

2006-2010: PREPARING ENGINEERS FOR THE GLOBAL WORKPLACE: IOWA STATE UNIVERSITY

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Preparing Engineers for the Global Workplace: Iowa State University

Abstract

Iowa State University’s College of Engineering recognizes the importance of study and work abroad in an engineering student’s education. As such, it is the task of the Engineering International Programs & Services (EIPS) department at Iowa State University to promote and foster study and work abroad programs among students in the College of Engineering. In this paper, we discuss the methods utilized by EIPS in order to achieve the goal of doubling the current number of students studying and working abroad. Specifically, we highlight how strategic partnerships are created, how students and faculty are actively involved in recruiting and support programs and how EIPS is promoting study and work abroad through collaboration with other departments at Iowa State University.

I. Introduction

To remain competitive in an increasingly global economy, Iowa State University’s College of Engineering urges students to consider studying and working abroad. The Engineering International Programs & Services department (EIPS)¹ promotes international opportunities to a student body of 4,700 undergraduate and 900 graduate students – the 7th largest undergraduate enrollment in the U.S. As **Figure 1** shows, in just five years, study abroad participation has tripled with over 160 engineering students studying and working abroad each year (students working abroad are not included in Figure 1).

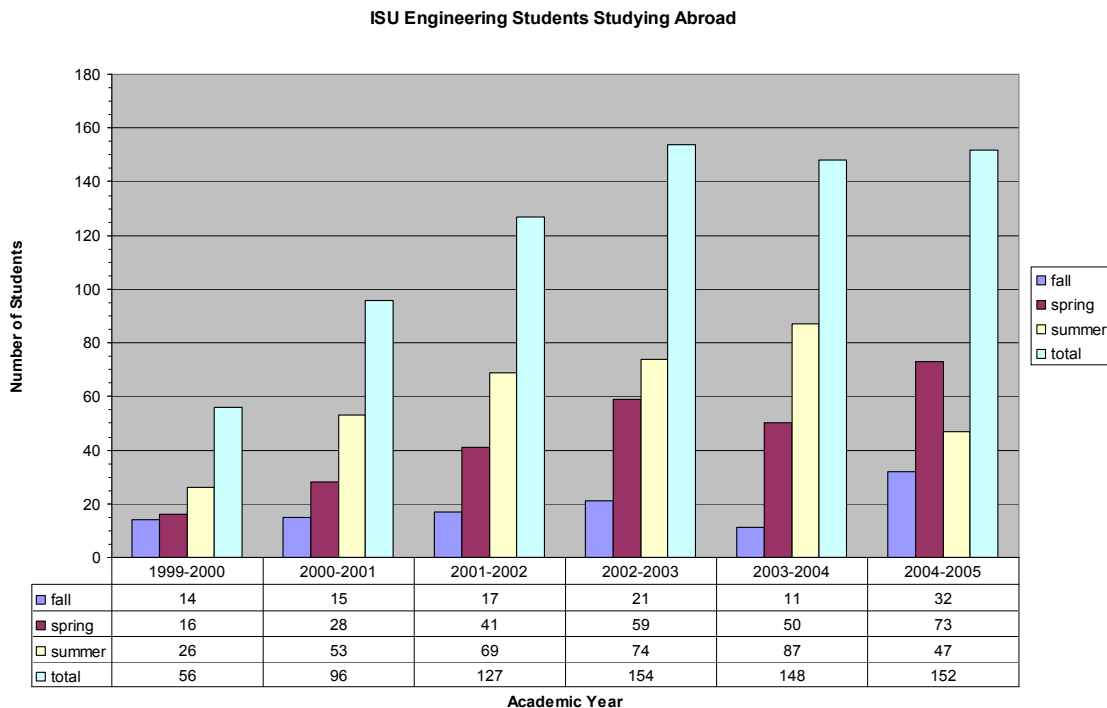


Figure 1 – ISU Engineering Students Studying Abroad

Our success comes from the breadth of opportunities offered to students, the commitment of the College and the involvement of stakeholders such as faculty, students, cross-college collaborators, international academic partners, industrial partners and contributors.

This paper will present a basic overview of the College of Engineering's International Programs' initiatives. It will focus on challenges, successes and "what works" to get engineering students abroad so that they are prepared for leadership roles in an increasingly complex, culturally diverse national and global society.

The College of Engineering's Strategic Plan² indicates that we will prepare our students to become leaders in a profession dominated by globalization by offering them increasing opportunities for international experiences. This commitment to international learning is based on the premise that

- Engineering is a global enterprise
- Engineering education must prepare future engineers for careers in a global market
- Engineers must be prepared to be global citizens

II. International Strategic Partners Model

Although a variety of ad-hoc types of partnerships existed between engineering faculty and their international partners since the early 1970's, it was not until 1998 that the College took a more strategic approach and commitment to developing international collaborations. Since that time, we have created academic and research partnerships with over 25 universities in more than 15 countries around the world including Australia, Brazil, China, England, Germany, India, Ireland, Mexico, Singapore, Spain and Turkey. Through these partnerships, we are able to offer semester, year-long and summer study abroad options. Some study options also include work abroad which is a result of our industry partnership collaborations.

Criterion used for determining new international partnerships includes the following:

- Must be win-win for all partners
- Will engage many participants, including
 - Strong educational institutions
 - Industry
 - Faculty, students and engineers
- Leverage will be through focus and breadth
- Involve multi-organization partnerships in multiple countries

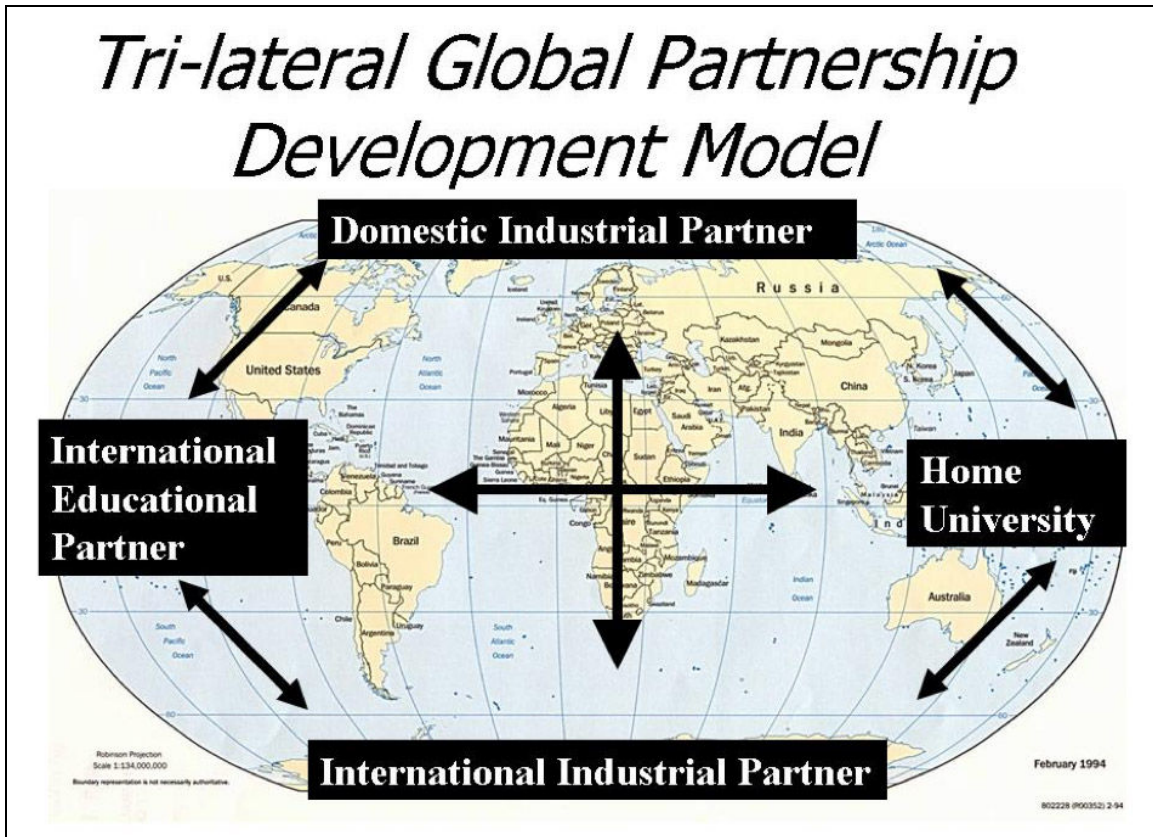


Figure 2 – Tri-lateral Global Partnership Development Model

In addition to measuring new partnerships by the above criterion, we use a “Tri-lateral Model” as illustrated in **Figure 2** as an approach to building new programs. The three components of the Tri-lateral Model include the Iowa State University College of Engineering, our international educational partner and our global strategic industrial partner. We believe that the strength of this approach has played a key role in our ability to offer international internships and academically robust study abroad options.

One example of this Tri-lateral Model (**Figure 2**) is the Iowa State, Hochschule Mannheim, John Deere International Coop Program. This program is based on a reciprocal exchange of students between the Iowa State College of Engineering and the Hochschule Mannheim. Students study abroad for a semester or year after completing a rotation of coop experience at either the John Deere Waterloo or Mannheim facilities. This gives students the opportunity to experience John Deere at both an American and German facility. Students have reported that this program gives them the opportunity to observe and function in two different corporate climates of the same company.

III. International Multi-Partner Action Program

Faculty members in the college have also taken a greater interest in international learning opportunities. One reason for this increased interest is that engineering faculty members realize the importance of study abroad. It has been noted that engineering faculty believe “students who

have participated in study abroad programs are better problem solvers, have strong communication and cross-cultural communication skills, and are able to work well in groups of diverse populations and understand diverse perspectives.”³ One of the ways we involve faculty is through our International Multi-Partner Action (IMPACT) grant program which funds groups of 3-5 engineering faculty for international partnership development. IMPACT teams travel abroad to either develop new partnerships or strengthen existing partnerships both in academia and industry. Faculty participants return to Iowa State and serve as Program Coordinators and resources to students for these programs.

To qualify for an IMPACT grant, an IMPACT team must meet the following criterion:

- International university location qualifies to be a strategic partner
- The project is lead by an Engineering Exchange Program Coordinator. (The Coordinator will recruit and lead a team of three to five faculty, preferably from differing engineering departments, who will work collaboratively to ensure the growth of the program with our partnering institution to enhance faculty and student exchange opportunities.)
- Course equivalencies will be identified and reviewed for approval
- Industry and alumni visits will be incorporated when feasible
- Other sources of money being contributed to the project are identified to reflect matching dollars

Over the past three years, the IMPACT grant program has funded over 50 trips to more than 23 countries involving over 70 faculty members. These trips have resulted in not only initiating new research collaborations, but also creating three new summer programs, seven new exchange programs and a variety of sabbaticals and faculty exchanges.

IV. International Task Team

The College of Engineering is comprised of ten different academic departments⁴, each of which has a representative who serves on the International Task Team (ITT). ITT is a Dean’s Committee; each ITT member has been selected by their Department Chair and the Dean of the College. The group has been charged by Dean Mark Kushner to develop initiatives that support the college’s International Education and Experience Mission through faculty involvement, which serve as a conduit between the individual academic departments and EIPS.

Co-Chaired by the Director of EIPS and a Senior Engineering faculty member, ITT works with issues such as the credit transfer process for students, increasing the number of students with international experiences and developing new programs. Additionally, ITT is a central forum for discussion about programs being developed within departments. One example of this collaboration within ITT has been the development of a course entitled Engr 320X⁵. This 3-credit, International Experience course is designed for students studying abroad – the student completes a special project while abroad, journals his or her experience while abroad and writes a report upon returning to Iowa State. Although this course was initially created within the Civil Construction and Environment Engineering Department, students across all engineering curriculums are taking advantage of this course through the assistance of ITT.

V. Society of International Engineers

The Society of International Engineers (SIE)⁶ is our 600+ member student organization. SIE is supported by EIPS and lead by Iowa State engineering students. SIE's mission is to

- Promote Study/Work abroad and international learning
- Provide hospitality to incoming exchange students
- Provide re-entry support to returning ISU engineering students
- Promote the value of international learning to prospective students

SIE's success is due in large part to its approach which involves returning ISU students who host current exchange students and also promote study/work abroad. During the 2004-2005 academic year, SIE

- Promoted study abroad to over 5,600 students and parents through classroom presentations and study abroad fairs
- Welcomed incoming exchange students and helped them acclimate to Iowa State through bi-weekly social events and by pairing them with an engineering student "partner"
- Organized cultural experiences including trips to cities and areas of interest in the mid-west
- Helped develop a new EIPS K-12 program by speaking to over 342 K-12 students
- Provided leadership opportunities to its officers, chairpersons and members

VI. Languages for Cultures and Professions

Languages for Cultures and Professions (LCP)⁷ is an excellent example of cross-college collaboration. In 2004, this second major option was created through the combined efforts of the College of Engineering and the Department of Foreign Languages and Literatures and offers students the opportunity to both study and work abroad for credit.

The long-term goal of the project is to create a lasting collaborative curricular program between the Department of Foreign Languages and Literatures and the College of Engineering to better prepare students to function successfully in a global environment. The "critical need" identified for such a program at ISU responds to the fact that multinational corporations with close ties to ISU have increasingly expressed interest in recruiting students who have the requisite international culture and language experiences. This external demand is compounded by a significant increase in interest among students pursuing a second major in foreign languages.

Similar to the model utilized by the University of Rhode Island's International Engineering Program⁸, LCP works as follows:

- Engineering students declare a second major in French, German, Russian Studies, Spanish, or Chinese

- Language and culture courses focus on professions, conversation, culture, civilization and electives
- Internship and study abroad opportunities are incorporated
- Students complete 30 credits within the option beyond the fourth semester level, i.e., 202 level

VII. Conclusion

As M. Peter McPherson, president emeritus of Michigan State University, states, “Study abroad is not a frill. Greater engagement of American undergraduates with the world around them is vital to our nation’s national security [and] economic competitiveness.”⁹

Iowa State University’s College of Engineering is committed to the premise that tomorrow’s engineering leaders must not only be technologically savvy – they must also embrace and leverage globalization to advance engineering and economic vitality while addressing the critical needs of society. While there are many paths to achieve success in these areas, we have chosen to create a program which offers a breadth of opportunities for today’s students.

The impact of this approach has resulted in the number of engineering students at Iowa State with an international experience tripling within a five year period of time. With the continued support and active involvement of our faculty, staff, cross-college collaborators, international academic partners and industrial partners, we plan to double the number of students studying/working abroad and experience even greater success with preparing our students for their global leadership roles.

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