Computing Fellows across Disciplines: Preliminary Results

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ABSTRACT

We describe initial research results investigating the impact of a new Computing Fellows program. The program provides computing-related peer mentoring and teaching in undergraduate courses across disciplines. Results suggest that the program positively contributes to both fellows and students engagement with computing.

1 INTRODUCTION

Peer mentoring programs in STEM fields have been shown to support self-efficacy and a sense of belonging and inclusion for students, particularly women and students from underrepresented groups [1, 2]. We describe initial results on the effectiveness of a new peer mentoring program in which Barnard undergraduates are hired and trained to work as "Computing Fellows" with undergraduate courses across disciplines (so far, including environmental science, chemistry, neuroscience, cognitive science, history, education, first-year seminars, and computer science itself) to integrate and support computing in the courses. The program aims for students in all disciplines to understand the role that computing can have to answer important real-world questions and to feel empowered to learn more, and for the Computing Fellows themselves to deepen their sense of identity in computing. Through a mixed-methods research approach, we are studying research questions RQ1: How do Computing Fellows contribute to course participants' engagement with computing? and RQ2: How does being a student Computing Fellow contribute to the fellow's engagement with computing?

2 RESEARCH METHODOLOGY AND RESULTS

Research participants include course students (i.e., students in classes with fellows) and fellows. Research instruments include pre- and post-surveys and structured interviews with fellows, and course evaluations and focus groups for course students. We have so far analyzed end-of-term course evaluations across nine courses (n=198), as well as interviews with six fellows and one focus group conducted with three course students. We employed thematic analysis to deductively and inductively generate codes for the Computing Fellows' interviews, the focus groups with students, and students' open-ended course evaluation responses. Our research questions and indicators guided our interview and focus group questions and set parameters for relevant topics in our coding process. We also identified emergent themes based on participant responses. We conducted quantitative analysis of the course evaluation data to corroborate results from the thematic analysis.

Our initial findings among the course students demonstrate a positive relationship between access to Computing Fellows and self-reported competency in computing in the focus group and course evaluations. The focus group also reveals that, at the end of the course, students recognized the interdisciplinary utility of computing in their future careers and academic interests.

Our thematic analysis of fellow interviews yields five overarching main categories that are closely connected to our research question and key indicators: Identity, Relationships, Interest, Value, and Engagement. Subsequent sub-categories are derived through further analysis, guided by our research questions while also remaining open to emergent themes. For example, in the initial findings, within the Identity category, Self-Awareness (SA) emerged as a sub-category and within the Interest category, Interest in Teaching Computing (ITC) emerged as a sub-category. Together these excerpts from the dataset reveal the theme, Awareness of Diverse Levels of Engagement, which emerges at the intersection of the codes ITC and SA. Fellows specifically expressed growth in their awareness that students come to computing with differing levels of interest and knowledge than their own.

3 CONCLUSIONS AND ACKNOWLEDGMENT

Our initial results suggest that the Computing Fellows program can deepen engagement with computing for both course students and fellows. Continuing the research will allow us to study the program over a longer duration, develop larger sample sizes, and expand and strengthen our conclusions. This research was supported by the National Science Foundation under award #2142628. The work of Zoë Webb-Mack was carried out while at Barnard College.

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