Lessons Learned from Going Beyond Chalk

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1. Introduction

This paper examines the lessons learned from a distance learning project in the 1990's and how it laid the foundation for distance learning, which is currently being implemented within the College of Engineering and Computer Science, and more specifically the Engineering Technology department at the University of Central Florida. Technological advances continue to be based on the initial infrastructure developed with the Distance Learning Demonstration Project. In the late 1990's the state of Florida realized that the upcoming college-age population and the non-traditional adult learner were exceeding the limits of the bricks and mortar buildings of the state university system and offered grants to universities to explore distance learning. To address this increase in students, both traditional and nontraditional, within the state of Florida, Florida began to explore the use of distance learning technology. As a part of this process, the Florida State University System funded five demonstration projects in 1995 to explore the options of distance learning within the state. The proposal for the University of Central Florida's (UCF) Distance Learning Demonstration Project (DLDP) was funded in February 1995.

The three basic components of the infrastructure included: instructional resources for educational technology delivery that were designed as a paradigm change agent, faculty training, and plans for a learner support system. Although much is changed in the past ten years and distance education has achieved more acceptance, the teaching and learning strategies for an institution or a department within an institution remain the same. Technological advances continue to open opportunities.

2. Distance Education Infrastructure

Of the three basic components in the Demonstration Project the most used and the best done was a video series, *Beyond Chalk: Teaching with Technology* [1], which was used as the change agent for faculty. Today with the current trends in technology and the existence of so many distance education programs, a change agent is not as important, however, on a search of the web many institutions are still using the original video series. The purpose of the thirteen *Beyond Chalk* videos and resource manual besides being a vehicle for change advocacy was to create enthusiasm, and to energize faculty and staff about distance learning and instructional technology. The materials also demonstrated that distance learning and instructional technology can enhance the quality of instruction while improving access for a new or emerging population of adult learners. *Beyond Chalk* is designed for different types of audiences and for different types of presentation or delivery modes. It was anticipated that the materials be used in formal or informal professional development programs by faculty members in two year and four year colleges, by teachers in K-12 school systems, and by directors of corporate training.

Reach Out and Teach: Designing Distance Education [2], an eight video series and resource manual, is the next step in faculty development. This is an introduction to designing distance education courses and is written to help educators and trainers understand and apply the fundamentals of distance education and instructional design. *Reach Out and Teach* provides basic, straightforward guidance about instructional design and logistical considerations that must be addressed when designing a course for delivery at a distance. The purpose of *Reach Out and Teach* is to help educators analyze a traditional course to determine if it can be successfully delivered via distance education, and if so, to describe techniques that can be used in distance

education course design. The focus of *Reach Out and Teach* is on general distance education course design principles, independent of the particular delivery technology being used, although examples typically employ the popular video teletraining and Internet technologies. The authors' orientation is one in which the instruction is the most important element of the course design process, not the technology being used.

Thus the deliverables for training faculty were two video series, *Beyond Chalk* and *Reach Out and Teach: Designing Distance Education* (1998). Both of these series were originally licensed and distributed nationally by the Public Broadcasting System (PBS) and are now available free on the web (http://www.beyondchalk.cecs.ucf.edu). Faculty development involved identifying and training faculty in the member institutions. This was accomplished with project developed materials, specific programs held on the campuses of the members, and by the funding of the instructional technologists.

Instructional technologists at each campus assisted in the training of faculty, planning and coordination of distance education programs, program organization, and the launching of Internet services. Topics presented to faculty included multi-media, personal computer use, electronic mail, distance education, and the web.

Learner support was the third component of the project and is where continued work is needed. These topics need to remain seamless so that the content of classes remain as the faculty member's main focus. The physical learner support systems were identified as crucial to the success of a distance learning program and this was of prime importance to this system, which consisted of one university and the six community colleges in the Central Florida area serving the area in white shown in Fig. 1.

Fig. 1 Service area

The learner support group met frequently and communicated on a regular basis. Building learner support systems in seven institutions involved several tasks: identifying key resource people, surveying each institution, coordination of activities, and the development of a workshop for all involved. Guiding this effort was the idea that each school had information to share about their successes and information to learn from their neighbor. Organized, systematic learner support systems are necessary in successful distance learning programs. Learner support involves all systems that students, faculty and staff normally interact with in traditional instructional programs. This includes such items as computer support, the library, admissions, book store, advising, registration, financial aid, and student life activities.

Distance learning students may or may not be taking traditional as well as non-traditional courses. The learner may be involved in taking course work for college credit or they may use the knowledge for continuing education credits or for self-improvement. The guiding principle within the Demonstration Project's Learner Support group was to look at systems that would support learning at a distance. It was assumed that learners would be infrequent visitors to the traditional campus, or never coming on campus. They would, instead, visit the virtual campus on a frequent basis.

3. Upper Division Engineering Technology Need within the State

Specifically charged with the responsibility of addressing a particular niche in the engineering technology continuum by the State University System, the University of Central Florida Engineering Technology Department is the only public institution in the state of Florida to offer only upper-level engineering technology degree programs. (One other state institution, Florida A&M, offers a four year engineering technology degree program.)

The state has 28 community colleges and 20 offer the two-year technician degrees. The UCF Engineering Technology program has articulation agreements with these schools that will enable the students to make a transparent seamless transition to an upper division institution and receive a bachelor's degree in engineering technology while remaining in their current location. (Although this program is initially designed for students within Florida, inquiries have come from Alaska to England and students in Louisiana, military in Iraq, and North Carolina have been enrolled.) The engineering technology departments of the Florida community colleges and the UCF Department of Engineering Technology have formed an alliance allowing students to complete both associate's and bachelor's degrees while remaining in their local community. Emerging communication technologies (electronic mail, WebCT, and the Internet) offer enhancements to the current educators' delivery system. Efforts by the Engineering Technology department have been made to utilize these technologies and enhance the quality and effectiveness of the system to serve the engineering technology students of Florida, who have been unserved for the past few years. A major part of the target audience then is the non-traditional adult learner. These students have usually been out of school for a period of time and are place bound by occupations, geography, military service, or families. As a result of serving these adult learners, all learners will also benefit.

4. Current Distance Learning Delivery System

Distance education, as defined within engineering, consists of video and written material. Over the past 25 years the model for delivering lectures at a distance has remained essentially the same within engineering. Instructors utilized specialized classrooms equipped with video cameras and other recording equipment to create a video documentation of the face-to-face classroom experience. However, as technology changed in the last few decades the recording medium and delivery methods have also changed.

Initially, lectures were recorded and stored on VHS tapes. These were then hand delivered across the state. This early solution worked well and offered higher than television broadcast resolution at the time (640 x 480 pixel resolution). Lectures were available at branch campuses within a few days of the lecture recording.

In the late 90's, the Internet and the use of the World-Wide-Web (WWW) was widely accepted as a means of accessing information including college lectures. In the late, 90's the medium for lecture distribution was changed from VHS tape to the Internet using digitally encoded videos. These videos were accessed from a common college website and were available to all students without authentication. This medium of delivery greatly reduced the delay for distance students from a few days to a few hours after the lecture was recorded as shown in Fig. 2. However, the resolution of the videos remained at the standard size of 640 x 480. In 2000, this resolution was already being surpassed by DVD and other digitally available content on the Internet.

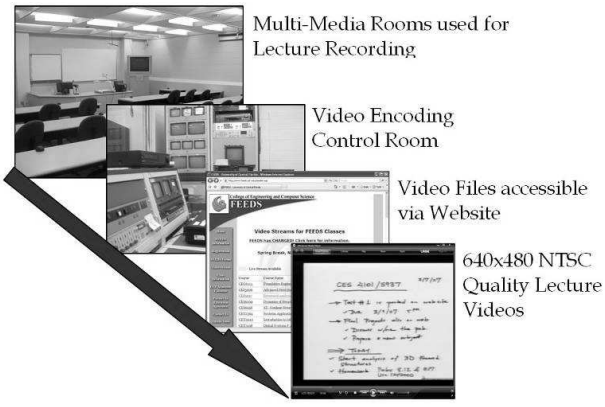

Fig. 2. Recording and distribution flow diagram

In 2006, the College of Engineering and Computer Science made a significant technology upgrade of the existing recording hardware and software used for recording lectures. This change was possible because the speed of computers for certain applications, such as video recording, began to surpass that of expensive hardware. The out-dated video recording hardware was removed and a software based lecture recording solution

was purchased and implemented. The current recording hardware and streaming video delivery is pictured in Fig. 3. The medium for delivery of the new system still utilizes the Internet but the quality of the content is greatly enhanced. Resolution is now limited only by the instructor's choice of computer desktop resolution and can be high-definition (1920 x 1080) if required.

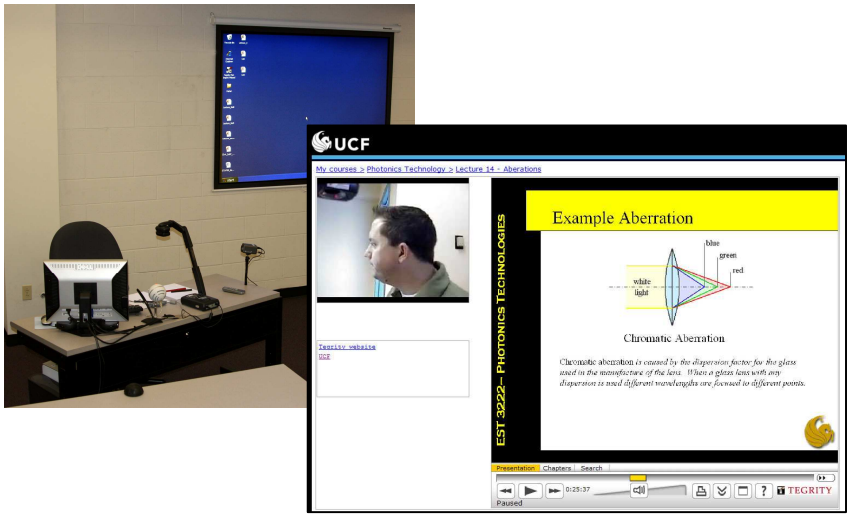

Fig. 3. Current recording hardware and streaming video delivery

Although the medium for lecture video delivery has changed it is important to note that the essential elements of instruction have not. Instructors lecture using digital white boards or document cameras. This information is captured as it is presented on the instructor's computer. However, the use of digital slides or Power Point® slides has increased in the last decade.

Historically, engineering instructors prefer to use handwritten material generated as the lecture unfolds. Many see this as a fundamental method of teaching engineering related problems such as formulaic derivations. However, in the past few years handwritten lecturing has been replaced by slides completely in 45% of the UCF engineering courses. In Engineering Technology specifically, the use of digital slides is the preferred method of instruction. At this time, 62% use digital slides, 30% use some slides, and 8% use only the document camera [3].

With the advances in recording software many new tools are available for students and instructors. The new recording software creates an enhanced video recording of the classroom experience. Along with the video of the instructor and the instructional material displayed on their computer, additional information is recorded. All typed text is automatically captured from the computer and used to generate a searchable database. This allows students to locate vital information in any lecture using a search tool inherent in the video viewing application.

Instructors also have new available sign-ons to the new software system. The most important of these is the ability to generate viewing reports. This provides feedback on which students have watched the recorded lectures, for how long, and how many times. This can be used to access the clarity of particular lectures and allow instructors to gain valuable feedback for future lectures.

5. Lessons Learned

The enhanced recording software was launched with approximately 90 engineering and engineering technology faculty teaching 120 courses to 2300 students. The use of the new software was a drastic change for both faculty and students. As with most implementations of this magnitude there were successes and problems both

technically and in how the software was used. In this section, we will outline the major lessons that we learned and present our solutions.

Training

In our experience, everyone desires more training but is reluctant to spend the time to be trained. The week before the launch of the new recording software we held a one hour training session for faculty. This session was repeated on three successive days. A majority of the faculty attended this training. However, the training was only an overview of the new software and a presentation of how the software was used by the instructor. What we learned was that a hands-on training session would have been more beneficial for the attendees. Unfortunately, this would have been difficult to achieve since only six computers were used for lecture recording. We decided to solve this problem by encouraging faculty to be available 10-15 minutes before their first lecture recording. Training staff met faculty in each classroom and gave them hands-on instruction on the same system they would be using for their lecture. This short amount of time proved to be extremely valuable. A majority of the faculty felt comfortable with the system after a few minutes of training. Additional, questions were answered by training staff during the next several weeks of the semester.

Communication to Students

The faculty were notified before the semester that the new software was to be implemented in the coming semester. Unfortunately, the students were not notified of the change in how the lectures would be viewed. Their ability to quickly adapt to the new lecture viewing software was over estimated. Although the new software was simple to use, similar to watching any video available on the Internet, some students had difficulties. The primary problem was Internet browser software versions and toolbar add-ons. The viewing software produces a new browser window when a lecture is viewed. Browser toolbar add-ons that block this type of software operation caused a problem with many students. We solved this problem using several approaches. First, an Internet forum was created to answer viewing problems. This proved to be minimally useful as many students chose to use the forum to voice their negative feelings about the change. Second, we sent email to all of the students. This was moderately successful because many students ignored the email or had provided an incorrect address to the university. Third, we fielded hundreds of telephone calls and provided telephone support. This was immensely successful but manpower intensive. Unfortunately, the majority of problems were very simple but required numerous detailed steps to navigate on the telephone.

Training Videos

Another method we used to disseminate information was using short (1-3 minute) training videos. Approximately 15 videos were recorded to help both students and faculty use various feature of the new software. The lesson we learned from this was although the videos were short and useful, very few people took the time to watch them. Most of the training on the feature use of the software took place in-person or by telephone.

College Level Staff

As is the case with many universities we have a limited budget for all things. Students were hired to cover the technical support staff during operational hours (approximately 60 hours). Just enough students were employed so that one student was available at all times. The lesson we learned is that when problems arise they usually occur in pairs and in different locations. Even though staff was always available, faculty often visited the technical support office to find it unmanned. This was primarily because the student was in another location helping another instructor. We solved this problem by using an Internet service that accepts calls and routes them to several numbers (Google Grandcentral). This allowed each student to enter their cell phone into call list. The all inclusive support telephone number was posted in each recording room. This solution has worked very well for satisfying support needs and is still used today.

Engineering Technology Department Level Staff

Support personnel are the glue that hold the distance education process together. Once the potential students learn about the distance education program inquiries begin. Since distance education degree or certificate programs in most institutions are departmental, rather than institutional, the department has an additional role.

These inquiries may be made by e-mail, telephone, or letter. A process must be in place to handle these inquiries in a timely fashion and a person to do it. The method of response to each type of inquiry will vary according to the method of inquiry. Since these students will be using the Internet for their education, a postcard or a web paragraph may be used. Initially, students need to know the admission deadlines, when the semester begins, how to register for classes, and how many courses do they need to take for a degree. To follow through with these inquiries a database on the department web site needs to be set in place with the name, address, e-mail address, date of contact, and comments. This database will allow for follow-up by the department. This web site must be continuously kept up to date.

Testing is a dilemma for distance education. Online testing may be used, or if the students are not very distant, they may be required to come to campus for the exams. Proctors are used by many programs and academic honesty may be easier to achieve with the proctors. The names of the proctors and the sending of the exams is handled by the support personnel of the department.

Slide Formatting

A set of slide formatting guidelines has been developed from our experience in recording lectures. Although the new system has the ability to adequately resolve text down to 8-point font size, many of the faculty do not follow our suggested formatting guidelines. Besides font size, we suggest that instructors minimize the amount of text used on each slide. Font sizes should be 44-point for titles, and 36-point for body text, using 36-point minimizes the amount of text. In addition, figures should be simplified and should also adhere to the 18-point font size recommendation. The guidelines have been made available but our experience is that it is difficult to change an instructor's personal format style.

Communication

This lesson seems obvious but the solution that we found successful was unexpected. We found email to be minimally useful for communication updates, changes, and other information. Numerous emails are often ignored while long emails are often not read completely. An Real-Simple Syndication (RSS) news feed was created to make announcements about the new software. This RSS feed was also supplied on the college distance learning website. After several weeks the number of subscribers suggested that this was not a viable solution to our communication problem. The method that seemed to work the best was signs. Colorful and simply worded signs were posted directly on the recording computers and in the classrooms. These signs communicated usage instructions, change notifications, and recording setting information. We found that many of the instructors utilized the information conveyed on the signs immediately. In addition, after a few weeks new signs were printed in new configurations to encourage re-reading of the information. This provided a useful method for communicating to the faculty.

In general, we learned that even in this day of being surrounded by numerous high-tech solutions, the old fashion methods worked best - primarily telephone support and colorful signs. We suggest that the cost of a telephone help desk be considered when implementing any new technology on a wide-scale.

6. Conclusion

The commitment to distance education culture at the University of Central Florida continues today as new technologies are applied to traditional concepts. The Distance Learning Demonstration Project had a history of success and has created a strong foundation for what is now an exponentially growing part of higher learning. At the University of Central Florida in the College of Engineering and Computer Science we have seen an increase in instructors choosing digital lecturing tools rather than traditional instruction. Additional tools available to students such as searching capabilities are just a glimpse into a future filled with new technologies. Distance Learning based on traditional instruction while utilizing new technologies was the goal of the DLDP and we believe success has been achieved in our College and specifically, the Engineering Technology department at UCF.

REFERENCES

[1] Video series and Manual. Central Florida Consortium of Higher Education. 1997.
[2] Video series and Manual. Central Florida Consortium of Higher Education. 1998.
[3] Data collected for 100 online UCF engineering courses from August-October 2007.