

CONVERGENCE IN HIGHER EDUCATION: EFFECTS AND RISKS

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Abstract — *Convergence implies advantages and risks, and normally is decided by political criteria. Higher Education in Europe is not an exception. Many governments have made considerable progress with respect to the creation of legal frameworks which allow the implementation of the convergence principles established in the Bologna Declaration, although it is not sufficient. Any change must consider the acceptability criteria that universities traditionally maintain. This paper analyses the phenomenon of Convergence in Higher Education in Europe, making reference to specific goals as the tier two system and the European Credit Transfer System (ECTS), and its repercussion teaching Engineering in Spain.*

Index Terms — *Higher Education Convergence, Bologna Declaration, globalization, Information Technologies, digital world.*

CONVERGENCE AS CONSEQUENCE OF GLOBALIZATION

We are living drastic changes in our society as the information technology revolution, the end of ideological confrontation between major powers, the emergence of the English language to a predominant position among languages of wider communication, with economic, social and cultural effects on humankind, often called as globalization. Globalization is showed as through homogenization of cultural models, tastes in music, way of life, and finally a similar globalization in higher education. In our society, success is increasingly based on knowledge, skills and ability to learn, so universities play a key role. This phenomenon has led to the adoption of news ways of implementing Higher Education systems.

THE NEW HIGHER EDUCATION SYSTEMS

“University” means the combination of all the branches of learning of knowledge or the totality of things that exist. The most popular aim of universities corresponds to a place where knowledge is pursued by experts at the highest levels and where students are selected for further training. University is synonymous of Higher education, where scholars instruct selected students face to face in classrooms with the support of resources such as a library.

Traditional universities, over the time as consequence of changing demands and shifting demographic profiles, have entered a differentiation process, so new types of institutions are born and new types of providers have entered in the sector. Several factors feature this evolution:

- Demand for enrollment in Higher education is increasing
- New technologies have led to an increment in jobs that require high level qualifications.
- Competition, although is not a new concept, acquires more importance due to the possibility of internalization. An institution must now compete with another institution for its pool of local students.
- Technologies are changing the curriculum of the courses thus as academic research interests, reshaping the pedagogical methods, making possible the e-learning.

As consequence of all the previous factors we can consider new models of Higher education. What follows is an enumeration of several models described in [1]: virtual universities, corporate universities, certificate programs run by ICT companies, franchise universities, academic brokers.

From these models, because of its importance in Spain, we emphasize too corporate universities because they reach a growing share market. It is assumed to be very similar to large business organizations and therefore being capable of being run as businesses [2]. This model has the following characteristics: it pursues technical excellence and it follows a supplier/customer model. Students are seen as customers, and universities produce and sell knowledge.

Limits of acceptability

Higher Education is highly political. There are a number of examples of how the exercising of power policy-makers universities reach limits of acceptability and sometimes beyond [3]. Main goal of universities is the pursuit of truth, but it can leads to a conflict with a politically imposed ideology. In traditional Higher education systems we could highlight some historical examples:

- The main assumption of the Third Reich was based on the superiority of “Aryan” over “non-Aryan” people as Jews or gypsies in fields as intellectual and scientific discovery. Scientists such as Heisenberg or Planck were denounced as “white jews”. As consequence, Germany lost its world leadership in natural science for the US

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where many of persecuted scientists moved with the knowledge which had been considered as impure.

- Another basic parameter of university acceptability is openness of access. The apartheid period in South Africa for 1948-1990 produced that higher education was segregated in two separate sets of institutions.
- Academic freedom requires some preservation of a continuity of courses, staff and research specializations from external authority. Under totalitarian regimes, whole disciplines were banned as law, or sociology, and thousands of academics were dismissed by inappropriate criteria. As result these universities begun lacking credibility. The independence of a university for establishing and controlling its own curriculum is very important as well as the continuity of employment of staff. Let me explain a real example: a tenure associate professor of engineering had used the school's computer system to create a web page arguing that the tragedy of the Holocaust had been exaggerated. The school did not renew his contract because he was employed as an engineer and his historical views are irrelevant to his competence. If he had been a professional historian, the ideals of freedom of expression would have been violated.
- By last, more serious consequence than loss of continuity of employment is actual loss of life in a university caused by military intervention by the State. For example, on 1970, National Guards fired upon a crowd of students demonstrating against US involvement in the Vietnam War, leaving four students dead.

In brief, we can summary as the basic parameters of survival for the traditional universities, as the followings: intellectual integrity, openness of access, continuity of employment and physical safety. Any event, by exceeding these parameters would end in disastrous conflict, at least in a classical model of university.

To these basic parameters, we should add the effects produced by globalization, which can explain the new forms expoused previously of Higher Education systems. Globalization refers to a process of heightened interconnections between States and individuals which is consequence of the revolution in Information Technology. Technologies as high density data storage or digital imaging technology can provide the transfer of sound and image electronically. An important consequence of technical change is the enlargement of the framework of higher education activities, where European students seem less worried with national differences and more concerned with the acquisition of a qualification giving access to the labor market and usable internationally.

Basic parameters can be tune up depending on the impact of these factors as the globalization:

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- Greater access to higher education for all and disadvantaged groups. It reinforces the basic parameter of openness of access.
- Greater responsiveness to demands for more relevant courses and greater involvement of universities with the communities that surround them; technical excellence as a suitable criterion for the purposes of a university and the decline of classical disciplines. This is also happening in the classical science disciplines of chemistry, physics or mathematics, where is most important to go to the applied.
- Tenure or the right of academics to continuing employment has become controversial. Many European countries have a long tradition of tenure but it has begun to extend the idea of academics that can be dismissed or with lower salaries as result of unsatisfactory conduct.

Globalization in universities, in consequence, highlights or lessens the traditional sources of conflict or limits of acceptability. As globalization can take more than one direction, accelerated by the quick development of information technologies, we will focus in this paper on the repercussions of the political decision taken at Bologna by the Education ministers of the European Union.

CONVERGENCE AT HIGHER EDUCATION: BOLOGNA

Towards a European Global Higher Education Area

The Bologna process was a political decision made by European Education ministers and supposes a dramatic change in European universities, so important that we should assure the acceptability conditions (previous section). They decided a general and common policy in the field of Higher Education with the aim of having created and developed around 2010 a unique "European Area for Higher Education".

More specifically Bologna Declaration proposes a number of goals or evolution lines that the national systems should try to reach in ten years. These objectives are as follows:

- **Adoption of a system of easily readable and comparable degrees**, through the implementation of the Diploma Supplement, in order to promote employability of European citizens and the competitiveness of the European higher education system
- **Adoption of a system essentially based on two main cycles**: undergraduate and graduate. Access to the second cycle will require successful completion of first cycle studies, lasting a minimum of three years. The degree awarded after the first cycle will be also relevant

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to the European labor market as an appropriate level of qualification. The second cycle leads to the master or doctorate degree.

- **Establishment of the system of credits:** the ECTS, European credit information system, as a proper means of promoting the mobility.
- **Promotion of mobility:** by overcoming obstacles to the effective free movement for students and for teachers, researchers and administrative staff, with recognition and valorization of periods spent in European context researching, teaching and training.
- **Promotion of European co-operation in quality assurance:** with a view to develop comparable criteria and methodologies.
- **Promotion of the necessary European dimension:** with regards to curricular development, inter-institutional co-operation, mobility schemes and integrated programmes of study, training and research.

Some of these goals seem to be contradictory since the Declaration aims to improve the convergence and harmonization of educational systems [4], and acknowledges, at the same time, divergent cultures and languages of member countries. This ambivalence can explain why there are many open issues related with the Bologna process. Each one of them can be considered as acceptability limits for the universities that only can be solved by the political control.

Another risk associated to the convergence is the reason because it was introduced. "Convergent change is planned by governments not simply because they feel an obligation to comply with the Bologna Declaration, but because there is a compelling need for them to move in that direction in their own interest..." [5] What would be the price of not taking action now? For governments, if countries do not converge their reform efforts could produce a division in Europe with negative consequences for non-convergent systems. For institutions, only those ones prepared to compete will prosper.

All these convergence objectives collect the idea of the "A Europe of Knowledge" expressed through the building of a European Higher Education Area. Dangers of non convergence can appear under several forms, as the difficulty for the mobility, non possibility to access to specific professional positions even with the qualifications required. A common policy, like the principles established at Bologna, can avoid dangers as the previous ones. However, in the practice the implementation of these principles address to conflictive situations or more cases of non acceptability.

If we analyze one by one each of the previous goals, it is difficult not to agree upon most of what the ministers committed themselves to in Bologna. For instance the value

of comparable degrees is obvious, or a credit system as the ECTS will ease a system for recognition and transfer and it will promote the mobility. In fact, we could assert this effect reviewing experiences of ECTS in some European countries. From now on we will focus on the analysis on acceptability conditions for two of the goals expressed at Bologna.

Potential risks associated to Bologna targets

Europe has developed its universities, as it was mentioned before, some 7-8 centuries ago. This fact explains the existence of a long tradition, with different national models for the management of High Education, and the existence of a huge diversity of national systems that reflects its long and rich history and the importance of the various national cultures.

As a matter of fact all actors involved in higher education begin to interpret the Bologna process, education decision makers, university governors, administrators as university staff seem to be obstacles towards substantial restructuring of this education space.

We discuss more in depth two issues of Bologna Declaration.

- **The two-tier system:** This is the crucial point that has attracted the attention of most observers: the adoption of a system essentially based on two cycles, undergraduate and graduate, with a first degree that should be relevant to the European labor market as an appropriate level of qualification. This concept is not new for Engineering Education [6]: on the one hand the education and training of scientific engineers, and on other hand the education and training of applied production engineers. Nevertheless, this system is far different of what it has been proposed by the European politicians at Bologna. Bologna Declaration move towards a sequential two-tier system that generates a difficulty because the decisions of national governments have not been the same.

An introduction of two-cycle structure is an option to harmonize European structures. Recent efforts to harmonize indicate a certain feasibility of this approach at a surface level, but fundamental questions remain open [7]. What are the benefits and risks of different solutions with the possible solution "harmonizing structures of programmes of study" as one of these?

A first observation is that the particular conditions for engineering education do not seem to have been taken into account [8]. There is already a high degree of similarity in Engineering Education between the various national engineering education systems. The long 5 year curricula typical for countries like Spain, Sweden, Switzerland, Italy and Germany have a long tradition and are well established. This classical Engineering Education should be preserved.

- **Establishment of European credit information system.** The current version of ects is mainly a credit transfer system which has been developed in the wake of EU programmes for cooperation and mobility in higher education. If ects is not reduced to the issue workload of students, it may have enormous potential for reforming/improving higher education curricula, cultures of learning and structures [7]. The introduction of ects in a coherent way must consider its essential components, as the workload students, competencies and standards, learning outcomes, ways of documenting these and flexible inter-institutionally recognized accumulation of credits earned in various education settings.

Several aspects would need further consideration.

- Firstly, the introduction of ects implies that curricula must be examined on their feasibility to be followed by successful within the 60 credits defined as the workload of students by course.
- Secondly, there is no an explicit definition of how many hours should count as one ects credit.
- Finally, the ects generalization: Ects provides a way of measuring and comparing learning achievements and transferring them from an institution to another. The traditional measure unit was the correspondence with the number of hours of lectures. Ects, by on the opposite, focuses on the student learning and overall workload, with a factor of 1 to 3 (1 hour lecture needs 1-3 hours individually study).

IMPLICATIONS IN THE TECHNICAL EDUCATION SUPERIOR IN SPAIN

From Bologna one should expect a series of national reforms, possible taking inspiration from other countries with their systems in line with this convergence process. Spain is one example of national reforms along the year 2003 with a giddy avalanche of legislative norms and their correspondent drafts. They are oriented for a two-tier structure (bachelors-master), implantation of ects and Diploma Supplement, and all combined with independent accreditation.

Establishment of European credit information system.

The regional government of Madrid helped last year in the creation of universities networks in some disciplines in order to analyze the Convergence European process. One of these disciplines chosen was Computer Science (the first author of this paper is the current coordinator of the network for the School of Computer Science of the Universidad Polit cnica de Madrid).

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This network aims to design an adaptation program to the European credit system (ects). Its main results have been in several lines:

- Definition of contents for an Information Package for every title expended by the university. It includes the list of courses described according to a template (see figure 1).

Course Template			
Degree:			
Department:			
Title:		Code:	Type:
Level	Year	Semester	Ects:
Horas semanales:			
Theory:			
Practices:			
Seminars:			
Professors:			
Expected learning outcomes and competentes to be acquired:			
Prerequisites:			
Course contents:			
References:			
Teaching methods:			
Assessment methods>			
Idiom:			
Web links with additional information			

FIGURE. 1
COURSE INFORMATION

- A poll among professors and students to estimate the additional hours that students take by each course, as study hours, exam hours or tutor hours. The analysis was based on different coefficients. The most important indicators used to compare the real curriculums of the public and private universities of Madrid were the number of hours needed by each ects, and number of hours needed by each presential class.
- The elaboration of Diploma Supplement following the European Commission criteria. The purpose is to provide sufficient independent data to improve the international transparency and fair academic and professional recognition of qualifications. It describes the description of the nature, level, context, content and status of the studies that were pursued and successfully completed by the individual named on the original qualification to which this supplement is appended. (See figure 2)

These actions lines contribute to reinforce the openness of access, one of the acceptability criteria explained in this paper. This experience shows a clear example of the impact of the convergence process in universities. We received at the beginning of the experience a general approval from all the collectives of our institution. However, through several presentations to the community we have begun to detect the first discrepancies. A lot of open issues arose, many of them associated to the phenomenon of resistance to the change.

EUROPEAN SUPPLEMENT TO THE QUALIFICATION

1. Information identifying the holder of the Qualification
2. Information identifying the Qualification
3. Information on the Level of the Qualification
4. Information on the contents and results gained
5. Information on the function of the Qualification
6. Additional Information
7. Certification of the Supplement
8. Information on the National Higher Education System

FIGURE. 2
SECTIONS OF THE EUROPEAN SUPPLEMENT

As follows:

- As regards to professors. How can we obtain credible data from professors? There is a strong tendency among professors to transform the size in number of hours of the course measured in traditional credits in an equivalent value in ects. Academic requires a continuity of courses, and convergence will oblige to a new curriculum. Professor could even fear losing its position. Coherence in the change should be assured because the methodology applied to create a new curriculum begins with the study of professionals' competencies and the labor market.
- As for students, they fear receiving lesser attention by the professor because the number of hours in class will reduce. They do not trust in professors and their capabilities to adapt to this new situation.

The two-tier system:

Specific actions to implement Bologna' principles in each state have been controversial. Opinions from the directors of technical schools in Spain show a clear divorce with the opinions of politicians [9]. The main argument is that Spanish engineers are not worse trained than other European or American engineers. A declaration of the Engineering Board [10] manifests more risks as how proceed with the transition of current engineers to the new common European model, including the attribution of professional competencies.

Bologna in this case is interpreted in a different way. The creation of a common space of High Education should not involve the destruction of current system (with two kinds of engineers, technical and superior) that, besides, could work well. The convergence, in this case, towards an American model of 4 years debated in its own country, is a risky decision.

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CONCLUSIONS

The current context help to the political decisions in respect to convergences, including the arrival of the Information Society, increased global competition rapid development of technologies, shift towards service industries and striving for sustainable development. However its implementation requires the elaboration and application of norms that can break acceptability criteria for universities, to take care of diversity issues or those systems that work well.

Some of the lessons learned highlight the risks of the convergence reforms.

- It is dangerous to focus on very small differences, for example discussing if one ects credit is equivalent to 27 or 28 hours for students, rather than looking at the big and global common issues.
- The level of change announced to converge is big, so great resources must be assigned to explain and disseminate the progress.

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