

Project Year

2004

Project Team

Cila Herman, Professor, Mechanical Engineering, Whiting School of Engineering; Yo-Rhin Rhim, Graduate Student, Mechanical Engineering, Whiting School of Engineering

Project Title

Digital Learning Tools for Heat Transfer

Audience

Students in the *Heat Transfer* course in the Mechanical Engineering department

Pedagogical Issue

The Heat Transfer course is a theoretical, math-intensive course that poses a considerable challenge for most ME students. Students increasingly expect their course content to be exciting and interactive, and have difficulty with a more traditional presentation of math and theory.

Solution

We plan to attempt to package the mathematical and theoretical components of this course in a more attractive framework, using interactive visualizations, simulations, on-line quizzes and math resources. We expect that these new elements will both make the course more appealing to the students and provide additional context for the concepts that students find most difficult to comprehend. WebCT will be used to house all the new resources in a comprehensive course website.

Technologies Used

Courseware (WebCT development), Menalto Online Gallery, HTML/Web Design, JAVA, Graphic Design

Project Abstract

Heat Transfer is a mathematically demanding required core course in Mechanical Engineering. We find that students are being increasingly challenged by the math component of the course, which makes the course unpopular. During the fall semester of 2003/2004, we started the revision of this course under the guidance of Erin Hagar from the CER. Course learning objectives were clearly stated, key problems were identified, and several active learning strategies were implemented throughout the course. Several assessment surveys were developed to evaluate the impact of the newly introduced teaching approaches. (The revised course is being taught at this time; the impact of the revisions will be evaluated at the end of the semester.) In the second step of our revision of this course, additional tools will be developed that will make the course more attractive to the students. These tools will include interactive simulations, animations and on-line surveys. Math resources and online quizzes will also be made available to help students practice applying formulas and theories taught in class. We are requesting support through the Technology Fellowship Program to develop these new tools, and to incorporate them into the WebCT framework. The proposed fellow, Yo-Rhin Rhim, took this course as a

Hopkins ME undergraduate and is currently serving as TA. Rhim will be implementing the modifications during the summer, along with the faculty member, under the guidance of the CER mentor. The additional resources and the assistance in the development of the web page will allow the team to make significant improvements within a relatively short time. When the project is completed, we will develop additional surveys to evaluate the impact of the new course elements on student learning.