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## **AC 2012-3401: RAISING THE LEVEL OF PARTICIPATION IN STUDY ABROAD BY INDUSTRIAL ENGINEERING UNDERGRADUATE STUDENTS**

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# **RAISING THE LEVEL OF PARTICIPATION IN STUDY ABROAD BY INDUSTRIAL ENGINEERING UNDERGRADUATE STUDENTS**

## **Abstract**

This paper discusses the development of a survey administered to undergraduate Industrial Engineering at the University of Arkansas to determine why more students do not study abroad. The survey examines why students choose not to study abroad, funding levels needed to study abroad, and where students want to study abroad. Results from this survey indicate that students are highly interested in studying abroad, but that the primary reason that they do not engage in this experience is a shortage of finances. Strategies are discussed to raise the level of participation in study abroad by Industrial Engineering students.

## **Introduction**

In 2003, the Department of Industrial Engineering at the University of Arkansas established a global studies endowment to provide financial support for activities designed to enhance the understanding of the global economy, global business practices and global cultures by their students. A primary use of these funds is to provide supplemental support in the form of academic scholarships to defray the expenses of Industrial Engineering undergraduate students who wish to study abroad. The department wishes for as many students as possible to participate in a study abroad experience, and in its five-year strategic plan, calls for a goal of at least 25% of our students to graduate with a global studies experience. In the recent past, about 15% of our students in the Department of Industrial Engineering have studied abroad. Further motivation to ensure that our students study abroad and become “global thinkers,” is the ever increasing world economy, which has created a growing need for students to be able to live, learn and understand other cultures and environments<sup>3</sup>. ABET outcome h citing “the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context”<sup>2</sup> and the report released by the National Academy of Engineering on Educating the Engineer of 2020<sup>4</sup> have provided further motivation for engineering educators to address this need.

Informally, many students report that studying abroad is unobtainable due to a shortage in finances. In order to verify this report and to determine if there are other factors deterring more students from studying abroad, an online survey was administered to the undergraduate Industrial Engineering students to learn more about their interests in study abroad. The analysis of survey data examines where students would like to study abroad; the type of study abroad experience that they would like to participate in (summer, semester or year-long); the reasons why students do not study abroad (financial, class selection, time, and/or other reasons); and what percent of the cost associated with study abroad the students need to have covered in order to be able to afford to study abroad. We also analyzed the survey data to learn if there were differences in study abroad interest across gender or classification (freshman, sophomore, junior, or senior). These results were not significant across gender or classification so we chose not to include this discussion within this paper.

In the next session of the paper, details about the survey development are described and the actual survey questions are shown. Next, results are presented and conclusions are drawn. Finally, strategies are discussed as to what measures are being taken to remove barriers in order to raise the level of participation in study abroad by our students.

## Survey Development

A survey was designed with input from Industrial Engineering faculty, staff, students and alumni. Approval to administer this survey was obtained by the University's Internal Review Board (IRB). A paper-based survey was initially piloted with Industrial Engineering students and based on their responses, it was refined in order to clarify questions and ask additional questions. The new survey was developed using the Qualtrics Labs, Inc. academic survey research suite. This suite provides a method to electronically create, distribute, record, and analyze surveys. During this process, other departments within the College of Engineering learned of our efforts within Industrial Engineering and asked that we administer the survey to their students as these departments also had aspirations to increase the participation in study abroad by their students. The survey was therefore distributed to 2,374 students via an email request. An explanation of the survey was included within the email along with a link to the survey. In order to encourage high participation in the survey, multiple reminders were sent out, and students who completed the survey were eligible for prizes from a random drawing. In the end, a total response rate of 25.5% was achieved across the College, which equated to a response rate of approximately 30% within Industrial Engineering. The focus of this paper is on the results within Industrial Engineering.

The survey contained general demographic, previous travel experience, and specific study abroad questions. The students were asked:

### Demographic Questions:

- Q1: What is your classification?
- Q2: What department are you a part of?
- Q3: Are you a member of the Honors College?
- Q4: Gender?
- Q5: Are you an international student?

### Previous Travel Experience:

- Q6: Have you traveled outside of the United States?
- Q6A: Where have you traveled?
- Q6B: Reason for travel?
- Q6C: How many times?
- Q6D: Average Period?

### Study Abroad at the University of Arkansas:

- Q7: Are you aware of the study abroad resources that the Office of Study Abroad offers?
- Q8: Which of the following engineering study abroad programs are you aware of?
- Q9: Would you like to study abroad?
- Q9A: Why do you not want to study abroad?

- Q10: What type of study abroad experience do you desire?
- Q11: Where would you like to study abroad?
- Q12: What is prohibiting you from studying abroad?
- Q13: Semester study abroad experiences cost around \$15,000. What level of support in terms of scholarships would you need in order to make such an experience a possibility for you?
- Q14: Summer study abroad experiences cost around \$8,000. What level of support in terms of scholarships would you need in order to make such an experience a possibility for you?

## Demographics Results

The responses from this survey provided insight about the Industrial Engineering students and their interest in studying abroad. According to the responses, 55% of the students were male and 45% female. The 45% female response rate was higher than the 33% female Industrial Engineering departmental enrollment. It is unclear whether this has any effect on the results. The classification of the respondents is shown in Figure 1. As can be seen, seniors completed the survey at the highest rate. Higher participation by seniors could have resulted from strong encouragement to complete the survey by one of the co-authors who taught a senior level course during the semester in which the survey was administered. It should be noted that we have a common Freshman Engineering Program at the University of Arkansas, so likely the students who identified themselves as Freshman are what we term as “second year Freshman,” in other words students who are in their second year of study, but who officially are still designated as Freshman because they are behind on program requirements.

Answer	Response	%
Freshman	2	4%
Sophomore	11	22%
Junior	11	22%
Senior	27	53%
Total	51	100%

**Figure 1:** Student Classification

The University of Arkansas has a highly successful Honors Program, and honors students have access to funding opportunities for study abroad. It was therefore of interest to us to capture the honors status for each Industrial Engineering student. This status is depicted in Figure 2.

Answer	Response	%
Yes	14	27%
No	37	73%
Total	51	100%

**Figure 2:** Honors College Status

Students identified whether they were an international student. Within Industrial Engineering 12% reported that they were an international student. This was important as it biased their responses about international study as by default these students were studying abroad within the United States.

### **Previous Travel Results**

We were surprised to learn that the majority of respondents (86%) have previously traveled outside the United States with vacationing being the primary reason for travel (reported at the 84% level). Other reasons for study abroad included for religious purposes (16%) and a plethora of other reasons (34%) such as study abroad, mission trip, military assignment or parent's job. Note that some students had multiple travel abroad experiences, thus accounting for the greater than 100% response. Of the 51 respondents, 7 (13.7%) reported that their travel was in fact for study purposes.

Travel abroad was mainly to Mexico and respondents reported that their travel generally was for one-week in length. This makes sense given that they reported most frequently that they were traveling for vacation purposes. Despite prior travel abroad, 67% of the respondents report that they would like to study abroad, preferably in the summer.

### **Study Abroad Results**

Several study abroad programs already exist at the University of Arkansas for our engineering students and for Industrial Engineering students in particular. Students learn about study abroad opportunities prior to even coming to the university through orientation and campus visits. Once on campus, they learn about them within the Freshman Engineering Program and within the department. The Department of Industrial Engineering holds a Global Studies Night each fall for all undergraduate students and it is hosted by our Director of Global Studies. As part of this event, food from around the world is provided to those students attending. At this event, the Director invites several students who have previously studied abroad to talk about their personal study abroad experiences and to present an overview of their trip. The student presentations are always full of very cool pictures from their travels, and colorful descriptions of their interactions with people from the local culture. The Director also reviews resources available to the students from the Office of Study Abroad, and funding opportunities within the Honors College and from the department's global studies endowment. He discusses relevant deadlines, estimated costs, and program information offered by the Office of Study Abroad. To learn more about the effectiveness of these efforts to educate students about study abroad opportunities, we asked a specific question on the survey about whether the students were aware of the study abroad resources that the Office of Study Abroad offers. Figure 3 shows their response. These results show that there is concern that despite repeated information on study abroad opportunities that 35% of our students report that they are unaware of resources provided by the Study Abroad Office.

Answer	Response	%
Yes	33	65%
No	18	35%
Total	51	100%

**Figure 3:** Awareness of the Study Abroad Resources Provided by the Study Abroad Office

We probed further to identify which, if any, of our existing study abroad programs our students were familiar with. Figure 4 reveals that our study abroad programs in India and Belize are most visible.

Answer	Response	%
Australia	19	37%
Belize	27	53%
India	30	59%
Italy	12	24%
Spain	12	24%
I am not aware of any of these programs.	9	18%

**Figure 4:** Awareness of Specific Study Abroad Programs

As mentioned earlier, the department has a goal to raise the level of participation in study abroad by our students. Hence, a primary reason for implementing the survey was to confirm our suspicion that finances was a primary barrier preventing students from studying abroad. We wanted to gain insight into this suspicion regardless of whether students indicated that they wanted to study abroad or not. Figure 5 shows these results for students who indicated that they really do not wish to study abroad at all. It shows that both finances and time are barriers. For those students who do wish to study abroad, Figure 6 shows that finances is their primary barrier. For this question, students were asked to check all barriers that applied, thus accounting for the larger than 100% response rate. Besides finances, time was listed as a significant barrier in both cases. This problem can manifest itself when the start and end dates of semesters do not match. For example, a study abroad in Australia may run from February through June and when one counts their travel time and time on the front and/or backend for site seeing, the commitment can effectively overlap two semesters at the home institution. This would preclude students from taking courses, for example over the summer to perhaps allow them to lighten their load while studying abroad. Loss of income is a double-edged sword in that while studying abroad, students are generally paying more for their studies than they would at home, while at the same time forgoing employment opportunities which might allow them to work in order to help defray these additional costs. Students also cited additional barriers within the “other” category. Examples included concerns about being separated from their family, language barriers, and inability to perform their job (one student reported being a Resident Assistant for housing).

Answer	Response	%
Finances	8	47%
Loss of Income	2	12%
Time	8	47%
Class Selection	2	12%
Other	9	53%

**Figure 5: Do Not Wish to Study Abroad – Barriers**

Answer	Response	%
Finances	28	82%
Loss of Income	4	12%
Time	13	38%
Class Selection	9	26%
Nothing	3	9%
Other	1	3%

**Figure 6: Want to Study Abroad – Barriers**

For those students who do wish to study abroad, Figure 7 shows that students are most interested in a summer study abroad experience and Figure 8 shows that Europe, followed by Australia are the two most desirable study abroad destinations. This highlights students' preference to study in areas where course instruction is delivered in English. For both of these questions, students could select more than one response, thus results total more than 100%.

Answer	Response	%
Semester	18	53%
Year Long	3	9%
Summer	28	82%

**Figure 7: Type of Study Abroad Experience**

Answer	Response	%
Central America	4	12%
South America	7	21%
Australia	19	56%
Europe	31	91%
Asia	10	29%
Other	3	9%

**Figure 8: Study Abroad Destination**

Questions were asked about funding levels to support a semester-long study abroad experience or one that would last only for the summer. Figure 9 shows the required funding level for a semester abroad experience. Most students required 80-100% of the costs to be covered.

Answer	Response	%
0 – 19% (\$0 - \$2850)	0	0%
20 – 39% (\$3000 - \$5850)	2	5%
40 – 59% (\$6000 – \$8850)	6	14%
60 – 79% (\$9000 – \$11850)	7	17%
80 – 100% (\$12000 - \$15000)	27	64%
Total	42	100%

**Figure 9:** Semester Study Abroad Required Funding Levels

Figure 10 shows the required funding level for a summer-long study abroad experience. Again, students report requiring 80-100% of funding was required.

Answer	Response	%
0 – 19% (\$0 - \$1520)	0	0%
20 – 39% (\$1600 - \$3120)	3	7%
40 – 59% (\$3200 – \$4720)	9	21%
60 – 79% (\$4800 – \$6320)	5	12%
80 – 100% (\$6400 - \$8000)	25	60%
Total	42	100%

**Figure 10:** Summer Study Abroad Required Funding Levels

This data clearly showed that many students need financial assistance to study abroad. The department’s current funding levels for global studies scholarships for semester study abroad is \$3,500 and for the summer study abroad programs the scholarships are for \$2,500, both of which are well below what the majority of student’s state they need. Well over 90% of the responses were for funding levels between 40-100% with the majority of students stating they would need support in excess of 80% of the program costs.



## Summary

The Department of Industrial Engineering at the University of Arkansas desires that their students gain a better understanding of the global economy, global business practices and global cultures. They have a specific goal that at least 25% of their students will graduate with global studies experience. This effort is further motivated by the changing world economy, ABET outcome h, and the National Academy of Engineering on Educating the Engineer of 2020. To help determine why many of Industrial Engineering students do not study abroad at the University of Arkansas, a survey was created. The major results from this survey are summarized below:

- 86% have traveled outside the United States, mainly to Mexico. 84% have traveled for vacation, 16% for religious reasons and 34% for other reasons. These trips have lasted generally for one week.
- 67% would like to study abroad preferably in the summer.
- Popular destinations are India (59%) and Belize (53%).
- For those students who wish to study abroad, Finances was the most cited factor prohibiting study abroad. Finances (82%), Time (38%), Class Selection (26%), Loss of Income (12%) were mentioned most often.
- Well over 90% of the responses were for funding levels between 40-100% for either a semester-long or summer study abroad.

## Future Work

In the future, it would be interesting to administer this survey to Industrial Engineering programs across the country so that differences between schools and regions could be compared. Ultimately, however, the Department must implement strategies to secure additional funding sources to make the cost of studying abroad less onerous for students and their families. We are working closely with our alumni group to help us with this effort. By securing more resources, more of our students can participate in study abroad and reap the benefits associated with gaining a global perspective. In addition to creating more funding opportunities, we need to implement processes to better educate students on how to study abroad without deviating from their degree plans. This will help students see that they are able to study abroad without delaying graduation. Creating additional University organized study abroad experiences, like our Global India Program, will help us achieve our goal. Programs like Global India allows for a larger cohort of students to participate while ensuring coursework will count towards their degree. If successful, we might be able to one day aspire to a goal that all of our graduates participate in a study abroad experience. The University of Pittsburgh is on their way towards achieving this goal, so perhaps we can do the same at the University of Arkansas.<sup>1</sup>

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