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Accomplishments and Lessons Learned
A Partnership between University of Hartford, and Herat University

Abstract

In 2007, the University of Hartford College of Engineering, Technology, and Architecture, in West Hartford, Connecticut began a partnership with the Faculty of Engineering at the Herat University, in Herat City, Afghanistan. The goals of the project were to use a combination of curriculum revision and improvement, faculty development, distance learning and collaborative projects, and local/ internal partnerships to establish Herat University Faculty of Engineering as the preeminent Engineering program for Western Afghanistan.

Once part of Kabul University, the Faculty of Engineering became a permanent part of Herat University in 2002. After functioning in Kabul for approximately 20 years, the Engineering program was closed following the Soviet occupation of Afghanistan in the 1980s. The program temporarily relocated to Pakistan in the 1990s and then to Herat in 1995. Although the university was officially open in Herat City during the five years of Taliban rule, programming and resources were extremely limited. Many of those constraints still remain in place as the Afghan government seeks to rebuild Afghanistan’s Higher Education System.

The partnership between the University of Hartford (UH) and Herat University (HU) was accepted for funding by the World Bank in 2006. Before the partnership began, engineering instructors at HU had bachelor’s degrees only with extremely limited opportunities for graduate study or professional development, including technology in the classroom, pedagogical innovations, and student-centered learning.

Since the partnership began in 2007, a total of 17 instructors from Herat University pursued their masters’ degrees in different disciplines of engineering at the University of Hartford. In addition to their coursework leading to a master’s degree, they shadowed UH instructors and through this mentoring, they learned technological applications available and are installed at HU via the World Bank and USAID funding. They developed and updated, student-centered course materials, assessment methodologies, and plans for continuing education and professional development strategies. A number of the instructors also have implemented the Mechatronics and Architecture programs. These two curriculum areas have been developed collaboratively by HU and UH, and began admitting students in 2010.

This paper will address the key successes achieved as well as the challenges encountered in developing a robust partnership between universities in countries with such different histories, cultures, educational philosophies, and resources.

Introduction

Education is one of the key infrastructure components needed to sustain peaceful development and maintain security so that the Islamic Republic of Afghanistan can meet the critical needs of its people and as well as participate fully in the international community. Higher education, in
particular, engineering education, is at a crucial crossroads and a comprehensive and functional higher education system for engineering students will provide Afghanistan with the technical capacity to develop in-country infrastructure as well as to expand its role in the international community.

Collaboration with foreign universities, under the framework of the Strengthening Higher Education Program (SHEP), was formed by the Ministry of Higher Education, Islamic Republic of Afghanistan, and was funded by the World Bank. As a result, the partnership between the University of Hartford (UH) in West Hartford, Connecticut, USA, and Herat University (HU) in Herat City, Afghanistan was initiated in August 2007 to develop and implement a modern program to strengthen and modernize engineering education at HU. The program included a number of activities such as curriculum review and revision, faculty development, and laboratory upgrading.

Under the partnership, junior HU faculty members, who had only a bachelor’s degree, applied to enroll in the master’s degree program at the UH and worked toward obtaining their master’s degrees. Earning this graduate degree will enable Herat faculty to be better teachers as well as be better prepared to implement curriculum revisions. More qualified faculty will also attract better students and will provide the groundwork to expand curriculum to other engineering majors.

**Background of the Herat/Hartford collaboration**

Engineering education as a formal pursuit began in Afghanistan with the establishment of the Faculty of Engineering at Kabul University in 1956. That program flourished for over two decades in partnership with various foreign universities and government agencies. In 1984, five years after the Soviet invasion, the faculty was dispersed. Many left the country. A number of these faculty members established an engineering program in Peshawar, Pakistan, which in 1995 was transferred to Herat in Western Afghanistan. The program was officially incorporated as part of HU in 2002.

Since the transfer of the engineering program to Herat in 1995, a total of 625 civil engineers have graduated, including 43 women. Currently there are 635 students enrolled in three disciplines of engineering, Civil, Architecture, and Mechatronics.

Through the partnership, the goal of modernizing engineering education in Herat was achieved through a two-phase effort.

- Phase I, which concentrated on developing the professional capacity of junior and senior faculty and upgrading the existing program and curriculum.
- Phase II, which concentrated on establishing two new bachelor’s degree programs: Architecture and Mechatronics.

These activities, which were not mutually exclusive, were pursued concurrently.

**Achievements**

**Phase I Project Activities**
The project activities under Phase I concentrated on upgrading the existing engineering program at HU. The engineering curriculum at HU was outdated and contained too many credit hours for a four-year degree in engineering. The Civil Engineering curriculum has been updated, approved by HU, and has been phased in. This curriculum in terms of its content and coverage is at par with typical American engineering curricula. All engineering courses at HU are designed such that they are transferable to the UH as equivalent courses.

For faculty development, the full-time engineering faculty members were divided into two groups, junior faculty who were pursuing master’s degree training, and senior faculty whose training was limited to shadowing activities at UH.

In this step, a senior faculty member from HU shadowed a UH engineering faculty member. The Dean of Engineering at HU spent a month at UH in September/November 2008 and another month in September 2009. He shadowed the Associate Dean of Engineering at UH. Shadowing activities included:

1. Observation of engineering classes at different levels.
2. Supervised assistance teaching a variety of engineering courses to develop a variety of pedagogical models and options.
3. Developing course(s) for HU, particularly in an electronic/computer-based classroom or for distance learning environment. One point of emphasis is the development of future shared projects between UH and HU students.
4. Observation, study, and practice of administrative and management skills, including ongoing faculty and curriculum development and revision.
5. Skill acquisition and practice for managing and completing the assessment process.
6. Academic advising.

In addition to classroom observation, the senior faculty member was able to assist and/or co-teach a class with a UH professor.

Under the partnership program eighteen junior faculty were sent abroad to pursue their masters degrees. Seventeen to Hartford and one who was not able to obtain a US visa was sent to the Asian Institute of Technology (AIT) in Bangkok. The ones sent to Hartford attended intensive English preparatory courses followed by their respective master’s degree program courses. Twelve pursued master’s degrees in civil engineering, two (female professors) in architecture and three in mechatronics. The professor who was sent to AIT also followed a graduate program in civil engineering. Of the eighteen who were sent abroad, sixteen returned back to Herat University and are teaching full time. While at UH, HU junior faculty also:

- shadowed Hartford professors during the academic year,
- developed on-line courses, to be used at HU, under the supervision of a UH professor,
- participated in a project related to Afghanistan.

To further enhance the quality of the partnership, engineering faculty members from the UH traveled to HU during UH summer term (second semester HU) and/or as part of a leave or sabbatical. Their role was to:
• co-teach courses at HU,
• assist in curriculum revision,
• provide ongoing faculty enrichment,
• conduct research,
• help develop an assessment process, and
• provide refresher courses.

These activities were accomplished through co-teaching courses and through conducting seminars, workshops and short courses. Another component of the UH to HU partnership was working to establish joint senior design projects through different initiatives at UH. These joint design projects will be established via distance learning, and will be led by faculty from UH, HU, and individuals from Connecticut industry.

The distance learning room at HU with teleconferencing capabilities is ready to be used for this purpose; however, the internet connection is not sufficient to support joint projects at this time. With the establishment of the campus wide fiber optic program funded by NATO NIG program at Herat University in the near future, such joint projects will be undertaken.

Computers have been placed in the library for access to digital library resources such as engineering and academic research databases through the e-Quality alliance (funded by USAID). This resource is available at this time on a limited basis and once the fiber optics network is operational, they will be used more widely by students and faculty.

Laboratory facilities at HU include:
• Soil laboratory
• Asphalt laboratory
• Concrete and metals laboratory
• Surveying laboratory
• Hydraulics laboratory
• Computer laboratories

UH assisted HU in integrating laboratory experience with theoretical and textbook learning throughout the curriculum. Computer tables have been purchased and are set up in the third-floor computer lab and second-floor library of the engineering building.

PHASE II: ADDITIONAL PROGRAM DEVELOPMENT

Significant progress has been made in the expansion of program offering at HU. The new Architecture and Mechatronics fields have been inaugurated and the first batch of students has been admitted into these fields in 2010. Expanding the engineering curriculum to areas beyond civil engineering that are critical for continued development of infrastructure and capacity in Afghanistan has already begun.

An undergraduate program that develops practicing architectural experts fits well with the interests of HU and the City of Herat and can help meet the need for orderly rebuilding of the
city’s infrastructure. About 20 existing civil engineering courses (approximately two years’ worth) will be shared between the Architecture and Civil Engineering programs.

Development of the architecture program also conforms to the Ministry of Education’s goal of increasing enrollment of female students. A complete (four-year) curriculum for the Architecture program was developed by UH and submitted to HU and is adopted by HU. A studio with tables and equipment, and PC Lab was also established for the architecture program.

Mechatronics combines the strengths of electrical and mechanical engineering, and graduates from a mechatronics program function well in both the mechanical and electrical engineering job markets. Students in such a program can select courses to emphasize either electrical or mechanical engineering, or both. Of particular benefit to HU, an undergraduate mechatronics program is an alternative to separate electrical or mechanical engineering programs and will greatly augment the current offerings in civil engineering. A complete curriculum for a Mechatronics Engineering was developed by UH and submitted to and is adopted by HU. Two laboratory rooms with equipment were also established for this program.

Five HU engineering graduates were nominated to be trained at UH for assuming faculty positions in Architecture and Mechatronics programs. Of the five, three were trained in Mechatronics and two in Architecture. The Mechatronics group spent two years at UH—one year devoted to taking any needed undergraduate courses to prepare them for graduate level work, and a second year to work toward a master’s degree in Mechanical Engineering/Mechatronics.

In a similar manner, the Architecture group (two faculty members) spent a total of two years at UH. However, due to limitations in the grant period, they pursued a master’s degree in civil engineering with heavy emphasis on architecture. They took enough architecture courses, both undergraduate and graduate, to prepare them to teach Architecture courses at HU. Both professors completed their degree programs and returned to Herat to full time teaching.

The following labs were established as part of the implementation of phase II at HU:

1. Electrical Engineering (EE) Lab
2. Mechatronics Lab
3. Architecture Studio

As of now, a combined EE/Mechatronics lab, a separate Mechatronics Lab, a fully equipped Architecture Studio for 120 students and a dedicated PC-Lab for Architecture have been established.

Lessons Learned:

Lessons learned are presented below as points, considerations, and suggestions that may be considered in order for a partnership to be successful, in our view. These are a combination of factors that may be considered to both gain the trust of the partner institution, and to accommodate the students at the host institution. As a byproduct of the trust, it is then easy to
work with the partner institution since they are willing to work with you. As far as the students, they must feel that they are welcomed at the partner institution, they will be treated differently and they will be listed to.

From the administration side:

- **Connection**: it is essential to have a connection with the other side. This connection could be through a native of that place, like in our case, or through someone who knows this area, the culture, the people. Such a connection will give access to the people and eventually will be the first step in establishing a working relationship that is built on trust.
- **Visit the place**: you must visit the place before any work. Learn about the needs, vision, and constrains. Then, working with the other side you should identify the strengths, the weaknesses and what can be done given the limited resources.
- **Re-visit the place whenever possible**: we were lucky in the sense that several faculty were able to make several trips and some stayed there for an extended period of time. This created a better connection with the partner institution and created an environment of appreciation to our commitment and help us is speeding the implantation of the proposed changes.
- **Stay connected**: technology made this possible; to stay connected by Skype on a daily, weekly or as needed basis. This was essential to us to follow up on the progress of a task. It was easy just to call and check on the progress of installing the new PCs and software. It was face-to-face meeting, through Skype, that made it easy for us to address problems and find solutions.

From the visiting student/faculty side:

- **Screening prospective students**: prospective students (who are full-time faculty at the other institution –in our case HU) should be screened by the other institution for their commitment to their institution and their desire to be part of the change. Of course they will be screened academically by the host institution for academics.
- **Advising students**: students were called “student-faculty” to distinguish them from the regular students and to make them feel welcome. In addition to their faculty academic advisor, they had a faculty who met with them regularly- the PI of the grant. The faculty was available to support the students, guide them and offer advice on variety of issues.
- **Central office**: having an office for the “student-faculty” helps in creating a community and makes it is easy to solve problems.
- **Help**: it is essential that help is available. For example, editing paper or a report is not easy for someone who is not well versed in English. International graduate students typically have hard time doing so. We had a professor who was assigned to help students in all of their technical writing. This was extremely helpful to all and eliminated tremendous frustration on the part of students.
- **Acknowledgment by the institution as a whole**: during our spring commencement, the president of our institution publicly recognized the “student-faculty” and acknowledged their future roles in rebuilding the higher education system in and
hence rebuilding their country. Such recognition is important to the students and their institution to show the level of commitment on your part.

- Assessment and administrative training: while we acknowledge that we brought students for professional development to earn a master degree, we found out that workshops on assessment and management were helpful to our “student-faculty”. We believe those workshops made them more aware and better focused on their course work, since they will, soon, be teaching courses in the same subject area.

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Bibliography