

Multimedia and Electronic Means to Enhance Teaching Effectiveness and Delivery to On-Campus and Off-Campus Students

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Abstract

There are many remote areas around the world that need effective educational delivery systems. These remote sites can consist of a single individual, a whole classroom, or a corporate training center. Existing delivery methods are the Internet and the World Wide Web (WWW), emails, hardcopy documents, disks, CD's, teleconferencing and desktop videoconferencing, and mailed videotapes or audiotaped classes to off-campus students. This paper presents existing educational delivery methods by various institutions for delivery of course material to both on-campus and off-campus students.

Introduction

Florida Engineering Educational Delivery System (FEEDS) is an excellent example of offering off-campus engineering courses throughout Florida to those full-time engineers employed by government, industry and private consulting companies. FEEDS was developed in response to the needs of engineering graduates working in industry for access to quality programs and extended studies in engineering (1). FEEDS courses are offered by many Florida universities, including University of Florida (UF) and University of Central Florida (UCF). In these institutions, FEEDS courses are held in special studio classrooms equipped with televisions, ELMO (an electronic projector for pictures, newspaper slips, or any written material), electronically connected slide projectors and computer facilities projecting any software such as PowerPoint presentations. The setup is such that there is a live audience (students) in the classroom, and other students at remote sites receive the lecture through FEEDS, or live television transmission. Students receiving lectures through live television transmission are able to see the on-campus class and the instructor, and they interact with both by audiofeed. The remaining students receive videotaped classes by expressmail (2).

The primary delivery mode at the University of Florida is videotape delivery. The instructor's lecture and in-class discussions are recorded on videotapes (VHS) and shipped along with the course handouts on a daily basis via courier; course homework and examinations are returned via express mail, e-mail or fax. Moreover, new course delivery modes are being used in addition to videotape delivery. Selected courses are now available using two-way telephone line-based compressed video (or videoconferencing) technology, and via computer-based technology through the Internet or World Wide Web (WWW) (1).

The course syllabus, handouts, and all course material are regularly delivered through FEEDS to off-campus students. The same textbooks are used by both on-campus and off-campus students, and it is the responsibility of off-campus students to contact university bookstores and order a text copy. The educational standard, course content, homework assignments, and tests are kept the same, and the instructors' expectations from off-campus students

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are the same as that of on-campus students.

The Internet is becoming an attractive tool to many instructors. For example, instructors can incorporate their prepared lecture notes into the Internet for students to obtain access under the designated course. The instructor can also provide the copy of a course class notes in the college bookstore or through student chapter organizations for a minimum purchase price. The instructor can also deliver his class notes through e-mail to students or through the Internet for students to access the class notes. The author uses all methods above and delivers all of his graduate and undergraduate classes through FEEDS and the Internet. He also communicates with his students through e-mail for homework, questions, his teaching performance, and questions on students learning.

Christensen and Barnett at UCF developed an Internet home page for students to access syllabus, frequently asked questions, grading policies, assignments, handouts, lecture notes, practice exams, helpful hints, and list of links to WWW resources pertinent to the course guides. They have also compared the final grade of off-campus to on-campus students and grades were almost the same: This is an indication of equal amounts of learning (2).

Application of multimedia for course delivery

The application of multimedia expedites the course delivery, which allows time to interact with students and opportunity to hear what they say, question-answer sessions and also for them to see what is said in class. Ferguson used multimedia resources through example problems to illustrate complex engineering concepts and mathematical equations (1). He used examples with sine and cosine series by computer graphical presentation depicting complex vibro-acoustic measurements and plate theory. He used a multimedia environment which allowed the whole class, including those involved in distance learning to observe how an interactive environment enhanced learning (4).

The need for students' active participation as opposed to their passive attendance is the basis for cooperative learning. In an analysis of 120 studies of cooperative and competitive learning, it was found that cooperative learning promoted greater individual achievement (3). Todd lectured on new material in each of her classes, but all of the in-class problem solving was performed by the students. The students were assigned to teams of three, and much of their cooperative experience was to take place outside of class as they worked on assigned problems together (3). This process will work if team members are self-disciplined and when they solve the problem in the class, they should be able to create interaction with students and be able to demonstrate all issues related to the assigned problem. The instructor must also participate in the process to improve the class understanding of the problem and he/she must dramatize key points in the problem to stimulate student interest.

Todd's plan was to answer questions related to homework and lecture on new material. She then formed teams of three or four students in the classroom and assigned a problem for the students to work on until the end of the class period (3). This method is interesting as long as both instructor and the graduate assistant are working and observing team members' progress and answering any questions they may have. This arrangement may not work in a distance learning environment. However, if such arrangements are through the live interactive video transmission, the instructor can see and hear all of the students at both sites all of the time on television monitors. Students can interact with the instructor, ask any question and receive immediate responses. Many campuses are operating this way and constantly improving their existing systems. Future technology of such systems can be enhanced and instructors can allot time in their office hours to interact with off-campus and on-campus students on their office PC monitors to make sure that students receive their answers for any questions that they may have. This arrangement may even provide opportunity for those on-campus students who can not attend the class for some reason or other to still participate and receive class lectures through their personal PC connected to the system. In combining cooperative and distance learning through intercampus telecommunication, Todd found the methods very useful, but she believes the process requires additional innovation for a more successful outcome (3).

Distance learning through the personal computer is also important for busy executives who need continuing education to meet ever changing global market competition. Every year, more adults are pursuing formal education programs in spite of full-time employment, marriage, childrearing, and community activity. Some seek degrees, having only limited access to institutional resources because of remoteness or schedule conflicts (5).

The authors developed 226 pages of class notes for the course Construction Method and Management for undergraduate senior civil engineering students. The material is written in a HTML-based Internet format and is available for students to access. The material is constantly updated and incorporated into the Internet. The HTML-based Internet is very efficient and increases the productivity and effectiveness of the multimedia educational material. The instructor's classroom setup is such that he connects to the Internet immediately upon his arrival to the class and the material is projected on a large screen like a PowerPoint presentation that highlights the important aspects of his lectures which enables him to retain the attention-span of students and use his time effectively for the question and answers sessions. He opens the dialog with his students on class issues to serve and to stimulate student interest, improve student understanding of course material, and dramatize key points.

Conclusion

Multimedia and electronic communication are effective tools to enhance teaching effectiveness to off-campus and on-campus students. The utilization of FEEDS in Florida and the world wide web-based educational approach for course development and distribution are encouraging educational steps. The HTML-based Internet applications are effective tools that can be used by both on-campus and off-campus students. The utilization of educational delivery through the World Wide Web is the right step. Putting the material on CD's to be delivered to remote areas is also effective. Teaching/learning is a continuous process, and one needs to be very creative and must use innovative practices in course design. Computer technology must be enhanced to the point that video-conferences are offered economically to remote areas where a PC can be connected to any classroom setup and individuals could receive and interact constantly with both the instructors and live audiences. Utilization of fiber optic and sound and visual chips installed in PC's can expedite the educational delivery system. It is envisioned that in the next decade there will be a significant expansion of distance learning education at a global level. People will learn at their own pace without having to relocate. They will take courses at their homes or offices having full interaction with instructors and students.

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