



Development of Students' Intercultural Knowledge and Competence

Dr. James Warnock, University of Georgia

James Warnock is a Professor and founding Chair for the School of Chemical, Materials and Biomedical Engineering at the University of Georgia. He has been a big proponent of self-directed learning and active learning in his classes. James is also the Adjunct Director for training and instruction in the professional services department at ABET. In this role, he oversees the development, planning, production and implementation of the ABET Program Assessment Workshops, IDEAL and the assessment webinar series. He also directs activities related to the workshop facilitator training and professional development.

Ms. Galyna Melnychuk, Mississippi State University

Galyna Melnychuk completed her undergraduate education in Optical Engineering at Kiev Polytechnic University. In addition, she holds two engineering masters degrees - M.S. in Optical Engineering from Kiev Polytechnic University and M.S. in Electrical Engineering from Mississippi State University. Subsequent involvement in technology commercialization and small business development at MSU stimulated her interest in finances, accounting and business taxations, and she received her third graduate degree - Master of Taxation from the College of Accounting at MSU. Galyna's work in the Emerging Materials Research Laboratory at MSU involved R&D of semiconductor and nano-electronic materials and devices. This research experience helped her develop a multidisciplinary expertise in science and technology, covering Electrical Engineering, Physics, Materials Science, Chemical Engineering, etc. Since 2011 Galyna have been administering International Programs at the Bagley College of Engineering. Born and raised overseas, she encouraged Mississippi State University students to gain firsthand knowledge of how engineering is taught and practiced throughout the world.

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Abstract

The most common international experience that US students have while undergraduates is a faculty-led study abroad. These can last between two to ten weeks and allow students an opportunity to travel to a foreign location with a cohort of American students and faculty member. This is a valuable experience, especially for students that have never before traveled overseas. However, the opportunity to develop their intercultural knowledge and competence is limited by the fact they are constantly interacting with other American students. To overcome this deficit, we partnered with a French institution to offer a faculty-led study abroad course. Before departing the US, American students were given a French pen-pal at the host institution and were able to start communicating with them. During the two-week stay in France, students participated in a number of social activities with their French counterparts. Students completed a survey to determine the extent to which their intercultural knowledge had changed. Students participating in a separate study abroad program in Germany, where there was no interaction with students from the host institution, were also asked to complete the survey. This cohort served as a control group and enabled us to determine the extent to which interaction with students from the host country promotes intercultural knowledge.

Keywords

Study Abroad, Student Exchange, International Education, Globalization

Introduction

In today's global marketplace, it is critical for engineering students to have an appreciation and understanding of different cultures. This is recognized by the National Academy of Engineering who state the 21st century engineer should have a sound understanding of globalization [1] and ABET, who state in both the current and revised student outcomes that by the time of graduation, students should have an understanding of the impact of engineering solutions in a global, economic, environmental, and societal context [2]. Additionally, if our graduates are to become leaders in the profession, they need to understand and appreciate the diversity of cultures in the world [3].

Higher education has addressed intercultural development through multiple measures, including the increased number of study abroad programs [4]. Study abroad programs can take a number of different formats including short-term faculty led programs (usually ranging from 2-6 weeks), semester long exchange programs, international co-op or research experiences and service-learning projects [5]. Informal discussions with students who have participated in study abroad opportunities have revealed that these students' outlook on the world was changed and their ability to be more accepting of different cultures was enhanced [6]. Although evidence shows students that participate in longer-duration programs achieve better global competency outcomes

[7], the IIE open doors report for 2017 shows that 60% of students studying abroad participate in programs that are 8-weeks or less in duration [8].

Students develop their knowledge and skill over time, and it is the cumulative result of the curricular path they follow (i.e. the courses they take), the pedagogies employed by their instructors, and their co-curricular experiences [9], that shape their professional future, as shown in Figure 1. In the context of developing their intercultural knowledge and competence, we determined that pre-college traits (or pre-study abroad traits) could be formed by prior international travel, whether through service activities, including church/mission trips, vacation, or living overseas and by the student's family background. Family background can be an influence if a student is born outside the US or by having parents born outside the US, or any combination of the aforementioned. The coursework that would have an influence on students' intercultural knowledge would predominantly be comprised of foreign language courses they had taken. The institutional context presented in figure 1 refers to the university context; however, in the context of this study, we considered the influence of foreign language courses taken both during High School as well as during college. For any study abroad program, the out-of-class experiences will include visits to places of historical and cultural significance. The study abroad programs that are the subject of this research both incorporated multiple organized trips to historical sites. Finally, the classroom experience is the class students are enrolled in for the study abroad program. In this study, we evaluated two different courses; the first course paired US students with students from the host university prior to the start of the program, included the host students in the organized site visits and incorporated seminars run by the host university faculty that addressed cultural perspectives. The second course did not integrate students from the host institution to any of the organized class activities.

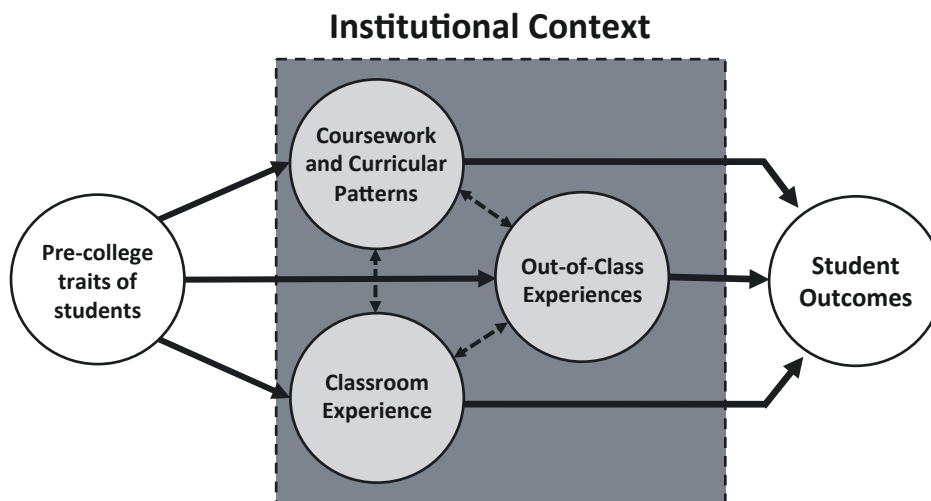


Figure 1: A general conceptual model of college influence on student learning. Adapted from Terenzini et al. [9].

The purpose of this preliminary study was to answer the research question:

How does deliberate interaction with students from the host country improve students' ability to develop their intercultural knowledge and global awareness?

Study Abroad Programs

The Bagley College of Engineering at Mississippi State University has a long tradition of offering faculty-led study abroad courses dating back over the past 15+ years. During the past five years, the college has been proactive in increasing the number of students choosing to participate in engineering-centric faculty-led study abroad summer course [3] and has witnessed almost a 4-fold growth in student participation (see Figure 2). Two courses were offered in 2017; the first course was engineering economy, which is a required course or an engineering elective for all engineering programs. The second course was Technical Writing, a course required for all undergraduate students.

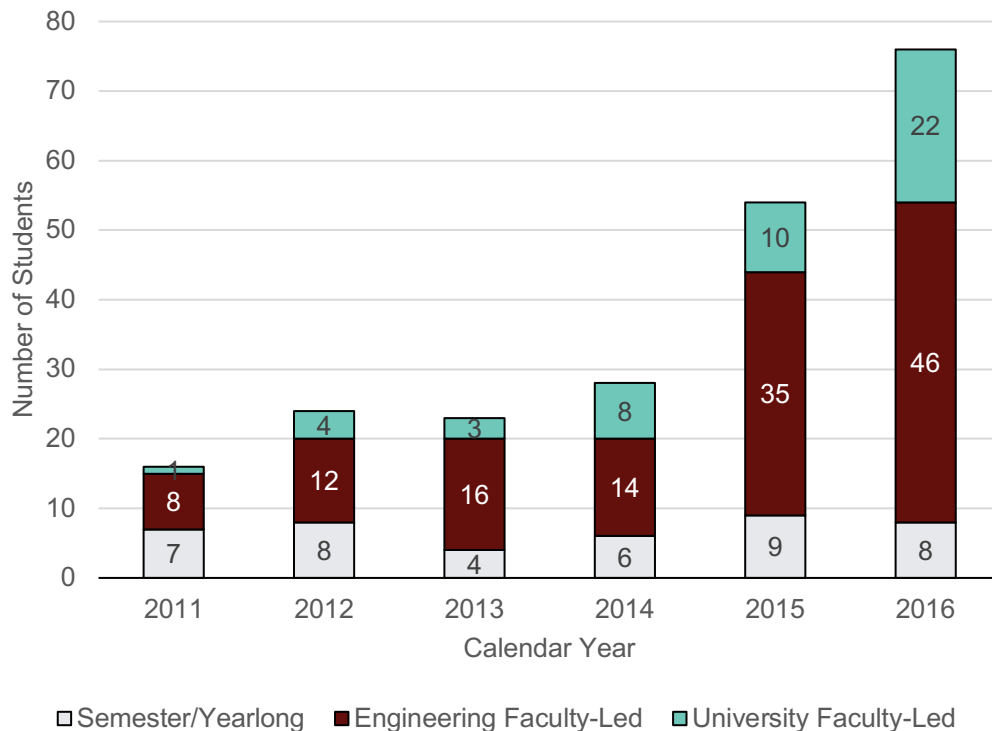


Figure 2: Number of engineering students participating in international programs. The number of students participating in engineering faculty-led summer study abroad courses has increased from 8 students to 46 students between 2011 and 2016.

Engineering Economy is offered during the first 5-week summer term at IMT Mines Albi in France. In 2017, 25 students participated in the program. Student demographics are shown in Table 1. Once class enrollment was confirmed, the class roster was sent to IMT Mines Albi and they were matched with a French Pen Pal. The US students were asked to contact the French students before the departure date. To give them some additional incentive, students were given an extra 5 points on the final exam (200 points) if they had some communication (usually email) with the Albi students before the trip.

When students arrived in France, their pen pals were available to help them acclimate to the new campus and surroundings. Students from both universities attended joint seminars that were separate from the Engineering Economy classes. These seminars were organized by a French

faculty member and focused on activities that addressed cultural differences and perceptions through the use of movies and pop culture examples. Additionally, the US students participated in a number of cultural tours during the weekends, including a trip to the historic town of Cordes sur Ciel and a tour of a local vineyard and winery. The majority of the French students accompanied the US students on these tours.

The Technical Writing program is offered during the second 5-week summer term at the Munich University of Applied Science (MUAS) in Germany. In 2017, 18 students participated in the program (see table 1). The students did not have any contact or interaction with German students prior to departure from the US. Any interaction with German students during the program was purely serendipitous, even though MUAS was in session while the program was in progress. As part of the program, students participated in a number of cultural activities, including a bicycle tour of Munich that incorporates a number of historical sites, and a trip to the Dachau Concentration Camp.

Table 1. Student demographics in the study abroad programs.

	Male	Female	Freshman	Sophomore	Junior	Senior
Engineering Economy	15	10	6	7	10	2
Technical Writing	11	7	0	3	9	6

Both courses followed the same syllabus as the on-campus sections of the courses and had the same course content and student learning outcomes. Neither course incorporated a formal intercultural learning component and none of the class assignments were used to assess how or if students were developing intercultural competencies.

At the conclusion of the program, students were asked to complete a survey to determine how the program had helped them develop their intercultural awareness. The surveys were based on the American Association of College and Universities (AAC&U) VALUE rubrics of “Intercultural Knowledge” and “Global Learning”. A five-point Likert scale ranging from strongly agree to strongly disagree was used to evaluate the extent of intercultural learning. The survey also included questions related to students’ prior international experience to determine if knowledge gains were impacted by the students’ traits prior to the trip. In addition, French students that interacted with American students were asked to complete the survey to determine if their interactions had impacted their intercultural knowledge, even though they remained at their home campus. A copy of the survey is presented in Appendix 1.

Student Profile

Responses to the survey were separated into three different cohorts; US students participating in the Engineering Economy class in France, US students participating in the Technical Writing

class in Germany and French student pen pals from IMT Mines Albi. The survey response rate from the three cohorts was 72%, 44% and 100%, respectively.

To gain an understanding of what international experience students had prior to the program, we asked if they had ever traveled abroad. As seen in Figure 3, 100% of French students had traveled to a foreign country prior to the program. This was in contrast to US students where only 42% of respondents combined between both programs had traveled overseas.

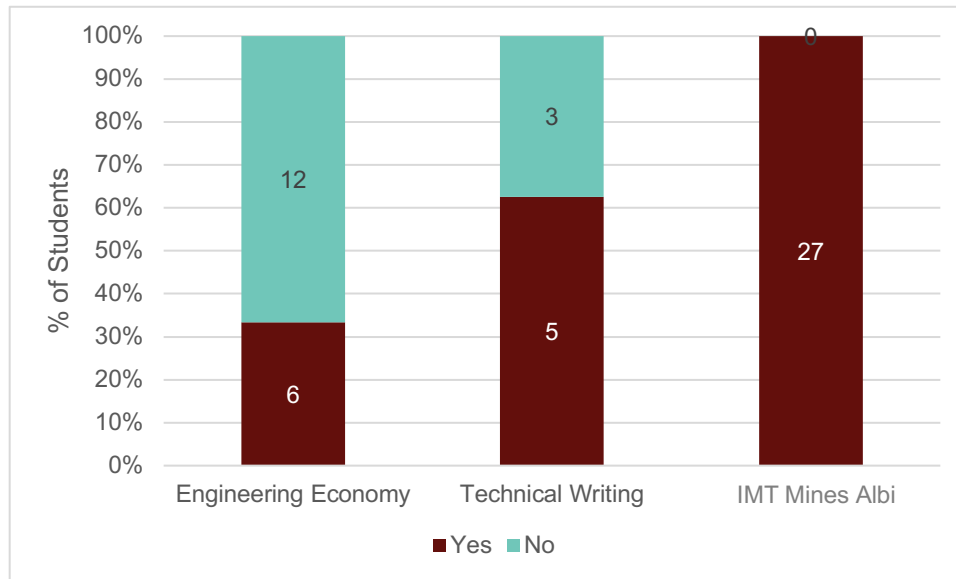


Figure 3: The percentage of students for each cohort that traveled abroad prior to the program.

Additionally, students were asked what type of international experience they had and the duration of the experience. The results are presented in Tables 2 and 3.

Table 2. Longest period of time that students from the different programs had spent abroad.

	Longer than 1 month	Between two weeks and one month	Between one week and two weeks	Less than one week	Never
Engineering Economy	6 (33%)	0	0	0	12 (67%)
Technical Writing	2 (25%)	1 (12.5%)	2 (25%)	0	3 (37.5%)
IMT Mines Albi	19 (70%)	4 (15%)	4 (15%)	0	0

Table 3. Comparison of students' international experience prior to the study abroad program

	Vacation	Other study abroad program (including internships)	Church/mission trip	Military service	Lived abroad
Engineering Economy	3* (50%)	1 (17%)	3* (50%)	0	1 (17%)
Technical Writing	2† (40%)	0	3† (60%)	1 (20%)	0
IMT Mines Albi	16‡ (59%)	12‡ (44%)	0	0	1 (4%)

* Two students indicated they had participated in a church/mission trip and a foreign vacation

† One student indicated they had participated in a church/mission trip and a foreign vacation

‡ Three students indicated they participated in a study abroad program and a foreign vacation

To determine if students had taken any coursework that might have contributed to their intercultural knowledge, students were asked if they had taken any foreign language courses. Of the US students, all but three students had taken a foreign language class. These three students were all participants in the Technical Writing class in Germany. The distribution of foreign languages is presented in Figure 4. In addition to French, Spanish and German, one student had taken Latin, one student had taken Japanese and one student had taken Chinese. Six students indicated they had taken the same foreign language for four or more semesters.

Table 4. Number of students that took a foreign language in either high school or college before the study abroad program. Numbers in parentheses indicate number of students that took the same foreign language for more than 4 semesters.

	No. of Students that only took a foreign language class in High School	No. of Students that only took a foreign language class in College	No. of Students that took a foreign language class in High School and College
Engineering Economy	12 (3)	0	6 (2)
Technical Writing	4	0	1 (1)

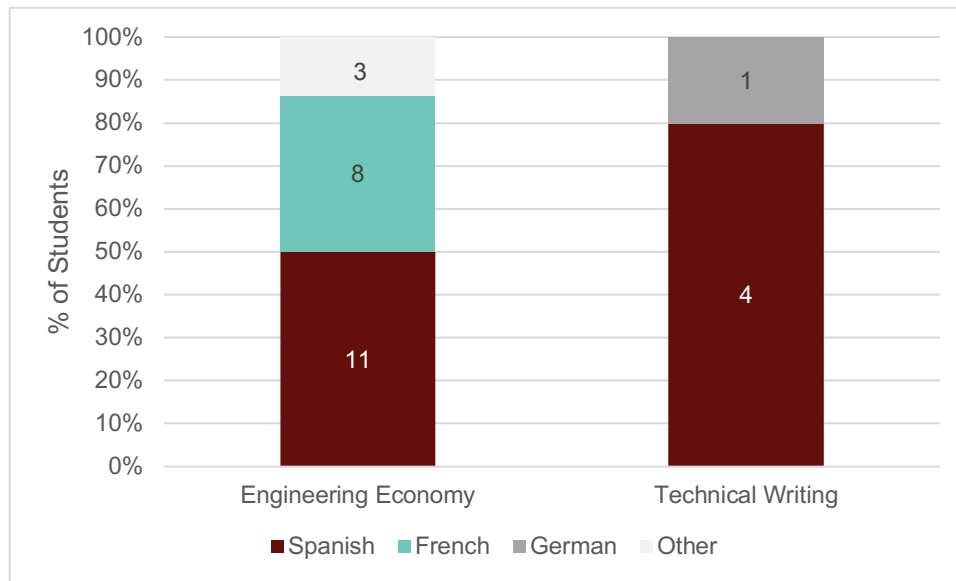


Figure 4: Percentage of students that had taken a foreign language course prior to their study abroad.

Intercultural Knowledge and Competence

In addition to determining the extent of experience students had in developing their intercultural knowledge and competence prior to the study abroad program, students were asked how the program had helped them develop specific aspects of intercultural knowledge and competence. The survey results are presented in figures 5-10.

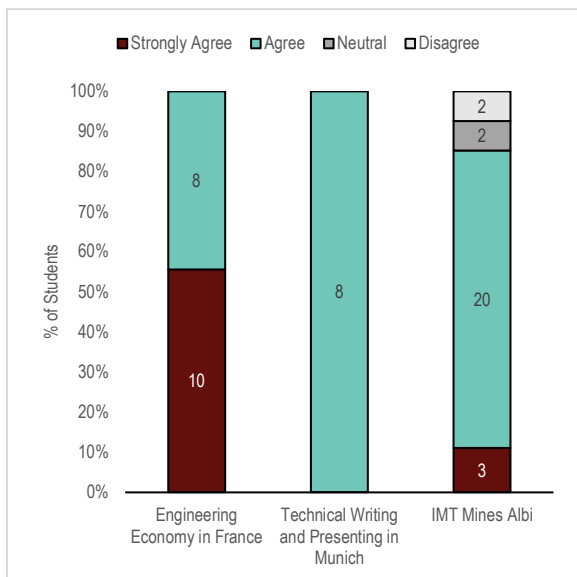


Figure 5: Student responses when asked if they had developed a deeper understanding of issues that are important to people from other cultures in relation to their history, values, politics, communication styles, economy, or beliefs and practices as a result of participating in the study abroad program.

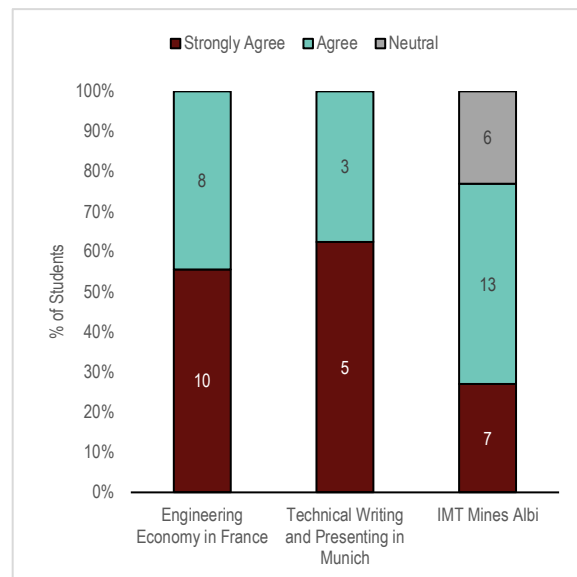


Figure 6: Student responses when asked if they are more likely to act in a supportive way towards people from other cultures that may have a worldview that differs from my own as a result of participating in the study abroad program.

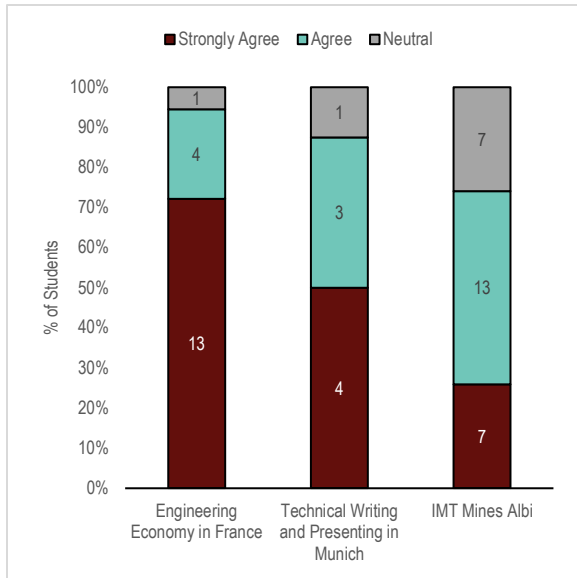


Figure 7: Student responses when asked if they are more open minded and recognize that more than one worldview exists as a result of participating in the study abroad program.

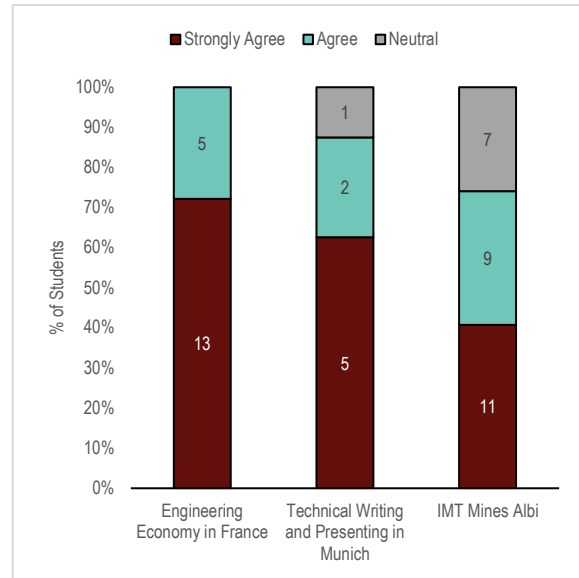


Figure 8: Student responses when asked if they are more effective at communicating, using both verbal and non-verbal forms, with people from other cultures as a result of participating in the study abroad program.

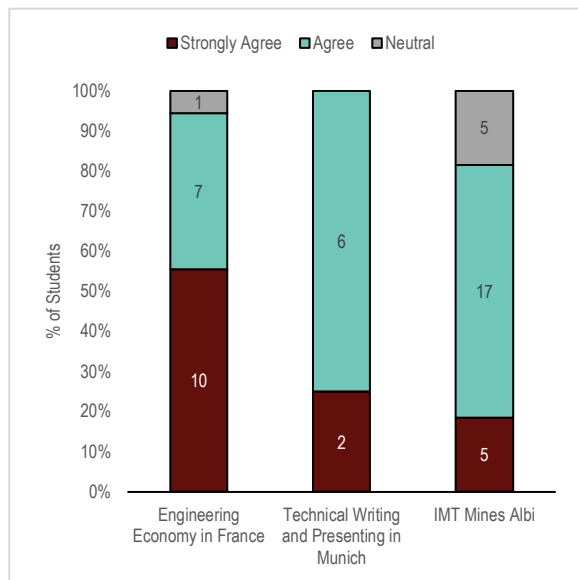


Figure 9: Student responses when asked if they had a deeper curiosity of other cultures as a result of participating in the study abroad program.

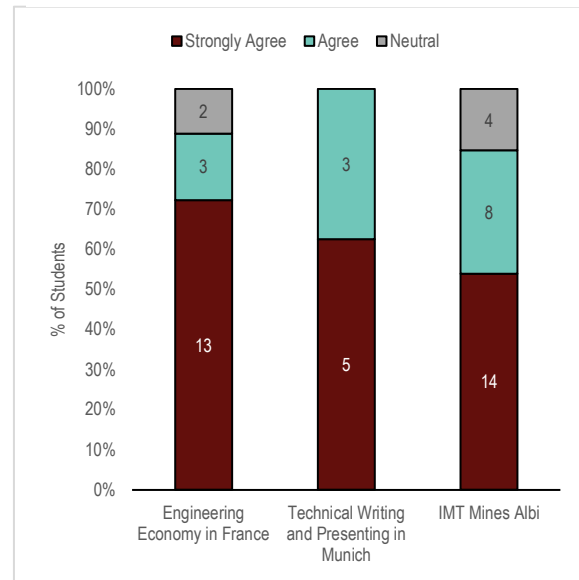


Figure 10: Student responses when asked if they are eager to interact with people from other countries and learn more about their culture as a result of participating in the study abroad program.

Discussion

The gains in intercultural knowledge that students experience during a study abroad program are influenced by the international experiences that they have had prior to the program. 100% of French students had previous international experience and of those, 70% had spent over a month abroad. In contrast, only 33% of students in the Engineering Economy course and 62.5% of students in the Technical Writing course that responded to the survey indicated they had traveled abroad prior to the study abroad program. Of the students in the Engineering Economy course that indicated they had travelled overseas prior to the program, all of them stated they had spent at least one month abroad, whereas only 40% of students in the Technical Writing program that had been abroad had spent more than one month overseas. Another major difference between French students and American students was the type of international experience they had prior to this program. The two predominant reasons for international travel for American students were vacation and church/mission trips. The proportion between both programs was consistent. Students were not asked about these experiences but one could imagine that these may not present students with many immersive opportunities where they could learn about the culture of the host country. None of the French students indicated they had been on a church/mission trip, which demonstrates one cultural difference. A slightly higher percentage of French students had been on an international vacation when compared to American students. However, the most significant difference was the number of French students that had participated in a study abroad or internship program. Again, students were not asked to provide details about their experiences but it might be assumed that these were immersive experiences that may have contributed to students' intercultural knowledge prior to the start of this program.

Of the three student cohorts, the French students had that least gains in intercultural knowledge and competence. This result was consistent for all six questions students were asked and a higher percentage of French students had a neutral response to questions than for the two cohorts of American students. As all French students had traveled overseas previously, and 70% had spent one month or more abroad, this result was unsurprising. These students will have had other opportunities to develop intercultural knowledge and this program may be reinforcing the competencies they had already developed.

Overall, the data suggest that US students participating in the Engineering Economy program in France had the most gains in intercultural knowledge with a higher percentage of students strongly agreeing with all questions with the one exception of the data in figure 6. There was a marginally higher percentage of students in the Technical Writing program in Germany that strongly agreed they were more likely to act in a supportive way towards people from other cultures that may have a worldview that differs from my own as a result of participating in the study abroad program. These data suggest that intentionally pairing American students with students from the host country during the study abroad program is beneficial. However, it should also be recognized that more students participating in the German program had prior international experience, which might have led to smaller gains in intercultural competence and knowledge. Further analysis is required to determine the full extent of how pre-program traits influence the way in which students develop their intercultural knowledge. What can be deduced from the data is that both study abroad programs were beneficial for all three student cohorts.

Limitations

One of the major limitations in this study was the small number of participants. To overcome this, the authors plan to collect data from students over multiple years to increase the sample size. Future work will incorporate pre- and post-surveys as a means of evaluating student growth in intercultural knowledge as a result of the study abroad experience. Our preliminary analysis took a very high-level view of the collected data and did not delve in to the influence of student background. Future work will analyze individual student responses in relation to their differing backgrounds as oppose to only looking at the cohort. Additionally, semi-structured interviews with students will be conducted to obtain a deeper understanding of how their study abroad experience contributed to their intercultural growth.

Another limitation of the study was the low response rate from students in the Technical Writing program. Only 44% of students responded to the survey, compared to 72% and 100% from the American and French students, respectively, associated with the Engineering Economy program. The survey was administered to American students by the Director of International Programs, who was also the course instructor for Engineering Economy. The level of familiarity between the students and the instructor may have resulted in the higher response rate for Engineering Economy and, conversely, less familiarity with the Technical Writing students may have resulted in the lower response rate. Therefore, future surveys will be administered by the course instructor in an attempt to increase response rates.

Summary

This work in progress describes our preliminary quantitative, indirect survey data taken from three, relatively small student cohorts. These data suggest that US students gain more intercultural knowledge and competence during faculty-led study abroad courses when they have intentional interactions with students from the host country. The benefit to host students was less marked and we suspect this is a result of the host students having extensive experience traveling abroad prior to the program, with 81% having visited five or more countries.

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Appendix 1

Which study abroad summer program did you participate in?

Have you been abroad prior to this study abroad trip?

Which of the following best describes your previous overseas trip(s). Check all that apply.

- Family vacation
- Church/mission trip
- Vacation with friends
- Other study abroad program
- Military service (own)
- Military service (parents)
- Other (Please explain)

What is the longest period of time you've spent overseas?

- One week or less
- Between one and two weeks
- Between two weeks and one month
- Longer than one month

Were you or your parents born outside the US?

- Both me and my parents were born in the US

- I was born in the US but at least one of my parents was born overseas
- My parents were born in the US but I was born overseas
- Both me and my parents were born overseas

Have you ever taken any foreign language courses?

- Yes
- No

Which language(s) have you taken?

- Spanish
- French
- German
- Italian
- Other

When did you take a foreign language class?

- When I was in high school but not at college
- When I was in college but not in high school
- Both in high school and at college

What is the most number of semesters you have taken the same foreign language?

As a result of participating in this study abroad program:

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
I have developed a deeper understanding of issues that are important to people from other cultures in relation to their history, values, politics, communication styles, economy, or beliefs and practices.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am more open minded and recognize that more than one worldview exists	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am more likely to act in a supportive way towards people from other cultures that may have a worldview that differs from my own.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am more effective at communicating, using both verbal and non-verbal forms, with people from other cultures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a deeper curiosity of other cultures.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am eager to interact with people from other countries and learn more about their culture.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>