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Equity Oriented Experiences for Emerging Teacher Leaders

Equity is essential to the improvement of mathematics and science teacher education across grades K-12 (c.f., Gutiérrez, 2012; Jacobs, 2012). Though there is research on teacher learning and practices with a focus on equity, there is little established research concerning teacher leadership with an equity focus (Milner, et al., 2015). A five-year Noyce mathematics and science master teacher fellowship program was designed to advance 20 teacher leaders (TLs), from high-need urban districts, in their development as teacher leaders. Twelve of the TLs have been working with a team of mathematics and science education researchers, with expertise in urban schooling, to improve the learning experiences of their students in *all* demographic groups, as well as learning to lead their school-site colleagues. In addition to their work with the urban school team, the TLs were also introduced to the Professional Noticing Framework by Jacobs et al. (2010) that includes *attending* to students' ideas, *interpreting* what the student's understandings are as evidenced by their ideas, and *deciding how to respond*. We investigate how their experiences with the urban school team and the Noticing framework provide opportunities to enrich conceptions of equity and so contribute to knowledge of how mathematics and science teacher educators can support emerging teacher leaders.

Theoretical Framework

Gutiérrez's (2012) four dimensions of equity provides a framework to examine TLs' conceptions of Equity. This framework expands on the familiar dimensions of *Access* and *Achievement* by including two more dimensions, *Identity* and *Power*. These dimensions are further organized along two axes, dominant and critical, with *Access* and *Achievement* on the dominant axis and *Identity* and *Power* on the critical axis. *Access* refers to the tangible resources that enable students to participate in mathematics. These resources may include high-quality teaching, technological and classroom resources, and a rigorous curriculum. The dimension of *Achievement* is centered on student outcomes, which might include grades, standardized test scores, or having a math-based career. The *Identity* dimension acknowledges that students who come from varying personal, cultural, or linguistic backgrounds may experience education differently. Issues of *Identity* address questions of whether students are encouraged to use their cultural resources in the classroom and whether they view the content as meaningful to their lives. The final dimension, *Power*, takes a broader view of equity to describe how societal systems may remain inequitable despite students' experiencing equity along the other three dimensions. Issues of *Power* might be measured in terms of who has a voice in the classroom and what opportunities there are to use the tools gained in mathematics courses to analyze social justice issues. Gutiérrez argues that for equity to be achieved, it must be satisfied along all four dimensions.

Data and Methodology

Participants

This study examines the experiences of 12 mathematics and science teachers and their opportunities to learn about equity in their first year of the fellowship. The participant group consisted of seven mathematics teachers and five science teachers whose grade levels ranged from third grade through high school. Demographically, the

group consisted of seven who identify as women and five who identify as men with a mix of cultural backgrounds: 5 White/nonLatinx, 5 Latinx, 1 Vietnamese-American, and 1 reporting mixed ethnicities. Although the TLs do not proportionally represent the ethnic diversity of the local K-12 student population, the ethnic diversity of the TLs more closely mirrors the student population than the local teacher workforce.

Data Corpus

Data sources included transcripts and teachers' written contributions from six, three-hour sessions with the urban school team and their responses to a survey administered after the last session. In two coaching sessions with the team, participants were introduced to the eight *Teaching Practices from America's Best Urban Schools* (Johnson et al., 2019). The TLs spent two three-hour sessions where they were responsible for synthesizing and demonstrating meaning for all eight practices. Another coaching session, also led by the team addressed the Cultural Wealth Model, a framework that describes how marginalized students experience academia from a strengths-based perspective (Yosso, 2005). These sessions were recorded and transcribed. We analyzed the written contributions from the Cultural Wealth session. Toward the end of the year the teachers responded to a survey synchronously. Three of five questions were utilized in this study:

Thinking back over the last year, we'd like you to reflect on the ways in which the project may have influenced you as a teacher and teacher leader:

1. *What are (up to) three specific ways in which the work has influenced your practice as a teacher?*
2. *What are (up to) three specific ways in which the work has influenced you as a teacher leader?*
3. *What connections do you see between the [Urban Schools Team] and Noticing work (please be specific)?*

Methods

We took Gutiérrez's four dimensions of equity: Access, Achievement, Identity, and Power (Gutiérrez, 2012) as an a priori coding scheme to analyze the transcripts, written contributions, and survey responses (Miles & Huberman, 1994). Initial analysis was conducted by two researchers, who reached consensus on all but a few items. In areas of uncertainty, the two initial researchers consulted with the larger research group to reach agreement.

Results

An analysis of whole group discussions and reflections revealed that the Noyce TLs have had several opportunities to engage with equity issues that align with both the Dominant and Critical axes. For example, in one coaching session, teachers discussed the practice, 'Ensuring Culturally, Socially, and Personally Responsive Teaching'. This practice describes teachers' pursuit of delivering lessons that carry meaning for students by building connections to their "interests, backgrounds, cultures, and prior knowledge" (Johnson, et al., 2019, p. 56). This practice also engages teachers in thinking about students' identities by building lessons that are relatable to them. Furthermore, this practice goes beyond knowing about students in general and challenges teachers to take the time to get to know their students as individuals. One takeaway from this practice that was discussed by TLs was that "lessons are never

culturally neutral." The following excerpts from two TLs highlight the understanding that mathematics learning is dependent on students' backgrounds, language, and culture - elements that contribute to identity.

*"culture is kind of like, that's our lens of how we take in information. So even in mathematics, how we understand math depends a lot on our own experience. And so when we say that the lessons are not culturally neutral is the degree to which students are engaged with any task in class is based solely on their own experience." (Celeste, 10/20/21)**

"And so also adding to that the agency that the students bring in, you know, I have a lot of students who are English learners, are emerging language learners, even for them, sometimes it's easier to count in Spanish. So we count in Spanish. You know, like again, the way that they talk about math, whatever words they use it still, you know, it's still important. " (Camila, 10/20/21)

In another coaching session the TLs discussed the Cultural Wealth Model (Yosso, 2005). This framework includes six types of cultural capital that are offered as a way for teachers to "frame their interactions with students" (Yosso, 2005, p. 69). In particular, the TLs discussed *resistance capital*, which is characterized by the empowerment students gain from their parents, community members, and a "historical legacy of social justice" (Yosso, 2005, p. 70). The TLs thoughtfully engaged with this idea, identifying ways that they can incorporate societal issues of inequity in the classroom.

"Resistance Capital is recognizing and incorporating ways for students to advocate for and improve their community." (Adrian, 4/6/21)

"What issues are relevant to or important to them, and then finding the math relevant to that interest. E.g. overcrowded classrooms, property value and how neighborhoods were gentrified." (Jayme, 4/6/21)

Identifying the need to provide ways for students to engage with systemic social issues and analyze the world around them is aligned with the dimension of Power. These excerpts demonstrate the TLs' understanding that mathematics and science are interpreted through students' identities and that it can and should be used by students to address the issues they face outside the classroom.

The survey revealed further evidence that the TLs engaged with ideas about equity that aligned with all four dimensions during their first year of the fellowship. There were eight excerpts, across five TLs, identified with Access. There were also eight excerpts, across six TLs, identified with Achievement. Identity was the most common, with 12 excerpts coded across eight TLs. Lastly, there were two instances of Power from the submissions of two different TLs. The TLs free responses coded as Access frequently discussed the TLs' ability to elicit student thinking through lesson or curriculum design. The TLs recognized a need for students to have access to high-quality teaching and curriculum. One TL wrote:

“In the same way schools that are recognized by [Urban Schools Team] are schools that are not watering down curriculum but maintaining high standards and making content accessible whether it be culturally relevant, or project/problem based.” (Antonio, Q3)

Most excerpts coded with Achievement focused on viewing student work from a strengths-based perspective. Although the TLs did not discuss assessment we interpret a strengths-based perspective as a precursor to more equitable grading.

“My experiences with our professors, the [urban schools] conference and the essence of the [Urban Schools Team] program have challenged me to think more about equity in our educational system and constantly reassess my role as an educator. When I have taken part in the noticing work, I have seen how it leads to the teacher or teachers have a deeper perception of the students' understanding of the work and to build from what they know instead of what they do not know. The Noticing work is an important tool for educators to provide more equity for their students and when teachers collaborate for their students.” (Claire, Q3)

The survey responses that were coded as Identity frequently discussed building relationships with students as a way to make all students feel valued and also acknowledging that they have their own experiences and knowledge that they bring to the classroom.

“I also have noticed that I try to make connections with my students so they can feel more comfortable learning, whether that be through lessons that they can relate to or just short side conversations. It's been challenging through distance learning, but the students who I have met in person now appear to be comfortable asking me questions and attempting the tasks assigned. (Robert, Q1)”

The excerpts coded as Power referenced students' environments, ensuring that students are treated fairly in the classroom. One TL took her response a step further by acknowledging the societal inequities that impact mathematics education.

“I have planted the seeds in slowing down teaching to focus on student learning and create an equitable environment for all students. I can say that I feel confident in defending my philosophy of decolonizing math education in our school and bringing social justice in our classes.” (Camila, Q2)

Conclusion

Overall, the TLs connected their experiences in the fellowship to ideas about teaching, learning, and leading that correspond to the four dimensions of equity. Many of the TLs recognized aspects of the dominant axis by describing the importance of high-quality lesson planning and a focus on a strengths-based orientation to student work. Most of the TLs identified the need to build relationships and get to know their

students as individuals with varied experiences and knowledge, while some also addressed the need to empower students to critique societal issues - showing, at least in part, the importance of the dimensions along the critical axis. Similar experiences to those the TLs had with the urban school team and engaging with the Noticing framework may be valuable to those who are looking to expand and refine understandings of equity along both the dominant and critical axes. Teacher leadership can be essential in building a school community that supports these equity ideas (Milner, et al., 2015).

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*All names are pseudonyms

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