

Is “interactive” teaching sufficient to promote conceptual development in physics?

Over the past few decades, systematic research has shown that many physics students express essentially the same (incorrect) ideas both before and after instruction. It is frequently assumed that these ideas can be identified by research and then addressed through “interactive” teaching approaches such as hands-on activities and small-group collaborative work. In many classrooms, incorrect ideas are elicited, their inadequacy is exposed, and students are guided in reconciling their prior knowledge with the formal concepts of the discipline. Variations of this strategy have proven fruitful in science instruction at all levels from elementary through graduate school. However, this summary greatly over-simplifies the use of students’ ideas as the basis for effective instructional strategies. Examining what students have actually learned after using research-based curriculum is essential for improving the curriculum and validating its effectiveness. I will illustrate the process with examples from introductory physics.