Chapter 5

The Science Behind Support: Preparing Science Teachers for Urban Classrooms

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ABSTRACT

This chapter explores the graduate Secondary Science Teacher Preparation Program (TPP) at the University of the District of Columbia (UDC). The program addresses several critical needs in urban education and science teacher preparation using a combination of approaches that, when considered in light of one teacher candidate’s experiences, serve to meet documented deficits among current TPP frameworks. The experiences of one teacher candidate are described and analyzed in light of the research literature, specific aspects of the UDC TPP that are assisting in filling existing deficits and supporting underrepresented minorities in science teacher education are discussed, and needs for future consideration, research, and program implementation are presented.

DOI: 10.4018/978-1-5225-3454-9.ch005

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INTRODUCTION

The National Research Council (NRC, 2012) has reiterated the need for a renewed approach to the K-12 science education framework in the United States. This renewal targeted seeks to meet the science, technology, engineering, and mathematics (STEM) needs of a modern global society. Regardless of the various policies and regulations set forth in urban education, traditional science education programs have difficulty attracting and preparing underrepresented, minority students in STEM, thereby further contributing to the achievement gap among diverse learners in urban schools persists. Previous studies indicate that effective urban teaching is different from effective teaching in suburban areas, which suggests the rethinking of urban teacher preparation programs (Watson et al., 2006; Buffum et al., 2009; Kahle et al., 2000; NCES, 2011). To improve success with diverse learners, literature suggests that teacher preparation programs (TPPs) must apply teaching approaches geared towards overcoming systemic barriers—which often includes a lack of cultural responsiveness, racial and cultural underrepresentation, an unwillingness to recognize minority women teachers as assets to STEM and stem-related careers, and an overall absence of support.

At UDC, the secondary science education track was recently added to the Master of Arts in Teaching degree offerings. Partially funded by the National Science Foundation’s Robert Noyce Scholarship Program, the science education track is unique as the program prepares teacher candidates for teaching specifically in urban settings and purposefully integrates intense instructional experiences centered on the NRC’s Practices for K-12 Science Teaching (NRC, 2012). The current program at UDC is novel because it provides instruction that supports the success of urban minority teachers while providing a competitive edge regarding science teacher education with the intentional focus on the Practices of K-12 Science Teaching.

An integral part of the purposeful instruction on the Practices for K-12 Science Teaching is a required observational field component that each teacher candidate completes under the mentorship of a scientist or engineer at the University. Inquiry-based observational field or laboratory experience is crucial not only for fostering student learning goals in science and engineering, but also enhancing students’ critical thinking skills in learning and teaching (NRC, 2012). Subsequently, teacher candidates are provided opportunities to observe and participate in providing instruction in the urban and primarily minority middle school science classroom. This particular component of the UDC program is essential as it offers an opportunity for teacher candidates to work with individuals who themselves are underrepresented minorities in science. Thus, teacher candidates work with scientists and engineers that not only look like them, but may have similar experiences to their own or, importantly, to their adolescent students who may also be part of an underrepresented group.
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