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“Thinking Like a Physicist” about Physics Education

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Decades of systematic research indicate that many students emerge from traditional university science courses without having developed a functional understanding of important basic concepts. In fact, many physics students express essentially the same (incorrect) ideas both before and after conventional instruction. These findings have motivated significant changes in how physics is taught. In particular, the physics education research community has developed instructional materials and approaches whose effectiveness is supported by a significant body of evidence. In addition to conceptual learning, these approaches often promote the development of a loosely-defined set of skills and habits of mind often referred to as “thinking like a physicist.” In the United States, the pioneers of physics education research had formal preparation in experimental and theoretical physics research, and it continues to be the case that many leaders in PER are steeped in the culture of physics – obtaining PhDs in physics, operating as regular faculty in physics departments, etc. In this talk I’ll explore what it means to “think like a physicist” and how that applies, or might apply, to thinking about the learning and teaching of our own discipline.