CESAER & SEFI on the
BOLOGNA
DECLARATION

Communication of CESAER and SEFI on the Bologna Declaration

Based on the joint seminar organized at Helsinki University of Technology February 2003

Taking into account the viewpoints of industry, national and EU administrations, as well as those of engineering associations/networks such as BEST, CLAIU, FEANI, CLUSTER, IAESTE, TN SOCRATES - "E4", TIME and the EUA

CESAER SEFI

The Role of CESAER and SEFI

CESAER

CESAER, the Conference of European Schools for Advanced Engineering Education and Research, is a multinational association of some 50 leading European universities and schools specialised in engineering education and research.

These institutions exert a powerful influence on technological growth and workforce development, and ultimately on the viability of the European economy.

SEFI

SEFI, the European Society for Engineering Education, founded in 1973, is an international non-profit organization linking together 480 members amongst which are 250 European universities and institutions of higher engineering education (38 countries).

Through its network and its numerous activities and services offered to its members, SEFI has acquired extensive expertise concerning the situation of higher engineering education in Europe.

SEFI contributes to the development and improvement of HEE, to the improvement of exchanges between teachers, researchers and students, and of industry with the academics.

CESAER and SEFI

CESAER and SEFI both play a major representational role in the field of European Engineering Education. They have been engaged in and have supported the Bologna Process since its inception. In addition, they have been very active in organising debate and investigations on the future of European engineering education. They remain committed to playing a constructive role in the creation of the European Higher Education Area. They have produced this communication in order to inform the wider Higher Education community and political decision-makers about their views on key issues in the debate on the Bologna Process.

CESAER and SEFI strongly support the idea of the creation of a European Higher Education Area.

In particular,

- CESAER and SEFI share the opinion of the Ministers concerning the need for a system of easily readable and comparable degrees, through a Diploma Supplement or otherwise,
- CESAER and SEFI support a wider use of the ECTS system as a proper means to promote student mobility,
- CESAER and SEFI are convinced of the importance of increased mobility for students, teachers, researchers and administrative staff and wish to promote such mobility,
- CESAER and SEFI are already, by statutes, committed to the idea of developing the European dimension in Higher Education.
- CESAER and SEFI share the opinion of the European Ministers concerning the importance of European cooperation in quality assurance and accreditation. In certain countries in Europe, Engineering Education programmes are already accredited by competent bodies. We welcome any initiative leading to a common reflection, aiming at a deeper understanding and cooperation between these agencies. CESAER and SEFI are fully prepared to pursue actions in this area, in cooperation with these accreditation agencies and other organizations.

Recommendations of CESAER and SEFI

Recognition of Special Factors that affect Engineering

Recommendation 1

The special role and features of engineering must be taken into account in the Bologna Process

The supply of highly qualified engineers is of vital importance to the future economic and societal development of Europe, particularly to the aim of making Europe the most competitive and dynamic knowledge-based economy in the world. Thus, the Higher Engineering Institutions producing such engineering graduates form a crucial sector in European Higher Education which should be specifically represented in the discussions and strategies that constitute the Bologna Process. They should be given a voice in the debate.

The implementation of the Bologna objectives must make clear provision for the special factors that apply to advanced engineering education. There is a need to ensure that the competences required of engineering graduates are recognized and are not compromised by provisions directed to the whole of Higher Education.

Second degree as goal for scientifically oriented programmes

Recommendation 2

In the scientifically oriented programmes the students should normally be educated to the level of the second degree. There must continue to be provision for an integrated route through to second cycle Masters level.

In the Bologna Declaration the Ministers commit themselves to the adoption of a higher education system based on two main cycles, undergraduate and graduate, where the first cycle shall in itself be relevant to the labour market and where the second should lead to a Master's degree. Basically CESAER and SEFI support this approach provided that the specific needs of engineering education are properly taken into account.

More precisely, in present-day Europe two distinct types of engineering curricula are offered, one longer, more scientifically oriented and the other shorter, more application or vocationally oriented. Both have been developed to respond to particular needs and are well accepted by the job market.

In the context of the new first and second cycle degree structure, the engineering community of Europe agrees that in order to attain a high level of scientifically oriented competencies, engineering graduates need to be educated to a level corresponding to second cycle Masters level degrees. It is thus important that any new procedures and regulations do not compromise the number and quality of such graduates. In particular, there must continue to be provision for an integrated route through to the Masters level as this preserves the coherence and efficiency of the formation. This implies that where structures include the award of a first cycle (Bachelors) degree, that stage should be regarded mainly as a pivot-point rather than a normal finishing point. The pivot-point allows choice of specialization and mobility between first and second cycles but it is important that financial and regulatory barriers do not impede the continuation into the second cycle stage.

The introduction of a larger number of second cycle (Master's) degree programmes, building on first cycle (Bachelor's) degrees, will no doubt make European Engineering Education more attractive for non-European students, especially if the programmes are run entirely or partly in English. It will also facilitate student mobility within Europe. CESAER and SEFI therefore welcome a large-scale introduction of separate 1-2 year Master's Programmes in Engineering.

Recommendation 3

The specific qualities of the presently existing, application oriented first cycle degrees must be recognized and safe-guarded with bridges to second cycle programmes being provided.

Most European countries also have various forms of shorter Engineering Education. The length and character of these curricula may vary slightly from country to country but they have normally two factors in common; they are more vocationally oriented, or application-oriented, than the longer programmes and they typically lead to a first cycle degree. Even if they are not primarily designed as the first part of a two-tier system, bridges to second cycle degree programs should be provided. Graduates of these programs play an important role, particularly in small and medium-sized enterprises.

CESAER and SEFI are convinced that this 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 should not be sacrificed. The cultural diversity of Europe is also a source of richness, so changes in the architecture of Engineering Education must not be allowed to destroy this richness.

Also, it should be stressed that engineers need continuing education in order to update their knowledge and to develop professionally. CESAER and SEFI reaffirm, that lifelong learning could become one of the most important features of the European Higher Education Area.

Research and the doctorate

Recommendation 4

The European Research Area and its links to the Higher Education Area have to be strengthened. Competition for support has to be based on merit and quality. Joint Programmes for doctoral studies should be supported, but the doctoral level as such should not be brought into the Bologna process.

University education has to be strongly based on original and relevant research. The confluence of the European Higher Education Area and the European Research Area is vital not only for a high quality of both sides but also for the achievement of a globally competitive economy. Universities and other higher engineering institutions are the major European contributors to research both by carrying out the bulk of fundamental and strategic research and through the training of professional researchers in doctoral programmes. This is particularly true in engineering.

It is therefore necessary to create stronger links between the European Higher Education Area and the European Research Area. More specifically it is necessary to strengthen the latter, e.g. by creating a European Research Council, with the primary goals to strengthen research quality in Europe, to develop capacity across the continent and to promote the best research through competition at European level. This competition has to be based on merits and quality, thus the independence of the funding agencies (at national and at European level) must be safeguarded.

Research must be carried out primarily at Institutions of higher learning thus automatically leading to the desired effect of strengthening the interaction between

research and teaching. Doctoral students play a crucial role in research and they play a particular role in inter-linking teaching and research. Hence, efforts to strengthen research and its ties to teaching will stimulate the creation of additional doctoral positions within the framework of networks of highly qualified research groups, and more importantly, these efforts will promote joint programmes for doctoral studies. However, doctoral programmes are intimately related to universities' research organization and activities. Excessive interference in this would diminish the output as research is by nature a highly creative process in which the freedom to develop new ideas and approaches is at a premium. Thus, doctoral studies should not be brought within the ambit of the Bologna Process. There is already wide agreement across Europe on the criteria for successful doctoral programmes.

Steering by Output Parameters

Recommendation 5

Criteria for degrees in engineering should be based on learning outcome and on competence rather than solely on student workload.

Engineers need high-level competences in areas such as design, problem solving and innovation, particularly this relates to the advancement of technology; there is a strong scientific basis to their work, but at the same time, engineers have particular responsibilities to society as a whole. Thus, it is natural and important that the primary criteria for determining the level reached by engineering degree programs are expressed in learning outcomes that relate to these competences rather than criteria that are expressed mainly by student workload. This competence-based approach also leads to greater transparency and improved international comparability. It enables allowance to be made for differences in national educational traditions in areas such as student selection and teaching methods.

Excellence and distinctive profiles of institutions

Recommendation 6

Higher education institutions need to strive for quality and for excellence. Their governance structures and decision-making processes must support these goals.

It is vital that Higher Engineering Education Institutions are enabled to compete in the global market place for students and staff and for the employment of their graduates. To do this effectively they need to develop their own strengths and particular profiles. In particular they need to make their own decisions regarding the balance of their activities and how these relate to both global and regional needs. This requires institutional autonomy. Excessive regulation in matters such as admission policy and the balance between different degree cycles, content or graduate profiles, would be counterproductive. Any political steering of universities should be based on objectively defined and mutually agreed output parameters. There should be no external interference with operational aspects and no artificially imposed uniformity of mission and structures. For example, separate Masters degrees, intended mainly for international students, may become an important part of the provision of some engineering institutions.

Quality Assurance

Recommendation 7

Higher education institutions themselves have the primary responsibility for the quality assurance of their own programmes. Networking of Universities and liaison between national quality agencies could create added value, centralized European control has to be avoided.

The production of world-class engineering graduates depends both on the provision of world-class resources and also on good management. Quality assurance is an important aspect of this. Higher education institutions themselves have the primary responsibility for ensuring the quality of their own programmes. External accountability and guidelines for best practice can be provided by national quality assurance agencies. The European dimension of quality assurance is best developed (a) by networks of universities in Europe working together to produce similar procedures and sharing expertise, and (b) through liaison between national quality agencies directed to the adoption of common approaches and standards. Centralized European control of quality assurance is likely to be counter productive and will lead to an excessively bureaucratic approach.

Accreditation and Professional Recognition

Recommendation 8

Transnational recognition of engineering degrees at professional level has to be a primary goal.

In certain European countries, engineering education programs are already accredited by competent bodies. We welcome any initiatives leading to a common reflection, a deeper understanding and cooperation between these agencies. CESAER and SEFI are fully prepared to pursue constructive actions in this area in cooperation with accreditation agencies.

Comparable degree structures and cooperation between accreditation agencies must pave the way to transnational recognition at professional level.

Summary of recommendations of CESAER and SEFI

in view of the European University Association Graz Conference, May 2003, and of the European Education Ministers Summit, Berlin, September 2003

1 The special role and features of engineering must be taken into account in the Bologna Process.

2 In the scientifically oriented programmes the students should normally be educated to the level of the second degree. There must continue to be provision for an integrated route through to second cycle Masters level.

3 The specific qualities of the presently existing, application-oriented first cycle degrees must be recognized and safe-guarded with bridges to second cycle programmes being provided.

4 The European Research Area and its links to the Higher Education Area have to be strengthened. Competition for support has to be based on merits and on quality. Joint Programmes for doctoral studies should be supported, but the doctoral level as such should not be brought into the Bologna process.

5 Criteria for degrees in engineering should be based on learning outcome and on competence rather than solely on student workload.

6 Higher education institutions need to strive for quality and for excellence. Their governance structures and decision-making processes must support these goals.

7 Higher education institutions themselves have the primary responsibility for the quality assurance of their own programmes. Networking of Universities and liaison between national quality agencies could create added value, centralized European control has to be avoided.

8 Transnational recognition of engineering degrees at professional level has to be a primary goal.

And ...
CESAER and SEFI believe that any attempt to harmonize the national academic calendars and to promote foreign languages within the higher engineering education curricula, would certainly represent important initiatives to overcome too frequent obstacles to the mobility of students, professors and researchers.

Approved by the members of
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