

Preface

A major challenge in science education is how to encourage and support science teacher educators as they help preservice and practicing science teachers to encourage and support their adolescent students to participate at the highest level in science and ensure that all students learn quality science (Bryan & Atwater, 2002; Irvine, 1990; Russell & Atwater, 2005). Historically, science has been viewed by many as a culture-free, ethnicity-free, and gender-free discipline (Carter, Larke, Singleton-Taylor, & Santos, 2003). Fortunately, an increasing number of science education researchers acknowledge that there needs to be a significant change in the way science has been traditionally taught and instructional approach that emphasizes White, male, Western, and European perspectives (Atwater, 1994, 1995a, 1995b; Carter, Larke, Singleton-Taylor, & Santos, 2003). For example, a key component in this paradigm shift is the necessity to emphasize culturally relevant pedagogy in the classroom, a “pedagogy characterized by individual and collective empowerment” (Ladson-Billings, 1995a, 1995b, 2000).

With the aforementioned challenge in mind, it is imperative that science teacher educators understand how they can better prepare teachers to teach all students and be empowered with the best practices for promoting success. Research demonstrates that teachers tend to teach the way they were taught and subsequently they are more than likely to rely on methods that are heavily textbook-oriented and less on hands-on, inquiry-based learning (Carter, Larke, Singleton-Taylor, & Santos, 2003; Seung, Bryan, & Butler, 2009). Moreover, there are few based on research in best practices for equity in science teaching can serve as resources to science teacher educators that provide knowledge about multicultural science pedagogical strategies to better educate preservice and practicing teachers from multicultural and social justice perspectives in their college courses and professional development activities (Atwater & Butler, 2006; Butler, Lee, & Tippins, 2006; Eide & Heikkinen, 1998; Lawrence & Butler, 2010).

This book is designed as a resource for science teacher educators to ultimately emphasize the critical role that multicultural education, equity, and social justice have on the teaching and learning of science for adolescents from all backgrounds.

Moreover, science educators will find this book useful for professional development workshops and seminars for both novice and veteran science teachers. Many questions arise in discussions with teachers during professional development activities, as well as in the context of science teacher preparation programs that stem from a lack of commitment, knowledge, understanding, and obvious cultural dissonance between school professionals and the student populations that they teach on a daily basis. We thank the staff of Springer—Bernadette Ohmer, Publishing Editor Education, Marianna Pascale, Senior Editorial Assistant Education, and Shanthy Gounasegarane, Project Manager, SPi Content Solutions – SPi Global—for their support and assistance in the publication of the book. With this in mind, it is our hope to encourage science teachers to become actively involved in transforming their curriculum, pedagogy, and assessment to increase the scientific pool so that students from traditionally marginalized and underrepresented groups in STEM areas realize their full potential in science.

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