Abstract

These case studies will examine successful and unsuccessful interactive learning techniques used with taped Engineering Technology at a Distance courses. The integration of tape-based course content with multimedia includes electronic mail, scavenger hunts, Web discussion groups, the Delphi Method, and virtual teams.

Introduction

The rapid development, application, and sophistication of technology have added substantially to the quality of life and productivity in our society. The benefits of advanced technology, however, have not come without its educational and corporate costs. Specifically, today’s engineering technology graduates will become more quickly obsolete than their earlier counterparts, while corporate demand for increased productivity all but eliminates off site education possibilities for technical personnel. Within this context traditional approaches to engineering technology education must be expanded to those who need it.

In this last decade higher education has undergone many changes, but a significant change has been in the increased use of technology. Now faculty on many campuses delivers instruction with the use of technology rather than the traditional lecture approach. Education at a distance is one of the ways technology is used. There are a wide variety of Distance Education approaches. This continuum ranges from the paper-based correspondence courses to the more technical approaches as two-way video/two way audio real time courses.

The Engineering Technology at a Distance program at the University of Central Florida gives students an opportunity to complete upper level courses in engineering technology and obtain a Bachelor of Science at a distance. This program, which is offered with FEEDS (Florida Engineering Education Delivery System) support is a degree program designed for students who have completed either an Associate of Arts Degree, an Associate of Science Degree, or the equivalent. The target audience is the student, who is not able to or will not travel to campus.

Specifically charged with the responsibility of addressing a particular niche in the engineering technology continuum, the 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 upper level engineering technology, but concentrates on a four year degree program.) The state has 26 community colleges offering the two-year technician degrees. The UCF program has articulation agreements with these schools for the students to continue and receive a bachelor’s degree in engineering technology.

The Bachelor of Science degree in Engineering Technology (BSET), Operations concentration,
Session 3147

is the initial program being offered at a distance and it provides an orientation for professional careers in technical management and operations in the manufacturing, sales, service and construction industries. Through the selection of the upper-level technical concentration, students can tailor their program, based on previous knowledge, to assist them in launching a career that best meets their needs and aspirations. Projects in cooperation with local industry, solving real-world problems, are required of all students in the BSET program.

Since the fall of 1990 Engineering Technology has offered courses utilizing the videotape lecture successfully demonstrated by the FEEDS system. Primarily using UCF campus and community college locations, this system allows for maximum viewing freedom of the course material via tape without geographic or work schedule constraints. Emerging communication technologies (electronic mail, web forums, and the World Wide Web) offer enhancements to the current educators’ delivery system. Efforts by the Engineering Technology department are now underway to utilize these technologies and enhance the quality and effectiveness of the system.

Program Description

The goal of Engineering Technology at a Distance is to deliver engineering technology programs to students any place and any time. Distance learning needs to be student centered, self paced and flexible as to the time and place it is available. This paper examines a variety of multi-media strategies for class interaction within distance learning.

Curriculum with Interaction

Every Florida public institution has access to some technologies appropriate for delivery of distance learning and the one technology commonly used within the state is the use of video tapes. The courses previously offered have been the ones that are the easiest to deliver on tape and have not considered the need for a complete degree program at a distance.

The FEEDS model is presenting course content on tape. Classes are taped in front of a live audience and the tapes are distributed to designated remote sites, usually within 72 hours. An on-site coordinator handles tapes, handouts, and proctors examinations.

These courses are delivered in an asynchronous manner, which gives the convenience of students being able to work when and where they wish and the students can also control somewhat the pacing of instruction. Traditionally in the FEEDS model interaction between teacher and student has not been considered. Yet interaction is considered to be the key to effective learning and information exchange. Some of the interaction techniques now included with the course materials are:

- Electronic mail
- World Wide Web
- Scavenger hunt
- Delphi Process
- Virtual teams
- World Wide Web Forum discussions
Research has shown that these distance techniques have little gender bias, which is often a part of gender-related behavior patterns in the classroom. This is important within Engineering Technology since the percentage of women receiving bachelor’s degrees is half (9%) of the number of women receiving bachelor’s degrees in engineering (18%). These interactive techniques will also benefit the learning of all students.

**Interaction activities**
All the different interaction activities within a course contribute a given percentage to the final course grade. This encourages students to participate. The activities listed are more suitable for some courses than others.

**Electronic Mail**
Each student at UCF is given an electronic mail account, yet many students use a commercial provider. Electronic mail is important in the class for professor to student, student to professor, and student to student communications. This is the backbone for interaction. These electronic conversations have advantages over typical classroom discussions since responses can be considered and carefully articulated.

**World Wide Web**
Each course has a web site with the syllabus, class notes, special assignments, and homework answers. This site helps eliminate the need for handouts. The sites are set up before the semester begins and are updated on a regular basis. The web becomes a site, in addition to the video content, for professor to student interaction.

**Scavenger Hunt**
The scavenger hunt is held in the first month of the semester to get students used to electronic mail and the World Wide Web. It is presented by electronic mail and students are asked to check out electronic addresses, send mail, and access the resources on the Web which pertain to their particular course. This assists the student to demonstrate to themselves and the professor their proficiency with these techniques and assists them with later projects. All responses are returned only to the professor.

**Delphi Process**
Within this process the instructor becomes the Delphi coordinator and all the members of the class are the participants. The questionnaires are submitted via electronic mail to the class as an expert panel, and each class member submits their response back to the instructor alone. Based on the results of the first questionnaire, a second questionnaire is sent to the students and then returned to the professor for analysis. Based on the two (or more) questionnaires a decision can usually be made. The key to this technique is the formulation of the original question.

**Virtual Teams**
All the students in the class are divided into virtual teams of approximately four students per team. The basic elements of the virtual team process include:

1. Communication
   - Give the team a name.
• Develop list of key players, and contact information.
• Develop a clear statement of purpose. (Even when the team receives its purpose from the professor, a team must interpret and express it in its own terms.)
• Set up delivery dates.
• Select a leader for each phase of the project

This level of detail might be all that is needed. It is not wise to burden a short and simple project with a few members with unnecessary planning.

2. Planning
• Agree on tasks.
• Clarify responsibility within the group and identify leaders for the tasks.
• Create a plan for what kind of technology you will be using within and without the group.

3. Managing
This is the action phase.
• Review your process and create a model for the control of the various tasks.
• Review technological tools, and organizational system.

World Wide Web Forum
At the course site on the web there is a Forum, which is used for team reports and comments to the reports, as well as for general student comments. These comments are available for all class members. Within these Forum discussions there is the ability to include references to other web sites. The Forum is also used by the instructor to enhance different lectures with further research materials.

Conclusion

Although interaction within a Distance Education course is more time consuming to prepare than in the traditional classroom, it is a worthwhile process. Students participating in these different interactions become active participants, rather than passive learners. This process is very important to the success rate of the students.

References


2. Martin, B., Moskal, P., Foshee, N., and Morse, L., “So You Want to Develop a Distance Education Course?” ASEE Prism (February 1997), pp. 18-22.
Biographical Information

LUCY C. MORSE

Dr. Lucy C. Morse is an Industrial Engineer serving as a professor in the Engineering Technology department of the University of Central Florida. In that capacity, she is the Director of Engineering Technology at a Distance, a program to deliver B.S.E.T degrees at a distance. She was the project manager and the principal investigator of the Central Florida Consortium of Higher Education Distance Learning Demonstration Project. Previously, she was the program manager in the engineering department of the National Science Foundation. Her major areas of interest and expertise are project management, quality management, economic analysis, and distance education.