

**CONFIDENCE IN COMPUTING: A CAREER PREPARATION COURSE FOR
UNDERGRADUATE STUDENTS**

**INVESTIGATING THE GENDER GAP
IN UNDERGRADUATE COMPUTER SCIENCE PROGRAMS**

An Undergraduate Thesis Portfolio
Presented to the Faculty of the
School of Engineering and Applied Science
In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science in Computer Science

By

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SOCIOTECHNICAL SYNTHESIS

Why is it that since 1990, while other STEM fields saw an increasing proportion of female workers, computing saw a decrease? As we watch the disparity between men and women in technology grow, especially in undergraduate studies, we wonder where this disconnect is. The technical project aims to target underrepresented groups in computer science and bolster their knowledge with additional skills applicable to the real world, such as technical skills or professional development. The science, technology, and society (STS) focus explores the lack of gender diversity in undergraduate studies. Contextualizing the issue empowers administrators, faculty, and students to redesign the system, increasing the diversity of those pursuing an undergraduate computer science degree. The tightly coupled STS topic and technical topic consists of an analysis of the lack of gender diversity and then implements just one possible solution to this problem.

Inspired by boot camps and alternative internships, the technical project created a student-led course that tackled technical and professional development skills not explicitly taught in the current curriculum. College majors are known for their “weed-out” classes, classes that are intended to be difficult to test whether or not a student “is right” for the major. These classes fail to take into consideration some students’ advantageous prior experience. Oftentimes these students who do not have prior experience often come from underrepresented groups regarding race, income, and gender. This course was implemented to teach students these skills early in their college career to decrease this gap in knowledge by hosting weekly lessons and giving feedback on weekly assignments.

The course was analyzed by surveys where students measured their self-efficacy regarding computing topics. In Fall 2020, research showed that when prompted statements of being and belonging in computing, non-White students had more of an impact from the course. Female students had more of a positive impact than male students. By the end of the semester, all students felt confident in completing their current degree program. This course will continue to be offered at the University of Virginia and potentially packaged as a course template for other schools.

This research targeted potential solutions to encourage gender diversity in computer science departments in universities nationwide. The STS paper looked at current class structures, existing stereotypes, and potential job fields. Latour's Actor-Network Theory was employed to analyze the situation women enter in the undergraduate computer science program currently and after the proposed solution. The actor-network was developed by aggregating different research studies that centered around a women's choice in higher education, including prior experience and future opportunities.

The research focused on women in undergraduate studies and why they may not be as prevalent in computer science programs. Gender diversity in undergraduate studies can be improved by increased exposure to those before entering undergraduate, contextualized college courses, and deconstructed stereotypes in the industry. Overall, this research did not portray a specific solution but provided more information that allows undergraduate programs to interpret and improve their system.

Though more diverse companies have a greater financial return, there is still a gender gap in the technology field, caused by a lack of gender diversity in undergraduate computer science.

This is created by a variety of factors: a poorly constructed course, a lack of female role models in the industry, and misconceptions of the field. Regardless of the reasons, the system must be restructured to allow for new growth.

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