

Chapter 9

A Globally Focused, Experiential Educational System for STEM Fields: Measures for Intentionally Promoting Diversity

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ABSTRACT

The diversification of the STEM labor force is essential to the health of the American economy, both because diverse teams are more adept at achieving project goals and because of shifting national demographics. Although the professional STEM workforce is currently more diverse than ever, sustained increases in diversity over the last 20 years has been relatively limited and may be decelerating. The focus of this chapter is specific programmatic components that can be implemented to intentionally supporting STEM students of diverse backgrounds. The hub of such an educational system would be Individual Development Plans (IDPs), which would empower students to follow an intentional path during their studies, combined with a strong focus on reflection and connection through ePortfolios and experiential learning both in academic projects and extracurricular professional activities such as internships.

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INTRODUCTION

The diversification of the STEM labor force is essential to the health of the American economy. Diversification provides a competitive advantage, as it is well established that diversity on project teams leads to superior attainment of project goals (Trygvgvason & Apelian, 2011). Further, industry and academic structures that are unable to train and support members of underrepresented populations in the STEM fields pose a threat to the American economy, as those populations are projected to grow most quickly over the next few decades – the U.S. Census estimates that by 2050, members of historically underrepresented ethnic and racial groups will make up more than half of the national population. Although the professional STEM workforce is currently more diverse than ever, sustained increases in diversity over the last 20 years have been relatively limited and may be decelerating; in some disciplines, the participation of conventionally underrepresented populations has been in decline since the early 1990s (Landivar, 2013).

The struggle to diversify the STEM workforce coincides with a period of gradual change in the fundamental focus of higher education. Conventional academic programs have focused almost entirely on professional preparation, providing students with the professional skills that were needed to succeed in the pre-internet business environment. With the rise of global connectivity, however, many in industry and academia alike have concluded that these skills alone will not be sufficient for student success, and are turning their attention to encouraging students to develop global competencies, the set of skills that will enable personal and professional success away from a student's home culture. Despite the widely recognized importance of producing globally competent STEM professionals, however, it is estimated that STEM majors make up less than 5% of the students that participate in off-campus programs, which are broadly regarded as the best mechanism by which to build global competencies (Parsons, 2010).

Although internships, co-op experiences, study abroad opportunities, learning communities, guest lecturers, project-based work, innovative classroom methodologies, student clubs, summer bridge programs, and similar activities can each contribute to supporting members of underrepresented populations as they build professional skills and global competencies in the STEM fields, such activities are often introduced as discrete components of an educational program and are almost always implemented and administered with goals other than diversifying an institution's student population. The complex and interconnected social, economic, and political processes that have resulted in the current demographic imbalance in the STEM fields is beyond both the scope of this chapter and the expertise of the authors, as are pre-college efforts that show merit in attracting members of underrepresented populations to the STEM fields. This chapter instead focuses on low-cost

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