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Using a flipped classroom in an algebra-based physics course
LEIGH SMITH, University of Cincinati — The algebra-based physics course is taken by Biology students, Pre-Pharmacy, Pre-Medical, and other health related majors such as medical imaging, physical therapy, and so on. Nearly 500 students take the course each Semester. Student learning is adversely impacted by poor math backgrounds as well as extensive work schedules outside of the classroom. We have been researching the use of an intensive flipped-classroom approach where students spend one to two hours each week preparing for class by reading the book, completing a series of conceptual problems, and viewing videos which describe the material. In class, the new response system Learning Catalytics is used which allows much richer problems to be posed in class and includes sketching figures, numerical or symbolic entries, short answers, highlighting text, etc in addition to the standard multiple choice questions. We make direct comparison of student learning for 1200 sudents who have taken the same tests, 25% of which used the flipped classroom approach, and 75% who took a more standard lecture. There is significant evidence of improvements in student learning for students taking the flipped classroom approach over standard lectures. These benefits appear to impact students at all math backgrounds.

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