



Re-engineering Engineering Education In Europe ■

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Re-engineering Engineering Education in Europe: what is that all about? Why such a puzzling title for a 3-years long work by more than 110 Engineering schools all over Europe? Let me try to introduce to the reasons for this title (and why we have decided to adopt it for the publication of the TREE Thematic Network outcomes), by quoting the Education Ministers of the countries of the “Bologna process”: “. . . As we look ahead we recognise that, in a changing world, there will be a continuing need to adapt our higher education systems to ensure that EHEA remains competitive and can respond effectively to the challenges of globalisation. . .” (art. 1.3., The London Communiqué of the European Ministers of Education, “Towards the European Higher Education Area: responding to challenges in a globalised world”, May 2007). Thus, the need for any branch of Higher Education to dynamically adapt its profile to the continuous challenge of the society becomes evident: European Universities, at the dawn of the 3rd Millennium, face the extraordinary task of reshaping (or, as we like more: *re-engineering*) their educational profiles and mission statements in order for their graduates to be skilled and ready to respond “*effectively to the challenges of globalisation. . .*”. What does all this mean?

Higher Education Institutions (HEIs) should be well prepared in order to face: i) the ever fast developing framework of the work market & stake holders environment, ii) to follow the tough competition within the education sector between public and private sector, iii) to adapt to the radical changes in the higher education (HE) studies and curricula in general (and, more and more, in particular, in Engineering and Technology sector), iv) to set-up a reliable, internationally recognised system of quality assessment and v) to improve the attractiveness and competitiveness world-wide of the European University system.

Therefore, issues like *Mobility, Internationalisation of studies, Degree Structure, Recognition of degrees, Qualification Frameworks, Lifelong Learning, Sustainability of competencies and Professional development, Quality Assurance (and European Register of Quality Assurance Agencies), Doctoral studies and students, Social dimensions (social cohesion, reducing inequalities, raising the level of knowledge, etc.)* need to be analysed, implemented and monitored at European level, in order to continuously improve the current situation and to promote good practice. Furthermore, there is an increasing awareness, that a “*significant outcome of the process will be a move towards student-centred higher education and away from teacher driven provision*” (Art. 2.1 of the London Communiqué, see above).



Thus “*Re-engineering Engineering Education in Europe*” means all the above for the Engineering and Technology sector; isn't that too demanding and pretentious target? How can a simple TN-project within the SOCRATES II programme, even if with a very large number of participating engineering education (EE) schools, try to afford such an ambitious goal and what is concretely the beneficial impact on the European Higher Education Area?

I shall avoid (not even try) to answer the questions above by describing the content of this volume, the work, the results and the perspectives for the EE sector in Europe: this will be the task and the deserved privilege of the scientific Coordinator of TREE, Prof. Maffioli, who to hold the reins of such a large group of schools and colleagues, i.e. the work of 4 activity lines and 30 Special Interest Groups (SIGs), the managerial meetings, and others: a huge amount of work. For this purpose, I specifically address the Reader to the next Chapter 1 (TREE: Development, Results and Challenges).

Nevertheless, I shall not miss the opportunity to give some general comments on what TREE has represented and has achieved in terms of impact on HE in Europe, promoting the international dimension of EE and dealing with almost all critical issues of the globalised market of education as stated above.

My first comment deals with the intrinsic nature of “Thematic Networks” projects (SOCRATES II programme): I believe, one can definitely affirm that they contribute largely to the improvement and to the implementation of the new and innovative strategies and policies of HEIs, as a part of the strategy and development plan of internationalisation. This is why the University of Florence, School of Engineering, decided to continue the successful experience of the previous TN project (Enhancing Engineering Education in Europe, E4, 2001-2004) and selected again as the Contractor of TREE in 2004. The University of Florence (UNI-FI in the following) has recognised it again as an opportunity for strengthening its role as a strongly “ERASMUS committed” Institution: this engaged commitment is also concretised in direct financial support to the TN project which has been yearly awarded to the School of Engineering by the central administration. I shall therefore acknowledge here this substantial contribution and express our gratitude to Rector Marinelli and Pro-Rector Givone, together with the enthusiastic support of the recently appointed Dean of the School of Engineering (Prof. Tesi). Nevertheless, the commitment of the Contracting University alone would not have ensured the successful accomplishment of the project: the Coordinator (F. Maffioli) and the 4 Promoters (the true scientific “souls” of the project: G Augusti for Line A; A. Avdelas for Line B; K. Hawwash for Line C; M. Markkula for Line D) have to be gratefully acknowledged for their personal commitment and devotion.

Commenting on the impact of TREE on European HE policies in the Engineering sector, I see at least four different levels of beneficial outcomes from the activity of the Thematic Network:

1st: at the level of individuals (teachers, students, corporate representatives, professionals, etc) who have



the chance of an interpersonal cooperation and mutual enrichment, although with completely different origins and traditions; the “transversality” of this effect (teachers with students, teachers with corporate and professionals, etc) is the truly added value of the TN Activity

2nd: at the level of a single HEI, in particular those ones in countries that only recently joined the SOCRATES programme and the Bologna process (or even the EU) and, in some cases, participated for the first time in such a large pan-European project in EE

3rd: at the level of EE associations and stake-holders societies in Europe: the TN TREE has resulted into a *network of networks* (or *double networking* effect), bringing together (or better: bridging across) different associations including CESAEEER, SEFI, IGIP, BEST, FEANI and ENAEE allowing a unification of the efforts and coordination of initiatives and good practices.

Furthermore, looking to the “Progress towards the EHEA” (again by the London Communiqué, Sect. 2) all the issues raised there have been dealt with thoroughly within TREE, coming to some very innovative and surprising outcome:

- the *mobility* issue: as a true “*Network of Networks*”, TREE has acted continuously as a think-tank and resonance forum for all those projects and initiatives to foster mobility of students, teachers and professionals, always listening to the voice and expertise of the students and of many teachers involved in mobility programmes. Very often, the meetings and the work within the TN project gave rise to newly established links and flows of mobility between HEIs which never came in touch before;
- *degrees and recognition*: the Attractiveness Line (Line C) has put in evidence the increasing beneficial effect of the joined degrees and of many recognition agreement, which may favour the trans-national recognition of titles and mobility of graduates; synergy with TEMPUS projects has been also looked for, especially for those initiatives of joined curricula between Institutions
- *doctoral studies and students*: the Education and Research Line (Line B), the central activity of the project intentionally focused on the alignment of the two main component of the Humboldt-kind of University education, developed a deep analysis of the doctoral studies and contributed to the discussions on the 3rd level of the Bologna scheme; Engineering and Technology sector shows here some reluctant in capturing the Ph D studies under rigid curricular frameworks/standards
- *lifelong Learning*: European competitiveness depends more and more on professional competencies, productivity and creativity for innovation. Different aspect of knowledge society development have been studied especially by Line D “Sustainability of competencies”.
- *quality Assurance and Register of Quality Assurance Agencies*: Line A has contributed decisively to the development and implementation of the new standards and qualification framework of the EUR-ACE® label, which has been recognised as “the” European Quality Assurance label for the engineering education sector.



- *social dimension*: - some priority issues of social relevance like “Continuing Engineering Education” and “Open and Distant Learning” have been widely and deeply dealt with by Line D while most recent advances in “Ethics in Engineering” and ways of attracting learners from non-traditional background analysed and critically complemented in Line C.

Nearly 117 partner Institutions involved, 4 Activity Lines, 30 working groups, some service actions to the whole project structure, a Management Committee of 14 members, 1 Project manager at the TN-Headquarter (at the International Relation Office of the School of Engineering in Florence): these are the figures that give an overall idea of the dimension of the project work and effort, both at scientific and managerial levels. Such effort has made it possible for TREE to become the true voice of higher EE schools in Europe: I am confident, this voice will now find the attention of all relevant policy makers and stake holders of Education in our Continent.

But, before this happens, let me spontaneously conclude these few words with a statement of full satisfaction: it has been a great honour and a privilege to serve as President of a truly innovative and challenging project for a better future of EE in Europe!