

Increasing Social Relevance to Increase Inclusion in First-Year Seminars

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Abstract: Research has shown that making STEM socially relevant can attract more diverse students to STEM fields. Learn to utilize the United Nations' Sustainable Development Goals to center socially relevant goals in first-year seminars, as we did when constructing STEM linked-course learning communities. The seminars were designed to foster a communal view of science and mathematics, both in terms of the importance of collaboration to STEM success and the application of STEM to real-world problems. Course structures and sample materials will be shared as inspiration. Conversations will focus on helping visitors increase the social relevance of their own courses or curricula.

Why Increase Social Relevance?

- Using STEM to make a social impact is a major motivator for most students in STEM (e.g., Barth & Yang, 2022).
- Students of color, first-generation students, and women, are most likely to highly value communal goals and want a career that makes a meaningful social impact (Allen et al., 2015; Boucher et al., 2017; Stephens et al., 2012; Thoman et al., 2014).
- In multiple studies, STEM has successfully been framed as more socially relevant in order to increase STEM persistence and motivation (Diekman et al., 2017; Hulleman & Harackiewicz, 2009).

Traditional Introductory STEM Classes

- Driven predominantly by content needed in advanced classes.
- Often do not address students' broader STEM interests.
- Can lack interdisciplinary lens.

How to Increase Social Relevance

- Frequently reiterate how STEM concepts & skills connect to socially relevant goals, such as the UN SDGs.
- Provide opportunities for students to use their STEM knowledge & skills to engage in socially relevant causes (e.g., field work, STEM outreach, etc.).
- Create opportunities for students to share their motivations for pursuing STEM degrees with each other.
- Provide STEM role models who can articulate the social relevance of their work.

BIOL 199: Clean Water, A Basic Human Right

This seminar integrates biological lab work and public health by understanding water, water sanitation, and water-borne illness. While many people have gained access to improve water sanitation in the past three decades, water borne diseases continue to cause 500,000 deaths per year.



CHEM 199: Sustainable Nanotechnologies

This seminar helps students discover how unique material properties unlocked at the nanoscale allow us to grow more food, provide clean water, and protect the environment.



MATH 199: Math for Social Dynamics

This seminar, on mathematical modeling, social dynamics, and social justice, aims to provide students with concrete examples of how mathematics can be used to study critical societal issues such as segregation and social injustice.



BIOL 199: HIV: Knowing is Everything

This seminar integrates basic concepts from biology, public health and social sciences to examine the impact of HIV on our society. Discussions focus on HIV biology, public health aspects of HIV management and disease prevention.



PHYS 199: Sustainable Microchip Manufacturing

This seminar aims to help students understand the global environmental impact of microchip manufacturing. Students examine the supply chain, waste, and manufacturing processes, and recommend areas for improving the process.



Study Methodology and Aims

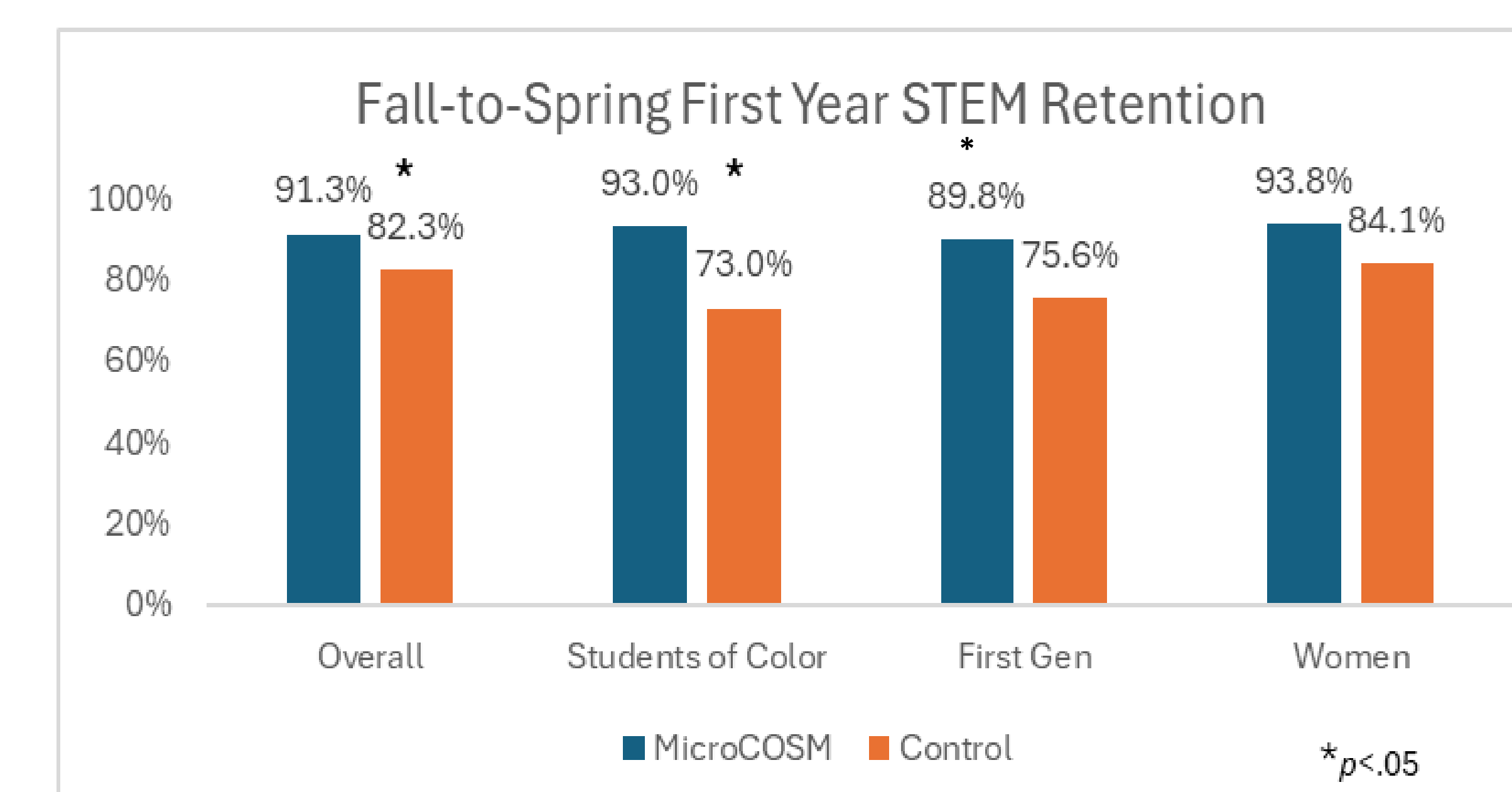
UN SDG Seminars are the central hub in linked course communities for first semester students that includes

- A UN SDG-themed Seminar
- An appropriate mathematics course
- Either the 1st course in the students major or a communications course

Using **matched random assignment**, incoming first-year science and mathematics majors in 2021, 2022, and 2023 participated in either a linked course community or an unlinked schedule. We then tested the impact of participation on GPA, retention, social belonging, and attitudes about science and mathematics.

Study Results

Participation in the communities increased STEM retention compared to the control group ($N=291$).



Interviews with students in the communities mostly revealed how meaningful the peer connections were, but this student also commented on how the social relevance of the first-year seminar related to their sense of belonging:

I do belong definitely, because I'm able to have discussions with people when it comes to certain things. Especially in my [first-year seminar], I feel like I was able to make a lot of connections to not just the class, but stuff outside of that, stuff that was happening in the world now.