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GLOBALIZATION OF ENGINEERING EDUCATION

Prepared by: Manan Aggarwal

Advisor: Dr. Oliver Hensley
Dean, graduate studies and research

Submitted to:
Dr Christopher Ibeh
Pittsburg state university
Pittsburg, Kansas -66762

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ABSTRACT:

The increasing globalization of corporate economies has changed the face of engineering practice. In addition to core engineering skills, modern engineers must possess cross-cultural communication skills, team management skills, and ability to form globally. Due to the current world wide shortage of qualified engineer's there are efforts made to increase the total number of students graduating from engineering programs and incorporating cross cultural knowledge in to engineering curricula.

INTRODUCTION:

The extent of the shortage of engineers threatens to hamper the innovation, growth and employment. A number of institutions have taken steps towards implementing internationalization within individual academic units as well as across the university as a whole .for example university of Rhode Island start giving degree in international engineering (<http://www.uri.edu>).

The worlds economy has become vastly more interdependent, exports account for the increasing percentage of the economic activity, works and jobs move rapidly and frequently from one continent to another.

Although international programs for engineering students have had some success, their impact on engineering education as a whole remained limited, participants remain relatively small. For example the northern Arizona University (NAU) has developed student exchanges with the international partners, providing lectures by the international visitor's .despite these strong efforts; however, fewer than 2% of the engineers receive significant international training.

A detailed investigation of why more students are not participating in the international programs is stifled by the number of obstacles; the first thing is the language barriers, inflexible curricular structure are also including and a failure to appreciate the implications of a global economic future. Thus, international programs remains relegated to the periphery of the curriculum, viewed by most of the students as the optional add on to the traditional curricular core; only few highly motivated students take advantages of these programs.

This condition calls for the comprehensive curricular reform that guarantees that all engineering students must receive the basic international exposure, making the programs so easy and attractive so that many students will be motivated to incorporate in to this experience.

From the practical point of view globalization of engineering education includes four keys:

1. CURRICULUM INTERNATIONALIZATIONS:

International perspectives can be integrating in to existing engineering course curricula by replacing generic, context free assignments and projects with “scenario based “ challenges, in which the same exercise are situated in international context. For example rather than being asked to “ design a rail to such and such specifications “ students would be asked to design a rail in a specific foreign locale, taking in to considerations the Internationals issues such as materials, measurement differences, local availability of capitol and labor.

2. VIRTUAL STUDENT EXCHANGE:

Students at the NAU and its partner institution abroad will be able to participate in each others design courses at a distance by advancing in internet technologies. This allows to “bring the world in the classrooms”, ensuring that even students who never go abroad are exposed to international teaming and collaboration. For example NAU electrical engineers working to design a novel device might be teamed up with counterparts in Dresden, Germany. Aside from the international teaming experience, an advantage of this concept is that the recourses of all the institutions are available to the team. in this way students who never get the chance to go abroad are nonetheless exposed to international teaming.

Virtual student exchange also eliminates the problems associated with semester synchronism by allowing the student to participate remotely in a desirable design course at a partner institution, while still completing classes in an ongoing semester at the home institution: optionally, he or she can then travel abroad at the semesters end to physically join the semester in progress abroad.

3. GLOBAL INTERNSHIPS:

For success in modern international corporate environments include sensitivity and adaptability to difference in work habits, different legal environments, and respect for local customs and mores. Because this kind of experimental knowledge can be best gained in an international workplace, streamline excess to global internship experience for motivated students is an essential part of globalization of engineering education. Approximately half of the all the students complete at least one internship, usually with a local or regional company, prior to graduation. Lack of contacts with overseas

corporations and high logistics barrier s (visas, housing, financing) have limited international internship opportunities for students.

INTERNATIONAL INTERSHIP: PROGRESS AND OUTCOMES

During an informal survey we came to know that why students have historically not pursued in the international internship. The following obstacles are included:

- **Finding internship**

The first obstacle even knows what companies offer internships in their discipline. While company websites and services generically invite applications for internship, they leave most students overwhelmed at the prospect of placing an application in to an anonymous pool with hundred of other applications. What is needed is the comprehensive, searchable database of internship opportunities.

- **Finding community**

Going to work in a foreign community is a novel and intimidating concept to most American students. As the international internship program gains momentum, however, a growing number of students will have faced these challenges and will have bought home a wide variety of experiences. What potentials intern needs is to access these students and their experience to draw on advice and encouragement.

- **Finding answers**

There is an endless series of questions that students must have find answers to in pursuing the international internship, e.g. where and I do I find apartment from abroad, what is the visa process and where do I find proper forms? This flood of uncertainties represents a significant obstacle that's drains away student initiative and, simply put, makes it easier to stay at home.

4. ENGINEERING SPECIFIC LANGUAGE INSTRUCTION:

Over the past 30 years , the percentage of students exposed to foreign language instruction during their studies has dropped from over 16% to less than 8% , the percentage are even lower for engineering students. Fewer and fewer students believe that the traditional language instruction is worthwhile investment of their time ,mainly because progress toward communicative competence in a typical college language course is slow and diffuse , with little coverage of technical language of engineering. With this low ratio, foreign language instruction often has low priority for engineers.

To increase the use of foreign language among the students a lab manual is provided to the students of the NAU, which is the comprehensive set of engineering – oriented

language exercise and basically focused on measurement, engineering processes and technical vocabulary.

CONCLUSION

The past 2 decades of increasing corporate globalization-accompanied and facilitated by the rapid development of internet-have a revolutionary change in the face of future engineering practice. The engineer of the 21st century will, in addition to traditional technical skills, be asked to play multiple roles on small independent design teams: will need excellent communications skills; and must be prepared to work efficiently with team members from other cultural and linguistic backgrounds.

To prepare engineers for the future, engineering education must adapt to incorporate training specifically aimed at the design and global engineering skills that modern engineers will need. Although some institutions have made efforts to provide appropriate training opportunities, these efforts have all been essentially “add-on” approaches, in which opportunities for global engineering experience are made available to students as optional extras, peripheral to the conventional curriculum.

In my point of view this is simply not working: the stubbornly low percentage of engineers participating in existing global engineering programs makes it clear that a comprehensive curricular reorganization is called for....

The proposed ways in the paper leads to the making the engineering education a central, ubiquitous curricular element, rather than a peripheral add on. By eliminating the logistical, curricular and geographical barriers between international partner’s institutes, we can create the truly progressive education environment in which engineering students continuously encounter the international peers in the hallway and class rooms, work in teams with international students and take advantage of course and facility available at partner institutions.

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