

Using the Internet for an Engineering Management Course

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Abstract

Since the fall of 1990 Engineering Technology at the University of Central Florida has offered courses utilizing the videotape lecture successfully demonstrated by the FEEDS (Florida Engineering Education Delivery System) 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. 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

The basic technical management course has been using these technologies as additional resources. The textbook used for this particular course is Daniel Babcock's *Managing Engineering and Technology*, although the resources and techniques may be used for a variety of management courses. This paper presents resources and tools that may be used to enhance the management functions, product life, and personal management discussions. Since the resources are not static, the web listings will give a starting place for future explorations.

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 education must be expanded to those who need it.

In the last few years higher education has undergone many changes, but a significant change has been in the increased use of technology. Education at a distance is one of the ways technology is used, and enhancing the traditional lecture is another.

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Program Description

Curriculum with Interaction

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.

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Interaction activities

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

World Wide Web

The management course has a web site (<http://www-ent.engr.ucf.edu/classes/1998-1999/spring/eti4635/index.htm>) with links to:

- Course Outline
- Class Notes
- Forum
- Projects

This site eliminates the need for handouts. The site is set up before the semester begins and updated on a regular basis. The course outline contains the syllabus and advance organizer. The syllabus is available on the web prior to the beginning of the semester and helps assist the students examine the content and timetable of the course.

The advance organizer is an outline that shows the relationships the concepts to be presented in the course, or an ideological scaffolding for the course. With the advance organizer the student is able to see how the subject matter is to be presented. This approach allows the professor to organize and present what is to be learned in the course and demonstrates to the students how the course is organized. The advance organizer model is designed to strengthen students' own cognitive structure.²

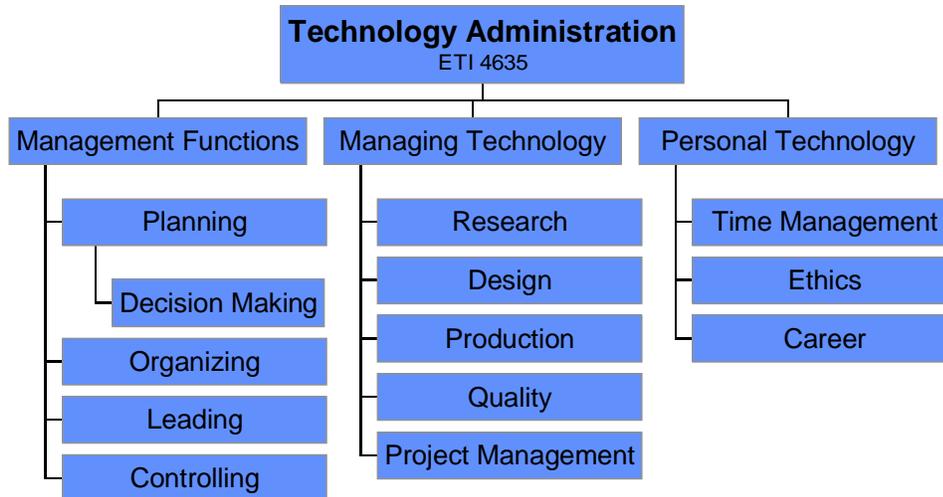


Figure 1. Advance Organizer

The class notes contain all the PowerPoint slides that are used in the class for each chapter and for outside speakers. Students are encouraged to download these slides and use them for notetaking. Originally the notes were not password protected as a measure to encourage other faculty to do the same. They are now copyrighted and protected.

The Forum used at the University of Central Florida is WebCT. WebCT is a tool that facilitates the creation of sophisticated World Wide Web-based educational environments by non-technical users. Aside from facilitating the organization of course material on the web, WebCT also provides a wide variety of tools and features that can be added to a course. The main use of the Forum in the management class is for class discussion. This includes team reports and comments to the reports, as well as for general student discussion and comments. These comments are available for all class members. It gives professor to student, student to professor, and student to student communication opportunities. This is the backbone for interaction. These electronic conversations have the advantage over typical classroom discussions since responses can be considered and carefully articulated. 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 web links to sights pertinent to each chapter.

Information on the projects for the class can be listed in a timely fashion during the semester. Since this listing is on the web, references or explanations can be linked to other sources. For team projects all the students in the class are divided into virtual teams of approximately three to five students per team. The basic elements of the virtual team process include:³

- 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
- Clarify responsibility within the group and identify leaders for the tasks.
- Create a plan for the type of technology each team will be using within and without the group.

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

Exercises

The scavenger hunt is held in the first month of the semester to get students used to electronic mail and the World Wide Web. (For some classes this is an unnecessary exercise. It depends on where the student is on Internet competency.) 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.

Within the Forecasting chapter the Delphi process is used as an example of forecasting. The use of electronic mail makes this a real-life example. 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 electronically 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.

Conclusion

Although interaction within a Distance Education course or web enhanced course is more time consuming to prepare than for 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

1. Babcock, Daniel. *Managing Engineering and Technology*, Second Edition (Upper Saddle River, New Jersey: Prentice Hall, 1996.)
2. Joyce, B. and Weil, M. *Models of Teaching*, Fifth Edition (Englewood Cliffs, New Jersey: Prentice Hall, 1996.)
3. Lipnack, Jessica and Stamps, Jeffrey. *Virtual Teams* (New York: John Wiley & Sons, 1997).

Biographical Information

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Dr. Lucy C. Morse is an Industrial Engineer serving as an Associate 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.