Changing the rate of engineering education innovation: Reflections on the HPL & UbD Workshop at the 2010 National Academy of Engineering Frontiers of Engineering Education Symposium (NAE FOEE) – Karl Smith

This reflection supplements my HPL & UbD workshop and provides guidance to the PowerPoint slides I used. The materials are posted to <http://www.ce.umn.edu/~smith/links.html> (scroll down to Conferences/Presentations/Papers)

The NAE FOEE held at the NAE Beckman Center for four days in December, 2010 involved over 40 innovative engineering faculty along with twelve invited plenary speakers, seven planning committee members and several representatives of the National Academy of Engineering.

The goals of the symposium were ambitious and included, (1) apply identified best practices in engineering education, (2) develop new ideas to advance their innovations, and (3) build community.

My charge as a member of the planning committee for the How People Learn (HPL) and Understanding by Design (UbD) session was to enhance the participants’ knowledge and skills about learning theory and instructional design. I decided beforehand to add emphasis on innovation and try to help the participants ground their innovations in learning theory and instructional design as well as spread their ideas. A remark by Chuck Vest about the importance of stories prompted me to tell a short version of my Engineering Education innovation story, which I summarized in the annotated slides.

During the HPL & UbD workshop on theories/models of learning AND promising practices in instructional design, I drew a link between Stokes’ (1997) Pasteur's Quadrant and an adaptation of Mayer's (2010) 4th quadrant (Science of Learning AND Science of Instruction). I argued that our innovations need to be based on good learning theory and good instructional practice. I also engaged in a little nostalgia, noting that I identified cooperative learning as important for engineering education in about 1974, tried it in my classes and did some systematic research on it, introduced it to the community in 1981 (FIE conf & JEE paper), and it took over 25 years for it to become widespread practice. My point in presenting this story is I don't think we can afford to wait 25 or more years for the current innovations to make it into practice.