Equity in Practice

XE.1. Introduction

The number of mathematics degrees awarded at the undergraduate and graduate levels provides insight into the impact of institutional cultures and instructional practices on women and historically underrepresented groups in science, technology, engineering, and mathematics (STEM). In 2012, only 20% of bachelors, 18% of masters, and 8% of doctoral degrees in mathematics were awarded to black, Latinx, native American, native Alaskan, and Hawaiian students combined (National Science Board, 2014) despite the fact that these racial groups composed approximately 30% of the U.S. population at that time. Further, the 2010 survey of mathematics departments conducted every five years by the Conference Board of the Mathematical Sciences (CBMS) indicated members of these underrepresented groups composed only 9% of the full-time mathematics instructors (CBMS, 2013); while women made up 29% of these full-time instructors, only 3% were women of color.

Research has revealed additional and sometimes hidden stressors placed on women and students of color as they navigate undergraduate and graduate mathematics (Herzig, 2004; McGee and Martin, 2011a; 2011b). McGee and Martin (2011b) detailed how academically successful black undergraduates pursuing mathematics and engineering majors faced racial stereotypes of low ability and underachievement. Experiences in undergraduate mathematics classes have also been shown to contribute to women's decisions to leave STEM fields despite the fact that they are well-prepared and fully capable of succeeding in these fields (Ellis, Fosdick, and Rasmussen, 2015; Kogan and Laursen, 2013). Such research suggests our community needs to critically examine factors well beyond students' academic preparation and achievements in our quest to increase students' success in STEM. Such factors include implicit messages our course design and teaching practices send to students regarding what mathematics is and who "belongs" in mathematics. Adiredja and Andrews-Larsen (2017) provides a more detailed review of research in postsecondary mathematics education related to equity issues at the institutional level.

Fixation in higher education on low achievement rates among women and students of color in mathematics, coupled with erroneous notions that mathematical ability is innate and fixed, contribute to the prevalent deficit perspective of these underrepresented groups, especially among a predominantly white teaching force (Battey and Leyva, 2016; Harper, 2010; Valencia, 2010). Such deficit perspectives, that focus on what students cannot do, often result in instructors reducing the rigor of mathematical tasks and assessments, avoiding instructional strategies that engage students in higher-level reasoning, and failing to build positive relationships with students from these groups (Battey, Neal, Leyva, and Adams-Wiggins, 2016; Ladson-Billings, 1997; Lubienski, 2002). It is incumbent upon us to consider classroom, assessment, and design practices that affirm our students and provide equitable access to rich mathematical learning opportunities for all. We must challenge the deficit perspective among the broader mathematical sciences community and help our colleagues broaden their notions of mathematical competence and success while still maintaining high levels of rigor and standards of performance.

XE.2. Definitions

XE.2.1. Four Dimensions of Equity

Gutiérrez (2009) offers a framework to define and conceptualize equity in mathematics education. Her model involves four key factors: access, achievement, identity, and power (see Figure 1). Access and achievement occupy the "dominant axis" as these dimensions of equity focus on supporting students to participate in the existing dominant culture and practice of mathematics. Addressing issues of access and achievement support students in learning the rules of mathematics and successfully "play(ing) the game" (Gutiérrez, 2009, p. 6). Attending to access means ensuring all students have access to physical and intellectual resources to learn mathematics (e.g., good instructors, rigorous curricula, opportunities to think critically about mathematics). Achievement focuses on student learning outcomes as traditionally measured (e.g., scores on exams, persistence in mathematics, majoring in STEM).

Dimensions of Equity

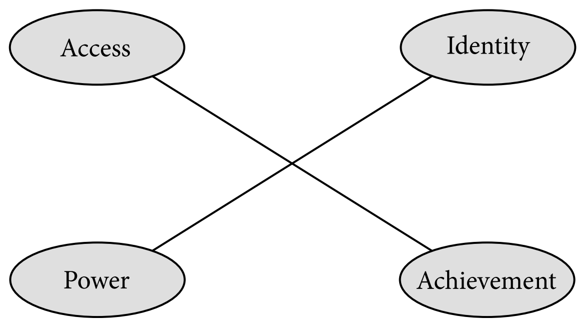


Figure 1. Diagram adapted from Gutiérrez (2009).

Identity and power occupy the "critical axis" as these dimensions of equity focus on supporting students to become critical participants who have the potential to "change the game" of mathematics (Gutiérrez, 2009, p. 6). These two are the most transformative of the four dimensions in terms of their potential to affect monumental change in mathematics education. Attending to identity means recognizing ways in which the constellation of social identities students bring (e.g., race, gender, social class) can be a resource in learning. We must educate ourselves and remain ever cognizant of the ways students' social identities impact their participation in the classroom. We must acknowledge ways in which these identities serve to include or exclude students based on the prevailing view of various identities in the context of learning mathematics. For example, the stereotypical view that all Asians are good at mathematics affirms that Asians "belong" in mathematics but excludes other racial identities (Martin, 2009) and can lead to exclusion of students from groups that have been historically marginalized (e.g., black students, see Nasir and Shah, 2011). Further, this stereotype can lead to the erasure of the needs of particular Asian groups that have had limited access to educational opportunities (e.g., 38% of Hmong-Americans have less than a high school degree compared to the 13.4% national average, Center for American Progress, 2015). Stereotypical hierarchies of intelligence are damaging for *all* students.

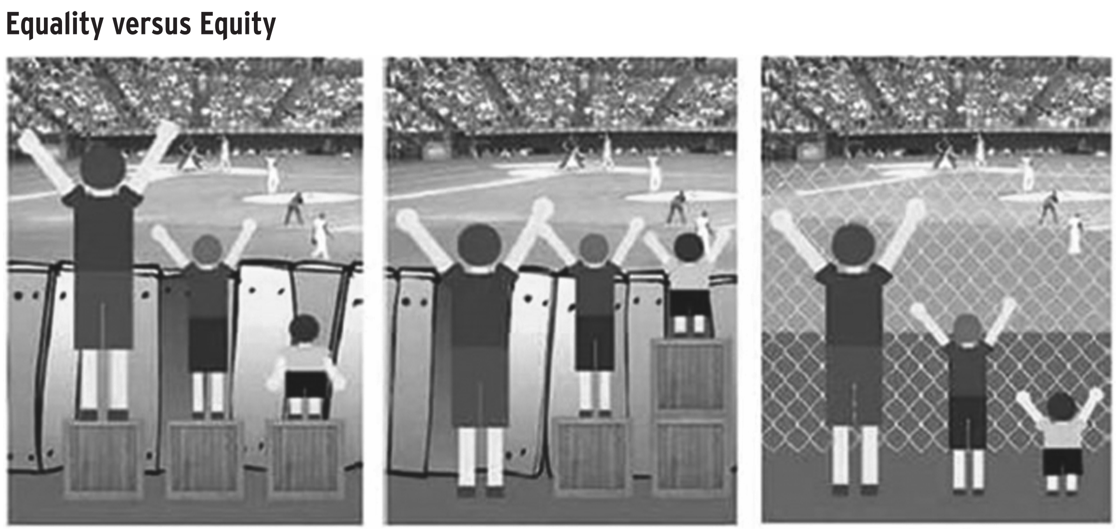
Attending to issues of power means examining the degree to which learning disrupts or challenges the existing distribution of resources and influence in the classroom as well as in society. This distribution is often unequal in terms of race, gender, and social class (Gutiérrez, 2009). Thus, attending to power means asking questions such as, "Who benefits from the teaching of mathematics and to what end?" or "Is this mathematics empowering students or does it maintain the status quo?"

Challenging existing power dynamics can be achieved by exploring the use of mathematics to critique social and political issues (Gutstein, 2003). For example, Tufts University hosted a workshop for mathematicians on the "Geometry of Redistricting" to analyze the legality of gerrymandering.

Gutiérrez notes that the two axes of equity are often in tension with each other. For example, supporting students to successfully participate in the current practice of mathematics might inadvertently ignore aspects that exclude some students from participating. Exploring a non-traditional use of mathematics or challenging an existing power distribution might lead to exclusion of some students in the current culture of mathematics. Gutiérrez's framework can help guide us in thinking critically about ways to broaden access to mathematics and in designing inclusive and equitable mathematics classrooms where all students can thrive.

XE.2.2. Equity, Inclusion, and Systemic Barriers

A primary tension that comes into play in the process of addressing issues of equity in undergraduate mathematics education is distinguishing *equity* from *equality*: *equity* focuses on social justice whereas *equality* focuses on sameness (Gutiérrez, 2002). Sameness refers to a response in which all students are treated the same regardless of their backgrounds and skills. This type of context-free[1] approach offers the illusion of fairness but ignores the critical roles that students' experiences and identities play in their education. Gutiérrez asserts, "To redress past injustices and account for different home resources, student identities, social biases, and other contextual factors, students, in fact, need different (not same) resources and treatment to reach fairness" (2002, p. 152). Context-free approaches ignore these factors and continue to privilege students from the dominant groups.



In the first image, it is assumed that everyone will benefit from the same supports. They are being treated equally.

In the second image, individuals are given different supports to make it possible for them to have equal access to the game. They are being treated equitably.

In the third image, all three can see the game without any supports or accommodations because the cause of the inequity was addressed. The systemic barrier has been removed.

Figure 2. Equity v. Equality (image source: culturalorganizing.org/the-problem-with-that-equity-vs-equality-graphic/).

The first two images of Figure 2 highlight the critical need to attend to students' different contextual factors (here, their heights). The third image illustrates the removal of the barrier (the wooden fence), thereby removing the need for accommodations, which results in equity.

Removing barriers is the real key to equity and inclusion. Achieving equity in undergraduate mathematics education is a formidable task that will require philosophical shifts in the way our community views the accessibility of mathematics, particularly as a social justice issue. We must first identify the systemic barriers inherent in higher education in general, and in mathematics education specifically, and then devise strate-

1 We use the term "context-free" instead of "color-blind" or "gender-blind" to describe the lack of attention to individual's backgrounds. The term "color-blindness" has been useful in describing beliefs about freedom from racial bias and led to powerful critiques about such beliefs in a racialized society (Bonilla-Silva, 2003). However, the terms discriminate against people with visual disabilities by erasing or delegitimizing their existence and experiences (Colorblind, 2011).

gies for removing these barriers for our students. All our students deserve access to mathematics.

We must utilize effective methods for supporting students in becoming better learners as we work to change departmental and institutional processes, policies, and cultures that act as barriers to student success. We must ensure all students have the opportunity to experience the rigor, practicality, elegance, and beauty of mathematics (dominant axis). Perhaps more critically, we must examine mathematics as an institution with its own set of norms, values, and practices and identify ways to provide a more inclusive, affirming environments for students, particularly students from underrepresented groups (critical axis). For example, how can we problematize acceptable expression of mathematical ideas when students are still learning the formal mathematical language? How do we conceptualize rigor in different stages of learning for our students? Certainly, there is no implication here that lowering our expectations and level of rigor is in any way acceptable. Rather, the onus is on our community to maintain high academic standards as we consider systemic barriers in learning mathematics.

The "growth versus fixed mindset" theory of intelligence (Dweck, 2006) can serve as an instructive example in this context. This theory is appealing to the education community because of its explanatory power, but it has limits of which instructors must remain mindful. In utilizing the theory to effect positive change toward increased student learning and success, instructors must remain cognizant of the potential to inadvertently limit access to mathematics for students. How might that occur?

The theory posits that individuals with a "growth mindset" are more likely to persist and succeed in the face of challenging tasks compared to individuals with "fixed mindset." That is, those who view intelligence and ability not as inherent qualities but rather as malleable qualities are more likely to improve their skills and understandings over time. Those with a fixed mindset are less likely to persist on a challenging task. A recent publication by Boaler (2015) details specific applications of the growth/fixed mindset model in mathematics, such as the role of struggle in expanding students' knowledge and abilities. Helpful questions arise for reflection as we consider mindsets in mathematics students: What messages do we send students about the field of mathematics? To what extent do we view mathematical ability as innate in students? To what extent do successful learners of mathematics experience struggle and need time to make sense of mathematics?

The danger can arise when we inadvertently treat students' adoption of growth mindset as the only means to address inequities. It is counterproductive when an instructor views students as "change-worthy" and focuses on changing the students while ignoring the systemic barriers that perhaps prompted the fixed mindset view students have of themselves. Solely focusing on students' mindset ignores the impact of systemic oppression (e.g., racism) on students' lives and educational experiences. McGee and Stoval (2015) have extensively discussed a similar fixation around the notion of "grit" in education and its failure in accounting for the impact of racism on the mental health of black students. The growth mindset model is a useful concept but should not be viewed as a singular quick fix to the very complex issue of equity and inclusion in mathematics. Such an approach needs to be coupled with continued work to remove systemic and institutional barriers for all students to be successful. We now offer some principles that can assist with the implementation of the specific suggestions from earlier chapters and begin the process of addressing equity in the classroom.

XE.3. Higher-order equity-oriented principles

XE.3.1. Social discourses and narratives impact teaching and learning

Established social discourses and narratives around social identities (e.g., race, gender) and intelligence impact students' sense of belonging and their opportunities to participate in the classroom (Leyva, 2016; Nasir and Shah, 2011). Deficit narratives about students, particularly black and Latinx students as academically and intellectually inferior, limit access to educational opportunities (e.g., who is called on in class, who is advised into STEM majors). These narratives can also place unnecessary cognitive burdens on students in learning environments, particularly for students operating under "stereotype threat." Steele and Aronson (1995) identified and defined stereotype threat as a situational predicament in which individuals are at risk of confirming negative stereotypes about their group because they will be judged based on negative stereotypes about their group rather than their own merits. These researchers investigated the effects of stereotype threat on students when performance was linked to intelligence.

The researchers found that black college freshmen and sophomores performed worse on verbal tests in an academic environment than white students when their race was emphasized. The typical race gap in achievement emerged when stereotype threat was activated via a reminder of a negative stereotype about their group's intelligence. White students performed at the same level under both conditions, but black students performed as well or better than their white peers in the absence of stereotype threat. They found similar patterns in test performance between women and men. Follow-up studies suggest that in situations where their ability is being evaluated, stereotyped students carry an extra weight on their minds related to the stereotypes about their group.

XE.3.2. All students are capable of learning mathematics

There is no special "mathematics gene," only social valuation of skills that align better with the traditional methods of instruction in mathematics (e.g., passive lecturing). Ease in understanding mathematics is not an inherent personal quality but a product of prior opportunities and social positioning. Similarly, students' and instructors' behaviors and dispositions are in part a product of socializations. Their knowledge is influenced by their environment and distribution of resources. Categorizations of students as "mathematics students" versus "non-mathematics students" or "slow" versus "fast" are artificial, limiting, and not conducive to learning. Research has shown that the way teachers label and talk about students impact how they respond to students' difficulties in the classroom (Horn, 2008).

Instructors must deliberately adopt an anti-deficit perspective on students and their knowledge in order to recognize that all students have the ability to contribute in the classroom. Misconceptions and errors in student thinking are a natural part of learning. The fixation on remediation is deficit-oriented, undermines student progress, and hinders the development of mathematical identity. The value of students' ideas should not be solely based on proximity to the norm.

XE.3.3. The importance of fostering a sense of classroom community

A critical aspect of learning mathematics is participating in mathematical discourse in an environment that supports students sharing and critiquing their own and each other's work. The work of teaching is not an activity solely between a student and a teacher. Student participation in the classroom is influenced by the distribution of authority, status, and power among all participants in the classroom. Authority, status, and power are all influenced by students' social identities. Experiencing other students as resources in learning fosters students' connections to the classroom community. This requires a safe environment for students to share partial understanding, communicate freely with other students, and build on each other's knowledge.

XE.4. Attending to equity

XE.4.1. An illustration: Students with disabilities

Most mathematics instructors have had experience attending to equity issues in the classroom related to providing accommodations for students with disabilities. Instructors recognize the importance of providing accommodations to facilitate the learning process and ensure students with disabilities are not further marginalized in their learning experiences. These students have to navigate learning environments differently from other students. We recognize that we are not experts on the particular needs of a student. For example, we cannot treat all students in a wheelchair the same way because they will likely have different needs. We rely on the assistance from both the student and the office for disability services on campus to understand the student's particular needs. We as instructors work in collaboration with students to create the most supportive and inclusive learning environment. We understand that an inclusive classroom environment would benefit all students in the class. For example, speaking more slowly in the classroom would help accommodate an interpreter for a student with hearing impairment as well as provide other students more time to process information. For additional information on students with disabilities, see section 2.7 in the Design Practices chapter.

Some of these ideas are helpful as we consider an equity-oriented approach to teaching for other marginalized students. We support students by focusing on the needs of individual students and recognizing their histories and positioning in society. We do not treat all marginalized students the same way. The students are an important resource in learning about their needs. We need to work in collaboration with them in providing the most supportive learning environment. We can also draw on resources outside of our own departments (e.g., Office for Diversity and Inclusion) to best serve students. For example, these offices in Student Services are typically equipped to assist in issues related to microaggressions—e.g., everyday communicative actions or verbal expressions that may or may not intentionally slight target or marginalized individuals such as students of color (Sue, 2010)—or other challenging conversations in the classroom. Ultimately, our students are the best resource in our effort to create a more inclusive classroom environment that serves all of our students.

XE.4.2. Critical need to attend to developmental mathematics

As we consider instructional practices in the context of different topics in mathematical and types of institutions, one particular issue that requires careful consideration is developmental mathematics. The national pass rates in developmental mathematics courses in both two- and four-year institutions are disconcertingly low. This has prompted scholars to investigate factors associated with student success in such courses (e.g., Fong, Melguizo, and Prather, 2015) and to recognize the value of curricula focused on quantitative reasoning and statistics more than algebra (Hoang et al., 2017). Furthermore, poor performance in developmental mathematics courses is correlated with dropout rates and low transfer rates (Bonsangue, 1999; Fong et al., 2015). Multiple failed attempts by students to pass these courses place undue financial burdens on both students and states (Fong et al., 2015). Even more disconcerting, non-traditional students and various underserved populations are overrepresented in these courses. For example, Larnell (2016) cited studies that confirm the disproportionate number of black students in these courses (e.g., Attewell, Lavin, Domina, and Levey, 2006; Bahr, 2008).

The principles and practices outlined in this guide are particularly relevant in the context of developmental mathematics courses. Many of the students in these courses are there precisely because our traditional teaching practices (e.g., passive lectures) have failed these students. Yet the CBMS 2010 survey reports that these courses are dominated by traditional lectures. While a minimal amount of traditional lecturing can have a place in an active-engagement environment, the evidence-based practices detailed in this guide offer benefits and support for students in developmental mathematics courses. A documented barrier to instructors adopting innovative, evidence-based teaching practices is the perception that students in lower level courses are unable to engage in deep mathematical reasoning, which brings us back to the notion of anti-deficit perspectives on students and their knowledge.

XE.4.3. Conclusion: Anti-deficit perspective and focus on excellence

Research has consistently shown the positive correlation between instructors' high expectations of students and student success in mathematics (e.g., Asera, 2001; Delpit, 2012; Gutiérrez and Dixon-Román, 2011; National Collaborative on Diversity in the Teaching Force, 2004). Course design as well as instructional and assessment practices framed by high expectations and anti-deficit perspectives have a positive effect on how students see themselves in relation to mathematics. In her study of instructors supportive of black students, Ladson-Billings (1995) found that the common factor across all instructors was their anti-deficit perspective.

Some of the documented curricula, programs, and pedagogical approaches shown by research to successfully support underrepresented populations in mathematics are strongly driven by anti-deficit perspectives about students. For example, the Treisman Math Workshop program, which originated at the University of California, Berkeley, dismissed the narrative that black and Latinx students lack resources and motivation to do well in mathematics (Treisman, 1992). The workshop was designed as an honors program to provide students with rich learning opportunities to engage critically with mathematics (Asera, 2001). The Meyerhoff Scholars Program at University of Maryland Baltimore County is one of the few programs that focuses on underrepresented students' success in STEM (Miller, Ozturk, and Chavez, 2005). Similarly, inquiry based learning (IBL) efforts have been shown to "level the playing field" between male and female students by building on the premise that all students are capable of engaging in higher level mathematical practices such as conjecturing and generalizing (Laursen, Hassi, Kogan, and Weston, 2014).

These innovative programs and practices also impacted the development of students' mathematical identities and redistributed power in students' experiences with mathematics. For example, Oppland-Cordell and Martin (2014) found that in an Emerging Scholars Program calculus workshop, students sharing their mathematical work publicly recalibrated peers' perceptions of intelligence related to race, gender, and other social identities. Through observing strong mathematical work by fellow students of color, Latinx students recognized their own excellence in mathematics and challenged existing narratives about the perceived superiority of their white and Asian peers in mathematics. Hassi and Laursen (2015) documented how the implementation of IBL instruction in calculus courses resulted in empowerment of female students who then perceived themselves as mathematically competent and expressed interest in future IBL mathematics courses at higher rates than female peers in non-IBL courses. Anti-deficit perspectives shape socially-affirming forms of course design and instruction that position historically marginalized students as constructors of mathematical knowledge, thus promoting their development of positive social and mathematical identities.

These findings further contextualize exemplary practices detailed in this guide. Teaching practices have a significant impact on students' learning experiences and outcomes but are only part of the story. Awareness of the impact on students' identities and broader institutional issues can prompt instructors to adhere to the core principles of evidence-based practices and the inequities they aim to correct. Equity is a process, not an end goal.

XE References

Adiredja, A.P. and Andrews-Larson, C. (2017). Taking the sociopolitical turn in postsecondary mathematics education research. *International Journal for Research in Undergraduate Mathematics Education*, 3(3), 444–465. doi.org/10.1007/s40753-017-0054-5.

Asera, R. (2001). *Calculus and Community: A History of the Emerging Scholars Program*. New York: National Task Force on Minority High Achievement, College Board.

Attewell, P., Lavin, D., Domina, T., and Levey, T. (2006). New evidence on college remediation. *The Journal of Higher Education, 77*(5), 886–924.

Bahr, P.R. (2008). Does mathematics remediation work?: A comparative analysis of academic attainment among community college students. *Research in Higher Education*, 49(5), 420–450. doi.org/10.1007/s11162-008-9089-4.

Battey, D. and Leyva, L.A. (2016). A framework for understanding whiteness in mathematics education. *Journal of Urban Mathematics Education*, 9(2), 49–80.

Battey, D., Neal, R., Leyva, L.A., and Adams-Wiggins, K. (2016). The interconnectedness of relational and content dimensions of quality instruction: Supportive teacher-student relationships in urban elementary mathematics classrooms. *The Journal of Mathematical Behavior*, 42, 1–19.

Boaler, J. (2015). *Mathematical Mindsets: Unleashing Students' Potential through Creative Math, Inspiring Messages and Innovative Teaching*. San Francisco, CA: Jossey-Bass.

Bonilla-Silva, E. (2003). *Racism without Racists: Color-Blind Racism and the Persistence of Racial Inequality in the United States.* Lanham, MD: Roman and Littlefield.

Bonsangue, M.V. (1999). Factors affecting the completion of undergraduate degrees in science, engineering, and mathematics for underrepresented minority students: The senior bulge study. In Gold, B., Keith, Z. K., and Marion, W. A. (eds), *Assessment Practices in Undergraduate Mathematics, MAA Notes Number 49*, 216–218.

Center for American Progress. (2015). Who are Hmong Americans? Retrieved from: cdn.americanprogress.org/wp-content/uploads/2015/04/AAPI-Hmong-factsheet.pdf.

Conference Board of the Mathematical Sciences (2013). *Statistical Abstract of Undergraduate Programs in the Mathematical Sciences in the United States: Fall 2010 CBMS Survey.* Providence, RI: American Mathematical Society.

Delpit, L. (2012). *Multiplication is for White People: Raising Expectations for Other People's Children.* New York, NY: The New Press.

Dweck, C. S. (2006). *Mindset: The New Psychology of Success*. New York, NY: Random House.

Ellis, J., Fosdick, B.K., Rasmussen, C. (2016). Women 1.5 times more likely to leave STEM pipeline after calculus compared to men: Lack of mathematical confidence a potential culprit. *PLoS ONE* 11(7). doi.org/10.1371/journal.pone.0157447.

Esmonde, I., and Langer-Osuna, J. M. (2013). Power in numbers: Student participation in mathematical discussions in heterogeneous spaces. *Journal for Research in Mathematics Education*, 44(1), 288–315.

Fong, K. E., Melguizo, T., and Prather, G. (2015). Increasing success rates in developmental math: The complementary role of individual and institutional characteristics. *Research in Higher Education*, 56(7), 719–749.

Gutiérrez, R. (2002). Enabling the practice of mathematics teachers in context: Towards a new equity research agenda. *Mathematical Thinking and Learning,* 4(2 and 3), 145–187.

Gutiérrez, R. (2009). Framing equity: Helping students "play the game" and "change the game." *Teaching for Excellence and Equity in Mathematics*, 1(1), 5–7.

Gutiérrez, R. and Dixon-Román, E. (2011). Beyond gap gazing: How can thinking about education comprehensively help us (re)envision mathematics education? In B. Atweh, M. Graven, W. Secada, and P. Valero (eds), *Mapping Equity and Quality in Mathematics Education* (pp. 21–34). Springer Netherlands.

Gutstein, E. (2003). Teaching and learning mathematics for social justice in an urban, Latino school. *Journal for Research in Mathematics Education*, 34(1), 37–73.

Harper, S.R. (2010). An anti-deficit achievement framework for research on students of color in STEM. In S. R. Harper and C. B. Newman (Eds.), *Students of color in STEM: Engineering a new research agenda. New Directions for Institutional Research* (pp. 63–74). San Francisco: Jossey-Bass.

Hassi, M.L., and Laursen, S.L. (2015). Transformative learning: Personal empowerment in learning mathematics. *Journal of Transformative Education*, 13(4), 316–340.

Herzig, A.H. (2004). 'Slaughtering this beautiful math': Graduate women choosing and leaving mathematics. *Gender and Education*, 16(3), 379–395.

Hoang, H., Huang, M., Sulcer, B., and Yesilyurt, S. (2017). *Carnegie Math Pathways 2015-2016 Impact Report Year Review.* Carnegie Foundation for the Advancement of Teaching. Stanford, CA. Retrieved from: www.carnegiefoundation.org/resources/publications/carnegie-math-pathways-2015-2016-impact-report-a-five-year-review/.

Horn, I.S. (2008). Fast kids, slow kids, lazy kids: Framing the mismatch problem in mathematics teachers' conversations. *Journal of the Learning Sciences*, 16(1), 37–79.

Kogan, M., and Lauren, S.L. (2013). Assessing long-term effects of inquiry-based learning: A case study from college mathematics. *Innovative Higher Education*, 39(3), 183–199.

Kona, G., Hussar W., McFarland J., deBrey C., Musu-Gillette, L., Wang X., Zhang, J., Rathbun, A., Wilkinson-Flicker, S., Diliberti M., Barmer, A., Bullock Mann E., and Dunlop Velez, E. (2016). *The Condition of Education 2016* (NCES 2016-144). U.S. Department of Education, National Center for Education Statistics. Washington, DC. Retrieved from nces.ed.gov/pubs2016/2016144.pdf.

Ladson-Billings, G. (1995). Toward a theory of culturally relevant pedagogy. *American Educational Research Journal*, 32(3), 465–91.

Ladson-Billings, G. (1997). It doesn't add up: African American students' mathematics achievement. *Journal for Research in Mathematics Education,* 25(6), 697–708.

Larnell, G.V. (2016). More than just skill: Examining mathematics identities, racialized narratives, and remediation among black undergraduates. *Journal for Research in Mathematics Education*, 47(3), 233–269.

Laursen, S.L., Hassi, M.L., Kogan, M., and Weston, T.J. (2014). Benefits for women and men of inquiry-based learning in college mathematics: A multi-institution study. *Journal for Research in Mathematics Education*, 45(4), 406–418.

Leyva, L.A. (2016). An intersectional analysis of Latin@ college women's counter-stories in mathematics. *Journal of Urban Mathematics Education,* 9(2), 81–121.

Lubienski, S.T. (2002). A closer look at black-white mathematics gaps: Intersections of race and SES in NAEP achievement and instructional practices data. *The Journal of Negro Education,* 71(4), 269–287.

Oppland-Cordell, S., and Martin, D.B. (2015). Identity, power, and shifting participation in a mathematics workshop: Latin@ students' negotiation of self and success. *Mathematics Education Research Journal*, 27(1), 21–49.

Martin, D.B. (2009). Researching race in mathematics education. *Teachers College Press,* 111(2), 295–338.

McGee, E., and Martin, D.B. (2011a). From the hood to being hooded: A case study of a black male PhD. *Journal of African American Males in Education*, 2(1), 46–65.

McGee, E.O., and Martin, D.B. (2011b). "You would not believe what I have to go through to prove my intellectual value!": Stereotype management among academically successful black mathematics and engineering students. *American Educational Research Journal*, 48(6), 1347–1389.

McGee, E. and Stovall, D. (2015). Reimagining critical race theory in education: Mental health, healing, and the pathway to liberatory praxis. *Educational Theory*, 65(5), 491–511.

Miller, L.S., Ozturk, M.D., and Chavez, L. (2005). Increasing African American, Latino, and native American representation among high achieving undergraduates at selective colleges and universities. *University of California, Berkeley the Institute for the Study of Societal Issues (ISSI) Project Reports and Working Papers.* Retrieved from: escholarship.org/uc/item/10s3p1xt.

Nasir, N.S., Hand, V., and Taylor, E. (2008). Culture and mathematics in school: Boundaries between "cultural" and "domain" knowledge in the mathematics classroom and beyond. *Review of Research in Education*, 32, 187–240.

Nasir, N.S., and Shah, N. (2011). On defense: African American males making sense of racialized narratives in mathematics education. *Journal of African American Males in Education*, 2(1), 24–45.

National Collaborative on Diversity in the Teaching Force. (2004). *Assessment of Diversity in America's Teaching Force: A Call to Action*. Washington, DC.

National Science Board. (2014). *Science and Engineering Indicators 2014.* Arlington, VA: National Science Foundation (NSB 14-01).

Steele, C.M., and Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of Personality and Social Psychology*. 69(5), 797–811.

Sue, D.W. (2010). *Microaggressions in Everyday Life: Race, Gender, and Sexual Orientation*. Hoboken, NJ: John Wiley and Sons.

Treisman, U. (1992). Studying students studying calculus: A look at the lives of minority mathematics students in college. *College Mathematics Journal*, 23(5), 362–372.

Valencia, R.R. (2010). *Dismantling Contemporary Deficit Thinking: Educational Thought and Practice.* New York, NY: Routledge.