Multimedia Worked Examples as a Problem-Solving Tool in an Undergraduate Engineering Course

There are two major aspects that define engineering expertise: understanding of fundamental physical principles and application of analytical procedures. The combination of physical principles and analytical procedures creates the basis for engineering problem solving. However, for many undergraduate engineering students even fairly successful application of analytical procedures to problem-solving doesn’t necessarily translate into understanding of the physical phenomena that these procedures represent (Streveler et al. 2004). We have designed a number of multimedia worked examples to help civil engineering students improve their understanding and application of principles and procedures in the domain of fluid mechanics. The worked examples were developed using Tablet-PC capabilities and Camtasia authoring tools, published by TechSmith Corp. These multimedia worked examples were integrated with the homework problems by breaking the continuous multimedia presentation into seven separate parts that showed only the conceptual and procedural information related to each step in the homework problem to facilitate analogical reasoning and schema development (Anderson et al. 1987; Holyoak 2005). To promote active construction of meaning and to facilitate understanding of principles, worked examples were also enhanced with self-explanation prompts (Chi et al. 1989; Ainsworth & Loizou 2003). Multimedia worked examples were delivered online as a part of the homework assignment using a course management system.

In this presentation we will discuss our findings from the pilot study that was conducted in Spring 2009. The purpose of the pilot was to inform the final design, which would involve integration of multimedia worked examples into seven homework assignments. The study used a 2 x 2 factorial design that was employed to evaluate different combinations of worked examples and self-explanation prompts in two homework assignments. An immediate problem-solving test was included in the homework, and a delayed problem-solving test was administered during an in-class quiz one week after the intervention. The presentation will discuss findings and implications from the pilot study and also provide recommendations for implementation of multimedia learning in the classroom.

References:


