Chapter 8
A Closer Look at Equitable Outcomes: A Self-Study in Urban Mathematics Teacher Education

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Abstract Inequitable opportunities to learn mathematics has plagued the U.S. for decades. Given the challenges facing urban children and families (e.g., systemic racism; deficit orientations; limited resources for schools), it is particularly important for prospective urban teachers (PTs) to not only be proficient with mathematics content and develop skillful pedagogy, but also be able to understand historical and social phenomena that have created inequitable opportunities to learn and thrive with mathematics. This collaborative self-study is fundamentally rooted in the belief that an examination of our histories and experiences can serve to provide insights into the productive practices that might help us define effective mathematics teaching and break free from the stalemate of uncritical, mediocre mathematics teaching that has persisted despite major, concerted efforts from leading organizations and local agencies. Drawing on narrative data from our elementary mathematics methods courses, we show an interrogation into the origins of our beliefs and pedagogical moves that can help surface mathematics teacher education practices that hold the potential to disrupt the perpetuation of stubborn inequities in mathematics teaching and learning. Furthermore, we analyze classroom discourse and PT work samples from our methods courses as a means of further reflection and to correlate the impact of—or lack of—our curriculum and instructional approach. Our findings spotlight the ways we have had to be resilient in the face of entrenched mathematics and racial ideologies, and we discuss the relationship between these reflections and our views on the mathematics learning experiences urban children deserve.

Keywords Self-study · Mathematics · Education · Equity · Race

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We, the authors and investigators of this self-study, are mathematics teacher educators (MTEs) whose work is focused on preparing urban teachers. Our objectives are manifold. We are tasked to guide our prospective teachers (PTs) through their education program with the knowledge and skills needed to teach effectively. Concurrently, we are committed to helping them hear, resist, and challenge deficit-oriented narratives about urban schools and communities, and about the individuals who attend the schools and reside in these communities; without active and intentional confrontation of deficit notions, we can expect urban youth to continue to be mischaracterized and misunderstood as systemic racism thrives and evolves (Foote et al., 2013; Milner, 2008). We work collaboratively with PTs to establish productive narratives, where children's cultural, linguistic, personal, and community assets are valued and positioned as resources for learning (Turner et al., 2016, 2019). In the case of elementary teachers, we do this through our teaching practices, and how we assess their growth and success; then we broadcast that. With respect to mathematics, we dispel myths that narrowly define what it means to do math and who can do math competently. We build confidence in doing math among PTs where insecurities once dominated. And, we aggressively articulate belief systems about the brilliance of children of color and the corresponding math teaching practices that act on these beliefs.

Given this backdrop and these goals, there are countless questions that surface as we make curricular and pedagogical decisions (Kitchen, 2020; Oda, 1998). For example, how do we frame course content and learning experiences to make clear to PTs that issues of equity and justice are central to developing math teaching practices designed to augment success for children of color? If we are serious about equity and justice in mathematics education, then a candid examination of the efficacy of our practices is the least we can do. As a result, we will know where we are having an impact and where we are experiencing limited success (Clandinin & Connelly, 2004). Given that this self-study is aimed squarely at enhancing the mathematics learning experiences of children of color and has the potential to offer opportunities for growth and improvement, this model could serve as a tool for others to critically interrogate their teaching practices and dispositions as well.

This collaborative self-study (Chang et al., 2016), inherently involves an examination of self, as well as our relationships with PTs, urban communities, and teaching mathematics. We recognize that we are a part of multiple, complex systems: schooling, mathematics teaching and learning, and justice, economic, and political systems that do not provide equal respect and dignity for people of color (Battey & Leyva, 2016; Griffiths & Poursanidou, 2005). It might seem futile to focus our gaze on an individual, or pair of individuals, as a means to dismantle inequitable systems that all too often perpetuate injustices. Systems (including schooling and pedagogical systems) are the products of the actions and legacies of individuals (Billett, 2006). Therefore, to combat and change inequitable systems, we need to center and interrogate the effectiveness and impact of our work (i.e., our actions as MTEs) in preparing urban teachers to resist deficit notions about students of color and to adopt affirmative perspectives. We believe that an interrogation of our own dispositions and professional practices can increase the likelihood that our PTs (our

community's next generation of teachers) see and hear students of color from an equity, asset-based orientation and, in relation to mathematics, honor their mathematical contributions to the classroom. Such an interrogation can more fully inform our own teacher education practices and contribute to how our PTs teachers resist racist policies and practices, and advocate for tolerance and justice—in mathematics and beyond. For us, engagement in this self-study is central to our work, as without this interrogation of our practices, we might feel confident in what we present and teach our PTs (in the form of curriculum and pedagogy), yet perhaps it might be with little regard to previous notions they might possess about urban settings and students of color. Scant attention to this perpetuates the status quo of inequitable schooling practices.

In this chapter, we situate this collaborative self-study in the larger context of city schools and urban teacher education, describe the parameters and self-study methods deployed, and report key themes that emerged from our data analysis. We follow with a discussion of these themes in relation to urban teacher education. We conclude by raising important implications for the field of teacher education and for self-study research.

8.1 Theoretical Framework

Two theoretical constructs are particularly salient to this self-study: *whiteness* and *consciousness*. Whiteness does not refer to an individual's phenotype, but rather to the attitudes and behaviors that serve to maintain systemic racism and white dominance (Hayes & Hartlep, 2013). Decades ago, Frankenberg (1993) stated, "As a collection of everyday strategies, whiteness is characterized by the unwillingness to name the contours of racism, the avoidance of identifying with a racial experience or group, the minimization of racist legacy, and other similar evasions" (p. 32). While this might resonate with some of the more overt forms of racism demonstrated today, whiteness also involves the more insidious forms of racism that may prove difficult to name and address. In higher education contexts, these might include centering one's (White) self and the associated emotions in tenuous situations (Matias, 2016), an unwillingness to hold oneself accountable and instead assigning blame on others (particularly people of color), undermining the authority of people of color, avoiding direct or contentious interactions with people of color, and/or circumventing people of color in search for a (White) authority figure (DiAngelo, 2018). Regardless of race or ethnicity, we are all imbued in whiteness by nature of its prevalence in *all* the social institutions where we work and live; there are no exceptions. To what degree we enact whiteness is likely a result of our cultural experiences and socialization into (anti)racism.

We use the notion of consciousness to represent the level of awareness and mindfulness of others' lived experiences, perspective and realities. Furthermore, consciousness indicates a willingness to locate oneself within racist structures and

institutions (Ullucci & Battey, 2011). Gutiérrez (2013) argues urban mathematics teachers need political knowledge to:

> (a) negotiate their practice with colleagues, students, parents, administrators, colleges, and members of for-profit organizations who may not agree with their definitions of "mathematics," "education," or "learning"; (b) work with fewer material and human resources than teachers in more wealthy school districts; (c) support their students to compete on an unfair playing field that constantly changes; and (d) buffer themselves from images of students as unmotivated, not having the proper amount of "grit," lacking role models in their community, and having cultural and linguistic obstacles to overcome, as well as images of urban teachers as slackers, saviors, or people who simply could not obtain work elsewhere. (pp. 7–8)

In this study, the concepts of whiteness and consciousness are applied directly to the teaching and learning of mathematics (e.g., Battey & Leyva, 2016). The myth of political neutrality in mathematics continues to stigmatize mathematics teaching and learning (Martin, 2015). Educators who believe and teach the ideology that mathematics is *just* numbers have yet to fully analyze and critically appraise the ways that statistics and other measurements that feign political neutrality have been used to "prove" learning deficiencies among students of color and the academic achievement gap between them and their White mainstream peers. Without incorporating culturally relevant pedagogical practices into mathematics teaching (and mathematics teacher education), teachers will continue to deliver a one-size-for-all curriculum that fails to connect with a large percentage of students, namely urban students of color. The students who are successful under the traditional methodology of teaching mathematics risk being indoctrinated into believing that only certain people are good at math, further perpetuating the negative reputation attached to mathematics teaching and learning. Furthermore, acknowledging and combatting whiteness contributes to dismantling the myth that mathematics/mathematics education is politically and culturally neutral, which is an effort that can help facilitate equitable school experiences for P-12 learners.

8.2 Methods

Self-study methodology afforded us the opportunity to scrutinize our teaching practices and experiences in light of our broader goals (Kitchen, 2020; Pinnegar et al., 2020). In the following section, we share our teacher education context, our methodological approach to self-study, and our data sources and analysis.

8.2.1 Context

The setting for this inquiry is the four-year undergraduate elementary education program located in the midwestern United States in a large, urban area. The program is focused on preparing teachers for city schools. It is conceptually anchored and informed by a shared commitment to helping PTs develop anti-racist, culturally relevant pedagogies. When PTs are admitted into the program, they are assigned to a cohort, and the cohort is assigned to a partnership school. Normally, nearly all courses are taught in a designated K-6 classroom at the partnership school. The program employs a clinically-centered model of teacher education (e.g., Dennis et al., 2017), and field experiences are integrated with each course. For example, the mathematics method course meets on Wednesdays from 9:00 AM–12:00 PM for 16 weeks. During eight to ten of those class sessions, PTs can expect to plan and implement lessons with actual elementary students. Debriefing these field experiences and making explicit connections to course content/readings is a common practice for our PTs.

This study drew from two university courses we taught during the 2020–2021 school year amid the COVID-19 pandemic. Therefore, all courses had synchronous online virtual class meetings. There were thirteen 90-min class meetings. The first two courses, which occurred in the fall 2020 semester, examined methods for teaching mathematics in the early elementary grades (kindergarten through second grade). This introduction to the teaching profession challenged PTs' beliefs and assumptions about teaching and learning while providing exposure to critical sociocultural learning theory and its use in the process of inquiry. The second course focused on third through sixth grades and was in the spring 2021 semester. This course emphasized the developmental nature of the arithmetic process, how this leads to algebraic reasoning, and how both of these connect to the cultural and mathematical experiences of elementary school children. In planning for these courses, we referenced the Association of Mathematics Teacher Educators (AMTE) *Standards for Preparing Teachers of Mathematics* (2017). The standards allowed us to develop tasks, activities, and a variety of means to assess our students' understanding of the material covered in each course.

Throughout the preparation for our classes, we focused on improving the effectiveness of PTs' mathematical instructional practices and decision making. This began with developing their understanding of key concepts (e.g., students' mathematical thinking, community funds of knowledge) to encourage a positive orientation to learning and teaching mathematics. We also sought to include opportunities to critically reflect upon and develop PTs' consciousness of their own former experiences as students in P-12 mathematics classes. Additionally, as teacher educators, we planned for, developed, and supported learning experiences for our PTs that emphasized the need for equitable teaching practices and methods to support the success of all students.

Reflecting on our experiences, we recognized that PTs who commence their work with an orientation towards equitable mathematics education (as evidenced in

their lessons and instructional practices), compared to those that do not, experience greater satisfaction in their field experiences. It is during this stage of development that PTs begin to draw connections between the pedagogical practices they were exposed to as P-12 students and their current work. We have observed that our PTs are also reckoning with their former P-12 mathematics learning experiences that had a heavy emphasis on memorization of facts and procedures rather than the development of a deep understanding of number sense and how to problem solve. It is during the teacher preparation period that PTs learn that reasoning skills are just as important as memorization. As PTs learn how to employ research-based practices and methods, they are also working through years of stress and anxiety as they transition towards becoming mathematics educators (Young & Dyess, 2021). We aim to implement encouraging learning environments so that our PTs are able to study math pedagogies through a different, more critical lens while recognizing the root causes of their anxieties towards mathematics.

8.2.2 Self-Study Methodology

The use of self-study research methodology focuses on self-understanding and the enhancement of professional practice based on the analysis of one's professional experiences (LaBoskey, 2004). We concur with Samara's (2011) definition of self-study of practice methodology as, "a personal, systematic inquiry situated within one's own teaching context that requires critical and collaborative reflection in order to generate knowledge, as well as inform the broader educational field" (p. 10). In particular, we focused on the tenuous moments engaging PTs (A. Martin, 2020), vis-à-vis our expressed pedagogical goals, in order to more fully take up efficacious teaching methods with our prospective mathematics teachers.

8.2.2.1 Self-Study Team

Dr. Natalie Odom Pough is a mathematics teacher educator. She is a Black female who holds the position of Visiting Clinical Assistant Professor. Her primary role is to teach mathematics methods courses to undergraduate students majoring in elementary education. Pough taught middle school mathematics and social studies for 8 years. She served as a former school administrator and former lecturer prior to her current position. Pough is passionate about instilling the joy and excitement she feels about mathematics teaching and learning into every PT she serves.

Dr. Craig Willey is a mathematics teacher educator. He is a White male with more than 10 years of experience in urban teacher preparation, primarily teaching mathematics methods for prospective elementary teachers. Prior to his current roles as Associate Professor and department chair, Willey was a bilingual middle school mathematics teacher in Denver Public Schools and a research fellow with the Center for Mathematics Education of Latinas/os (CEMELA) in Chicago. He believes

(White) teachers and teacher educators have a responsibility to examine their beliefs and practices in an effort to confront systemic racism**.**

8.2.3 Data Sources and Analysis

We drew on both historical and contemporary data in this self-study. For example, we analyzed journal entries from Pough's time as a teacher, including entries from her first year of teaching. We also both wrote extensive autobiographies describing the events and narratives that shaped our decisions and perspectives as teachers and mathematics teacher educators in urban contexts. In an effort to further contextualize our work as mathematics teachers educators, we wrote narratives centered on the aims and goals for our mathematics methods courses, as well as explanations for why equity in mathematics education is so hard to achieve. Finally, to hone in on the experiences of PTs and better understand the shifts (or lack of) towards re-conceptualizing mathematics for urban youth, we documented our in-class and out-of-class assignments and activities in our methods courses, assessing the intent and the degree to which these assignments and activities made explicit connections to children's multiple mathematics knowledge bases (e.g., community, familial, cultural, linguistic) (Turner et al., 2019).

We examined and coded the data individually. We then conferred weekly to share our respective codes, discuss, and reach consensus on our understandings of the most salient codes. These discussions and consensus building involved highlighting specific examples/experiences and grounding these experiences within the concepts of whiteness and consciousness. We were also guided by Anfara et al.'s (2002) process to ensure that the data sources directly evidenced and addressed our research aims through iterative coding.

The close, professional proximity between us provided plentiful opportunities for candor and vulnerability when discussing our PTs' learning goals, successes, and failures. The themes presented below reveal how we frame course content and learning experiences to make clear to PTs that issues of equity and justice are central to developing math teaching practices designed to augment success for children of color; they also highlight the tensions that surfaced as a result of a teacher education program focused on equity and justice.

8.3 Findings

Our findings center on our experiences confronting PTs' existing perspectives and ideologies in order for them to provide more equitable mathematics learning experience for children, particularly urban youth of color. We share our experiences and sentiments through the lens of resilience (Lam, 2015), where we persist despite the complexity of the issues at hand and the deeply embedded belief systems of PTs. As

alluded to earlier, PTs' beliefs and conventional wisdom are the products of decades of socialization towards what counts as good mathematics teaching. Further, they are often the recipients of deficit-laden narratives about urban youth and communities. Our findings reveal how we as MTEs persist to recast mathematics ideologies, as well as confront and combat oppressive racial ideologies. We have embedded our analysis in the reporting of the findings, which are presented in the form of composite descriptions of recurring events and discussions from our courses.

8.3.1 Resilience in the Face of PTs' Mathematics Ideologies

One of our goals is to support PTs to interrogate taken-for-granted approaches to mathematics teaching and learning that are often deemed effective. In this way, they can develop consciousness about equitable mathematics teaching and the role of whiteness in status quo approaches to mathematics instruction. For example, we have had multiple, lengthy discussions centered on the use of timed tests, as the merits of timed tests appear frequently in PTs' journal entries. It spotlights PTs' affinity for competition and repetitive practice in the mathematics classroom with little regard to the research that details how timed tests build anxiety towards mathematics. The negative consequences of such approaches are harmful to all students, but especially students of color, who often do not possess the cultural and financial capital to perform well academically in such a context. PTs themselves have detailed their own negative experiences with mathematics instruction in their former schooling years. For many, this highlighted a personal disdain for the content area. We believe that there is a prime opportunity in teacher education to make connections between conventional mathematics teaching practices and negative sentiments towards mathematics. Nonetheless, it has proven difficult to help PTs expand their consciousness about what could be productive, effective, and equitable mathematics pedagogy.

Still, there were glimmers of hope in what new mathematics instructional practices PTs took up. For example, a common theme throughout out-of-class assignment data was the use of games in mathematics classrooms. The feelings highlighted in PTs' assignment reflections, however, had more to do with how they felt while playing the games in class. PTs provided positive recollections of these games when they considered themselves successful, a shift in their own consciousness on how they could approach mathematics instruction as future teachers. However, if they felt embarrassed and/or anxious during a game, as a winner or otherwise, there was a negative connection towards mathematics.

There was also a connection between PTs' beliefs about mathematics and how they critically reflected on their beliefs. We worked to build upon these connections throughout our methods courses. The tasks we presented during these courses encouraged students to recognize the advantages of games and the need to pair them with equitable instructional practices. We believe this experience can increase the chances of PTs designing lessons that fully benefit students during instruction and

review sessions. Our goal was for PTs to be able to internalize the value of games for learners who have been marginalized by traditional mathematics instructional structures and maximize the effectiveness of these instructional strategies.

Furthermore, when asked to discuss their personal history with mathematics, our PTs often wrote about specific activities they were exposed to. Seldom was there a discussion over a specific mathematical concept or routine the PTs were particularly fond of or successful with. Stand-alone celebrations or games, such as Pi Day, Around the World, and cooking activities, were common responses describing their most positive experiences. The only mention of mathematical concepts throughout class discussions and assignment reflections surfaced when discussing third grade. There was a consensus amongst PTs surrounding the stress of third grade mathematics which typically involved fractions, multiplication facts, and timed tests. We recognized that these instances (presented as scattered memories) suggest our PTs were coming in with minimal understandings or minimally consciousness of culturally relevant pedagogical practices that could be adopted to make such content meaningful to all students. Such practices could be used to co-construct an ambitious mathematics pedagogy (e.g., Lampert et al., 2013) that aims to include and engage diverse learners than have historically been under-served. Ironically, however, the above-mentioned negative sentiments, combined with some entrenched, default practices (e.g., timed test, repetitive practice over rich problem-solving activities) have shown to be inhibiting in the development of new pedagogical approaches.

We acknowledge that this is an ongoing project to contribute—through preservice teacher education—to shifts in mathematics pedagogy. We believe our self-study has helped us build not only resilience, but also motivated us to re-think and re-shape the experiences we provide PTs. PTs need more than to be told how to do something and why it is important; they need to feel worthwhile themselves as math students and future teachers of mathematics, possess an understanding of and consciousness about the role of whiteness in the education of diverse children, and believe that they can make a difference in the education of urban youth.

As MTEs, we discovered the need to investigate the common activities discussed by our PTs and explore what makes them popular. The use of these activities, such as Pi Day and Around the World, were common practices across the numerous school districts represented in our classes. As we discussed these with each other, we began to investigate widely used channels of mathematics teaching professional development. Subsequently, we had discussions with classroom teachers and determined that many of the practices used in their classroom are activities that they themselves engaged in when they were students. As we analyzed our methods courses and sought to more fully promote our students' consciousness, we integrated activities, projects, and assignments that were challenging but also engaging, and even entertaining. We learned that offering a detailed purpose and rationale to the assignment enabled our students to see why the activity was engaging to them and to learn ways to integrate the assignment into their own pedagogical index. Throughout this process, we also recognize the impact of social media and websites such as teacherspayteachers.com, on our students' approach towards understanding

and teaching mathematics. Although many of these digital resources lack the critical lens (e.g., fails to take up whiteness and consciousness) that we stress in our classes, we cannot ignore the significant reach that these educators have. As MTEs, we must be aware of this shaping influence on our PTs.

8.3.2 Resilience in the Face of PTs' Racial Ideologies

As professors of undergraduate and graduate PTs working towards initial licensure as elementary education teachers, it is commonplace that they bring their unchecked biases into the learning environment, whether our own classrooms or in their clinical practice. When watching a YouTube video of a fifth grade class of White and Asian students in Canada, one PT stated, "I can't even do that! They're really smart." As discussed in Pough's journal entry about that class session, the student highlighted how the teacher scaffolded the discussion about numbers and prepared the students for the activity. Yet, while watching a video from the textbook, *Making Sense of Mathematics for Teaching Grades 3–5* (Dixon and Nolan, 2016), of a classroom of Black and Latinx students successfully navigating a rigorous word problem in a model similar to the one in the YouTube video, the same student exclaimed, "These have to be paid actors!" and further noted this comment in her own field journal. As we discussed this situation, we realized that all biases do not surface as readily as this one, but we recognized that they exist as part of the racial narratives that dominate throughout the U.S. and permeate mathematics classrooms (Shah, 2017). Pough highlighted these two comments and brought them to the student's attention within the evaluation feedback to her journal grade. We recognized such an instance as an opportunity to elevate students' consciousness about race, whiteness, and the learning experiences of diverse students and teachers' responsibilities to support and affirm all children.

Whiteness and biases often interfere with PTs' ability to imagine and enact high academic expectations for urban youth—and youth of color in particular—in the mathematics classroom. When we hear PTs questioning what kind of mathematics pedagogy is possible in urban classrooms, this signals a set of lower expectations for children of color, and we interpret these lower expectations as both whiteness and a way to mask educators' struggles with mathematics content. What emerges as whiteness is the struggle to reconcile the race-based, differentiated images of math teaching and learning: robust cognitive capacity and problem-solving skills for White children, and memorization and skill-based learning for children of color. With respect to their own insecure math content knowledge, PTs appear to be stuck in a cyclical dilemma: they fear their weaknesses in mathematics being exposed and subsequently find themselves relying heavily on textbooks and workbooks that hold extraordinarily little rigor and rely heavily on rote memorization. We recognized this in PTs' reflections after they worked with students one-on-one during field experiences. The expressed need to have resources, exemplars, or textbooks to develop their activities and lessons became a source of concern for us. Feelings

about mathematics and mathematical ideologies compound racial/ethnic biases, and vice versa, and this combination contributes to racialized mathematics teaching and learning experiences (Battey & Leyva, 2016; Gholson & Martin, 2019).

Additionally, we realized that many of our PTs focused on incorporating classroom management protocols into their lesson rather than on the mathematical concepts we presented in our courses. It was evident that some PTs were more concerned with the behavior of students as opposed to the assessment of what their students should have learned. For example, in one lesson plan, a PT wrote about how the students should behave in class during her lesson and very little about the instruction or how she would engage her students. In the feedback provided to the PT, it was suggested that she modify the activity to more fully support student participation and engagement rather than focusing on behavior or punishment for off-task behavior. We believe that such a focus and attention to student behavior rather than learning highlights that this PT was grappling with dominant racial narratives and the need for us as MTEs to focus our energy towards conceptualizing an ambitious mathematics pedagogy for urban youth.

Our self-study has helped us appreciate the importance of discussions about race and racial ideology in mathematics education. The omission of such discussions can lead to an underdeveloped understanding of the relationships among student-teacher relationships, socio-economical and sociopolitical dimensions of schooling, and community activism. It leaves mathematics excluded when other content areas might be subjected to examinations as to how they are implicated in racist systems and structures.

However, when mathematics educators take the time to place mathematics within the day-to-day discussions that impact society, a stronger emphasis is placed on the importance of mathematics. Some may believe these are discussions for the secondary mathematics classroom and beyond, but a PT's understanding of equitable mathematics teaching is directly connected to how well they can understand and incorporate culturally relevant pedagogy (Ladson-Billings, 1995; Magee et al., 2020) into their instructional practices. We acknowledge that there are layers to PTs' ability to name and enact culturally relevant math teaching practices (Magee & Willey, 2021). Sustained and interconnected discussions are needed to help make explicit connections among our beliefs about mathematics, our experiences with mathematics, racial narratives, whiteness, and our pedagogical tendencies. The lack of discussions on race leave PTs uncomfortable when discussing the implications of racism in education. Teacher education programs are ideal places for PTs to explore race, social change and social justice, and engage with and take up knowledge of unfamiliar ideas and concepts to build profound understandings of mathematics.

As we analyzed our experiences in this inquiry, we came to terms that our desire for change often conflicted with the lessons and ideas that have been ingrained into our PTs since their youth. There are PTs who engage with students with "genuine intentions of making each of them better regardless of how many adjustments or accommodations need to be made" (Barksdale, 2021, p. x). These are the individuals who will possess consciousness about whiteness, see the components of culturally relevant pedagogy, and actively work to improve their teaching practices and

expand their pedagogy. There are also individuals who have or will succumb to the "pressures of bureaucratic expectation and overzealous perceptions" (Barksdale, 2021, p. x) and allow their instruction to be dictated by standards and other procedures rather than guided by their students' needs. Lastly, there are educators who, "cannot be influenced or changed about how they choose to teach, interact with, and interpret the success of students" (Barksdale, 2021, p. xi). These are the individuals who choose to not connect with the needs and backgrounds of every child. In discussions during class, these are the students who usually use their own success as a benchmark for the success of others from similar backgrounds. They are not willing to connect with or understand whiteness or culturally relevant pedagogy and thus further the cycle of ill-prepared mathematics educators.

This self-study exposed us to the purpose behind our work. We must develop the tools we need to further improve on our pedagogical approach and continue to study how mathematics teachers are working to facilitate desired change. We collaborated to design courses and tasks that challenged our students and pushed them outside of their comfort zones. We, as mathematics teacher educators, have learned how to work through uncomfortableness in our classroom environments when we push our students in directions they are not familiar with. We have found comfort in leaning on one another for guidance and support. During our collaborative sessions, we have discovered ways to create a safe and productive learning environments. We have also designed techniques to restore and repair our learning environment when PTs disconnect with us or one another. As we continue to grow, we will modify our approaches so that students are leaving our programs with a solid approach towards their first year of teaching that includes the ability to constantly strengthen their critical lens.

8.4 Discussion

We acknowledge the complexity of teaching mathematics in urban spaces. This complexity translates into a similar complexity when identifying the needs of our PTs and designing mathematics methods courses. We have mentioned the need to provide mathematics learning experiences for PTs (e.g., problem solving or teaching problem solving to peers) so they can develop confidence in mathematical reasoning. We have also needed to scrutinize underlying beliefs about mathematics (e.g., some people are math people) and urban youth (e.g., their families don't care about education). When examining the most crucial, high impact domains of mathematics teaching and learning (e.g., content knowledge or facilitating discursive classrooms), we have found ourselves gravitating towards shifting PTs' attitudes towards mathematics as a critical starting point. This is a priority area for us in an effort to broaden perspectives on the teaching and learning of mathematics for urban youth.

With an understanding that our PTs are products of "the same school system and societal treatment of math" (Zager, 2017, p. 3) which we are asking them to

critically analyze and change, it is imperative that we take the time to study the variations of mathematics teaching PTs have been exposed to. Similarly, it is essential for MTEs to take a step back and study how they are working to facilitate the desired changes. The use of visual representations, for example, via video lessons or in-class demonstration lessons of instructional strategies being taught, strengthens the chances of PTs feeling comfortable with employing these strategies in the future.

Teaching PTs about the intention, rationale, and focus of a lesson in alignment with fully including all students but especially urban children of color can serve to cultivate joy in the teaching and learning of mathematics.

8.5 Implications and Conclusions

Careful examinations of program/course goals, PTs' backgrounds and experiences, and MTEs' curriculum and instruction are crucial if we are to continue to develop an elementary mathematics education program that supports anti-racist, culturally relevant teachers. This self-study has made us more resolute to engage our elementary mathematics education team of professors and instructors in ongoing dialogue and professional development about mathematics and racial ideologies as priority areas for the design of mathematics learning experiences for PTs. This and subsequent models of interrogation serve as the basis for further growth, which is essential as our mathematics education instructional staff expands and changes (Baker & Bitto, 2021; Marin, 2014). Furthermore, the analysis of course assignments vis a vis PTs' learning products will offer direction and focus for our future work and collaborations.

This self-study also supports our continued efforts to fortify our partnerships between school districts, community leaders, and businesses throughout the city. Understanding how our work is directly connected to the strength and health of the community, we will continue our research efforts to provide our current and future PTs with the space to grow, flourish, and connect with mathematics at high levels and equitable teaching practices for urban students. This self-study offers an exploration of urban math teacher preparation. We analyzed our practices and the outcomes of our assignments in order to understand how our instruction was received by PTs, and how this related to the development of their mathematics teaching practices. We highlighted the ways in which PTs' beliefs and ideas are reflected in our courses, and what this suggests for teaching urban youth. It was our intent to explore the critical consciousness of our students, and we were able to create a snapshot of how our students were constructing an understanding of equitable mathematics instructional practices. Additionally, we were able to recognize and challenge mathematics ideologies that can exclude math learners by naming and confronting dominant conceptualizations of what it means to be "good at math", and share images of inclusive mathematics learning environments.

The findings reveal that our practices, strategies, and approaches are aimed at providing transformative educational experiences for our PTs. While we attempt to model the instructional practices that we would expect from our PTs, future research is needed (Bell et al., 2021). We would like to expand our work to include further analysis of the success of our PTs as they began their careers, and trace the ways in which their work, dispositions towards mathematics, and the success of their students might be influenced by our practices. Of course, there is always the need to be candid when assessing the ways in which equitable practices are not developing among novice teachers. Here lies an opportunity for future self-study research: it affords mathematics teacher educators the opportunity to do better (i.e., improve their practices), which allows PTs to deepen the knowledge and skills that are designed to transform (mathematics) learning experiences for urban youth. Working with self-study to explore the relationship between MTEs' and PTs' practices and the development of their respective professional mathematics identities is a promising mechanism that supports MTEs' insight of teacher development from multiple angles (Baker & Bitto, 2021). Ultimately, we argue that MTEs should take up self-study research of their pedagogical practices which, in turn, can support PTs in their preparation to becoming equitable and just urban mathematics teachers.

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