

Application of Multimodal Software Tools to Teach Problem Solving Skills

Paul Blowers (blowers@engr.arizona.edu)
Department of Chemical and Environmental Engineering
PO Box 210011
The University of Arizona
Tucson, AZ 85721-0011

Many faculty members have attempted to apply new technological advances in classroom settings to improve pedagogical approaches, increase student learning, and to run classrooms more effectively. Unfortunately, many of the approaches of applying these new tools do not accomplish these goals. This work investigates the use of multimodal (spoken verbal, written verbal, and visual) approaches integrated through Microsoft's OneNote program to change student access to problem solving frameworks in the context of a junior level thermodynamics course on equilibrium thermodynamics for chemical engineers.

One of the challenges in engineering is getting students to move beyond plug-and-chug type solutions and frameworks to having them fully integrate new knowledge into an independently organized thought process for bringing complex information to bear in applied ways. Students have a difficult time developing these skills from textbooks because the texts are not interactive and because they often do not present information in more than one way (written verbal). Lectures can engage students in active learning techniques where students can apply information with guidance. However, the fast pace of some lecture materials will leave weaker students with little recourse other than to extensively rely on the textbook. Archived materials from lectures recorded with OneNote accompanied by verbal spoken explanations timed with the flow of the note development allows students the ability to review notes at their leisure and to capture the nuances of explanation they may have missed during the actual lecture. Examples of materials generated for the sample course and a brief tutorial of how to apply the software will be discussed.