Proceedings

Enhancement of the Global Perspective for Engineering Students by Providing an International Experience

Engineering Conferences International *Year* 2003

Preparation of US Engineering Students for International Practice

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PREPARATION OF US ENGINEERING STUDENTS FOR INTERNATIONAL PRACTICE

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Driving Forces re International Preparation for Engineers

- Engineers must design and develop products for multinational markets
- Materials and components must be sought worldwide to be competitive
- Engineers may practice directly in foreign countries for part of career
- Multinational company engineers must work with international teams

What is needed to prepare engineers for international practice

- Foreign language proficiency
- Cultural background development
- International business knowledge
- International technical knowledge
- …and do not dilute the traditional math, science and engineering studies which provide the career-long technical base

Institute for International Education core elements for transnational competence

- Ability to imagine, analyze, and creatively address the potential of local economies/cultures
- Knowledge of commercial/technical/cultural developments in a variety of locales
- Awareness of key leaders (and ability to engage such leaders in useful dialogue)

… more IIE core elements

- Understanding of local customs and negotiating strategies
- Facility in English and at least one other major language, and facility with computers
- Technical skills in business, law, public affairs, and/or technology, and awareness of their different nature in different cultural contexts

US Foreign Service Officer Program knowledge requirements

- Historical antecedents of international affairs to aid understanding of foreign governments and societies
- World geography to understand the geographic context of foreign relations and US foreign policy
- Foreign political systems
- Major contemporary international economic and commercial issues to understand the impact of economic conditions on a foreign country and on US programs and policies
- Major events, institutions, and movements in the history of the US, to facilitate understanding of the US system of government

… more Foreign Service knowledge requirements

- History of US intellectual, artistic, and cultural life in order to interpret US cultural life to foreign nationals
- Social, political, and economic trends in the US
- Contemporary cultural trends in the US
- The US political process and its impact on policy
- The Constitution and the structure of the US government
- The US economic system, its institutions and philosophical principles, to interpret policies and actions to foreign nationals
- US educational system

Current programs and approaches

- Traditional study abroad (Global E3)
- Study abroad enhanced by language immersion (University of Rhode Island)
- Electronic trans-national project team work (University of Michigan)
- Group term abroad (WPI)
- Double degree approach (PUC-Rio)
- Engineering Cultures study (Virginia Tech)
- Engineers Without Borders (Cornell, Colorado)
- Technical internships (IAESTE-US)

Traditional Study Abroad Programs

- Available at many schools, through campus-wide international programs office
  - Small numbers, due to lockstep engineering curriculum
- Global Engineering Education Exchange (Global E3) program is a consortium of 36 US schools and 53 foreign schools
  - Requires two way exchange – pay tuition at student's home school
  - Small numbers to date, 100+ per year

Study abroad plus language

- University of Rhode Island International Engineering Program
  - Dual degrees in engineering and a language – German, French or Spanish – in 5 years
  - International internship with foreign corporations (up to a year abroad in combination of study and work)
  - Small, high quality program: 100+ graduates to date, 170+ current students

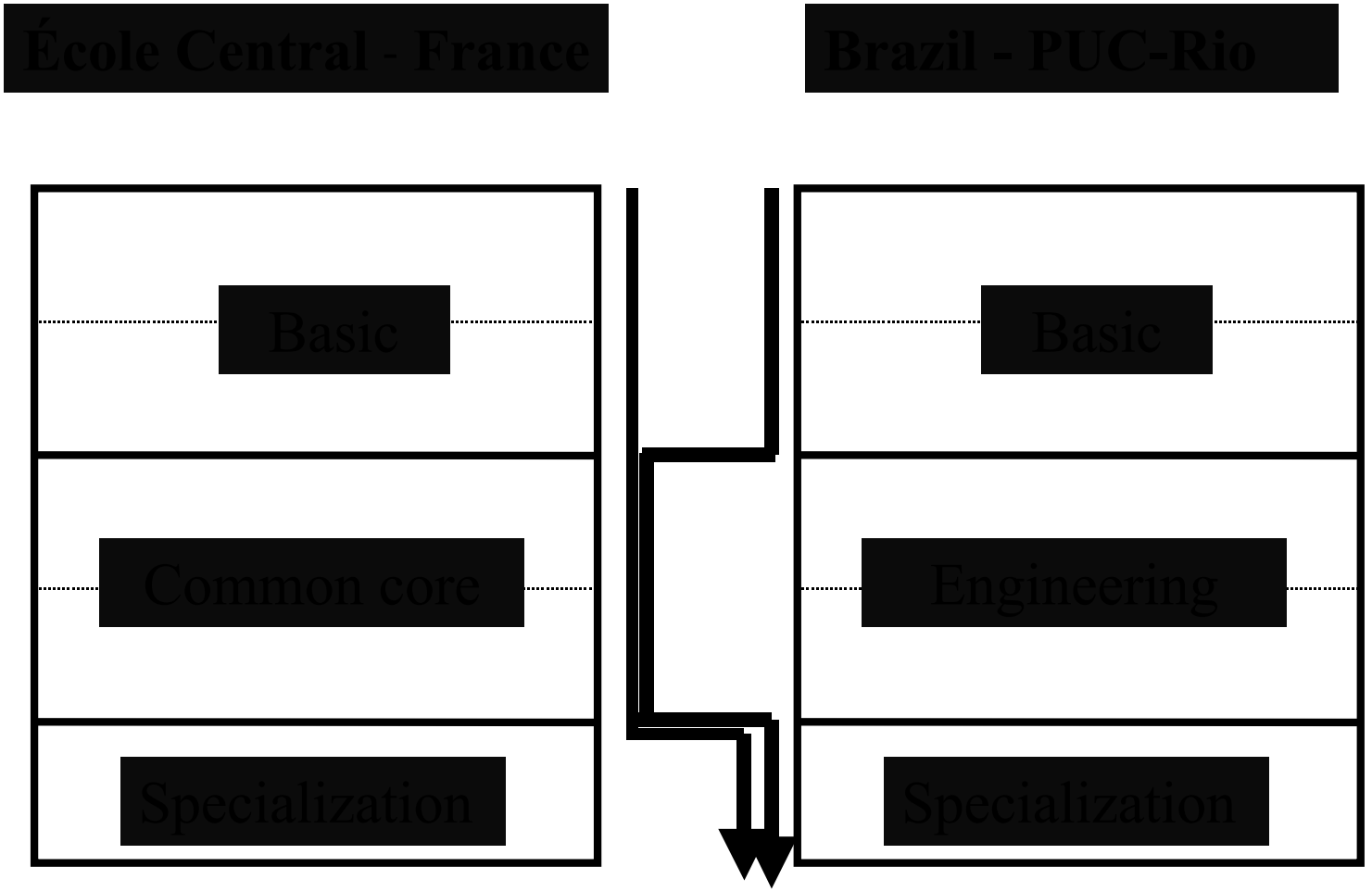
Electronic trans-national teams

- Design project teams from US and foreign engineering schools collaborate on a project relevant to both countries
- Communications are all electronic (e-mail, shared data files, fax, phone)
- e.g., University of Michigan plus South Korea and United Kingdom
- Typically try to have teams meet in person at least once – for either introduction or final presentations
- May interest students in study or work abroad period

Group term abroad

- Worcester Polytechnic Institute requires international experience for most students
  - Teams of students travel to a foreign country for a several week term, with faculty member, to work on, relevant project there
  - Part of an overall project based curriculum
  - Teams consist of engineering and other students from the WPI campus
  - Limited immersion in local language, culture

Double Degree Approach



Engineering Cultures Study

- Program developed at Virginia Tech analyzes the cultures of engineering in various countries (UK, Russia, France, Japan, US …)
  - Examines how engineering approaches vary around the world, to prepare US graduates to work with diverse cultural approaches
  - Mini-courses available on cd, with web support
  - Future plans: Korea, Taiwan, China, India, Egypt

Engineers Without Borders

- Engineers Without Borders – University of Colorado
  - Assists developing communities to resolve a particular infrastructure need, using student engineers who get international experience
- Engineers Without Frontiers USA – Cornell University
  - Students learn concepts of sustainability, appropriate technology, social responsibility, etc. while getting international cultural exposure

Technical Internships Abroad

- International Association for the Exchange of Students for Technical Experience (IAESTE United States)
  - Serves technical students looking to intern outside the US
  - On-the-job training to develop global skills in tomorrow's technical leaders
  - Salary covers student cost of living abroad
  - Network of 70 member countries

Issues for the future

- Need to get international experience for vastly higher percentage of US engineering students (4139 studied abroad in ’99-’00)
- Electronic experiences can be scaled up more easily that study or work abroad
- Need to expand faculty international experience too

For further interaction

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