Chapter 5

Gender Gap: Factors Affecting Female Students’ Retention in an Online Undergraduate IT Program

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ABSTRACT

Women are underrepresented in information technology (IT) fields. This study aims to understand faculty gender’s impacts on female IT student retention in introductory courses in an online university’s undergraduate IT program. Univariate and multivariate statistical models indicate that faculty gender does not moderate the retention of female students in this context. However, the retention rates of women are encouraging, suggesting that an online format may be conducive to the retention of female students.

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INTRODUCTION

There are a shortage of information technology (IT) workers: 3.5 million U.S. computing-related job openings are expected by 2026, and only 17% could be filled by U.S. computing bachelor’s degree recipients (NCWIT, 2017). Women are under-represented in the IT field. They comprised 11% of the global cybersecurity workforce (2017 Global Information Security Workforce Study) and 26% of the U.S. computing workforce in 2017. African-American women comprised 3%, Asian women 5%, and Hispanic women 1% of the US computing workforce in 2017. Women hold 17% of Fortune 100 CIO positions and 19% of computer and information science bachelor’s degrees (NCWIT, 2017).

No progress is being made in this regard. The share of computing degrees held by Black, Latina, and Native American women has dropped from 7% to 4% over the last ten years, and women in IT have actually declined over the last 25 years (Conway, Nowski, & Wittemyer, 2018). Of the computer science AP test-takers in 2016, only 23% were female (NCWIT, 2017). Just 15% of high school girls are interested in studying and working in science, technology, engineering and math (STEM) fields, compared to 40% of high school boys, and six times as many high school girls as boys think companies view men as more qualified than women in STEM fields (Business Wire, 2018). This is disappointing, as STEM employment is growing three times as fast as, and averages 26% higher pay than, non-STEM fields (MyCollegeOptions.org).

In addition to labor insufficiency, this under-representation reduces team diversity. Team diversity improves decision outcomes, as multiple varied perspectives assure a more complete consideration set. Diversity also improves internal dynamics; for example, it minimizes groupthink and harassment. IT strategies, IT architectures, IT projects, and IT security policies thus benefit from team diversity. Costs resulting from a lack of inclusion and diversity—lost stock value, lower market share, HR costs, and public relations costs, etc. are also minimized. Thus, diversity correlates positively with financial performance (Conway, et. al, 2018).

For these reasons, women’s success in university IT programs is critical to commerce and firm performance, as well as current and future living standards. We studied the impact of faculty gender in early math and IT classes on women students’ performance and retention in an open enrollment online undergraduate IT program.

Previous research has shown that demographic matching between faculty and student impacts female student outcomes. Carrell, Page, and West (2009) found that female U.S. Air Force Academy students taught by female instructors in early required math classes performed significantly better and were significantly more likely to take future math courses than those whose early courses were taught by men. Similarly, a study of 20 economics departments shows that the percentage of female faculty correlates with the percentage of female students graduating six years later (Hale & Regev, 2014, in Weeden, Thébaud, & Gelbgiser, 2017).

Cohoon (2001) found that computer science departments in Virginia retained women students at the same rate as men (an average 69% female vs. 46% male students starting in computer science in 1987 switched by 1991) when, among other things, there was at least one woman on the faculty and enough women students to support each other.

Dasgupta, Scircle, and Hunsinger (2015) randomly assigned first-year women engineering students to small study groups whose composition was experimentally varied, with some groups having 75%, 50%, and 25% women. Participating in female-majority groups improved women’s confidence, career