



Using Case Study  
Research to  
Transform Science  
Teaching and  
Learning at Public  
Schools



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# Overview

Q1. How do I situate my case study to explain the phenomena that I am studying at different phase of my work?

Q2. What are some core strategies I might share?

# Who am I? How do my identities shape my approach?

- A first generation, Asian, female, immigrant, and multilingual scholar
- A former secondary science teacher
- Currently working at a highly privileged setting as a tenured faculty member
- teacher educator
- **Educational** researcher who cares about science education- and teacher education-related matters



Image source: <https://engineerinclusion.com/what-is-positionality/>

# Why Do I Use Qualitative Case Study?

- As an educational researcher, I view my role as not just understanding educational phenomena, but also improving them.
- Improvement: “doing things better” “doing better things” (Fisherman & Herrenkohl, 2022)
- For me, the heart of improvement work is disrupting and transforming the status quo of the public education that perpetuates unjust for minoritized students, and working toward a more just, thriving future
- The questions that I am interested in?

**What works?**

**How/Why  
does it work?**

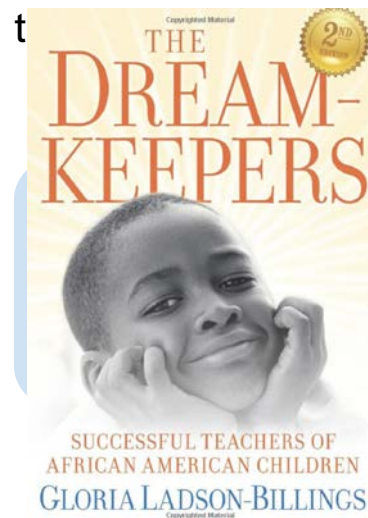
**What is possible?**

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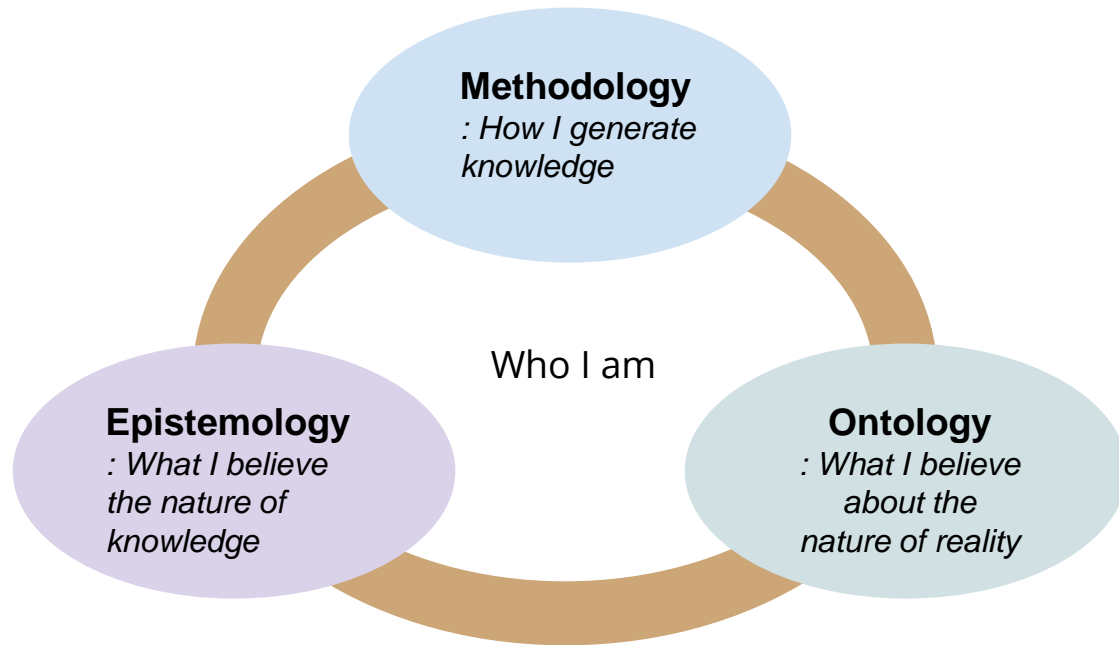
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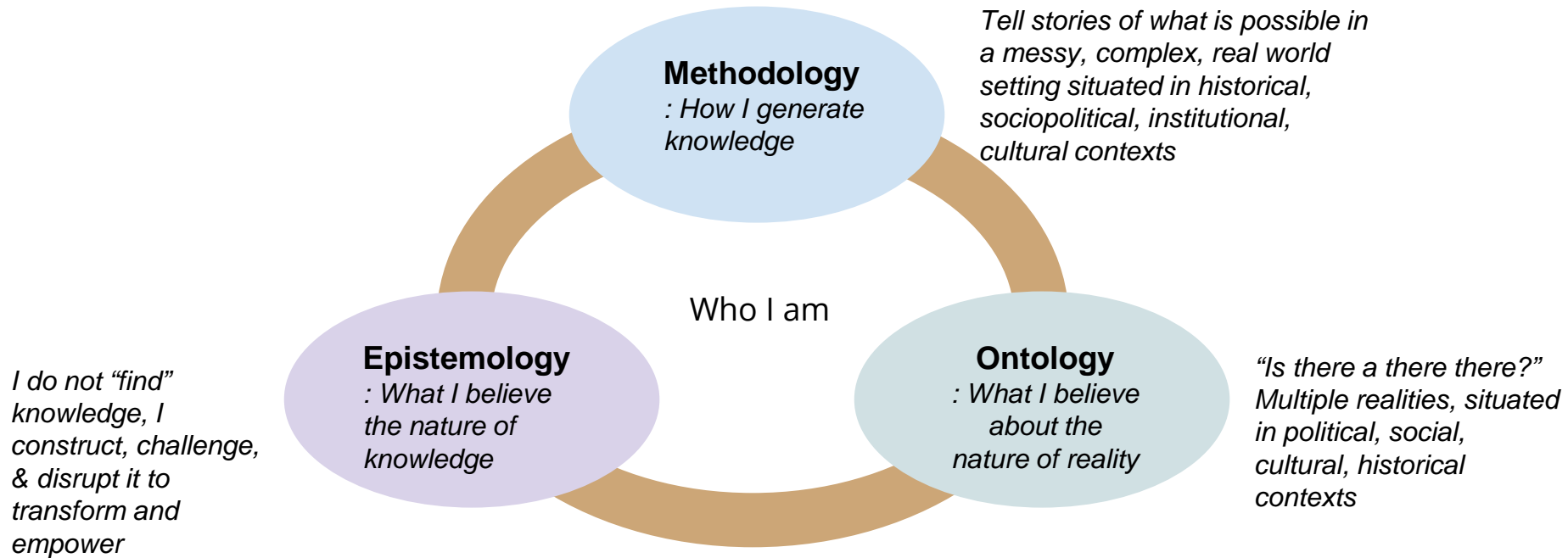


University of  
California, Irvine

# Why Do I Use Qualitative Case Study?



# Why Do I Use Qualitative Case Study?



# How can we expand minoritized students' opportunity to learn in secondary science classrooms?

Classroom instruction of the secondary science teachers who have opportunities to co-design and enact equity/justice-centered curriculum (preservice teacher education, partnership)

What is possible?  
And how and why...?



# Why this case?

Classroom instruction of the secondary science teachers who have opportunities to co-design and enact equity/justice-centered curriculum (preservice teacher education, partnership)

Intentionally selecting an exceptional teacher's interactions with minoritized students



## Teacher Responsiveness that Promotes Equity in Secondary Science Classrooms

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### ABSTRACT

This study aims to deepen our understanding of teaching, specifically the role of teachers' responsiveness in promoting equity in secondary science teaching. To build a conceptual argument—that teachers' responsiveness expands the opportunity to learn for students from historically marginalized communities—I explore one high school science teacher's classroom instruction using multiple forms of data collected over 2 academic years. The teacher worked with students from Latino, immigrant, and low-income communities. The data were analyzed focusing on both describing observable teaching behaviors and interpreting their meanings in relation to students' opportunity to learn. The analysis showed that a "responsive" teacher who expanded students' opportunity to learn attended to students' identities, historical relationships, struggles, and ideas. The teacher addressed students' relational challenges in participating in disciplinary practices at the stages of both planning and instruction while working against settled hierarchies, cultures, and ideologies reflected in dominant discourses. The theoretical significance and methodological complexity inherent in recognizing teachers' responsiveness for equity are discussed.

### Introduction

This paper seeks to articulate the features of teachers' responsiveness that promote equity in the context of secondary science teaching. Research shows that teachers' responsiveness to diverse learners is essential in creating strong learning contexts for youth from non-dominant communities in science classrooms (Bang & Medin, 2010; Ladson-Billings, 1995; Nasir, Rosebery, Warren, & Lee, 2006). Recently, efforts have increased to study and characterize teachers' responsiveness in the context of complex classroom settings (e.g., Kang & Anderson, 2015; Russ & Luna, 2013; Thompson et al., 2016). The underlying assumption of this movement is that characterizing teachers' responsiveness will help teacher educators to facilitate professional learning in both pre-service and in-service contexts, and in turn improve students' learning experiences in classrooms.

Despite growing recognition of the importance of teachers' responsiveness, the teacher education community struggles to design and facilitate professional learning that enhances teachers' responsiveness for several reasons. First, the current notion of teachers' responsiveness as a means to promote equity is under-developed and under-theorized. From sociocultural and situative perspectives (Greeno, 2006; Lave & Wenger, 1991; Wenger, 1999), every action that teachers take can be viewed as a response to a situation, including "not-responding" to certain behaviors or ideas. One cannot discern the productivity of a teacher's actions (or inaction) at a particular moment and with a particular group of students, without interpreting the *meaning*—whether and how the teacher's response facilitates student learning. Meaning-making is always situated in a

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Through the detailed and in-depth analysis of a teacher's classroom interactions for two years, I intended to:

- challenge and expand prevalent, cognitive oriented conceptions of responsive teaching or teacher responsiveness
- offer a new conception about teacher responsiveness that promotes equity in secondary science classrooms

# My core strategies #1: continuously ask '*Why*'

- Why am I doing this study? For whom, and towards what ends?
- Why am I selecting this case, not the others?
- Why is it a 'good' or 'the best' case given the goal and purpose of this study?



# My core strategies #2: Work for theorizing, beyond describing

- How does my case study provide a **new insight** into the focal phenomenon or problem?
- How does my case study generate **new languages** that facilitate the meaning-makings of the focal phenomenon?



My core strategies #3: use a 'good theoretical lens' that enables me to see something new and important

- What is my analytical lens that guides the systemic, critical and thoughtful analysis of my cases?
- What is the unit of analysis?
- What is this study really about? What is the story that I am trying to tell?





Thank you!

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