Exemplary Poster Abstract from ASMCUE 2018

Title: The Role of Team-Based Learning Environments in Closing Performance Gaps in a Large Introductory Biology Course

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A survey of recent literature suggests across-the-board learning gains associated with so-called scale-up classrooms, and a disproportionally positive effect of active modes of instruction for students from traditionally underrepresented backgrounds and/or with lower incoming placement scores. In Fall 2017 the opportunity presented itself to test the hypothesis that team-based learning environments disproportionately benefit students from underrepresented demographic backgrounds when a large introductory course for biology majors was split into two parallel lecture sections (AL1 and AL2) at the University of Illinois. Section AL1 was offered in the largest lecture hall on campus to 530 students in a front-directed configuration. Section AL2 was offered in a 90-seat scale-up room with students sitting in “research teams” at round tables. Both sections were taught by the same instructor in a flipped format and used the same learning goals, content, pre-lecture lessons, exams, and similar lecture activities. A quasi-experiment was conducted to test the impact of the team-based instructional treatment (AL2), with the parallel lecture-hall setting serving as a control (AL1). Data collection included: 1) learning outcomes (assessed using exam scores, and paired pre- and post-assessments), 2) observations of student engagement, and 3) attitudinal data in the form of surveys (IRB 16127). Chi-square tests reveal significantly higher attendance, higher likelihood of in-class engagement, higher self-reported satisfaction with the course and intent to remain in a STEM major in the team-based learning environment. Math ACT scores are significant predictors of exam scores in the AL1 control ($r^2 = 0.32$, $N = 361$), but are a poorer predictor in the AL2 team-based treatment ($r^2 = 0.21$, $N = 56$). This is attributable to elevated exam residuals of 6.5% in AL2 compared to AL1 after controlling for Math ACT scores. The results suggest that providing team-based learning environments is a disproportionately effective tool to close performance gaps for at-risk students, especially when large class sizes make this approach unfeasible for an entire course.

Core Concepts: Evolution, Structure and function
Pedagogical Category: Teaching approaches
Keywords: Instructional innovation (i.e., small- or large-scale course reform efforts), Online/hybrid/flipped classrooms, Team-based learning