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PRACTICE BRIEF

Crafting a Racial Equity Practice in College Math Education

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While assessment, curricular, and pedagogical reforms have improved overall success rates in college math courses, they have been less effective in closing racial equity gaps and fostering equitable classroom experiences for racially minoritized students. Following the insights of critical race math scholars, we argue that racial inequity persists because these reforms do not tackle the dominant instructional template that informs how many math faculty teach. We propose that racial equity requires a reconfiguration of practice involving (a) race-conscious sensemaking of teaching; (b) awareness of racial dynamics in math classrooms; and (c) a humanizing math pedagogy. We describe these three principles of a racial equity practice, along with the challenges that can arise when faculty confront complicity in producing racial inequity, attempt to undo practices serving them well, and wrestle with institutional factors that constrain change.

Keywords: racial equity, math education, faculty, pedagogy

For students seeking a college degree, completing a “gateway” math course—typically college algebra, precalculus, or statistics—is required for graduation (Bragg, 2012; Logue, 2016). However, success in these courses has proven elusive for many, especially for Black and Latinx/a/o students. At community colleges, for example, where gateway math comprises a sizeable portion of course offerings (Bragg, 2012), the average completion rate within 1 year of entry is 5%; for Black students it is 3%, and for Latinx/a/o students, 4% (Complete College America, n. d.). Given these outcomes, policymakers, practitioners, and researchers have concluded that math is a “gatekeeper” (National Research Council, 2013), “the single biggest obstacle to retention and completion” (Kirwan, as cited in Logue, 2016), and “a burial ground for [students’] aspirations” (Cullinane & Treisman, 2010, p. 2). For decades, reforms have sought to improve (a) the assessment of college math readiness (Rodriguez et al., 2018); (b) the developmental math sequence that many students must traverse before getting to college math (Bailey et al., 2010); (c) the effectiveness and relevance of math curricula (Bragg, 2012; Logue, 2016); and (d) the participation of women and racially minoritized¹ students underrepresented in the discipline (National Research Council, 2013). Recent efforts have turned to what happens in the classroom, how teachers enact curricula and pedagogy, and how the classroom environment shapes the learning and experience of all students (Cox, 2015) and racially minoritized

students in particular (Levy et al., 2021; Roberts, 2020). Yet, while these reforms have improved overall success rates, racially unequal outcomes persist (Brathwaite et al., 2020; Rodriguez et al., 2018).

In this brief, we draw on the scholarship of critical race scholars studying K-12 math education and racial equity scholars in higher education to explain why math faculty need to (a) locate the problem of and solution for racial inequity in their teaching, their classroom, and themselves, and (b) develop a racial equity “practice.” We then present three principles that faculty can adopt to begin crafting their racial equity practice and show these principles in action with examples from community college math instructors who took part in a racial equity initiative focused on self-inquiry and change. This brief should be of value to math faculty, especially those at teaching-intensive institutions that enroll high numbers of minoritized students (e.g., community colleges, broad access baccalaureate institutions, Carnevale & Strohl, 2013). Department chairs and professional learning directors may also find our articulation of a racial equity practice useful for designing racial equity learning opportunities for math faculty.

Why Center Race in Math Reform

Before crafting a racial equity practice, faculty need to first understand why race must be centered in math reform and how traditional ways of teaching math impact Black and Latinx/a/o students. According to critical race math scholars, the reforms noted above do little to address racial inequity (Gutiérrez, 2008; Martin, 2019). While they can help minoritized students do math better, they emphasize iterative change and do little to disrupt institutionalized beliefs of math as a racially, culturally, and politically neutral activity (Gutiérrez, 2008, 2018). Racial equity demands a race-conscious approach that (a) presses faculty to make sense of who they are, what they believe, and how they teach (Dowd & Bensimon, 2015; Rousseau & Tate, 2003); (b) uncovers the racial norms and

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¹ Our use of “minoritized” in the remainder of the brief, refers specifically to racially minoritized students unless indicated otherwise.

logics of math education (Battey & Levya, 2016; Levya et al., 2021); and (c) advances a humanizing pedagogy in which minoritized students feel validated and cared for as learners and persons with complex lives (Acevedo-Gil et al., 2015; Aronson & Laughter, 2016; Gutiérrez, 2018; Joseph et al., 2019).

This is a tall task for math faculty, many of whom were hired for their disciplinary credentials rather than teaching experience, student-centeredness (Flannigan et al., 2004), and/or racial equity commitments (Liera & Ching, 2019). Disciplinary training premises learning and achievement on understanding math concepts, demonstrating understanding through solving problems of varying difficulty, and perhaps applying concepts to real-life scenarios (Martin, 2007). Teaching means presenting operations and procedures coherently, giving students opportunity to practice, and assessing learning at multiple points primarily through exams (Cox, 2015; Mesa et al., 2014). Standing at the board, faculty talk; facing the board, students speak when spoken to or when asked a question (Martin, 2007). In these “teacher-dominated,” “sink-or-swim” (Martin, 2007, p. 19) classrooms, students are “passive spectators” (Mesa et al., 2014, p. 118) who are rarely encouraged to make meaning of math and whose smartness is based on whether they can solve problems quickly and accurately (Joseph et al., 2019; Levya et al., 2021). For students who need help, faculty hold office hours, recommend tutoring, and/or point to resources online (Schwartz, 2006). Race, if addressed, manifests when faculty share that math concepts are not exclusively Western constructions (e.g., Sumerians and Mayans independently developed the “zero”) or feature mathematicians of color (Rosa et al., 2016). When final grades reveal low success rates, they think: Maybe students struggled with the material and with more time, they would get it; or, perhaps life issues precluded their full engagement; or, maybe their math skills were insufficient for course demands (Bustillos, 2006). And, *if* they note that Black and Brown students did not perform as well as white and East Asian students, they might conclude that the former did not work hard enough or cannot do math, perpetuating a belief in a “racial hierarchy of mathematical ability” (Martin, 2009, p. 297).

Organized around idealized notions of objectivity, meritocracy, rigor, color-blindness, and individualism, and expectations faculty hold about students’ capabilities, this dominant instructional template impacts minoritized students’ opportunity to learn—whether they are deemed capable of doing math, have positive math experiences, and are allowed to develop robust math identities (Battey & Levya, 2016; Levya et al., 2021; Martin, 2007, 2019). Faculty enacting this template dehumanize minoritized students by constraining their ability to perform in mathematics spaces (Gutiérrez, 2018), by attributing course outcomes to what they do or do not/can or cannot do, and by expecting them to succeed in an environment where negative stereotypes about their math knowledge and skills are pervasive (Martin, 2019; Shah, 2017). In addition, they downplay structural forces shaping success and failure and absolve their role in (not) fostering minoritized students’ learning (Battey & Franke, 2015).

How to Develop a Racial Equity Practice

This template is powerful because of its legitimacy—it is what teaching math is and how it should be done. The question is: How can faculty unlearn it and start to develop a racial equity practice? Researchers have found that racial equity initiatives (REI) that prioritize faculty self-reflection and change, ideally within a

community of peers, are promising interventions (Battey & Franke, 2015; Bensimon & Malcom, 2012). Instead of prescribing “best practices” that have proven efficacious in other settings, these inquiry-based REIs frame racial equity as a *practice* where faculty (a) see racial inequity as a problem of teaching (and the beliefs and values undergirding it) and thus something over which they have control; (b) engage in iterative cycles of race-conscious learning and change to transform status quo approaches; and (c) not only work toward achieving racially equal course outcomes, but also creating spaces where minoritized students are affirmed and afforded opportunities to learn (Acevedo-Gil et al., 2015; Dowd & Bensimon, 2015). Further, since developing a racial equity practice is an individualized affair, there is no set mix of tools and strategies that will work for all faculty. For some, crafting math autobiographies are effective starting points for self-reflection (Kalinec-Craig & Bonner, 2016). Others find value in interrogating teaching artifacts like course syllabi (Ching, 2018) or examining outcomes data (Bauman, 2005).

Math faculty looking to craft a racial equity practice should thus be less concerned with which tools and strategies have worked for others. Rather, they must work toward enacting and embodying three principles: Race-conscious sensemaking of practice; seeing math classrooms as racialized spaces; and developing a humanizing pedagogy. We elaborate on these principles next and the challenges that can arise when faculty confront complicity in producing racial inequity, attempt to undo practices that have served them well, and wrestle with institutional factors that constrain change. Our empirical examples draw from the experiences of 13 math faculty at three community colleges who volunteered for an inquiry-based REI (Dowd & Bensimon, 2015) organized by the Center for Urban Education (CUE).² Most faculty identified as white. By the start of the REI, all had been teaching math for at least 10 years. While invested in pedagogical improvement (e.g., instructional technology, active learning strategies), only a few had previously done racial equity work. Over a 2-year period, they worked in campus-based teams, participated in workshops, and conducted inquiry into their teaching. Two CUE equity coaches supported the faculty’s racial equity practice development, helping them to make sense of what they were learning, offering suggestions for next steps, and addressing points of resistance.

Principle 1: Make Sense of Practice in Race-Conscious Ways

Since it is not the norm to consider race in math education, faculty beginning to develop their racial equity practice need to have foundational knowledge of racial equity. This includes concepts like “color-blindness,” which is the logic that frames policies and practices as race-neutral despite having racially material effects (Battey & Levya, 2016), and “deficit-minded,” which roots outcome inequity in perceived deficiencies of minoritized students rather than structural inequalities (Valencia, 1997). To activate these concepts and not leave them in the abstract, faculty should apply them to their teaching, as one participant in the REI did with “color-blindness.” “Color-blindness” helped surface his belief that delivering math content, grading fairly, and having office hours worked well for all students. It gave him language to describe his pedagogy prior to the REI, to see the “faultiness” of a race-neutral approach for

² A fuller description of the REI, including its design, can be found in Center for Urban Education (2020).

minoritized students, and to realize that teaching is not simply about grading and treating students fairly, but about making student attrition his problem to address. He now pays attention to the demographics in his classroom and who is/is not participating and coming to office hours. Recognizing that he engaged minoritized students less, he reorganized classroom seating from rows to “pods” of four to six students so he could circulate and check in with them during class.

Faculty can also use data disaggregated by race/ethnicity to foster a racial equity practice, provided that the data are close to practice (Dowd et al., 2018) and they engage in critical analysis (Bauman, 2005). While institutional outcomes data like graduation and retention rates are relevant, they are too far removed from faculty’s classrooms, everyday practice, and locus of control. Department and especially course-level data are more useful in making the problem of racial inequity and possibility of racial equity real (Dowd et al., 2018). For one REI participant, comparing her disaggregated course enrollment and success rates with the department average shattered the impression that most of her students passed with As and Bs: Not only were her pass rates lower than the departmental average, she lost students, many Latinx/a/o, throughout the semester; only those who were doing well remained. Still unclear about what to do, it was not until she mapped student attendance, grades, homework due dates, and exam days that she saw patterns by race/ethnicity in how students progressed in the course. This even finer-grained disaggregation helped her see that the strategy of fewer homework deadlines and pairing them with quiz dates was not working. She believed this scheme gave students time to practice and seek support if needed; students, however, completed homework and quizzes at the same time, and likely entered the quiz not as prepared. With a well-intended approach causing more harm than help, she increased the frequency of homework due dates. Important to note is that along with using data close to practice, this instructor engaged in critical analysis that resisted deficit explanations. Instead of blaming students for not completing homework ahead of quizzes, she asked what she is (not) doing to serve minoritized students well—a question that prompted the action of changing homework due dates.

Principle 2: See Math Classrooms as Racialized Spaces

For minoritized students, classroom engagement involves much more than learning math concepts, studying, and taking tests; they are working in “highly racialized domains” (Shah, 2017, p. 32) where their progress depends on interactions with faculty and peers (McGee & Martin, 2011; Roberts, 2020). Each engagement influences how they view themselves as math learners, their outcomes, and whether they continue their math education (Larnell, 2016). Faculty who believe that math is a raceless discipline and math classrooms are raceless learning spaces can harm and marginalize minoritized students through microaggressions, stereotyping, and implicit biases (Martin, 2019; McGee & Martin, 2011), and through supposedly “fair” practices like calling on the first person who raises their hand (Joseph et al., 2019; Levya et al., 2021). Particularly when those students are white, it can signal to minoritized students that white students have innate math intelligence and that faculty value their knowledge (Shah, 2017).

Faculty must learn to see math classrooms as racialized spaces where racial dynamics are at play, not just between themselves and students but also between students. Peer classroom observations

using structured observation protocols that draw attention to student participation by race/ethnicity, who instructors engage, and how they facilitate student engagement, distribute power and knowledge, communicate who and what matters, etc., can move faculty from viewing “classroom participation in general terms” to “noticing for equity” (Reinholz & Shah, 2018; van Es et al., 2017, p. 254). One REI instructor who initially resisted the idea that math classrooms are racialized spaces said that observing a peer’s classroom with these questions in mind was “transformative.” Now, she cannot walk the hallway or be in class without noticing what students are doing and who is doing what. For another, receiving peer observation feedback helped him see that he gravitates toward students he deems “pleasant,” allows these students to be the “voice of the class,” and measures “class progress based on those individuals.” Rarely were these students Black or Latinx/a/o, who often sat in the back and whom he ignored, assuming they were not paying attention. This feedback worked like a mirror, reflecting what was not apparent to him. It heightened his awareness of racial dynamics and pushed him to proactively engage minoritized students. In this case, observation feedback was met positively. Compared to K-12, classroom observations are less common in higher education, and when faculty are observed, protocols are not typically designed to identify racial dynamics and how instructor actions may contribute to those dynamics (Gleason & Cofer, 2014). Receiving feedback can thus be challenging, especially for faculty who believe their approach is fair and effective. As with analyzing disaggregated data, faculty need to be open to the feedback, to be vulnerable rather than defensive, and to focus on what they can do to curb racialization in their classrooms.

Principle 3: Develop a Humanizing Math Pedagogy

Finally, faculty must develop a humanizing math pedagogy in which they are decentered and minoritized students are centered in the learning process (Joseph et al., 2019). In this pedagogy, learning is a two-way street in which the power for constructing math knowledge is shared between faculty and minoritized students, and faculty encourage students to make sense of math concepts in their own way. Faculty should prioritize relationship- and trust-building, and approach minoritized students as complex persons who must navigate oppressive systems to build their own expansive futures (Gutiérrez, 2018; Tuck, 2009). With a humanizing pedagogy, learning and success depend on minoritized students feeling validated and cared for, experiencing satisfaction and belonging, and knowing that their voice matters in the classroom (Acevedo-Gil et al., 2015; Joseph et al., 2019).

Returning to the participant for whom “color-blindness” was a location for self-reflection, the path toward a more humanizing practice started with recognizing disparities in who comes to his office hours and participates in class, and with admitting that his belief that all students should be treated the same contributes to these disparities. He realized that he could not assume that all students who need help will come to office hours and that getting to know minoritized students was a prerequisite to becoming a better instructor for them. To address the latter, he developed a first-day questionnaire that asked students about their goals, major, and experience with math. This enabled him to see them not just as students, but as individuals with hopes and dreams (Acevedo-Gil et al., 2015). He reviewed the responses before each class until he

knew the information intimately and was able to use what students shared to personalize his interactions.

Faculty can also enact a humanizing pedagogy through culturally relevant assignments that give minoritized students opportunities to draw on their personal backgrounds to do math (Aronson & Laughter, 2016). For example, an assignment in one faculty's math education course required students to create a game that they would share with others during a "game night." A Latina student created a version of the Mexican game *lotería* with cards written in Spanish and directions in Spanish and English. While other students developed games based on what they played as children (e.g., Jenga), this was the first time a student did not base their project on a traditional American game. The instructor found this significant because he was becoming "much more aware of racial dynamics" in math. That this was an assignment for a math education class could give instructors who teach sequential math courses like algebra or calculus the impression that it is not something they could easily implement. Indeed, having to cover a lot of content so students are adequately prepared for the next course in the sequence is a constraint and this constraint can discourage assignments that do not follow the typical mode. Yet, as much as learning math rules, operations, and procedures is imperative for students' subsequent course success, racial equity is about creating opportunities for math to impact minoritized students' lives, families, and communities—for math to be defined on *their* terms (Gutiérrez, 2008). Faculty with a humanizing math pedagogy do not just help students become math proficient, but offer a more expansive view of math, and empower students to approach it on their own terms and to use math in ways that advance their goals and desires.

Conclusion

Racial inequity in student outcomes and experiences persists because most reforms do not tackle what occurs inside the classroom nor do they interrupt the dominant instructional template that undergirds the teaching of many math faculty. Racial equity demands a practice premised on (a) race-conscious sensemaking of teaching; (b) seeing racial dynamics in math classrooms; and (c) having a humanizing math pedagogy. The potential of this approach is buoyed by data showing that most REI faculty saw improved course completion rates for Black and Latinx/a/o students (Center for Urban Education, 2020). This is just a start, however. A racial equity practice is an ongoing endeavor that relies on faculty's unwavering commitment to "do the good," to reflect on what it means to be a "good" math teacher and what "good" math teaching is, and to evolve based on what works for minoritized students (Bensimon & Malcom, 2012, p. 3; Gutiérrez, 2018). As Gutiérrez (2018) reminds us, math is a human construction that was made by people and can thus be remade. While many minoritized students are subjected to dehumanizing math classrooms that kill their aspirations (Cullinane & Treisman, 2010) and where racial inequities and dominant racial and gender logics are maintained (Levy et al., 2021; Martin, 2009; Roberts, 2020), math education does not need to be this way. It is just as possible for classrooms to be sites of true learning, where minoritized students experience "connection, joy, and belonging," (Gutiérrez, 2018, p. 4), feel seen, are cared for, and are treated with dignity (Joseph et al., 2019). Math faculty can do their part to make the latter a reality by crafting a racial equity practice.

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