Utilizing online learning for construction field supervisor training: Development, facilitation and assessment

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Abstract

Multiple jobsites and geographic regions in the United States and the world often make it difficult for industry to schedule training for employees. Another downfall is the expense of travel and time necessary to meet in one location. Virtual training via the internet has evolved and now provides real time collaboration between all participants no matter where they are located. This paper will describe the use of virtual training software to present synchronous distance learning program for construction field supervisors at a major university. Adobe Acrobat Connect Professional allows the faculty to use a hybrid synchronous, interactive delivery model for this certificate program. It allows the participant to be seen and to be heard, as well as to see and hear what is going on at the host site. The paper will outline the technology, curriculum, development, and evaluation of the first online Construction Site Supervisor Training Certificate program at Purdue University.

KEYWORDS: Online learning, field training, distance learning, virtual training

Introduction

Reacting to the input from the Building Construction Management (BCM) department advisory board at Purdue University, faculty members developed an online certificate program for field personnel. Past training for field supervisors had been done through training grants in which faculty would travel to the company to facilitate a training program. Due to the cost of travel, this would usually become a two day / sixteen hour training period where employees were paid and the faculty were paid travel, development, and facilitation costs. This could be cost between $15,000 and $20,000 for one company to train 15 field supervisors. As the state of the economy remains marginal, it seemed that a new model needed to be developed.

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Types of virtual training

The first full online learning course was complete in 1981 (Harasim, 2000). As the internet has allowed for access, research has shown that online-learning enhances student learning (Brewer, DeJonge, & Stout, 2001, & Hoffmann, 2002). Distance learning is expanding in all areas of higher education to create more opportunities for students (Allen & Seaman, 2007). The first computer technology has expanded from the correspondence courses of the 19th century to live television courses and now online web-based versions (Monolescu, Schifter, & Greenwood, 2004). It is now possible for anyone to acquire education from anywhere in the world. Research exists that shows minimal differences in the effectiveness of online learning as compared to the brick and mortar / face-to-face traditional methods of teaching. The major needs for online programs have been shown to be convenience, access, and flexibility (Devi, 2001; Ryan, 2001). In construction management, persons currently working in industry cannot be away from their jobs due to responsibilities onsite.

Research was conducted by reviewing some of the existing online programs. One of the challenges of online learning is retaining the student; research has also shown that the dropout rate remains high (Connolly, MacArthur, Stansfield, & McLellan, 2007; Levy, 2007). It was important for 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 learning, (c) synchronous learning, and (d) a combination of online and in-person learning (Bocchi, Eastman, & Swift, 2004). Table 1 outlines the relationship of each instructional method with time, location and interaction:

Table 1: Instruction Methods Comparison

Instructional Method	Location	Time	Interaction
Traditional Learning	Faculty and Student in same place	Meet at same time	One on one and group interaction
Self-paced, independent study	Faculty and Student not in same place	Meet only as necessary	One on one interaction with teacher as necessary
Asynchronous Learning	Faculty and Student not in same place	Interact at different times	One on one interaction with teacher as necessary
Synchronous Learning	Faculty and Student not in same place	Meet at same time	One on one and group interaction

The online training program must provide the ability to complete course requirements with minimal interference of work. In order to cut the costs related to travel and employee lost time on the jobsite, it was decided that the program needed to provide distance learning options.

The Adobe Connect Professional software tool, which was chosen for this training program, allows:

- Real Time interaction between faculty and class participants
- Interaction between all or part of the class participants
- No Travel to physical location of class
- Breakout Groups for small group discussions
- Polling ability to ask questions and display real time results
- Team Presentations where team members are at different locations
- Ability to record course discussions / lectures/ chat for review at later time or in case of missed class

Tools for teaching online

As early at 1916, curriculum theorists such as Dewey, believed that interaction was the defining moment of a student transforming knowledge into personal application and value (Dewey, 1916). The internet allows for this interaction to be accomplished in different methods. Figure 1 shows the relationship between interaction and the independence of time and distance.

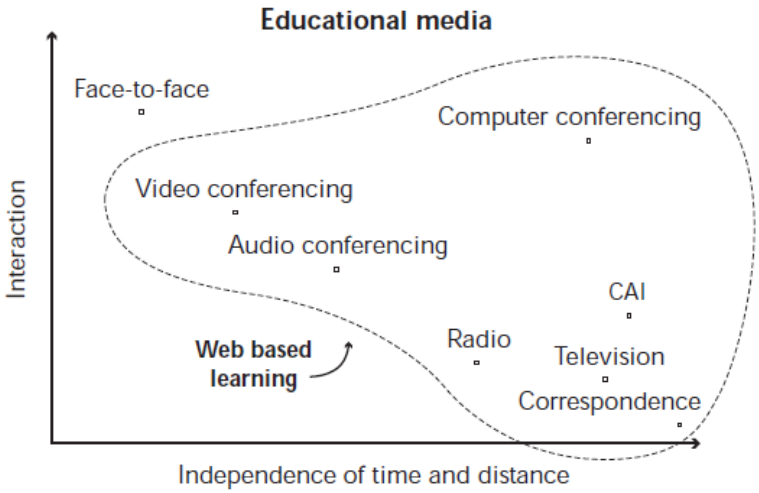

Figure 1: Relationship of Education Median with Interaction and Time and Distance (Anderson, 2004).

Adobe 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 (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 training courses directly from within PowerPoint.

The Connect meeting room is a series of “pods” which can be moved and resized by the instructor. 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 2 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 conducted 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.

Figure 2: Screen shot of Adobe Connect Professional Pod Layout Example

Managing the Connect classroom requires some multi-tasking by the instructor. 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 Costa Rica. Another advantage of Adobe 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 website (URL), each student has his or her own room adobe connect site (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 a day, seven days a week.

Case Study

The BCM program has a Construction Advisory Council (CAC) that meets twice a year to discuss different aspects of the construction industry and academic workshops. A part of this

meeting now includes breakout sessions to discuss industry needs and concerns. In 2009, a Field Training breakout group formed a task force made up of industry and BCM faculty representatives. Several proposed initiatives came from this group including:

- Further promote the role and career possibilities of the superintendent,
- training programs for existing site supervisors, and
- understanding demands of leadership on current field staff.

The feedback from this group helped outline the Construction Site Supervision Certificate (CSSC). The proposed courses were outlined and presented to the CAC in fall of 2010. It was received with an overwhelming response. The challenge then became how to deliver the 10 modules in an ever depreciating economy. Companies were limited in travel budgets and did not want to have the added burden of job site absences. The solution was to utilize a virtual classroom.

In 2006, the BCM department introduced a Distance Masters program utilizing Adobe Connect software. Implementing this program for the past four years had allowed the staff to become acquainted with the procedures and teaching styles required for virtual training. The CSSC program was developed with this delivery model and was established to allow workers to remain on site, at home, or at the office.

The program was developed into 10 modules. Module #1 was delivered live and in person on campus so participants could meet each other and establish relationships. The faculty also demonstrated the software and hardware requirements for the class. Classes 2-10 were all facilitated in Adobe Connect Professional on Monday evenings at 5pm (EST). The initial CSSC group of participants was predominately from Texas, Indiana, and Illinois. Some occasions required traveling participates to log in from as far as Costa Rica. The program was taught by three faculty members. Each course was assigned to a faculty member based on expertise and knowledge area. Adobe Connect allows for collaborative interaction as diagramed in Figure 3.

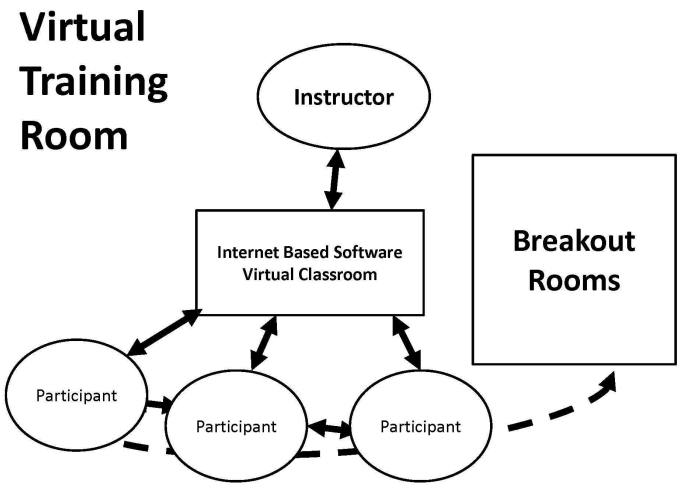

Figure 3: Virtual Training Room Schematic

There was initial skepticism by the participants as to the ability for a course to be taught in a Virtual Training Room. Many of the participants had less than 5 years of computer experience and were intimidated by the software. The initial on-site course put most concerns to rest when a simulation in the computer lab allowed them to see the ease and accessibility of the software. By the end of the second class participants were versed in using the system. Similar to in class training, students began to learn from one another. Each week participants were encouraged to share examples of job site situations that had happened and how they were handled. Participants became comfortable and active with sharing their ideas, photos, and examples via Adobe Connect during the class.

Upon completion of the modules, twenty of the twenty five students were able to attend the reception, dinner, and certificate ceremony. While the participants had only met in person once, they all greeted each other as old friends and peers. The ceremony allowed for verbal feedback and validation that the training was viewed as successful.

Virtual Training Post-Program Survey Results

A post-program evaluation was conducted on the initial group of CSSC students to provide feedback on issues related to the online course. Of the twenty-five participants, five responses (20 percent response rate) were returned. The following section presents the results from the post-program evaluation.

When asked if they would rather take the course online or travel to see the class in-person, all five respondents (100 percent) stated that they preferred taking the class via distance learning. Overall, they indicated that they would like to take online classes on Tuesdays (80 percent) and

Thursdays (20 percent) and that the 5-8 pm (60 percent) and 4-7pm (40 percent) time periods were preferred. Some of the students met with co-workers at the company's home office to participate in the class as a group. Some of these students shared computers in this group setting during class sessions, while others logged into the class on a separate computer. When asked if they thought the group setting was worth traveling to the main office versus taking to course from home/jobsite, two students (20 percent) strongly agreed it was worth the effort, two students (20 percent) indicated a neutral response, and one student didn't provide a response. Three students (60 percent) stated that the group setting was difficult to collaborate with other participants, while one student (20 percent) disagreed. When asked if they would prefer to have their own computer and headset, two students (40 percent) strongly agreed and two students (40 percent) agreed.

The results show that two students (40 percent) strongly agree and three students (60 percent) agree that taking the course with participants from other companies was valuable. Eighty percent (4 students) strongly agreed and twenty percent (one student) agreed that they enjoyed taking the course via distance learning. Eighty percent (4 students) strongly agreed and twenty percent (one student) agreed that they would recommend the CSSC program to others.

At the end of the course, each student received a framed certificate of completion during a closing reception. Eighty percent (4 students) strongly agreed and 20 percent (one student) agreed that the certificate meant a lot to them. One student (20 percent) strongly agreed and the remaining four students either agreed or remained neutral that the closing reception was worth attending.

Conclusions

This is a simple model for implementing an affordable field supervisor training program. It not only has flexibility to align with the needs of the construction industry, but also retains the rigor of academic standards with high level faculty. The Adobe Connect Professional technology is easy to learn for instructors and for participants. Although evaluations were small from the first cohort, improvements have been put into place to assist in the success of the next groups. This program should be taken into consideration for other programs needing to accommodate industry training at any level.

Future research has included formative evaluations throughout the training to allow the "students" to give input on their progress. More "homework" has been added to become learning outcomes that can become part of a summative evaluation for the company leaders that have sent employees to the training. Examples include weekly updates on what the field has used from training each week. This information can then be collected and submitted to the CAC board showing the outcomes and value for the training. Some companies now feel they have surplus funds to provide group training that may end in the development of the certificate in a face to face format.

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