Chapter 4

Enhancing Participation in Computer Science among Girls of Color:
An Examination of a Preparatory AP Computer Science Intervention

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ABSTRACT

To address disparities in computing among girls of color, this chapter examines the impact of a multi-year, out-of-school computer science intervention with n=108 female high school students of color. This rigorous and comprehensive 5-week computer science intervention designed within a culturally-relevant framework, demonstrated the following outcomes: 1) one exposure to the intervention demonstrated a significant impact on computer science knowledge, attitudes, and access to diverse peers/role models, 2) the impact of the intervention endured after a 9-month period, and 3) repeated-exposure to the intervention (2 sequential 5-week interventions) produced greater growth than just one summer. These findings suggest that short-term interventions can be impactful, and repeated exposure opportunities are

needed to increase growth in knowledge, attitudes, and aspirations among girls of color in computing. This research provides preliminary data for a model for effective programming for girls of color in computer science and has implications for practitioners, researchers, and policymakers.

INTRODUCTION

Current data indicate that women comprise just 25% of the computing workforce, while African Americans and Latinos combined comprise just 15% (Bureau of Labor Statistics, 2015). By comparison, women comprise 50% of the U.S. population, and African American and Latinos combined make up 30% of the nation's population (U.S. Census Bureau, 2014). The underrepresentation of women, African Americans, and Latinos in the computing workforce is of significant concern for numerous reasons, including the future projected job growth in computing fields, the lack of supply of computing professionals to keep pace with the demand, and the demonstrated increased success and innovation associated with diverse teams (Carneval, Smith & Melton, 2011; Hunt, Layton & Prince, 2015; U.S. Census Bureau, 2014). Thus the continued underrepresentation of women, African Americans, and Latinos in computing has the potential to not only affect the continued economic success of the technology industry, but also has implications for creating innovative technological solutions to address problems affecting all segments of society.

Barriers to Computing Among Women of Color

In examining the computing pipeline, from K-12 education into the workforce, there are clear disparities in participation across the pipeline. At the high school level, females make up just 22% of all students taking the Advanced Placement (AP) Computer Science exam, while African Americans and Latinos participate in AP Computer Science at even lower rates (13% combined; College Board, 2015). In post-secondary education, women comprise just 19% of all computer science Bachelor's degree earners, with African Americans and Latinos also comprising a small percentage of students earning degrees in computer science (11% and 9%, respectively; NSF, 2015). It is also critically important to examine the outcomes of women of color as a unique population which is often overlooked in discussions of race and gender in computing. A growing body of literature discusses the "double-bind" facing women of color in STEM and the ways in which dual marginalized identities affect educational experiences in STEM fields (Ong, Wright, Espinosa & Orfield, 2011; Perna et al., 2009). Statistics reveal significant within-gender and within-race disparities affecting women of color in computer science. For example,

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