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Why no difference? A controlled flipped classroom study for an introductory differential equations course.

PRIMUS, Probl. Resour. Issues Math. Undergrad. Stud. 25, No. 9-10, 907-921 (2015).

Summary: Flipped classrooms have the potential to improve student learning and metacognitive skills as a result of increased time for active learning and group work and student control over pacing, when compared with traditional lecture-based courses. We are currently running a 4-year controlled study to examine the impact of flipping an Introductory Differential Equations course at Harvey Mudd College. In particular, we compare flipped instruction with an interactive lecture with elements of active learning rather than a traditional lecture. The first two years of this study showed no differences in learning, metacognitive, or affective gains between the control and flipped sections. We believe that contextual factors, such as a strong group-work culture at Harvey Mudd College, contribute to the similar performance of both sections. Additionally, to maintain a rigorous experimental design, we maintained identical content across the control and flipped section; relaxing this requirement in a non-study setting would allow us to take further advantage of educational opportunities afforded by flipping, and may therefore improve student learning.

Classification: D45 I75 U55 U85

Keywords: differential equations; mathematical modeling; flipped classroom; inverted classroom
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