NEPC
NATIONAL EDUCATION POLICY CENTER

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Newsletter

Only 19% of Computer Science Majors Are Female. Can This Approach Help Change That?

The disparities are stark: Although more than half of undergraduates in the United States are female, women comprise just 19 percent of students pursuing a computer science degree or related major. Nationwide, 17 percent of students enrolled in four-year colleges are Hispanic and 12 percent are Black. Yet computer science majors are 11 percent Hispanic and five percent Black.

A program that aims to narrow these gaps has demonstrated signs of promise, according to a case study conducted by NEPC Fellow Roslyn Arlin Mickelson, Ian Mikkelsen, Mohsen Dorodchi, Bojan Cukic, and Tytianna Horn, all of the University of North Carolina-Charlotte. Their article is published in the peer-reviewed *Journal of College Student Retention: Research, Theory & Practice*.

The program was launched in 2019 at the University of North Carolina-Charlotte to address racial, gender, and social class disparities in computer science and to encourage more local students to apply to the college. It placed undergraduate tutors majoring in computer science at a local middle school, with the undergraduates teaching coding and computational thinking and exposing students to their college's campus. Middle schoolers participated in the volunteer program based on their interest in computer science.

To study the impacts of this intervention, the researchers drew upon multiple sources of

qualitative data, including open-ended surveys of middle school students, interviews, field notes, and 220 reflective essays written after each tutor-led workshop. Due to bureaucratic challenges, the newness of the program, the need to maintain confidentiality, and other concerns, they were unable to obtain quantitative data on longer-term outcomes such as high school science course enrollment or college enrollment/major choice. However, the qualitative results suggest that the program encouraged middle school students to develop an interest in attending college and majoring in computer science.

Students also appeared to grow academically, enthusiastically participating in learning to a degree that surprised their classroom teachers. "The workshops appear to spark marginalized middle school youth's interest in going to college, in coding, and in CS [computer science] careers," the researchers write. "The workshop experiences appear to augment development of CS identities and build the self-confidence of the middle school learners. These tentative outcomes are important because prior research indicates science identities are central to success in all STEM fields."

The program also helped the tutors—many of whom were themselves females or members of racial/ethnic groups underrepresented in computer science—develop their own academic and social skills and sense of belonging to their academic discipline.

In 2023, the Partnership was incorporated into the university's STARS Computing Corps Scholarships program, which offers service learning courses that place undergraduates in local schools with the goal of fostering K-12 students' interest in STEM. The program appears to have provided a blueprint for a fruitful university-K-12 partnership, by meeting the needs of both the middle school and the college.

NEPC Resources on Diversity – Race, Ethnicity, Class, Culture, and/or Gender

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