Transforming a Traditional Introductory Materials Engineering Course to an Active, Learner Centered Environment Using Computer Based Technology Tools

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ABSTRACT

Over the past three years, the Introduction to Materials Engineering and Science course at Western Washington University has been transformed from a traditional lecture delivery format course to an active, learner centered environment course. Several computer based technology tools have been used to make that transition possible. A Classroom Response System (CRS), the BlackBoard® Course Management System, MP3 audio files, and narrated, archived PowerPoint presentations have all been used to make better connections to the students and to make the course active and concept based. The initial assessment data is encouraging in that it shows improving student scores on traditional exam questions for classical problems, students more involved in their own learning, students rating teacher involvement and understanding of their needs higher, and a deeper conceptual understanding of the course material. In addition, the students were able to complete a much more challenging design problem at the end of the term. The drawback, of course, is that transforming the course and incorporating all these computer tools, active learning exercises and conceptual/peer learning into the course consumes an enormous amount of development time. Given that the potential gains for the students are really quite large and given that the technology used is already transforming our communication environment, the investment is a worthy one for any faculty member. This paper describes not only the specifications for the computer technology tools, but it also explains the needed development activities also necessary for reshaping the course, especially those needed for a concept based course. This approach is innovative because it combines the more traditional transformation approach to active learning with a computer tool centric approach to active and conceptual learning.

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