Keynote Talk

Science Education for the 21st Century: Using the Insights of Science to Teach/Learn Science

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Abstract
Guided by experimental tests of theory and practice, science has advanced rapidly in the past 500 years. Guided primarily by tradition and dogma, science education meanwhile has remained largely medieval. Research on how people learn is now revealing how many teachers badly misinterpret what students are thinking and learning from traditional science classes and exams. However, research is also providing insights on how to do much better. The combination of this research with modern information technology is setting the stage for a new approach that can provide the relevant and effective science education for all students that is needed for the 21st century. I will discuss the failures of traditional educational practices, even as used by “very good” teachers, and the successes of some new practices and technology that characterize this more effective approach, and how these results are highly consistent with findings from cognitive science.

Categories & Subject Descriptors: K.3.2 [Computers and Education]: Computer and Information Science Education – computer science education

General Terms: Human Factors

Bio
Carl Wieman is currently the director of the Carl Wieman Science Education Initiative at the University of British Columbia and a similar program at the University of Colorado at Boulder. These collaborative initiatives are aimed at achieving departmental-wide sustainable improvement in undergraduate science education. He has carried out research in a variety of areas of atomic physics and laser spectroscopy. His research has been recognized with numerous awards and honorary degrees including the Nobel Prize in Physics in 2001 for the creation of Bose-Einstein condensation.

His work in science education has been recognized by being named the US University Professor of the Year in 2004 by the Carnegie Foundation for the Advancement of Higher Education and receiving the National Science Foundation’s Distinguished Teaching Scholar Award in 2001 and the American Association of Physics Teacher’s Oersted Medal in 2007. He is an elected member of the National Academy of Sciences and serves on the Academy Board on Science Education. He is also a member of the U.S. National Academy of Education.