PRE-SERVICE ELEMENTARY TEACHERS NAVIGATING TENSIONS RELATED TO CLASSROOM SOCIAL DYNAMICS THROUGH HYPOTHETICAL TEACHING SCENARIOS

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This study uses hypothetical teaching scenarios as a methodology to explore pre-service teachers' reflective practices about social dynamics in elementary classrooms. Here we unpack tensions that emerged for pre-service teachers as they explored the role of the teacher in responding to a scenario involving third-grade students navigating ideas of mathematical equivalence. In particular, we contrast approaches focused on teacher control with approaches focused on student ownership, attending also to pre-service teachers' emphasis on the individual versus the group. Finally, we share design and methodological implications for the development and use of hypothetical teaching scenarios in teacher education.

Keywords: Teacher Education - Preservice, Elementary School Education, Classroom Discourse, Equity and Diversity

Background and Goals

This research explores how *hypothetical teaching scenarios* (or "case-based scenarios") as a methodology can foster pre-service teachers' reflective practices about social dynamics in classrooms. This paper sits at the intersection of literature on teachers' reflective practices (e.g., Zeichner & Liston, 1996) and case-based scenarios as a research tool for providing authentic windows into the teaching profession (e.g., Sykes & Bird, 1992). Here we explore how scenarios can elicit tensions among pre-service teachers (PSTs) about their views on teaching. One such tension, which has been highlighted in existing literature, centers on classroom approaches focused on teacher control versus student ownership (Stefanou et al., 2004). This tension is knowingly important as new teachers tend to teach in ways similar to how they were taught (Buchmann, 1989), yet mathematics reforms have encouraged a shift toward more student-driven mathematics engagement (National Council of Teachers of Mathematics, 2014). By identifying nuances in this tension through unpacking PSTs' responses to one scenario, we can learn more about how hypothetical teaching scenarios can foster reflective practices in this important area.

A body of work has documented the value of teachers developing *reflective practices* (Zeichner & Liston, 1996), or skills that enable teachers to observe and notice students' social interactions and ideas about content in a classroom. While these skills are important for responding to and building on students' thinking in the moment (Barnhart & van Es, 2015; Jacobs et al., 2010; Stockero, Rupnow, & Pascoe, 2017), learning to notice can be difficult (Jacobs, Lamb, & Philipp, 2010; van Es & Sherin, 2002), and teachers sometimes focus on their own behaviors at the expense of student thinking (Star & Strickland, 2008). While many approaches exist with related goals (e.g., Nichols, Tippins, & Wieseman, 1997; Rich & Hannafin, 2009), here we explore *hypothetical teaching scenarios* as a mechanism for supporting PSTs' development of reflective practices, particularly related to classroom social dynamics.

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In this work we use one hypothetical teaching scenario to examine PST perspectives on the role of the teacher in addressing issues related to social dynamics in the elementary classroom. Specifically, we explore the tension between traditional approaches in which the teacher maintains control and student-centered approaches in which students drive much of the decision-making and social work of learning (Stefanou, Perencevich, DiCintio, & Turner, 2004). The following two-part research question guides our work: How do PSTs respond to a hypothetical teaching scenario about social dynamics and mathematical equivalence in an elementary classroom? More specifically, what tensions emerge as elementary PSTs engage in reflective practices about mathematics teaching and learning through discussion of the scenario?

Methodology

Case Design

This study builds on the long history of using case-teaching in teacher education (Sykes & Bird, 1992) as a method for supporting teacher candidates in learning a variety of necessary teaching skills and practices for engaging in what Shulman (1992) called "the messy world of practice" (p. xiv). Here we continue the trend of using such cases to capture teaching dilemmas with no clear resolution (Carter, 1999) and to analyze these cases through open-ended qualitative coding of teacher candidates' discussions (Southerland & Gess-Newsome, 1999). In particular, we explore PST discussions that emerged in response to a particular scenario involving three third-grade students working to solve an equivalence problem ($8 + 5 + 4 = 4 +$ ___). The teacher overhears their conversation (Figure 1), in which a hypothetical student ("Pat") tries to get his peers to attend to the location of the equal sign. After reading the scenario, PSTs were prompted to discuss the dynamic among the students: "How do you think the dynamic came about?" and "If you were the teacher, when would you intervene? How? What would you do?"

Rebecca:	I'm not sure what to do. I'm confused. Do I fill in the blank?
Pat:	This is so easy guys! The answer is just 13.
Rebecca:	I don't think it's easy. That was rude Pat.
Gabe:	Plus, I don't think you did it right Pat. I think the answer is 17. Cause 8 plus 5 plus 4 is 17.
Rebecca:	Yeah. That seems smart.
Pat:	You guys are so dumb. You have to pay attention to the equal sign...
Gabe:	Don't act like the boss of us. You always act bossy.
Rebecca:	I think it's 21. Cause I added it all up.
Pat:	If you guys would just listen I could teach you how to do it.
Gabe:	We can figure it out ourselves. Thanks anyway.

Figure 1: Student Dialogue in "Mathematical Equivalence" Teaching Scenario

The dialogue in Figure 1 was adapted from Heyd-Metzuyanim & Sfard (2012) and Langer-Osuna (2011), with a focus on issues of gender in math class interactions. Additionally, the mathematical content for this scenario (equivalence) connects with standards 1.OA.6 and 1.OA.7 in the *Common Core State Standards for Mathematics* (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010), as well as literature that highlights how noticing the location of the equal sign impacts strategy use and learning outcomes (Alibali, Crooks & McNeil, 2018; Gutiérrez et al., 2018). Further details about the design of this scenario, including the racialized and gendered aspects are discussed in Gutiérrez et al. (2019).

Data Collection and Analysis

Forty-eight elementary PSTs (Mean age = 23.9, *SD* = 4.1) who engaged with the "Mathematical Equivalence" scenario in a math content course for elementary teachers consented to participate. Thirty-three identified as female, two identified as male, and the rest did not report gender identification. The PSTs were randomly assigned to small groups (N=14; 2-4 per group), with 10 minutes to read and discuss the scenario. All discussions were audio recorded and transcribed, and analysis began with an initial process of open coding and data reduction (Saldaña, 2015). The complexity emerging in PSTs' responses related to the role of the teacher in the scenario then led us to identify tensions that emerged around how to address issues related to social dynamics, which we present here along with illustrative examples. Our goal here is to offer interpretations of the tensions we observed and capture the complexity of PSTs' perspectives (Stake, 1995), rather than attempt to systematically characterize all instances of PSTs' reflective practices in the data corpus. By offering rich examples, we aim to demonstrate how this particular hypothetical teaching scenario elicited and promoted critical reflection around crucial topics such as classroom power dynamics.

Findings

Here we examine tensions related to social dynamics that emerged as elementary PSTs discussed the scenario. While some PSTs groups directly grappled with the tensions identified, weighing the benefits and drawbacks of different approaches, other groups explored only one possible pathway. The presence of such wide-ranging approaches across conversations suggests affordances of bringing these approaches into conversation with each other, an implication we take up in our discussion section.

In their conversations, PSTs explored the tension between teacher-led and student-led approaches to addressing issues of power in the mathematics classroom. For example, Group 12 discussed when – and whether – the teacher should intervene in group dynamics. To begin, one PST commented, "I feel like really if I were listening when Rebecca's like that was rude Pat, I feel like I would have been like, Rebecca's right—that is rude, Pat! That's not really like a thing to do because then they're just gonna be wanting to be calling each other out." A second PST noted that "then Rebecca might feel that like you're on her side, like you're picking sides" and questioned, "Or do you kind of just like let them figure it out on their own?" After a brief discussion about lessons learned in another course, the first PST then noted that the latter approach aligns more closely with what the PSTs were taught: "I feel like there's—I mean—you're supposed to encourage them to talk it out." The second teacher concurred and added benefits, saying, "That's what I was thinking. Like let them learn more social skills and stuff."

In this discussion, the PSTs questioned whether they should jump in to let Pat know that his behavior was unacceptable, or whether they should let the students "talk it out" themselves. The PSTs also briefly attended to the goals a teacher might have related to avoiding choosing sides and helping students to learn social skills. This discussion exemplifies the tension between approaches that emphasize teacher control versus student ownership.

A PST in a different group encapsulated this struggle between wanting to take action and letting the students try to handle the situation on their own: "The initial reaction is to, as soon as you hear that negativity, step in. But, sometimes it's better to let that negativity keep going so that they work it out and then you approach at the end and say, 'Okay, how could we have done that better?'" (Group 11) After more discussion, the same PST then elaborated on one challenge of trying to refrain from intervening as a teacher: "It's also hard because in real time, you don't know what comes after each sentence. So you're like, do I stay and wait for this? Do I intervene now? Do I check out another group? I don't know." (Group 11) In both groups, the PSTs acknowledged benefits of letting students "work it out" or "talk it out" and "learn...social skills"; here, however, the PST identified a challenge

related to that approach -- that the situation might get worse without teacher intervention ("you don't know what comes [next]") -- identifying one source of tension related to determining the teacher's response.

Within discussions about how to navigate student social dynamics, another issue emerged for PSTs – whether intervention should occur at the individual or group level. In Group 7, a PST started by suggesting that the teacher talk to Pat and "maybe say like, 'Just cause something's easy for you doesn't mean it's easy for everyone else….Can you help explain it to Rebecca?'" Then one of the other PSTs chimed in to suggest, "I think it'd be better to recognize [the] group. You know, I don't think anybody wants to be pulled aside individually." While many other PST groups did not explicitly debate these approaches, disparate ideas were offered ranging from "talk to Pat beforehand" to "go over group work rules [with] the whole class."

Here we see multiple dimensions of how the tension related to the teacher's role in addressing classroom power dynamics played out in PSTs' discussions. PSTs struggled through the issue of when (and if) to jump into conversations and whether intervention should occur at the individual or group level. In both instances they reflected on power dynamics while trying to work out the teacher's role in these interactions.

Discussion

Hypothetical teaching scenarios offer a productive avenue for eliciting tensions experienced by pre-service teachers. We argue that discussion of such scenarios serves multiple purposes: First, the scenarios serve as stimuli that allow PSTs to engage in and build their capacity for reflective practice in which they consider differing approaches to the teacher's role in responding to issues related to social dynamics. Second, hypothetical teaching scenarios can be used as research tools to understand PSTs' perspectives and struggles and to identify points of tension that are ripe for future investigation. Third, these scenarios can serve as teaching tools to elicit different PST viewpoints and then put contrasting perspectives in conversation with each other. While some PST groups in our data corpus explicitly discussed pros and cons of contrasting approaches in a given area, others primarily focused on one potential approach, suggesting benefits of facilitating discussion across groups, an approach we will take in future research. As teacher learning communities often avoid explicit disagreement and discussion of contrasting perspectives (Dobie & Anderson, 2015; Grossman, Wineburg, & Woolworth, 2001), we argue that hypothetical teaching scenarios can serve as a productive resource in teacher education for elevating issues with which PSTs grapple. Furthermore, engaging with such scenarios can help to create a culture of rich discussion around tensions of teaching and learning while also fostering PSTs' reflective practices in ways that can provide opportunities for future learning.

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