

Investigation of student learning in thermodynamics and implications for instruction in chemistry and engineering

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Working with collaborators in both physics and chemistry departments, my research group has been engaged in an ongoing investigation of student learning of thermodynamics at both the introductory and advanced levels. As part of this investigation, we have probed the reasoning of students enrolled in introductory courses in both physics and chemistry. A large proportion of these students were planning to major in engineering. In addition, we have looked at learning difficulties encountered by physics, chemistry, and engineering students enrolled in an upper-level thermal physics course that included many topics also covered in physical chemistry courses. Through this investigation we have gained insights into students' learning difficulties in thermodynamics at various levels, and we have developed and tested a variety of instructional strategies. Our experience in addressing these learning difficulties can offer insights into analogous pedagogical issues in upper-level courses in both engineering and chemistry which focus on the theory and applications of thermodynamics.

<http://web.phys.ksu.edu/perc2006/formats/TP.htm>