

Does active learning increase self-efficacy with course material in introductory biology classes?

Darines D. Perez*, Krista Donis & Sarah Eddy

Student-centered teaching strategies, such as active learning, are increasing in higher education. Many significant social and psychological predictors of success at the college level could be influenced by the use of active learning. One of these is self-efficacy, a person's belief that they can succeed at a specific task such as learning course material. Self-efficacy has multiple established benefits including increased sense of belonging and persistence at a task. In this study, we compare the growth of self-efficacy in both an active and traditional introductory biology class. We hypothesize students in active learning classes will increase in self-efficacy over students in traditional classrooms, because they receive more feedback from professors and peers and more opportunities to engage with the course material.

We identified and adapted 22 published items measuring self-efficacy with course content. We interviewed four biology undergraduates to determine if the questions made sense to them (think-a-louds) and edited the items based on their feedback. Next, we used factor analysis to determine the structure of the survey. We deployed these surveys in two classes at an R1 institution three times during the semester: before the first exam, after the second exam, and right before the final. Finally, we used DART, a phone app, to measure the amount of time students were talking in groups.

Factor analysis suggested four factors to our self-efficacy survey: self-efficacy with content, self-efficacy teaching the content to others, ability certainty, and ability uncertainty. With regards of the longitudinal study, we discovered that students come in to introductory

biology with high self-efficacy and experience little change over the semester regardless of the teaching methods. Women consistently reported lower self-efficacy in these classes than their male peers. We conclude these measures of self-efficacy do not correlate with amount of active learning, at least in this setting.