Teaching Dynamics in a Master Classroom using CourseInfo

B. S. Sridhara

Middle Tennessee State University (MTSU)

I. Introduction

Middle Tennessee State University (MTSU) is located in Murfreesboro, about 30 miles southeast of Nashville. MTSU was founded in 1911 and is the fastest growing university in the state of Tennessee. Currently, the student enrollment is approximately 20,000 and we have 800 full-time faculty members. The university has five colleges; Basic and Applied Sciences, Business, Education, Liberal Arts, and Mass Communication. Engineering Technology and Industrial Studies (ETIS) is one of the 10 Departments under the college of Basic and Applied Sciences. We offer Engineering Technology, Industrial Technology, Pre-engineering, and Pre-architecture programs. Our Department has an enrollment of 600 students, of which 200 are majors in Computer, Electro-Mechanical, and Manufacturing Engineering Technology concentrations. Dynamics is a required course for all pre-engineering students and Design Engineering Technology (DET) majors and currently DET is being phased out. Several students from the Aerospace department also take this course to meet their requirement for an ET minor.

Teaching Dynamics in a conventional classroom with blackboard and chalk is a tedious process. It takes a lot of time and effort to draw figures and list given information on the blackboard while lecturing or solving problems. Sridhara teaches Dynamics at Middle Tennessee State University (MTSU) and spends a considerable amount of time in the class to solve problems interactively. In the last two years, we have been fortunate to get several new master classrooms with a computer and the Internet access at each student station. The versatile overhead projector Elmo at the master workstation has not only replaced the conventional unit but also allows projection of opaque and three-dimensional objects on the screen. The need for writing problem statement and drawing figures and diagrams on the blackboard has been completely eliminated with the use of this projector. The VCR and stereo receiver are also useful in showing instructional videotapes. Ability to switch between the master workstation computer, Elmo or VCR instantly is very useful while teaching topics that require multimedia presentation.

II. Web-Enhanced Instruction

Web-based and web-enhanced instruction\textsuperscript{1,2} has become a very powerful tool and many instructors and students have embraced it. In the spring of 2000, MTSU obtained license from Blackboard.com and developed a site called CourseInfo for web-based and web-enhanced
instruction at MTSU. Sridhara attended workshops on CourseInfo and learned several tools and techniques. He developed course sites for several ET courses including Fluid Power, CADD, Statics, Strength of Materials, and Thermodynamics on CourseInfo. In reference 5, sridhara discussed the advantages and limitations of web-enhanced instruction in Engineering Technology citing examples from ET 4850 – Fluid Power which is a lecture/lab course. He has discussed the advantages of adopting CourseInfo for CADD courses which are essentially lab courses. Currently in our department, Statics, Strength of Materials, Thermodynamics, and Dynamics are taught as lecture courses without any formal laboratory work. In this paper, different aspects of web-enhanced instruction related to ET 3840 – Dynamics are discussed. 

Salient features of CourseInfo are discussed in this paper as well as in references 5 and 6 with respect to particular courses mainly to make each paper complete by itself.

CourseInfo offers many new features including unlimited disk space and easy access to its main page from MTSU’s home page at http://www.mtsu.edu. Students at MTSU are given an e-mail account as soon as they are enrolled. Instructor, students and guests (with some limitations) can access the Courseinfo login page from this site using their e-mail user name and password and select any course in which they have enrolled. The Announcements page for Dynamics is shown in Fig. 1. Announcements are displayed automatically with the option of viewing all of them or those posted in the previous two weeks or four weeks. Links are provided on the left side of this page to other sites such as Course Information, Staff Information, Course Documents, Assignments, Communication, External Links, and Student Tools. Instructors and students can also access Resources, Course Map, and My Blackboard sites. There is also a search option.

Fig. 1. Announcements Page.
provided on this page. The Control Panel (Fig. 2) allows the course instructor to post or modify announcements, course material including syllabi, contest guidelines, homework, projects, and solution to test/quiz problems.

![Control Panel](image)

**Fig. 2. Control Panel.**

Many of the above mentioned sites have menus that can be accessed by all users. As an example Communication Center menus are shown in Fig. 3. The instructor can access the class roster and optionally send e-mail messages to all students or selected individuals or groups. This task is made easy because the class roster is created automatically when the students enroll for the course. However, the instructor can modify the class roster using the Control Panel. Students can create their individual or group pages using the appropriate menus. They can use the Discussion Board to post their queries, comments and suggestions for each other or for the instructor. Students can drop their homework assignments and reports using the Student Drop Box located under the Student Tools site (Fig. 4). They can check their test or quiz grades on this site and perform several other tasks. However, the instructor should make the grades available either immediately or after a certain date by setting appropriate options on the Control Panel.
Fig. 3. Communication Center Menu

Fig. 4. Student Tools Options

Proceedings of the 2003 American Society for Engineering Education Annual Conference & Exposition
Copyright © 2003, American Society for Engineering Education
The instructor can access the Digital Drop Box (Fig. 5) from the Control Panel, grade the submitted material, and return files to the students electronically with corrections, comments and/or grades.

A welcome statement with a note to look for new announcements regularly was posted under Announcements. Course syllabus was posted under Course Information providing a link to appropriate MS Word files. Creating and modifying announcements and folders, uploading files, and providing links were done using the Control Panel. In the first one or two classes, the instructor gave a virtual tour of CourseInfo and briefly described how it would be utilized in Dynamics. Students were helped with setting up their user name and password, and login and logout procedure. As the semester progressed, many new announcements were posted which included guidelines for the egg drop contest, test/quiz date and time, solutions to problems, and grade distributions. Announcements regarding guest lectures, useful web sites related to Dynamics, extra credit projects, and student presentation dates were also posted. Some of these announcements were modified to serve as reminders to students as the announcements are displayed chronologically. Course instructor’s office location, phone and fax numbers, and e-mail address were provided under Staff Information.

Students could access homework assignments under Assignments that has links to particular MS Word files. Solutions to test/quiz problems were posted under Course Documents providing links to appropriate folders and files. Extra-credit problems that required writing a
computer program or using a software package to solve problems and perform analysis were posted in this section. The Send E-mail and Student Roster tools under Communication were very useful. The instructor could send e-mail to all students with a click of a button reminding them of guest lectures or ensuing tests. Many of our majors work full time and attend classes only in the evening and they found these reminders helpful. The instructor sent e-mail to individual students answering their questions on tests, quizzes or homework, sometimes providing missing data or correcting typographical errors. Our students seemed to like the Student Tools site. Several of them used it to send e-mail to the instructor and to submit their reports using the Drop Box. Many students checked their test grades using the Check Your Grades tool. This instructor registered as a student under an alias and used the Student Tools site to get a first hand experience of what the students could view. However, different features and tools of CourseInfo were discussed periodically in the class as well as with individual students.

The Online Gradebook was used to post or modify grades by student or by item such as test, quiz, homework, and presentation. The spreadsheet shows all entries and allows the instructor to enter or modify individual grades. It has a built-in feature that automatically adds each student’s scores and also gives the class mean based on the total possible points. Optionally, the spreadsheet can be exported to MS Excel for further processing of the data. Course Statistics can be used to obtain feedback on how well the students have used the course site. A report can be generated with the click of a button to view the overall course statistics (Fig. 6), number of accesses over time, user accesses by hour of the day, user accesses by day of the week, and total accesses by user.

![Overall Course Statistics](image)

**Fig. 6. Overall Course Statistics**
The Assessment tool on the Control Panel is an efficient tool for creating tests and quizzes, posting grades and viewing course statistics. The User Management tool permits the instructor to add, remove or modify users and it was used to add graduate students and remove those who dropped out after a few weeks.

III. Assessment of Web-Enhanced Instruction at MTSU

Tests and quizzes were not created on CourseInfo because of the nature of the subject. A very simple practice test administered on the course site showed that the students had to put in a lot of time and effort to type mathematical equations and enter Greek symbols in a word processor. However, the effectiveness of web-enhanced instruction was assessed using the course statistics report. The students were not required to use CourseInfo to obtain course materials and they were given the choice to request for hard copies of any item that was posted on the course site. However, typical results presented in Figs. 7 and 8 show that the Dynamics course site was well used during the most part of the day and week. Feedback in the form of personal and e-mail communications from the students also indicated that the students enjoyed using CourseInfo.

Fig. 7. User Accesses by Hour of the Day
IV. Web-Enhanced Instruction by Other Faculty Members in the ETIS Department

Several faculty members at MTSU adopt web-based and web-enhanced instruction in their courses. It will be very interesting to study and analyze their methods and results, and the feedback they have received from their students. However, it will be a huge undertaking because there are nearly eight hundred faculty members at MTSU and there is sufficient material for an independent paper. Also, ASEE conference is about Engineering Education and it is only appropriate to confine our discussion to the ETIS department at MTSU. Soliciting information formally and chatting informally with sixteen colleagues in our department revealed that only two other faculty members used web-enhanced instruction in some of their courses. These two instructors told Sridhara that they used the CourseInfo site mainly to post the course syllabus and some handouts, and for e-mail communication with students regarding class matters.

V. Egg Drop Contest

Egg drop contest is conducted as part of Dynamics in an effort to make learning fun. Groups of two or three students build structures (Fig. 9) out of balsa wood and glue the members according to the guidelines. An egg will be placed inside the structure so that it is supported at three points only.
The structure and egg with and without a parachute attached will be dropped from the second floor of a building. The students are required to write a report showing necessary calculations. The contest will be evaluated considering several factors including aesthetics of the structure, dimensions and construction, weight, location of the unit measured from the target after landing, condition of the structure and egg after reaching the ground, and correlation between theoretical and experimental results.

VI. Conclusions

Web-enhanced instruction in Dynamics saved a considerable amount of time and effort for the instructor as assignments, solution to tests and quizzes, and contest guidelines were posted on the course site eliminating the need for hard copies. However, such a course can only be taught in a master classroom with sufficient number of good computers and printers, and appropriate Internet access. One or two students did not have the aptitude for or interest in using CourseInfo although they were computer literate. Initially, the instructor had to invest a considerable amount of time and effort to persuade these students download information from the course site. As a general rule, no hard copies were handed out in the class with the exception of the course syllabus. This strategy and different submission deadlines yielded some good results as seen in the course statistics (Figs. 6, 7 and 8). Web-based instruction is possible in areas such as humanities and liberal arts. Web-enhanced instruction can be adopted in Engineering Technology although it cannot replace interactive problem solving in the classroom and hands-on activities. The Dynamics course site was developed while teaching a full load of ET courses and therefore, this article gives only an overview of web-enhanced instruction using CourseInfo.
VI. Bibliography


2. Reena, Jana, “Getting the most out of online learning”, Infoworld, v21, i37, p119, September 1999.


B. S. Sridhara
Dr. B. S. Sridhara is a professor in the Department of Engineering Technology and Industrial Studies at Middle Tennessee State University. He received his B.S.M.E. and M.S.M.E. degrees from Bangalore University and Indian Institute of Science, Bangalore, India. He received his M.S.M.E. and Ph. D. degrees from Stevens Institute of Technology, Hoboken, New Jersey, and Auburn University, Alabama. Dr. Sridhara has published several peer-reviewed articles in the areas of Acoustics, Vibration, finite element methods, and Engineering Education.