PreService and Beginning teachers' perspectives on equity

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Abstract: This report is part of a larger, longitudinal study focusing on the development of equity-related knowledge, beliefs, and practice across 68 individuals and five teacher preparation programs. In this brief report, we seek to unpack the ways five preservice and beginning mathematics teachers think about equity, especially as it relates to their current and future teacher practice. Analysis of interview data from these participants suggest as many as twelve different aspects of equity reflected in their thinking, as well as multiple actions teachers could take to promote equity including raising expectations, rejecting deficit views, and using complex instruction.

Keywords: Preservice Teacher Education, Equity, Inclusion, and Diversity

In this brief report, we describe preliminary analysis of data from an ongoing, longitudinal study of middle/high school mathematics teacher education and beginning teacher practice in the U.S. as it relates to equity. Our goal is to understand how teachers develop and use their knowledge of equity - how they think, what they think, and how they apply their knowledge. We are guided in this work by ideas from culturally responsive teaching (Gay, 2002; 2010; 2015) and equity literacy (Gorski 2014, Gorski & Swalwell, 2015), as well as from work by experts in the field of educational equity in mathematics (e.g., Aguirre, Mayfield-Ingram, & Martin, 2013; Bartell et al., 2017; Gutierrez, 2009; Moschkovich, 2013; Ramirez & Celedon-Pattichis, 2012). We adopt Aguirre, Mayfield-Ingram, and Martin's (2013, p. 45-48) categories of access and advancement, the use of cultural and linguistic resources, and the development of identity and agency to structure our thinking about teacher knowledge and its development. Further, we incorporate self-determination theory (Ryan & Deci, 2000) into our conceptual framework as a lens through which to consider teacher agency and perceived constraints to increasing equity.

Using a combination of data sources including interviews, work samples, surveys, written reflections, and videos of instruction, our research group is constructing data sets for each of 67 preservice or beginning teachers (PT/BT) across five teacher education programs in the U.S. Each PT/BT participates in the research project for four years, encompassing the final two years in their education program and the first two years of their post-program classroom teaching. Most study participants are/were enrolled in undergraduate programs at their institutions, but some are/were enrolled in a graduate certification program while teaching concurrently. For this brief report, we examine the knowledge and beliefs of five PT/BTs, which was a convenience sample but also spanned four of the five programs. We present our preliminary analysis of the end-of-program, structured interviews, and focus on the following research question: *How do*

PT/BTs think about equity in relation to their teacher education programs and their emerging teaching practice?

The interview protocol for each PT/BT included the following questions: (1) Since you began your teacher education program at [institution], what experiences have particularly impacted how you think about teaching mathematics? (2) What are some of the most important things you have learned about teaching and about students in your teacher education program? (3) What, if any, instruction or experiences related to equity have you had in your teacher education program? (Note: a definition of equity was <u>not</u> provided) (4) What have you learned about equity through your teacher education program? (5) How do you feel personally about equity? (6) What actions should math teachers take to promote equity in opportunities to learn, participation in learning, and learning outcomes? (7) What do you wonder about, or what questions do you have, about equity and mathematics teaching? We used an open-coding process (Strauss & Corbin, 1990) involving four interviews and two coders which resulted in six codes. Next, three researchers coded one common interview independently using the six codes and met to discuss differences, refine coding categories, and add new codes as appropriate. Finally, three researchers independently coded three interviews each using the refined coding scheme and met again. The final coding scheme we established accounted for the sections of data we interpreted as equity-related, with some sections of text receiving two or more codes.

Using the process described above, we achieved kappas of 0.9^+ across coders for these six codes: **personal meanings** - personal meanings, experiences or definitions of equity; **understanding/sense-making** - productive struggle, mathematical reasoning, cognitive demand, creativity, learning from mistakes, critical thinking and problem solving; **building relationships with students** - includes relationships with individual students or groups, attending to social/emotional needs, listening to students and sharing with them beyond the mathematics at hand, knowing about students' homes, knowing who needs what to help them learn; **connecting the math/classroom to the real world** - building math instruction upon students' interests and lives, bringing current events/issues into the classroom, attending to social (in)justices, connecting to lived experiences outside the classroom; **inequities in education and actions to take** - includes expressions of awareness of educational issues such as bias, deficit views, and privilege (from a personal or systemic perspective), descriptions of inequities in general or specific terms, as well as strategies for addressing inequity; and **constraints to increasing equity** - focus on barriers identified by PT/BTs that they believe will materially limit their ability to create more equitable classrooms, or barriers for the world to be more equitable, also includes expressions of lack of knowledge about how to achieve a vision of equity. For this paper, we focus on initial analysis of the "personal meanings" code and responses to the questions "How do you feel personally about equity?" and "What actions should math teachers take to promote equity in opportunities to learn, participation in learning, and learning outcomes?"

A constant-comparative analysis of the five PT/BT interview transcripts resulted in 12 "equity associations" demonstrating the many ways these five PT/BTs connected the notion of equity to themselves and to their emerging teacher practice.

Equity as Accommodation - "equality is everyone gets the same resources, but equity is where you, um, accommodate for those who would need the additional resources to be able to perform at the same level as everyone else around them"

Equity as Productive Struggle - "I know that sounds evil, and almost inequitable, but um, I mean, there's this idea of a constructive, I think, constructive struggle that students need to go through so that they've reached an understanding themselves"

Equity as Asset-Based Teaching - "it's very, very easy to prioritize and . . . spend a lot of time on boost up the students who are also good students . . . I think that it's so easy to just fall into like this compare and contrast. I think you like you at first do it in your own head. . . . you start thinking all these negative things and then like it starts coming out in your actions and your words . . . it's just something you have to be really conscious of."

Equity as Accessibility and Choice - "it'll make math more accessible to all students because you, you know, as long as you follow like some certain basic rules, like you can solve, like coming, coming up with a new way to solve a problem is, is actually a better thing."

Equity as Assigning Competence - "giving them that public specific praise in class to raise their status of not only of themselves, but also how other students view them."

Equity as Differentiation - "supporting those students who might need extra support . . . challenging all of your students to just go above and beyond and push past your expectations."

Equity as Personal Experience - "and just being like a female in a math class was you could tell, as soon as I walked in the room, they didn't even look at me twice."

Equity as Culturally Responsive Teaching - "so for me, it's like the culturally responsive teaching. . . . you have to know who your students are to be able to meet their needs best."

Equity as Social Justice - "it's sort of the responsibility of an educator to address these systems of oppression and inequity that are looming around us and making our students aware"

Equity as Empowerment - "maybe have a focus on empowering students . . . explaining to them the reality of the world and then working with them to break down the barriers."

Equity as Personal Transformation - "a lot of the time, I thought, well, why don't people just work harder if they're not doing as well?. . . . [the program] made me realize that there are barriers that other people have had to fight through systemically that I've never faced."

Equity as a Systemic Issue - "issues with the system is how we should be viewing it rather than how that idea kind of portrays it as issues with the person. . . . dismantling hierarchies of status in class trying to almost like level the playing field."

Although we can imagine other associations that PT/BTs might make that we did not find in the interviews of these five individuals, for example, equity as racial justice or collective liberation, initial analysis suggests that PT/BTs are able to connect the idea of equity to their own lives and their emerging teacher practice in many different and potentially powerful ways. Going forward, we are interested in determining whether/how different ways of thinking about equity cluster together within and across individuals and teacher preparation programs, and whether/how particular associations are expressed in the classroom.

Regarding actions that mathematics teachers could take to promote equity in opportunities to learn, participation in learning, and learning outcomes, all five PT/BTs noted that teachers should engage students in problem solving that draws on contexts that are familiar or interesting to students and related to their experiences. One PT/BT, Frank, believed the experience would help students understand that mathematics could be useful in navigating their world.

> I think math teachers have to take the opportunity to use real world issues in the class. Not just like word problems, but actually bringing about, in the right way, in the right context, issues that face their students in a very real way […]. Saying, okay, we can use math to help solve this issue or we can use math to at least analyze this issue that many of you are facing or dealing with. And that can be one way for maybe students who haven't dealt with that issue before in my class to kind of open their eyes to it. (Frank, PT/BT)

Three PT/BTs suggested that teachers should differentiate their instruction to meet students where they are and build on their existing knowledge. The PT/BTs noted that engaging students

in problem solving could be challenging. Two PT/BTs suggested that it was important that teachers have non-deficit views about the students and their capabilities. Teachers should believe their students can engage in challenging mathematics with scaffolding. One of the PT/BTs discussed the importance of allowing students to engage with productive struggle for learning.

> In regard to overall instruction, I think learning to allow your students to struggle. And I know that sounds evil, and almost inequitable. I mean, there's this idea of a constructive struggle that students need to go through so that they've reached an understanding themselves, rather than the instructor providing the answer for them. (Colin, PT/BT)

In addition to believing that students are capable of handling challenging work, three PT/BTs stated that the teachers need to develop a supportive classroom environment to encourage student discourse. They pointed out the importance of classroom discussions among the students, and the students and the teacher, and they highlighted the work that the teachers need to do to make the classroom into a discussion-rich space.

> I really think teachers ought to use this idea of complex instruction. Whether it be exactly that or some sort of form of it, it's just what I've been able to see in the classroom. There have been students who have been so quiet at the beginning of the year, but to see their growth using this, this kind of teaching, this group work building on students' strengths and giving them that public specific praise in class to raise their status of not only of themselves, but also how other students view them in class. I think, is it just, it does a lot for when it comes to equitable participation in class, you see students grow, you see them finally feeling like they have a voice. I would say using that strategy is definitely a big teacher move (Frank PT/BT)

Discussion

In this paper, we focus on ways of thinking about equity as expressed by five PT/BTs who were interviewed near the completion of their respective teacher education programs. As we move forward in our research, we are interested in considering how frameworks for thinking about equity, such as that proposed by Gutierrez (2009), could be useful in characterizing this data. For example, comparing the 12 "equity associations" made by the five PT/BTs with the axes of access, identity, power, and achievement (Gutierrez, 2009), we notice that they attended collectively to all four axes, but with differing emphases. With regard to the categories and framework developed by Aguirre, Mayfield-Ingram and Martin (2013), these PTs expressed ways of thinking about equity falling into all three categories - access and advancement, the use of cultural and linguistic resources, and the development of identity and agency. One component of equity literacy (Gorski 2014, Gorski & Swalwell, 2015) we did not find in the data for these five PT/BTs is empowering students to collectively take action to create meaningful changes inside or outside their schools. This is not to suggest that the PT/BTs do not think in this way, but rather that this idea was not evoked during the interview.

With respect to influences on PT/BTs' knowledge, both Colin and Frank pointed to university courses and their instructors as they described the importance of productive struggle and complex instruction, respectively. In fact, we found an emerging theme in the data thus far as the PT/BTs repeatedly return to the importance of maintaining non-deficit views of students and allowing them to engage in problem-solving and productive struggle. Going forward, we will investigate how these ways of thinking about equity may serve as "launch pads" for designing increasingly equitable classrooms, and how they may constitute "comfort zones" allowing teachers to maintain the status quo.

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