

Small classes reduce performance gaps in science

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From high-stakes multiple choice exams to the social climate of the classroom, research has shown those factors can contribute to the negative impact of large, introductory and undergraduate science courses on students. However, class size is often an overlooked factor despite research suggesting it influences student performance and, unlike other influences on student attrition, is subject to legislative action.

In new research from the University of Minnesota's College of Biological Sciences (CBS) published in the journal *BioScience*, researchers looked at the impact [class](#) sizes might have on students' performance. Researchers discovered:

- small class sizes closed the gap in academic performance between men and women;
- smaller classes did not impact underrepresented minorities, who underperformed compared to students from well-represented backgrounds in STEM regardless of [class size](#);
- the impacts of class size do not generalize to all students, suggesting other characteristics of the education environment and incoming preparation affect learning.

"Even when large classes are a 'necessary evil,' there are many simple ways to make even big classrooms feel small for students," said Cissy Ballen, Ph.D., postdoctoral associate in Biology Teaching and Learning and lead author on this study. "That includes group work, giving students more opportunities to interact with lecture material and instructors using

inclusive teaching practices."

For this study, researchers collected data from 17 introductory biology courses from four institutions: California State University, Chico; Cornell University; University of Puget Sound, and the University of Minnesota Twin Cities. Researchers then pooled exam grades, non-exam assessments of [student](#) knowledge (e.g., laboratories, online activities) and final course grades from more than 1,836 students.

"While many variables contribute to [student performance](#), these results may be compelling for administrators, curriculum committees or legislators who are motivated to promote all undergraduate scientists," said Sehoya Cotner, associate professor in CBS and senior author on this study.

The authors, representing a range of institutional types, plan to follow this work by testing a variety of in-class interventions, all with the goal of minimizing [performance](#) gaps.

More information: Cissy J Ballen et al, Do Small Classes in Higher Education Reduce Performance Gaps in STEM?, *BioScience* (2018). [DOI: 10.1093/biosci/biy056](https://doi.org/10.1093/biosci/biy056)

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