Comparing Study Abroad Interest between Universities

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Abstract

A growing movement is occurring across the United States to encourage college students to study abroad so that they may become better aware of other cultures and environments and more importantly is able to successfully compete in the global economy. ABET outcome h (the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context) and the report released by the National Academy of Engineering on Educating the Engineer of 2020 have provided further motivation for engineering educators to address this need. This paper will discuss the extension of an online survey developed and originally administered to undergraduate engineering students at the University of Arkansas, a public institution, to a new cohort at Stevens Institute of Technology, a private institution. This survey examines the factors prohibiting students from studying abroad, specifically, 1) if there are differences among gender, classification and/or program of study, 2) whether students do not study abroad due to financial, class selection, time, and/or other reasons, 3) what percent of the cost associated with studying abroad the students need to have covered in order to be able to afford to study abroad, and 4) where students wish to study abroad. In addition, this comparison contrasts findings between a public, rural, comprehensive university (University of Arkansas) with a private, urban, technological university (Stevens Institute of Technology). Results show that the majority of public and private university students want to study abroad (ideally in Europe), but identify time and finances as constraints. Students from private institutions require less funding than those from public institutions.

Introduction

The National Academy of Engineering on Educating the Engineer of 2020 calls for tomorrow's engineers to be able to live, learn, and understand other cultures and environments.[1] ABET outcome h calls for engineers to have a "broad education necessary to understand other cultures and environments".[2] According to Thomas Friedman, our world is flat[3], and this 'flattening' of the world is taking place in an ever-quickening pace. Products are designed in California, parts manufactured in Taiwan, assembled in China and supported in India. Increasingly, many companies have some part of their operations, market or supply chain in more than one country. This makes the economy a global one where citizens live and work in an environment where borders are not barriers; and where knowledge about another culture or foreign environment is an asset in industry. The globalization of industry and engineering practice is present and increasing, and institutions of higher learning must assist their students in providing a global understanding. Study abroad is one method to this end.

Study abroad would seem to have somewhat obvious benefits such as providing understanding and appreciation for other cultures and perspectives. In pursuing study abroad, it is hoped new frames of reference allow those who study abroad to compare and contrast their own education, professional goals and socio-cultural values with those of

their host country. Such international study is intended to better prepare students to assume significant roles in an increasingly global economy and interdependent world.

However, John Grandin, Executive Director Emeritus, International Engineering Program at the University of Rhode Island says study abroad also has correlations to other, more academic, characteristics such as the development of problem solving skills, acceptance of greater challenges and expansion of personal goals.[4] Additionally, there is also a high correlation between study abroad and on-time graduation rates at both the four-year and five-year markers.[5]

Ann Stock, US Assistant Secretary of State for educational and cultural affairs said, "For American students to be competitive in today's globalized world, international experience is critically important"[6], but sadly only 1% of American college students participate in study abroad and only 4-5% of that 1% are engineers. This leaves the U.S. lagging in a directive, so critical to the future success of America maintaining its economic leadership.[7] This call to incorporate the understanding of other cultures into the education of America's engineers, begs the question, how do we get more of our engineers to study abroad?

The Need

Undergraduate engineers, the eventual creators and designers of the products and services we will use in the future, need to think globally. Engineers, probably more than other professions, will be working for organizations with some aspect of their manufacturing or production process, market or supply chain overseas. As engineers, they will therefore be more interrelated to the process and its overseas connection, but how can our engineers of the future think and act in this global marketplace if study abroad is an option very few engineers undertake? If it is critical to provide opportunities to our students for international experiences, businesses want our students to have these international experiences, and America's government and educational governing bodies want our students to have them: If it is so valuable to the future of our nation, why are so few of our undergraduate students participating?

When asking why our engineering students don't choose study abroad more often, many thoughts abound. Very few engineers study abroad, but even fewer study abroad in countries where English is not the native language. Language is not normally a requirement of engineering majors, so there are not many who would opt to take engineering courses in a foreign language.[8]

Engineers also need to take highly specialized and specific classes. It is often difficult to find exact equivalents for the courses engineers need to take to graduate. In a similar vein, some students may falsely believe they would need to stay in college longer if they took a semester overseas for this very reason.

Students in general may have a skewed opinion in regard to the true costs for study abroad, or cost can factor in another way since a summer abroad, would mean one less

summer working to help pay for college. Finally, some may just not be aware of the study abroad opportunities, and some may not realize that study abroad can also mean a 2-3 week short course in the summer.

Survey

In order to address the above questions, in 2011 researchers at the University of Arkansas piloted, and then fully administered a survey on study abroad to the engineers at their college. The results of their research were published with ASEE in 2012.[9, 10] A summation of their conclusions were that:

- The majority of the students surveyed want to study abroad, and want to do so in the summer.
- Time and finances are the major reasons why most students do not study abroad.
- The majority of students stated that additional funding would be necessary for them to study abroad.

The results from the first administration of the survey were from engineers at a large, public, rural college. The current research aims to use the same survey on engineers at Stevens Institute of Technology: a small, private, urban campus in New Jersey. The data would be used to compare and contrast the student responses on a public versus private institution, rural versus urban campus, etc. basis on the reasons why/what makes engineers go/not go study abroad. (eg. cost, loss of income, convenience, awareness, time, etc.).

The original survey contained general demographic questions, as well as some on past travel experience, in addition to specific questions on study abroad, and was pre-programmed to prevent conflicting responses. For example, if a student answered yes to Q9, Q9A would be skipped. This survey was slightly modified to make it understandable by students at Stevens, but the core content of the questions stayed the same to allow for comparisons to be made between the two institutions. For example, Q3 was changed from Honors College to Scholars Program. In addition to the modifications, two questions, Q11 and Q16, were added to help Stevens gather information for their specific programs. This modified survey was approved by the University of Arkansas internal review board (IRB) for the use of human subjects. Stevens' students were asked the following questions.

Q1 – What is your classification?
Q2 – What department are you part of?
Q3 – Are you a member of the Scholars Program?
Q4 – Gender
Q5 – Are you an international student?
Q6 – Have you traveled outside of the United States?
Q6A – Where have you traveled?
Q6B – Reason for travel (check all that apply)
Q6C – How many times?
Q6D – Average period (in weeks)?

Q7 – Are you aware of the study abroad resources that the Study Abroad Office offers?
Q8 – Which of the following engineering study abroad programs are you aware of (check all that apply)?
Q9 – Would you like to study abroad?
Q9A – Why do you not want to study abroad (check all that apply)?
Q10 – What type of study abroad experience do you desire?
Q11 – Would lengthening the winter/Christmas break to provide time for a 2-3 week study abroad experience incentivize you to participate in one?
Q12 – Where would you like to study abroad (check all that apply)?
Q13 – What is prohibiting you from studying abroad (check all that apply)?
Q14 – Semester study abroad experiences cost the same as Stevens' tuition ($20,000) plus travel, and room and board at the host institution. What level of support in terms of scholarships would you need in order to make such an experience a possibility for you?
Q15 – Summer study abroad experiences cost the same as Stevens' tuition ($20,000) plus travel, and room and board at the host institution. What level of support in terms of scholarships would you need in order to make such an experience a possibility for you?
Q16 – A 2-3 week short course study abroad over the summer cost the same as a Stevens' course ($4,000) plus travel, and room and board at the host institution. What level of support in terms of scholarships would you need in order to make such an experience a possibility for you?

The survey was distributed to all the engineers at Stevens via email. The email included a link to the survey. In order to encourage participation in the survey, multiple reminders were sent out. Additionally, those students who completed the survey were eligible for prizes drawn at random.

Hypothesis

Before the study was performed, researchers from Stevens predicted that students from their institution did not wish to study abroad due to limitations on class selection and fear of not being able to graduate on time. These researchers also thought that because of the type of student Stevens serves that finances would be a major inhibitor to students studying abroad, and even more so, study abroad would mean the loss of summer or co-op income

The researchers also thought there would be notable differences between Stevens a private institution, and the University of Arkansas, a public institution in terms of the number of students' desiring study abroad. Specifically, it was theorized that Stevens, with its urban setting might have more students who desire to study abroad, even if they did not physically do it, simply because of the continuous exposure to an international, highly metropolitan environment, etc.

Response Distribution

To consider biases in the survey results and to determine if the responses provided a good representation of the entire population, the demographic responses were compared with

Stevens' actual demographic statistics. This was completed to mirror the original study completed by the University of Arkansas researchers. The University of Arkansas study had a population of 2,374 with a 25.5% response rate, which proved to provide a good distribution with minor biases towards honors and female students.[10] The new study had a population of 1,843 with a 10% response rate. These researchers believe the low response rate was due to the devastating results of Hurricane Sandy, which hit Stevens during the scheduled survey distribution.

According to the responses, 65% were male and 35% were female. This response differs by 10% from the actual break down of 75% male and 25% female at Stevens. Respondents were part of one of nine programs as seen in Table 1 with the largest response rate from engineering management students, 30%. These results indicate that the survey distribution does not match the actual distribution of engineering students since engineering management accounts for 6% of the engineering student body at Stevens. The classification of the students adds to the skewed distribution, as seen in Table 2, since 60% of the respondents were seniors compared to the actual 36%.

Program	Actual	Survey
Engineering Undecided	8.00%	1.00%
Biomedical Engineering	10.00%	1.00%
Chemical Engineering	11.00%	15.00%
Civil/Environmental/Naval Engineering	17.00%	20.00%
Computer Engineering	7.00%	3.00%
Electrical Engineering	8.00%	10.00%
Engineering Management	6.00%	30.00%
Mechanical Engineering	33.00%	20.00%
Engineering Physics	0.27%	0.00%

Table 1: Engineering Department Distribution

Classification	Actual	Survey
Freshman	26.00%	3.00%
Sophomore	16.00%	9.00%
Junior	22.00%	28.00%
Senior	36.00%	60.00%

Table 2: Student Classification

The percent of students that were in the Scholars Program (15% compared to the actual 13%) and percent that identified themselves as an international student (4% compared to the actual 5%) were the only two demographic statistics that were close to the actual.

The next statistic to determine bias was if the respondent had previously traveled abroad. 84% of the respondents answered yes to this question. 73% of these respondents traveled abroad for a vacation, 3% for religious reasons, 19% for "other" stated reasons and most importantly 6% stated it was to study abroad. This result indicates that many of the

survey respondents are experienced travelers possibly indicating their desire to study abroad. Interestingly, there are many anecdotal examples of a correlation showing study abroad leads to more international traveling. [11,12] The data from this survey seems to indicate that this correlation may go both ways.

Since the demographic breakdown from the survey did not match Stevens' actual, the survey responses may contain bias. The authors believe much of the bias stems directly from the after effects of Hurricane Sandy. Stevens lost power for 5 days and lost 7 class days due to the Super storm. The academic calendar had to be reset, and the disruption affected some student's ability to cope and recover academically. It is likely that the freshmen and sophomore students (being less experienced in juggling difficulties in their lives) may have been less likely to spend their limited time taking a survey; something they might have considered not significant to their academic progress. While the upperclassmen may have had more experience with disruptions in their lives, and were better able to get back on their feet academically, and therefore, be more willing to dedicate their valuable time to taking a survey.

Overall Results

Several study abroad programs exist at Stevens which provide the unique experiences this paper discussed above. The Australia (15%), Ireland (14%) and Semester at Sea (14%) programs were the most known programs. At Stevens the students learn about these programs in several ways. As prospective students and freshmen, Stevens' students are introduced to various study abroad opportunities in presentations during prospective student events, Orientation, as well as in the Introduction to Engineering class. There is also an Office for Study Abroad and a website. This office sponsors events once or twice an academic year to showcase the different study abroad opportunities. Even with these various methods only 62% of the respondents were aware of the study abroad resources on campus and 65% of the respondents wanted to study abroad.

The 65% and 80% from the University of Arkansas survey[10] showed that the majority of students, no matter rural or urban, want to study abroad, and is counter to the hypothesis that more of Stevens' students would want to study abroad. The reason for this disparity may be that some Stevens' students get enough of an international flavor simply by experiencing New York and its surroundings. Stevens is located directly across the Hudson River.) Perhaps Stevens has a much higher percentage of interest in study abroad due to the student's not having this type of opportunity readily available to them.

An interesting difference was noted between the two data sets for program type. When the respondents were asked what type of study abroad program they desired, 48% answered semester and 43% summer. This was different from the University of Arkansas survey since their data showed that 50% of their respondents desired a summer program and 37% desired a semester.[10] In addition to a summer or semester program, 86% of the respondents said that they believed lengthening the winter break to provide time for a 2-3 week study abroad experience would incentivize them to study abroad. The difference

between the public and private institution could have occurred because of the perspectives that students have about cost and time.

In the original study the students who indicated that they did not want to study abroad, did so mainly because of time (32%) and finances (30%).[10] Stevens' respondents indicated that they did not want to study abroad for the same reasons: time (24%) and finances (23%). These answers were somewhat consistent with the prohibiting factors for the students who wanted to study abroad. Respondents indicated that finances (24%), class selection (22%) and time (18%) were the prohibiting factors for Stevens' respondents while finances (42%) and time (24%) were the factors for the UofA respondents.[10] This showed that there was a slight different perspective for those who want, and for those that do not want to, study abroad between the two different types of schools.

Since finance was a factor, it was important to examine the level of support the respondents needed to overcome this factor. Table 3 shows the amount of funding the respondents required for a semester abroad at Stevens and the University of Arkansas.[10] 52% of UofA's respondents needed funding for 60% to 100% while 54% of Stevens' respondents needed scholarships or grants for 80% to 100%.[10] This indicates that public university students require more funding to study abroad then private.

Response	Stevens	University of Arkansas
0 - 19%	6.00%	2.00%
20 -39%	14.00%	4.00%
40 - 59%	28.00%	16.00%
60 -79%	28.00%	24.00%
80 - 100%	24.00%	54.00%

Table 3: Public and Private Semester Abroad Required Funding Levels Comparison

Table 4 compares the amount of funding needed by Stevens' respondents for a semester, summer or 2-3 week abroad. It shows that more respondents required 40% to 79% then 80% to 100% funding for a semester or summer abroad. It also shows that the respondents required less funding for a 2-3 week program.

Response	Semester	Summer	2-3 Weeks
0 - 19%	6.00%	5.00%	16.00%
20 -39%	14.00%	13.00%	20.00%
40 - 59%	28.00%	28.00%	26.00%
60 -79%	28.00%	30.00%	23.00%
80 - 100%	24.00%	24.00%	15.00%

Table 4: Stevens Required Funding Level Comparison

More than 30% of the respondents from Stevens and the University of Arkansas both wanted to study abroad in Europe. Table 5 shows the complete comparison. An interesting note is that both schools had responses within 5% of each other for the same

response. This reasonably shows that engineering students no matter public or private consider the same places to study abroad.

Response	Stevens	University of Arkansas
Central America	7.32%	10.00%
South America	11.50%	13.17%
Australia	27.18%	25.40%
Europe	38.33%	33.25%
Asia	13.59%	15.08%
Other	2.09%	3.10%

Table 5: Desired Location Comparison

Comparison

After the biases were determined and the overall results analyzed, the results were filtered by specific demographic groups: gender, classification and program of study. This filtering was also performed in the original study to analyze the presence of any preferences among these groups. This study performed the same steps and compared the results with the original study. Due to the relatively low response rate, the data produced for classification and program of study did not yield useable results. However, the gender comparison showed one interesting result. When asked why they did not wish to study abroad fewer female students listed finances as the reason. Finances were the third lowest response compared to the unfiltered second best as seen in Table 6. All results of the filters were consistent with the differences between the types of schools as stated above.

Response	Unfiltered	Filtered	
		Male	Female
Finances	22.73%	25.23%	9.52%
Loss of Income	4.55%	4.50%	4.76%
Time	24.24%	23.42%	28.57%
Class Selection	16.67%	17.12%	14.29%
Lack of program knowledge	9.09%	9.01%	9.52%
Lack of language	12.12%	11.71%	14.29%
Other	10.61%	9.01%	19.05%

Table 6: Reasons Not to Study Abroad by Gender

Summary

By successfully incorporating the results of the survey into our colleges' Study Abroad Offices, we hope to increase the number of students who participate in study abroad. And by doing so, will help prepare our engineering graduates to better succeed professionally and personally in the global economy. The major results from this study are summarized below:

- Need of larger sample for better distribution.
- Majority of public and private university students want to study abroad.
- Adding a 2-3 week program during winter break would incentivize students to study abroad.
- Time and finances are the prohibiting factors.
- Students at private institutions require less funding then public.
- Both public and private students want to study abroad most often in Europe.

To summarize, 65% of Stevens and 80% of University of Arkansas engineering students want to study abroad. Finances and time were seen as the major factors inhibiting them from studying abroad (class selection also for Stevens).

Recommendations

The question remains, how do we use this information to increase the number of students who don't just *want* to study abroad, but actually go? Some possibilities exist. One idea was included in the survey and was perceived by 86% of the students as a possible solution: extend the mid-winter break by a week to allow international travel during that time period. A similar solution, but potentially in better weather, would be to create a short course study abroad program in May from the end of finals until the start of June. A domestic university in conjunction with the foreign university would do short courses in either of these time periods. And a true exchange could happen so that a cohort from the foreign university comes to the United States as well during the same time period. If such a coordinated effort were made, then perhaps such an idea could be a coordinated (from the school's point of view) and simple (from the student's point of view) way to assist the engineering students to study abroad, and as such provide experiences to help them be better prepared to be "Engineers of 2020". [1]

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