

Europe/USA Mobility Exchange in Engineering: Why Is It Less Attractive to the American Students?

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Introduction

Globalization is modern trend in the era of technology allowing geographically distant nations, communities and individuals working together. Globalization is a mechanism to integrate economic, political, and cultural systems across the globe. International student mobility has grown rapidly in the last decade becoming an important factor of higher education. Student mobility is supporting globalization by familiarizing young people with a concept of different cultures and languages, different work habits and custom. Spending time abroad benefits students personally, academically, and professionally while enhancing their resume and often employment potential specifically to those seeking a job in a global economy that relies on the ability to relate and communicate with diverse people around the world.

There are evident advantages of learning the discipline in an international context. Carly Fiorina, as the CEO of Hewlett Packard, a company with an international outreach, uttered that "diversity drives creativity". Student and faculty mobility has been promoted in majority of universities across the globe but with a varying degree of administrative and financial support [1].

As reported by King [2], globally 1.8M students were outside their country of origin in 2000. The paper stipulates the finance and language as two main barriers in addition to the lack of information, and perceived/actual academic obstacles such as course structure, credit transfer, grades difference, etc. The study was prompted by concerns of low level of outward international student mobility from UK as compared with other EU countries. The authors provided a defensive argument that English become the global language. Such viewpoint obviously ignores intercultural learning experience that period of study abroad can bring. The observation has been confirmed in authors' experience with the Atlantis mobility project as described in the paper.

For the last two years consortium of three American and three European universities undertook an Excellence in

Mobility project on Dependable Systems International Research and Educational Experience (DeSIRE²) supported by the Fund for Improvement of Postsecondary Education (FIPSE) and the European Commission. The American consortium partners include: Embry Riddle Aeronautical University (ERAU) in Daytona Beach, FL, the University of Central Florida, (UCF) in Orlando, FL, and the University of Arizona (UOA) in Tucson, AZ. The European partners are AGH University of Science and Technology (AGH) in Krakow, Poland, Brno University of Technology (BUT) in Brno, Czech Republic, and the University Joseph Fourier (UJF) in Grenoble, France. The first two years of the project allowed the consortium to identify several issues related to the recruitment of American students. The paper will discuss the program, identify the issues and will attempt to analyze the situation.

DeSIRE² Concept and Implementation

The objective of the DeSIRE² [3] program has been to facilitate exchange of graduate and upper-level undergraduate students in engineering. A common thread of the programs at all the consortium partner institutions is that their alumni are typically employed by industry to build dependable systems, which includes developing software, control, embedded hardware, and communication components. The courses selected for the program constitute a coherent value added when taken by overseas students. Regularly enrolled graduate students at the consortium partners may apply to participate in the DeSIRE² program. Additionally, the European students on exchange to the USA require to demonstrate capability to speak and write in English, which can be documented by successful completion of appropriate level language courses or/and submission of appropriate certificates.

The DeSIRE² program provides student an option to spend one term overseas taking courses which will be recognized toward their degree and will provide them with specific area of concentration identified in the USA as a "certificate" and in the EU in a "diploma supplement". Under this project, each institution will send only limited

number of students in semester. The target for the exchange is 24 students each way within four years of the project duration. Enrollment and tuition are completed and paid at the home institution. The mobility exchange is delineated in the consortium partners' Memorandum of Understanding. The actual course assignment is negotiated for each student in a coordination between the exchange partners on a case-by-case basis and finalized by signing appropriate Implementation/Learning Agreement identifying the courses to be taken and thus stipulating that the overseas credits is accepted in the home institution. Figure 1 presents the time diagram for individual student mobility. The process starts early with the recruitment and initial negotiations. The preparatory phase term is dedicated to arrange for all formalities culminated with signing the Learning Agreement. The actual implementation is the semester abroad and the exit phase includes post-mortem and analysis of the mobility exchange.

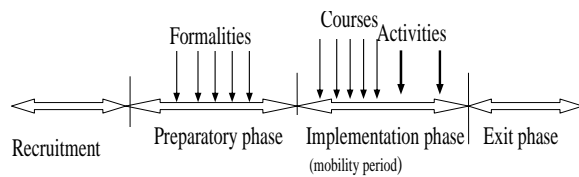


Fig. 1: Students mobility time diagram

Thus, in spite of providing financial assistance and heavy marketing at the partner universities, one of the problems that has dogged the DeSIRE² project has been the resistance of US engineering students to study abroad. The three American schools hosted six students from Europe while managing to send only two to Europe (and one of them did not complete the entire semester). While the effort has not been totally in vain and new candidates have been identified, we believe an analysis of the situation is warranted. While the reasons listed and discussed below have not been scientifically determined, they are based on our own experience as well as anecdotal evidence from our student population.

Student Mobility

Despite some obstacles [4], student mobility has been extremely popular in Europe. Erasmus is the EU's most popular mobility programs, enabling EU students to study abroad each year, as well as supporting co-operation between higher education institutions across Europe. The program caters not only for students, but also for faculty who wants to teach abroad or who want to be trained abroad. Around 90% of European universities take part in Erasmus and almost 2 million students have participated since it was started in 1987. The European Commission aims to reach a total of 3 million students involved by 2012 [5]. The annual budget of the Erasmus Program is in excess of €440M, with more than 4,000 higher education institutions in 31 countries participating signing the Erasmus University Charter. The Charter aims to guarantee a high level of quality in mobility and cooperation by

setting out fundamental principles that the participating institutions must follow. For many European students, the Erasmus Program is their first time living and studying abroad. Hence, it has become a cultural phenomenon and is very popular among European students. Several studies have shown that a period spent abroad not only enriches students' lives in the academic field but also in the acquisition of intercultural skills.

Erasmus Mundus is a cooperation and mobility program designed to enhance the quality of European higher education and to promote European higher through cooperation with Third World Countries. In addition, it contributes to the development of international cooperation capacity of higher education institutions in Third Countries by increasing mobility between the European Union and these countries. From the beginning of this program, more than 7000 outside Europe students have been granted with scholarships. Erasmus Mundus offers scholarships for non European and European students to promote the exchange of students between European and non-European universities at all levels - study periods can vary between 3 months and 3 years. New Erasmus Mundus II (2009-2013) supports Joint European Master and Joint Doctoral programs with the budget of €493 million [6].

As the U.S. economy becomes more and more international, the need increases for well-trained engineers, scientists, and business executives to cooperate with their overseas counterparts. Through the mobility exchanges students have the opportunity to develop their foreign language abilities, cross-cultural skills, and international experience. Global trade expansion by corporate America has required most of the Fortune 500 companies to provide cultural and language training some of their employees. Corporations are more predisposed to hire a technically trained person who is internationally savvy and familiar with European cultures and languages.

In the US, the Institute of International Education (IIE) [7] is a non profit organization supporting student mobility exchanges. The IIE vision is that peace and prosperity around the world depend on increasing the capacity of people to think and work on a global and intercultural basis. The major elements of the Institute mission are to promote closer educational relations between the people of the United States and those of other countries and to strengthen and link institutions of higher learning globally.

According to [8], considering the data from 2007-2009, the ratio of incoming to outgoing students is the USA is 3 to 1. About 262,000 American students studied abroad in foreign countries while the number of international students enrolled in U.S. universities and colleges in 2008/09 was over 672,000.

Global Engineering Education Exchange (Global E3) is an international exchange program for engineering students at participating universities. The program allows students to take courses overseas for credit at their home institutions, and receive practical education within the systems of another country. At the same time, the Global E3 program strives to minimize the increased costs associated with most study abroad programs. Global E3 works closely with GE4 Consortium of European partner universities promoting mobility exchanges of students

between the US and Europe. The partners of joint Global E3/GE4 in addition to over 30 American universities include over 40 universities in Hong Kong, Japan, Mexico, Singapore, South Korea and United Kingdom as well as universities in Austria, Denmark, Finland, France, Germany, Italy, Portugal, Spain, and Sweden.

Majority of the American universities support very popular Study Abroad Programs, where an organized group of students visits a foreign country with a supervising faculty during the course of short summer term taking classes and learning the host country language and culture. The majority of study abroad participants choose to study abroad for eight weeks or less. Also many colleges, specifically for majors in social sciences, business fields, humanities, the arts and physical or life sciences have a provision for a junior year or semester abroad. Around 36% of study abroad participants go abroad during their junior year.

Issues

The DeSIRE² Program is dedicated to a branch of engineering. One of the issues to consider is the universality of science and engineering: Engineering equations are the same all over the world. Unlike other fields such as art, history, languages, literature and even business administration, there is no perceived advantage to students to learn these subjects abroad. In fact, the perception is that they may lose out in the clarity of explanation if learned in a different educational culture (or in a different language). An additional factor is that the majority of American students do not feel comfortable leaving the “English only” environment to get into the environment that everyone speaks e.g. Czech, French, or Polish (we do not consider exchanges to Spain or Latin America). An anxiety before crossing the ocean to far away place may be yet another psychological factor.

The following sections elaborate four major issues we identified as the main obstacles in encouraging American engineering students to spend semester abroad.

Course recognition

Recognition of the courses is still one of the most crucial factors concerning the quality and range of student exchanges. The decision of a student to go abroad is mostly determined by this factor. In few cases students stated that they would still take part in the DeSIRE² program even if they knew they would not get a full recognition. Having said this, students obviously have many other motivations to study abroad. The DeSIRE² institutional agreements state that Atlantis mobility students are entitled to expect full academic recognition from their home university for credits achieved during the ATLANTIS study period, in accordance with the Learning Agreement. All the DeSIRE² project partners' universities had a clearly defined transfer system between ECTS and American credit hours. However, there were differences in the procedures of signing the Learning Agreement and course recognition between the European and the American universities. Generally, EU universities are more flexible allowing the students to choose courses (it is one result of 13 years of

Erasmus experience), while some US universities tend to have more rigid control of the course selection. One of the concern here is the ABET accreditation rules of American engineering programs which requires curriculum. Main parties in EU co-deciding about the courses in the Learning Agreement are students and academic coordinators. Less involved are deans, There is less flexibility in the US where the academic program coordinators and student academic advisors are involved to assure that the courses abroad match the courses they suppose to be replacing.

There were differences in ECTS/credits calculations [9] based either on workload only on workload and type of the course, e.g. lecture, seminar, existing or not existing etc. Also, occasionally confusion arose in credit calculation from local or national credit hours systems (in the US) to accepted in Europe ECTS credits and vice versa.

Financial situation

Financial obstacles are not too significant for the EU students. ATLANTIS stipends cover living costs and travel expenses. Tuition fees paid at home university (EU) are comparatively low (and often the tuition is free). Financial situation is considered much larger obstacle to the US students. The travel stipend is lower than the grant offered to the EU students. Only in some cases, students are able to cover from the scholarship all living costs, travel expenses or tuition fees (paid at home universities) when studying abroad. While the DeSIRE² program provides a modicum of financial assistance, it is often not sufficient for American students who may leave behind part-time jobs, apartments with leases and car payments for a car they will not use for six months. In USA, majority of students have to work in order to cover their living costs during the study period. However on one semester long mobility exchange they are not able to receive residence and work permits.

Information provision

Quality of information, both for outgoing and incoming students could be improved. The EU recommendations that the course catalogue “should be published on the institution’s website so that all interested parties can easily access it (sufficiently in advance for students to make their choices)” are often not fulfilled. Some universities publish the last updates concerning courses for international students quite late. Often European universities provide information only in the local language. Host universities are late providing course schedules, descriptions and other related information. Consequently, the exchange students and coordinators have problems to specify their Learning Agreements.

Students need more practical information not only regarding the academics but also in all spheres concerning exchange. Specifically, they need step-by-step description of required administrative procedures. Students need more practical information about studies and university-life as well as all practicalities of settling in a new country. This information should be provided to them before they go on exchange. Universities should collaborate with student organizations to support distribution of the information about the program.

Logistics

Logistical issues include the differences in academic calendars, where some European universities have different starting and ending times that do not align well with the US academic calendars. The perception is that students would lose one semester because of this misalignment and thus prolong their period of study and reduce opportunity of on-time graduation. Considering the tuition cost in American universities, such situation adds to student expenses and prevents them from joining workforce paying off the incurred debts. Other logistical issues include course offerings that may not align well with their program of study, the difficulty in arranging travel, accommodation, and other logistics in preparation for a semester of study abroad.

Conclusions

We have found it difficult to address the presented above issues in a convincing manner. The issue of universality of engineering has been the easiest to overcome by arguing that even though engineering science is indeed universal, engineering practice is not. This may include the use of the metric system and other design standards, but more importantly, how design decisions are made in other countries. They may also learn to team with engineers from other cultures. By studying and learning about how engineering is taught in other countries, they may also see how engineering is practiced there. This can give the American students a significant advantage when in the market for professional positions, especially in multinational companies or those that do significant business overseas. By and large majority of students have bought into this.

The other issues have been more difficult to handle. The students that have successfully sought to go abroad have been those that either did not have financial problems, and that overcame the logistical resistance of our academic system, which often does not make it easy for them to do it. Other than provide greater resources for their study abroad, there is little one can do to overcome the economic issue. In the difficult current economic times for public universities in the US, this is simply not an option in the foreseeable future. One argument that we have made is that their ability to spend an extended period of time in a foreign country will likely end once they graduate. Some financial difficulties at that time may result in priceless experiences and memories that will last a lifetime. This argument has had some success, but more incentives, financial or otherwise, must be found.

Andrew J. Kornecki, Wojciech Grega, Avelino Gonzalez, Europe/USA Mobility Exchange in Engineering: Why Is It Less Attractive to the American Students?

The paper describes inter-Atlantic mobility program for engineering students and addresses related issues of educational system differences, accreditation, credit point transfer, academic programs requirements, and schedules. The economic, psychological, and sociological causes of a limited interest in the exchange program from the American students' side are discussed.

The last one, logistical issues, is where most progress can be made. While the re-alignment of academic calendars is hopeless, better systematic ways to provide attractive coursework and a better system to identify such courses could be done. We are currently working hard to make that obstacle disappear through better advisement, computerized access to coursework abroad, and other such measures.

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