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Interactive Engagement in the Large Lecture Environment

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Watching a great physics lecture is like watching a great piano performance. It is can be inspiring, and it can give you insights, but it doesn't teach you to play piano. Students don't learn physics by watching expert professors perform at the board; they can only learn by practicing it themselves. Learning physics involves high-level thinking like formulating problem-solving strategies or explaining concepts to other humans. Learning is always messy, involving struggle, trial-and-error, and paradigm shifts. That learning struggle cannot be overcome with a more eloquent lecture; it can only be surmounted with prolonged, determined, active engagement by the student. I will demonstrate some techniques of active engagement, including clicker questions and in-class activities, which are designed to activate the student's higher-level thinking, get them actively involved in their learning, and start them on the path of productive struggle. These techniques are scalable; they work in classrooms with 30 or 300 students. This talk about audience participation will involve audience participation, so please put down your phone and be ready for a challenge.