The Many Facets of International Education of Engineers
Les Multiples Facettes de la Formation Internationale des Ingénieurs
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of International Education of Engineers

Les Multiples Facettes
de la Formation Internationale des Ingénieurs

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Foreword

J. Michel

In the past decade, engineering education has entered the international era. “European culture” became a key word long before “globalisation”, and we have learnt, step by step, to design engineering curricula to include time spent in a foreign institution. Thanks to the successive programmes of the European Community (namely Erasmus and Socrates), the best motivated students, and to a lesser extent, faculties are able to get the benefit of foreign experience. This is now fully accepted in academic institutions. However, at the same time as this experience has developed through greater international exchange, new challenges have emerged:

International formation should not be restricted to those lucky students able to undertake a binational curriculum;

International teams of engineers must be able to work together to design a project while physically separated. This implies a fair amount of common culture and an extensive use of modern communication technologies;

Information is available in any place, at any time and for anybody, so that every engineer will have to be able to grasp it, and engineering education will have to develop new learning skills;

Competition between engineering education institutions will increase world-wide, since major companies now have an access to the best graduates, whatever their citizenship. At the same time, alliances, benchmarking and trans-national evaluation are becoming more common, and will become mandatory.

The international Conference SEFI 2000, organized by ParisTech and SEFI, is the appropriate forum for a thorough discussion of all the challenges that internationalisation poses engineering education. Academics and employers will be able to compare relevant international experiments and consider new approaches to meet the demands that engineering education will face over the next decade.

The conference will deal with main topical themes: the formation of engineers for the international dimension of their trade, the impact of international formation on the training of engineers, international co-operation between institutions, the global market of engineering education. Round tables with industrialists, academics and students and thematic key sessions will help to understand the present move towards a better integration of internationalisation and europeanisation in the engineering curricula (with, for instance, a debate on the consequences of the Bologna Declaration on engineering education).
The selected 80 papers (some 30 countries represented) for the parallel sessions cover a wide range of issues:

- Trends in Engineering Education facing the New Global Environment
- The Professional Demand and Requirements
- The Impact of Internationalisation on Engineering Curricula
- International Networks and Partnerships
- The International Exchange Programmes
- Examples of International Engineering Programmes
- Specialised International Engineering Programmes
- Communication Skills, Tools and Languages
- Virtual Universities, Open and Distance Education
- Truths and Lies about Using the Internet in Engineering Education
- Information Technologies for Self and Cooperative Learning
- Engineering Education: an International Market?
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ParisTech is an association gathering nine Institutions of higher engineering education. Recognised as the best in their respective fields, they are complementary and cover the essential disciplines of engineering education. ParisTech, delivers approximately 2500 engineering diplomas per year and counts more than 1200 researchers in doctoral formation. The teaching staff includes approximately 1500 members and the research laboratories and centers are nearly 120. This size and this complementarity enable ParisTech to be an interlocutor comparable to the large foreign universities.
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Preparing scientists and engineers for the 21st century

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Keywords: accreditation, globalization, knowledge-based economy, technological higher education, continuous learning

As we enter the new millennium, scientists and engineers will face a far different context from that of the 20th Century. The rapid growth of information and communication technologies, along with an efficient transportation system, is increasing globalization in nearly every dimension. Competition is no longer limited by geographical boundaries, leading to shorter and shorter product development cycles and a drive for higher quality, all of which place premiums on the intellectual skills of the workforce. In addition, environmental issues and interdependent world economies make apparent the need for cooperation and teamwork between nations and their peoples.

The resulting knowledge-based economy values intellectual assets above physical assets and defies the familiar economic principle of scarcity. Increasingly, competitive advantage will lie in an organization’s ability to learn and innovate, which in turn will depend upon knowledge management.

These changes raise a number of issues for higher educational institutions that prepare scientists and engineers, especially at the undergraduate level. Rather than developing in-depth expertise along narrow disciplinary lines, institutions must offer broad programs that prepare graduates for their lifework and life. The focus of these programs should be on outcomes rather than underlying processes. For the knowledge economy, a principal outcome must be that graduates have ability for sustainable lifelong learning. This is not a topic suitable for a course, but rather must be experienced by students so that they learn how to learn. Consequently, learning outside the classroom becomes an important rubric for the future, which has substantial cost implications.

This presentation will review this developing context for scientists and engineers in the early decades of the next century and explore these implications for technological higher education. The efforts of the faculty at WPI to provide the needed educational experiences will be offered as one approach to meeting the growing challenges.

Curriculum vitae: Edward A. Parrish was born in Newport News, VA on January 7, 1937. He received the B.E.E., M.E.E., and Sc. D. (electrical engineering) degrees from the University of Virginia in 1964, 1966, and 1968, respectively. After serving as department chair at Virginia and dean of engineering at Vanderbilt, he assumed the position of President of Worcester Polytechnic Institute in 1995. Dr. Parrish is a Fellow of IEEE, a Fellow of ABET, and is listed in Who's Who in Engineering as well as many other such registries.