

## **AC 2007-843: TEACHING PROJECT MANAGEMENT WITH INTERNATIONAL COLLABORATION**

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# Teaching Project Management with International Collaboration

## Abstract

Global project management is a natural context for training engineering students to meet challenges of the global economy. This paper describes the methods employed in an innovative project management course integrating lecture seminars with international engineering counterpart faculty in China, Czechoslovakia, and the United States. The US's East Carolina University's engineering program entered into reciprocal agreements with the Czech Technical University and SUST of China to integrate and collaborate the presentation of seminars related to ongoing course work in project management. The collaboration required establishing a network for live video feeds, time zone coordination and technology compatibility demonstrations. The tri-party collaboration required the integration of course materials across the time and space divides in order to provide seamless, coherent delivery. This paper summarizes the logistical hurdles in establishing the lectures and describes the curricular content coordination challenges required for success in expanding appreciation for international cooperation and levels of knowledge.

## Background

In the competitive market that represents engineering and project management today, understanding the particulars of customers representing a global clientele requires and understanding of local laws, customs, languages and cultural beliefs<sup>1</sup>. For cross-border teams executing any or all phases of a project, whether R&D, supply chain or construction the needs are similar. The project world issue is magnified due to the inherent nature of global customers and global team members. Separations of time and distance require project management teams to focus on robust communications and communications systems in order to survive and thrive. Communications issues are factors of time zone differentials, technology infrastructure disparities and technical proficiency levels among the project team's members<sup>2</sup>.

The flattened opportunities in which current economies of the globe operate provide an expanding need for academicians to prepare students for professional life<sup>3</sup> within the context of the global environment. The need is grounded in learning that prepares students for the reality of working across borders, virtually or in reality. In discussions with educators outside the US, it is common that university students seek exposure in international exposure including internships abroad<sup>4</sup>. While common in the non-US world, mainstream students in the US continue the traditional approach of study-here-work-here, all the while corporations clamor for international exposure<sup>5</sup>. Factor associated with engineering curriculum have been reported as a root cause for the lack on international opportunities for US based students<sup>6</sup>. The ABET criteria for accrediting engineering programs provides incentives for the encouragement of exposing US engineering students to a broader perspective<sup>7</sup>.

East Carolina University (ECU), in cooperation with the Czech Technical University (CTU) in Prague and the Shaaxi University of Science and Technology (SUST) in Xi'an, China has begun an effort to provide students at all three universities an opportunity for international exposure.

This paper represents the initial report of an ongoing effort to expand international understanding of the project management process. The three universities recognize that initial efforts will not be experiential for the students but plans are to provide for an ever expanding integration of the course content.

## **Discussion**

Initial efforts for the international “exchange” were suggested by a Chinese-American faculty member at ECU recognized the importance of international experience. From her perspective it was apparent that, for the most, ECU students could not afford to go abroad. The alternative was to find and exploit opportunities to bring international experience to ECU. As an Acting Dean of the College housing the Engineering Department, she successfully identified ways to establish internet exchanges with countries that lacked direct satellite uplinks. As the principle driving force for ECU’s Global Understanding Project<sup>8,9,10</sup>, she uses the same technology to promote the International Lecture Exchange Project and the International Course Exchange Project which includes the effort described here. Her request of the ECU engineering program was simple, “Can you exchange a lecture?” The request has produced some tenuous crawl-like steps that are expected to be expanded as familiarity with time zones, cultures and curriculum increases.

From the humble request began the current project. The project’s objective is to provide an exchange, via internet delivered lectures (voice and video) of project management knowledge between CTU, ECU and SUST. This objective relates to a goal of providing students with an exposure to international project knowledge. The project is a classic candidate for a project management demonstration project. The current status is a conceptual demonstration project.

## **Steps to Do It**

The project floundered after the idea was first suggested due to a lack of leadership. No one from the three collaborating universities demonstrated real leadership initially until ECU faculty made some overtures and requested the three universities each take become proactive. A basic outline, or steps to achieve the exchange, emerged.

- 1) Establish a point of contact with the universities. A working relationship had been previously established with CVUT for other exchanges. SUST had not been previously approached although other Chinese universities had worked with ECU on similar exchanges.
- 2) Establish communications. When a single point-of-contact had been established with each university, the initial communications were established. Primarily the communications have been exchanged via email.
- 3) Establish video link protocols. Each university was required to connect using a single exchange medium (see below). Once the medium was accepted and equipment made available, testing of the video link was possible.
- 4) Test video link protocols. The internet based video link is based on the quality of cameras used, video feed projection at each location, audio signal quality and ambient conditions at each of the sites. Video link testing establishes the efficacy of the contributing systems. The testing will not adequately simulate a “filled-room”

environment unless a fully populated class room is used during testing. This has not been done.

- 5) Establish logistical protocols. During one of the video tests, the participating universities established some basic understanding of content delivery. For instance, brief bios of the rhetoricians would be exchanged prior to the exchange. Files (\*.pdf) would be emailed that could be used as handouts at each location prior to the each exchange.
- 6) Complete the lecture exchanges.
- 7) Evaluate value pedagogically and logistically. Several evaluation tools will be developed as the exchanges occur. The evaluation tools will be on two levels. First, was there value for the students at each location? What could be improved content wise? What could be improved during question and answer periods? What materials should and could be distributed prior to the exchange? After the exchange? Second, what technological enhancements would improve the delivery processes from the student's perspective? What enhancements would improve the delivery processes from the rhetorician's perspective? The latter two questions beg an additional discovery process relative to how to implement the insights.

### **Technology Requirements**

The technology requirements were based on two criteria: international availability and inexpensive. To that end, synchronous communication technology was selected specifically H.323 videoconferencing and Internet Relay Chat (IRC) technology.

H.323 videoconferencing provides real time communication suitable for the seminar style of the lecture series. With videoconferencing, students and instructors of the participating institutions can see each other and engage in discussion.

H.323 videoconferencing requires certain technology features on data networking, such as sufficient bandwidth and availability of TCP/IP ports. While the bandwidth requirement is usually below the bandwidth available to major institutions, it some times poses challenges if an institution has very limited Internet access. Therefore, several test links are performed to verify adequacy.

The major challenge is firewall configuration of each institution. By design, H.323 uses fixed TCP ports for call setup and follow control, but when it comes to determine the ports for data transfer, H.323 units at each end negotiate a set of acceptable data ports dynamically. Because these data ports can vary from one call to another, it is very difficult to configure a firewall at each institution's border to accept incoming and outgoing packets especially if the firewall technology relies on specific port configuration (compared with protocol friendly firewall technologies). Thus, a major component of test links is to see if the videoconferencing packets pass the firewall at each institution.

The IRC requires provides technical coordination during each lecture session and requires little bandwidth. Technical support person at each institution use the IRC to keep continuous communication in the background so that the instructors can focus on the content.

Initial steps involved technology baselining of equipment at all three universities through a series of emails. Once equipment availability was established, a video link conference was established. SUST, having undergone some major infrastructure changes associated with relocating to a new city, has not had the necessary stability of personnel and equipment to participate in a video conference at the time this paper was prepared. However, the ECU-CTU initial conference was conducted and the principle lecturers were able to “see” one another over a web-link. A phone conversation was conducted simultaneously between ECU and SUST. ECU faculty includes a graduate of SUST who has been instrumental in leading the SUST involvement.

### **Logistical Requirements**

During the initial video test conference, ECU, CTU and SUST laid out some fundamental logistical issues for proceedings. The students of all three universities would be exposed to an international lecturer via a web-streamed video conference. The class room exchange would take place with a 45 day period in the Spring, 2007 (exact dates are pending at that time of writing). Approximate meeting times were discussed with some recommendations by all. Post conference emails settled on an early morning US, mid-afternoon Czechoslovakia and early evening China time in order to accommodate all universities. These emails also provided a final review and acceptance of the project management lecture topics (Table 1) and order of lectures.

Table 1. Project Management Topical Responsibility

ECU	Leadership in Project Management
CTU	Project Management – Our Experience
SUST	Knowledge Management and Intellectual Property Challenges

The process of establishing the first video conference to discuss and resolve outstanding technological logistical issues provided an indication of the significant issues of cross-cultural engagement. The representatives from one university have been very quick to take the lead, another university’s representatives seemed relieved to defer to the leader but have on occasion been very decisive. The third university has had continued delays and has caused some consternation for the others due to their apparent lack of proactivity. These actions and responses seem to reflect available literature for international teams<sup>11</sup>.

### **Lessons Learned**

While this paper is only an initial report on the collaborative efforts of an international team of educators, still some lessons learned are apparent.

1. The project has demonstrated project like qualities that have been associated with international projects. There was hesitancy demonstrated by all the universities at the start of the project. ECU adopted a leadership role that seems to typify the expect project norm<sup>11</sup>.
2. Technological parity is required. All three universities are emailing each other however, the availability of web-streaming has not been demonstrated by SUST and therefore their

involvement has not been demonstrated. The SUST alumnus at ECU has made repeated inquiries as to their state of readiness with little satisfaction.

3. Cultures influence roles and demonstrated level of concern. While ECU and CTU have been continually emailing and interacting, the most often received communication from SUST is an auto reply to email (written in Chinese). ECU and CTU seem to be dedicated to making the international series a reality, SUST seems to be taking more of a lackadaisical approach.
4. Cultures influence time of work. It has been generally accepted that the mid-evening timing for the lectures to be received at SUST reasonable due to the work ethic of the Chinese populace.
5. The growing impetus for engineering students in the US to be exposed to international influences may be pushing the ECU staff more so than the international participants.
6. The project has provided an opportunity for educational collaboration and provided an opportunity for instructors at the three universities to experience and understand the international project issues first hand. These “lessons” are directly transferable to students as a mini-laboratory experience.
7. While SUST expressed interest in the project, the level of interest varied inversely with organizational level. The Dean was very interested but delegated responsibility to subordinates who demonstrated limited initiative and interest. Again similar to a risk-reward free international or domestic project.

The last video-conference test has been completed. This was a demonstration of the video link in the actual rooms to be used for the exchange. Unfortunately, only ECU and CVUT participated. SUST did not due to the Chinese New Year holiday. One of the open planning issues is for a student and faculty evaluation of the classroom exchanges. It is hoped that students from all three universities’ will gain an appreciation for their peers across borders. It may be that the insights learned from planning and development of the international classroom series could provide a valuable lesson in international project management.

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