



PUBLIC COLLOQUIUM

Building Sustainable Educational Change - A Systems Approach

by Professor Kenneth Heller
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<http://groups.physics.umn.edu/physed/index.html>

When: 3:00-4:00 on Friday, December 7, 2012

Where: 116 Health Sciences, Wright State University
(Reception at 2:30 in Foyer of Health Sciences)



Abstract:

At the University of Minnesota, we have successfully instituted long-lasting systemic change in the Physics Department by analyzing each course as a system. Using this systems approach, we identified the important parameters that determines the behavior of that system and designed changes that conformed to the biological constraints of learning and the roots of successful pedagogy. To implement these changes, we used the approach of engineering a product. We identified the most important goals for students in the course, determined the state of the students entering the course, identified the parts of the course (students, instructors, physical environment, content, pedagogy) that affect the performance of the students in meeting the desired goals, and determined the performance of the students after the course. This talk will give a brief review of the outcomes of these processes and describe the Cooperative Group Problem Solving pedagogy used.

Ken Heller is a professor of physics at the University of Minnesota. His current research in high energy physics focuses on the properties of neutrino oscillations. He is helping build the NOvA long baseline experiment to determine the neutrino mass hierarchy and possibly lepton CP violation. Previous work includes the first detection of tau neutrino interactions, the precise measurements of the muon to tau neutrino oscillation with the MINOS experiment, and early proton decay detectors. His work also includes the discovery and investigation of polarization in high energy particle production and the precise measurements of hyperon magnetic moments. His physics education research focuses on understanding student learning of physics through problem solving. His work includes the development of Cooperative Group Problem Solving and curricular tools such as Context-rich Problems and Problem Solving Laboratories. In addition, he has developed systems to support teaching assistants while developing their professional skills. Currently he is developing and testing internet problem solving coaches. He has served as the president of the AAPT and chair of the APS Forum on Education as well as numerous committees in the APS, the AAPT, and the NAS. He received his B.A. from the University of California, Berkeley, Ph.D. from the University of Washington, and was a post-doc at the University of Michigan before joining the faculty of the University of Minnesota where he is College of Science and Engineering Distinguished Professor and Morse-Alumni Distinguished Teaching Professor.

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