

# Student Perceptions of Global Knowledge and Skills Acquired During a Five-Week Study Abroad Program

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**Abstract**—The purposes of this Work-in-Progress paper are to describe the evolution of a faculty-led, summer-based study abroad program and its impact on the development of student global competency skills; and to describe an on-going research study to determine students' expectations for global skills learning before going abroad and perceptions of skills actually learned while abroad. The results are being used to further improve the study abroad program so as to increase student awareness and development of the knowledge and skills that will serve them in the increasingly global engineering workplace. Currently, the principal program assessment instrument is retention rates: virtually every student who has participated in the program since its inception in 2012 (77 students) has either graduated or is on track to do so.

**Keywords**—study abroad, global competency skills, retention.

## I. INTRODUCTION

Lists and descriptions of skills needed for global competency in the engineering profession abound, e.g., [1]-[4], but without general agreement; however, items common to most lists include knowledge and appreciation of other cultures, knowledge of international business and finance, and foreign language skills. Owing to the growing importance of these skills, study abroad programs are proliferating [1], [5]. There are many formats for study abroad programs, e.g., semester-long, January intercession, and spring break, but the one of interest here is a popular faculty-led summer program that began as a four week, three-credit program in 2012 and expanded to a six-credit five week program in 2015. This program enables students to develop some global skills, and it helps to motivate them to be more engaged in their education, which results in greater retention, i.e., graduation rates.

While the current five-week program should enable increased learning of global skills as compared to the four week version, the question arises as to whether even greater global skills learning can be achieved in the five week program than at present. In order to inform this question, a simple qualitative research study has been initiated to determine students' expectations for global skills learning before going abroad and perceptions of skills actually learned while abroad. The results of the research will be used to revise and improve the five week study abroad program.

Although significant global skills learning can be achieved in five weeks, relevant publications suggest that, realistically, many global skills simply cannot be learned very well during a five-week program [6]. To remedy this, we have designed and submitted for approval, a Certificate in Global Studies program for engineering students. The program will encourage and reward students for complementing an engineering study abroad program with courses in foreign culture and civilization, and/or international business and finance, and/or modern foreign language.

The following sections include descriptions of the evolving study abroad program and some assessment results illustrating the success of the program; a description of the information-gathering research program, including a discussion of results gathered from the research surveys; and a brief description of the new global studies certificate program.

## II. PROGRAM EVOLUTION

The program began in 2012 as a faculty-led month-long study abroad program to the Republic of Ireland. Using facilities at a local university, students from every department in the College of Engineering (Electrical and Computer, Mechanical and Aerospace, Civil and Environmental, Industrial and Manufacturing Systems, Chemical, and Biological) were housed in student residence halls on the local Irish campus and took an introductory three credit course in electric circuit theory, which is either required or a suggested elective, depending on the student's major. The course was taught using an adapted version of a strategy known as team-based learning (TBL) [7], in which the students are required to study new conceptual material outside of class before it is formally addressed; and they then spend significant classroom time working in groups on assigned problems and exercises. During group work, students are required to help each other (peer instruct) within their groups, and the instructor and teaching assistant observe the group work and provide appropriate assistance when needed.

Throughout the month, in addition to the technical classroom sessions, the course included several co-curricular activities, including group field trips to culturally enriching sites and to facilities where engineering is either practiced or

taught. Between the two types of outings, students learned some Irish history and culture as well as various aspects of engineering education and practice in Ireland. During their free time in the evenings and on weekends, students interacted with and observed the Irish people (and people from other countries as well) and their customs. This enabled them to develop the independence and personal growth needed to live in a foreign country [1], [2], as well as what is known among global studies experts as cross-cultural awareness and appreciation [2], which includes items such as etiquette and interpersonal skills, appropriate dress, and awareness of religious and political issues. All these features of the program provide the students with a certain amount of global competency that will serve them as practicing engineers in the increasingly global engineering workplace of the 21<sup>st</sup> century.

In 2015, it was decided that the program could be enriched so as to foster greater learning of global competency skills by adding a three credit engineering humanities course to it. Thus, in the current version of the program, students may take either or both of two three-credit-hour courses. The first course, an engineering humanities elective, begins on campus in March with weekly classes to study the culture and history of the host country. Then for the first ten days within the host country, the class tours several cities and locations that are of both cultural and/or engineering technical interest. At the completion of the humanities course, the above-described electric circuit theory course, including several cultural and engineering co-curricular visits, begins, and runs for four weeks.

In 2016, the program was moved from Dublin to Rome, Italy for two reasons. First, the predominance of the Italian language would provide students with greater challenges concerning development of survival skills, and second, the abundance of pre- and early Christian era history and historical sites, as well as the abundance of medieval history and art, could provide students with greater opportunities for cultural development. Besides the fact that the International Program Director had relevant professional contacts in both cities, which greatly simplified various administrative tasks, there was nothing particularly unique about Dublin or Rome as the location for the program. Both provide opportunities for cultural growth and global skills development, but many other locations could be used as well.

### III. PROGRAM ASSESSMENT

Several instruments have been used to demonstrate the success of the described study abroad program. These include statistics on the numbers of participants; student comments and instructor observation; grade point average (GPA) data for the electric circuit theory course; and retention rates of students in the engineering program. Table I contains data on the numbers of students in the electric circuit theory component of the program since its inception. The rapid growth indicated illustrates the popularity of the program, especially since the addition of the three-credit engineering humanities course in 2015.

TABLE I. Program Enrollment Data

Year	Location	Number of Participants
2012	Dublin, Ireland	13
2013	Dublin, Ireland	16
2014	Dublin, Ireland	16
2015	Dublin, Ireland	32
2016	Rome, Italy	44

Student comments, made both during and after the program, have been overwhelmingly positive, and they support several important points. First, the cultural and technical excursions taken throughout the program lead to greater student enthusiasm, engagement, and motivation for the engineering profession. Second, by spending substantial amounts of time living and studying together, whether during the cultural and technical excursions, in the residence quarters during the month-long course, or on weekend travel to other countries, the students form strong and lasting friendships that are difficult to form on campus during the regular semesters. Lack of success at making personal connections with other students, faculty, or staff, is considered to be the primary reason why students drop out of the University of Missouri. And third, by virtue of being immersed in the host country for five weeks, students develop the above-mentioned independence, personal growth, and cross-cultural skills. Instructor observations agree with all these conclusions.

Student grade point averages also speak to the success of the program. Since the inception of the program in 2012, grade point averages (GPAs) in the circuit theory course have averaged 3.39 (through 2015). In contrast, the average GPA of the same course taught during the same four summers on campus was 2.94, and that of the same course taught during the Fall and Spring semesters since Fall 2012 was 2.70. The higher GPA during the study abroad program is probably due to a combination of three factors: the so-called “one-course-at-a-time effect” [8], in which students can immerse themselves into the subject without the distractions and pressures associated with other courses usually taken simultaneously; the fact that they live and study in close proximity to each other with the teaching assistant nearby; and due to the use of the TBL learning strategy used in the classroom [7]. The GPA data suggest that because of these factors, the first two of which are only possible during the study abroad program, the students achieve the course learning outcomes to a much greater degree than they do during the regular semesters.

A final, overall measure of the success of the described program is student retention rates. Thus far, every student in the program has either graduated, or is on track to do so, which is well above the overall average for the college, i.e., 71 percent.

### IV. STUDENT PERCEPTIONS OF GLOBAL SKILLS LEARNING

Although pre-departure study, visits to cultural sites and engineering facilities in the host country, and immersion in the

local culture provide some global skills development, the question of how to maximize global skills learning in the five week program has arisen. In order to begin to answer this question, a simple two-questionnaire research project has been initiated to determine students' expectations for global skills learning before going abroad (a pre-departure survey) and their perceptions of skills actually learned while abroad (an end-of-program survey). Results of the surveys will be used to make improvements to the program that increase global skills learning. In the IRB approved, pre-departure survey, students were asked to state whether they were enrolled in the 10-day engineering humanities course only, the 28-day electric circuit theory course only, or the 38 day two-course combination of the two, and then to provide a narrative response to the following:

"Please name or briefly describe which global knowledge and skills you hope to learn and/or develop during your study abroad program. If you aren't sure what global skills are, simply say so."

The results of the pre-departure survey are summarized and discussed in Section V below.

To complete the project, students were asked to complete a second, IRB-approved, end-of-program survey, shortly before the completion of their respective programs. It consisted of the following two questions:

1. Which global skills do you think you actually learned and/or developed during your program?
2. How can the program be revised to enhance global skills learning and development?

A preliminary summary and discussion of the results of the end-of-program survey in this Work-In-Progress paper is contained in Section VI below.

## V. PRE-DEPARTURE SURVEY RESULTS

The pre-departure survey was administered to all students registered for the 2016 study abroad program during a pre-departure orientation session. Of the 42 students present at the session, 38 chose to participate in the survey, and from those 38 responses, 73 useful statements were obtained and grouped according to certain common themes (thematic coding). The results are summarized in Table II. As the table shows, two students (or 5 percent of the participants) claimed to have no knowledge of global skills. The other 71 statements can be described as various expressions of four themes: experience a new culture, communicate across language and cultural barriers, observe engineering and business professional environments, and develop independence and survival skills for living abroad. The number of times each theme was mentioned is given in the far right column of the table. Twenty of the 31 new culture statements and 9 of the 16 professional environment statements could be further grouped according to certain specific aspects of the theme, as shown in the table.

TABLE II. Summary of Pre-Departure Survey Statements: Student Perceptions of Anticipated Global Skills Learning

SKILL/EXPERIENCE	SPECIFIER	TIMES MENTIONED
Don't know what global skills are		2
Experience a new culture		31
	None	11
	Learn the language or about it	5
	Food, cuisine, restaurants	3
	Lifestyle, everyday life, shopping, people	6
	Customs and traditions	2
	History and historic sites	2
	Observe cultural diversity	2
Communicate across language and cultural barriers		11
Develop independence and survival skills for living abroad		13
Experience engineering and business professional environments		16
	None	7
	Meet Italian engineers	2
	Observe workplace, production facilities	4
	Gain professional experience	1
	Observe the role of women	2

The results of the pre-departure survey suggest that, collectively, the students have a reasonably good idea of the skills needed for global competency, and significant ambition to develop some of those skills.

## VI. END-OF-PROGRAM SURVEY RESULTS

The survey was administered to the 44 students enrolled in the engineering circuit theory course a few days before the end of the course. At that point, 18 of them had been in the host country for 31 days and 26 had been there for 21 days. All 44 students chose to participate in the survey, and from their responses, 99 useful statements relative to the first question and 34 useful statements relative to the second question were obtained and grouped according to certain common themes, as was done in the case of the pre-departure survey. The results are summarized in Tables III and IV for the first and second questions, respectively.

Preliminary analysis of the data in Table III suggests three principal themes. First, students' expectations for experiencing a new culture generally were roughly realized. Second, they developed independence and survival skills to a much greater degree than originally expected. Significant numbers specifically mentioned the abilities to travel around the city, the country, and even beyond; and to manage to communicate with people across the language barrier as important global skills that they had developed to a reasonable degree. And third, their expectations to gain experience related to international professional and business skills were largely unrealized.

TABLE III. Summary of End-of-Program Survey Statements: Student Perceptions of Global Skills Actually learned

SKILL/EXPERIENCE	SPECIFIER	TIMES MENTIONED
Don't know what global skills are		0
Experience a new culture		38
	None	14
	Learn the language or about it	6
	Food, cuisine, restaurants	3
	Lifestyle, everyday life, shopping, people	7
	Customs and traditions	3
	History and historic sites	5
	Observe cultural diversity	0
Develop independence and survival skills for living abroad		59
	None	4
	Navigate transportation and travel modes	24
	Communicate across language barrier	29
	Manage money and time	2
Observe engineering and business professional environments		2
	None	1
	Meet Italian engineers	0
	Observe workplace, production facilities	1
	Gain professional experience	0
	Observe the role of women	0

TABLE IV. Summary of End-of-Program Survey Statements: Student Suggestions for Improving Global Skills Learning

TIME FRAME	ISSUE	TIMES MENTIONED
Pre-departure		
	More intensive language study	8
	Greater interpersonal relations study	4
	More on history and culture	2
While Abroad		
	More formal opportunities to meet Italian students	10
	More professional opportunities: people, workplace	10

Preliminary analysis of the data in Table IV suggests two principal themes. First, many of the students experienced significant culture shock, particularly in relation to dealing with the local populace. The combination of the language barrier and many differences in local customs and etiquette created many uncomfortable situations, which the students suggest could be mitigated to some extent with greater pre-departure instruction in the local language and in the local customs and etiquette. And second, many students were disappointed in the lack of international professional and business skills development, as mentioned in connection with Table III. Thus the desire for more formal opportunities to meet their university-age peers and working engineers, as expressed in Table IV.

## VII. GLOBAL STUDIES CERTIFICATE PROGRAM

Without actually including extensive foreign language study and topics in international business and finance in the academic component of the study abroad program, it is unrealistic (despite the responses of some students in the pre-departure survey) to think that those global competency skills can be learned to any significant degree during the described five-week study abroad program [6]. Thus, to enable and encourage students to complement and enhance their study abroad experience, an Engineering Certificate in Global Studies has recently been proposed. The (at least) twelve-credit certificate program would require students to participate in a three-to-nine-credit engineering-based study abroad program. Then, depending on the number of credits earned abroad, the student would take additional courses in foreign culture and civilization, international business and finance, and modern foreign language. These courses can be taken before or after studying abroad.

## VIII. CONCLUSIONS

The described study abroad program is growing in popularity, especially since adding the engineering humanities course in 2015 and providing students with three options (either or both courses). Various assessment measures point to its success, but it is felt that further changes can be made to maximize learning of global competency skills. Thus, a two-questionnaire research project was initiated to determine students' expectations for global skills learning before going abroad (the pre-departure survey) and their perceptions of skills actually learned while abroad (the end-of-program survey). The principal preliminary findings of the project are that students experience significant language and custom culture shock in the host country, as well as some disappointment concerning international business skills development, both of which can be remediated within the program.

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