

GLOBAL EXPERIENCES: SHORT TERM STUDY ABROAD PROGRAMS FOR ENGINEERING AND TECHNOLOGY STUDENTS

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Abstract

Faculty in the Purdue School of Engineering and Technology, Indianapolis on the Indiana University-Purdue University Indianapolis (IUPUI) campus, have created a number of short-term faculty led study abroad programs for undergraduate engineering and technology students. Each program has a partner university in the host country and a specific theme to their program, i.e. sustainability, motor sports, and computer graphics. These short-term study abroad programs are generally one to four weeks in duration in the foreign country with pre- and post classes on the IUPUI campus. The short-term courses were created to offer non-traditional students who have full time jobs, family obligations, or internship opportunities in the summer a chance to study abroad.

The international study abroad programs described in this paper generally consist of visits to industries, businesses, municipalities, or universities to meet with experts to hear presentations and see demonstrations. For example, the mission of one of the programs is service learning where computer graphics is taught to foreign students and/or faculty. In addition in all the courses, students learn first hand about the culture of the country where they travel. Students earn between two to three credits depending on the course. In addition, students earn a RISE (Research, International, Service, Experimental) credit on their transcript. All IUPUI students are encouraged to earn at least two RISE credits before they graduate. IUPUI offers scholarships, especially to those who have never studied abroad, in order to encourage more students the opportunity to study overseas. Typically, the School has between four to eight scholarships for students to study abroad.

This paper will discuss each short-term study abroad program, the benefits, and lessons learned for students, faculty and the university.

A Need for Study Abroad

Globalization is the interconnectiveness of people and organizations all around the world. Thomas Freidman wrote in his book, *The World is Flat: A Brief History of the Twenty-First Century*, "It is now possible for more people than ever to collaborate and compete

in real time with more people on more different kinds of work from more different corners of the planet and on a more equal footing than at any previous time in history of the world –using computers, email, fiber-optic networks, teleconferencing, and dynamic new software.” [1] While a relatively new term, globalization has an impact in a number of areas including higher education. What does globalization mean for educators and students (potential graduates)?

Corporations are looking for employees who have knowledge, understanding, and experience living and/or working with individuals and organizations in other countries and other cultures. Recently in an article written by Thomas Freidman, Laszlo Bock, senior vice president of people operation for Google was discussing what Google looks for in hiring individuals, he said,

“The least important attribute they look for is “expertise.” Said Bock: “If you take somebody who has high cognitive ability, is innately curious, willing to learn and has emergent leadership skills, and you hire them as an H.R. person or finance person, and they have no content knowledge, and you compare them with someone who’s been doing just one thing and is a world expert, the expert will go: ‘I’ve seen this 100 times before; here’s what you do.’ ” Most of the time the nonexpert will come up with the same answer because most of the time it’s not that hard. Sure, once in a while they will mess it up, he said, but once in a while they’ll also come up with an answer that is totally new. And there is huge value in that.” [2]

In the case of a content expertise over world expertise, Google chooses the person with the world expertise. Here is an excellent reason why students should have the ability to study study abroad while they are pursuing their degrees. Students should learn to explore the world and different cultures, so that they will feel comfortable working in a global world.

Engineering and technology students need to understand and appreciate the business aspects of cultural differences around the world. Study abroad can give students these experiences and much more. Study abroad teaches students to be responsible and flexible, qualities that are valuable in the real world. Educational institutions and faculty are faced with the challenges of how to enhance the curriculum to include experiences in such areas as: globalization; collaborative skills with diverse groups; knowledge of cultures; and foreign language. Short study abroad programs can assist to accomplish some of these goals.

One way to teach students about globalization and have an appreciation for another culture is to offer various opportunities to study abroad. Offering short-term study abroad opportunities in areas related to students field of study or complementing areas, such as sustainability, are especially important to foster student interest. Many students are reluctant to study abroad for various reasons including: they don’t feel comfortable leaving the U.S.; they work full time; they have an internship opportunity; they have a family they can’t leave home for long periods of time; they don’t have the money; the course doesn’t fit into their program; etc. There are many excuses, not surprising since very few U. S. citizens even possess a passport. Matthew Kepnes, the creator of

NomadicMatt.com and an extensive international traveler said, "Americans are going to have to speak more languages and be more culturally savvy. We have to change because we have to do business with all these other cultures." [3]

Background Short Study Abroad Programs

The most common type of undergraduate study abroad courses in the U.S. are short, typically between one to eight weeks in length, or lasting less than a semester or quarter. They are generally conducted in the January term, spring break, or summer. About one-half the students who study abroad choose short-term programs. Short-term programs are more appealing to students, in fields like engineering and technology for financial reasons and because the course may fit into their academic program. However, short-term study abroad programs are relatively new. In 1996-97, only 3.3 percent of the students participating in study abroad were in short-term programs. [4]

During the twentieth century mostly wealthy students were the only ones who were able to study abroad. The explosion of globalization at the end of the twentieth century has changed study abroad by encouraging larger numbers of students from more diverse backgrounds and many different fields of study. These types of students were attracted to the shorter programs because of the programs have reasonable costs. [4]

Short-term study abroad programs have suffered criticism during their development and arrival into higher education. Many, especially those who taught the larger study abroad programs, do not believe that one week or one month is enough time for a significant experience for students. [4] However, a 2009 study conducted by faculty members at the University of Minnesota found that there was no significant difference in global engagement for students who had studied abroad whether they studied for a longer or shorter period of time. [5] The research group surveyed more than six thousand alumni from twenty universities who participated in study abroad programs over a fifty-year period. Another study conducted in 2006 on short-term study abroad (e.g., 4 weeks) programs indicated that short-term study abroad programs have an impact on intercultural sensitivity. [6] There have been other studies that have confirmed similar results.

Germany and France: GO GREEN Study Abroad

One example of a short study abroad program and the first to be offered in the Purdue School of Engineering and Technology, Indianapolis is the GO GREEN program, which stands for Green Organizations: Global Responsibility for Environmental and Economic Necessity. This short-term study abroad program was developed in 2002, specifically for engineering and engineering technology students to learn about sustainability and sustainable development in businesses and industries in Germany, a leading country in sustainable practices. The first GO GREEN course was held in 2003 with seven students. The course was developed with the assistance of our university German partners at the Duale Hochschule Baden-Württemberg Mannheim.

GO GREEN is an interdisciplinary course emphasizing sustainability, globalization and

German culture. This course looks at sustainability practices in businesses and industries for the purpose of being environmentally responsible, energy efficient, cost effective, and socially responsible. Students visit businesses, industries, municipalities and universities; such as, Daimler, Roche, MVV Energie, City of Mannheim, University of Kaiserslautern, etc. to see imbedded sustainable practices and various innovative new methods of technology, manufacturing, and engineering. Germany is known for its innovative technology and engineering practices and their sustainable culture and business practices. Sustainability or sustainable development has been widely practiced in Europe for decades, especially in Germany. In addition, the German culture practices sustainability in recycling, living, and conservation practices.

The GO GREEN course consists of pre- departure classes at IUPUI, which include information about the course topic in addition to cultural and traveling aspects of the one-week program in Mannheim, Germany, and a one full day post trip class at IUPUI about three weeks after the Germany program.

The one-week classes in Germany include discussions, guest lecturers, visits and tours of businesses, industries, municipalities, and universities in Germany, as well as, post discussions of the visits. Some of the industries visited are Daimler, Roche, MVV Energie, BASF, City of Mannheim, etc. where students see first hand the sustainable practices, in addition to their manufacturing processes. The class travels by foot, train, and tram to all the destinations, while housed in various hotels around the city of Mannheim.

This GO GREEN Germany study abroad course has been taught for over 10 years. In this course students purchase their own airline tickets to Germany, and reserve their own accommodations. While these methods are slightly unusual, they work well. Students learn independence very fast in a foreign country. Students are assisted on the front end and encouraged to partner with other students in traveling and accommodations.

In 2011, the GO GREEN course was also offered in Marseille, France. This program is put together in partnership with our partners at the Polytech Marseille (ex-ESIL) Aix-Marseille Université. The GO GREEN program in France is run exactly the same as the program in Germany; students meet the professor in Marseille and arrange their own airfare and hotel. The modes of transportation for GO GREEN France are by foot, boat, subway, and rented vans, which are driven by the professors.

Germany: Motorsports Study Abroad

Indianapolis has often been called the capital of racing. It is home to the Indianapolis Motor Speedway, many racing teams, and race affiliates. Indianapolis is now also the home to the only Motorsports Engineering degree in the United States. Motorsports Engineering is a Bachelor of Science degree offered by the Purdue University School of Engineering and Technology, Indianapolis only on the IUPUI campus. The program draws students from all over the U.S. and internationally. Since the program started, there have been two graduating classes and all graduates are employed in either the racing or automotive industry. Many of the students have opportunities to intern during the racing season, which includes all the summer months. In order to develop an

opportunity for students to have a short-term study abroad program, which did not interfere with opportunities to intern, the Motorsports Germany program is offered during IUPUI's spring break. The first program was offered in 2013.

The faculty member in charge of the program works with Heilbronn University of Applied Sciences, which has been a long-term partner of the School. The first year, eight students attended the program. The students and faculty member stayed in Heilbronn and visited: an Audi production facility; Audi Quattro (which converts the Audi R8 to a sports car for customer race team); Porsche and Mercedes Museums in Stuttgart; Bosch Motorsports; and Formula One Racetrack. Cultural visits for the Motorsports group include sites the town of Heidelberg and Heilbronn. The Motorsports students also meet with students at the Heilbronn University of Applied Sciences and the school's Formula One student team.

Students in the Motorsports study abroad class keep a daily journal and write a major paper relating to Germany's automotive or racing industry. All students enjoyed the first trip and one of the students on the trip obtained an internship at Bosch Motorsports.

Spring break 2014, twelve students will be enrolled in the Motorsports study abroad spring break class. In addition to spending time in Heilbronn, this class will travel to Cologne, Germany to add more cultural aspects to the trip. This change was a direct result of comments from the first group of students who suggested seeing more of Germany. Cologne is a sister city to Indianapolis. The students will have a walking tour of historic Cologne and a visit to a local university. The course will be based in Heilbronn again, students will have the same opportunities as the previous year with the exception of visiting Bosch Motorsports this year because of the company is limiting visit this year. Instead, the group will be visiting a Porsche manufacturing facility in Stuttgart.

The Motorsports study abroad program gives Motorsports students an opportunity to study abroad for one week during spring break and have the summer for internships. In addition, it is geared specifically towards the Motorsports program. Students earn two credit hours for this course. They meet several times with the professor prior to leaving for Germany and again when they return. The students and professor travel together and stay in the same hotel while in Germany.

Poland: Computer Graphics Technology Study Abroad

The opportunity to organize a study abroad program in Poland came about rather by chance. The Computer Graphics Technology (CGT) program at Purdue University- West Lafayette (WL) was approached by its own International Programs Office (IPO), which had been in contact by several Polish universities expressing a desire to identify technology programs that might be of interest to their students. As Computer Graphics Technology had previously delivered several short workshops at Tula State University in Russia, the IPO Director contacted the department to see if it would be interested in an exploratory visit to three campuses in Poland. What started as a purely fact finding

mission turned into a very successful study abroad program on the IUPUI campus. After faculty had visited Poland for two successive summers where he offered two or three day workshops to students in the cities of Poznan, Krakow and Rzeszow, it became clear that there was a growing interest in a long-term association being formed between Purdue University (WL) and two of the Polish universities.

The first study abroad trip with students was at Purdue University -West Lafayette in 2004. Then with the faculty member's relocation to IUPUI, he began to promote the idea of carrying on the study abroad program in Poland among the CGT faculty of that campus. To his delight, the plan was met with enthusiasm as a means to not only offer students an opportunity to provide a service-learning course, but also couple it with an international experience. In 2005, IUPUI had secured the necessary credentials from the Office of International Affairs (OIA) to launch its own study abroad program in Poland and students were selected for the trip in May of that year.

Partner universities in Poznan and Rzeszow welcomed the U.S. students enthusiastically and marveled at the level of technical expertise they exhibited as they joined with the faculty members from IUPUI in delivering lectures, providing demonstrations, and leading laboratory sessions. Prior to their assignment in Poland, the students were required to attend pre-departure workshops where they were instructed on basic teaching techniques such as speaking to the audience, asking and answering questions, and techniques for successful demonstrations. Once in Poland, and being guided by the faculty, students were assigned duties, which included assisting faculty members during lectures by demonstrating the computer techniques being taught, or team teaching with fellow students basic computer graphic concepts.

The CGT study abroad program in Poland has continued since 2005 to grow each year taking well over one hundred students in total to Poland. As this program is open to any student who has an interest or experience in computer graphics. In any given year teaching teams are made up of participants from Computer Graphics Technology and diverse programs, such as Interior Design or Computer Information Technology from the IUPUI campus and other statewide campuses within the Indiana University and Purdue University systems. For some of these students it has been the first time they have ever left the State of Indiana, or even been on an airplane. For all of these students it has been an eye-opening experience where they have had the chance to see their career path open up to include possibilities, which they never dreamed of such as becoming an industrial trainer, or project manager. Students in this program receive a grade, which reflects their preparedness and participation in their daily duties, which posted on their transcripts and may be used as credit toward graduation.

The program has also changed over the years for the faculty involved. Whereas the initial goal of the program was to provide a venue for Polish and U.S. students to learn within an international academic environment, requests from professional educators have allowed the program to expand to include high school students and practicing teachers, who desire to participate in professional development workshops aimed at assisting them in starting their own Computer Graphics Technology programs within their home

schools. What started out as a “new born baby,” which needed directed and careful attention, has now grown into an adult, which is learning to stretch forth its arms to grasp at new horizons...and, the journey continues.

The Poland study abroad is a four-week program, student pay for their airfare and their accommodations, meals, and some travel inside the country. Students travel with their professor to different cities in Poland for some cultural tours. Beginning the summer of 2014, students will be required to have a laptop for this program. The course for this program gives the students credit for an internship, which is a benefit for students actively seeking internships in the summer and a chance to study abroad.

Benefits and Lessons Learned

Students, who study abroad, realize very early through their experiences, that understanding cultures is important to businesses internationally. All study abroad programs at IUPUI emphasize culture in courses. Students are introduced to culture and some language in the pre-classes or workshops. One of the benefits to study abroad is that students learn first hand about a different culture while studying abroad; they discover that English is not the only language spoken in in the world; that the U.S. is not that only country in the world; they begin to understand that no country should be superior to any other country; and they have an appreciation for the country they are visiting because they are taught to respect the customs, beliefs, and values of that particular country while they are visiting.

Thomas Freidman said in his book, *Hot, Flat, and Crowded*, “I am convinced that the best way for America to solve its big problem—the best way for America to get its “groove” back—is for us to take the lead in solving the world’s big problem. In a world that is getting hot, flat and crowded, and the task of creating the tools, systems, energy sources, and ethics that will allow the planet to grow in cleaner, more sustainable ways is going to be the biggest challenge of our lifetime.” [7] One of the objectives of the GO GREEN study abroad course is to have students utilized the information from the course to apply sustainable knowledge in the workplace upon their return. A benefit to study abroad is the lasting impact what a student studies abroad; for GO GREEN alums the goal is that they will make a positive sustainable impact in the U.S. and beyond in their profession because of their experiences in Germany or France.

A benefit for students who successfully completed the Poland study abroad program, they were able to look at new career opportunities as industrial trainers or project managers. In addition, these students earn credits for an internship, which is beneficial for all of the study abroad Poland students.

In the past with study abroad programs for example, Motor Sports, and with the GO GREEN study abroad programs, students have made connections with organizations for international internships. One Motor Sports student found an international internship opportunity in Germany after participating in the study abroad program during the first year of the program. This is an opportunity that the student was able to take advantage of

because he was participating in the program and was talking to the right individual running the program.

Another benefit for students and faculty is allowing them to purchase their own airfare and making their own hotel accommodations. When developing the GO GREEN study abroad course from the start the faculty decided that students would purchase their own airfare and accommodations (Germany or France) for several reasons: first, it would allow students to learn first hand how to travel to a foreign country and reach their destination on their own; and second it would allow for students to be able to travel in Europe either before or after the one-week study abroad program. This decision has proven to be very beneficial for students and has been a draw to the program for a many students. When students arrange their own accommodations, they cannot complain to faculty about the hotel or room selected its location. However, in selecting accommodations, students are given city parameter to stay within.

As the coordinator, leader, professor of a study abroad program, faculty members play many roles including ambassador, parent, counselor, etc. In addition, professors in the Purdue School of Engineering and Technology, Indianapolis have to market and advertise their own programs. Some of those marketing opportunities include: participating in all the university sponsored study abroad fairs; offering information sessions on your program; developing and promoting flyers, hanging posters all over campus on your program; discussing your program in classes; advertising on building TVs, and sending emails to school faculty all assist to encourage more students understand the opportunities to study abroad. However, participating in all those endeavors will not guarantee full enrollment in your study abroad course. A study abroad course must be promoted by all the engineering and/or technology programs in the school to really succeed so that all students are encouraged to attend and the study abroad credits must count towards a student's plan of study for the program to be successful.

Finances are a large issue in study abroad. Depending on how your study abroad financial model works, it seems like there is never enough money when you are trying to balance the costs for the students and the program. In our School, faculty are allowed to budget all of the student fees and income from the course for their program. Your budget depends on the number of students enrolled. Several study abroad programs take more than one faculty member (Poland and GO GREEN), however, the cost of taking an extra faculty member can eliminate funds for compensation for teaching the course. Teaching a study abroad can be very rewarding, it takes a dedicated, passionate faculty member. Teaching study abroad is a huge responsibility and very exhausting all the while some of your colleagues may think you are on vacation in a foreign country. However, as study abroad educators we know that we are giving our students an opportunity of a lifetime, one these students will never forget for the rest of their lives, and it could be the most valuable learning experience of their entire undergraduate education.

Conclusions

IUPUI and the School of Engineering and Technology, Indianapolis offers small grants to support faculty who want to develop study abroad opportunities. However, the number of study abroad programs available for students is not an issue. Currently there are seventy-seven study abroad courses at IUPUI. There are five currently offered through the School, two others not mentioned in the paper are a one week trip for IT students to India and a three week course in design to Thailand.

It is not the number or variety of programs available that is an issue for students or IUPUI. The larger issue that study abroad faculty face is filling their course with enough students to make it viable. As an example, the IT India study abroad course was cancelled twice due to low enrollments.

Study abroad is enormous undertaking for a faculty member to establish and maintain; the current dilemma is there are not enough students to fill the courses for a plenitude of reasons mentioned earlier in the paper.

A solution to this problem at IUPUI and at other universities would be for engineering and/or technology educators; to identify a list of study abroad programs at their university that would work for their program and allow students earn credit in their degree program for the study abroad courses. This would allow more students to consider study abroad as a viable option.

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