AC 2008-1092: INTERNATIONALIZING OUR ENGINEERS: SHORT-TERM EXPERIENTIAL PROGRAMS ABROAD FOR ENGINEERING STUDENTS

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Internationalizing Our Engineers: 
Short-term Experiential Programs Abroad for Engineering Students

Experiential programs are an important component of engineering education because they provide opportunities for students to apply classroom knowledge to real-world situations. When the experiential programming takes place in an international setting, the learning benefits are compounded. While there are a variety of ways in which students can obtain an international experience, we focus on only one here – short term, intensive programs. Specifically, students participating in a well-designed, short-term experiential international program not only gain valuable hands-on practical experience, but they also further develop their cross-cultural communication skills, knowledge of other countries and marketplaces, sensitivity to the perspectives of others, and in some cases, even language skills and ability to work in multi-disciplinary groups. These are all skills that our engineering graduates must possess if they are to become future global technical leaders and retain their place in Friedman’s “Flat World.”

To date, engineering students have faced particular challenges in finding appropriate study abroad programs. The unique obstacles faced by engineering students require an innovative approach to internationalizing their education. In order to address this challenge, a small, but growing number of universities are creating short-term, engineering-specific, experiential programs overseas. This paper will present cutting-edge program models and provide best practice advice and implementation strategies.

Unique Challenges for Engineering Students

The Institute for International Education’s (IIE) 2007 Open Doors report indicates that engineering students still make up a relatively small percentage of the overall number of students studying abroad, holding steady at 2.9% for the 2005-2006 academic year, a rate that has been consistent for the past five years and not substantially more than the 2.1% a decade ago. That is, while engineering’s relative participation in study abroad programs has increased by over 40% in a decade, it still lags the social sciences, business and humanities (21.7%, 17.7% and 14.2% respectively) by a considerable amount. According to the IIE data, only 6,556 students majoring in engineering (at either the undergraduate or graduate level) participated in a study abroad program during the 2005-2006 academic year.

To put this data into perspective, consider the total number of students in the United States seeking engineering degrees. The 2006 ASEE Profiles of Engineering and Engineering Technology Colleges notes that there were 373,074 undergraduates and 50,130 graduate students enrolled full-time (during the 2005-2006 academic year) at those U.S. institutions who participated in the report. We cannot make a precise comparison of the ASEE count of engineering students and the IIE data because the ASEE data includes students majoring in Computer Science; and IIE combines computer science with math. Although these 3,318 students comprise only 1.5% of the total study aboard population, we need to estimate the number that are from computer science in order to utilize the ASEE data. Based on NSF statistics for 2004, computer science graduates represented 80.7% of the total computer science and mathematics BS graduates. Applying this proportion to the IIE number above, we estimate
that 2,678 computer science students should be added to the IIE engineering total. Further, we have subtracted an estimated 100 graduate students to arrive at a total of 6556+2667-100 = 9123 engineering and computer science undergraduates who studied abroad in the 2005-06 academic year. Using the ASEE total eligible population of engineering and computer science majors, we can estimate that only 2.4% of eligible students enrolled in a US engineering or computer science program participated in an international educational experience. The bottom line is that engineering educators and international educators have a long way to go in the effort to internationalize our engineering students.

This alarmingly small percentage of engineering students who study abroad in an era of increasing globalization and concern about U.S. competitiveness is a result of several factors, not the least of which is a lack of programs that are specifically tailored for engineering students combined with the challenge of participating in international programs without the risk of deferring graduation. In this paper, we propose a programmatic model geared specifically towards engineering students: the short-term experiential program abroad. This model features an academic course which presents a technical subject within a global context, coupled with an intensive ten day to two week intensive study abroad experience that provides first-hand insights through site visits to corporations and academic institutions, lectures, and planned interactions with both international and host country students.

**Short-Term Experiential Program Design**

Experiential education programs and short-term study abroad courses are becoming particularly common ways for schools of engineering to provide an international experience for their students, in part because they can easily be introduced into a relatively inflexible engineering curriculum compared to traditional study abroad experiences. Experiential education, a model first articulated by John Dewey who developed theories of education rooted in and transformed by experience, is a term commonly applied to such “hands on” experiences as cooperative education, internships, outdoor education, organizational development and training, and service learning. In an experiential education program, students participate in a carefully chosen experience and then engage in reflection, critical analysis, and synthesis of related information. In Kolb’s model of experiential learning, the learners must begin with their own concrete experience, then engage in reflective observation, move to a stage of abstract conceptualization, in which they begin to comprehend the experience, and then engage in active experimentation of the concepts. In fact, reflection and analysis are key to distinguishing experiential education from experience alone. Joplin posits, “It is the reflection process which turns experience into experiential education.”

Especially given the recent surge in their popularity, there has been much debate among international educators as to the extent to which a program of less than eight-weeks can have a significant and lasting impact on students’ learning. Hulstrand published a prescient article about the gradual acceptance of programs of less than six weeks, stressing the characteristics of good program design. These were:

- Unassailable academic integrity
- Integration into the curriculum
- Affordable program design
- Good pre-departure orientation and preparation
Below we describe three examples of short-term programs: Plus3, INNOVATE and EMPOWER. Based on the successes of Pitt’s Plus3 program as well as the INNOVATE program (which originated at Rice University), IAESTE United States launched an initiative to develop and administer short-term experiential programs abroad in partnership with its institutional members in February, 2006. IAESTE United States provides the structure and support to create credit and non-credit-bearing, experientially-focused, two to ten week programs that have proven especially popular with this student population who often perceive it difficult to incorporate a regular semester or year-long program into their already demanding curriculum. In order to ensure that these programs are well-suited for engineering students and represent an effective experiential learning opportunity, IAESTE United States has identified several key program components that are required for every IAESTE United States short-term experiential program. IAESTE United States short-term programs must:

- Include course instruction on the technical issue as well as the cultural context both before and after the overseas portion of the program.
- Be experiential in nature, that is, the program must incorporate hands-on experiential learning element, such as a joint research project with in-country students, site visits to technical entities (companies, universities, etc.), service-learning project or internship.
- Provide opportunities for participants to engage in guided reflection such as journaling, group discussions and/or final projects.
- Provide opportunities for interaction with local industry leaders and researchers as well as local technical students whenever possible.

The development and administration of these short-term experiential programs abroad is a collaborative effort between IAESTE United States and its institutional members. IAESTE United States hired a program manager to provide staff support in order to assist with all of the stages of program development including marketing, application process support, visa and work permit services and international insurance coverage. As a member of the IAESTE international network, IAESTE United States brings to the table an extensive network of technical companies who offer site visits to students as well as counterpart offices in over eighty countries who can assist with travel arrangements, on the ground support and cultural activities for the program. The institutional members of the IAESTE United States, in turn, provide the educational content for programs, including course development, excellent science and engineering faculty, a vehicle for awarding academic credit for the programs, and experience with outcomes assessment.
Along with academic expertise, the IAESTE member universities also contribute their own overseas contacts in business, academia and government. Still in its nascent stage, the IAESTE United States with its consortium of universities is already sponsoring cutting-edge international program for science and engineering majors and becoming a spring board for collaborative programs among top technical universities. In 2007-2008, IAESTE United States and its members are sponsoring the following programs:

- Earthquake Engineering in Turkey (Purdue University)
- EMPOWER: Engineering for a Sustainable Future (University of Pittsburgh).
- IMPACT: Advancing Women in Technology (University of Illinois – Urbana-Champaign)
- INNOVATE: The International Technology, Globalization and Leadership Conference for Engineering, Science and Technical Students (Rice University, University of Tulsa and the University of Pittsburgh)
- KAIZEN Japan: Women as Global Leaders (Kansas State University)

While developing and administering short-term programs is a challenge, ensuring the affordability of these opportunities for students can also be difficult. We have learned that it is important to keep the costs of a two-week program below $4000. The program cost includes transportation from a gateway city, visas, hotel and some meals, in-country transportation, and any entrance fees for cultural activities. If the program is built into the regular academic year, the tuition cost may be included as part of the student’s regular tuition. For programs in the summer, an additional amount has to be added to cover tuition. Staff costs can add considerably to the trip; typically, at most, only staff travel is built into the program cost with salaries being covered by other sources. Note that a trip for 20 students with two staff can add $250 to $300 to each student’s cost. All of the programs discussed above are operated at minimum cost. For example, the 2008 Plus3 program will cost each student $2950 regardless of the destination (Brazil, Chile, China, or Germany) since we did not want students to select a trip based on cost. As an incentive, engineering students who earned a 3.00 their first semester (Plus3 is for freshmen only) received a $500 scholarship for Plus3. Certainly, it is possible for the institution to solicit contributions from corporate friends or alumni that could be used to either subsidize the cost of the trip or provide scholarships to selected students. In addition, beginning with the 2008-2009 academic year, short-term program participants will be eligible to apply for IAESTE United States scholarships.

**Plus3: A first Study Abroad Experience for Freshmen Engineering and Business Students**

The University of Pittsburgh has been one of the leaders in developing short-term, experiential programs, beginning with its Plus3 program. The “Plus3” program is designed to interest a relatively large portion of first year engineering and business students in international study. It builds upon material covered in the College of Business Administration’s “Managing Complex Environments” and the Swanson School of Engineering’s “Engineering Analysis 2” courses; hence the name “Plus3.” The three-credit course begins with four preparatory Sunday afternoon sessions in March and April, followed by a two-week study trip in early May, and ends with each business-engineering student team presenting a final report in early September. During the two-week trip, students work in teams as they participate in a series of company visits and prepare a report on a particular industry. Plus3 students also interact with local students, hear guest
lectures from host universities and make several cultural visits while in the host country. Each trip is led by either an Engineering or Business faculty member accompanied by a support staff from Engineering, the College of Business Administration or the University Center for International Studies (UCIS). Plus3 aims to cultivate interest in foreign language study and future study abroad. This is particularly important for engineering students, as the discipline has traditionally been less well-represented due to time constraints imposed by strict curriculum requirements. The Plus3 program serves as the University’s model for its “Integrated Field Trips Abroad” programs. Currently over 100 students participate in the program each summer. This spring they will spend two weeks in Brazil, Chile, China (see Figure 1), or Germany; a fifth site will be added for 2009. The Plus3 Program received the Institute for International Education’s Heiskell Award for innovation in study abroad in 2005.

INNOVATE: A Conference on Globalization, Technology, and Leadership

One of the initial programs adopted by the IAESTE United States consortium has been the annual INNOVATE conference for undergraduate and graduate technical students that examines the relationship between technology, globalization, and leadership in the contemporary marketplace. The conference was created in 2004 by Rice University, and leadership for the program has since been assumed by member institutions in the IAESTE United States consortium, including Rice, the University of Tulsa, the University of Pittsburgh, and Georgia Tech. Student delegates spend five days each in two Asian cities, meeting with key business, academic and government leaders and conducting professional visits to leading technology companies. The venues for this conference change on an annual basis. The 2005 program was in Singapore and Tokyo; the 2006 program was in Shanghai, China and Osaka, Japan; the 2007 program was in Beijing, China and Bangalore, India (see Figure 2); and the 2008 program will be in Ho Chi Minh City, Vietnam and Singapore. INNOVATE is funded in part by a National Science Foundation Partnership for International Research and Education (PIRE) grant.

A discussion of the INNOVATE 2005 program provides a useful overview of the program design elements that, based on the initial outcomes assessments, seem to have the greatest impact on student learning. That conference took place March 6-13, 2005, and involved 55 students representing 12 different countries and 4 different continents. In addition to the organizing US institutions, the conference collaborators included Tokyo Institute of Technology, Keio University, the National University of Singapore, and the International University Bremen (now Jacobs University). The conference considered four themes: the relationship between academia, government, and industry (e.g.,
government's role in encouraging development of new industries such as biotechnology and nanotechnology ventures); technical innovation (e.g., entrepreneurship, design and development of new technologies considered within a cultural context); ethical obligations of technology use and leadership (e.g., establishing business ventures in developing countries); and effective global leadership (e.g., problem solving in non-Western countries, working with a multicultural workforce). Each day of the conference was organized around one of the conference themes. For example, one day focused on the semiconductor industry in Singapore as an example of the collaborative relationship between government and industry. As conference activities, the day opened with a manager from the Economic Development Board discussing the history of the semiconductor industry in Singapore. The students next took a tour of TECH Semiconductor, a company formed in partnership with the EDB, Texas Instruments, Canon, and Hewlett Packard, to understand the technology behind the industry. They concluded the day’s programs with a tour of Micron Semiconductor and a talk by the vice-president of market development who explained why the Boise-based company had adopted a global business strategy. Subsequent days during the conference were similarly organized around visits with professionals in the biotech industry, entrepreneurship, the automotive industry, and consumer electronics. It is significant that none of the conference talks were strictly technical; rather, they considered technology in its social, economic, or political context.

One of the most significant elements of INNOVATE is the academic course that accompanies the program. For many of the students, INNOVATE represents their first trip abroad, much less to Asia. Although all of the students have a demonstrated interest in international activities, very few have studied the history, economics, or politics of Asia. The organizing universities have designed a three-credit course to accompany INNOVATE, taught via interactive video between the University of Tulsa, Rice University, and the University of Pittsburgh, and available on-line for students at other universities. The course, which draws upon area and discipline specialists, introduces students to topics including the history, politics, and economies of countries in Asia; theories of globalization; technology as an economic driver; and ethical issues in global community. In addition to assigned textbooks, students have access to a customized “INNOVATE Reader,” via a password-protected course website, that includes articles from US and international newspapers and magazines. Students are expected to complete several writing assignments regarding class topics. As their final project, they prepare posters regarding the themes of the INNOVATE conference and present both in a “virtual” poster fair and a separate venue on their home campuses.

An important aspect of INNOVATE revolves around reflection as an important aspect of student learning. Throughout the course students write a series of reflective essays on such topics as globalization, microfinancing, and expectations for the trip. An important reflective essay is incorporated as part of a trip journal that each student keeps. Throughout the trip, students are asked to reflect on what they have observed, typically during long bus rides, or as part of a wrap-up session. Approximately 10 days after returning, and after submitting their journals, students participate in a structured reflection and debriefing session led by a trained faculty member. We have learned that
after visiting countries, especially developing world countries, that a period of time devoted to reflection is not only valuable but necessary to enable students to better understand what they saw and learned. Below are three examples of student reflections from INNOVATE 2006 and 2007:

- **Reflection 1:** While I was wandering around [in Bangalore] . . . I turned to an India girl and her friend who were about my age and asked if they knew where I could find hair clips. They said that they knew of a vendor just down the street that they could take me to. So I said goodbye to the boys and put my trust into these two girls. They took me through several shortcuts and came to an open road and pointed towards the beacon of all jewelry vendors. During our walk we talked about school. One was studying psychology at a local university. It was fun to step out of my comfort zone and talk to a girl that wasn’t all that unlike me but was living on the other side of the world. . . The international students have shown me that I never truly understood diversity, because to me diversity really means that although we come from different parts of the world and call different places home, we are all truly the same. Although it sounds strange the advisors really helped me buckle down and figure out what I want to be when I grow up. All in all, I realize that it’s now or never, I must “pursue my passion.”

- **Reflection 2:** Simply put, this experience changed my life. I feel that I have brought back with me a great understanding of the “bigger picture”. Seeing first hand both China and India has had a profound impact on my thinking on a global scale. I now have a greater understanding of how business is conducted overseas, along with a greater understanding of cultural differences that have to be dealt with. By learning as much as I did during the short stint abroad, I found that I came back to the states with even more questions than I left with. This experience has really taught me to question things in a different way than I have before, I suppose it has something to do with me “putting myself in other people’s shoes”.

- **Reflection 3:** After returning from one of the most incredible opportunities I’ve ever had the chance to experience, it is difficult describe in words just how much of an impact a trip like this can make on a person’s perspective on culture, business and life in general. I left the United States with the notion that I was going to experience this huge world in front of me, and I returned home with the realization that the world isn’t as big as it looks, and it’s shrinking smaller every day. There were several times on the trip where I would look at a situation and found myself thinking, “this is globalization.” We experienced globalization first hand, not only during our industry tours and informative seminars, but from the students and advisors surrounding us. I realized during the trip, that the students from Japan and China and other US schools were exactly like me, just from a different place on the world map. If you removed the cultural skin of each of us, we were all there for the same purpose: to learn about the globalization of technology throughout the world, particularly in China and Japan, and to experience a culture other than our own. The ironic part of this uniform goal is that we were living proof of the concept of globalization. From talking to the delegates from Chinese and Japanese universities, I became conscious of the fact that
students from around the world are learning the same concepts in school as I am, this class as example... Perhaps the most surprising experience for me was the ease of communication. I expected to be put in a situation with different students who spoke different languages and to have to hurdle over communication barriers. However, it was a pleasant surprise to find that most, if not all of the international delegates spoke English well, and could communicate with us easily... I truly appreciated this ease of communication, but I now wonder if the roles were reversed and Japanese or Chinese students with no English language background would be able to come to the United States and find that same hospitality. In several ways I realized that China and Japan are slowly accommodating globalization in their every day culture, but the United States is perhaps not as accepting or aware of it as it should be.

In the program assessments, INNOVATE delegates indicated that participation in the conference increased their knowledge about globalization and influenced the likelihood that they would seek future experiences working in a cross-cultural environment. More than sixty percent of the students reported that their participation in INNOVATE 2007 increased their knowledge about how globalization impacts their careers, what are the major components of effective leadership in a global context, and how technology impacts local economies, results consistent with student evaluations in each of the previous years of the conference. Additionally, they report that their participation is an influence on career-related actions that they intend to take, such as pursuing a job with significant international responsibilities. The conference organizers used the Intercultural Development Inventory (IDI) for the first time to assess the 2007 conference. Although complete results are not ready for publication, initial analysis suggests that students demonstrated significant gains in their intercultural effectiveness.

The program feature that seemed to have the most significant impact on the students’ experience, however, is the diversity of the delegates themselves. Of the 65 delegates who attended INNOVATE 2006, roughly half were enrolled at US universities. The remaining students hailed from Japan, China, Singapore, India, and Malaysia. For many students, both from the US and the foreign institutions, this was the first time that they had interacted with people from these countries. Outside of the formal conference program, these students spoke informally about their academic experiences, their career and personal aspirations, social issues affecting men and women in their respective countries. In fact, one Japanese participant in the 2006 program reported: “The thing that I gained by participating in [INNOVATE], such as way of acting in the cross-cultural situation, made my work better quality and my humanity, too.” Anecdotal evidence indicates that these students consider each other as part of their global network. In summers following the INNOVATE conference, several of the students reconnected as they made arrangements for their summer internships and research travel.

Some of the features that students cite as positively impacting their learning are consistent with the characteristics identified in the literature as elements
of sound short-term program design: The program is academically rigorous and is related to the students’ majors; it is a relatively affordable alternative for students to experience travel in Asia. For students from Pitt, Rice and Tulsa it is imbedded within a requires course that provides both a pre-departure overview of the countries being visited as well as a post-trip follow-up in order to ensure that they have the background necessary for their full participation. Students interact with business leaders and students from the host community; the faculty leaders have special expertise as related to globalization, technology, and Asia. As noted, the program requires that the students complete structured reflection upon return.

The 2008 program will take place in Vietnam and Singapore. The learning objectives for the program are:

- Understand the differences between Vietnam and Singapore in terms of their history, government, and economic strategies, especially as they relate to their respective roles in a global market;
- Understand the role of technology as an economic driver in Vietnam and Singapore;
- Understand a “knowledge economy” in the context of globalization and discuss the differences between Vietnam’s and Singapore’s efforts to train their respective workforces;
- Be able to articulate a definition of the term “globalization” and identify how it is impacting their respective fields of study and future employment;
- Gain awareness of differences in the business environments of the U.S. in relationship to the rest of the world, with an emphasis on Southeast Asia.

An additional focus has been included in Vietnam: non-governmental organizations (NGOs) in general and microfinancing in particular. Students studied microfinancing as part of their preparation and will have a site visit to an NGO during the visit to Vietnam. Students will learn first hand the primary focus of various NGOs operating in Vietnam and the relations between the NGOs and the government, as well as how the NGOs are funded and structured. In order to acquire a more in-depth knowledge about the other countries in Asia, students will also prepare a short paper and in-class presentation on an assigned Asian country and its relationships with Vietnam and Singapore.

The EMPOWER Program

During the 2007 spring semester, IAESTE United States partnered with the University of Pittsburgh to develop and administer EMPOWER: Engineering for a Sustainable Future, which took place in Brazil. Twenty-two undergraduate students representing seven U.S. universities and nine different engineering disciplines participated in the inaugural program. Three advisors accompanied the students on the program an engineering faculty from the University of Pittsburgh, an environmental engineer, and the IAESTE United States Program Manager. The University of Pittsburgh and IAESTE United States worked in tandem to ensure that the EMPOWER program design incorporated the necessary elements.

EMPOWER participants enrolled in a three-credit course taught by a Pitt engineering professor which began during the spring semester. While University of Pittsburgh students attended class in-person, other participants took the course “virtually,” viewing video-streamed lectures,
accessing course documents and readings online and submitting assignments. The EMPOWER course presented students with a model for understanding sustainability and how government policy impacts the U.S. approach. Guest lecturers provided students with, different sustainable energy approaches, Brazilian business etiquette, and an overview of Brazilian politics and history, as well as basic Portuguese language instruction. Finally, students were required to write both reflection papers on various aspects of renewable energy and sustainability as well as synopsis reports about the companies and sites that they were going to visit in Brazil. The EMPOWER course was designed to enable participants to have a context for what they would see on the overseas portion of the program and be able to incorporate these observations into a more comprehensive view of sustainability and the effect of political, environmental and cultural factors.

After six weeks of instruction, participants departed for the overseas portion of the program which lasted twelve days and consisted of site visits to companies and research centers in Rio de Janeiro and the greater Sao Paulo region, including Voith Siemens, the Centro de Tecnologia Canavieira, Usina Sao Jao Sugar Mill and Distillery (see Figure 3), and AES Eletropaulo Distribution Systems. The program concluded with a technical tour of the Itaipu hydroelectric power plant at Iguacu Falls. Each site visit consisted of a technical tour of the facilities, a presentation from company administrators, researchers or engineers on the company operations and plenty of time for questions and discussion. There were also schedule cultural visits and an opportunity to interact with faculty and students from the University of Campinas (UNICAMP).

The EMPOWER advisors facilitated discussions with the students following each site visit to guide them in fitting the research or processes they just saw into a Production-Consumption model of sustainability presented during the EMPOWER course. In addition to engaging the students in dialogue throughout the program, participants were also required to complete a trip journal to ensure that they fully reflected on their experiences throughout the program. Upon their return from Brazil, students completed a comparison research paper (between Brazil and the U.S.) and poster presentation that addressed a renewable energy topic of their choosing. Papers focused on various sustainable energy issues including:

- Investigation of Landfill Gas Projects in the United States and Brazil
- Corn Ethanol: Hope for Green Future? Ethanol Production in Brazil and the United States
- Hydropower and its Potential as a Sustainable Energy Source in the United States and Brazil

To ensure that students also received exposure to Brazilian culture and sites as well, the EMPOWER program provided students with guided tours of Rio de Janeiro, visits to Corcovado and Pao de Acucar, dinners at Churrascarias, a soccer game, and a Macuco boat tour and safari at Iguacu Falls. For the EMPOWER 2008 program, plans are underway to again work with professors from UNICAMP to recruit Brazilian student participants. Including participants from both U.S. institutions and a Brazilian institution will provide opportunities for cultural exchange between U.S. and Brazilian engineering students during the program.

In their program evaluations, EMPOWER 2007 participants revealed their own personal and academic growth. Some comments from the evaluations were as follows:
- “The EMPOWER program was extremely educational. Not only did we get a chance to learn all about sustainable energy, but we were able to do it in an entirely different culture on the other side of the world. You had an engineering lesson coupled with a new cultural experience.”
- “I learned that engineering can be exciting when it’s applied. Books, classes and labs do not adequately represent the actual experience of applied engineering.”
- “I learned that sustainability has so many different meanings and impacts on different people and industries.”

Admittedly, the EMPOWER 2007 evaluations only provided anecdotal evidence of the learning outcomes achieved by its participants. In addition to the written program evaluations, as with the INNOVATE, EMPOWER participants were asked to complete the IDI prior to their departure for Brazil and again after their return. Nineteen students completed the pre-program IDI and twelve students completed the post-program IDI. Due to the small sample size, statistical analyses were not conducted for the pilot EMPOWER.

Conclusions

The demand and need for professional skills in technical graduates is well-known. ABET’s criterion 3(h) requires engineering graduates to have the “the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.” There is still very little data, however, on whether short-term experiential programs abroad such as INNOVATE and EMPOWER can serve to help students understand engineering within a global context. The directors of the INNOVATE conference are conducting assessment of the program’s impact on student learning, specifically whether participation in INNOVATE influences students to engage in activities associated with cross-cultural interactions, leadership, and their post-graduate career decisions. After experimenting with the use of the IDI for the EMPOWER 2007 participants, IAESTE United States is working to create a more comprehensive evaluation protocol to gauge the effectiveness of its short-term programs. Instead of a pre- and post-evaluation model which focuses on how much a short-term program may have changed the participant, IAESTE United States will begin evaluating these programs in terms of their overall impact on the participant, especially with respect to:

- Interest in completing an engineering or science degree
- Interest in incorporating a global perspective into practicing engineering or science as professionals
- An understanding of how societal, political or cultural issues impact the practice of engineering or science

With more comprehensive assessment, we can further explore the value of short-term experiential programs abroad and to assess the impact of such programs on learning outcomes.
related to global competence for technical professionals. Short-term, experiential programs such as INNOVATE and EMPOWER should not replace traditional study abroad experiences, but can be an important complement to the types of programs that universities make available to their students. Experiential education programs, following sound pedagogical design, can complement traditional academic experiences and stimulate student self-confidence to pursue future related actions.

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