

## Transforming Practices and Policies So Multilingual Learners Thrive in Mathematics

**Question:** How do we transform practice and policies so that multilingual learners thrive in mathematics?

For too long, our educational systems have privileged some students in the mathematics classroom while marginalizing others. Too often, we have dismissed the assets and strengths of multilingual students while prioritizing English-dominant or monolingual learners. Our policies and practices must be changed to ensure that multilingual learners thrive in the mathematics classroom.

### Introduction

Multilingual learners bring multiple assets to the mathematics classroom, including their dynamic and fluid identities, which consist of their race, language, culture, religion, class, sexual orientation, and status (NCSM and TODOS 2021). The use of natural language(s) and culture(s) is a human right, and in particular a linguistic human right (Skutnabb-Kangas 2000). Multilingual learners use more than one language to make meaning of mathematics (Ramirez and Celedón-Pattichis 2012; LópezLeiva, Torres, and Khisty 2013; Moschkovich 1999, 2015). Regardless of what language development stage multilingual learners are in, teachers can engage them in cognitively and meaningfully demanding tasks that not only leverage bilingualism as a tool to negotiate mathematical meaning, but also provide multiple entry points to represent solutions (Khisty 1995; LópezLeiva, Torres, and Khisty 2013; Moschkovich 1999; Turner and Celedón-Pattichis 2011). When mathematics teachers nurture environments in which students and teachers are respectful of one another, have high expectations, value collaborations, consider students' dynamic identity and agency, and position students as leaders, multilingual learners thrive by learning and developing mathematical proficiencies (Aguirre, Mayfield-Ingram, and Martin 2013; Chval et al. 2021; de Araujo et al. 2018; Ramirez and Celedón-Pattichis 2012).

### Declarations

To design and enact educational spaces, learning opportunities, and curriculum with and for multilingual students, teachers, leaders, and administrators must invest in professional learning. These learning experiences should enhance participants' knowledge and competencies so they are equipped to effectively advocate for policies and practices that position multilingual learners as valued leaders and participants in the mathematics classroom. In particular, such experiences should do the following:

- Work to build an understanding of deficit language in policies, practices, and resources regarding multilingual learners and their families and work to eradicate it (Civil et al. 2005; de Araujo and Smith 2022; Gutiérrez 2002). Such an understanding would also position the use of multiple languages as an asset that educators should encourage and draw upon in the classroom (Civil 2016; National Academies of Sciences, Engineering, and Medicine 2018).
- Emphasize the importance of knowing and understanding students' individual assets in language, mathematics, and beyond. Multilingual students are not a homogenous group, and knowing their individual strengths is necessary to effectively devise instructional strategies to further their learning (Chval et al. 2021; National Academies of Sciences, Engineering, and Medicine 2018).
- Aid participants in understanding intersections of race, language, gender, and other aspects of identity (Aguirre, Mayfield-Ingram, and Martin 2013; NCSM and TODOS 2021; TODOS 2020). Many multilingual students are also members of other historically marginalized groups. Understanding the history of marginalization and more equitable approaches to instruction are necessary to create the learning environments students deserve.
- Center multiple modes of communication (e.g., speaking, writing, drawing, direct modeling) to simultaneously develop students' learning of both language and mathematics (Chval and Khisty 2009; de Araujo et al. 2018; Khisty 1995). Students' mathematics learning should not be put on hold as they learn English. Instead, teachers should build on students' strengths and work with support systems (e.g., language acquisition specialists) to help students gain access to mathematics while they develop language proficiency (National Academies of Sciences, Engineering, and Medicine 2018; Erath et al. 2021; Moshckovich 2015).

Multilingual learners deserve the right to thrive in mathematics education. Therefore, we need to learn and enact practices that center the brilliance of multilingual students and align with research. We must understand and interrogate long-standing policies that have served as roadblocks for multilingual learners (e.g., English-only schooling practices, biased mathematics assessments, tracking based on English proficiency). This will require our entire mathematics education community to build strong alliances to advocate for and enact policies, resources, and practices that will dismantle inequitable structures and racism that have hindered too many students for far too long.

## References

- Aguirre, Julia M., Karen Mayfield-Ingram, and Danny Bernard Martin. 2013. *The Impact of Identity in K–8 Mathematics: Rethinking Equity-Based Practices*. Reston, VA: National Council of Teachers of Mathematics.
- Celedón-Pattichis, Sylvia, and Nora G. Ramirez. 2012. *Beyond Good Teaching: Advancing Mathematics Education for ELLs*. Reston, VA: National Council of Teachers of Mathematics.
- Chval, Kathryn Bouchard, and Lena Licón Khisty. 2009. "Latino Students, Writing, and Mathematics: A Case Study of Successful Teaching and Learning." In *Multilingualism in Mathematics Classrooms: Global Perspectives*, edited by R. Barwell, pp. 128–44. Bristol, UK: Multilingual Matters.
- Chval, Kathryn B., Erin Smith, Lina Trigos-Carrillo, and Rachel J. Pinnow. 2021. *Teaching Math to Multilingual Students: Positioning English Learners for Success*. Thousand Oaks, CA: Corwin.
- Civil, Marta. 2016. STEM Learning Research through a Funds of Knowledge Lens. *Cultural Studies of Science Education* 11, no. 1 (March) : 41–59.

- Civil, M., Bratton, J. & Quintos, B. (2005). Parents and mathematics education in a Latino community: Redefining parental participation. *Multicultural Education*, 13(2), 60-64.
- de Araujo, Zandra, Sarah A. Roberts, Craig Willey, and William Zahner. 2018. "English Learners in K–12 Mathematics Education: A Review of the Literature." *Review of Educational Research* 88, no. 6 (December): 879–919.
- de Araujo, Zandra, and Erin Smith. 2022. "Examining English Language Learners' Learning Needs through the Lens of Algebra Curriculum Materials." *Educational Studies in Mathematics* 109, no. 1 (January): 65–87.
- Erath, Kirstin, Jenni Ingram, Judit Moschkovich, and Susanne Prediger. 2021. "Designing and Enacting Instruction That Enhances Language for Mathematics Learning: A Review of the State of Development and Research." *ZDM—Mathematics Education* 53, no. 2 (May): 245–62.
- Gutiérrez, Rochelle. 2002). "Beyond Essentialism: The Complexity of Language in Teaching Mathematics to Latina/o Students." *American Educational Research Journal* 39, no. 4 (January): 1047–88. <https://doi.org/10.3102/000283120390041047>.
- Khisty, Lena Licón. 1995. "Making Inequality: Issues of Language and Meanings in Mathematics Teaching with Hispanic Students." In *New Directions for Equity in Mathematics Education*, edited by W. G. Secada, E. Fennema, and L. B. Adajian, pp. 279–97. Cambridge: Cambridge University Press.
- LópezLeiva, Carlos A., Zayoni Torres, and Lena Licón Khisty. 2013. "Acknowledging Spanish and English Resources during Mathematical Reasoning." *Cultural Studies of Science Education* 8, no. 4 (December): 919–34.
- Moschkovich, Judit N. 2015. "Academic Literacy in Mathematics for English Learners." *The Journal of Mathematical Behavior* 40 (February): 43–62.
- Moschkovich, Judit. 1999. "Supporting the Participation of English Language Learners in Mathematical Discussions." *For the Learning of Mathematics* 19, no. 1 (March): 11–19.
- National Academies of Sciences, Engineering, and Medicine. 2018. *English Learners in STEM Subjects: Transforming Classrooms, Schools, and Lives*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/25182>.
- NCSM: Leadership in Mathematics in Education and TODOS: Mathematics for ALL. 2021. *Positioning Multilingual Learners for Success in Mathematics*. Joint position statement. Englewood, CO: NCSM; Tempe, AZ: TODOS.
- Ramirez, Nora, and Sylvia Celedón-Pattichis. 2012. "Understanding Second Language Development and Implications for the Mathematics Classroom." In *Beyond Good Teaching: Advancing Mathematics Education for ELLs*, edited by Sylvia Celedón-Pattichis and Nora Ramirez, pp. 19–37. Reston, VA: National Council of Teachers of Mathematics.
- Skutnabb-Kangas, Tove. 2000. *Linguistic Genocide in Education or Worldwide Diversity and Human Rights?* Mahwah, NJ: Lawrence Erlbaum Associates.
- TODOS: Mathematics for All. 2020. *The Mo(ve)ment to Prioritize Antiracist Mathematics: Planning for This and Every School Year*. Tempe, AZ: TODOS. <https://www.todos-math.org/statements>.
- Turner, Erin E., and Sylvia Celedón-Pattichis. 2011. "Mathematical Problem Solving among Latina/o Kindergartners: An Analysis of Opportunities to Learn." *Journal of Latinos and Education* 10, no. 2 (April): 146–69.