

# An International Project to Improve Engineering Education Quality

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**Abstract**—This paper describes an international project grouping over 50 universities aiming at increasing the attractiveness of Electrical and Information engineering studies, and trying to build up common crediting schemes in line with the European ECTS system. The project puts a strong emphasis in pedagogical practice, purpose of the syllabus and transformation of curricular structure.

**Keywords**—: *Innovation in teaching, Competences;crediting systems*

## I. INTRODUCTION

This paper presents the INNOVA-CESAL project, an ALFA III project financed by the European Commission, grouping more than 50 universities from all the countries in Latin America and 3 universities from Europe.

The main objectives of the INNOVA-CESAL project are the development and experimentation of several strategies for the innovation of higher education in Latin America, with an emphasis in pedagogical practice, purpose of the syllabus and transformation of curricular structure, in cooperation with European universities. The name of the project reflects the interests of the consortium to be recognized as centers where teaching praxis is closely related to innovation and research.

## II. RATIONALE AND BACKGROUND OF THE PROJECT

Several studies have demonstrated that the level of development of a country depends on the education level of its population and the degree of development of research activities in connection with the country's needs. An important parameter in this process is the adequate transfer and exploitation of these research results to the society.

Latin America has in general a very low level of doctoral students and also a low scientific and technical production with little, if any, relation to the economy and industry of the country. There is an urgent need to reform the teaching/learning process in order to improve the acquisition of specific skills and increase motivation, that will ultimately lead to an increase in the number of students completing their degree and contribute to the implementation of life long learning as a requisite for professional excellence.

One of the possible ways of improving the situation is to change the existing teaching learning methodologies in higher education in order to establish links between industry and the university, with a adequate transfer of competences acquired, to specific problems, contribution to a knowledge based society and stressing the need of investment in life long learning initiatives to promote a constant update of knowledge. An important tool for this process of change is ICTs (Information and Communication Technologies).

New forms of practice must be devised to prepare students to compete in an open market where information and communication technologies are key features.

The association of teachers and researchers in wide networks where exchange of practices and information can take place is an essential step towards better teaching praxis and to curricula harmonization.

## III. DESCRIPTION OF THE PROJECT

The Innova-Cesal project is an ALFA III project funded by the European Commission, coordinated by the University of Veracruz, Mexico, together with seven higher education institutions from Latin America and Europe.

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The aims of this new project, which has been developed since 2009 and will end in September 2011, are:

- Implementation of teaching strategies, based on the development of critical reasoning and development of competences in the professional education which

will respond to the interests of the students in different situations.

- Combining different learning scenarios: presential lectures, semi-presential courses and distant learning courses supported by ICTs.
- Include the results of research both at a scientific or educational level, in the teaching process.
- To design evaluation proposals with a student centered approach.
- Use these experiments as a basis for the design of new courses for the formation of teachers and researchers.
- To design institutional and inter-institutional programs, with a typical duration of 1 or two years, for the updating of university lecturers. This can be accredited as diplomas or masters.

The direct beneficiaries of the activities of the project are the academics who have participated in the development and testing of these courses. These in turn will act as leaders in the innovation process in their home institutions and also in other institutions through networks of researchers.

The end users of these courses, which can be delivered either in the presential type or in virtual classes, are the students from several higher education institutions.

The consortium is composed by institutions from Latin America and from Europe with different roles.

The managing team is composed by representatives from the following institutions:

- University of Veracruz, México
- Universidad Nacional de Cuyo, Argentina
- Universidad de Costa Rica, Costa Rica
- University of London, U:K
- University Pais XII, France
- Industrial university of Santander, Colombia
- Instituto Superior técnico-UTL, Lisbon, Portugal

The remaining countries in Central and South America have at least one university as partner in the project. The universities involved are listed below:

- University of Colima, México
- University of Guadalajara, México
- Universidad Autónoma de Nayarit, México
- Universidad Nacional de Cuyo. Argentina
- Universidad Nacional de Córdoba, Argentina
- Universidad Nacional de la Plata, Argentina
- Universidad de Costa Rica, Costa Rica
- Universidad Industrial de Santander, Colombia
- Universidad del Rosario, Colombia
- University of Valparaíso, Chile
- UA de Chiriqui, Panama
- UAP, loja, Ecuador,

- UA de Tamaulipas, Mexico,
- UA de Yucatán, Mexico
- UA Juarez de Tabasco, Mexico
- Un de Campeche, Mexico
- Ua de Chihuahua, Mexico
- PUC Rio Grande do Sul, Brasil
- UT de Oruro, Bolivia
- CESA, Colombia
- Universidad del Norte, Colombia

Besides these higher Education institutions, two other partners are involved which have a vast experience in quality assurance and competitiveness:

- Instituto Mexicano para la Competitividad, (IMCO) Mexico
- ACET (Aseguramiento de la Calidad en la Educacion y en el Trabajo), Mexico

Figure 1 shows the geographical distribution of the project's consortium.



Figure 1. The INNOVA-CESAL consortium

The expected outcomes of the Project are:

- Systematic development of pedagogical strategies and design of new curricula which can be either tested or introduced as new courses in the participating institutions.
- Development of handbooks and other supporting material for the classes.
- Development of joint programmes for formation of teachers.

This project, follows a successful initiative, the 6x4 UEALC project (2006-2008), also financed by the ALFA programme, which grouped six professional activities and

promoted research in education based on four axis of analysis. The project grouped 150 participants from 60 universities of 13 different countries from Latin America and Europe.

The main outcomes of the 6x4 UEALC project were:

- a proposal of common reference points for professional competencies
- Establishment of evaluation and accreditation criteria.
- Guidelines for the establishment of a crediting system

The results of this project can be found in [www.6x4uealc.org](http://www.6x4uealc.org), and constitute a major contribution to the building of professional networks, which are the corner stone of the community of higher education in Latin America (CESAL). The successful outcomes of the 6x4 UEALC project are the rationale and background of the INNOVA-CESAL project.

#### IV. PROJECT'S ACTIVITIES

During the lifetime of the project, several activities are previewed with an interim period for the implementation of the strategies developed in the previous meeting and evaluation of results.

Two meetings per year are organized grouping all the members of the consortium and associated partners. Each meeting includes conferences by invited speakers who are experts in the area, and work in smaller groups by special fields with reports and presentation of results. The coordinating Committee will summaries and publish the results obtained at the end of each meeting.

There are four meetings previewed: the first one took place I September 2009 in Mendoza, Argentina. The objective for this meeting was to present the present teaching/learning scenario in the partner institutions, and develop teaching strategies for the development of competencies and critical reasoning for the following semester. The interim semester functions as a laboratory where the strategies proposed in the meeting are applied and will be reported and evaluated in the next meeting.

The second meeting took place in Lisbon, Portugal in March 2010. The objective of this meeting was to discuss how to introduce research methodology, activities and results in the teaching process at the master level, and devise strategies for inclusion of innovation and entrepreneurship.

The 3<sup>rd</sup> meeting was held in Bucaramanga, Colombia, with the objective of designing proposals for the evaluation of teaching strategies, based on a student-centered approach. The results of this experience will be the departing point to design a program for teachers/ researchers upgrade.

The final meeting will be held in San Jose, Costa Rica in March 2011. The purpose of this meeting is to build institutional and inter-institutional programs for the upgrade of university lecturers, which can be accredited as Bachelor or Master Courses according to its time scale (1 year for bachelors, 2 years for master studies).

The results of the project are available at the project's webpage: [www.innova-cesal.org](http://www.innova-cesal.org)

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