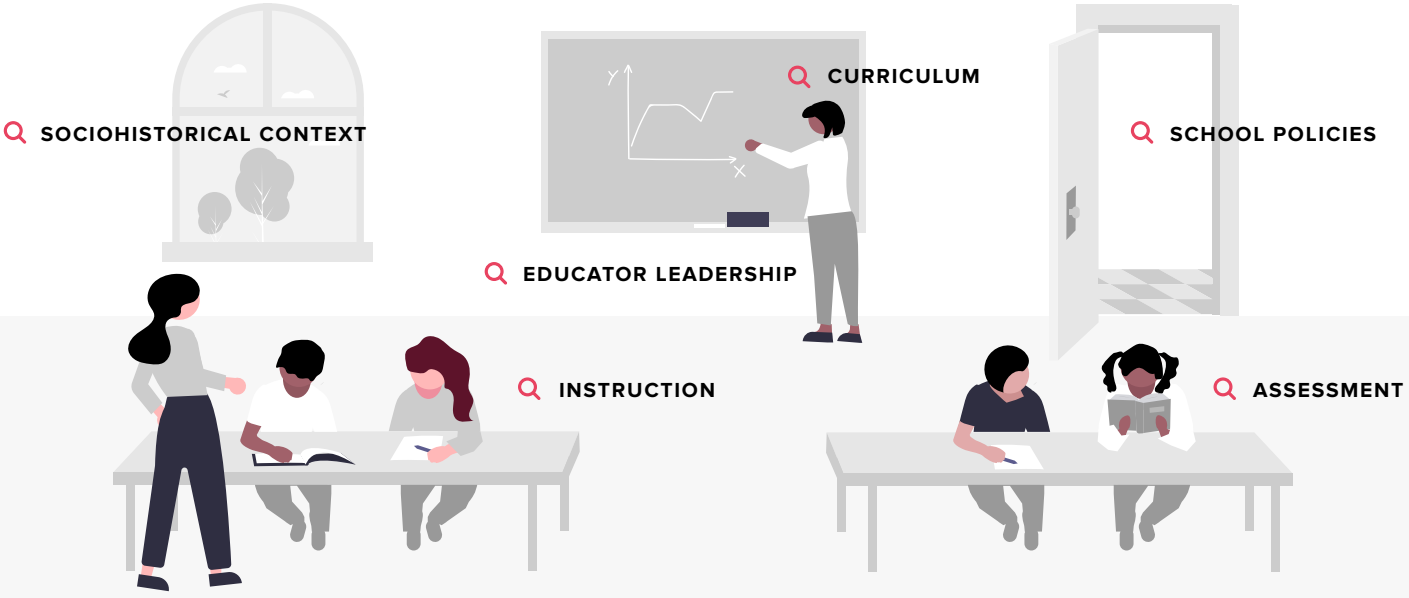
How does the mathematics environment shape student experience?

student experience RESEARCH NETWORK



Students' mathematics learning is shaped by explicit and implicit messages in the environment about who belongs in mathematics, whose knowledge is relevant, and who is expected to succeed. The Inclusive Mathematics Environments Early Career Fellowship brought together scholars of mathematics education, psychology, and sociology to review and synthesize decades of research on students' experiences with and perceptions of the subject. Their research revealed a set of deeply interconnected factors that, while non-exhaustive, are key to building more inclusive mathematics environments.

Sociohistorical context shapes students' opportunities to learn directly – by affording or constraining access to material, financial, and social capital – and indirectly, through widely-held but mistaken beliefs about what it means to be good at mathematics that reflect and reproduce historical power relations and social hierarchies.

Family and community involvement in school can help students develop a more robust mathematics identity, or sense that they are a "mathematics person." Students should have opportunities to interact with family and community members in the context of mathematics and use mathematics to pursue prosocial goals – those that benefit other people or society.

Curriculum should offer an expansive view of mathematics, including its history, uses in different cultures, and application in the context of current events. These entry points can help students take an interest in mathematics, see the relevance of mathematics to their own lives, and expand their vision of who can be a mathematician.

Educator leadership should be grounded in critical consciousness – an understanding of how marginalization and bias are expressed in mathematics environments and a commitment to countering those processes. Training and professional learning should equip and support educators to use asset-based, culturally-relevant teaching practices and convey high expectations for all students.

Instruction should leverage the unique mathematical identities and uses of mathematics of the specific students in the classroom. Students should have opportunities for meaningful group work with their peers, which aligns with the values of collectivist cultures and with career mathematicians' views of the discipline as highly collaborative.

School policies are critical to coordinating and reinforcing students' sense of belonging, relevance, and identity as competent and capable mathematics thinkers. Schools should ensure equitable access to advanced mathematics courses and should position students to co-construct their environment and learning experiences with the adults in the school.

Assessment should prioritize deep mathematical thinking, exploration, and collaboration. This might take the form of extended projects rather than timed tests, assessments that are designed for small groups and multiple approaches to solving a problem, or feedback that is not attached to a grade or score.

Interpersonal interactions in the learning environment should be grounded in respect for others as mathematical learners and doers. Students should not feel that they need to conceal or alter aspects of themselves in order to be perceived as "fitting in" in mathematics environments.

Learn more about the fellowship findings.