

Chapter 5

Understanding the Links between Mentoring and Self- Efficacy in the New Generation of Women STEM Scholars

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ABSTRACT

American colleges and universities are in need of innovative approaches to recruit and retain the upcoming generation of new faculty members. Specifically within the STEM (Science, Technology, Engineering, and Math) fields, there is an additional need to focus on meeting the needs of women in order to begin to address gender inequity within STEM. This chapter examines the impact of mentoring on self-efficacy for female graduate students and post doctoral fellows in STEM fields. Using data from a national study of selected U.S. academic institutions, recommendations are made in order to enhance mentoring practices that will reduce the barriers women face within STEM fields. Quality mentoring programs represent a viable way to enhance institutional change that may result in increased numbers of women in STEM fields.

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INTRODUCTION

Within the last two decades, the academic science fields have progressed in positive ways that are changing the face of traditional science departments within academia. American colleges and universities have experienced considerable changes in the demographic makeup of their student population, as well as an increasing number of individuals that are obtaining graduate degrees (Zumeta & Raveling, 2002; Valian, 1999). However, these promising accomplishments have not culminated in an increase in professional scientists, and in particular women scientists, within academia. The U.S. is not alone in struggling with issues of gender inequity. Multiple studies throughout the European Union (EU) have addressed gender inequity in STEM academia; while Finland and Southern Europe are more equitable, the rest of the EU is similar to the US with less than 10% of women holding STEM academic tenure track positions (Dewandre, 2002).

In the last decade, a common trend for U.S. STEM graduates has been to pursue careers in private industry and research (Zumeta & Raveling, 2002; Stewart *et al.*, 2007). The majority of individuals who are choosing careers in academia have been and continue to be primarily male (Stewart *et al.*, 2007; Zumeta & Raveling, 2002). Thus, although a larger, more diverse group of students are enrolling in science courses at universities across the U.S., the challenge remains for institutions to continue to increase the number of graduate degrees, and the diversity of those graduating within the science fields. A critical component of this challenge involves finding effective ways of mentoring women that not only enhance their recruitment into faculty positions, but also encourage them to remain in STEM academia as a long-term career choice.

Scholars have provided information on both the successes and failures of recruiting women into STEM academic fields. From as early as their middle school years, teachers can make a differ-

ence in the career choices of girls by encouraging them to participate and excel in science classes (Dyer, 2004). Other successes are attributed to the recruiting efforts of colleges and universities (Stewart, 2007), and the general social and demographic shifts of an increasing number of women in the professional workplace (Barber, 1995). Areas for improvement, found in past empirical studies, reveal that in terms of total numbers of earned graduate degrees, women outnumber men in terms of earned master's degrees, but fall short in meeting parity in earning doctorate degrees overall (Freeman, 2004). However, the gender gap identified does have the potential to be eliminated, and has been addressed through government interventions in both the European Union and the United States.

A long-term view of enrollments within academic science would indicate that traditional recruitment and retention strategies have resulted in a positive increase in the number of women within the STEM fields. The number of women in science and engineering rose from 16% of women obtaining bachelor's degrees in 1960 to 40% in 1989 (Barber, 1995). Doctoral degrees earned by women reported for science and engineering was 6% in 1960 and 28% in 1989 (Barber, 1995).

Despite the overall increase in the number of women within academia and specifically STEM departments, data reveal that a disparity in male and female enrollment still exists within science and engineering. Males are found to outnumber females in some STEM areas by rates as high as three to one throughout the educational pipeline (Freeman, 2004). Trends in the most severe gender divides in STEM areas have not changed substantially over the past two decades. Those with the greatest gender divide in earned doctoral degrees include: computer science (17% female), engineering (16% female), and physical sciences (26% female) (Freeman, 2004).

As a result, much work remains in the effort to recruit and retain women within the academic STEM fields. This study seeks to evaluate ways

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