Making Thermodynamics More Visual, and Engaging Students in the Classroom? [1]

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I have just started on this project after taking some time to think about the best way to utilize the funding from the PTS program. It will be implemented in fall 2002.

Two aspects of teaching the junior level chemical engineering course in thermodynamics will be changed in an effort to increase the understanding of the concepts and engage the students more in class.

Making the important concepts more visual: Thermodynamics is conceptually more difficult than many engineering courses and I have developed a list of the most important concepts for students to understand. I am developing visual representations of these concepts that will be presented as color slides, PowerPoint presentations, and by other computer software in the classroom. I will also place these representations on the course web site and thus I have created a new web site for the course. I recently obtained a small grant from the College's Engineering Excellence Fund to supplement the PTS funding so that I can hire a student to work on developing these visual representations this summer. This includes animated representations of the processes. I hope to complete much of this during the summer for use in CHEN3320 in the fall semester.

Engaging students more in class: I have revised the thermodynamics class and will teach it in the fall using concept tests during each class. I am basically following the approach that Professor Mike Dubson of Physics has used in Introductory Physics classes. Periodically during class, a multiple choice concept test will be presented to the students based on understanding of what we have been discussing and what they have read. I will purchase IR detectors using PTS funds and funds from the Associate Dean of Engineering. These will be installed in the classroom in the summer, and will be connected to my portable computer during class. The students will purchase an IR transmitter at the bookstore so they will be able to instantaneously answer these concept tests, and the software will identify how each person answered. After answering, they will discuss their answers with their neighbors and then have the opportunity to change their answers. This idea of concept tests and peer instruction has been used successfully at many universities and it should involve the students much more in class. Since the results will be tabulated by the computer and can be graded, the students will have some motivation to participate. The main objective is to involve the students more in the classroom and engage them more in their learning. One other professor in the department has indicated he may also try this in his class if I have it set up for the fall.

Groups audience:
President's Teaching Scholars Program

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