EXPLORING ADAPTIVE EXPERTISE IN ENGINEERING EDUCATION

Ann F. McKenna
Research Associate Professor
Dept. of Mechanical Engr. & School of Education and Public Policy
Director, Center for Engineering Education Research
Northwestern University
Evanston, Illinois

Monday, February 9, 2009
451 Riddick Hall
4:00 p.m. (Refreshments served at 3:30 p.m.)

Abstract

This talk will present an overview of several of my research projects that are applying the adaptive expertise framework to understand how disciplinary knowledge supports engineering design and innovation. The adaptive expertise framework is a construct that describes performance on two axes representing efficiency and innovation, and has been presented as a way of thinking about how to prepare individuals to flexibly respond to new learning situations. The talk will present results from a study that is investigating the nature of computational knowledge that is used in the design process and exploring potential instructional strategies that will enable learners to develop what we call computational adaptive expertise (CADEX). In addition, I will present results from a study that explored how the framing of a design problem (more constrained vs. less constrained) influences the use of knowledge-application and solution innovation in problem-solving approaches. The goal of this research is to identify experiences in the learning environment that put students on a trajectory toward the development of adaptive expertise and, further, to understand what motivates them to engage in those experiences. Findings shed light on the development of instructional methods and assessment tools that promote characteristics of adaptive expertise in student learning and more specifically, in engineering design education.