Implementation of Active Learning in Introductory Physics Classes at Harvard; Lessons Learned

Recent trends towards flipped classrooms raise interesting questions regarding the teaching of physics to large introductory classes. The implementation and logistics of Applied Physics 50, a flipped, ‘studio style’ physics class at Harvard, will be discussed. This course blends six best practices to deliver a learning experience that helps students develop important skills, including communication, estimation, problem solving, and team skills, in addition to a solid conceptual understanding of physics. In this talk, I will discuss how we used the principles of backward design to structure the learning objectives, activities and assessment of Applied Physics 50 as well as lessons we have learned over six years of teaching the class.

I will also present recent findings from a study on student’s perceptions of active learning strategies in introductory physics classes at Harvard. We have found that, compared with students in traditional lectures, students in active classes perceived that they learned less, while in reality they learned more. Students rated the quality of instruction in passive lectures more highly, and they expressed a preference to have “all of their physics classes taught this way,” even though their scores on independent tests of learning were lower than those in actively-taught classrooms. These misperceptions of learning are likely to reduce students’ motivation to participate in active learning and may discourage faculty from adopting research-based active teaching strategies.