Same Time Distance Learning

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ABSTRACT

This paper will describe the use of videoconferencing software to deliver synchronous, at the same time, distance learning graduate classes in a department at a major university. Adobe Acrobat Connect Professional allows the faculty to use a hybrid synchronous, interactive delivery model for this department's masters program. It allows the student to be seen and to be heard, as well as to see and hear what is going on at the host site. This delivery model is a hybrid because there are also students physically attending the class at the host site. Not only can the students attend class at home or at work, but the student can also attend classes while traveling. The paper will outline the technology, curriculum, and development of this online master's program.

KEYWORDS: Online learning, distance master's program, graduate education

Introduction

Distance learning is expanding in all areas of higher education.[1] Computer technology has expanded from the correspondence and live television courses to online web-base courses. It is now possible for anyone to acquire education from anywhere in the world. Research exists to show minimal differences in the effectiveness of online learning as compared to the brick and mortar / face-to-face traditional.[2, 3] The major needs for online programs have been shown to be convenience, access, and flexibility.[4, 5] In the area of construction management, persons currently working in industry can not afford to leave their jobs to become a full time student. There have not traditionally been large incentives for completing a master's degree in the construction industry, but conversation with industry exposed interest in a master of science (MS) program that would provide a way for experienced professionals to expand their knowledge.

Reacting to the needs of the industry, the Associated General Contractors (AGC) sent a request for proposal (RFP) to develop a master of science (MS) degree program related to construction management. AGC is a the leading national trade association with a mission statement to: "… serve our nation's construction professionals by promoting the skill, integrity and responsibility of those who build America."[6] The Building Construction Management (BCM) department at Purdue University took advantage of this opportunity to develop a MS program that would allow students to interact with faculty while maintaining their current residence and job. In return for the development of the program, AGC's support would be shown by strongly promoting the masters degree to all members.

Program Development

Research for the program was completed by reviewing some of the existing programs for higher education. One of the challenges of online learning is retaining the student; research has shown that the dropout rate remains high. [7,8] It was important to developers to build a program that would align with student success. There are four major categories considered for online courses (a) self-paced, independent study, (b) asynchronous interactive learning, (c) synchronous learning, and (d) a combination of online and in-person learning .[9] As a department, the need for graduate education is required to grow academia. There is a need in construction education to fill faculty positions; one goal of this program would be to spark interest in continuing on after the Master's degree to complete a PhD.

Therefore, a master in construction degree needs to be attractive to young constructors (those who have a minimum of five years experience, but might also jump into an academic type position later in life). The program needs to provide distance learning options or utilizes other unique delivery systems while limiting residency requirements (cutting cost for out of state tuition). Young constructors are also likely to have less fear of returning to academics, are receptive to the merits of continuing education, and understand that a graduate degree is becoming more important to their career; it could make them stand out above the others. The program must then provide the ability to be completed with minimal interference of work. They can not quit their jobs and attend school full time as a residential student. Many potential students may have important responsibilities, so it should not be during working hours.

The department's research revealed that technology existed to meet the needs of the young constructors. A team of faculty members met many times to construct the program. The program that was developed included the following:

1. Synchronous, interactive delivery was achieved with a software tool called Macromedia Breeze (now Adobe Acrobat Connect Professional). Synchronous distance education connects students and professors in real-time. The software allowed meeting participants to broadcast and to receive live video and audio using inexpensive webcams and headsets.
2. Classes were scheduled from 7:00 to 9:30 PM Eastern standard time.
3. Students were required to visit campus during the first week of each semester to connect with faculty and with each other and learn the technology
4. Utilization of Blackboard, the web-based course management tool.
5. A plan of study with two 3 credit course and a one credit seminar per semester so that the student can finish in five semesters or 21 months.
6. The student chooses to do the directed project or thesis option.

Specific course topics were developed from past graduate courses which had been offered in the department combined with research conducted during the development of the program. Courses were to be relevant and applicable to a wide range of backgrounds. A weekend master's program for general technology in the College of Technology was used as a guide for program management. The BCM program would utilize more online learning and less campus visits than the existing weekend program,. Emerging Construction Technology seminars are given during

the first week of the Spring semesters. Distance students visit the campus to complete the one credit seminar. Course topics include beginning technology, Adobe Connect Training, Blackboard training, library consultation, APA format training, and presentations of student progress. This time allows for the collaboration of students and faculty to discuss proposals, projects, and progress. Other course topics apply higher level thinking to issues common in the construction industry.

The BCM department also has M.S. and PhD students who take classes as residential students, living on the main campus. These students complete individualized plans of study that allows them to attend the classes in the distance program that meet their academic goals. They also take additional classes offered on the Purdue University campus that are related to their specific thesis or directed project topic. The hybrid aspect of the courses allows the residential students to attend the class online while sitting in a classroom together. These students work together with the online students in virtual breakout rooms assigned for interactive class exercises.

A sample plan of study shows a two-year plan for a typical online student. The program consists of five semesters, including one summer semester. Students may begin the program in the fall semester only. Spring and Fall semesters include 7 credit hours each, while the summer has only 5 credit hours. Additional credit hours of research credit are added if students are not complete at the end of the fifth semester. Residential students have varied plans determined by their research areas.

Semester One (fall of even years)
BCM 581A Preconstruction Project Management
BCM 581B Construction Quality and Productivity Improvement
BCM 581W Academic Writing 1(on campus)

Semester Two (spring of odd years)
BCM 581C Construction Operations, Management, and Strategy
BCM 581F Construction Accounting, Finance, and Marketing
BCM 581J Emerging Construction Technologies Seminar (on campus)

Semester Three (summer)
BCM 581H Analysis of Research in Construction
BCM 598 Directed MS Project

Semester Four (fall of odd years)
BCM 581D Construction Law and Change Management
BCM 581L Construction Management Training and Development
BCM 581V Academic Writing 2 (on campus)

Semester Five (spring of even years)
BCM 581G Risk Management in Construction Management
BCM 581E Construction Company Leadership
BCM 581J Emerging Construction Technologies Seminar (on campus)

Fourteen master's students enrolled for the fall 2006 semester. Each student returned for the spring 2007 semester, and three new students joined them. These first students were recruited through the publication of brochures which were distributed to alumni and corporate partners. We now have an online presentation that uses the technology utilized in class to serve as a live recruitment tool. This can be viewed at https://gomeet.itap.purdue.edu/p99173328/. Figure 1 shows a screen snapshot of that presentation. This recorded session allows the viewer to see and hear the instructor talking through the class. All classes can be recorded to be used in case of absences or for further discussion.

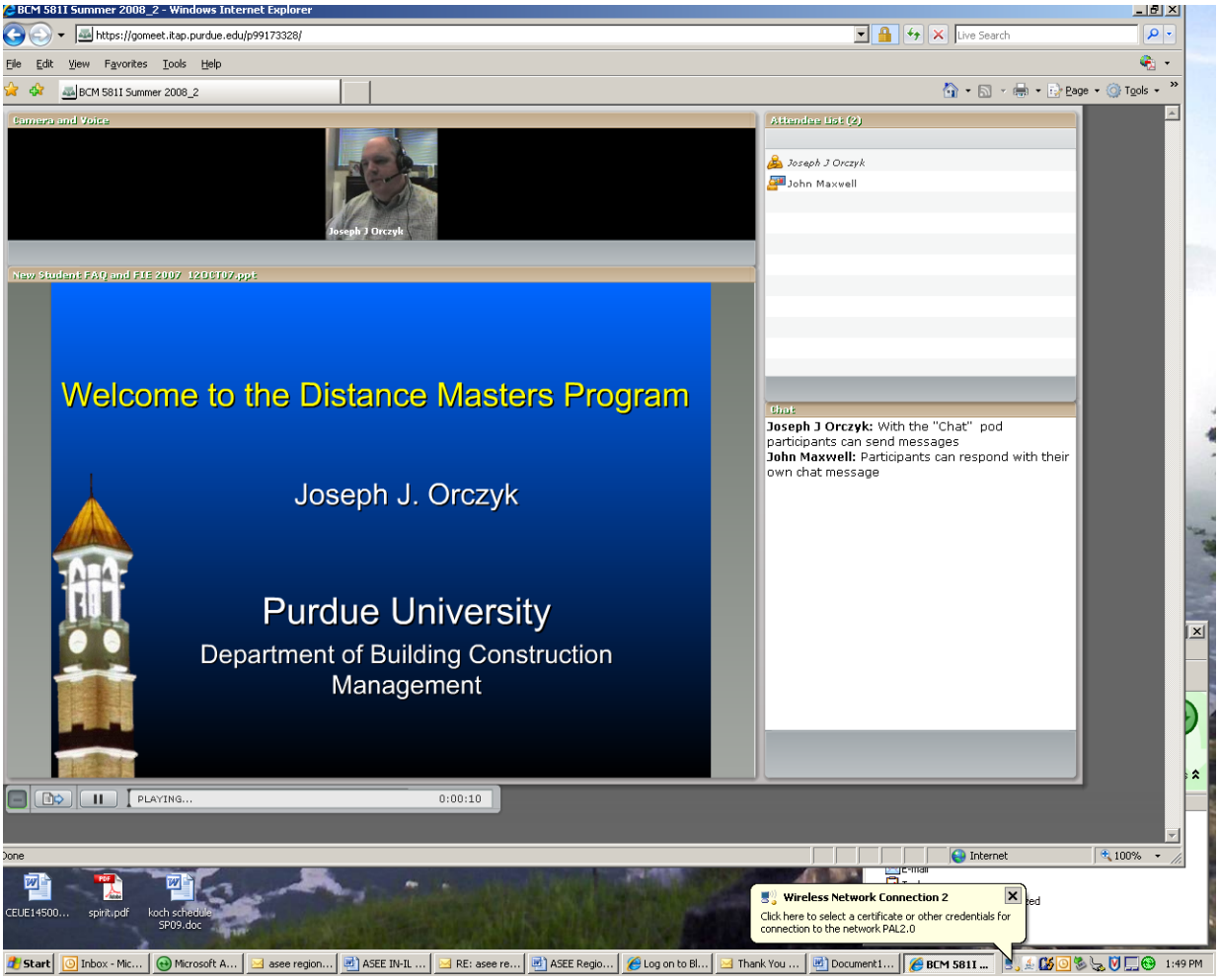

Figure 1: Screen shot online course review

Tools for teaching online

During the development and initial semesters of the program, Breeze, a product of Macromedia Inc., was utilized as a tool to connect to students via the internet. In December 2005 Adobe Systems acquired Macromedia. Breeze has since been renamed Adobe Acrobat Connect Professional (Connect). Connect is a Web communication system that lets instructors reach an audience anytime with engaging multimedia content. Currently, two of its system components,

Connect and Adobe Presenter, are available for use at this university. Because Connect is deployed using Adobe Flash Player, already installed on more than 98 percent of browsers, audiences can join Connect online meetings, courses, and presentations instantly. Connect can be used for distance learning, professional development, and collaboration.

Connect Professional is used for real-time meetings and seminars enriched with interactive presentations and discussion capabilities. It combines existing learning content with real-time interactivity between presenters and students for engaging collaborative teaching and learning experiences. Microsoft PowerPoint slides can be used to give a professional outline in real time, live and recorded video, Flash animations, live screen-sharing, audio, and two-way text chat to deliver more effective presentations. Adobe Presenter is a plug-in fully integrated with Microsoft PowerPoint that simplifies the creation and sharing of narrated, media-rich presentations. With Presenter dynamic presentations can be created to enhance courses directly from within PowerPoint.

The Connect meeting room is a series of "pods" which can be moved and resized. Pods include camera and voice, polls, chat, attendee list, whiteboard, notes, discussion notes, share, file share, and web links. A single room can actually have multiple screens with multiple pod layouts. Figure 1 shows the Camera and voice pod, presentation pod, attendees pod, and chat pod. The classes use a room with three layouts: presentation, discussion and collaboration. Each screen has its purpose. Most of the class work is done on the presentation screen. The discussion screen is used to facilitate classroom discussions. The collaboration screen includes a large whiteboard which the instructor can use like a chalkboard for drawing illustrations during class.

Managing the Connect classroom requires some multi-tasking by the professor. In addition to presenting a lecture with Microsoft PowerPoint, the instructor must also monitor the chat pod for student questions. While potentially daunting at first, this technique is not unlike monitoring the traditional classroom audience for raised hands. Not only can the students attend class at home or at work, but the student can also attend classes while traveling. One faculty member was able to participate in classes while traveling in China. The local time in China for the class was from 7 a.m. to 9:30 a.m. Another advantage of Adobe Acrobat Connect Professional for distance learning is that it is desktop-based. This means that using Adobe Flash technology; the desktop (or laptop) computers are connected directly to each other. The software allows students and faculty to broadcast and receive live video and audio using broadband internet access, a computer, an inexpensive webcam, and a hands-free headset/microphone. In addition to the classroom meeting room URL, each student has his or her own room URL in the Connect system. These rooms are used for breakout sessions during class and for student collaboration on projects and meetings outside of class. These rooms are available to the students 24 hours per day, seven days a week.

Blackboard is internet based course management software that all student are automatically a part of as a student at this university. It has been shown to be the most widely used course management software.[10] This software allows for posting announcements, distributing assignments, online assessment, submitting student work, grading, email, and other tools required for a class. At this location, students can log in and acquire the internet addresses (URL's) of the site of the class or personal space. Attachments are seldom used with e-mail

because many companies have firewalls that block some attachments. E-mail is used to notify the students of documents available on blackboard, for announcements, and for individual communications between a student and the professor. The telephone is also an appropriate technology for conversations and discussions between the students or between a student and the professor. While students can scan and e-mail written problems, assignments are also accepted via fax machine.

Program specifics

The program continues to grow; Table 1 shows enrollment statistics by region since the program's inception in August 2006. Figure #2 illustrates the division of the regions for the United States used in this analysis. The student admitted from England was an American citizen working for an American contractor. The planned enrollment is 24 for distance students plus a number of resident students commensurate with the number of assistantship available in the department. Once the curriculum was developed and teaching assistantships became available, resident students have also been drawn to the program.

Table 1:

Distance Masters program enrollment August 2006 – January 2009 by region

Admission Statistics by Region and Date

Region → / Start Date	Northeast	Southeast	Midwest	Mountain	Southwest	West	England (US Citizen)	Traditional - Resident	Total	Graduates (as of Dec 2009)
August 2006	1	3	4	1	0	2	0	2	13	5
January 2007	0	0	2	0	0	1	0	0	3	3
August 2007	3	0	3	1	0	0	0	4	11	--
August 2008	2	1	2	1	2	1	1	4	14	--
Totals	6	4	11	3	2	4	1	10	41	8

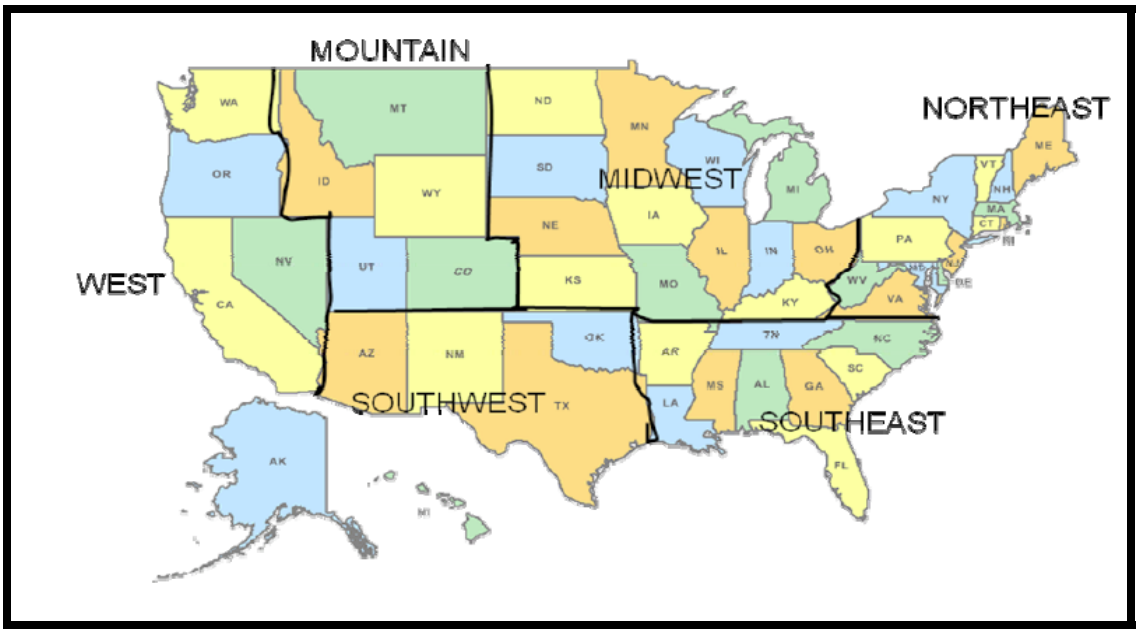

Figure 2: Regional split of United States.

As the program in being developed, new courses numbers are also being approved. At this university, the process has not yet been completed, so the letter designations have been used in with the TECH581 course and unique course descriptions have been developed for each. The department is also developing the final paperwork to formalize the program within the university. As a part of the requirements, assessment data is being collected related to the learning outcomes of the program.

Conclusions

This is a simple model for implementing a Master of Science degree. It not only has flexibility for industry, but also retains the rigor of academic standards. The adobe technology is easy to learn for instructors and for students. Although graduation rates have been slow in the first cohort, improvements have been put into place to assist in the success of the next groups. It was realized that stricter deadlines are required for the distance maters programs because their academic requirements do not always get first priority over their work requirements. New deadlines for proposal drafts have been given to the students to assist them in their success. A voluntary online discussion has also been added to collect student responses. This formative evaluation method is being used to continually improve the program. This program should be taken into consideration for other programs needing to extend into the industry at the graduate level.

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Biography

Daphene Cyr Koch, PhD, Is an assistant professor in the Building Construction Management Department in the College of Technology at Purdue University. She has over 10 years of industry experience that she utilizes in the classes that she teaches.

Joseph Orczyk, PhD is an associate professor and coordinator for graduate students in the Building Construction Management Department in the College of Technology at Purdue University. He has many years of industry and teaching experience that is integrated into the teaching environment.