Chapter 8
Improving STEM Career Aspirations in Underrepresented Populations: Strategies for Urban Elementary School Professionals

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ABSTRACT

The United States preK-12 educational system is uniquely positioned to assist elementary students, especially girls and minorities, in experiencing achievement and developing a self-efficacy in STEM, and consequently producing students who pursue STEM degrees in college and STEM careers. Thus, this chapter uses Gottfredson's Theory of Circumscription and Compromise and Bandura's concept of self-efficacy to identify barriers to STEM career aspirations that girls and minorities face in urban settings. These theories and research are also used to identify strategies for urban teachers and professional school counselors to improve elementary girls and minorities' STEM career aspiration.

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INTRODUCTION

Encouraging students to pursue degrees and careers in Science, Technology, Engineering, and Mathematics (STEM) is vital to the United States for both economic and ecological reasons (Douglas & Strobel, 2015). Having individuals in STEM fields influences the United States' ability to remain globally competitive in a world that is becoming increasingly dependent upon science and technology (Harwell et al., 2015; Museus, Palmer, Davis, & Maramba, 2011; National Academy of Science, 2006). Developing scientists and engineers for the 21st century is vital in meeting needs for clean water, adequate food supply, global communication, and shelter (Kanwar, 2010) as well as in enhancing the globalization of state-of-the-art-technologies (Buschor, Berweger, Frei, & Kappler, 2014).

Projections have demonstrated that nine out of ten of the fastest growing occupations require at least a bachelors' degree with mathematical or scientific training, and the largest increases in job openings in the United States are in computer science and engineering fields (United States Department of Labor, USDOL, 2013). Between 2008- 2018, STEM jobs increased by 17% in comparison to non-STEM careers increasing by only 9.8%. Additionally, individuals in STEM careers earn on average 26% more than those in non-STEM careers (Langdon, McKittrick, Beede, Khan, & Doms, 2011). Unfortunately, the Bureau of Labor Statistics (BLS) (2010) has noted that the United States is having an increasingly difficult time filling STEM positions due to retirement trends and a decrease in students choosing STEM degrees in college. In the 21st century, only 20% of the United States workforce has the STEM skills needed for new jobs (Granovskiy, 2018; NSTC, 2011).

Underrepresentation of women and minorities in STEM fields is also a concern (NSF, 2009, 2015). In the fastest growing fields of computer science and engineering, women hold fewer than twenty-five percent of the jobs (USDOL, 2013). Beginning at a young age, in general, men demonstrate a higher interest in the science-related study than women (Caleon & Subramanian, 2008). Despite similar capabilities, girls perform poorer than boys in science and math (Smith, Sansone, & White, 2007). Furthermore, African-Americans hold about only eight percent of science and engineering occupations; Hispanics only four percent; and American Indians, Native Alaskans, Native Hawaiians, Other Pacific Islanders, and multiracial individuals only three percent (NSF, 2009, 2015).

Complex factors influence the lack or skilled STEM workers as well as the underrepresentation of women and minorities in STEM careers. Among these factors are stereotypes and self-efficacy. Gender stereotypes that children encounter in early elementary school have been theorized to influence children's perceptions of self and gender appropriate careers in STEM (Gottfredson, 2002; Smith, Sansone, &

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