A review of the Accreditation Bodies and Processes in Europe. A vision from the Engineering

F. Jurado[1], M. Llamas[2], E. Tovar[3], F. Arcega[4], F. Mur[5], J.A. Sanchez[6] and M. Castro[7]

Abstract - **Europe has taken the decision of strengthening its cultural links after the successful implementation of the economic union. Many of the states reached the compromise of coordinating their educational policies to create a European Higher Education Space and to promote the mobility of their citizens. Universities play a relevant role in this process.**

Quality has been considered as an international determinant factor of the competitiveness of Europe. The instrument chosen has been the accreditation of the quality, as in other geographical areas or countries as the USA. This paper analyses the European process to reach the accreditation, the involved agents (like the ENQA – European Network for Quality Assurance, and the ECA – European Consortium for Accreditation), along with the role of the quality national agencies, as the ANECA (Spanish National Agency for Accreditation.) in the Spanish case.

Index Terms - accreditation, assessment, Higher Education, quality assurance.

1. BACKGROUND OF THE BOLOGNA PROCESS

The Bologna process was initiated by the Sorbonne Declaration of May 25th 1998, building on the results of the Lisbon Convention of 1997 on the recognition of higher education qualification in Europe. Signed by the ministers of four EU countries, the Sorbonne Declaration introduced a new dimension to the European process: the concept of an "open European area for higher learning".

Despite open borders in terms of employment, labor force mobility among EU (European Union) countries remained low, which reduced European competitiveness internationally. In the Sorbonne Declaration, the signatory countries resolved to enhance the continent's international appeal and competitiveness.

The Bologna Declaration, signed by the ministers of education of 29 European countries on June 19th, 1999 is the cornerstone of the process. It is the first joint document in which the signatories pledged their commitment to and laid the foundations for a major overhaul of European Higher Education. The primary aim set in the Declaration was to create an European area of higher education by pursuing two subsidiary goals: the promotion of the mobility of academic staff, researchers, and students within the European area, and the promotion of European higher education as a single and coherent system in order to increase Europe's competitiveness and its share in the global higher education market.

The basic aims of the Bologna Declaration may be summarized in three key words: mobility, employability, and competitiveness.

"Trends in Learning Structures in Higher Education" was prepared for the Salamanca and Prague Conferences of March and May 2001, respectively. This report surveyed the other signatory countries of the Bologna Declaration and provided a review of structures and trends in the countries not covered in 1999. Among others, the report's findings were that:

- the competitiveness issue also gained profile and various plans aimed at attracting non-European students had been forged.
- in terms of quality assurance, progress was also visible, but still the problem of the unclear relationship between quality assurance and accreditation needed to be solved.

In the Salamanca Convention the compatibility, defined as a common but flexible qualification framework, was a further aim set by the Convention. This is to be achieved by the articulation of programs and degrees in two main cycles and by the use of ECTS (European Credit Transfer System) for both credit transfer and accumulation. Prerequisites in this respect are quality assurance mechanisms, certification, and good accreditation procedures. A desired outcome of quality assurance would be achieving academic competitiveness internationally.

The aim of the Prague Summit on May 2002 was to review at the ministerial level the progress made and to identify future directions and actions necessary to achieve the goals set in 1999, such as the issues of quality assurance systems and accreditation are on the public agendas.

Ministers committed themselves to supporting further development of quality assurance at institutional, national and European level in Berlin (September 18th-19th, 2003). They

[1] Francisco Jurado University of Jaén, Department of Electrical Engineering, 23700 EPS Linares (Jaén), Spain, fjurado@ujaen.es
[2] Martín Llamas, University of Vigo, Department of Telematic Engineering, E-36310 Vigo, Spain, martin@uvigo.es
[3] Edmundo Tovar, Madrid Polytechnic University, Department of Software Engineering, 28660, Boadilla del Monte, Madrid, Spain, etovar@fi.upm.es
[4] Francisco Arcega, University of Zaragoza, Department of Electrical Engineering, E-50018 Zaragoza, Spain, arcegafj@unizar.es
[5] Francisco Mur, Spanish University for Distance Education, Electrical and Computer Engineering Department, E-28040 Madrid, Spain, fmur@ieec.uned.es
[6] Jose Angel Sanchez, I.E.S. J.A. de Castro, E-45600 Talavera de la Reina (Toledo), Spain, jsanchez@talavera.uned.es
[7] Manuel Castro, Spanish University for Distance Education, Electrical and Computer Engineering Department, E-28040 Madrid, Spain, mcastro@ieec.uned.es

stressed the need to develop mutually shared criteria and methodologies on quality assurance.

They also stressed that consistent with the principle of institutional autonomy, the primary responsibility for quality assurance in higher education lies with each institution itself and this provides the basis for real accountability of the academic system within the national quality framework.

The European Commission of Education and Culture help to organize a coherent inventory exercise in close conjunction with the Bologna Secretariat in order to have a clear picture of the headway made in the signatory states ("Bologna process scoreboard") and to draft an analytical report that has been presented to the Bergen Ministerial Conference in May 2005.

2. QUALITY ALONG THE BOLOGNA'S PROCESS

By signing the Bologna Declaration in 1999 European ministers committed to create a European Higher Education Area with the strategic objective of the definition of criteria and methodologies to evaluate the quality in a comparable way, which fosters and supports the development of mobility of students and staff between Higher Education institutions. This task is under the domain of each institution and conditioned by the legal framework of every country.
Each general meeting of the Bologna's process of the people responsible of the European education has assumed challenges related to this last issue.

According to the Declaration of Prague (2001), it was particularly stressed that the quality should be an important determinant of Europe's international attractiveness and competitiveness [1].

As discussed at the Graz Declaration of the European University Association (EUA) the policy goals for an appropriate European Quality Assurance dimension were:

- Achieve greater compatibility while managing diversity of Quality Assurance (QA) procedures. The diversity reflects specific national circumstances that each national QA framework tries to address. Upholding a shared set of principles in the Quality area would assure compatibility in national frameworks.
- Achieve trust. EUA contends that trust emanates from the way in which the spirit with which QA procedures and guidelines are carried out rather than simply in having a similar protocol of procedures or set of guidelines.
- Preserve and extend institutional autonomy while meeting the demands for accountability. The development of this QA dimension accompanies and extends institutional autonomy.
- Avoid a big bureaucracy, burdensome QA mechanisms and promote cost-effective QA procedures. Funds can not be wasted on complex bureaucratic arrangements or on other tasks that will put an excessive drain of human and financial resources.
- Ensure the role of the Higher Education sector in any future monitoring scheme. It is essential that the sector plays a role in any future monitoring scheme in order to guarantee that academic core values are upheld and to ensure the adhesion of the academic community.

- Promote innovative and dynamic institutions in a context characterised by diversity of missions, goals and curricula. EUA's proposes a set of six standards that include QA procedures to promote institutional autonomy by evaluating institutions against their mission and strategic plans, to promote organisational quality, to develop internal quality measures, to assure public accountability by including stakeholders in the process, to follow guidelines that are transparent and, by last, QA agencies with internal quality processes that can be evaluated themselves.

Later, in the Berlin Communiqué of 19th September 2003, Ministers said that "the quality of higher education has proven to be the heart of the setting up a European Higher Education Area". But quality in every country is different, so the ministers commit themselves "to support the further development of quality assurance at institutional, national and European level". This ministerial conference, underlined the need and importance of developing common methodological instruments and criteria to be applied on quality assessment and accreditation processes of Higher Education in Europe.

Therefore, they agreed that by 2005 national quality assurance systems should include:

- A definition of the responsibilities of the bodies and institutions involved.
- Evaluation of programs or institutions, including internal assessment, external review, participation of students and the publication of results.
- A system of accreditation, certification or comparable procedures.
- International participation, co-operation and networking.

Currently, almost all countries have made provision for a quality assurance system based on the criteria set out in the Berlin Communiqué and with a high degree of cooperation and networking. However, there is still progress to be made, in particular as regards student involvement and international cooperation. Last step in the Bologna Process has been taken recently at Bergen. According to the Bergen Communiqué, (May 2005), Ministers responsible for Higher Education:

- Have urged higher education institutions to continue their efforts to enhance the quality of their activities through the systematic introduction of internal mechanisms and their direct correlation to external quality assurance.
- Have adopted the standards and guidelines for quality assurance in the European Higher Education Area as proposed by ENQA.
- Have committed themselves to introduce the proposed model for peer review of quality assurance agencies on a national basis, while respecting the commonly accepted guidelines and criteria.
- Have welcomed the principle of a European register of quality assurance agencies based on national review and have asked that the practicalities of implementation be further developed by ENQA in cooperation with EUA, European Association of Institutions in Higher Education

(EURASHE) and National Unions of Students in Europe (ESIB) with a report back to us through the Follow-up Group.

- Have underlined the importance of cooperation between nationally recognised agencies with a view to enhancing the mutual recognition of accreditation or quality assurance decisions.
- Have charged the Follow-up Group with continuing and widening the stocktaking process and reporting in time for the next Ministerial Conference and by 2007 to have largely completed the implementation of the standards and guidelines for quality assurance as proposed in the ENQA.

3. ACTORS TO REACH THE QUALITY GOALS

Those responsible for higher education policy in Europe pressed for the establishment of networks of assessing entities. The entity that was recognized the preferred interlocutor in matters of quality assurance at Berlin in September 2003 is the ENQA [2]. The ENQA has played a crucial role in the implementation of institutional assessment as part of the activities of higher education institutions. This positive experience of networking will go to be imitated for the purpose of accreditation, so in the accreditation the institutions establish clear objectives, plan their activities and define their programmes. The recognition of diplomas and study periods among institutions is a key element in promoting mobility, and information about and accreditation of the quality of studies and work carried on at institution are essential for such recognition be possible.

A growing number of heads of European accreditation agencies are increasingly becoming convinced that the solution pass through networking. In this way we are progressing towards a knowledge of the methodologies, parameters and procedures used by the different agencies. This will bring a gradual convergence of criteria, mechanisms and working tools until to reach a consensus. This was the objective of the European Consortium for Accreditation (ECA) constituted on the initiative of eight European accreditation agencies. ECA has addressed issues relating to mutual recognition of accreditation decisions among its component agencies.

A major part of the ECA's activity is connected with the ENQA compiling a report on quality assurance for the European Ministers of Education at Bergen in May 2005 [3].

The main results and recommendations of the report are:

- There will be European standards for internal and external quality assurance, and for external quality assurance agencies.
- European quality assurance agencies will be expected to submit themselves to a cyclical review within five years.
- There will be an emphasis on subsidiary, with reviews being undertaken nationally where possible.
- A European register of quality assurance agencies will be produced.
- A European Register Committee will act as a gatekeeper for the inclusion of agencies in the register.

- A European Consultative Forum for Quality Assurance in Higher Education will be established.

The report is composed of three parts covering internal quality assurance of higher education institutions, external quality assurance of higher education, and quality assurance of external quality assurance agencies. Part 1 proposes standards and guidelines for:

3.1. Policy and procedures for quality assurance: Institutions should have a policy and associated procedures for the assurance of the quality and standards of their programmes and awards.

3.2. Approval, monitoring and periodic review of programmes and awards: Institutions should have formal mechanisms for the approval, periodic review and monitoring of their programmes and awards.

3.3. Assessment of students: Students should be assessed using published criteria, regulations and procedures which are applied consistently.

3.4. Quality assurance of teaching staff: Institutions should have ways of satisfying themselves that staff involved with the teaching of students is qualified and competent to do so.

3.5. Learning resources and student support: Institutions should ensure that the resources available for the support of student learning are adequate and appropriate for each programme offered.

3.6. Information systems: Institutions should ensure that they collect, analyse and use relevant information for the effective management of their programmes of study and other activities.

3.7. Public information: Institutions should regularly publish up to date, impartial and objective information, both quantitative and qualitative, about the programmes and awards they are offering.

Once the standards and guidelines have been defined it is needed to establish the common criteria for assuring the quality of the diplomas emitted by the Higher Education Institutions.

Such criteria: a) will contribute to a higher transparency of the higher European education, b) will facilitate the mutual recognition of studies and diplomas and finally, c) will promote the mutual confidence.

Such criteria correspond to all common elements to all Diplomas no matter the level (Graduate, Master or Doctor). Later, once the main own guidelines will be established, other specific criteria will be introduced to evaluate each particular diploma.

Once the criteria will be defined, a set of indicators and standards corresponding to each criterion will be established. They will allow the correct evaluation of the different diplomas. These indicators are been worked out now and will be publicized prior to their application to the evaluation of Spanish diplomas.

For elaborating the Spanish criteria the work and knowledge of other institutions working in this field in Europe have been taken into account, for instance, other agencies of the ECA or other agencies of the ENQA.

But as well the own work of the Spanish National Agency for Accreditation (ANECA)[8] and the work carried out by the auditors and evaluators of the ANECA in the pilot experience. Other European countries are working in a similar way. The idea is to have a series of common and specific criteria to evaluate and finally to achieve accreditation of the diplomas.

At this moment, the common criteria for accrediting de Grade and Master Diplomas are seven [4] [5]:

- Formative program. Objectives and structure.
- Teaching organization. The teaching activities are well planned and there are mechanisms for coordinate and communicate all activities so the learning process is developed correctly.
- Human resources. Good personnel with technical and educational knowledge, doing research, development and innovation oriented to the educational process.
- Material resources. Good facilities for developing learning activities like classrooms, laboratories, working places and library with books and technical papers easily accessible.
- Formative process. Orientation programs during the period of study and after it for the first placement in the labor market. Evaluation of the learning process is coherent with the objectives and as well there are mechanisms for promoting the mobility of students (national or internationally) for study or for practical work in companies.
- Results. Students, graduates and employers are satisfied with the results of the educational program (knowledge, abilities and know how).
- Quality Assurance. There are systematic studies for analyzing the input in the labor market, evaluate the satisfaction of students, staff and employer and improve continuously the activities in the teaching and learning process.

But for the Doctor diploma the common criteria have been reduced to six, only formative process is not included in the criteria, but the other six are oriented in a similar way as for the Grade and Master, but with evaluation of the research activity (published papers, contracts between enterprise and university, etc).

Other actors can be the Educational Professional Associations. The Spanish Chapter of the IEEE Education Society[9], created last year, has a very important mission because of the new education system based on the Bologna declaration helping teachers in these changes [6]. Apart from a Dissemination Committee, the Spanish chapter of the IEEE-EdSoc is organized through two more Committees, Technical[10] and Activities. Its objectives support the different actors involved in the Bologna process, as for example,

identifying the existing procedures of accreditation in education within the areas of engineering for its correct implementation or sponsoring forums for educators to evaluate educational programs and approaches. As well, it is clear that our problem is similar to other European countries, so we need to share our solutions with other chapters of the IEEE Region 8 [7] [8].

4. ACCREDITATION OF ENGINEERING EDUCATION PROGRAMS

There is obviously a growing interest in Europe for accreditation of engineering education programs and an increasing awareness of the importance of this for the mobility of engineers and to guarantee the quality of European engineering education [9] [10].

Although accreditation has a long history in Europe, (especially in France and United Kingdom), the recent important events in this context are the reform in Germany and the creation in December 2002 of the German *Fachakkreditierungsagentur für Studiengänge der Ingenieurwissenschaften, der Informatik, der Naturwissenschaften und der Mathematik e.V.* (ASIIN[11]), in English Accreditation Agency for Study Programs in Engineering, Informatics, Natural Sciences and Mathematics. Accreditation has furthermore been recently introduced in other countries such as Portugal and some of the East and Central European countries. Initiatives have been taken, e.g. in Italy. A European Standing Observatory for the Engineering Profession and Education (ESOEPE[12]) has been created by the British Engineering Council[13], the German ASIIN, the French Commission des Titres (CTI)[14], the Italian *Collegio dei Presidi delle Facoltà di Ingegnieria*[15], the Portuguese Ordem dos Engenheiros[16] and the European thematic network "Enhancing European Engineering Education" (E4)[17].

The issue of accreditation is of vital importance for European Engineering Education and thus for all associations and institutes involved. SEFI[18] (European Society for Engineering Education, from the French translation), which should be involved in some way when a European accreditation system for engineering is created, has been involved in discussions on accreditation, quality and mobility for the last years. CESAER[19] (Conference of European Schools for Advanced Engineering) is a multinational association of some 50 leading European universities and schools specialized in engineering education and research. CESAER and SEFI both play a major representational role in the field of European Engineering Education. Both share the opinion of the European Ministers concerning the importance of European cooperation in quality assurance and

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[8] http://www.aneca.es/
[9] http://www.ieec.uned.es/ES/
[10] http://webs.uvigo.es/es-ct/

[11] http://www.asiin.de/
[12] http://www.feani.org/ESOEPE/HomePage.htm
[13] http://www.engc.org.uk/
[14] http://www.commission-cti.fr/
[15] http://www.disg.uniroma1.it/
[16] http://www.ordeng.pt/html/servicos/servicos.html
[17] http://www.ing.unifi.it/tne4
[18] http://www.ntb.ch/SEFI/
[19] http://www.cesaer.org/

accreditation. In certain countries in Europe, Engineering Education programs are already accredited by competent bodies. SEFI and CESAER welcome any initiative leading to a common reflection, aiming at a deeper understanding and cooperation between these agencies, and both are fully prepared to pursue actions in this area, in cooperation with these accreditation agencies and other organizations.

CLAIU[20] (*Comité de Liaison des Associations d'Ingénieurs Universitaires de l'Union Européenne*) represents the professional engineering associations in the European Union with a long-cycle engineering education (5 years of university education with scientific content). CLAIU strongly shares the opinion of the European Ministers of Education concerning the needs of a transparent system of easily readable and comparable degrees sustained through e.g. a Diploma Supplement. CLAIU states also that legal implementation in the respective European countries should consider special conditions for the engineering education because this is strongly connected with the engineering profession, including the promotion of European cooperation in quality assurance. CLAIU therefore welcomes the initiative of the European Commission which has launched ENQA[21].

In large European countries, as regards engineering education, some bodies are already involved with accreditation such as the Engineering Council (UK), Commission des Titres d'Ingénieurs (France), Akkreditierungsagentur (Germany). In these accreditation bodies, besides government and educational institutions, also professional organizations are involved.

CLAIU strongly advises that other countries, which are not very familiar with "accreditation", should follow a similar accreditation organization structure.

According to CLAIU, the involvement of the professional bodies in the accreditation process is very important to maintain the link between engineering education and professional practice. We refer in this respect to the European Directives on regulated professions based on recognition of diplomas. We refer also to the European Commission which has underlined the need to have a broader interaction between the academic and the professional recognition of diplomas.

The Ministers also commit themselves to the adoption of an education system based on two main cycles, where the first cycle shall in itself be relevant to the labor market and where the second should lead to a Master's degree. Its implementation runs parallel with the establishment of accreditation procedures. The introduction of a larger number of Master's degree programs, building on Bachelor's degrees, will no doubt make European Engineering Education more attractive for non-European students, especially if the programs are run entirely or partly in English. It will also facilitate student mobility within Europe, so accreditation programs will acquire more importance. SEFI therefore welcomes a large-scale introduction of separate 1-2 year Master's Programs in Engineering.

The particular conditions and circumstances of Engineering Education must, however, be taken into consideration. It is often said that the educational systems across Europe are very different. This may be true in some fields but in Engineering Education the systems are already similar in many respects. There are many reasons behind this. One reason is the international character of the engineering profession. Another is the influence that the classical 19th century German technical university has had in the past as a model for other countries, particularly in Northern, Eastern and Central Europe. SEFI and other organizations have also contributed to a convergence of ideas.

In many European countries, two distinct types of engineering curricula are offered, one more scientifically oriented and one more application-oriented. Both of these have been developed to respond to the particular needs of industry and graduates of both types of curricula are well received by the job market.

5. CONCLUSIONS

This paper has presented the recent developments and steps done in the implementation of a common European Space of Higher Education. This is a live process having as main objective the complete mobility of students and teachers though the European University studies in the 2010.

The most recent developments in this long way are the establishment of an European Network of Accreditation Agencies as well as the publication in Spain of the general Degree and Master/Doctoral degree regulation.

In a medium term a refined analysis could be applied having more detailed references and developments of the law and regulation implementation that could allow to propose a set of indicators valid to the engineering studies learned through a comparative with policies and indicators developed by ABET (Accreditation Board for Engineering and Technology) in the USA.

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GLOSSARY

A glossary with all the acronyms used along this paper is included for easy location of the reader.

- ABET - Accreditation Board for Engineering and Technology.

- ANECA - Spanish National Agency for Accreditation.

- ASIIN - Accreditation Agency for Study Programs in Engineering, Informatics, Natural Sciences and Mathematics, Germany.

- CESAER - Conference of European Schools for Advanced Engineering.

- CLAIU - Comité de Liaison des Associations d'Ingénieurs Universitaires de l'Union Européenne.

- CTI - The French Commission des Titres d'Ingénieurs.

- E4 - European thematic network "Enhancing European Engineering Education".

- ECA - European Consortium for Accreditation.

- ECTS - European Credit Transfer System.

- ENQA - European Network for Quality Assurance in Higher Education.

- ESIB - National Unions of Students in Europe (ESIB).

- ESOEPE - European Standing Observatory for the Engineering Profession and Education.

- EU - European Union.

- EUA - European Union Association.

- EURASHE - European Association of Institutions in Higher Education.

- QA - Quality Assurance.

- SEFI - European Society for Engineering Education, from the French translation.