Chapter 1

Grace under Fire: Examining the Underrepresentation and Persistence of Women in STEM Professions from an Ecological Systems Theory Perspective

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ABSTRACT

Understanding why women are underrepresented in various Science, Technology, Engineering, and Mathematics fields remains an important area of research. In the United States and in many industrialized nations around the world, STEM professions remain male dominated. Explanations for why women are not participating STEM professions are many and diverse. The Ecology Systems Theory (EST) presents a lens through which the causes for the continued underrepresentation of women in STEM fields may be examined. EST is widely accepted theoretical framework for exploring the influences that contribute to the development of an individual. The study presented in this chapter explored the familial, educational, economic, and social experiences of 125 female participants working in a STEM field. Findings suggest there are influences at specific levels in EST that can and do affect the educational and career aspirations of women in relationship to STEM fields.

INTRODUCTION

The importance of recruiting and retaining women in science, technology, engineering, and mathematics (STEM) fields is a long-standing, widely accepted notion in the United States as well in many other nations around the world (American Association of University Women, 2010; Ceci, S., Williams, W., & Barnett, S., 2009; Kleinhubbert, 2013; Gayles, 2012). As far back as fifty years ago, researchers began

writing about the lack of women in science (Rossi, 1965). Recently, the call to recruit and retain women in STEM careers has reached all-time highs. The looming shortfall of professionals with STEM expertise has spurred the release of journal articles, books, and reports stressing the importance of increasing the number of females and minorities who major and then choose a STEM career (Committee on Equal Opportunities in Science and Engineering 2004; National Science Foundation (NSF) 2006a, b; Southern Education Foundation, 2005; Wagner, 2008; Bellanca, 2010). According to the Bureau of Labor & Statistics (2010), by 2018 computer and mathematical science occupations are projected to add 785,700 new jobs to the U.S. economy. Jobs in these fields is projected to grow at double the average pace for almost all other occupations. The projected demand for a workforce with degrees or credentials in a STEM field, coupled with the expected retirement of many current STEM professionals, makes recruiting and retaining women of particular importance (NSF, 2006b; Southern Education Foundation, 2005).

The Untapped Female Workforce

More women are attending universities and colleges than ever before in the history of the United States. The number of females enrolled in post baccalaureate programs has exceeded that of males since 1988 (National Center for Educational Statistics, 2013). The gap between females and males enrolled in college is even greater among Hispanics and African Americans than their white counterparts, (Lopez & Gonzalez-Barrera, 2014). The ratio of males to females earning advanced degrees furthers reveals the untapped potential of females as STEM professionals. As of 2011, among adults 25 and older, 10.6 million U.S. women have master’s degrees or higher, compared to 10.5 million men (National Center for Educational Statistics, 2015). Yet, amid the record-setting number of educated females who could potentially pursue a STEM career, there continues to be a formidable gap between women who earn STEM degrees and pursue a career in a STEM field as compared to their male counterparts (Freeman, 2004). Even more disheartening is the fact that for the past three decades policymakers, educators, researchers, and others have spent a great deal of time and resources implementing initiatives aimed at increasing the number of females in STEM careers. Numerous grants and programs exist to recruit more women into STEM careers. Some of the more well-known programs include: Educate to Innovate, The Girl Scouts STEM Program, The SciGirls Seven, and Techbridge. Yet, except for few fields such as biology and chemistry, little progress has been made in increasing the representation of women in STEM fields. Moreover, some fields, such as computer science and mathematics, have seen a decline in women earning bachelor degrees (AAUW, 2013; National Science Board, 2014).

The benefit of increasing the number of women who pursue and then attain a career in a STEM field is not limited to a larger more diverse workforce. The unique perspectives women possess can enrich and shape innovations made in STEM disciplines in distinctive ways. Case in point, recent improvements to Facebook’s features such as the photo viewer and news feed were the result of suggestions from female engineers (Huhman, 2012). With STEM professionals solving problems and working on improvements that serve males and females, it is logical to include perspectives from both genders. When the perspectives of only one gender dominate the work of STEM professionals, the products or solutions presented may include incorrect assumptions or worthwhile innovations may be overlooked. It is not difficult recognize that society as a whole is “enriched when women fully contribute the advancement of science and technology” (Milgram, 2011, p. 5). The real question is not why do we need more women in participation in STEM professions, but how can we convince more women to choose a STEM career. This is a lingering question, which has yet to be fully answered.
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