Effectiveness of Introductory Physics Instruction: The Present Situation, and Pathways toward Improvement

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Research in physics education has provided strong evidence of a gulf between physics instructors' *intended* learning goals, and most students' *actual* learning gains. Traditional methods of instruction in introductory courses seem to provide little lasting improvement in student understanding of fundamental physics concepts. Physics and engineering students have opportunities to fill gaps in their knowledge by taking more advanced courses. However, this is generally not a route followed by liberal arts and life science students who have completed introductory physics courses. If positive learning outcomes in such introductory courses are genuinely considered to be an important objective, more effective instructional strategies will have to be implemented. I will discuss a number of such strategies that have been developed and successfully tested with a wide range of student populations and institutional settings.