Chapter 8
Digital Youth Divas: A Program Model for Increasing Knowledge, Confidence, and Perceptions of Fit in STEM amongst Black and Brown Middle School Girls

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ABSTRACT

Women use technology to mediate numerous aspects of their lives, yet women of color are grossly underrepresented in the fields of computer science and engineering. Decisions about participation in STEM are frequently made prior to high school, and these decisions are impacted by prior experience, confidence, and sense of fit with community. The Digital Youth Divas (DYD) is an out-of-school program that uses narrative stories to launch the creation of digital artifacts and support non-dominant middle school girls' STEM interests and identities through virtual and real-world community. This chapter describes the framework of the Digital Youth Divas program, which blends narratives with project-based design challenges in an informal learning environment. Results suggest that our narrative-centered, blended learning program increases non-dominant girls' knowledge, confidence, and sense of fit in STEM activities.

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INTRODUCTION

Over the past decade Science, Technology, Engineering, and Math (STEM) career opportunities have increased; however, the majority of young women pursue non-STEM fields of study (e.g. Hill, Corbett, & St. Rose, 2010) with these disparities being even greater for women of color (e.g. Corbett & Hill, 2015; DuBow, 2011; Klawe, Whitney, & Simard, 2009). The underrepresentation at the high school level reflects the fact that decisions to participate in STEM are frequently made prior to high school (Ainley, Hidi, & Berndorff, 2002; Hulleman & Harackiewicz, 2009; Renninger, Nieswandt, & Hidi, 2015; Tai, Liu, Maltese, & Fan, 2006). Despite doing well in STEM classes early on, many girls do not pursue STEM subjects or majors due to lack of experience, confidence, and perception of lack of fit in the domain due to social and environmental factors and these concerns persists throughout life (see Hill, Corbett, & St Rose, 2010). Such factors are not uncommon given that non-dominant girls and youth from areas of lower socioeconomic status have limited access to in- and out-of-school opportunities and resources that have the potential to build their computational fluencies (Goode, 2007; Margolis & Fisher, 2002; Margolis, et al, 2008; Warschauer & Matuchniak, 2010; Watkins, 2012). For those who do have opportunities for participation in STEM activities, other factors can arise to hinder girls' confidence and sense of fit in the domain. These factors include STEM environments that breed negative stereotypes about girls' and non-dominant students' lack of ability to succeed in performing in STEM environments dominated by white male students, which can lead to feelings of isolation when there are few girls and non-dominant students (Hill, Corbett, & St Rose, 2010; Malcolm, Hall, & Brown, 1976; Margolis & Fisher, 2002; Johnson et al, 2011; Ko et al, 2014). This sense of fit becomes particularly important in middle school when students begin to have more authority to select the classes and programs in which they will participate (e.g., afterschool, electives), *and* are at a stage of identity development where they are critically concerned with fitting in. The lack of opportunities, low STEM confidence, and isolating STEM environment are all reasons why we see a decline in the number of non-dominant girls indicating an interest in STEM (Maltese & Tai, 2010; NSF, 2003a). These factors and declining numbers suggests that the racialized and gendered realities within STEM learning settings may make it difficult for many non-dominant girls to develop a sense of belonging (e.g. Hall & Brown, 1976; Margolis & Fisher, 2002; Johnson et al, 2011; Ko et al, 2014). Taken together, this growing body of research suggests that it is essential that we design STEM programming and curriculum that intentionally addresses issues such as prior experience, confidence, and sense of fit to increase the number of non-dominant girls who decide to engage in STEM activities.