The Impact of NSF-funded Physics Education Research at the University of Washington

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It is now well known that many students who complete introductory physics courses are unable to apply fundamental concepts in situations that involve qualitative reasoning. Systematic investigations have helped researchers understand why so many students fail to develop robust and coherent conceptual frameworks, and have led to the development of new teaching practices and materials that are far more effective than conventional ones. The Physics Education Group at the University of Washington has played a leading role in raising awareness of the need to improve instruction, and in supporting physics faculty in their efforts to do so. With support from the National Science Foundation, the group has helped build a research base that instructors can draw on, and has produced practical, flexible instructional materials that promote deeper learning in physics classrooms. Both “Tutorials in Introductory Physics” (Pearson, 2002) and “Physics by Inquiry” (Wiley, 1996) have been developed in an iterative process in which ongoing assessment of student learning plays an integral role. These materials have had a widespread and significant impact on physics teaching and on student learning from kindergarten through graduate school. In this talk I will describe the role of research in curriculum development, and speculate on the next generation of tools and resources to support physics teaching and learning.