


Chapter 7

“I'm in it for the People”: Leveraging Culturally and Historically Responsive Teaching and Learning Towards Humanizing Science Instruction

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ABSTRACT

This chapter examines both the shortcomings and potential of current K–12 science education reforms in addressing racial inequities and centering race and racism. Despite efforts by The Framework for K–12 Science Education committee to promote “Science and Engineering for All,” existing policies fail to adequately recognize race and racism as key factors influencing educational inequality. The chapter advocates for integrating Muhammad’s (2020) culturally and historically responsive teaching and learning framework as a guiding tool for science educators. Drawing from the narratives and lesson plans of two early-career science teachers who engaged with Muhammad’s (2020) work before science content, the chapter illustrates the practical application of the history, identity, literacy, and liberation framework. The participants’ experiences highlight the human connection central to teaching and its alignment with the history, identity, literacy, and liberation framework, demonstrating how centering criticality and identity in lesson planning can improve learning outcomes.

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INTRODUCTION

I'm not necessarily just in teaching to be a science teacher. I'm in it for the people, and so it really made a difference to me to learn about the HILL framework. (Autumn, Interview, August, 2024)

The Framework for K–12 Science Education committee addressed inequities in science education, adopting the tagline “Science and Engineering for All” (National Research Council, 2012, p. 2). The committee dedicated a chapter to the diverse nature of K-12 students, highlighting achievement and learning gaps while proposing strategies to mitigate inequitable practices. They asserted, “Science and engineering practices can serve as productive entry points for students from diverse communities—including students from different social and linguistic traditions, particularly second-language learners” (National Research Council, 2012, p. 13). Discussions of diversity and inclusion must be compelling to ensure that all student identities are reflected in science education policies. Despite these efforts, the reform documents neglect race and racism. The Framework contains no discussion of racial ideologies in the classroom or their impact on teachers and administrators. U.S. Supreme Court Justice Blackmun (1994) stated, “In order to get beyond racism, we must first take account of race” (p. 5). Failing to foreground race as a primary driver of inequality shifts responsibility for opportunity and achievement gaps onto Black students rather than systemic structures. This omission frames disparities as student deficiencies rather than systemic failures. Rodriguez (2015) critiqued the framework and Next Generation Science Standards (NGSS), arguing:

The Framework and Writing Team committees could have acknowledged these institutional, historical, and sociocultural realities more directly and could have provided arguments to counter them. In this way, our work as teacher educators/researchers could be made more productive by using important national policy documents, such as the NGSS[s], as leverage to counter teacher resistance to pedagogical and ideological change. (p. 12)

Reform documents can reshape discussions on Black students’ science learning. Rodriguez (2015) emphasized the need for science education to evaluate how reform is enacted, particularly regarding teachers’ resistance to ideological change. Science education and teacher preparation must incorporate the critical race theory tenet, the centrality of race and racism. This tenet asserts that race permeates all aspects of U.S. historical and social life (Stefancic & Delgado, 2000). As Ladson-Billings (1998) and Gillborn (2005) observed, racism is not an isolated occurrence but an embedded, ongoing process. Solórzano and Yosso (2001) noted that “In this, a [critical race theory] acknowledges how notions of objectivity, neutrality, and meritocracy, as well as curricular practices, such as tracking, teacher expectations, and intelligence testing, have historically been used to subordinate students of color” (p. 2). Science

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