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Physics Education Reform: An Object Lesson from Coastal Carolina University¹

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During the last two decades, researches from both the physics education research (PER) community and the cognitive sciences have determined that physics is best learned in an interactive environment where students are actively engaged in their learning. Despite this most introductory physics classes taught at American universities use pedagogical techniques that are still traditional passive lectures. It is not surprising that both student enthusiasm and student performance are generally quite low. In this talk, we will review the outcomes of PER research, and discuss our adaptation of these findings to our physics classrooms. In particular, at Coastal Carolina University, we have implemented the SCALE-UP model of Physics instruction. This model combines lecture and laboratory into single entity, emphasizes active learning, and student cooperation. It uses applications of technology including web-based quizzes and homework, online demonstrations, interactive computer simulations, video analysis, data time-series analysis and computer/instrument interfacing. We have seen a major impact on both student grades and performance on standardized tests. In this presentation, we will illustrate the SCALE-UP model and report on its positive impact on students.

¹In collaboration with Teresa Burns, Coastal Carolina University.