

AC 2009-1232: EVALUATING A SHORT-TERM, FIRST-YEAR STUDY ABROAD PROGRAM FOR ENGINEERING AND BUSINESS UNDERGRADUATES: THE IMPACT ON THE STUDENT LEARNING EXPERIENCE

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Evaluating a short-term, first-year study abroad program for engineering and business undergraduates: The impact on the student learning experience

Abstract

This paper presents findings from a study of engineering and business students at a large public research university, who during their first year of studies had participated in a short term study abroad program in 2005 or 2006. The intent of the study is twofold: 1) to determine if the program is meeting its goals of influencing participants to pursue additional study abroad opportunities later in their college career, inspiring students to further study foreign language and culture, and encouraging students to become involved in additional international activities; and 2) to assess learning outcomes of the participants two to three years after the time of participation in the short term education abroad program.

Quantitative and qualitative data were collected in the study, and are presented in this paper. The researchers provide an analysis of both the quantitative and qualitative data, and discuss implications of the results.

Introduction

Incorporating an international experience into engineering and business undergraduate education is becoming an increasingly common practice. Although the number of engineering students who study abroad in the U.S. is significantly smaller than the number of business students who study abroad, both disciplines recognize the benefits of having students include an international experience as part of their education. For the first time in nine years, the percentage of U.S. students studying abroad who are engineers increased from a flat 2.9% of the total to 3.1% of the total ¹in 2007. Although this is a small increase, it points to progress being made in the efforts to have more engineering students study abroad.

The University of Pittsburgh developed a short term study abroad program for first year students from both the Swanson School of Engineering (SSOE) and the College of Business Administration (CBA). The rationale for bringing engineering and business students together is that these constituencies will inevitably work together as full time employees, and thus should learn how to interact on teams at an early stage of their academic development. Moreover, most engineering and business students will work internationally and therefore should have an early educational experience in an international context that is relevant to both their academic and career development.

Study abroad programs for first year students present a unique set of challenges. Because these students typically have not yet developed content-specific knowledge in a particular field of study, programs must take into account that participants have a less-developed knowledge base about global issues, especially about global engineering and business practices. The University of Pittsburgh has developed this program with these constraints in mind; students are introduced to global engineering and business practices at a level at which they can relate their developing knowledge to what they experience during the program. Because the overseas portion of the program is short (two weeks), topics covered are very tightly focused and presented at an introductory level to students.

Although short term study abroad programs have become a more dominant model of study abroad in higher education in recent years² and several studies have demonstrated the benefits of the short term program

model³, there are few studies that report on learning outcomes several years after students have participated in such programs. The researchers were interested in assessing what the impact of a short term study abroad program was on students two to three years after they had participated in the program, both in terms of how they report what they learned and in terms of the subsequent activities and choices the students made to further enhance their international awareness.

Background of program for the study

As explained above, the short term education abroad program under investigation for this study is offered to SSOE and CBA first year students enrolled at the University of Pittsburgh. The program, called “Plus3” (named so because it earns students an additional three credits) is a course that introduces first year business and engineering students to study abroad after the freshman year. The Plus3 course includes pre-departure class meetings, a required two-week international sojourn, and a team-based research paper. The program is designed to develop an interest in international business and engineering early enough in students' college careers to ideally impact their subsequent course and program selection. The three main goals of the program are 1) expansion of language study among students, 2) pursuit of additional study abroad or other international educational experiences throughout each student's college career, and 3) subsequent involvement in international activities throughout the student's university studies, such as participating in globally-focused campus groups or projects. In order to participate, students complete an application and are accepted into the program based on the following criteria:

1. Must have at least a 2.75 GPA (CBA Students) and 2.50 GPA (Engineering students)
2. Students must have completed two semesters prior to the program departure.
3. There is no foreign language requirement for this program.
4. Must attend 12 hours of mandatory workshop classes during the spring term (four three-hour workshops).
5. During the trips, students visit a number of companies, attend lectures and cultural events, meet with local students, and sightsee. Students must participate in all activities and keep a journal.
6. Students will prepare a written and oral group project related to one of the company visits to be presented during the fall term.
7. Students MUST have a valid passport at the time of submitting application.
8. Students under disciplinary sanctions are not admitted to the program.
9. If a student obtains a disciplinary sanction after admission to the program participation is revoked.

Begun in 2002 with programs to Eastern and Western Europe (Czech Republic and Germany), the program expanded in 2003 to include Latin America (Chile) and in 2004 added a fourth destination - Asia (China). France and Brazil were also added for the 2005 program, and Vietnam was added for 2009. Currently, the program locations include Brazil, Chile, China, Germany, and Vietnam. The program typically has about 100 students participating (20-30 from business and 70-80 from engineering).

The engineering and business students work on joint projects, and in some cases, they work with students from universities in the country of destination. These projects focus on the analysis of a firm/organization and the global industry within which the firm/organization operates. Upon their return, the student teams write a research paper on the project and make a presentation to faculty and students from the business and engineering schools at the beginning of the fall term of their sophomore year. The program is directly connected to three of the four National Resource Centers at the University (Center for European Studies, Center for Latin American Studies, and the Asian Studies Center) and benefits from the substantial resources

of those centers. The program concept has now been replicated by other schools at the university and is used as the model for short term faculty-led study abroad programs at the university.

Survey

The Plus3 survey was developed and administered to help determine how well the program was meeting its goals. As listed above, the goals of the program are 1) influencing participants to pursue additional study or internship abroad opportunities later in their college career, 2) inspiring students to further study foreign language and culture, and 3) encouraging students to become involved in additional international activities, such as joining an international organization or attending internationally-focused events. Additional goals are to increase the students' ability to work in teams and to develop greater cultural sensitivity. The survey was developed to capture data that report on the percentages of students (in both CBA and in SSOE) who engaged in additional international educational activities following their participation in the Plus3 program, as well as to gather data that provide descriptive information from the students about how they felt they had benefited or changed as a result of having participated in the Plus3 program. The survey design included closed-end questions that would allow us to compare responses across our population, as well as open-ended questions that would allow participants in the study to describe their experiences and perspectives in greater detail, and that would allow us to gain a more in-depth understanding of the impact of the program on the participants.⁴

Participants in the survey were students who participated in the Plus3 program during either 2005 or 2006. Surveys were sent out electronically during the spring of 2008, and three follow-up emails were sent to those who had not responded. There were a total of 184 students who received the survey, with 87 from the 2005 program and 97 from the 2006 program. Forty-eight surveys went to business students and 136 to engineering students. Of the 184 surveyed, 101 responded, providing us with a 54.9% response rate. For the 2005 participants, 56.7% (55) responded, and for the 2006 group, 52.9% (87) responded. 55.9% (76) of the engineering students responded versus 52.1% (25) of the business students. For the specific destinations, the response rates varied from 45.2% for China to 65.9% for Chile.

Survey Results

Table 1 (shown below) provides the number of respondents and some pre-Plus3 program participation characteristics of the respondents, including the numbers from each school, the numbers in each year, and the numbers who participated in each destination by school. The table indicates that prior to participating in the Plus3 program, the business students had significantly more international experience [$X^2(1, N=101) = 8.59$, $p < 0.003$], with 60% of the 25 students having been abroad for at least 2 weeks and only 28% of the 76 engineering students having been abroad for at least two weeks. The smaller percentage of engineering students having had prior travel abroad experience may also indicate the increased participation in the Plus3 program among these students. Additionally, the difference in the number of participants from each discipline may be attributed to engineering students desiring an earlier study abroad experience, as they might not be able to accommodate additional experiences during their subsequent academic career. Also, variations in sizes between first year classes within engineering and business may play a part in the number of participants in the program. The College of Business Administration reports a first year class size of 310 students, while Engineering reports a first year class size of 450 students. The percentage of participants from each school is 8.0% of first year business students and 17.7% of first year engineering students.

Table 1 also indicates that 89% of the engineering students and 80% of the business students had studied one or two foreign languages before participating in the Plus3 program, with the most common language for both

groups being Spanish. 60% of the business students were graduating at the end of the spring 2008 versus only 25% of the engineering students. Finally, the results show that significantly more of the CBA participants than the SSOE participants were graduating in April 2008 [$X^2(1, N=101) = 10.32, p < 0.001$]. This difference is partly due to the fact that relatively more CBA students than SSOE students participated in the 2005 programs, but may also reflect the fact that engineering students often do co-op programs which require a later graduation.

Table 1
Numbers and Characteristics of the Respondents

	Engineering	Business	Total	
Total respondents	76	25	101	
2005 Participants	40 53%	15 60%	55 54%	
2006 Participants	36 47%	10 40%	46 46%	
Plus3 Destination				
Brazil	23 30%	5 20%	28 28%	
Chile	21 28%	6 24%	27 27%	
China	18 24%	1 4%	19 19%	
France (2005 only)	4 5%	5 20%	9 9%	
Germany	10 13%	8 32%	18 18%	
International Experience before Plus3	21 28%	15 60%	36 36%	**
Foreign Language Study Before Plus3				
One foreign language	61 80%	15 60%	76 75%	
Two foreign languages	7 9%	5 20%	12 12%	
Languages studied before Plus3				
Spanish	46	12	58	
French	10	4	14	

German	9	4	13	
Other	6	5	11	
Graduation Date				
April 2008	19	15	34	***
	25%	60%	34%	
After April 2008	57	10	67	
	75%	40%	66%	

***Statistically significant difference at the .001 confidence level.

**Statistically significant difference at the .01 confidence level.

Table 2 (shown below) provides data on some of the desired outcomes from participation in the Plus3 Program. One goal of the Plus3 program is to encourage students to participate in another, longer study abroad program or international internship during their college studies. For CBA students, 60% (15) of the respondents had already completed an additional study abroad experience or international internship after Plus3, and another 8% (2) planned to do so prior to graduation. Combining these two statistics, 68% of CBA students who participated in Plus3 either studied abroad again, or planned to go abroad a second time. As for engineering students, 18% had already participated in an additional study abroad program, and 22% planned on participating in an additional program prior to graduation. In total 41% of engineering students either already studied abroad or planned to study abroad. The difference between the percentage of CBA students and the percentage of SSOE students who have done or plan to do study abroad or an international internship is statistically significant, $X^2(1, N=101) = 5.59, p < 0.018$. The second study abroad or internship experiences had a median of 15 to 16 weeks for both schools. The standard errors were 13.3 weeks for engineering and 6.6 weeks for business.

Table 2
Outcomes from Participation in Plus3

	Engineering	Business	Total	
Total Respondents	76	25	101	
Did an additional study abroad or international internship after Plus3	14	15	29	
	18%	60%	29%	
Median weeks of additional study abroad or international internship	15.0	16.0	15.5	
Standard deviation	13.3	6.6	10.1	
Plan to do another study abroad or international internship	17	2	19	
	22%	8%	19%	
Studied one or two foreign languages after Plus3	17	14	31	
	22%	56%	31%	**
Spanish	9	5	14	
French	2	2	4	

German	3	2	5
Chinese	1	0	1
Portuguese	1	1	2
Other	4	4	8
Participated in some international activity since Plus3	45	17	62
	59%	68%	61%
On campus international organization	14	2	16
Off campus international organization	2	1	3
Kept in touch with foreign friends made on Plus 3	36	15	51
Other international activity	3	4	7
To what degree have you sought out contact with international students since Plus3?			
No contact	14	7	21
	18%	28%	21%
Limited or moderate contact	53	18	71
	70%	72%	70%
Frequent or constant contact	9	0	9
	12%	0%	9%
What international activities do you anticipate being involved with after graduation?			
Applying for a Fulbright	1	1	2
Graduate work involving international studies	6	4	10
Graduate work in another country	8	3	11
Internship abroad	6	2	8
Job abroad	17	13	30
Other (mainly travel)	15	6	21

**Statistically significant difference at .01 confidence level.

Differences between engineering and business students

Substantial differences exist between the CBA students and the engineering students in their later study abroad activities, which likely reflect the amount of structure in each program. The business program allows more freedom throughout the academic program, thereby allowing the students more flexibility in planning study abroad experiences. The engineering curriculum is much more structured and requires precise planning of study abroad components from the early stages of freshman and sophomore year. The business program

also does not have a formalized cooperative education program like engineering, which requires taking entire semesters off to work for a company, consequently creating even less space in the engineering curriculum because the students will then take classes in the summer, eliminating the possibilities of summer study abroad programs. Business students also frequently combine internships with study abroad programs, while this proves to be much more difficult for engineering students to do. Both the business and engineering schools have their own international programs offices who can approve business classes and liberal arts requirements earned during study abroad; however, the process is more complicated for engineering students seeking approval for technical courses or other engineering electives earned during study abroad.

Study of foreign languages

As stated earlier, another goal of the Plus3 program is to encourage students to continue to study foreign language(s) after completing the Plus3 program. The results indicate that 22% of the engineering students and 56% of the business students continued foreign language study after participation in the Plus3 program, with Spanish being the most common language studied. The difference is statistically significant [$X^2(1, N = 101) = 10.00, p < 0.002$], with more business students studying foreign languages after Plus3.

International activities

Still another goal of the Plus3 program is to get students interested in participating in international activities both during college and after graduation. As shown in Table 2 above, 68% of the CBA students and 59% of the SSOE students became involved with an international activity upon returning to the university after participating in the program. These differences between the two are not statistically significant. Of the CBA students, 8% joined an internationally oriented on-campus organization, 4% joined an off-campus organization, and 60% continue to keep in contact with individuals whom they met during the Plus3 program. As for the engineering students, 18% joined an internationally oriented on-campus organization, 3% joined an off-campus organization, and 47% continue to keep in contact with individuals met during the Plus3 program. Although the averages are similar overall between the two groups of students, more engineers joined an internationally related on-campus organization, possibly because of their limited international experience prior to Plus3. A number of the students also planned international activities after graduation, with 30% (23) of the engineers and 60% (15) of the business students planning to do an internship or pursue a full time position abroad after graduation.

Teamwork and cultural sensitivity

It was hoped that the Plus3 experience would improve the ability of students to work in teams, be culturally sensitive, and interact effectively with those from outside of the U.S. In figure 1, the results are shown for the question about how they felt the Plus3 experience affected their ability to work well in teams. 92% of business student participants and 88% of engineering student participants felt that the Plus3 program positively affected their ability to work in teams. Since analysis of variance indicated that the responses of business and engineering students were not statistically different, only the aggregate results are shown. Many of these students said that coordinating the projects and presentations between different schedules and locations during the summer months enhanced this teamwork ability. Other students mentioned the integration of engineering students and business students into groups made it challenging and rewarding when incorporating the different backgrounds and writing styles into the final project and presentation. We discuss the issue of teamwork in greater detail later in the paper.

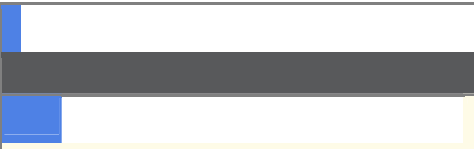

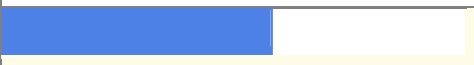

#	Answer		Response	%
1	None		12	12%
2	Limited		24	24%
3	Moderate		57	58%
4	Significant		5	5%
	Total		98	100%

Figure 1: To what extent has the Plus3 experience improved your ability to work in teams?

With respect to the students' ability to interact with individuals from other countries, 96% of both business and engineering students felt the program improved this ability. (See figure 2.) A major skill that many students felt they gained was the ability to effectively communicate without using language, due to language barriers. This has also likely increased the students' ability to work in groups with others because of increased communication skills resulting from the Plus3 experience. We address this point further in our examination of the qualitative data we collected, presented later in the paper.





#	Answer		Response	%
1	None		4	4%
2	Limited		20	20%
3	Moderate		45	46%
4	Significant		29	30%
	Total		98	100%

Figure 2: To what extent has the Plus3 experience improved your ability to interact successfully with those from different cultures?

Additionally, 96% of the CBA students and 92% (not statistically different) of the engineering students felt the Plus3 experience increased their cultural sensitivity in some way. (See figure 3). They felt that working in teams with individuals from the host country, as well as the experience of being immersed within a foreign country for two weeks helped to increase this sensitivity.

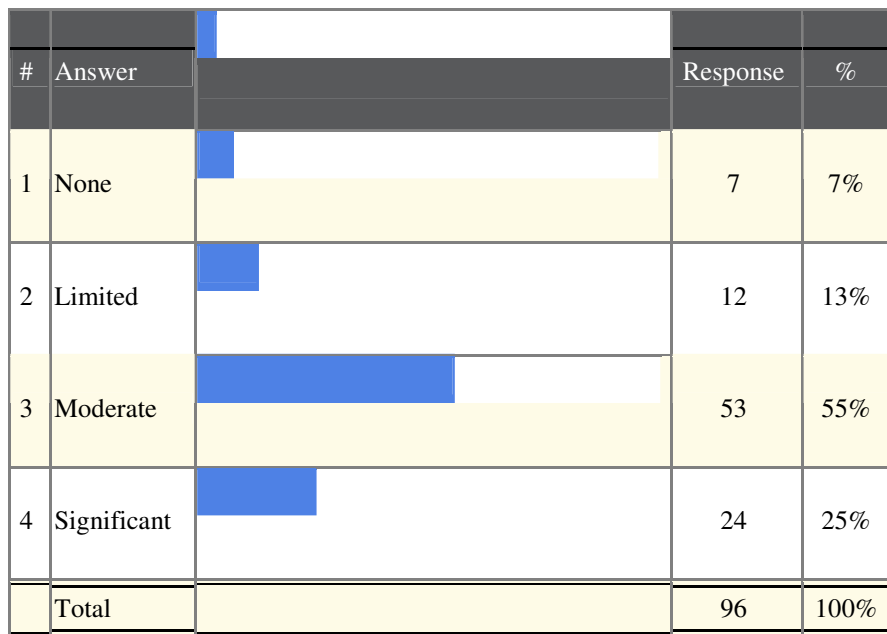


Figure 3: To what extent has the Plus3 experience increased your cultural sensitivity?

Qualitative data

As explained earlier, qualitative data were also collected in the study. Some questions in the survey included:

1. To what extent has the Plus3 experience improved your ability to work in teams?
2. To what extent has the Plus3 experience improved your ability to interact successfully with those from different cultures?
3. What stands out to you as the most helpful or meaningful part(s) of the Plus3 experience that has or will impact you?

In analyzing the responses to these questions⁴, the researchers searched for themes that emerged from the responses, as is congruent with qualitative data analysis⁵. In the following section, themes that emerged from each question are presented and discussed.

Theme: Teamwork

The question “To what extent has the Plus3 experience improved your ability to work in teams?” elicited some interesting responses. Themes that emerge from the responses include the importance of group dynamics, relying on others when in an overseas environment, and learning how to work with students from different cultures and from a different college – all of which we classify as teamwork. Responses include:

“Plus3 group work gave great experience on how to interact in a team with students from different countries.”

“We had to work in teams on our projects, and while we were in China, we relied a lot on the other students because we were out of place.”

“I feel like Plus3 is an excellent introduction to new cultures and new environments...It certainly lays out the foundation for cross-cultural teamwork.”

“Being put into groups with students I’m not familiar with has allowed me to practice basic skills in communication and getting along, even if it’s not project-oriented.”

“Teamwork and growing close to people in groups was essential on our trip to China, and it taught me to recognize my own shortfalls and strengths and to know when to count on others.”

These responses indicate an essential feature of this short term study abroad program, which is teamwork. Incorporating teamwork into the structure of the program allows for students to enhance skills beyond developing cross-cultural awareness. It also encourages students to learn how to interact with each other to accomplish goals – something they need to do in their future careers in engineering or business. The importance of incorporating teamwork into short term study abroad programs is often overlooked and is an issue the authors believe needs further investigation.

Theme: Interacting with other cultures

The question “To what extent has the Plus3 experience improved your ability to interact successfully with those from different cultures?” yielded a variety of responses. Some examples include:

“I would have had no idea how to act in a foreign environment, but now I have a good idea”.

“It helped me to understand that small differences in cultures can be very important”.

“I have just been more cognizant of how I can change the way I communicate with others so that they can understand what I am trying to convey”.

“Basically I went from not knowing anything about the different culture, feeling awkward and unsure about interacting with foreign students, to a comfortable degree when I interact in an international environment”.

“Life outside of America! What a thought. Seriously, though, I hadn’t really ever seen America from a different angle before, so going abroad was worth it for that benefit alone”.

“I understand that you must first observe how different cultures conduct business in order to be efficient and productive when working internationally”.

From these responses, it is clear that participants gained an awareness of how to effectively interact with those from another culture as a result of participating in the Plus3 program. Even more interesting is that participants gained a better perspective of what it means to be an American and how that factor impacts the types of interactions the students have with those from other countries. Experiencing what it means to be an American in a foreign country led many of the participants to develop more awareness of how they come across to those from another culture, and moreover, how they communicate to those who may not speak English as their first language.

Theme: Learning that transforms

For the question, “What stands out to you as the most helpful or meaningful part(s) of the Plus3 experience that has or will impact you?”, the responses indicated that many things the participants learned from the Plus3 program have transformed the way they view themselves and the world. Additionally, the responses pointed out that many planned to further pursue additional international experiences as a direct result of having participated in the Plus3 program. Responses include:

“It made me realize that I definitely wanted to study abroad in the future and possibly even work and live abroad one day”.

“The trip has also inspired me to study abroad again and pursue an international business certificate”.

“It broadens your view of the engineering industry beyond the United States. Seeing the profession in a different cultural setting gives a better appreciation for it”.

“I was convinced I wanted to obtain my engineering degree after spending time touring engineering facilities

in my Plus3 country”.

“I’m much more comfortable now at approaching people and talking with people that I don’t know...I’m more friendly and understanding”.

“It gave me the desire to go out and experience the world...to not be such an isolationist. Since Plus3 I’ve been back to Germany twice already, once to visit and another time to do research for the University of Hamburg. It’s also inspired me to study abroad at Oxford University in the United Kingdom for a year, something I wouldn’t have dared to do without the confidence gained from this experience”.

Of particular interest is that for many participants, the Plus3 program helped them to become more engaged with the world around them, and more aware of how they should interact with those who are different from them - essentially helping the participants to become more outwardly-focused and confident about themselves. These are issues that the authors feel need more exploration. As a learning outcome, it is surprising that students would report such transformative learning as an outcome from participating in a short-term study abroad program, where the general consensus among practitioners is that short-term study abroad programs do not allow for sufficient time or opportunities to develop such important and lasting change in participants.

Conclusion

The data the researchers collected show that a first year, short-term study abroad program can lead to changes in the ways in which engineering and business students structure their subsequent college experience. Namely, involvement in international activities, increased cultural awareness, and a greater interest in pursuing additional international opportunities all increased among the students who had participated in the Plus3 program. These findings confirm that a short term study abroad experience early in a student's college career can lead to a greater level of interest in international issues, and often leads to additional engagement in international activities.

The researchers are interested in exploring other factors that can enhance engineering and business students' international and intercultural awareness. To further enhance the findings in this study, the researchers would like to conduct a study with a control group of students who did not engage in the Plus3 program to determine differences in those students' attitudes and beliefs about international experience. The researchers are also curious about those students who did not participate in the Plus3 program, but who did participate in an international education program later in their college career, to see if there are differences with that population in how they view their own awareness of international issues.

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