

Study Abroad to Promote Design and Construction Collaboration

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The construction industry continues to implement greater collaboration between design and construction organizations. To be prepared for these collaborations, graduates of construction management (CM) programs need exposure to collaborative environments where they can develop the behavioral and communication habits that support success for teams comprised of individuals from diverse backgrounds. To prepare students for these new collaborative opportunities, Purdue University has begun to offer study abroad opportunities that expose CM students to international and architectural diversity at the same time. This paper utilizes literature support and lessons learned from recent study abroad experiences to assemble a list of best practices for student international collaborations.

Key Words: Global, International, Study Abroad, Collaboration, Design Integration

Introduction

This paper focuses on the internationalization aspect of study abroad (SA) collaborations that promote cultural curiosity, openness, and empathy as preliminary steps in educating students to become effective in diverse team environments. In addition, the paper treats globalization and internationalization as somewhat synonymous terms as was found to be common in much of the literature on the subject.

International employment opportunities for construction management graduates were noted well over a decade ago (Bodapati & Kay, 1998). As detailed in Table 4 of the World Bank International Comparison Program report, the US total actual expenditures for construction were only 15% of the global total in 2005 (World Bank, 2005). By 2017 approximately one third of the Engineering News Record's list of top 250 international construction firms were headquartered in the US. These 250 firms report \$468.12 billion in 2016 contracting revenue from projects outside their home countries (ENR, August 2017). It has also been noted that US construction organizations are experiencing an influx of foreign born workers requiring construction managers to deal with issues involving a more diverse workforce (Lower & Shaurette, 2010). Growth of a global supply chain to stock construction projects at home and abroad has also been noted (Levitt, 2007). These potential career connections support the notion that CM graduates will benefit in the future from personal growth in cultural curiosity, openness, and empathy.

Preparation for international employment opportunity, an increasingly global economy, and the need to manage a more international workforce are potential reasons to place emphasis on the importance of international connections for construction management programs. In response to this global economic opportunity, many programs now offer courses that provide an introduction to international management, engineering, and construction issues. As an example, Purdue University, in an attempt to provide global understanding across the full range of degrees offered, has included 'Global Citizenship and Social Awareness' as an imbedded outcome expected of the undergraduate core curriculum (Purdue University 2013a).

Some of the early attempts to provide global experiences for college students could be interpreted as more 'isolationist' because they did not promote true partnerships. Rather, the international collaborators were expected to totally conform to the host institutions language, culture, and practices with little or no accommodation for the challenges experienced by visiting collaborators. Other early attempts were based on a desire to help international partners but approached the process from more of a 'colonialist view'. The colonialist view operated from the assumption that what had been working in their culture would be equally effective in another culture. A more desirable approach is the move to a 'post-colonial' approach that can result in mutual transformation. Some

examples include global opportunities for faculty development and participation in international service learning projects involving faculty and many levels of student participation (DeZure et al., 2012).

These more collaborative international experiences mirror recent collaborative developments in construction, such as Integrated Project Delivery and the pull planning procedures some contractors are now implementing through lean design and construction. Collaboration of designers, engineers, contractors, subcontractors, and tradesmen to reduce waste in lean construction requires cultural curiosity, openness, and empathy as well, just in a different cross-cultural environment. The Design and Construction Integration (DCI) study abroad trips were created to build CM student interest in these cross-cultural environments by immersing them in the world of design education at the same time they experience a broader cross-cultural experience in global cultures different from their own.

Literature Review

Around the world there are notable similarities in the educational challenges to internationalizing teaching and learning in higher education (DeZure et al., 2012). Some of the challenges noted in the literature include resistance to change, time constraints, inflexible or incompatible reward systems, constraints created when working across geographic boundaries, limits to the use of active learning, limitations and continual changes in instructional technology, a diversity of views on and application of assessment, as well as limited international accreditation. Despite these significant challenges, the literature indicates a growing acknowledgement that global competencies should be introduced in higher education.

The engineering and technology curriculum is one area where the changes necessary to prepare students for future global interaction have been examined in detail. The need for global experience was one of eight objectives for curriculum change that came from a 2011 survey of over 3000 individuals followed by discussion at conference sessions during the American Society for Engineering Education (ASEE) 2012 annual conference (Meckl et al., 2012). One issue that came to light during the ASEE conference sessions was the need to better define global competence. A recent dissertation examining the global competency needs of industry included a literature review identifying the following categories of engineering global competence (Warnick, 2010).

1. Exhibit a global mindset
2. Appreciate and understand different cultures
3. Demonstrate world and local knowledge
4. Communicate cross-culturally
5. Speak more than one language including English
6. Understand international business, law, and technical elements
7. Live and work in a transnational engineering environment
8. Work in international teams

Table 1 includes a list of potential international educational and collaborative experiences that have been suggested to promote global competencies along with source citations available for additional detail. This paper concentrates on global experiences appropriate to enhance study abroad trips. Many successful study abroad experiences which provided value to the participating students have been described in the literature. In one case, a five-week study abroad experience is the basis for completion of a construction related undergraduate thesis (Liu & Kramer, 2010). Another included both classroom instruction before the study abroad experience and completion of a related paper at the conclusion (Lopez del Puerto & Gordon, 2010). An additional example of study abroad combined the end of degree capstone project with visits to international construction projects, culminating in both written and oral reports submitted to a faculty jury (Kramer, 2004). The study abroad experience is considered to be so advantageous to graduates that in 2013 Purdue University chose to provide scholarships of up to \$3,000 per student for participation in a semester long credit bearing study abroad experience (Purdue, 2013b).

The expected outcomes included in Table 1 are general in nature, are by no means exhaustive, and have been included as rough guidance only. Several of the international experiences from the table were implemented in the DCI study abroad trips described in this paper and literature support as well as first-hand experience is included in the lessons learned that conclude the paper.

Table 1
Potential International Educational Activities

Brief Description of Activity	Expected Outcome	Literature Source
Include global impact in class projects	Global Learning Cross-culture	Meckl et al., 2012
Utilize technology to travel: use virtual travel	Global Learning Cross-culture	Meckl et al., 2012
Form teams on projects to allow for cultural exchange	Global Learning Cross-culture	Meckl et al., 2012
Make it easier/less expensive to study abroad	Global Learning Cross-culture	Meckl et al., 2012 Purdue, 2013b
Define and assess global competency	Global Learning Assessment	Meckl et al., 2012
Articulation agreements with international institutions	Global Learning Cross-culture	Meckl et al., 2012
International student internships	Global Learning Cross-culture	Warnick, 2011
Study-abroad programs	Global Learning Cross-culture	Warnick, 2011 Liu & Kramer, 2010
Faculty-led courses while on international travel	Global Learning Cross-culture	Warnick, 2011
Research experiences	Research Global Learning	Warnick, 2011
Language study	Global Learning Cross-culture	Warnick, 2011
Interactive international co-teaching	Course Devel. Cross-cultural	Lewis & Sincan, 2009 Meckl et al., 2012

Design and Construction Collaboration (DCI) Study Abroad

The two May 2017 study abroad trips in question – DCI SA in Spain and DCI SA in Brazil – had itineraries which were quite different, but shared aspects of their goals and learning outcomes desired. For both trips, the main two goals were:

1. To deepen students understanding of different cultures regarding empathy, curiosity, and openness
2. To recognize and appreciate the differences between the design and construction cultures

Desired learning outcomes – At the conclusion of the SA experience, the student will:

1. be able to ask simple or surface questions about other cultures.
2. begin to initiate and develop interactions with culturally different others.
3. begin to suspend judgement in valuing her/his interactions with culturally different others.
4. be able to recognize intellectual and emotional dimensions of more than one world view and sometimes use more than one worldview during interactions.
5. be able to understand the aesthetic progression of Brazilian or Spanish architecture.
6. be able to do basic comparisons between North American construction industry practices and the construction practices in the cultures which they visited.

The first four outcomes are connected to the cultural learning goals of study abroad and the last two refer to outcomes related to learning about differing design and construction professionals and their practices.

Despite the shared goals and learning outcome, the Brazil and Spain SA trips differed in implementation. Both study abroad experiences were short term experiences (ten or eleven days) to allow students from construction related programs in the university to do internships over the summer. The main driver of the differences comes from the geographic and cultural diversity of the Brazil trip. Brazil is a vast territory with multiple cultural and ethnic backgrounds (Lohman & Dredge, 2012). The Brazil SA focused on the southeast region, more precisely in the State of Sao Paulo, due to previous connection of the study abroad lead instructor with the regional Architecture, Engineering, and Construction (AEC) industry, as well as the two architecture schools in the region. In order for the students to experience the multiple facets of Brazilian culture, the instructor opted for visits in three main locations. These locations were chosen due to their natural environment, cultural expressivity, or for having partner institutions. During the eleven days (from May 10th to May 21st), students stayed in Sao Carlos, Sao Paulo, and Ubatuba, in this order. In contrast, the Spain trip was concentrated in the Barcelona metropolitan area with only limited travel of less than 30 minutes to any location. This differential in travel time and distance left considerable free time for students to explore Barcelona in the unstructured way as they would normally visit a new location.

DCI Brazil and Spain students met with their instructor three times prior to the trip. The first meeting was an introduction to the participants, the course structure, trip details, and requirements. During the second meeting, students had an overview of the culture they would be visiting. A more detailed overview of the precise locations they would be visiting along with logistical information was covered during the third meeting.

Intercultural exercises were introduced both before and during the actual study abroad experiences. The exercises that were used for both trips included a 25 Revealing Questions Exercise for Intercultural Openness and a Grocery Store Ethnography activity. The Brazil trip also used the Guided Comparison Exercise and Martian Anthropology activity, while the group visiting Spain were introduced to a Values Continuum activity as an icebreaker at one pre-departure meeting. These intercultural exercises are not well known to many college faculty, and were introduced to the authors during intercultural pedagogy training that all Purdue University study abroad leaders are encouraged to participate in. A \$3000 faculty grant, which can be used for any university related expenditure, is provided as incentive for participation in the training.

Students in both trips were required to keep a journal where they provided the instructor with activity reports and debriefs. Journal reflections were also required everyday using guiding questions given to students prior to the trip. The journals were then collected and analyzed by the instructors using the ACC&U Intercultural Knowledge and Competence VALUE Rubric (www.aacu.org/value/rubrics/intercultural-knowledge). As an additional tool to assess success in achieving intercultural development goals, the students also took the Miville-Guzman Universality-Diversity Scale (M-GUDs) survey before and after the trip to assess their feelings regarding empathy, curiosity and openness. The M-GUDs is a survey instrument developed to assess intercultural competence. It has been

successfully used in several studies as an outcome measure with external validity and reliability documented in the college setting (Salisbury et al., 2013).

The Study Abroad Challenges

Both DCI SA trips were impacted by logistical challenges. For the Brazil DCI SA, the main challenge was to work with three different locations and two different campuses (and architecture programs) of the same partner institution. This required the Brazil SA leader to work with at least two different university liaisons, as well as the travel agent to organize the trip. Time and means of transportation between cities was also a challenge, since southeast Brazil is still a vast region (a little larger than the American state of Minnesota). For this SA, the program rented a mini-van with a driver that would transport students and instructor between locations and to some activities, however for one day, the SA leader decided to rent a car and drive students to the site locations in order to have more flexibility and to keep the student costs for the trip to a minimum.

Another challenge faced by the Brazil DCI SA was that the timing of the visit for the first studio (Sao Carlos) which was not ideal, as the architecture students were preparing themselves for a deliverable in the following week. This meant instructors were giving class feedback for the first half of the meeting (about 1h). The DCI SA students could only experience a traditional studio environment (student working in groups, and table talk feedback) for the second part of the class. The visit to the Sao Paulo architecture school was more structured and students could participate in a specially designed activity for them. During the tour of the facilities, the DCI students could again visit a studio during active learning hours and observed a table talk feedback. However, the feedback was given in Portuguese and the SA leader, along with one of the DCI students who spoke Portuguese and a Brazilian graduate student had to translate for the other three students who did not speak the language.

The primary logistical challenge for the Spain DCI SA was coordination of student and faculty availability during the architecture program site visit. The May 9-18, 2017 time frame for the trip coincided with completion of the Spanish students' semester projects. Because of the preoccupation of both faculty and students with this process, the interaction between the US group and the Spanish group was very limited. Some timing issues were also encountered with opening times for the sites the group was scheduled to visit. Weekday open times were not yet available because the summer tourist season does not begin until June.

The challenge of scheduling cultural interactions with architecture students in both locations will be minimized in future trips by moving the visit dates to the US spring break period. This change to an early semester time frame will facilitate interaction during a less hectic time for students and faculty in the host countries. Better pre-planning will solve any non-tourist season scheduling issues. In the case of the Brazil SA trip, the instructor has also considered reducing trip locations to one main location with one or two day-trips to nearby relevant sites.

Student Outcomes

Student reflections at the end of the trip followed several broad themes. The first showed an awareness of Diversity of Contact and Comfort with Differences. Some student quotes from the Spain DCI SA that are representative of this awareness:

"Residing in Barcelona for the short amount of time we were there gave me an abundant amount of knowledge and appreciation for the people, culture, and architecture ..."; "... we met people from all over the world and were able to explore the city."; "I also learned how school is different in Spain than in America when we visited the university. The architecture program is set up differently than the American architecture ..."; "People in Barcelona don't have a problem getting really close to one another when walking or on the train and it's just not something I am use to living in Indiana."

Diversity of embracing available food, both in restaurants and at the neighborhood grocery, was also noted:

"We ended up getting one of each of their tapas along with some soups and yogurts."; "Being in Barcelona taught me to try new foods that are not present in the United States because there is a chance that I will not be able to try the local food again."; "The food is amazing and though it may not always sounds appealing, once you try it you may end up ordering it again."

The final commonly noted reflections had to do with what they enjoyed and things that would enhance future trips:

“I personally loved having a mix of relaxation time on the beach and exploring the city.”; “That day (the free day) was also one of my favorite days because of the memories we made as a group over our journey to the Park. We got a little lost and ended up on the wrong side of the mountain but we definitely captured some awesome views and got to see what life was like toward the outskirts of the city.”; “To improve next year’s trip, I’d suggest more time with (architecture) students ...”; “... it may be a good idea to give students a basic list of attractions in Barcelona that aren’t on the itinerary.”

Despite the common intercultural themes expressed in many of the student reflections, the MGUDS pre and post trip results indicate that the growth in comfort with cultural difference resulting from the trips is not universal. The M-GUDs scale is made up of three subscales that contribute to the construct using five questions for each subscale measured as a six-point Likert choice ranging from Strongly Disagree (1) to Strongly Agree (6). The description of the three subscales is as follows:

- Diversity of Contact – students’ interest in participating in diverse social and cultural activities
- Relativistic Appreciation – the extent to which students value the impact of diversity on self-understanding and personal growth
- Comfort With Differences – students’ degree of comfort with diverse individuals

Table 2 shows several of the student participants expressed post-trip comfort levels that were below their pre-trip levels. In some cases the negative changes are small and in others the high pre-trip scores (5 and above out of 6) may be an indication of an initial lack of self-knowledge about potential discomfort with differences or lack of information about the cultural differences they would encounter.

Table 2
M-GUDs Results

Location	Student	Pre-test				Post-test				Change			
		Diversity of Contact	Relativistic Apprec.	Comfort w/ Differences	Full Scale	Diversity of Contact	Relativistic Apprec.	Comfort w/ Differences	Full Scale	Diversity of Contact	Relativistic Apprec.	Comfort w/ Differences	Full Scale
Spain (S)	1	3.80	4.20	5.00	4.33	4.80	5.20	5.80	5.27	1.00	1.00	0.80	0.94
	2	4.00	4.80	5.20	4.67	5.40	5.40	5.80	5.53	1.40	0.60	0.60	0.86
	3	5.40	4.80	5.80	5.33	5.00	6.00	5.60	5.53	(0.40)	1.20	(0.20)	0.20
	4	4.80	5.00	5.00	4.93	4.20	4.60	4.20	4.33	(0.60)	(0.40)	(0.80)	(0.60)
	5	4.20	4.80	5.00	4.67	5.20	5.00	4.80	5.00	1.00	0.20	(0.20)	0.33
	6	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	0.00	0.00	0.00	0.00
	7	3.80	4.80	3.80	4.13	5.00	5.40	4.80	5.07	1.20	0.60	1.00	0.94
	8	5.20	4.40	5.60	5.07	5.50	5.00	5.50	5.32	0.30	0.60	(0.10)	0.25
	9	5.80	5.60	5.20	5.53	5.80	5.80	5.60	5.73	0.00	0.20	0.40	0.20
	10	3.40	4.60	5.00	4.33	3.40	4.40	4.40	4.07	0.00	(0.20)	(0.60)	(0.26)
S Average		4.64	4.90	5.16	4.90	5.03	5.28	5.25	5.19	0.39	0.38	0.09	0.29
Brazil (B)	1	5.60	5.80	5.80	5.73	6.00	6.00	6.00	6.00	0.40	0.20	0.20	0.27
	2	5.80	6.00	4.60	5.47	5.80	6.00	4.20	5.33	0.00	0.00	(0.40)	(0.13)
	3	4.80	4.80	5.60	5.07	4.80	5.00	5.00	4.93	0.00	0.20	(0.60)	(0.13)
	4	4.80	4.40	5.00	4.73	5.40	3.60	4.00	4.33	0.60	(0.80)	(1.00)	(0.40)
B Average		5.25	5.25	5.25	5.25	5.50	5.15	4.80	5.15	0.50	(0.20)	(0.90)	(0.20)

Lessons Learned and Study Abroad Planning Tips

After observing how the DCI Brazil SA and DCI Spain SA progressed, and based on the feedback provided by students in the form of journal reflections and oral feedback during the trip, the main lessons learned were:

- Students visiting Brazil liked the diversity of sites visited, however traveling from site to site hours in the car was not ideal. In Spain the travel was limited and students appreciated the free time and flexibility to venture out in groups to areas that attracted them.
- Students enjoyed the learning activities as it provided them with a structured way to engage with others and the local culture, but also as a way to learn more about each other.
- Three of the students (the ones who did not speak the language) felt a communication barrier with Brazilians during the day to day activities. They suggested for future SAs to emphasize the importance of learning basic expressions prior to the trip. This challenge was not apparent in Spain because of the bilingual signage, prevalence of English speakers in the general population, and pro-tourist orientation.
- Students seemed very engaged and curious about different construction methods during the site visit in Sao Paulo and Barcelona.
- Students felt overwhelmed by the Brazil design activity as they were not used to the design methodology and preferred a more linear approach. However, after the second day of activities, students appeared to recognize value in using a non-linear approach to design as a way to deal with the overwhelming number of considerations and tradeoffs architects need to deal with when designing a building. The Spanish student activities were limited and the US students expressed a desire to have greater contact with Spanish students.
- Not all students respond in the same fashion to the intercultural activities offered by the study abroad trips. Continued careful examination of the outcomes on an individual and group basis are required to learn how best to help students develop the global skills they will need in the future.

Based on the authors' study abroad experiences and suggestions obtained from literature on the subject, the following best practices are suggested for international collaboration:

- Begin any collaboration with a physical visit from faculty to each location before inviting students if possible (Keshawarz et al., 2012). Nothing can replace personally experiencing the full context in which other cultures must operate as the plan for a student study abroad is developed.
- Personal connections with global collaborators can be a first step in a successful working relationship (Keshawarz et al., 2012). These personal connections will open the door to wider opportunities and collaborations.
- Stay connected and maintain flexibility with international contacts to sustain the collaboration and promote future interaction (DeZure et al., 2012; Keshawarz et al., 2012). Parties involved in the international collaboration should maintain contact throughout the year in order to realize the full long-term benefits of the relationships built during the study abroad experience. A global experience that ends after a single collaboration has not obtained the full benefits possible.
- There is a need for clarity in any collaborative partnership (DeZure et al., 2012). Communications are not always clearly articulated. Communications across cultures adds complexity to this challenge.
- In order to establish the most beneficial study abroad experience, there is a need for students to learn about the educational, industry, cultural, and political systems of collaborating countries (DeZure et al., 2012).
- Conceptualize and plan for mutual benefits. This will help to avoid a 'colonialist' mindset where one collaborator seeks to help the other while missing the opportunity to learn from other groups, cultures or situations (DeZure et al., 2012).
- Cultural differences between international instructors and students can create challenges. These challenges can be worked out over time by acknowledging the difficulty through open constructive discussion about successes and failures in initial study abroad trips (Lewis & Sincan, 2009).
- Establish expectations of the international experience ahead of time. All parties should be aware of these expectations so that they can work together in a way that provides benefits to all. This could be done with a written document or a meeting of all parties early in the planning process.
- If project visits are involved in international visits, review timing and accessibility issues. Lack of advanced travel planning that leads to a visit where appropriate work activities are not taking place may nullify the benefits of the project visit.

- Lines of communication should remain open among all parties during the international activity. Conditions may change that require some flexibility or a dramatic change in plans. Without open lines of communication, valuable opportunities can be missed.

Conclusion

The best practices that have been suggested are offered to help guide others planning study abroad experiences and may help minimize challenges and encourage increased global and cultural competency for those who participate. Simply arranging an entertaining trip is not adequate to accomplish the goal of improving student intercultural competency. This case example provides ideas and resources to improve success in reaching that goal.

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