AC 2012-3973: INVOLVING STUDENTS IN AN INTERNATIONAL TECHNOLOGY EXCHANGE

Dr. Clifton B. Farnsworth, Brigham Young University

Clifton Farnsworth received B.S. and M.S degrees in civil engineering from Brigham Young University and a Ph.D. in civil engineering from the University of Utah. He worked as a geotechnical engineer for eight years with the Utah Department of Transportation, spent three years as an Assistant Professor of civil engineering at the University of Texas, Tyler, and has a current appointment as an Assistant Professor of construction management at Brigham Young University.

Prof. Mark Owen Lords, Brigham Young University

Mark Lords received B.S. and M.Acc. degrees in accounting from Brigham Young University and a M.B.A. from the University of Vermont. He worked as a CPA for three years with a large national accounting firm, spent 22 years as a developer of real estate and home builder, and has a current appointment as an Assistant Professor of construction management at Brigham Young University.

Brian Charles Capt, Brigham Young University

Brian Charles Capt has a B.S. degree and a M.S. degree from BYU, along with 20 years experience as a General Contractor/Developer. Currently, he is an Assistant Professor full-time.
Involving Students in an International Technology Exchange

Abstract

Taking part in an international travel opportunity can provide invaluable learning opportunities not readily available through typical educational means for undergraduate students, including experiencing cultural diversity, global awareness, and identifying similarities and differences in professional practice. However, the benefits of student involvement increase tremendously when students are given a direct opportunity to share their educational knowledge with university students and professionals in a foreign land. This paper demonstrates how the Brigham Young University Construction Management Program is utilizing an international travel opportunity as a capstone option, with the students participating in a technology exchange.

An invitation was initially extended to the program to send students to the Dominican Republic to investigate the design and construction of a school within an impoverished area. One faculty member and several students made the initial trip to evaluate the potential construction of the new school. While there, they were able to meet with faculty and students at Instituto Tecnologico de Santo Domingo, where an interest was expressed in learning about some of the more advanced techniques being utilized by our program, including such topics as building information modeling, safety, and cost control. A second exchange trip was undertaken the following year, with the primary emphasis on conducting a technology exchange for concepts not currently being addressed within their construction program. Students from our program were able to prepare and present training sessions to university students and professionals. Since that time, a memorandum of understanding has been established to continue this international exchange for at least the next five years, involving students from both schools traveling to each other’s institution to exchange learning.

The purpose of this paper is to identify the sequencing and processes that have allowed the establishment of this international exchange program. The perceived benefits from the exchange will also be explained, including the results of an assessment of the students’ experiences while participating in this international travel opportunity. Finally, the paper discusses the importance of using students for the actual technology exchange and demonstrates how this creates a more complete international experience for them.

Introduction

In recent years, the need for engineering and technology students to experience international travel opportunities has increased. As the pace of society continues to quicken and the distance between people around the world continues to shrink through the advancements of modern technology, educators and accrediting bodies alike are beginning to place more emphasis on global awareness and international experience. Most engineering and technology programs now have outcomes emphasizing that upon graduation students are able to demonstrate understanding of international issues, relations, and global diversity within their chosen disciplines. In light of this, engineering and technology programs continue to seek out opportunities to expand student awareness and understanding through such things as study abroad, international internships,
international collaboration, encouragement of multi-cultural diversity on campus, and other similar activities.

Taking part in an international travel opportunity can provide invaluable learning opportunities not readily available through typical classroom instruction. The benefits of international travel include experiencing cultural diversity firsthand, identifying similarities and differences in professional practice, and increasing global awareness. Students gain more from their travel experiences as they interact with their international counterparts with similar educational and professional interests, especially as they are given direct opportunities to exchange educational ideas. This paper demonstrates how the Brigham Young University (BYU) Construction Management Program has utilized an international exchange opportunity as a means of allowing students to share a small portion of our curriculum with students and professionals alike. The primary purposes of this paper are to identify learning objectives related to student participation in an international experience, to demonstrate how establishing a collaborative peer exchange opportunity with an international university is serving to meet those objectives, and finally to present a summary of the students’ perceptions about their experience.

**Why Should We Send Our Students Abroad?**

Engineering and technology programs have been placing an ever increasing emphasis on global awareness and cultural diversity, to ensure that more graduates are prepared to work in international markets. One of the most effective means of preparing students to meet this emphasis is to provide opportunities for students to take part in meaningful international travel during their academic experience. When looking at the mission, aims, purposes, and objectives for most institutions of higher education, from the small community colleges to the large universities, we typically find some mention of preparing students to have an impact on the world. Traditionally, the social sciences have done a better job of providing opportunities for students to have an international experience as part of their education. However, the STEM (science, technology, engineering, and math) disciplines are beginning to realize the importance of providing international experiences that increase global awareness and cultural diversity for their students.

Every ABET-accredited engineering program should have some sort of student learning outcome tied to students demonstrating qualities and skills necessary for application in a global setting. This is because ABET requires that an accredited engineering program must document student outcomes that demonstrate “the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.” These learning outcomes should provide the foundation for establishing the desired global skills and qualities that will prepare students for success upon graduation. Numerous sources indicate the benefits of achieving global awareness through actual international experience. Shuman et al. report that “engineering faculty are beginning to recognize that students who have participated in study abroad programs are better problem solvers, have strong communication and cross-cultural communication skills, and are able to work well in groups of diverse populations and understand diverse perspectives. Living overseas creates graduates who are more adaptable to new environments and have a greater understanding of contemporary issues as well as engineering solutions in a global and social context.” Furthermore, Melsa et al. conclude that “for
Students preparing to work in a global environment should possess certain qualities and skills upon graduation. One report indicates that the qualities that should be possessed by a global engineer include being “technically adept, broadly knowledgeable, innovative and entrepreneurial, commercially savvy, multilingual, culturally aware, knowledgeable about world markets, professionally flexible and mobile.” It is impractical to expect that upon graduation an engineering student would be proficient in each of these. However, the seeds to grow these qualities should certainly be planted during the student’s education. Oliveira and Lima report that the five most important attributes of global competencies are that students “can appreciate other cultures, are proficient working in or directing a team of ethnic and cultural diversity, are able to communicate across cultures, have had a chance to practice engineering in a global context, whether through an international internship, a service-learning opportunity, a virtual global engineering project or some other form of experience, and can effectively deal with ethical issues arising from cultural or national differences.”

Downey et al. report a similar conclusion about student outcomes in that students should be able to demonstrate “substantial knowledge of the similarities and differences among engineers and non-engineers in different countries; an ability to analyze how people’s lives and experiences in other countries may shape or affect what they consider to be at stake in engineering work; and a predisposition to treat co-workers from other countries as people who have both knowledge and value, may be likely to hold different perspectives than they do, and may be likely to bring these different perspectives to bear in processes of problem definition and problem solution.” These examples represent a growing sentiment about the importance of student awareness of globalization and seem to imply the need for actual student international experience.

Engineering and technology programs that have already established regular international opportunities for their students report that there are great benefits to be obtained from these experiences. Spodek et al. report that study abroad experiences were important for helping student develop the “soft” skills such as flexibility, appreciation for diversity, open-mindedness, comfortable with “international,” and global perspectives of engineering. De Kryger indicates that student feedback from those who have participated in an exchange experience, “although financially challenging, it has been a pivotal point in their education, indeed, their lives.” It is readily apparent that an actual international experience for the students is an appropriate way to meet the learning outcomes surrounding globalization and provides many benefits not readily available through typical classroom instruction.

Establishing an appropriate, effective, international experience takes thought, effort, and commitment. Every technology and engineering program has to identify what type of international opportunities will work for them. The literature makes it clear that there must be a desire and commitment from both the respective program and the university to establish these international learning opportunities. Swearengen et al. state that “universities must cultivate cooperation with their international counterparts and industry to pave the way for students to study abroad.” Furthermore, Torres reports that “a program of international exchanges within engineering education can be successful, if sufficient attention is paid to the evaluation of institutional motives and the analysis of operational interactions and outcomes. Such a program
can only be successful if all participating institutions derive clear benefits from its success. The engineering education community must do its part to foster greater international communications and global awareness."¹⁰

**Objectives for International Experience**

The mission statements, purposes, and objectives of our university, college, and construction management program all include statements that support student involvement in international experience. These objectives are similar to many other institutions of higher learning. The aims of a Brigham Young University education include providing students with a broad global perspective with regard to their religious beliefs and those of others, the development of human civilization, non-Western arts and letters, and informed awareness of the peoples, cultures, languages, and nations of the world.¹¹ Meaningful international experiences for students can play a significant role in helping to meet these desires. Brigham Young University focuses on providing significant international experiences “to mold the brightest students today who will serve the people and nations of the world tomorrow – a commitment that extends beyond classroom theory to incorporate practical experience in an international setting.”¹² This vision includes students obtaining quality academic experiences and cultural immersion and exchange.¹³ The guiding principles for developing international learning opportunities include providing programs that shape meaningful relationships between students and faculty mentors, students and faculty participating in meaningful cross-cultural preparatory activities, students earning credit that will fulfill requirements contributing to their major, taking part in one or more meaningful service opportunities, providing professional development for mentors through teaching, research, and collaboration with colleagues on campus and abroad, and sharing knowledge and experience with other universities through regular academic conferences and publications.¹³

The mission statement of our college (The Ira A. Fulton College of Engineering and Technology) also includes language that supports the concept of students having an adept appreciation and knowledge of the world around them. The college mission includes developing men and women of “faith, character, and technical ability who will become outstanding leaders throughout the world, to conduct creative work of consequence that contributes to solving the world’s problems and advances engineering and technology disciplines, and to be an influence for good in the world.”¹⁴ One of the five key focus areas for the college specifically states that students will have “global competence,” meaning that students “understand the impact of the global economy on organizations, students appreciate the value and influence of culture and diversity in the operation of organizations, and appreciate and are prepared to help solve global challenges such as environmental protection, population growth, clean water, alternative energy, etc.”¹⁴ Our college has also declared that “global competence is a requirement for today’s successful technologists and engineers. As the importance of being able to work and communicate effectively in an international setting increases, an international experience is one of the most valuable investments a student can make.”¹⁵ It is clear that both our university and college support the idea of a meaningful international experience for the students as a means of accomplishing the objectives of their education.
Our college has recently developed a leadership model that has been carefully crafted and adopted as a guide for development of student learning experiences. This model has focuses on three fundamental dimensions of leadership: the leader as an individual (personal characteristics), in an organization (organizational skills), and in a global setting (global and cultural perspective). These focus areas and their associated student learning outcomes for leadership development have greatly influenced the BYU Construction Management Program’s international travel opportunities. To graduate from the BYU Construction Management Program, students must complete a capstone course, one option of which consists an international experience. This course is designed to provide “the culmination and application of core construction management principles. Project teams design, analyze, manage, and construct an international project.” The BYU Construction Management program currently provides a couple of different travel opportunities for students to have an international experience. One of those, as described within this paper, is a technology exchange that has been established with Instituto Tecnologico de Santo Domingo (INTEC University) in the Dominican Republic. Students receive credit for their capstone class by preparing and sharing select information from their coursework that is not currently being offered at the other school. Participating in the technology exchange is a key component of this international learning opportunity for our students. A second, and equally important, part of the technology exchange consists of the students experiencing their discipline firsthand by visiting construction projects in an international setting. This allows them to recognize similarities and differences in industry standards, building codes, and construction practices. Both of these activities have been designed with the intent to meet the capstone course requirements, the college leadership model, and all of the other various university objectives related to enhancement of student learning through meaningful international experience.

**International Exchange with INTEC**

To date, two separate international trips to the Dominican Republic have been taken by students and faculty from our program. The initial trip to the Dominican Republic took place in 2010, with four students and one faculty member invited by a humanitarian group to assess the design and construction aspects of a new non-profit K-12 school in an impoverished area of the country. In a country like the Dominican Republic, there is a lack of expertise for this type of work. Our students have access to more modern tools and construction skills than are typically found there, so their participation in the design phase of the new grade school and in preparation for construction was sought after. This trip was unique in that these students each paid their own way to participate. The purpose of the initial trip was discovery, as students visited other schools to see what types of designs might work, looked at potential project sites, explored available materials, labor, and resources, and identified local policies, permit requirements, and safety issues. During this trip, the team met with a professor and students at INTEC. It became apparent fairly quickly that many of the concepts and techniques being taught within our program were more advanced than what these students were currently being taught. The INTEC students and faculty expressed an interest in becoming more familiar with these more sophisticated construction concepts and techniques. At the invitation of INTEC, the decision was made to send another delegation of students and faculty back to the Dominican Republic the following year to provide a technology exchange.
Upon returning from the initial trip, the students were able to complete and submit their design of the new grade school structure. Unfortunately, the school was not ready to be built the following year, as originally anticipated, because of a lack of funding. Since the grade school project was placed on hold, the return trip in 2011 shifted focus to participate in a technology exchange with INTEC. This follow-up visit was also in a way somewhat exploratory in nature, as participants looked to establish a collaborative relationship. Although expected to be a great experience for the students, this was still somewhat of an experiment to ensure that the experience would meet the sought after educational objectives for an international travel opportunity. Two primary purposes were established for the technology exchange visit. First and foremost, the students from our program would provide seminars on current technologies and construction trends from their curriculum. It was determined that industry professionals and students alike would both benefit from these seminars. Most of the professors teaching within the engineering school at INTEC are also industry professionals, meaning they work at their jobs during the day and then teach at the university in the evenings. In other words, the INTEC students already work intimately with industry professionals, so including the two target audiences seemed appropriate. In return, and achieving the second primary purpose of the trip, our students would be given the opportunity to tour Dominican construction projects. The two primary purposes were, therefore, designed to provide our students with an experience that allowed for a true exchange – receiving knowledge and contributing some back.

Finding students to participate in the technology exchange trip to the Dominican Republic was not difficult. After returning from the first trip, word of mouth created more of a demand for students wanting to go than we could possibly handle. During the winter semester, six students, under the direction of two faculty mentors, began preparation for the technology exchange as part of their capstone experience. The students and faculty brainstormed potential topics of interest and decided to provide instructive seminars on building information modeling (BIM), cost control, company management, sub-contractor relationships, total quality management, sustainable building, and safety. Students were then divided into two different teams and assigned specific topics for their presentations. During this process, emphasis was placed on preparing two different aspects of the presentation: researching and developing the technical content with regards to the target audience (either students or industry professionals) and practicing delivery of the material. Although five of the six students already spoke fluent Spanish, there was still some necessary preparation in learning the translation for a number of technical terms and phrases. Simply preparing for the technology exchange was a great learning experience for our students in that it provided them with the opportunity to do some research and attain an even greater depth of understanding in their assigned topics.

The technology exchange trip included five days in the Dominican Republic. Seminars were taught in the afternoons and evenings of several of the days, with different sessions specifically presented to either undergraduate students or to the graduate students and industry professionals. Although the sessions had originally been designed as two-hour blocks, including some of the time being devoted to answering questions, they were so well received that they almost all went longer than the allotted time. Most of the seminars were presented in Spanish and the attendees seemed to appreciate that the questions and conversations back and forth were predominantly in their native language. The use of an interpreter for the three participants (one student and two faculty members) who did not speak fluent Spanish did not appear to pose any problems. In fact,
many of the Dominicans spoke English well enough that when the student presenter would crack a joke, everybody would laugh before the interpreter could repeat it. It certainly appears that the language differences were not a barrier to success in presenting the seminars.

The experience of teaching others was a tremendous learning opportunity for our students because it forced them to fully get their minds around the concepts, principles, and skills that they had been taught. Preparing for and providing these presentations met the intent of the college’s leadership model by strengthening the students’ personal characteristics (innovative thinking, genuine concern for others, and self-driven improvement), organizational skills (developing and practicing effective interpersonal skills, understanding group dynamics, functioning as a member of a project team, and accomplishing project goals), and global and cultural perspective (appreciating the value and impact of culture and diversity and understanding the impact of global technology and business practice). Numerous “aha moments” occurred on both sides during the presentation sessions. As the students presented, the Dominican participants were excited to receive the information about current construction technology and practices. As the Dominican participants asked questions and the presenters responded, the student presenters were able to strengthen their understanding of the practical value of the information being taught. This reciprocal enlightenment for both sets of participants helped to validate the intentions of the capstone experience. In this case, the design, analysis, and management of an international project consisted of the preparation and presentation of seminars in an international setting. Through this experience student teams were able to demonstrate their understanding and elaborate on the application of core construction management principles.

The second purpose of the trip was to provide our students and faculty the experience of observing construction techniques and practices in the Dominican Republic. It turned out to be an eye-opening experience for the students and faculty to see the wide variety of construction taking place, from very unsophisticated, unsafe, uncontrolled construction to more modern techniques. For example, a tour was conducted of a 14-floor residential building being constructed of reinforced concrete by a local company, which had very few controls on construction. Yet a mile away a three-story mall was being constructed by a company brought in from Brazil, which was using very sophisticated construction techniques. The application of modern construction principles and practices (or lack thereof, more often than not) that the students were able to observe in the field helped solidify the concepts that they had been taught within the classroom. Another project site was a fairly modern looking subway system that also seemed to be utilizing fairly unsophisticated construction techniques. It was apparent just by walking into the tunnel that the ventilation within the tunnel was not adequate, yet laborers were working in there all day long. Above ground, where the access station infrastructure was being constructed, literally dozens of workers were climbing multiple-story structures, performing their work with essentially no safety equipment whatsoever. Most were wearing open-toed shoes and working without any sort of tie-off equipment, and any fall would have certainly resulted in death from that height. These represent only a few of the construction practices that were observed while visiting these job sites.

Visiting project construction sites in a developing nation proved to be a valuable learning experience for both the students and faculty. Witnessing real-world application of unsophisticated management, construction, and safety practices provided a much more indelible
impression of the relevance of core construction management principles within the minds of the students, certainly more effectively than simply discussing them in a classroom. This aspect of the technology exchange was enlightening to the students as they were able to take away an increased understanding of the importance of proper construction management practice and render a firm resolve to make the world around them a better place. Many of the students commented that prior to these site visits they had not realized that the quality of construction practices could vary so dramatically. Likewise, they expressed recognition of opportunities that certainly exist all around the globe in helping improve the standards, techniques, and performance of construction practices, especially within developing nations, but also within the global construction community at large. This activity certainly met the intentions of providing a meaningful international experience for the students by increasing their global awareness, perspective, and competence.

An interesting aspect of this particular experience is that the students each paid most of their own expenses to participate in this trip. Initially we had some concern that the personal expense might deter students from wanting to participate. However, the student response was otherwise. The university did supplement a small portion of the expense, but each student paid about $1,200 (which included their airfare, lodging, and food) to participate in the trip. However, the cost to participate seems minimal compared to the value of the experience for the students. For a little bit of money, the students were able to have their eyes opened to construction practices that they simply would not have received otherwise. Student feedback about the personal expense to participate also supports these ideas.

**Student Perspectives about this International Experience**

Upon returning home from the Dominican Republic, students were asked a series of questions to assess their participation in the international experience with the primary purpose of determining the level of value students found in the technology exchange. Assessment questions focused on preparing and sharing technical presentations, touring construction sites and experiencing construction management in a uniquely different cultural setting, and the educational value of international travel. Understanding the students’ perspective about their experiences has provided significant feedback in context of evaluating accomplishment of the intended learning objectives and identifying ways to strengthen future technology exchanges. The assessment questions allowed free-form response so that they could provide their individual reactions to the experiences. The results of this assessment are briefly summarized within this section.

Preparing for the technology exchange presentations proved to be a key learning element for the students. The students indicated that researching their assigned topics and preparing their presentations caused them to learn more about their topics, expand their overall understanding, and gain a greater appreciation for the program and the things that they will be doing upon graduation. Sharing their presentations with each other also contributed to this. According to the students, they spent on the order of 25 – 30 hours preparing for their presentations. They identified potential obstacles needing to be overcome, including being boring, not wasting time on things the audience already knew, and cutting out extraneous information to meet the time constraints. Additionally, students felt the language differences would be an obstacle, so time was spent learning new vocabulary and practicing in Spanish as well as translating.
The students were delighted that the technology exchange presentations themselves were well-received and that the participants were generally very engaged and interested in learning more. The student presenters felt they got a better response when the participating students or industry professionals already had some knowledge about the topic. It appeared that some of the younger student participants at times seemed disinterested because they did not seem to know enough about construction to relate with what was being presented. Some of the topics were challenging to teach because the participants hadn’t ever been exposed to these technologies. The student presenters indicated that they felt their presentations would have a positive impact because they provided exposure to more modern construction trends and practices, and new ideas to tackle the various issues faced within the Dominican Republic.

The second portion of the technology exchange involved our students and faculty visiting construction project sites. The students indicated that this was a great opportunity to see construction in a different culture and provided them with a new perspective on construction practices. Nearly all of the students expressed solidifying their appreciation for the value of jobsite safety through observing poor construction safety practices. Likewise, this was the predominant difference that was observed in construction practices between the U.S. and the Dominican Republic. The students were able to observe how unsafe jobsites are not as efficient and have a negative affect on the productivity of the workers. They also acknowledged that the workers lack certain rights that would protect them from working in these dangerous situations. Another observation made by the students was recognizing the value of heavy machinery and the use of proper equipment. Since the projects visited were much more reliant on manual labor, these sites were not as efficient as what they were used to seeing. The students recognized that this could be attributed to readily available cheap labor. Furthermore, managing the quality of the project and the safety of the laborers was challenging. It was valuable to have the faculty mentors alongside of the students throughout the project site visits to help point out both proper and improper construction practices.

Students were also asked to explain how the international technology exchange experience increased their understanding of cultural diversity and global awareness. Responses included that experiencing a different culture made the diversity more apparent and that although cultures are different the people are still wonderful. Furthermore, students were able to recognize that different cultures have different methods of executing construction practices and that they influence each other. It is important to adapt construction practices to the culture and be flexible and understanding of their customs. With so much modern emphasis on sustainability, students found the poor use of resources to be alarming. Students further described how eye-opening the experience was in recognizing challenges faced by the construction industry in the Dominican Republic, both technically and socially. One student asked how many countries there must be that are like this, in their way of life and construction, and what is there that can be done to help? Another acknowledged that it is important to gain a better understanding of how things are done around the world, so that we can all work better with others. Despite the challenges faced by different countries, the construction industry is still a business that involves people and their well-being. One student suggested that while construction may be done differently, “we can take the best from each culture and improve it.”
Another assessment question sought to understand the reasons that students decided to participate in the Dominican Republic international trip. The primary reason was to experience their discipline (construction management) in an international setting. This included specifically wanting to learn about and experience international construction practices as well as exploring similarities and differences in the construction processes (management and operation) that exist in a developing nation. Several students indicated that they wanted the opportunity to strengthen their Spanish vocabulary to include business and construction terminology. Another common response included the enjoyment of traveling and being able to see the Dominican Republic. By experiencing other cultures, students felt that they would gain new views and insights to help them throughout their careers. Some students participated because they were able to do something unique and get credit toward their capstone course. These factors all contributed to the students desiring to participate, despite the out of pocket expense that students incurred, and the time away from home, school, and family.

When asked what changes would most benefit future visits, many of the students simply replied that they would not change anything, implying that they had a good experience. Students did suggest that more time could be allotted to the technology exchange seminars, allowing for more material to be covered, but more specifically so that more interaction could take place in answering the participant’s questions. It would also be beneficial to find out what topics they are most interested in and allocate more time to those presentations. As for the site visits, students desired to interact more with people on the jobsites, to be able to ask questions and learn about the construction experience from different levels of construction employees. The suggestion was also made that students get a chance to visit a construction office as well, to get the perspective of upper management.

The students felt that the experience was a beneficial piece of their education, in preparing them for their careers, and in strengthening them personally. In general, the students felt that it was a worthwhile experience to participate in. Students acknowledged benefits equally from both the presentation and the site visit portions of the technology exchange. They felt that it was highly educational to have an international experience that included both teaching and observing. Many credited doors that have opened up to them because they were able to strengthen their resume with an activity that really helped set them apart from other students. One student indicated that every interviewer since the trip wanted to know about the experience. Several attribute receiving their jobs or internship offers because of their participation in the trip. For the students not graduating yet, the experience strengthened their resolve to focus in the classroom and instilled within them a desire to want to truly learn more. Students recognized that this process helped them to greatly sharpen their presentation and interpersonal skills, and strengthened their Spanish speaking abilities (for those who already spoke the language). One student indicated that this experience prepared him to translate at a company-wide safety meeting while working as a summer intern. Other benefits include being able to see how the program curriculum applies in the “real world,” recognizing how far the U.S. has advanced in construction, and acquiring a more globalized concept of construction.

Finally, students shared their overall impressions of the experience and what advice they would give to other students. Students felt that it was valuable to experience the construction industry in a different environment and culture, to recognize that there are many opportunities that exist
outside of the U.S., and to gain a desire to make a difference in the world. Students acknowledged that it was a great opportunity to get to know the other students and interact so closely with the faculty mentors, an experience not normally realized in the typical academic setting. Students were pleased that they were able to share something with a group of individuals who were so eager to be taught, and felt like they had made a difference in establishing relationships and traditions that can continue to grow with INTEC University. Every single student felt like it was a worthwhile experience and provided their endorsement that other students should take advantage of the opportunity to participate as this trip occurs in the future.

**Future of Relationship**

With the success of this international experience and the corresponding learning opportunities that were gained by the participating students, we desire to continue this exchange. To facilitate a continuing relationship of technology exchange and further the opportunities available for international collaboration and travel experience, a five-year memorandum of understanding has been written between Brigham Young University and INTEC. This has been written “consistent with the cordial and cooperative affiliation between the parties,” with the intention of fostering “additional academic and scholarly collaboration in teaching, research, exchanges and other programs of study.” The memorandum was established with “mutual equality and the reciprocity of benefits” in mind.

The memorandum of understanding between Brigham Young University and INTEC formally acknowledges the commitment of both institutions to continue to grow this experience. Key points within the memorandum include facilitating international study abroad opportunities for undergraduate and graduate students, exploring opportunities to cooperate in various academic, research, and scholarly endeavors, exchanging information regarding relevant scholarly and community based initiatives, and conducting educational and research activities that will meet the requirements of applicable law and accreditation standards. The primary goal is that through our relationship with INTEC many students from both institutions will be provided the opportunity to have meaningful international experiences. This in turn helps fulfill the university, college, and program mission, goals, and objectives relating to student development in leadership, global awareness, and cultural understanding.

**Conclusions**

Current literature suggests that providing a meaningful hands-on international experience can be a valuable learning opportunity for students. The international experience described herein was unique in that students participated in a technology exchange. The culminating experience included students preparing presentations on technical content in subject matter that was of interest to the host school and then teaching their international counterparts. Seminar sessions were provided in their native language whenever possible. This level of involvement provided an added measure of depth by encouraging the students to become immersed within their international experience. Student feedback from this international technology exchange demonstrated that this was indeed a worthwhile educational opportunity. Furthermore, the student feedback confirmed that this experience helped enhance their understanding of culture, diversity, and globalization in the context of their construction management curriculum, thus
meeting the overall educational purpose of having students participate in this international
technology exchange.

The technology exchange meets the BYU Construction Management capstone course
requirements by having the students practice the skills and apply the knowledge that they have
learned throughout their coursework in a “real world” application. The presentations are a way of
evaluating just how well the concepts, principles, and skills had been engrained within the
students. This experience allowed the students to take their skills and knowledge beyond the
university setting, to a country where sharing this knowledge can make a difference. Simply
preparing for the presentations helped to drive the concepts deeper and strengthen their
understanding. Delivering the presentations also proved to be enlightening for the students as
they responded to questions, explained the relevance of each topic, recognized the excitement
that the presentation attendees had in receiving this information, and ultimately gained a greater
appreciation for their construction management education. Preparing and providing technical
presentation indeed met the objectives of the international experience and greatly enhanced
the students’ experience. The second aspect of the technology exchange involved students visiting
construction sites and witnessing the struggles that an emerging economy has in implementing
innovative technology and construction practices. These site visits were also an integral part of
accomplishing the purposes of the international experience, by allowing the students to get a feel
for some of the challenges being faced in the world and gain a sense of how they can personally
make a difference.

Participation in this capstone experience has already proven to be valuable to the students who
were involved. The students indicate that after having included the international technology
exchange on their resumes, job interviewers want to know about it and are very complimentary
for having participated. Two of the students indicate that the job offers that they received upon
graduating were greatly influenced by their participation. Thus far it appears that employers are
also valuing our efforts to provide a capstone experience that centers on fulfilling the college’s
leadership initiative, includes a service component, incorporates international travel, and
demonstrates practical application. We anticipate that participation in the exchange will continue
to provide students with a quick start to their careers.

Now that a relationship has been established with INTEC and has proven to have significant
educational value, the memorandum of understanding between the two schools provides a formal
avenue for the technology exchange to continue. Students will continue to benefit from
participating in similar technology exchange activities in the years to come, and avenues for
additional opportunities in academic, research, and scholarly activities will be explored. A key
component for this success to continue includes utilizing students in the technology exchange
aspect of the relationship to enhance and broaden their experience. Although having students
who already spoke Spanish was a great benefit, this ability was not essential to the success of this
program. To generate even more opportunity for knowledge to be shared, more time will be
allotted in future exchange session for questioning and answers. One of the principal means of
facilitating the learning was through the peer-to-peer interaction. The questioning and answering
sessions proved to be an important mutually beneficial element of the technology exchange.
Additionally, providing more hands-on training, such as taking laptops and performing a BIM
laboratory, will also greatly enhance the learning opportunities for both parties.
References


