

Health and Wellness Innovation Embedded in an International Study Abroad Experience

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Abstract:

Using a cross-disciplinary approach, faculty from a four-year university developed a robust study abroad program that incorporates several high impact practices for student retention. High impact practices are activities such as undergraduate research, service learning, and study abroad programs that increase student engagement and retention on college campuses (Kuh & O'Donnell, 2013). Although this initiative addresses high-impact practices, the goals and objectives go beyond efforts to retain students. This article describes how faculty from different disciplines and different countries implemented a course focused on innovation, low-budget prototyping and design thinking to improve health and wellness. This study abroad experience served to connect students, faculty, and citizens from two countries in meaningful work. Over the course of ten years, faculty who teach at a four-year Science, Technology, Engineering and Math (STEM) focused university created relationships with stakeholders in Havana, Cuba with the goal of connecting students and faculty to explore solutions to common health-related problems. Starting from an exploratory trip involving two faculty from nursing and foreign languages, the program has evolved into a cross-disciplinary (nursing, engineering, foreign languages) and cross-cultural program involving students and faculty from institutions in the United States and Cuba.

Key Words:

Cuba, Healthcare, Innovation, Design thinking, Cross-Disciplinary.

Introduction

With the emphasis on global learning experiences as a tool to retain undergraduate students (Kuh & O'Donnell, 2013), there has been a significant increase in study abroad efforts at colleges and universities (Eisenberg, 2018; Rovers, Japs, Truong & Shah, 2016). At the authors' university the number of faculty led study abroad experiences for undergraduate students has grown over the past 8 years. The current offerings at the university range from faculty-led programs where students tour historical and cultural areas of interest, to fully developed service learning opportunities implemented in collaboration with in-country stakeholders. The faculty involved in the Cuba initiative worked to create significant learning experiences for students wishing to participate in a course involving travel to a foreign country.

The hallmarks of this program include the opportunity to contextualize traditional classroom learning in broader global and professional situations, as well as the long-term collegial relationships formed among faculty and students from different disciplines and different cultures. The classroom experience centers on new device development to improve health outcomes using a cross-disciplinary approach and design thinking (Beaird, Geist, & Lewis, 2018; Sanders & Geist, 2016). The relationships formed among the participants in the study abroad experience required years of planning and multiple, often self-funded trips to Havana, Cuba. Developing links with officials in Cuba is notoriously difficult due to the fact that stakeholders in Cuba can often be cautious of foreign intervention (Mazzei, 2012). In our experience, meetings with professionals and ministry officials required multiple layers of permissions that consumed an enormous amount of time and effort. However, this time and effort was worth every frustrating encounter and resulted in a considerable return on investment for the faculty, students and stakeholders.

Course Description

The Clinical Immersion for Healthcare Innovation course initially taught at an English-speaking STEM focused university and eventually embedded at a university in Cuba, involved cross-disciplinary teams of engineers (chemical, electrical, mechanical), nursing, and pre-professional health (pre-med, pre-occupational therapy, etc.) students. At the university where the course originated, these teams completed clinical rotations in healthcare facilities such as hospitals and rehabilitation centers.

The three-credit hour course was co-taught by faculty from Chemical Engineering and Nursing in a true team-teaching manner. Both faculty members were fully involved in the initial design of the course and attended every class session. The critical components of the course that the instructors transferred to the study abroad initiative were as follows: 1) immersion into real-world settings for customer discovery; 2) team building activities; 3) a guided inquiry-based approach in which students had to define a problem and then devise a solution; 4) access to items and equipment for low-budget prototyping and reiterative design. Table 1 provides a comparison of these elements in the course taught in the United States, and the curriculum taught in Cuba.

Table 1: Comparison of Clinical Immersion Courses in the USA and Cuba

Course Component	USA	Cuba
Credit Hours	3	3
Course Duration	45 contact hours distributed over 15 weeks	45 contact hours distributed over 10 days
Real-world Immersion Experience	Hospitals, Clinics, Rehabilitation Centers	Casa de Abuelos; Senior Citizen Center
Faculty Involvement	Faculty from Engineering and Nursing	Cuba: Faculty from Biomedical Engineering Cuba: International Education Coordinators USA: Faculty from Nursing USA: Faculty from Chemical Engineering
Student Teams	Cross-disciplinary teams with at least one nursing or pre-health major and one engineering major (teams of four)	Cross-disciplinary and cross-cultural teams of four. Each team composed of at least one nursing student from the USA, one engineer from the USA, and two Biomedical engineers from Cuba
Prototyping Equipment	Access to a maker-space with power tools and 3-D printers as well as low-budget prototyping items (hot glue-guns, wooden dowels, straws, aluminum foil, etc.)	Access to low-budget prototyping items only.
Assignments	Develop a prototype for the problem identified during customer discovery; Peer and self-evaluation of teamwork; Pecha Kucha presentation describing the journey from problem identification to final prototype design	Develop a prototype for the problem identified during customer discovery; presentation describing the journey from problem identification to final prototype design
Course Outcomes	Prototypes of commercially viable devices designed in response to an unmet need; improved cross-disciplinary communication skills; gains in critical thinking	Prototypes of commercially viable devices designed in response to an unmet need; Developed strategies for cross-cultural and cross-disciplinary communication and teamwork; sustained international friendships; Presentation to high ranking embassy officials

The Cuba Initiative

With funding provided by the U.S. Embassy Mission to Cuba Grant, this immersion experience was conducted over 10 days in May 2017 with the participation of students, faculty, and staff from Cuba and a STEM focused English speaking university. The focus of this experience was for nursing and engineering students to discover problems common to the elderly in both countries (i.e. chronic pain, loss of functional independence, fear of falling, etc.). After the initial problem discovery, students worked in teams using low-budget prototyping and reiterative design to show proof of concept for devices to solve these problems.

With only ten days to complete the project compared to the traditional semester, the pace was fast; nevertheless, the students were able to accomplish the course objectives thanks to a well-planned schedule that allowed for spontaneity. Using the How People Learn (HPL) framework the faculty from both universities worked together to develop a robust and ambitious experience. How People Learn: Brain, Mind, Experience, and School (Bransford, Brown, & Cocking, 1999) is a comprehensive investigation into the best practices for supporting students as they develop flexible knowledge allowing the transfer of concepts across a variety of situations. HPL frames a method of teaching that is challenged-based in approach as compared to standard methods of teaching that are teacher-centered and focused on content delivery. The How People Learn framework approaches instructional practices using four perspectives referred to as “centerednesses”: (a) learner, (b) knowledge, (c) assessment, and (d) community. In learner-centered environments, students establish both conceptual and cultural knowledge; whereas, in knowledge-centered environments, students make sense of academic content considering prior learning experiences. In a knowledge-centered environment, teachers design activities to determine what the learner knows about a topic and builds on this knowledge base. In assessment-centered environments, students receive reiterative and formative feedback from experts as well as peers. Finally, in community-centered environments, students develop a connection between school-learning and the larger community of experts. Learning environments that are community-centered help the learner answer the question, “Why do I have to know this?” (Bransford, Brown, & Cocking, 2000).

The first day involved introductions, cultural activities, and team formation of students from both universities. A guiding goal in forming teams was to be certain, to the extent possible, that at least one Spanish speaking student from the visiting country and one English speaking student from Cuba was on each team as well as at least one student from the healthcare disciplines (including biochemistry/pre-med). This established a balance of cultural, disciplinary, and language characteristics which contributed to successful teamwork and collaboration.

On the second day everyone met at the Casa de Abuelos, a community center where older adults convene for social interaction and support. This was referred to by our Cuban counterparts as “the university for the elderly” and was the planned location for the authentic clinical experience piece. However, the person responsible for opening the community center did not show up to unlock the doors at the agreed upon time. The students, faculty, and participants in the “university” were not deterred by this unexpected development, and instead of giving up, the entire group moved to a local

café where the students spent hours learning from the older adults. As one student said, “this week was about generosity. The Cuban people have been generous with their time and with sharing their ideas.”

This interaction between the elderly and the students set the foundation for problem identification and prototype development for the remainder of the week. The students discovered that the older adults suffered from chronic pain due to musculoskeletal fatigue and arthritis and this became the focus for several of the teams. The teams spent the rest of the week designing and building prototypes for their healthcare devices. In the context of this academic challenge, the faculty observed the students developing close friendships. This was most evident when the Cuban students wanted to remain working and talking with their teammates through lunch instead of separating as originally planned. The students spent this time sharing pictures and videos of family, friends, and cultural events important to both groups.

Another spontaneous exercise that brought the groups together was a design challenge the faculty and students participated in on Thursday afternoon. The faculty challenged the teams, along with the faculty from both institutions, to develop a device that would launch a marshmallow (it was supposed to be a ping pong ball, but we did not have those and had to be creative) as high in the air as possible. Using only six items from the low-budget prototyping materials students had to launch the marshmallow and then successfully catch it. The laughter and good-natured teasing helped everyone relax and be ready for the pressure-filled day to follow.

The week in Cuba culminated with each team presenting the prototype solutions including the process from problem identification, idea generation, multiple design ideas, and how they might present the idea to business and industry. It is interesting to note that the presentations were made in English and Spanish, often with the Cuban students speaking English and the native English-speaking students speaking Spanish. The visiting students also received an invitation from the Cuban students for a night out to eat and dance which was gladly accepted. Many of the students have remained in contact after returning to their home country for friendship and to further develop their prototype. Of the four prototypes developed during the week, two groups expressed interest to enter entrepreneurial pitch competitions as international/interdisciplinary teams. One group won design and business pitch competitions in both countries.

On the last day, the STEM university faculty and students had the privilege of presenting their accomplishments to the Ambassador, Deputy Chief of Mission, and other US Embassy staff. This turned out to be one of the highlights of our trip to Cuba. The original invitation was extended to the entire group of participants, but the Cuban administrators were hesitant to allow interaction between the US Embassy and the Cuban students. In the university setting, the Cuban and American students experienced an open exchange of ideas and learning about each other's daily life. While this openness extended to social events in the evenings, the Cuban professors and administrators were cautious when discussing interaction between their students and official government entities from the United States. The presentation at the embassy involved only students from the USA, even so, at the end of the presentation, one embassy staff member stated, “This is an amazing accomplishment. You are making history,” referring to the often-strained relationship between the two countries.

The success of a study abroad experience depends on so many components, but the essential aspects leading to the achievements described in this paper was the students from both universities who were open to new challenges, engaged in the collaborative activities, were flexible in the face of difficulties, and hard-working throughout the week. The experience represented well the positive impact that a study abroad program can have on expanding worldviews and on solving global health issues via cross-disciplinary and cross-cultural initiatives. As an illustration, this was a text sent by one of the Cuban students after students from both countries went out to dinner together: "We arrived [home] well. Thank you for giving us the opportunity of sharing with you. In this week we made incredible friends, we are very happy of having met you and we will miss our Legit Piquete" (the name the students gave their team).

Ultimately, this program proved to be a powerful and unique experience rooted in high-impact practices such as service learning and global awareness, yet it provided so much more in the form of real-world practice settings, team work, and cross-cultural relationship building. The benefits have lasted far beyond the ten-day experience in the form of sustained relationships for not only the faculty, but also the students. The faculty from the two institutions have jointly submitted manuscripts and presented at conferences, while the students have continued to interact on social media as friends and collaborators on the original prototypes. Working together, one student team pushed their idea forward, obtained a provisional patent from one of the countries, and won design competitions with monetary awards. It is these meaningful and genuine relationships among people from different parts of the world that are the true rewards of global study abroad programs. This study abroad initiative demonstrates the power of bringing students, faculty and the community from different cultures and disciplines together with the purposeful goal of finding solutions to authentic problems to improve the lives of others.

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