Chapter 3
Centering Students' Resources:
Curricular Customization for Responsive and Expansive Science Teaching

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ABSTRACT

Teachers play a pivotal role in developing culturally responsive science instruction, yet often need support in shifting their classrooms' culture and epistemic power structures. This chapter focuses on research from three different professional learning communities (PLCs) that developed and used an equity-centered curricular customization model with teachers to support their enactments of middle school science curriculum materials. Specifically, the customization model consisted of four stages:

(1) (Re)establish an equity goal with student data; (2) Analyze curricular materials to plan customization; (3) Enact and collect student data; and (4) Reflect on the equity goal and enactment. The chapter shares examples from each PLC focused on a different equity goals: supporting emergent multilingual learners, increasing relevance and encouraging more voices and perspectives. By centering their work on their students, the teachers were able to develop more responsive and expansive science classrooms that looked significantly different depending on their equity goal.

INTRODUCTION

Current science education reform efforts advocate that learners develop science knowledge and practices that are anchored in their lives and applicable to real world questions and problems (National Research Council, 2012; National Research Council, 2015). Shifting classrooms toward places where learners build and apply science ideas and practices requires moving from *learning about* science that others have done, to *figuring out* questions and problems that students identify (Schwarz et al., 2017). These goals position students as "sense-makers and doers of science" (Miller et al., 2018, p. 1056) in which their questions and ideas drive instruction.

Teachers play a pivotal role in developing culturally responsive science instruction, yet often need support in shifting their classrooms' culture and epistemic power structures (National Academies of Sciences, Engineering, and Medicine, 2015). In this chapter, we share examples from research on three different professional learning communities (PLC) in which we developed and used an equity-centered curricular customization model with teachers to support their enactments of the OpenSciEd curriculum materials. First, we describe our conceptual framework that motivated the need for this work. Next, we provide an overview of the equity-centered curricular customization model. Then we share the three PLC cases utilizing examples from the teachers' classroom practice to illustrate how this customization model helped support responsive and expansive science classrooms.

CONCEPTUAL FRAMEWORK

Equitable Sensemaking in Science

Odden and Russ (2019) define sensemaking as "the process of building an explanation to resolve a perceived gap or conflict in knowledge" (p. 187). However, a commitment to knowledge building as a social practice entails that the work is meaningful and in service to students' own goals and questions, rather than learning

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