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The State of Engineering Program Accreditation and Quality Assurance in Latin America

Abstract
Engineering program accreditation and international recognition of its accrediting body is critical to degree recognition, to facilitate credentialing of the graduates of the program, and to permit mobility of the engineer. This paper looks at the countries in Latin America and the state of Engineering program accreditation in their region.

Introduction

Accreditation systems are the materialization of quality doctrines and criteria both for programs and university institutions. Appraisal methodologies and quality measurement of engineering teaching and education were created in USA and Europe some decades ago. During the 90s some Latin American countries created appropriated legal environments that in turn gave origin to what nowadays we understand as a quality culture, which included its interpretations as auto-evaluation for continuous improvement and quality assurance, also referred as accreditation processes. Accreditation is a form of auto-regulation and it is an essential mechanism to sustain a responsible professional practice. Accreditation may be understood as a service for students, professors, institutions, education authorities, professional associations, fellowships, employers, and for society in general. Auto-evaluation is the fundamental essence in the system.

The Asociación Iberoamericana de Instituciones de Enseñanza de la Ingeniería (ASIBEI – in English: Iberoamerican Association of Engineering Education Institutions) published a book on the state of accreditation of the Iberoamerican Engineer in 2003[1]. International recognition of the engineering degree and mobility has grown in importance, and an international register for professional engineers has emerged[2]. Although no Engineering accrediting agency in Latin America has signed the Washington Accord, some have signed agreements with signatories, and some engineering institutions have sought substantial equivalence by undergoing evaluation by internationally recognized accrediting agencies. The rapid changes occurring in the region warrant an update to the state of Engineering program accreditation in the region.

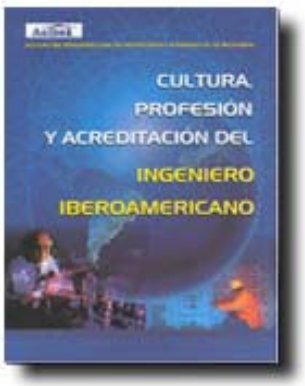

Figure 1. ASIBEI publication: *Culture, Profession and Accreditation of the Iberoamerican Engineer*

The next sections summarize some accreditation systems external to Latin America.

Accreditation Systems outside of Latin America

United States of America

- There are many of such systems in the US since 1933.
- ABET, Accreditation Board for Engineering and Technology, is the most known and its services are offered in other countries. It is recognized by the US Education Department, and by the COPA, Council of Post-secondary Accreditation.
- ABET is a collegiate organization of private nature, where experienced academics participate together with professional associations.
- ABET grants the accreditation of a program for an specific period of time; this sort of information is published annually.
- ABET system identifies the fulfillment of minimum requirements and develops specific criteria to different engineering fields.
- ABET is supervised by the US Accreditation Council. With the accreditation granted it is possible to apply for special federal funds.

Spain

- Under traditional guidelines issued by the Plan Experimental de Evaluacion -PEE- and the Proyecto Piloto Europeo de Evaluación de la Enseñanza -PPEEE-, academic programs in Spain and other European countries were evaluated.
- The above mentioned experience allowed the Science and Education Ministry to formulate the National Plan for Quality Evaluation in Universities -PNECU-, applied between 1995 and 2000.
- All universities concurred at the PNECU, although simultaneously appeared autonomic agencies of evaluation.
- The LOU, Ley Orgánica Universitaria, formulated the 2nd Plan of Institutional Quality in 2001 and in parallel the ANECA, Agencia Nacional de Evaluación de la Calidad y Acreditación, was established in the middle of 2002. It credits in the five big areas of knowledge.
- The PCU imposed to the autonomous regions the “Proyecto Plurianual de Calidad” referred to managements of education and research.
- Evaluation Agencies exist in Madrid, Valencia, Galicia and Canarias.

Accreditation Systems in Latin America

Here we organize by country information of Latin American accreditation systems

Mexico

- ANFEI: Members of the Asociación Nacional de Facultades y Escuelas de Ingeniería signed the Declaration of Cholula in 1993 which gave birth to a Mexican accreditation system.
- CACEI: The Consejo de Acreditación de la Enseñanza de la Ingeniería was conformed in 1994 as a collegiate civil organization with legal representation.
- Accreditation is voluntary and periodic; it uses auto-evaluation and an external peers evaluation; its costs are assumed by the institutions.
- Accreditation has an integral character since It evaluates resources, processes and results.
- Accreditation is granted when minimum standards are achieved.
- There are 319 engineering programs accredited out of a total of 1.000 offered. Also there are 4 programs re-accredited as of September 2006.

Central America

- Since 1948 was created the CSUCA: Consejo Superior Universitario Centroamericano.
- In 1998 it was conformed the SICEVAES: Sistema Centroamericano de Evaluación y Acreditación de la Educación Superior.
- In 2002 CSUCA gave raise to the CCA: Consejo Centroamericano de Acreditación de la Educación Superior.
- Jointly Between the Red de Instituciones de Ingeniería Centroamericana REDICA and the CSUCA, with IDB support, structured the Sub-Sistema de Acreditación de la Enseñanza de la Ingeniería.
- This system is being developed and it uses a minimum group of indexes, and it pursues to keep consensus among engineering faculties and professional organizations.

Colombia

- Law No. 30 of 1992 related to education, made the institutionalization of the Sistema Nacional de Acreditación or SNA.

- Formally in 1995 it was established the CNA, Consejo Nacional de Acreditación, institution that organized the accreditation process for undergraduate programs, based mainly on the experiences of:

- "Group of 10 Colombian Universities", 1994
    - SAAPI, Sistema para la Acreditación y Asesoría de Programas de Ingeniería de ACOFI, 1992-1995
    - SECAI, Sistema para la Evaluación de la Calidad de la Enseñanza en Ingeniería, fundeb by the Columbus Project of the European Union, 1994
    - ABET of the USA.
    - Evolution of the accreditation system in Mexico.

- "High quality" accreditation is voluntary and temporal; it is different from of the "previews accreditation" which is mandatory and it look for the fulfillment of minimum basic standards.

- The CNA has guaranteed accreditation of high quality to 142 engineering programs out of 900 that current exist. The system has guaranteed accreditation to 464 programs of which 26% belong to engineering.

- CNA policies determine that after the high quality accreditation for different areas is obtained, then such an institution may apply for institutional accreditation.

- As a result of programs accreditation, the CNA has created other sub-systems which have most importance:

    - ECAES: Exam for students who are close to being graduated.
    - Observatorio del Mercado Laboral -MEN- (Ministerio de Educación Nacional).
    - Cycle Examination for testing the quality in basic training in engineering, at the moment in experimentation by ACOFI.

- In addition, the structure of Ministry of Education has been reorganized, by creating the Vice-Ministerio para la Educacion Superior (Vice-Ministry for Higher Education), and the CONACES: Comision Nacional para el Aseguramiento de la Calidad de la Educacion Superior. This last instance operated under with 7 knowledge areas that approve new undergraduate programs and decide on the accreditation of post graduated programs.

Argentina

- In 1993 was integrated the CONEAU, Comisión de Evaluación y Acreditación Universitaria, as a consequence of university autonomy.

- The Ley de Educación Superior indicated the need for accreditation of careers whose practice had to be regulated by the government.

- In 1995 was conformed the CAP, Comisión de Acreditación de Postgrados.

- The initial call was first voluntary and then mandatory since 1999.

- In the CONEAU participate the CONFEDI, Consejo Federal de Decanos de Ingeniería (Miembro ASIBEI); the CU, Consejo de Universidades; and the CIN, Consejo Inter-universitario Nacional.

- The Accreditation System was reformed in 2001. Careers accreditation require previous approval of quality standards given by the Ministerio de Educación.

- Accreditation is granted for periods of 6 to 3 to 6 years and its results are made public**.**

Bolivia

- The University system is managed by the CEUB, Comité Ejecutivo de la Universidad Boliviana.

- There are two accreditation systems:

- SNEA, Sistema Nacional de Evaluación y Acreditación de la Universidad Boliviana; used for public universities.

- CONAES, Consejo Nacional de Acreditación de la Educación, which is a total autonomous system used to both private and public institutions.

- The SNEA is shaped with various entities, namely the CCA, Comité Central de Acreditación; and the CNEA, Comisión Nacional de Evaluación y Acreditación.

- The CCA has structured a section for engineering programs.

- Accreditation is a systematic and voluntary process and it is granted for 6 years in a given program.

Brasil

- The PAIUB, Programa de Evaluación Institucional de las Universidades Brasileras, was established in 1993 for both public and private institutions. 90% of universities adopted this process.

- Apparently, the PAIUB which is a program controlled by the SESU, Secretaría de Educación Superior, in turn as a part of the MEC, Ministerio de Educación, is no longer supporting this process.

- In 1996 the MEC established the ENC, Examen Nacional de Cursos (Programs). The institutions with low scores resulting during two successive years are subject to

desaccreditation by the MEC. Also It was implemented the institutional evaluation by means of the INEP, Instituto Nacional de Estudios en Educación.

- Nevertheless, previously in 1980 It was conformed the CAPES to evaluate post graduated programs.

- A number of 350 engineering post graduated programs (MSc and PhD) have been accredited given their high level of excellence.

Chile

- In 1990 Chilenean Law ordered that all private institutions must be submitted to accreditation processes, and in order to manage such system it was created the CSE, Consejo Superior de Educacion. It has had impact and social recognition, between public and autonomous establishments.

- In 1998 was developed the CNAP, Comision Nacional de Acreditacion de Pregrado.

- In the year 2000 the CONDEFI, Consejo de Decanos de Facultades de Ingeniería (ASIBEI member) proposed to the CNAP the assembling of the National Council of Accreditation for Engineering and Technology Careers.

- The process is voluntary, cyclical, based on auto-evaluation, centered on careers offered by autonomous institutions of higher education, and conceived to the assurance of a minimum quality level.

- They handle the qualification of a particular item with the use of the word “obligatory” (mandatory), in contrast with the word ”suggestion” (may be recommendable).

- Accreditation accepted are for 5 and 7 years periods, although may it be possible to grant a temporary accreditation for 2 years.

Ecuador

- The CONESUP, Consejo Nacional de Educacion Superior created, under the law passed in the year 2000, the SEAU: Sistema de Evaluación y Acreditación Universitaria.

- The SEAU is directed by the CNAA, Consejo Nacional de Evaluación y Acreditación, organism independent from the CONESUP but given the responsibility to coordinate their relations.

- The incorporation in this system is obligatory for all the university structure.

- Every institution fulfills the auto-evaluation process, and the final report is sent to the CONESUP and the CNAA.

Perú

- The CNE, Consejo Nacional de Educacion, which dates from 1998, redefined the quality criteria of the service of higher education, when it was supervised in all universities by a team of professionals, to produce a "ranking", using just a National Test for all careers.

- In 1969 when the Consejo Inter-universitario -CIU- expired, It was replaced with the CONUP, Consejo de la Universidad Peruana.

- The University Law of 1995 raised the accreditation system to the level of law.

- The CONUP then gave life to the current National Assembly of Rectors, ANR, that in turn arranged the constitution of the CNRA, Consejo Nacional de Rectores para la Acreditacion, in the year 2002.

- The ANR integrated into the RIACES network, Red Iberoamericana para la Acreditación de la Calidad de la Educación Superior, in 2003.

- With the support of the CEAB, Canadian Engineering Accreditation Board, the ANR began the accreditation of Civil Engineering Programs in 1996.

- The IEEE Peruvian chapter, Institute of Electrical and Electronic Engineers, associated with ABET, Accreditation Board for Engineering and Technology, founded in 2003 the ABET – Perú Agency.

Venezuela

- The OPSU, Oficina de Planificación del Sector Universitario, initiated institutional evaluations for undergraduate programs since 1986.

- Under norms of the new Constitution of 1991 and with the support of AVERU, Asociación Venezolana de Rectores Universitarios, the approval of a new Law of Education was achieved in 2001.

- The CNU, Consejo Nacional de Universidades, started the “Alma mater “ project for improving quality and equity in the Venezuelan university educational system.

- “Alma mater“ structured the SEA, Sistema de Evaluacion y Acreditación in 2002, to which the CAN, Comisión Nacional de Acreditación, was assigned.

- The SEA with the support of the NDFI, Núcleo de Decanos de Facultades de Ingenieria, designed and validated practices for accreditation processes in 2002.

- The evaluation is mandatory, and the accreditation, which is voluntary, has a validity of 5 years.

- Decisions on accreditation are not open to appeal. The accredited programs are publicly announced.

Brazil, Uruguay Paraguay and Argentina - MERCOSUR

- In 1998 the Education Ministers of Brazil, Uruguay, Paraguay and Argentina, as member countries of MERCOSUR, and with participation of Chile and Bolivia as associates, signed a Memorandum of Understanding to implement an experimental mechanism of careers accreditation aimed to mutual recognition of titles.

- There were created Advisory Commissions, and also the GTEAE, Grupo de Trabajo de Especialista en Evaluación y Acreditación.

- It considered desirable that careers or programs should become first accredited in each country.

- The accreditation process does not cover Faculties or Institutions.

- The Accreditation does not imply the free professional exercise in those countries.

- The accreditation operates observing legislation of every country, and respecting the university autonomy; it is voluntary and periodic.

- For engineering this process began to apply in 2003.

RIACES

- It was constituted officially in May 2003.

- It is a non-profit network and it is independent from any state.

- Basic goal: Cooperation and exchange of evaluation and accreditation material produced to test and measure quality of higher education.

- Member countries: Spain, México, El Salvador, Nicaragua, Costa Rica, Panamá, Cuba, Dominican Republic, Colombia, Venezuela, Ecuador, Perú, Bolivia, Brasil Paraguay, Uruguay, Argentina and Chile.

- Associate Members:
  - CSUCA, Consejo Superior Universitario Centroamericano.
  - CCA, Consejo Centroamericano de Acreditacion.
  - CUIB, Consejo Universitario Iberoamericano.
  - IESALC, Instituto Internacional para Educacion Superior en America Latina y el Caribe.
  - OEI, Organizacion de Estados Interamericanos.

Some Observations

Governments must develop more specific actions needed to measure and validate quality systems. Quality systems may become discriminatory when there are incentives immersed. Always peers will have criteria disparity among them, depending of their own experience. The concept of university autonomy acquires different connotations in public and private institutions.

The accreditation should be more demanding for post graduate programs. Other societies focus their efforts in sensible improvement of high school quality. The preservation and transparence of an accreditation system resides, to a certain extent, in the internal and external independence that can be conquered.

There is a certain degree of apprehension regarding local or regional accreditation systems. The crucial question remains: In a program, the external quality measurement process, manages to affect the internal systems of quality, and finally to affect the quality of the curriculum. The quality is a responsibility of the institutions themselves and not of the examination instances. The quality has different points of view: from the student, the institution, the labor market, society, and, of course, that of the government. It is understood that internal and external evaluation are complementary; nevertheless excessive interferences may occur.

In general, it could be said that is necessary to divide the problem: look for the educational criteria and observe the professional assessment. Challenges that need to be addressed: how to achieve a new system without being a rigid regulation, and how to understand this important phenomenon in the context of the appreciated declination of primary and secondary education.

Conclusion

Moving towards international recognized accreditation of Engineering programs is critical to the Latin American region. Continued dialog and dissemination of progress is crucial.

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