

# **CIEA 2004**

**How to develop and implement an external demand-orientated  
Curriculum for agricultural vocational training  
The case of CODESSER – Chile**

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## **HOW TO DEVELOP AND IMPLEMENT AN EXTERNAL DEMAND-ORIENTED CURRICIULUM FOR AGRICULTURAL VOCATIONAL TRAINING : The case of Codesser-Chile.**

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### **Summary**

The knowledge society demands a paradigmatic change on the part of contemporary education, the central referent of which is the concept of permanent learning throughout our entire lifetime. This new approach is multidimensional. It constitutes an educational aim, content and method oriented at encouraging the autonomy and sustainability of individual learning as an instrument of personal, professional and social development during the life span of each individual.

Within this framework, the core of this presentation is to provide an answer to the question of how to organise the curriculum and educational practice in an agricultural education institution in order to obtain the competencies that possibilitate the social and labour integration of its graduates, together with providing them with the ability of permanent learning. With this intention in mind, we give a description of the practical procedures used by Codesser - a Chilean educational corporation – in terms of the innovation of its objectives, contents and curricular practice in order to better satisfy the development demands of our country. The description of the process includes the different stages of the design of the curriculum and the procedures applied to put it into practice. We describe the Dacum methodology used to establish the graduation profile of students, the techniques applied in the development of the study plan and programmes, the pedagogical model implemented and the competence assessment scheme designed to verify results. Finally we comment on the lessons learned to date, together with the difficulties faced in the materialisation of the change.

### **I. Introduction: Encouragement for educational change.**

#### **a. The Global Context.**

Contemporary society faces the challenge of projecting and adapting to a process of structural change that advances vertiginously towards the construction of a new paradigm “a new way of life”, that affects every corner of human activity. Its strength is based essentially on the development of three basic processes that are highly complex and long reaching: globalisation, information and technological progress.

Information plays a key role in this new emergent society, and for this reason, it has been called the knowledge society, an expression that defines a “performance” in which all human activity is linked to or has a claim to knowledge, with the latter becoming the central element and principal development tool of individual and collective progress.

In our times, the centrality of knowledge has given the human being the status of the agent that produces and socialises knowledge, and therefore becomes a basic and essential agent when it comes to giving shape and intensity to the changes that affect mankind and the dynamics of the economic, social, political and cultural processes generated by globalisation on the technical basis of the information process.

The knowledge society has two main features, first, the conversion of knowledge into a factor that is decisive for productive and social development, and second, the strengthening of individual and social learning processes as a means to ensure an acquisition of knowledge that is turned into useful results. For this reason, this new society has also been called the society of learning and information.

Information is both input and outcome, but knowledge is always a personal achievement resulting from learning and can only be achieved through education. In this way the paradigm of knowledge

society leads to a conclusion that is two-fold. In the first place, the wealth of nations resides in their people and their capacity to think and to create knowledge, so that the boundary of attainable development is conditioned by the level of development of this human capital. Then, the future of each country depends on education. For this reason, the issue of education has started to take on a first place in the public policies of the world, and has become an unavoidable strategic investment for the progress and welfare of nations.

The above changes have created a substantial mutation in the concept, structure and practice of education, a fact that leads to the modification of the educational paradigm, whose synergetic core is the concept of permanent education or learning throughout life. In this sense, there is a consensual agreement to define the term as any learning activity carried out in the course of a lifetime with the object of improving knowledge, competencies and aptitudes on the basis of a personal, civic, social or labour-related perspective. This concept breaks the traditional scheme of lineal and progressive formative and professional training that predominates in current educational programmes to give way to a sustained protagonism of individual learning, that is independent from the age or occupational status of the learner. It also includes learning processes that traditionally lie parallel to the school system, as is the case of those acquired in the workplace, in organisations or other social groups.

The concept of continuous learning is multifaceted. It proposes the time and space co-ordinates required for education to take place. On the one hand, it includes a principle of organisation that groups formal, non-formal and informal education into a single large network. At the same time it provides a conceptual framework that integrates four wide –ranging and complementary objectives of education: personal satisfaction, active citizenship, social integration, and employability and adaptability. It also proposes a substantial modification to educational practice. And finally, it represents a strategy for improving human development by means of investment in abilities and skills that allow for the creation of new knowledge. In this sense, it constitutes a pillar of social cohesion policies that aim at the promotion of active citizens with a complete participation in the social, political and economic life of their countries.

In short, the implementation of the approach of lifelong learning requires a review of education from its bases and in global, in other words, we need to design a new educational architecture that articulates and complements different didactic systems, spaces and shapes in terms of a concept of continuous learning that is related to action over an entire life.

b. Continuous education and employability.

Within the scenario of an knowledge-based economy, technical professional education systems face the demand for a training that enables companies to have qualified human resources and enables the work force to keep their jobs, and reinforce and develop their work capacity. In other words, demand is centred round training supported by the “knowledge, know-how and know how to learn” trilogy over the entire course of a worker’s active life, which is indissolubly related to labour and social insertion. This requires that individuals should develop their learning abilities in order to be able to take on jobs with flexibility; they should also undertake a permanent analysis of their personal potential, develop their initiative and autonomy in terms of professional performance and be able to face the mobility and mutations of the labour market. In short, all this is necessary to obtain a passport to employability and an adequate quality of life.

On its part, the productive sector sees education as the great pivot for economic development. Its demands imply a growing relationship between training and employment and between development and training. According to this viewpoint, the requirements point to a need to establish a continuous education in which initial training is but a first formal step that goes together with other kinds of training in a veritable spiral of training processes. This contributes to the gestation of a sustained learning capacity that is to be kept up throughout a person’s active life and that contributes to increase competitiveness in the workplace and to the development of constant personal growth.

c. Competencies and the technical professional training curriculum.

In the area of permanent education, the modality of technical-professional or vocational training has had to give evidence of a special permeability to educational innovation, given the need to respond to a training that is demand-oriented. In this context, the idea of competence has become extremely relevant as an organising parameter for the curriculum, and has become a fundamental methodological instrument, and a content and evaluation criterion.

The concept of competence incorporates the outcome of learning expressed in desirable performances. In other words, it has a practical feature and alludes to a real observable human capacity. It also includes the concepts of pertinence and effectiveness. Competence is an attribute related to a successful performance in real contexts.

There are many definitions of the term competence and it tends to be typified in accordance with three trends: labour qualification, set of personal attributes, and integration of both concepts into a single holistic concept. In this latter perspective, it is defined as "knowing how to do something by means of given attitudes in a given environment", Competence is related to an integrated combination of knowledge, abilities, skills and attitudes leading to an adequate and timely performance.

In general terms, and in accordance with the integrated approach, it is possible to establish three types of competencies: personal, basic or functional and professional or labour related. The former refer to a group of characteristics that are difficult to define because they contain an ethical value-related component, an emotional component and an individual talent component. The second include the capacities that people use to build their own learning, their working relationship with peers and with the environment, capacities related to methodological-labour aspects and all those capacities that contribute to a fluid, harmonic and efficient professional performance. The latter are the ones that constitute a guarantee of proper performance of professional tasks and responsibilities. The integration of these three types of competencies represents the critical factors for personal and professional success.

d. The Chilean context.

Education in Chile is undergoing a process of change. Its trends and characteristics show that: i) education occupies a preponderant place in the government agenda and constitutes a state-policy; ii) the formal educational system is undergoing a process of global reform that incorporates a set of basic competencies that are transversal objectives that affect the entire educational system within the framework of a lifelong learning approach; iii) the quality of education is being systematically assessed by means of national and international tests; iv) we can visualise an increasing awareness and focus on permanent education at the country level thanks to the Chile-Califica project aimed at the articulation of the different segments of formal and non-formal education; v) enormous efforts have been made to train human resources with public funding supported by the private sector; vi) the Government has established a long term horizon for improving quality of life, in an approach based on economic development and growth in an environment of social dialogue that aims at a society of knowledge.

The Chilean education reform has resulted in the fact that the secondary technical professional training scheme has ostensibly improved in terms of value and social legitimisation over the last few years, to such an extent that it currently contains 50% of secondary enrolment in the country. This is the training sector that also shows greater levels of educational innovations in terms of curricular renewal that goes together with a progressive equivalence of educational offer and social and labour demand. The tuning of formal technical education with productive demands has also encouraged the incorporation of a competence-based approach defined jointly with the productive sectors, and its approximation to an approach that is compatible with the concept of lifelong education.

e. The educational institution as the starting point of change.

The above force us to focus on schools, meeting place for teachers and students, and within it, we must focus on teaching, the cornerstone of learning and key point of every education reform. The challenges schools must face in the contemporary scenario are directly related to innovation regarding what is to be taught and how it should be taught, the key aspects that define curricular architecture. Paradoxically, one of the most evident weaknesses of the educational environment is the documentation of technical processes, or information relating to the procedures used to implement the curriculum, including the recording of success and failure. In view of this observation, the following presentation aims at becoming a contribution to overcome this weakness by providing an answer to the following core question: "How to develop and implement the secondary level agricultural vocational curriculum within the framework of an approach based on a permanent learning process? Or How to design and materialise the curriculum within this context?"

In an attempt to address this issue, the presentation is based on answers to the following specific questions:

- How to synchronize offer and demand for training or what procedures should be used to establish the competencies required by the agricultural sector with a view to increasing the employability of its graduates?
- How to transform demand into study plans and programmes?
- How to structure the curriculum or which pedagogical approach and schema should be used to make compatible educational offer with labour demand?
- How to assess competencies and what instruments should be used to collect data?

## **II. Curriculum design and implementation in the agricultural vocational environment: A case study.**

a. The context of innovation.

The experience presented corresponds to an ongoing effort of Codesser, an institution that currently administers 19 educational schools, 14 of which specialise in agricultural technical-professional training. Since 1999, the institution has been implementing a deep process of change which, in line with the ongoing educational reform, has its own specific characteristics owing to its strong links with the national production sector. The curricular design process was initiated a few years prior to its application.

c. Conceptual and operational considerations.

Secondary education in Chile is ruled by a curricular framework that regulates the temporal design and organisation of the study plan. This suggests its consolidation into two areas of learning, general and differentiated education, and a transversal axis that crosses the curriculum lengthwise and corresponds to the final aims of education. The basic common area refers to training in general disciplines and its objectives and contents are regulated by the Ministry of Education (Mineduc). It includes subjects like Mathematics, Language, Natural and Social Sciences, etc. which are generic and compulsory for all secondary students in the country. The differentiated vocational area focuses on professional training in accordance with study plans that can be proposed by the educational centres themselves or that can respond to the ministerial curriculum proposal. This differentiated area also includes a set of free hours that can be destined to the in depth study of technical subjects, in accordance with the requirements determined by each school. The core of these transversal objectives includes four central issues: i) personal growth and self-assurance; ii) development of knowledge; iii) ethical training and iv) the individual and his/her environment. The specific contents of these issues are flexible and can be chosen by each educational centre in accordance with its own institutional concerns. At the same time, technical-professional education

promotes the approach of a competence-based education that is firmly linked to the productive sector.

In the case of Codesser, we opted for the production of our own plans and programmes, making use of the freedom of teaching established by the national constitution. In order to do this, we defined the following conceptual guidelines:

- The curriculum is envisaged as a strategic and flexible instrument that provides unity to educational activities. It is a referent that establishes the general parameters of teaching activities, translated into teaching objectives and contents that are measured according to level, sequence and time. It also establishes the framework and pedagogical criteria that should orient teaching-learning processes and assessment.
- Competence was defined as the practical capacity that includes “knowledge, know-how, knowing how to be, knowing how to live and knowing how to learn”. It was also visualised as a complex set of cognitive, procedural and attitudinal capacities that allow for efficient performance in daily life and in the work context.
- The competence-based curriculum was defined as an organic and flexible educational structure oriented at the development of observable performances that articulate global and professional knowledge and labour experiences. It includes different learning spaces, methods and resources, which are mediated by teaching interaction, and aim to strengthen the ability to attain a long-term, transferable and self-regulated learning on the part of the student. The main features of this type of curriculum are: i) clear identification of labour competencies put together on a graduate profile; ii) pedagogical subjects and activities should focus on the attainment of a graduate profile; iii) the design of effective learning activities, in real contexts and related to the theoretical-practical field; iv) systematic and progressive assessment of the attainment of competencies; v) students’ access to learning materials and resources; vi) constant stimulus of learning capacity, problem solving, development of enterprising spirit and team work; viii) focus on the integral and integrated training of students in view of an action-related approach. A special feature of competence-based teaching is the fact that it is part of an external referent to adjust the educational offer to the existing labour and social demand. This approach provides a valid parameter to optimise curricular design inputs and to organise the teaching-learning process along the lines of a capacity-based construct that leads to competence.

c. Curricular design objectives, criteria and stages.

The educational modernisation undertaken by Codesser pursued the objective of increasing the match between educational offer and social and labour demand within the framework of the country’s development policies and a continuous learning approach. It started on the basis of three key questions: What to teach? How should it be taught? And how to assess learning and the quality of the educational process? The same questions that were the axis of the curriculum design process. Three main criteria marked the starting point of the process: pertinence of objectives regarding the requirements of the employer, centrality and active role of the student with regard to the learning process and feedback-based evaluation. It was decided to apply a curricular design based on competencies, a pedagogical model focused on learning and action, and on continuous improvement within the framework of institutional total quality management.

In this respect, the criterion applied was based on the fact that there are no unique or general answers, as they depend on each specific reality. We also bore in mind the fact that to a great extent change is based on the degree of teacher commitment and participation in innovation. For this reason, the process of curricular design was undertaken with the collaboration of the directors and teachers of the educational centres, with the co-ordination of the Academic Directorate of Codesser and the advice of external consultants.

The educational innovation addressed by Codesser included three major stages: the design of the new curriculum, which took approximately two years, the implementation, which is currently in its sixth year of application, and assessment, which has run parallel to each stage of the project.

The description of our experience is focused on the design stage, and tangentially touches the other two stages, in view of the fact that our purpose is to analyse the procedures and technical instruments used to establish graduation competencies, the way of materialising the profile in terms of study plans and programmes and the features of the teaching practices process, with the inclusion of assessing learning in terms of competencies.

### **III. Curricular design procedures.**

The competence-based curriculum design stage had three decisional nuclei: definition of the study plan model, pedagogical model and assessment model. The configuration of each nucleus included the following activities and procedures:

#### **a. Study plan model.**

The query regarding what to teach was associated to the establishment of two essential referents of the educational process: objectives and contents, organised in study plans and programmes. The process for reaching this result included a series of activities carried out with the participation of different actors and the application of diverse procedures.

##### **1. Definition of work competencies required by the productive sector as expressed in the graduate profile.**

In the case of Codesser, the issue was approached by an entire team and the entrepreneurial sector was also consulted. The procedure applied was an adaptation of DACUM, a speedy, effective and low cost occupational analysis method that establishes the qualification required by the employer. In this case, six groups of agricultural entrepreneurs, with 20 to 25 participants each (130 in all throughout the country), were consulted. Consultation sessions lasted for approximately four hours each and were organised in accordance with the technical prescription established by the method and were directed by two experts. The teaching staff of the host educational institution attended each session as observers.

Each session was divided into three parts. The first defined the work field of the secondary level agricultural technicians. The idea behind this activity was to establish a clear boundary regarding the activities or functions of the agricultural technician, which differentiates him /her from other professionals of the area, such as agronomic engineers, agronomic technicians etc. and thus to derive the competencies required by each function. From a methodological point of view, the definition of the labour field was carried out on the basis of a written suggestion that was analysed and discussed by each entrepreneurial group until a consensus was reached. We should like to point out that the definition of the agricultural technician's work field resulting from first Dacum was submitted to the second group and that this was continued successively. There were practically no comments up to third application.

The second part of the session was oriented at identifying the competencies that this professional must have in order to carry out his /her functions and that are required by the employer who will hire him/her. In his sense, it is important to point out that in order to increase communication between entrepreneurs and professional researchers, the term competence was used as a synonym of task, performance and operation. The generating question was: What is the know how or qualification expected from a graduate in order that he/she obtains work in your company? Brainstorming was used as a medium. Replies had to be given in writing, and on special flashcards, with preliminary instructions regarding the way in which the expected competencies should be drafted. This process was iterative, as it envisaged the description of a single competence The

methodology allowed for a speedy and expedite placing of the flashcards on the walls, so that the entire group could have a vision of the questions asked and thus reach a final answer to the issue. Similarly, this facilitated the mobility, grouping and ordering of competencies in accordance with different criteria. The outcome of this exercise was to show that the demands of the employer aimed at three types of competencies; personal, functional and work-related. This gave evidence of the importance that entrepreneurs give to the development of individual and ethical-valoric attributes in the student, in addition to his/her basic functional abilities. Furthermore, it explicitly clarified the fact that the development of work competencies is important, but that the development of the former features is essential.

The third part was aimed at a joint classification of competencies according to the above teaching environments.

The final product of the application of various Dacum was: the definition of the occupational field of the agricultural graduate, his/her graduation profile in terms of personal, functional and work-related competencies.

## 2. Definition of the curricular matrix or Dacum chart.

The curricular matrix is a technical instrument that contains an itemisation of work competencies in the areas of basic work or occupation that define the functions of the agricultural technician, and the sub-competencies or specific operations related to each occupation. The procedure used to construct the curricular matrix or Dacum chart was an adaptation of the functional analysis method.

The teaching staff of the professional area took part in this exercise, participants included a group of engineers and agricultural technicians with a vast productive experience, belonging to the educational schools in which the Dacum was applied. They had received previous training on the use of the functional analysis method. In this case the key question was "Which functional or occupation areas are derived from the graduate profile and which are the performances or operations demanded from each occupation? In order to answer this, each group met in their respective locations for various work sessions.

The six resulting Dacum matrices were later analysed by the Academic Directorate and were used to produce a definite curricular matrix that provided a common study plan for the agricultural education provided by Codesser.

## 2. Definition of the study plan.

The study plan is the document that establishes the general structure of the curricular grid and the grouping, diversity, level, chronological sequence and time given to each subject. The definition of the structure of the plan and of the basic-common plan was taken over by the Academic Directorate, taking into account the technical curricular criteria established by the Chilean Ministry of Education. The definition of the professional area of the plan was left in the hands of the directors of the different educational establishments of the Corporation, 14 in all; the group consisted of 12 agronomic engineers and two veterinarians.

The procedure applied was a two-day workshop attended by two experts in curriculum. The workshop was divided into two activities. The first was aimed at determining the learning sectors or general technical subjects that were to make up the professional area of the study plan, based on the curricular matrix. Similarly, the regional optional subjects were established. In this sense, it is necessary to point out that, given Chile's geographic diversity, its regions have different productive agricultural vocations, a fact that was made evident in the Dacum chart. An example of this is the production of fruit, vegetables and flowers in the central zone, as opposed to livestock production in the south. This set of regional demands originated a set of subjects that are selected by each educational unit in accordance with local realities and demands. This complements the differentiated plan and made use of free time.

Once the selection of subjects had been completed, the next step was to propose the basic contents of general and regional professional subjects.

The outcome of this workshop was the definition of the general and regional subjects to be included in the professional study plan and its basic contents.

#### 4. Production of subject programmes.

This activity was in the hands of a group of teachers (25 in all), selected from the different educational centres according to their area of expertise, which is based on subjects taught in accordance with those established in the general and regional professional study plan.

The procedure used was a one week seminar, directed by two experts in instructional design. For these effects, a general programme structure designed by the Academic Directorate was proposed. Its basic components were: i) fundamental objectives, expressed in competencies (work operations and tasks) and abilities to be developed by the student throughout the programme; ii) transversal objectives expressed in personal and functional competencies; iii) general contents; iv) breakdown of programme into content-units, definition of objectives according to programmatic units, broken down into; cognitive (knowledge), procedural (intellectual abilities and motors skills) and attitudinal, and activities suggested for each unit; v) suggested bibliography.

Each programme was designed by a group of three specialists, who chose their subjects according to their specific skills and interests. The process was carried out according to a daily schedule after which the entire group reviewed the programmes designed. The work scheme enabled the timely completion of the work.

The result of this workshop was the design of the totality of the technical programmes, which were reviewed by the Academic Directorate before being sent to the Ministry of Education for approval.

#### b. Pedagogical model.

The competence-based training requirements led to innovations in pedagogical practice. This following query arose: How to teach in order to ensure the attainment of the graduate profile?. Once again, the answer was left in the hands of a team, making use of the entrance of a new Codesser school, whose diagnosis detected an urgent need to modify its pedagogical model.

The starting point was the existence of a wish to change and a sense of creativity on the part of the teachers, who wanted to improve teaching in order to satisfy new needs and aspirations. The subject was then in the hands of the teachers who, guided by their managers, took on the challenge of proposing a didactic scheme based on three main criteria; centrality, active role and responsibility of the student in learning. The procedure used was knowledge management supported by experts. At the same time, it was agreed to carry out a pilot experience to determine its pros and cons.

The pedagogical model proposed has the following characteristics:

- Learning is understood as a process in which new knowledge is built, new abilities and skills are developed, together with values and attitudes that are acquired through educational experiences that tend to produce permanent change in a person's way of life and attitude. Learning leads to increasing levels of personal competence and implies personal effort, work and commitment.
- It encourages progressive and increasing attainment of self-learning skills, self-discipline, self-control, self-evaluation and professional competence.

- It encourages the fact that the teaching of professional competencies is carried out in real contexts and that the student has the opportunity to observe good models and has sufficient practice opportunities, in addition to having the possibility of progressively taking over professional responsibilities that enable him/her to attain a competent technical expertise.
- Both students and teachers are encouraged to maintain a permanent attitude leading to learning and effective interaction in order to contribute to personal progress.
- Individual learning features, interests and rhythms are respected in the measure that they lead to the implementation of differentiated learning sequences.
- The student is responsible for his/her training. He/she is visualised as an itinerant educational agent in search of both knowledge and continuous personal improvement.
- The student is exposed to and has a variety of learning resources for his/her individual and group learning.
- The teacher plays the role of mediator in the learning process. His/her principal function is to teach how to learn, devoting a large part of his/her time to motivate the student, orient him/her towards sources of knowledge, the improvement of information processing capacities and the strengthening of metacognition strategies that enhance the autonomy and valuation of the learning process.
- The role of the teacher is associated to that of an academic guide responsible for the planning, facilitation and assessment of the learning experiences.
- Assessment is an integral part of the pedagogical management situation focused on the regulation of teaching and learning. The students take active and constant part in the self and heteroevaluation instances.

The practical activation of the pedagogical model required the following organisational, administrative and operational adjustments of the educational organisation:

- Curricular spaces: The use of the school and farm infrastructure was redesigned in order to provide the student with different study premises such as; i) The farm became the main classroom in which competencies were developed in real contexts; ii) classes were distributed according to subject and assigned to the teacher; iii) the library was organised as a resource centre, where the student has a variety of reference and study material, together with adequate spaces in which to work; iv) the science laboratories were turned into theme halls and scientific experiment premises; v) computer labs were available during the entire school period; vi) the farm site became a place for practical learning; vii) on-farm classrooms were designed and built in the very core of the productive centre; viii) new sports facilities were remodelled, as was the case with recreational centres and halls for social activities.
- Pedagogical context: The changes in this area were: i) concentrating each subject into time-table blocks; ii) recesses were distributed according to student needs; iii) students were allowed free circulation through the different curricular spaces in order to give them the chance to be itinerant in their search for knowledge.
- Farm practice: The innovations in this area were: i) formal introduction of Vocational Experience and Farming Activity subjects into the study plan, in order to promote the development of competencies and work responsibility in the student; ii) student development on the farm itself, where he/she has an active participation in the productive process in conditions similar to those existing in the real labour context; iii) as farms operate as productive units, or agricultural companies, it was decided to carry out the farm management process together with the

students under the supervision of professional practice teachers and in agreement with the farm management plan; iv) gradual sequencing when it comes to taking over productive responsibilities. This scheme enables the active and progressive development of labour competencies according to levels of complexity and responsibility. The student begins carrying out routine farming activities and then goes on to more specific tasks that culminate in the farming administration skills that he/she takes over for a week before finishing school; v) a final professional practice that is carried out outside the school centre, in which it is possible to verify the level of development that the student has reached in terms of technical, functional and personal competencies.

- Didactic focus: The use of the following was incorporated: i) eminently active methodological strategies; action learning, learning by action and production; centred on the permanent participation of students and on the encouragement of responsibility in the learning process; ii) an applied and global vision of knowledge; iii) methods focused on the learning of processes such as problem solving, information search and processing, evaluation, creativity, decision-making etc. (e.g. case studies and projects); iv) metacognition strategies oriented at the gaining of knowledge by means of maps and conceptual sketches, summaries and synthesis of ideas, comprehensive learning, reports, etc; v) group and team work techniques, and vi) student monitors that support the learning processes of their peers.
- Teaching style: Teaching activities were organised on the basis of the following criteria; i) accountability with academic results; ii) establishment of a relationship between different subjects; iii) team teaching and team work; iv) formal time-tabling for a joint evaluation and planning of didactic experiences; v) full time availability at the centre; vi) the Corporation and the centre itself offer self-training and continuous training opportunities.
- Academic support programmes; These were integrated in order to: i) strengthen basic language and mathematical competencies; ii) solve and replace the learning deficiencies detected in students starting the first year of the programme. In this sense, it should be pointed out that its design and implementation was the result of a joint effort of the teachers of both subjects, of the directive teams of different educational establishments and of the Academic Directorate of the Corporation.

#### c. Assessment model.

The curriculum design stage also implied the definition of a model for assessing learning that was compatible with the training based on competencies. The guiding question was: How to verify the attainment of competencies? Once again, the search for an answer involved the entire group and the active participation of the teachers.

The proposed model considers assessment as a process that is integral and integrated to the entire educational context, and is an activity of formal research that has the aim of evaluating the achievements or results of the learning process (knowledge, skills, abilities, and attitudes) attained by the students, on the basis of which teaching decisions should be sustained. It is based on the student and its function is to support the achievement of the different competencies proposed in the study plan.

#### General characteristics of assessing learning.

- Learning content: is conceived as a transversal theme of the study plan that is education-oriented. It supports the achievement of the capacities of academic autonomy and self-control. With this intention in mind, teachers teach their students to assess by means of a previous display of assessment criteria and encourage an active participation in the process by means of self and heteroevaluation.

- Bi-dimensional focus: It fulfils two important functions: formatrix and formative. The former is destined to facilitate the self regulation of learning and the second to regulate teaching.
- Integral and integrated: Includes the totality of learning environments and is present in the entire educational process.
- Flexible: Considers the use of a wide range of assessment procedures, instruments and situations according to the nature of the teaching processes assessed.
- Collaborative: It is a shared responsibility and the entire teaching staff takes part in it, giving their individual results to the integral assessment of each student.

Assessment of competencies.

The assessment model incorporates the formal evaluation of competencies for a progressive verification of the attainment of the skills established in the graduate profile. For each school level, we have established a set of competencies that are assessed annually in every one of the students in the system. This process is carried out by means of checklists constructed by the teaching teams. These instruments are structured observation guidelines that enable the recording of the steps of a process or procedure or the recording of the characteristics of a product.

Competence assessment contains a series of benefits. From the point of view of the learning process, it is useful because it enables objective measurement, it orientates and helps learning and facilitates self and heteroevaluation. In the view of the teaching context, it contributes to standardise technical performance criteria, and thus organises and systematises teaching. From the point of view of the Corporation, the elaboration of these instruments has increased institutional knowledge and has constituted a valuable critical mass of teachers.

#### **IV. Lessons learnt.**

The experience of the curricular design described brought on a series of positive learning experiences such as:

- It ratified various premises of all effective change: i) the notion that successful innovations are contingent, in other words that they depend on the specific circumstances of the educational institution; ii) all improvement in the learning process depends on the joint work of the entire establishment; iii) change is a problem solving process that requires the professional knowledge of all the teachers involved; iv) from the very start it must involve the co-operative effort of the teaching staff and must be generated from within the educational institution; v) it requires a direction that is mediating in nature rather than impositive, so that it allows for the emergence of the knowledge accumulated by the teaching staff in a relationship of complete equality; vi) to innovate is to build, within a context of community deliberation and decision; vii) to innovate is to learn and unlearn together, and in this sense is a very effective form of pedagogical training; viii) it is sustained on the management of knowledge; ix) it requires the deep conviction that change is beneficial on the part of the teachers, and x) it demands constant perseverance and stimulus.
- The errors or mistakes made were principally procedural in nature, such as: i) the adoption of procedures without a previous analysis of their application context. An example of this was the use of the Datum method, whose initial application was followed with strict adherence to the technical prescriptions established. Nonetheless, in practice, it quickly became necessary to implement changes in the way the programme was applied so as to adequate it to an entrepreneurial audience that was extremely different from the experts envisaged by the method. The same mistake was made in terms of functional analyses procedures, which should also have been rectified and adapted to institutional requirements; ii) it was necessary to

reduce the speed of change. It was initially believed that the work rhythm could be established externally, but reality showed that the initial assimilation of change on the part of a teaching body takes time and it is necessary to respect this period of maturation, because it involves an investment in commitment to change, and iii) staff training was initially projected as a generic instrumental resource, in other words, that it would be the same for all. Practice showed that in order to support change, training must be specific and centred round the needs of each educational centre.

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