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Cultural and Institutional Challenges in Improving Undergraduate Physics Instruction[1]

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A recent report from the National Academy of Sciences (2013), *Adapting to a Changing World: Challenges and Opportunities in Undergraduate Physics Education,* examined the status of physics education and provided recommendations for improvement. One major challenge is that most students do not gain a genuine understanding of physics concepts, practices of inquiry, and scientific habits of mind used in the discipline. Also, important groups of students (women, underrepresented minorities, prospective high school teachers) remain underserved by the traditional dominant paradigm of physics teaching. However, the physics education research community has developed empirically supported strategies for improvements in physics learning. Students in introductory physics at Stony Brook University now have the option to learn in Studio Physics, with more hands-on activities, peer problem solving, and instructor support. The newly designed laboratory modules enable repeated trials and immediate data analysis. The classroom design facilitates frequent student interactions where physics knowledge is constructed socially, strengthening students' self-efficacy and performance. However, such novel pedagogical approaches often encounter resistance without sustained support. This research presentation addresses the cultural and institutional challenges associated with implementing reformed physics teaching practices, and recommendations for broadening support among key stakeholders.

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