

Getting Started with Equity

A Discipline Brief for Equity in Mathematics:
Joel Amidon, Ph.D.



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About the Supporting Organizations



Every Learner Everywhere is a network of twelve partner organizations with expertise in evaluating, implementing, scaling, and measuring the efficacy of education technologies, curriculum and course design strategies, teaching practices, and support services that personalize instruction for students in blended and online learning environments. Our mission is to help institutions use new technology to innovate teaching and learning, with the ultimate goal of improving learning outcomes for Black, Latinx, and Indigenous students, poverty-affected students, and first-generation students. Our collaborative work aims to advance equity in higher education centers on the transformation of postsecondary teaching and learning. We build capacity in colleges and universities to improve student outcomes with digital learning through direct technical assistance, timely resources and toolkits, and ongoing analysis of institution practices and market trends. For more information about Every Learner Everywhere and its collaborative approach to equitize higher education through digital learning, visit www.everylearnereverywhere.org.



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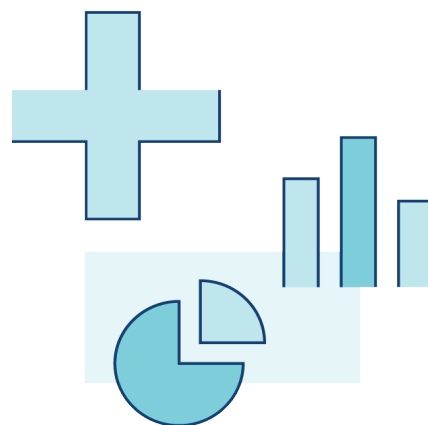
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Discipline Brief: Equity in Math

Joel Amidon, Ph.D., Associate Professor of Secondary Education at the University of Mississippi and host of the Amidon Planet Podcast, and co-host of the Teaching Math Teaching Podcast, is on a mission is to lead people to love others through teaching.

Summary of equity-related areas of concern

In the Mathematical Association of America's document, *A Common Vision for Undergraduate Mathematical Sciences Programs in 2025*, there is a charge to "collectively reconsider undergraduate curricula and ways to improve education in the mathematical sciences". The authors began with a review of key documents and synthesized their findings into a single conclusion: "The status quo is unacceptable." To elaborate, something needs to be done in the teaching of undergraduate mathematics courses, because the current path leads to inequitable outcomes.



Suggestions for change

What follows are suggestions for change based on a surface-level engagement with the literature on equity in the mathematics classroom (the references can serve as a starting point for more engagement). These changes may help the field take steps toward the vision of the Special Interest Group of the Mathematical Association of America on Research in Undergraduate Mathematics Education's (SIGMAA on RUME): "Turning undergraduate mathematics classrooms into spaces where all students can thrive - personally, intellectually, and professionally - as they critically engage with and learn high-quality mathematics."

Differentiate equity and equality

Equal outcomes will not be achieved through equal support. Equal access to success in the mathematics classroom will require different supports to be made available to students based on needs, abilities, interests, experiences, etc.

Adopt an asset-based perspective of students

Instead of analyzing what students lack (deficit perspective), consider instead what assets students bring to the classroom and how to leverage those assets to best build their relationship with mathematics., labs, etc.

Promote diverse perspectives

Students can use mathematics as a way to view and make sense of the world, so it is critical that diverse backgrounds and worldviews are represented in every mathematics course. This can be achieved by incorporating a diverse range of voices and images of doers of mathematics into the curriculum. This will benefit individual students, as they will be more likely to remain in a discipline where they feel seen and heard.

It will also unlock greater potential for advancement of mathematics as a discipline. Different perspectives are sometimes what is needed to spark a solution to a difficult mathematics problem. The same is true of the field of mathematics more broadly.

Work with Mathematics Educators

Calls to update curricula and utilize evidence-based pedagogies are often coming from other Mathematics Educators/Teacher Educators. This means that there is a critical role that partnerships can play in the overall improvement of teaching and learning of all students.

Give space and support for improvement

The call for changes in curriculum and pedagogy must be accompanied by support in order to enact such changes. Such support may mean restructuring classroom spaces, funding course overhauls, and enhancing or reimagining teaching evaluations. For educators in positions of authority over department-wide funding decisions, it is important to prioritize the changes to curriculum that are necessary to improve equity in mathematics courses.

Further reading

Boaler, J., & Staples, M. (2008). Creating mathematical futures through an equitable teaching approach: The case of Railside School. *Teachers College Record*, 110(3), 608-645. Retrieved from <https://www.youcubed.org/wp-content/uploads/2017/09/Creating-Mathematical-Futures.pdf>

This article is based on a landmark study that describes inclusive, engaging, asset-based mathematics instruction where “students learned more, enjoyed mathematics more and progressed to higher mathematics levels”. The changes made were instituted at a department level and permeated through the school. Also the article is stored on the co-author’s website (<https://www.youcubed.org/>) that contains many supportive resources.

Jansen, A. (2020). *Rough draft math: Revising to learn*. Stenhouse Publishers. https://books.google.com/books?id=VgXaDwAAQBAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false

This book by Amanda Jansen brings the idea of rough drafts from the English Language Arts classroom into the mathematics classroom. Contained in the book are strategies and examples from teachers who move the teaching of mathematics away from performance in order to foster meaningful participation.

Lampert, M. (2001). *Teaching Problems and the Problems of Teaching*. United Kingdom: Yale University Press. Retrieved from https://www.google.com/books/edition/Teaching_Problems_and_the_Problems_of_Te/gsTeaGEHxdMC?hl

Master teacher and mathematics education professor, Magdalene Lampert, shares an enacted vision of teaching mathematics through problems (not exercises). What she describes is a student led classroom where students are actively engaged with mathematics and each other in order to solve rich mathematical problems. What is helpful in this book is the included thinking of the author in the midst of making teaching decisions that considers how to foster productive relationships with mathematics.

McGee, E. O., & Martin, D. B. (2011). "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. Retrieved from <https://www.academia.edu/1109561>.

This article recounts the lived experiences of academically successful Black mathematics and engineering students where they describe "an intense and perpetual state of awareness that their racial identities and Blackness are undervalued and constantly under assault within mathematics and engineering contexts". Readers are prompted to consider who they are prepared to teach, and what changes they need to make to be more inclusive.

Moses, R., & Cobb, C. E. (2002). *Radical equations: Civil rights from Mississippi to the Algebra Project*. Beacon Press. https://www.google.com/books/edition/Radical_Equations/wb2eCgAAQBAJ?hl

Robert Moses was on the front lines during the civil rights movement, helping marginalized citizens to exercise their right to vote. In his book, *Radical equations: Civil rights from Mississippi to the Algebra Project*, he equates that struggle in the 1960's with the current struggle in helping traditionally marginalized students to learn algebra. He equates the learning of algebra as a "gatekeeper to citizenship" and describes his efforts through the work of The Algebra Project.

Reinholz, D. L., & Shah, N. (2018). Equity analytics: A methodological approach for quantifying participation patterns in mathematics classroom discourse. *Journal for Research in Mathematics Education*, 49(2), 140-177. Retrieved from https://www.nctm.org/Publications/Journal-for-Research-in-Mathematics-Education/2018/Vol49/Issue2/Equity-Analytics_-A-Methodological-Approach-for-Quantifying-Participation-Patterns-in-Mathematics-Classroom-Discourse/

This article describes the use of a free, online tool (EQUIP - <https://www.equip.ninja/>) to analyze patterns in instruction/participation to provide information to instructors to move toward more equitable classrooms

Saxe, K., & Braddy, L. (2015). A Common Vision for undergraduate mathematical sciences programs in 2025. *Mathematics Association of America*. Retrieved from <https://www.maa.org/sites/default/files/pdf/CommonVisionFinal.pdf>

This document captures work done by several mathematics professional organizations “to collectively reconsider undergraduate curricula and ways to improve education in the mathematical sciences”. Findings revealed “The status quo is unacceptable.” with the following recommendations: “(1) update curricula, (2) articulate clear pathways between curricula driven by changes at the K–12 level and the first courses students take in college, (3) scale up the use of evidence-based pedagogical methods, (4) find ways to remove barriers facing students at critical transition points (e.g., placement, transfer) and (5) establish stronger connections with other disciplines.”

Special Interest Group of the Mathematical Association of America on Research in Undergraduate Mathematics Education (SIGMAA on RUME). (2018). Position Statement on Equity. SIGMAA on RUME. Retrieved from <http://sigmaa.maa.org/rume/EquityStatement.pdf>.

SIGMAA on RUME offers advice for practitioners to turn “undergraduate mathematics classrooms into spaces where all students can thrive - personally, intellectually, and professionally - as they critically engage with and learn high-quality mathematics.” Practitioners are reminded that “ 1) Deficit perspectives about students, their communities, and their mathematical dispositions are detrimental to students’ participation in mathematics. 2) Equitable practice is distinct from equal treatment for all students, and 3) Equitable practice involves balancing ways that mathematics contributes to students’ lives and ways in which the discipline benefits from the perspectives and ideas from students who historically have been excluded.” In addition, recommendations are included in the statement for how to support research on equity in undergraduate mathematics classrooms.

Helpful Links

[A Discipline Brief for Equity in Mathematics: Natalie Hobson, PhD](#)