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2006-1295: UNDERSTANDING THE EUROPEAN BOLOGNA PROCESS

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Understanding the European Bologna Process

Abstract - This paper describes the European Bologna process, provides a 'mid-term' review of its implementation status and discusses its possible positive and negative impacts on US – European links in the fields of engineering and technology education. The first section of this paper describes the meaning and rationale behind each of the Bologna objectives, and why there is a need to establish a European area of higher education. It also comments on how these objectives are interpreted within educational institutions. The second section provides a mid-term report on the implementation status within European universities, focussed primarily on engineering and technology education. The third section of this paper describes the issues associated with successfully implementing Bologna in engineering and technology education. These include critical issues such as degree structure, how educational institutions are addressing the two-cycle requirement, the employability of first cycle graduates, and quality enhancement at both an institutional and a national level. The final section outlines the implications and impacts for US – European institutional co-operation and links, particularly in the area of student exchange.

Introduction

To understand the Bologna Declaration and the resultant Bologna Process, it is necessary to consider the thinking within the European Union that led to the Declaration. A reasonable point at which to begin is that in May 1998, Ministers of Education from France, Italy, Germany and Great Britain, signed a common Declaration in Sorbonne that aimed to "harmonise the architecture of the European higher education system". [1] The aim of this Sorbonne Declaration was to encourage the development of a common educational frame of reference that would improve the comparability of degrees, and thereby facilitate students' mobility and also, importantly, their employability. This Sorbonne Declaration effectively began a debate on the establishment of a European higher education architecture; a debate that led to the agreement and signing of the Bologna Declaration in June 1999 by twenty nine ministers of education or their representatives. Subsequently, the signatories to the Bologna process have grown to forty five participating countries.

The Bologna Declaration is quite simple: it is a pledge by those countries to coordinate their policies to reform the structures of their higher education systems in a way that will facilitate their convergence. But it is not intended as a mechanism to standardise European higher education. [2] In theory, principles of autonomy and diversity are respected for each country. There is a recognition that, in spite of differences, European higher education systems are facing common internal and external challenges and thus the Bologna Declaration (now often referred to colloquially as "Bologna") reflects a search for a common European answer to common European problems.

It must be emphasised that the Bologna Declaration is not simply a political statement (which it is), but also a commitment to an action plan. The overall common goal is to create, by 2010, a European area for higher education in order to enhance the employability and mobility of citizens and to increase the international competitiveness of European higher education.

Because the Bologna Declaration represents an action plan, it is to be expected that European institutions will, with increasing pace over the coming years, begin to introduce structural change to their engineering programmes. Care will therefore be required on the part of American universities admitting students to postgraduate study based on an understanding of engineering programme structure that may have changed. European universities will also need to re-evaluate how semester-abroad and one-year abroad programmes will function.

However, in the longer term, the widespread adoption of features such as the Diploma Supplement (i.e., transcript) together with an accepted definition of credits will lead to greater transparency and therefore greater mobility between American and European universities. This augurs well for continued educational cooperation into the future.

The Importance of a European Area for Higher Education

The European Council has acknowledged that the 21st century will be a century of science and technology. Consequently, investing in research and technological development offers the most promise for the future of Europe.

The European Council outlined a number of causes of concern, for example it noted that the average research effort within the European Union (the differences being significant from one country to another) is currently only 1.8% of Europe's GDP, as against 2.8% in the United States and 2.9% in Japan.

A second and perhaps more worrying indicator from a European perspective is that the number of degree-level European students in the United States is twice as high as the number of American students at that level in Europe, and 50% of Europeans studying for a doctorate in the United States stay there for long periods, sometimes for ever.

Consequently, Heads of State and Government of the European Union met in Lisbon in 2000 and launched a series of ambitious reforms at both national and European levels. According to the European Council, the "Union must become the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion" by the 2010 deadline [3]. This is now referred to simply as The Lisbon Strategy, and the strategy places much of the responsibility for its success on educational reform.

Bologna Objectives

Recall that the overall common goal of Bologna is to create, by 2010, a European space for higher education in order to enhance the employability and mobility of

citizens and to increase the international competitiveness of European higher education.

The Bologna objectives involve actions relating to: [5]

(1) Adoption of a system of easily comparable degrees: a system of academic grades which are easy to read and compare, including the introduction of a diploma supplement which is effectively a standardised transcript designed to improve international "transparency" and facilitate academic and professional recognition of qualifications;
(2) Adoption of a system essentially based on two main cycles, undergraduate and graduate: Access to the second cycle shall require successful completion of first cycle studies, lasting a minimum of three years. The philosophy towards reform for this cycle is to use outcomes-based awards and the outcomes for the first cycle were developed and agreed during the Irish presidency of the EU in 2004 and have become as the Dublin Descriptors. The degree awarded after the first cycle shall also be relevant to the European labour market as an appropriate level of qualification. The second cycle should lead to the master and/or doctorate degree as in many European countries;
(3) Establishment of a system of credits – now known as the European Credit Transfer and Accumulation System (ECTS) - as a proper means of promoting the most widespread student mobility. Credits could also be acquired in non-higher education contexts, including lifelong learning, provided they are recognised by the receiving universities concerned;
(4) Promotion of mobility by overcoming obstacles to the effective exercise of free movement with particular attention to: - for students, access to study and training opportunities and to related services; - for teachers, researchers and administrative staff, recognition and valorisation of periods spent in a European context researching, teaching and training, without prejudicing their statutory rights;
(5) Promotion of European co-operation in quality assurance with a view to developing comparable criteria and methodologies;
(6) Promotion of the necessary European dimensions in higher education, particularly with regards to curricular development, inter-institutional co-operation, mobility schemes and integrated programmes of study, training and research.

The Engineering perspective on Bologna

Shortly after the release of the Bologna Declaration SEFI, The European Society for Engineering Education, issued an opinion on the Declaration in which it strongly supported the idea of the creation of a European Higher Education Area. [6]

However, SEFI did point to both the character and the tradition of European engineering education in sounding some cautionary notes on the issue of the need for structural change in engineering education. For example, SEFI noted that engineering educational systems across Europe are already broadly similar in many respects. It also noted that in many European countries, two distinct types of engineering curricula are offered, one more theoretically oriented and one more application-oriented. It pointed to consensus that professional engineering degrees should take

five years to complete and SEFI concluded that "the existing European system for Engineering Education has much merit, that the system is quite compatible with the vision of a European Higher Education Area and that it should not be sacrificed." It did concede however that a two-tier Bachelor/Master system could be created whenever it was judged appropriate. The Master's degree should, in such cases, be equivalent to the existing 5-year degrees. [6]

Mid-Term Report on Implementation of Bologna – Political Dimension

The Education Ministers from forty five countries met in May 2005 in Bergen and released a mid-term review on the creation of a European higher education area in which it also set new goals and priorities over the remaining timeframe to 2010. [7]

In this report, couched in political language, the Ministers confirmed their "commitment to coordinating [their] policies through the Bologna Process to establish the European Higher Education Area (EHEA) by 2010." They noted that substantial progress had been made on the three priorities of the degree system, quality assurance and the recognition of degrees and periods of study.

While a two-cycle system had been implemented on a large scale, it hinted at concerns on the employability of graduates with bachelor degrees. It affirmed a third cycle leading to a doctoral award, where each level has the function of preparing the student for the labour market, for further competence building and for active citizenship. It acknowledged that "Almost all countries have made provision for a quality assurance system" but requested more student involvement and international cooperation. The Education Ministers highlighted the need for action plans "to improve the quality of the process associated with the recognition of foreign qualifications," and it saw the "development of national and European frameworks for qualifications as an opportunity to further embed lifelong learning in higher education."

Of importance was the distinction made between teaching reform and research: "Efforts to introduce structural change and improve the quality of teaching should not detract from the effort to strengthen research and innovation." This perhaps supported the argument that some countries were becoming overly concerned with process and structure rather than focussing on the overarching goal of the development a European area of higher education.

The Ministers again signalled that mobility of students and staff among participating countries remains one of the key objectives of the Bologna Process. Indeed, since Bergen, the EU has released draft plans to significantly increase the funding associated with mobility programmes between countries, such as the Erasmus Programme and has set new ambitious targets for mobility of students and academic staff. [reference needed here]

Mid-Term Report on Implementation of Bologna – Engineering Dimension

By the time that SEFI released its mid-term assessment of the Bologna Process, its thinking, and that of its members, had become more developed. While SEFI's

Opinion on the Joint Declaration by the European Ministers of Education, signed in Bologna from December 2000, could be characterized as strongly supportive of Bologna with minor concerns, its more detailed paper from January 2002 was more circumspect in its endorsement, more defensive towards existing structures and it was now proposing an interpretation of the two-cycle system that was perhaps curious for an engineering body.

In May 2001, SEFI, CESAER (Conference of European Schools for Advanced Engineering Education and Research), and CLUSTER (Consortium Linking Universities of Science and Technology for Education and Research) wrote to the education ministers to clarify and qualify the December 2000 position.

In their letter, these academic engineering bodies begin to examine and comment on Bologna in an engineering context and make the following points. The points made are reproduced here for completeness.

1. Highly qualified engineers, able to contribute to the technological progress through their leadership in research and development activities, are of vital importance for the economic competitiveness of Europe. Therefore scientifically oriented curricula leading to the Master's level, i.e. the 2nd Cycle level in the Bologna formulation, are necessary.
2. The society also needs graduates from application oriented engineering studies lasting three/four years. Their specific qualities should be appropriately recognised.
3. The option of 5-year integrated programmes (exceptionally 4-year) spanning the 1st and 2nd Cycles and leading straight to a Masters Degree in Engineering, without the mandatory award of an intermediate professional degree at the end of the 1st Cycle, should be maintained in addition to the two-cycle structure envisaged in the Bologna Declaration
4. The creation of new 1-2 year Masters programmes should also be encouraged.
5. The general employability should be distinguished from professional employability. The Bachelor's level does not necessarily have to qualify for professional employability.
6. The Bachelor's level should not only give employability; it should also be a pivot point for cross-European and international mobility and an entry point to the Master's level.
7. Universities should be allowed to set their own admission criteria for entry to the 2nd Cycle.
8. The organisations for engineering education and the professional engineers in Europe should play a formal role in the development of accreditation, quality assurance and recognition at a European level

The above eight points represent statements of caution in implementing Bologna for engineering curricula and certainly these are reasons that merit scrutiny, given their source. They include the argument for the need for two types of engineer: the theoretical engineer and the practical engineer, and that they can be educated differently; that an integrated 5-year programme should be acceptable; that the graduate with a new three-year bachelor degree may not have professional employability; that there is no automatic right of progression from the bachelor cycle

to the master cycle. In summary, while saying little about Bologna Objectives 1, 3, 4, 5 and 6, the letter takes issue with the fundamentals of Objective 2.

Shortly after the above letter was sent, SEFI released another discussion paper on the subject, January 2002. [8] In this report, SEFI begins with the statement that while "The Bologna Declaration is important for European Engineering Education, … it is far from obvious how the Declaration is being implemented and how it should be implemented."

Critically, the SEFI report now focuses on one aspect of Objective 2 of the Bologna Declaration, the aspect that in many ways has come to dominate discussion on Bologna in the context of European engineering education: i.e., engineering programme structure or the two-cycle system. This is unfortunate given that much progress has been made across Europe in most of the other five Bologna objectives.

Recall that Bologna established six objectives, one of which deals with the structure of education in Europe. The Declaration states as its second objective: "Adoption of a system essentially based on two main cycles, undergraduate and graduate. Access to the second cycle shall require successful completion of first cycle studies, lasting a minimum of three years. The degree awarded after the first cycle shall also be relevant to the European labour market as an appropriate level of qualification. The second cycle should lead to the master and/or doctorate degree as in many European countries."

Although first cycle studies should last a minimum of three years, much recent debate in European engineering education has focussed on a narrow 3+2 structure of bachelor/master degrees. It is argued that the intent of the language of Objective 2 was to deconstruct integrated five-year programmes, but the implementation within EU countries, often but not always driven from the political perspective, was to try to map all engineering programmes to a 3+2 format. This has occurred, for example, in Ireland, a country that was acknowledged at the outset to be Bologna-compliant with respect to programme structure, having an acknowledged 4+1 two-cycle system.

Deconstruction of first-cycle four year programmes leads inexorably to the awkward issue of the interpretation of the phrase that "the degree awarded after the first cycle shall also be relevant to the European labour market as an appropriate level of qualification." The argument made by the proponents of the 3+2 system is that the majority of graduates of the first cycle of a 3+2 system will proceed through to the second cycle. The end of the first cycle therefore merely acts as a pivot point for student mobility purposes throughout Europe and that should the graduate leave the educational system after the first cycle, he or she will be educated for general employment but not professional employment. As an example, within an Irish context, such graduates who exit will most likely possess a BSc rather than a BE or BEng, and would not be eligible for membership of Engineers Ireland, the professional engineers society.

The key mid-term question which remains unanswered is whether the majority of students will proceed from first through to second cycle studies in engineering. If yes, then 3+2 will be successful. If no, then it may be that the quality of engineering graduates across Europe will be considerably weakened as a result.

Other Issues Associated with Successful Implementation

In June 2004, SEFI conducted a survey of national engineering representatives on the implementation of Bologna reforms and released its findings. [9]

Most countries reported that their system of engineering education had changed or were planned to change as a consequence of the Declaration, with the clear majority of countries stating that they would implement a 3+2 structure. Degree titles would, in the main, remain similar to the existing awards. A majority of respondents indicated that the requirement for change was “top-down” or imposed politically, with a minority stating that it was driven from within the universities themselves.

On the issue of automatic progression from first cycle to second cycle, there was a variety of positions, most of which would appear to represent the status quo within those countries. Perhaps the prevalent view would be one of no applied quotas, and therefore automatic progression with only a percentage of first-cycle graduates choosing to progress to second cycle. Regarding the pace of reform, most countries reported that reform was well underway, although perhaps in the other areas of Bologna, such as quality assurance, diploma supplement, etc., and less so in implementing new structures.

However, where serious differences arise is in how the new first cycle degrees compare with already existing shorter and more application-oriented degrees. A number of respondents reported concern regarding confusion in the objectives of engineering programmes and indeed whether the new first-cycle degrees should be the same as the existing application-oriented degrees. In some cases they will merge to become the same, and in other cases they will remain distinct.

Again, there was considerable diversity on whether the new first cycle degrees would be relevant to the job market or whether these degrees would primarily be a break or pivot point suitable for mobility.

There was widespread agreement that much progress had been made on the implementation of a credit system (ECTS) and a diploma supplement, thereby considerably enhancing mobility of students.

Not surprisingly, respondents reported differences in attitude and interpretation of the process between the engineering education providers within their countries, such as research-oriented universities on one hand and Fachhochschulen/polytechnics on the other. For example, in Germany the classical research universities see their problem as how to restructure their traditional five-year one-cycle system to meet the new requirements. However, Fachhochschulen (Universities of Applied Sciences) intensely feel the threat to end up as second-class "undergraduate schools". Currently, January 2006, Fachhochschulen are required to reduce their 4-year diplomas to three and a half years.

Implications for US-European Co-operation

Currently, for those institutions on both sides of the Atlantic that cooperate and exchange students and staff, or indeed admit students into their educational programmes, there is a reasonably sophisticated understanding of the nature and quality of programmes and institutions. This understanding is most often experience-based and resident within the Admissions Office or the International Office.

It is to be expected that as European institutions begin more rapidly introducing structural change over the coming years that care will be required on the part of American universities admitting students to postgraduate study. European universities will also need to re-evaluate how semester-abroad and one-year abroad programmes will function.

However, in the longer term, the widespread adoption of the Diploma Supplement (transcript) together with an accepted definition of credits will lead to greater transparency and therefore greater mobility between American and European universities. This augurs well for continued educational cooperation into the future.

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