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Abstract

This study examines the attitudes of first-generation college students (FGCS) towards computer science (CS). It focuses on student interest, confidence, and perceived usefulness of CS, and study results can help school psychologists and educators understand the factors that can determine whether FGCS succeed in the CS field. Study results may be of interest to practitioners working in secondary schools and those with an interest in issues of equity and diversity in STEM.

Introduction

First-generation college students (FGCS) face lower graduation rates than students whose parents graduated college (Castillo-Montoya & Ives, 2020). As a growing population, many FGCS come from minoritized communities, lower income families, and non-English speaking backgrounds (Castillo-Montoya & Ives, 2020). A college degree in Computer Science (CS), in particular, has been associated with success due to an increase in demand for coding and programming professions in the United States. Unfortunately, minority community students are less likely than their peers to participate in and accomplish such degrees (Bettencourt et al., 2020).

Students' attitudes towards CS (their interest, confidence, and perceived usefulness of CS) play a crucial role in understanding the experiences and retention of students. These variables help to predict factors that discourage students from pursuing an education in CS (Hoegh & Moskal, 2009). These attitudes also allow for a deeper understanding of potential

differences in the ways that FGCS and non-FGCS view CS, which may contribute to disproportionate representation in the field.

Unfortunately, we lack a complete picture of the academic experiences of FGCS as compared to students whose parents attended college (Pike & Kuh, 2005). There is less research on FGCS within CS, specifically. The current study seeks to address these research gaps by investigating FGCS' and non-FGCS' attitudes towards CS at a diverse, urban university.

Methods

Research participants complete an online Qualtrics survey in their introductory CS courses. The survey includes basic demographic questions and Likert-type questions about their attitudes towards CS such as one's interest, confidence in CS ability, and their beliefs on the usefulness of CS. Items on attitudes towards CS were taken from the Usefulness, Confidence, and Interest subscales of the Engineering Students' Attitudes Toward Computer Science (ESATCS; Hoegh & Moskal, 2009) scale.

Results

Data collection will not be complete until December 2020, but we expect that approximately 150 students will participate in the research study. Fifty-one participants have completed the survey at this time. The study will compare FGCS and non-FGCS' attitudes towards CS in three areas: their beliefs about the usefulness of CS, their interest in the subject, and their confidence in their computing ability. Data will be analyzed using Hotelling's T-Squared multivariate test.

Though the sample size is admittedly small, an initial analysis of the collected data using Hotelling's T-Squared showed no significant differences between FGCS and non-FGCS on any of the variables of interest (their self-reported interest in CS, their confidence in their CS ability,

or their beliefs about the usefulness of CS). Unfortunately, achieved power for this analysis was 0.163, meaning that there was only a 16% chance that this analysis would detect a significant difference between groups if one existed. An a priori power analysis indicated that a minimum sample size of 128 would achieve a power of 0.8; we anticipate that 150 students will participate in this study.

Discussion

Contemporary research into FGCS experiences illustrates the personal challenges and systematic hurdles they face in college yet does not focus on how to mitigate such struggles (Castillo-Montoya & Ives, 2020). FGCS are disproportionately underrepresented in CS and face lower graduation rates compared to their non-FGCS peers (Pike & Kuh, 2005). The present study will provide insight into FGCS' attitudes towards CS, and the results will provide key insights into how to better diversify CS by shedding light on the attitudes that can affect FGCS' academic success.

While this research will be conducted with college students, the foundation for success in college is laid during K-12 education, and insight into potential areas of concern at the college level can inform the creation and execution of K-12 programs to better support potential FGCS who show an interest in CS. For example, these results can inform programs centered around K-12 exposure to beginning CS concepts to help foster positive experiences and provide students with the positive attitudes they will need to succeed in CS at the postsecondary level. School psychologists can use this information to support K-12 STEM teachers who work with potential FGCS who aspire to studying computing. As school psychologists, ensuring that all children and youth are valued and that their opportunities are protected in schools can include supporting

students' success in STEM and other underrepresented fields. Expanded discussion, limitations, and implications for practice will be presented.

References

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