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1 Abstract

The International Perspectives in Water Resource Management (IPWRM) course is steeped in a rich history of international experiences that have been provided to the graduate students of IIHR, and more recently, the greater academic community of the University of Iowa. Recognizing the need to expose students to the international facets of the engineering and research workplace, the IPWRM course aims to provide all of the benefits of a traditional study abroad course while overcoming the obstacles to enrollment that result in under-representation of engineering students. This year’s excursion is provided as an example of how the course is a unique experience, and the results of surveys assessing the impact of the class are presented. The surveys corroborate the fact that the IPWRM course presents valuable international experiences in the form of a short-term study abroad program that accommodates the academic needs of engineering students.

2 International Perspectives Background

IIHR—Hydroscience & Engineering (IIHR), formerly the Iowa Institute of Hydraulic Research, is a world renowned research institute with a distinguished 90-year history in fluid mechanics, water resources, engineering, and hydrology (Mutel, 1998). The institute includes expertise in nearly all areas of hydroscience, with research foci ranging from ship hydrodynamics to fish passage around hydroelectric dams. The common factor linking many of IIHR’s research and education areas is complementary expertise in field observational research, laboratory modeling, and computational modeling. Also distinctive to IIHR is its international flair, with faculty and research engineers hailing from 13 countries and its 75 students from 15 different countries (2008-2009 academic year). Thus it is appropriate that IIHR take the lead in offering students a unique international academic experience.

The University of Iowa course “International Perspectives in Water Resources Planning” (henceforth “IP”) was created in 1997 as an initiative of IIHR’s then director V.C. Patel (Mutel, 1998). It was developed in response to: 1) the increasing need for engineers and scientists to have a global perspective of water resources challenges; 2) the need for engineers and scientists from across the world to work together to develop solutions to our global water resources challenges; and 3) the lack of short-term, affordable international experiences available to engineering students.

Since its inception, IP has taken 124 students on nine different international experiences (India, 1998; Taiwan & Japan, 1999; China, 2000; Eastern Europe, 2001; Argentina & Brazil, 2003; Turkey, 2005; China, 2007; and Egypt, 2008-2009; UK and Netherlands 2010) to introduce them to the realities and complexities of global water and environmental issues. The course seeks to provide in-depth exposure to technical, historical, cultural, social, economic, environmental, and ethical issues and complexities influencing major water resource projects in countries outside of the U.S. The course participants, structure, and unique itinerary make IP a
stand-alone class that goes beyond the technical aspects of engineering, putting water resources engineering within the context of a different culture.

Most IP registrants are graduate students in The University of Iowa (UI) College of Engineering; however, students from other disciplines (generally liberal arts programs), engineering upperclassmen, and young engineering professionals also take IP. In addition, students from eight other domestic universities and colleges and from three international universities have participated in IP. Instructors for the course have also come from outside engineering, included faculty from geology and law. Thus, IP has become a truly international and multidisciplinary course, exposing students to new cultures while they interact with a diverse student and faculty group.

The course structure makes each offering unique. Prior to the international experience, students attend a series of seminars and presentations covering the region’s culture, history, politics, and other factors relevant to the region. These presentations, which may include speakers from the host country, offer important background and context for the international component.

The international experience includes several specific components during an intense two to three week tour of the host country or region to better understand the complexity of issues that impact planning and execution of water projects in the region. First are visits to a variety of different water resources structures and laboratories. Advance arrangements are made for behind-the-scenes tours of these facilities and to interact with local engineers for discussion of their unique challenges. IIHR’s vast network of research partners and alumni are often key to making these arrangements. Second, each tour includes an opportunity for students to meet and interact with engineering students and faculty at one or more universities. This includes formal time together (which includes a presentation about the UI by course participants) and unstructured time interacting with each other.

Each IP participant is also required to complete a group project. These projects vary depending on student interests, but generally include: development of a post-trip web site, presentation materials to deliver in the host country, and research papers focusing on relevant water resources issues of concern to the world region of the course.

3 Importance and Impact of Studying Abroad

Overview

Globalization and internationalization have become commonplace terms across all sectors of the economy, and the engineering field is no exception. While these words embody a broad variety of issues and opportunities, a major concern is that along with these terms come new obstacles that must be met with appropriate education and experience. This need has been identified by major institutions and deemed a high priority in research and education (NSTC,
The Accreditation Board for Engineering and Technology (ABET) has mandated that one of the expected outcomes of a degree in engineering is that “graduates understand the impact of engineering in a global and societal context” (DiBiasio and Mello 2004). Study abroad programs have been proposed as a source for this new need, but a band-aid approach will not be sufficient for fitting the unique requirements of engineering curricula; study abroad programs must be adjusted to accommodate the typically highly regimented schedules of engineers’ academic careers. Short-term study abroad programs have been shown to be appropriate and will likely become the new standard in preparing students for the global challenges that await them.

Global Context

The challenges have been prefaced as global for many reasons, including the facts that the global economy and national economies have become almost completely co-dependent and workplaces both inside and outside the United States have increasingly diverse multiculturalism. Additionally, the global economy has become ever more dependent on “knowledge products” and highly educated personnel for growth which subsequently has led to global capital investing heavily in knowledge industries such as higher education and advanced training (Altbach and Knight 2007). This has created a demand for engineers that are able to provide innovation to meet the expectations of global capital, which will likely place them in scenarios where they must address problems that are outside of the context of their immediate environment. Many industries rely on innovation to keep a competitive edge in an economy driven by knowledge products. Cultural and ethnic diversity foster creativity and recognize opportunity; diverse groups are more innovative and effective, which is crucial in today’s international markets (Lohmann, Rollins and Hoey 2006), (Berkey 2010). The ability to work within culturally and ethnically diverse groups unfortunately does not come naturally to everyone, and can always be aided by previous experiences. Thus a growing pressure to expose students to international settings has been acknowledged by higher education institutions.

It is generally acknowledged that there is a need for engineering graduates to have a global competence and the ability to work comfortable in a transnational environment (Lohmann, Rollins and Hoey 2006). Even if students do not expect to leave the borders of the United States, 17 percent of engineers working in the U.S. are foreign born, suggesting the multicultural workplace is near unavoidable. (Mahroum 2000). And while students may not foresee leaving the borders of their country, the truth is that the international migrations of engineers are largely dominated by push and pull economic factors which are principally out of their control. It is argued that this migration typically complements local talent due to existing differences in aptitude and methods of study between countries (Mahroum 2000). This fact reinforces the concept that diverse groups have been shown to be more effective at producing results; if engineers wish to succeed they must be ready to perform within the context of this fact.
An International Solution

With this identified need for globally competent engineers has come avid discussion on what is the best method for introducing students to this context and providing them with experience that can aid in their careers. Experiential learning theory proposes that lived experience is the most effective and enduring route for memory and learning (Jurgens & McAuliffe, 2004). Most current efforts to prepare a globally competent workforce have been directed toward undergraduate education through international study abroad programs offered by several American universities (Institute of International Education, 2004.b) and NSF-sponsored international Research Experiences for Undergraduates (NSF, 2001).

Studying abroad is one of the few options that can provide experiential learning in an international setting, and has thus become a center-point in discussions (McHargue and Baum 2005), (Nasr, et al. 2002), (Hirleman, Groll and Atkinson 2007). Despite this fact and the knowledge that the engineering field is an international one, the participation of engineering students in study abroad programs is dismally low; roughly less than 3 percent (Marcum 2001). While there has been a recent rise in the popularity of study abroad programs in general, engineering students have not participated in this trend and are severely under-represented (Berkey 2010), (Institute of International Education 2010), (King and Young 1994). This low turnout must be addressed, as it has been shown that study abroad experiences leave a lasting impact on participants that influence their personal and professional life for years to come (Armstrong 1984).

There are a variety of reasons that prevent typical engineering students from participating in study abroad programs. Incorporating international experience into the typically highly regimented engineering curricula has proven to be a challenge that cannot always be met by typical study abroad programs (Lohmann, Rollins and Hoey 2006). Typical programs span a semester or year period, which almost never meshes well with a curriculum that squeezes as many major relevant courses into four years as possible. It is a common fear that studying abroad will lengthen the time required to graduate. Affordability, diversity of program, and capacity, and transfer of credits are acknowledged to be key issues when students are deciding to take a study abroad course (Marcum 2001), (Parkinson 2007). To address the limitations of conventional study abroad programs, short-term courses have been put forth as an option that can fit within a rigorous course load.

Short-term international courses provide many opportunities that traditional study abroad courses cannot. One such opportunity is that courses can cater to focus areas of students while ensuring that proper credit will be received for participation. This implies that the international experience gained will be directly relevant to the students’ interests and most likely their career path. Due to the short nature of the course, associated costs are likely to be less than semester or year-long study abroad programs. It has been shown that short-term non-language based study abroad programs can improve participants intercultural sensitivity, implying they will be better
prepared for an international engineering workplace (Anderson, et al. 2006). The IPWRM course is one such program that provides an international experience that is relevant to participants’ field of study while having a duration that is approachable and will not impair graduation timelines.

Global competence should include an understanding of the relevance of international cultures to a student’s major (Lohmann, Rollins and Hoey 2006). The IPWRM course provides this relevant experience while taking advantage of best practices that help to ensure the success of the course. Due to the fact that the course is departmental, it takes advantage of the fact that departmental study abroad programs serve to both speed the process for incorporating international topics into an institutions curriculum and to help students gave an international professional perspective through linkages between host and home curricula (Praetzel, Curcio and Dilorenzo n.d.). Additional features of the course that have been identified to increase the success of a program are involving several faculty members in a program, preparing students before departure, taking advantage of already existing university infrastructure, and a college leadership that has made a long term commitment to the program (Parkinson 2007). The course provides the now necessary international experience and exposure to multiculturalism while overcoming the barriers of traditional study abroad programs. The predominant goal of the IPWRM course is to provide students with a unique experience that will aid in preparing them for the global engineering workplace.

4  A Unique classroom: The Netherlands – United Kingdom 2010

A diverse group composed of 14 students ranging from undergraduate studies to PhD candidates took the plane to Europe during the summer of 2010. They were accompanied by two University of Iowa faculty members. This time, the IP class took the students to The Netherlands and the United Kingdom from May 17th, 2010 through May 31st, 2010. The class was organized by The University of Iowa in cooperation with UNESCO’s-Institute of Water Education (UNESCO-IHE), University of Bristol, Cardiff University and Imperial College of London.

Before leaving the US, Several educational sessions were organized at the Iowa Institute of Hydraulic Research (IIHR) to discuss the logistics, available funding, cultural differences, and to assign projects to students. A pre-survey and post-survey were completed respectively before and after the study abroad class by 14 students and 2 faculty. The main topic of the course “Living in floods” followed up the efforts of the Iowa Flood Center to respond to the urgency of cutting-edge research and education to address flooding in Eastern Iowa. Therefore, several students who attended this course came from this center and were eager to learn the techniques used by the Dutch and the British to overcome flooding over centuries.

Indeed, the host-countries for the IP class are unique in water-related fields. They experienced severe floods in the past. For instance, in 1953 a colossal deluge hit The Netherlands. Over 2000 people died and 150,000 hectares of land were inundated (Deltawerken 2004). On the other hand, the United Kingdom has also an historical record of important
Inundations. In order to protect their lands and people, the Dutch and British developed sophisticated flood control systems and high-technology models to predict and monitor flooding. They are well-known for unique flood mitigation projects.

The first stop was in The Netherlands, a country that is home to the delta of three major rivers and where more than 50% of the population is living below sea-level. Most of the students travelled the weekend preceding the official start date of the course to experience the exclusive Holland tulips festival and to do sightseeing. Figure 4-1 illustrates the means of transportation, the itinerary, and the class schedule. University of Iowa Students and Faculty spent about a week in Delft, a city located South Holland. They had a first-hand experience of the Dutch flood technology and culture by being exposed to state-of-the-art techniques, visiting research facilities and hydraulic structures, meeting colleagues and peers, networking, and melting into the local population. Detailed guided tours were given in Belgium (Sigma River Project) and The Netherlands (Deltaworks). The stop to Belgium was brief but intense. It included a visit to the Flanders Hydraulic Research (Waterbouwkundig Laboratorium). This institute focuses on hydraulic, nautical research, and water management and it advises the Flemish government on water-related projects. Following research facilities, the Sigma Plan was presented to the students. This project followed the storm surge that flooded Northern Belgium in 1976. The plan was actualized in 2005 and included a combination of strengthened dikes and flood control areas (Peeters 2010). The speaker showed that today the Sigma Plan flood protection project also encompasses ecological needs and addresses environmental issues due to the implementation of the project. The pilot project in Lippenbroek was highlighted by the speaker. Lippenbroek is a polder used as a Flood Control Area and intertidal habitat restoration. A boat ride along the Scheldt River allowed the group to see the dikes and to visit a flood control area. The day terminated in a visit of the city of Antwerp. Many of us enjoyed culinary delicacies such as pralines and Belgian fries.

Another important visit was the Deltaworks, which were built between 1950 and 1997. The Deltaworks contained a state-of-the-art set of gates, dikes, sluices, locks, and storm barriers. These structures protect over millions of people living in the South Western part of The Netherlands. The visit consisted of field trips at the Eastern Scheldt Storm surge barrier and the Maeslant storm barrier. The former is a barrier composed of movable components, which will be closed in case of surge storm. It is the biggest hydraulic structures in the world. The latter consisted of two gates which can swing. Those movable gates protect the Rotterdam population estimated at 1M people from being flooded during storm surge. This is one of the largest moving structures on earth. The deltaworks project is listed as part of the Seven Wonders of the 20th century (ASCE 1994) Figure 4-2 illustrates the Sigma River and Deltaworks visits. Dutch guides enthusiastically shared knowledge about techniques used to implement those projects and history behind the motivation. Students learned about the planning, design, operation, and maintenance of these enormous structures.

Remarkable exchanges were made between IP and Dutch groups via visit of the leading research institute in water, soil, and subsurface “Deltares”. In a very welcoming setting Professor
Arthur Mynett introduced Deltares, presented the concept of environmental hydro informatics and the numerical models used to address water related and environmental issues. Flood center students shared their knowledge, and experience about projects conducted on the Mississippi River. Professor Allen Bradley from the University of Iowa group gave a presentation about the IFC. Later, the group visited prototypes, models, large-scale wave facilities (e.g. Vinge Basin). The last two days in Delft were shared between TU-Delft and UNESCO-IHE: an institute specialized in water education. Civil engineering professors presented their research and challenges faced while implementing water-related projects. “Room for the River”, a national program by the Dutch government to increase safety for its nation and environmental quality of its river basin, was presented. The lands along the rivers are protected by dikes, which height had increased over years, the lands which are dropping behind the dikes are more and more exploited by the population, and limited space is available for the rivers. (Hoekstra 2010). The speaker presented the techniques employed to address this issue. For instance, some actions imply lowering of the floodplains, removing of hydraulic structures, and getting rid of some manmade dikes. Among the challenges associated with the implementation of the program are the reallocation of families and farms, and the amendment of existing regulations. The program costs about €2.2 billion to the Dutch Government. Those lectures were an ideal occasion for U IOWA students to interact with Dutch faculty, and discuss about flood modeling tools (e.g. Delft 3D), flood management and protection techniques, environmental issues and ecological problems associated to those constructions. From May 17th to May 20th, students attended intense workshops, visited unique research facilities inaccessible to general public, and had valuable networking with Dutch peers.

Other non-academic activities were possible. The US group assisted to local fair in Delft that looks like a state fair in Iowa. Typical Dutch products could be tasted especially cheese and exotic fruits from Asia. Students have detected similarities between Iowa City and Delft. Both towns are small and they are both college towns. Differences were also noticed. Biking is a main transportation in Delft. This is not surprising. The Netherlands are well-known for their well-developed biking infrastructures. If in Iowa City some bike, in Delft most of the students used their bike as their primary transportation. A striking difference with the US College Town is the high-cost of living in Delft. Dutch students reported that eating out is not a common habit for students and it was too expensive for them. Iowa and Dutch students agreed.

The cultural aspect of the class was not negligible. The weekend of May 21st, students visited the lively city of “Amsterdam”. The IP group had a tour of the city by taking a boat ride along the canal. Students soaked up in the city atmosphere and had a unique experience ranging from jazz cafe to rock concert. A two-day pass permitted to discover the city architecture, to visit the museums, and to interact with Dutch people in a non-academic setting. Overall, Amsterdam is a busy city with several attractions, diverse cuisine, and a unique atmosphere.

On May 23rd, the tired but motivated IP group took the plane from Amsterdam to Bristol located South West England. Faculty and students settled at Burwalls situated at the edge of Clifton village offering a charming view of the city of Bristol. Right of the housing is situated the
attractive Clifton Suspension Bridge (See Figure 4-3 a.-). Students were pleased by the stunning views from the bridge. The next day the course instructor conversed about the logistics of the second part of this study abroad class. Expected assignments were discussed and updated based on the current situation of the IP Class. From May 24th to May 28th, U Iowa Group, British Students and Faculty travelled across the UK to visit universities (University of Bristol and Cardiff University), research facilities (HR Wallingford, Halcrow), and governmental agencies (EA at Wales and Tewksbury).

Students and faculty from the Department of Civil Engineering at the University of Bristol presented their research work and projects. Dr Han, a reader in Water Engineering, presented the main research focus of the department. The on-going project AQUATEST, which goal is to develop a low-cost device to water testing in the developing world, was presented. Presentations were made on hydro informatics, rainfall forecasting, hydrologic modeling, remote sensing, GIS and flood estimation as well as non-structural flood mitigation. For example, Liguori (2010) assessed hybrid models for rainfall forecasting by coupling Numerical Weather Prediction (NWP) models and radar nowcasts, while Liu (2010) outlined the criteria to choose the best set of data when calibrating flood forecasting models. Ishak and Han (2010) used sensitivity analysis to report the most important weather variables to estimate evapotranspiration using NWP models. A large range of numerical models were presented. Most are meant to predict flood in urban areas. U Iowa students had also the opportunity to meet and to assist to workshops organized by the School of Geographical Sciences under the direction of Professor Paul Bates. Projects using modified version of LISFLOOD, a grid-based and spatially distributed model used to simulate floods in large river basin in Europe. University of Iowa highlighted the main important projects conducted at the Iowa Flood Center. Challenges and future research of the IFC were discussed.

IP took students to Wales, an interesting country situated west of England, to visit Cardiff University and to attend presentations organized by the Hydro-Environmental Research Centre group. Professor Roger Falconer presented hydro-environmental assessment studies in the Severn Barrage. Dr William Rauen gave a talk on contaminant transport processes using flume experiments and a 3D-Hydrodynamics model (ECOMSED). Dr Lin gave a tour of the hydraulic laboratory where students could see a large tidal basin, recirculating flumes, and a large tidal flume used to acquire field data. The detailed Severn Estuary and Bristol Channel physical model was also shown (See Figure 4-3 b.-). The model has the following scaling: $\lambda_{xy} = 1:25,000$ and $\lambda_z = 1:125$

After lunch, Professor Falconer gave students a quick tour of Cardiff. The rest of the stay in Bristol was shared between workshops at Environmental Agencies (EA at Wales and Tewksbury) and two-world leading companies specialized in water-related fields, HR Wallingford and Halcrow. The two are independent research and consultancies companies specialized in civil engineering and environmental hydraulics. They provide assistance and advice to the British government, international organizations, and partner with University research lab. At the Environmental Agencies, officials presented techniques and tools for flood
risk managements. They made demonstrations of the forecasting & warning system used in England and Wales. Climate change is a challenge for the British government that is not neglected in flood modeling studies. Officials at the EA – Wales reported that the rivers flow peaks are 20% higher and the sea-level is expected to be 1m higher by 2110. A detailed review of the Tewkesbury Town flood in 2007 was presented and students assisted to a demonstration of erection of demountable and temporary flood defenses. Figure 4-3 c) and d) illustrate respectively the flood defense and the water elevation during historical floods in Tewkesbury town. At Wallingford students learned about the Life Safety Model (LSM2D) used for evacuation and reallocation planning. Halcrow presented the model ISIS used for river modelling studies just like Mike 11 and HECRAS. The model is used for flood risk mapping, flood forecasting, flood incident management and emergency planning.. ISIS 2D is now available for 2D flood modelling. During those presentations, students learned about models available for flood risk mapping and managements.

IP Students left Bristol in the morning of May 28th for a new set of presentation in London. In a friendly atmosphere, Professor Čedo Maksimović and students welcome the University of Iowa group to London Imperial College. Presentations were very diverse. The Imperial Students presented projects focusing on urban flood mapping, flood regulations, disaster prediction and management, and rainfall forecasting. Two IFC students presented about their work at the research institute. For example, PhD Student Luciana Cunha talked about the hydrological model CUENCAS. Two studies cases (Cedar rapids 2008 flood in Iowa and City of Charlotte in North Carolina) were showed. The former is to study the effects of basin scale on flood prediction and the latter is to study the effects of land cover changes on flood risk intensity. London Imperial College group, University of Iowa students and faculty gathered in a cheering reception organized by the Imperial group. The IP Group developed links with colleagues and faculty for long-time friendship and further collaboration. University of Iowa group provided thanking gifts to the Imperial College group. This was done after each visit.

The rest of the stay was in a more relaxing setting. Students were provided a two-day pass to visit museums and historical structures in London (e.g. London Bridge, Big Ben, etc.). The group took a boat ride to the famous Thames Barrier, which is the second largest movable flood barrier in the World. Students were pleased by the stunning view of the London Bridge which is a breathtaking civil engineering structure. University of Iowa students noticed the easy accessibility of public transportation in London. Students in London do not need a car to travel far. The Metro system is very efficient and they can easily travel across the UK. Some reported the air pollution in this busy city compare to Iowa City. Nevertheless most had a great experience meeting students from the London Imperial College with whom they continued to hang out over the weekend.

The class terminated on May 30th. Some student travelled to the US while others stayed longer in Europe for a well-deserved vacation after a very intense and unique study-abroad class.
Figure 4-1: Itinerary of the IP Class in Europe 2010

Figure 4-2: Visiting the Sigma River Project (Belgium) and the Delta-plan (The Netherlands)
Figure 4-3: Visiting Bristol and Wales

Table 4-1: Detailed of the IP Class agenda
5 Results of Survey

Participants in the 2010 IP course completed pre- and post-trip surveys covering the same questions as the 2008 survey. The 2010 participants had more travel experience than those who made the trip to Egypt. Only two had never traveled abroad prior to the course and four more had spent less than one month overseas. Over half the participants had extensive international travel experience, most having lived abroad in some capacity. Six of the participants had prior travel experience in Europe, a number that contrasts sharply with the Egypt course, when only one student had previous travel experience in the region.

The results of the surveys for the 2010 program in the Netherlands and the United Kingdom were similar in many respects to those of the Egypt course in 2008. Using the same statistical measure, t-Tests with a 95% confidence interval, eleven of the questions yielded statistically significant differences – five more categories than in 2008. Several of these significant differences overlapped with the observations from the Egypt trip. Students again reported strong gains in knowledge of the culture, society and water resources management issues of the destination countries. The surveys also show that student concerns about language barriers, personal security and committing a cultural faux pas decreased significantly both times.

Additional areas where students reported decreased concern after the Europe trip were illness, money and gender roles. None of these areas saw significant change following the Egypt trip. In the case of the illness question, the students on the Egypt trip actually reported a higher level of concern after the trip (though not statistically significant). Money was ranked as a less-important issue after both trips, although the change was not significant in the case of the Egypt course. The fact that money was considered such an unimportant problem for students in 2010 may have been aided by the sharp decline of the Euro in the months preceding the trip.

The qualitative answers given by students on the 2010 surveys reflect those of the 2008 surveys. When asked if students would pursue another IP opportunity in the future, all but one answered yes and several provided illuminating responses. Examples include:

- *It was an extremely valuable and enjoyable experience*

- *It was a unique experience. I built some great memories and... I will surely recommend it to others*

- *(it is the) only chance to travel abroad affordably*

Another component that students highlighted repeatedly was the value of interacting with international peers and colleagues. Some reactions:

- *Glad to meet people in my field*

- *...time with international peers and colleagues was enjoyable*
The two social outings, especially the one in London, were crucial for making contacts.

The emphasis students place on these interactions was reinforced by the fact that lack of time or opportunity to interact with international peers was one of the few common critiques provided in response to open-ended questions about how to improve the course.

The most important observation to take away from these surveys is that, in the opinion of the participants, these courses produce several important results. Students in both courses overwhelmingly reported significant gains in their understanding of water resources management issues in the countries visited. Moreover, they also indicated greater knowledge of society in those countries. This benefit, extending beyond the specific content of the course, is particularly relevant in this era of globalization.

Besides increasing understanding of society in the host country, the courses also tangibly improved students’ level of comfort traveling abroad. The fact that post-trip survey results from both courses showed students were significantly less concerned about language barriers, personal security and cultural faux pas afterwards supports this conclusion. Given these responses it is no surprise that both surveys showed students to be more comfortable traveling abroad after the course, whether to the host country or any other international destination.

6 Conclusion

Over the course of the previous decade the IIHR – Hydroscience and Engineering institute has provided an opportunity for engineering students to participate in a study abroad experience that would be otherwise impossible. The rigors of the highly demanding engineering curriculum have been circumvented by the application of a short-term model that attempts to address the obstacles to studying abroad. The two week excursion to the Netherlands and the United Kingdom presents a case study that showcases the exposure to concepts present in differing academic and professional cultures. The wide variety of lectures, presentations, and field trips are provided in a context of cultural exposure that serves to acclimate students to a career that is increasingly likely to be multicultural and global. Surveys that were completed both before and after the Netherlands/UK offering of the course, in conjunction with surveys from a previous course to Egypt, provide quantitative evidence towards the benefits of the short-term model. Qualitative and quantitative results from the surveys also illustrate the parallel gains in technical and cultural knowledge that only a course such as IPWRM can offer. Evidence points toward the fact that the IPWRM form of the short-term study abroad model prepares students for increasingly global environment of the engineering workplace, and the model must be developed further and find more wide-spread implementation.
7 References


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