**MATHEMATICS LEARNING AND LANGUAGE: SELECTED REFERENCES**

**(Last updated 23 October 2024)**

Abedi, J., & Herman, J. (2010). Assessing English language learners’ opportunity to learn mathematics: Issues and limitations. *Teachers College Record, 112*(3), 723-746.

Accurso, K., Gebhard, M., & Purington, S. (2017). Analyzing diverse learners’ writing in mathematics: SFL in secondary pre-service teacher education*.* *International Journal of Mathematics Teaching and Learning, 18*(1), 84-108.<https://www.cimt.org.uk/ijmtl/index.php/IJMTL/article/view/48>.

Adler, J. (1997). A participatory-inquiry approach and the mediation of mathematical knowledge in a multilingual classroom. *Educational Studies in Mathematics*, *33*(3), 235-258.

Adoniou, M., & Qing, Y. (2014). Language, mathematics and English language learners. *Australian Mathematics Teacher*, *70*(3), 3-13.

Aleven, V., Baraniuk, R., Brunskill, E., Crossley, S., Demszky, D., Fancsali, S., ... & Xing, W. (2023, June). Towards the future of AI-augmented human tutoring in math learning. In N. Wang, G. Rebolledo-Mendez, V. Dimotrova, N. Matsuda, & O. C. Santos (Eds.), *International conference on artificial intelligence in education* (pp. 26-31). Springer.

Bailey, A. L. (2020). The discourse of explicitness: Mathematics explanatory talk and self-assessment by Spanish-speaking emergent bilingual students in elementary classrooms. *Theory Into Practice*, *59*(1), 64-74.

Bakker, A., & Smit, J. (2017). Theory development in design-based research: An example about scaffolding mathematical language. In S. Doff & R. Komoss (Eds.), *Making change happen: Wandel im Fachunterricht analysieren und gestalten* (pp. 111-126). Springer.

Bang, H. J., Li, L., & Flynn, K. (2023). Efficacy of an adaptive game-based math learning app to support personalized learning and improve early elementary school students’ learning. *Early Childhood Education Journal*, *51*(4), 717-732.

Barwell, R. (2018). From language as a resource to sources of meaning in multilingual mathematics classrooms. *The Journal of Mathematical Behavior*, *50*, 155-168.

Barwell, R. (2020). Learning mathematics in a second language: Language positive and language neutral classrooms. *Journal for Research in Mathematics Education*, *51*(2), 150-178.

Bossé, M. J., Bayaga, A., Fountain, C., Young, E. S., & DeMarte, A. (2019). Mathematics learning through the lens of language acquisition. *International Electronic Journal of Elementary Education*, *12*(1), 103-113.

Brune, I. H. (1953). Language in mathematics. In H. F. Fehr (Ed.), *The learning of mathematics:* *Its theory and practice* (pp. 156-191). The National Council of Teachers of Mathematics.

Cannon, J., & Ginsburg, H. P. (2008). “Doing the math”: Maternal beliefs about early mathematics versus language learning. *Early Education and Development*, *19*(2), 238-260.

Chen, N., Zheng, Z., Wu, N., Shou, L., Gong, M., Song, Y., ... & Li, J. (2023). Breaking language barriers in multilingual mathematical reasoning: Insights and observations. *arXiv preprint arXiv:2310.20246*.

Cheng, L., Li, M., Kirby, J., Qiang, H., & Wade-Woolley, L. (2010). English language immersion and students’ academic achievement in English, Chinese, and mathematics. Evaluation & Research in Education, 23(3), 151-169.

Chistyakov, A. A., Zhdanov, S. P., Avdeeva, E. L., Dyadichenko, E. A., Kunitsyna, M. L., & Yagudina, R. I. (2023). Exploring the characteristics and effectiveness of project-based learning for science and STEAM education. *Eurasia Journal of Mathematics, Science and Technology Education*, *19*(5), em2256.

Chow, J. C., & Ekholm, E. (2019).Language domains differentially predict mathematics performance in young children*. Early Childhood Research Quarterly, 46,* 179-186*.*

Chow, J. C., Majeika, C. E., & Sheaffer, A. W. (2021). Language skills of children with and without mathematics difficulty. *Journal of Speech, Language, and Hearing Research*, *64*(9), 3571-3577.

Clark-Gareca, B. (2016). Classroom assessment and English language learners: Teachers' accommodations implementation on routine math and science tests. *Teaching and Teacher Education*, *54*, 139-148.

Council of Chief State School Officers. (2014). *English language proficiency (ELP) standards with correspondences to K-12 English language arts (ELA), mathematics, and science practices, K-12 ELA standards, and 6-12 literacy standards*. <http://elpa21.org/sites/default/files/Final%204_30%20ELPA21%20Standards_1.pdf>

Coxhead, A., & Boutorwick, T. J. (2018). Longitudinal vocabulary development in an EMI international school context: Learners and texts in EAL, maths, and science. *TESOL Quarterly*, *52*(3), 588-610.

Cuevas, G. J. (1984). Mathematics learning in English as a second language. *Journal for Research in Mathematics Education*, *15*(2), 134-144.

Dai, C. P., Ke, F., Pan, Y., & Liu, Y. (2023). Exploring students’ learning support use in digital game-based math learning: A mixed-methods approach using machine learning and multi-cases study. *Computers & Education*, *194*, 104698.

de Freitas, E., & Zolkower, B. (2009). Using social semiotics to prepare mathematics teachers to teach for social justice. *Journal of Mathematics Teacher Education*, *12*(3), 187–203. <http://dx.doi.org/10.1007/s10857-009-9108-1>

diSessa, A. (2004). Metarepresentation: Native competence and targets for instruction. *Cognition and Instruction, 22*(3), 293-331.

Driver, M. K., & Powell, S. R. (2017). Culturally and linguistically responsive schema intervention: Improving word problem solving for English language learners with mathematics difficulty. *Learning Disability Quarterly*, *40*(1), 41-53.

Duff, D. M., Hendricks, A. E., Fitton, L., & Adlof, S. M. (2023). Reading and math achievement in children with dyslexia, developmental language disorder, or typical development: Achievement gaps persist from second through fourth grades. *Journal of Learning Disabilities*, *56*(5), 371-391.

Ellerson, N. F., & Clarkson, P. C. (1996). Language factors in mathematics teaching and learning. In A. J. Bishop, K. Clements, C. Keitel, J. Kilpatrick, & C. Laborde (Eds.), *International handbook of mathematics education* (pp. 987-1033). Kluwer.

Erath, K., Prediger, S., Quasthoff, U., & Heller, V. (2018). Discourse competence as important part of academic language proficiency in mathematics classrooms: The case of explaining to learn and learning to explain. *Educational Studies in Mathematics*, *99*(2), 161-179.

Erath, K., Ingram, J., Moschkovich, J., & Prediger, S. (2021). Designing and enacting instruction that enhances language for mathematics learning: A review of the state of development and research. *ZDM–Mathematics Education*, *53*(2), 245-262.

Farsani, D., Lange, T., & Meaney, T. (2022). Gestures, systemic functional linguistics and mathematics education. *Mind, Culture, and Activity*, *29*(1), 75-95.

Fry, R. (2007). *How far behind in math and reading are English language learners? Report.* Pew Hispanic Center.

Fuchs, L. S., Seethaler, P. M., Sterba, S. K., Craddock, C., Fuchs, D., Compton, D. L., ... & Changas, P. (2021). Closing the word-problem achievement gap in first grade: Schema-based word-problem intervention with embedded language comprehension instruction. *Journal of Educational Psychology*, *113*(1), 86-103.

Garza, A. (2018). A translanguaging mathematical space: Latina/o teenagers using their linguistic repertoire. In P. C. Ramirez, C. J. Faltis, & E. de Jong (Eds.), *Learning from emergent bilingual Latinx learners in K-12: Critical teacher education* (pp. 139-157). Routledge.

Gigoryeva-Golubeva, V., Silina, E., & Surinova, E. (2020). YouTube English video lectures as a basis of CLIL classes for students of mathematics. *Journal of Physics: Conference Series, 1691*(1), 012045.

Gomez, K., Gomez, L. M., Rodela, K. C., Horton, E. S., Cunningham, J., & Ambrocio, R. (2015). Embedding language support in developmental mathematics lessons: Exploring the value of design as professional development for community college mathematics instructors. *Journal of Teacher Education*, *66*(5), 450-465.

Gong, M., & Kim, Y. (2019). The study of bilingual learning of mathematics at International High School in South Korea. *Journal of the Korean School Mathematics Society*, *22*(2), 115-132.

Graham, S., Kiuhara, S. A., & MacKay, M. (2020). The effects of writing on learning in science, social studies, and mathematics: A meta-analysis. *Review of Educational Research*, *90*(2), 179-226.

Guida, M., & Cinganotto, L. (2022). Remote teaching and learning math in English through CLIL. In M. Ivanović, A. Klašnja-Milićević, & L. S. Jain (Eds.), *Handbook on intelligent techniques in the educational process* (pp. 41-59). Springer.

Hanfy, H., Daleure, G., Abuquad, K., & Al Hosani, S. (2022). Enhancing critical and creative thinking skills in math at post-secondary level: Examining STEM versus STeM for efficiency and effectiveness. In C. Coombe, L. Hiasat, & G. Daleure (Eds.), *English language and general studies education in the United Arab Emirates: Theoretical, empirical and practical perspectives* (pp. 129-144). Springer.

Hemelt, S., & Lenard, M. (2020). Math acceleration in elementary school: Access and effects on student outcomes. *Economics of Education Review*, *74*, 1-21. <https://doi.org/10.1016/j.econedurev.2019.101921>

He-Yueya, J., Poesia, G., Wang, R. E., & Goodman, N. D. (2023). Solving math word problems by combining language models with symbolic solvers. *arXiv preprint arXiv:2304.09102*.

Ikeda, M. (2021). Pedagogical translanguaging in primary school math CLIL lessons in Japan. In M. Ikeda, S. Izumi, Y. Watanabe, R. Pinner, & M. Davis (Eds.), *Soft CLIL and English Language Teaching* (pp. 86-102). Routledge.

Jaekel, N., Schurig, M., Schwinning, S., Ferencik-Lehmkuhl, D., & Ritter, M. (2024). Investigating the effects of linguistic distance on German and English reading and mathematics among fifth-graders in Germany. *Learning and Individual Differences*, *116*, 102556.

Jaime, L. A. (2018). The effectiveness of mother tongue strategies on learning math in English. In J. Taylor (Ed.), *English language and bilingual programs in development (2nd Edition)* (pp. 127-155). ÚNICA.

Kaya, S., Yuksel, D., & Curle, S. (2023). The effects of language learning and math mindsets on academic success in an engineering program. *Journal of Engineering Education*, *112*(1), 90-107.

Kersaint, G., Thompson, D. R., & Petkova, M. (2008). *Teaching mathematics to English language learners*. Routledge.

Kopriva, R. J. (2014). *Technology-interactive classroom-embedded modules for measuring challenging math and science skills of ELs*. University of Wisconsin.

Lee, O., Quinn, H., & Valdés, G. (2013). Science and language for English language learners in relation to Next Generation Science Standards and with implications for Common Core State Standards for English language arts and mathematics. *Educational Researcher, 42*(4), 223-233.

Lopez, A. A., Guzman-Orth, D., & Turkan, S. (2019). Exploring the use of translanguaging to measure the mathematics knowledge of emergent bilingual students. *Translation and Translanguaging in Multilingual Contexts*, *5*(2), 143-164.

Maharani, R., Marsigit, M., & Wijaya, A. (2020). Collaborative learning with scientific approach and multiple intelligence: Its impact toward math learning achievement. *The Journal of Educational Research*, *113*(4), 303-316.

Martiniello, M. (2008). Language and the performance of English-language learners in math word problems. *Harvard Educational Review*, *78*(2), 333-368.

Martiniello, M. (2009). Linguistic complexity, schematic representations, and differential item functioning for English language learners in math tests. *Educational Assessment, 14*(3-4), 160-179.

Masek, L. R., Swirbul, M. S., Silver, A. M., Libertus, M. E., Cabrera, N., & Tamis-LeMonda, C. S. (2024). Math talk by mothers, fathers, and toddlers: Differences across materials and associations with children’s math understanding. *Journal of Experimental Child Psychology*, *246*, 105991.

Mbhiza, H. W. (2019). Using video-stimulated recall interviews: Teachers’ reflections on the teaching of algebraic functions in rural classrooms. *The Independent Journal of Teaching and Learning*, *14*(2), 92-107.

Méndez, L. I., Hammer, C. S., Lopez, L. M., & Blair, C. (2019). Examining language and early numeracy skills in young Latino dual language learners. *Early Childhood Research Quarterly*, *46*, 252-261.

Miqdadi, R., & Al-Jamal, D. (2013). Difficulties in content and language integrated learning: The case of math. *Jordan Journal of Educational Sciences*, *9*(4), 449-459.

Morales, H., & DiNapoli, J. (2018). Latinx bilingual students' perseverance on a mathematical task: A rehumanizing perspective. *Journal of Research in Mathematics Education*, *7*(3), 226-250.

Moschkovich, J. (1999). Supporting the participation of English language learners in mathematical discussions. *For the Learning of Mathematics, 19*(1), 11-19.

Moschkovich, J. (2002). A situated and sociocultural perspective on bilingual mathematics learners. *Mathematical Thinking and Learning, 4*(2-3), 189-212.

Moschkovich, J. N. (Ed.). (2010). *Language and mathematics education: Multiple perspectives and directions for research*. Information Age Publishing.

Moschkovich, J. N. (2010). Language(s) and learning mathematics: Resources, challenges, and issues for research. In J. N. Moschkovich (Ed.), *Language and mathematics education: Multiple perspectives and directions for research* (pp. 1–28). Information Age Publishing.

Moschkovich, J. (2015). Academic literacy in mathematics for English learners. *Journal of Mathematical Behavior, 40,* 43-62.

Moschkovich, J. (2019). Codeswitching and mathematics learners: How hybrid language practices provide resources for student participation in mathematical practices. In J. MacSwan, & C. J. Faltis (Eds.), *Codeswitching in the classroom* (pp. 88-113). Routledge.

Moschkovich, J. (2020). Bilingual/multilingual issues in learning mathematics. In S. Lerman (Ed.), *Encyclopedia of mathematics education* (pp. 75-79). Springer.

Nikolopoulou, K. (2020). Preschool teachers’ practices of ICT-supported early language and mathematics. *Creative Education*, *11*(10), 2038-2052.

O’Halloran, K. (2008). *Mathematical discourse: Language, symbolism and visual images*. Continuum.

Parkin, B., & Hayes, J. (2006). Scaffolding the language of maths. *Literacy learning: The middle years*, *14*(1), 23-35.

Patel, M. (2012). The ETeMS project in Malaysia: English for the teaching of mathematics and science. In C. Tribble (Ed.), *Managing change in English language teaching: Lessons from experience* (pp. 109-113). British Council.

Peng, P., Lin, X., Ünal, Z. E., Lee, K., Namkung, J., Chow, J., & Sales, A. (2020). Examining the mutual relations between language and mathematics: A meta-analysis. *Psychological Bulletin*, *146*(7), 595.

Perez, A. L., & Alieto, E. (2018). Change of "Tongue" from English to a local language: A correlation of mother tongue proficiency and mathematics achievement. *Online Submission*, *14*, 132-150.

Peters Burton, E., Behrend, T. S., Matray, S., Hudson, C., & Ford, M. (2020). Development and validation of a high school STEM self‐assessment inventory. *School Science and Mathematics*, *120*(8), 477-490.

Planas, N. (2018). Language as resource: A key notion for understanding the complexity of mathematics learning. *Educational Studies in Mathematics*, *98*(3), 215-229.

Planas, N., Morgan, C., & Schütte, M. (2018). Mathematics education and language: Lessons and directions from two decades of research. In T. Dreyfus, M. Artigue, D. Potari, S. Prediger, & K. Ruthven (Eds.), *Developing research in mathematics education* (pp. 196-210). Routledge.

Prediger, S. (2019). Investigating and promoting teachers’ expertise for language-responsive mathematics teaching. *Mathematics Education Research Journal*, *31*(4), 367-392.

Rattan, A., Good, C., & Dweck, C. (2012). “It's ok — Not everyone can be good at math”: Instructors with an entity theory comfort (and demotivate) students. *Journal of Experimental Social Psychology*, *48*(3), 731-737. <https://doi.org/10.1016/j.jesp.2011.12.012>

Rezat, S., & Rezat, S. (2017). Subject-specific genres and genre awareness in integrated mathematics and language teaching. *Eurasia Journal of Mathematics, Science and Technology Education*, *13*(7b), 4189-4210.

Robb-Hagg, A. (2021). Building mathematical confidence: Using math talk in a second language context. Delta-K, 56(1), 20-29.

Robertson, S. A., & Graven, M. (2020). Language as an including or excluding factor in mathematics teaching and learning. *Mathematics Education Research Journal*, *32*(1), 77-101.

Syaifuddin, M. (2020). Implementation of authentic assessment on mathematics teaching: Study on junior high school teachers. *European Journal of Educational Research*, *9*(4), 1491-1502

Schüler-Meyer, A., Prediger, S., Kuzu, T., Wessel, L., & Redder, A. (2019). Is formal language proficiency in the home language required to profit from a bilingual teaching intervention in mathematics? A mixed methods study on fostering multilingual students’ conceptual understanding. *International Journal of Science and Mathematics Education*, *17*(2), 317-339.

Schwab, S., Sharma, U., & Hoffmann, L. (2022). How inclusive are the teaching practices of my German, Maths and English teachers?–psychometric properties of a newly developed scale to assess personalisation and differentiation in teaching practices. *International Journal of Inclusive Education*, *26*(1), 61-76.

Skott, J. (2013). Understanding the role of the teacher in emerging classroom practices: Searching for patterns of participation. *The International Journal on Mathematics Education, 45*(4), 547-559.

Solano-Flores, G., Barnett-Clarke, C., & Kachchaf, R. R. (2013). Semiotic structure and meaning making: The performance of English language learners on mathematics tests. *Educational Assessment, 18*(3), 147-161.

Stevens, E. A., Leroux, A. J., Mowbray, M. H., & Lee, G. S. (2022). Evaluating the effects of adding explicit vocabulary instruction to a word-problem schema intervention. *Exceptional Children*, <https://doi.org/10.1177/00144029221112290>

Subtirelu, N. (2015). “She does have an accent but…”: Race and language ideology in students’ evaluations of mathematics instructors on RateMyProfessor.com. *Language in Society*, *44*, 35-62.

Tai, K. W., & Wei, L. (2021). Constructing playful talk through translanguaging in English medium instruction mathematics classrooms. *Applied Linguistics*, *42*(4), 607-640.

Tan, M. (2011). Mathematics and science teachers’ beliefs and practices regarding the teaching of language in content learning. *Language Teaching Research*, *15*(3), 325-342. <http://dx.doi.org/10.1177/1362168811401153>

Thompson, K. D. (2017). What blocks the gate? Exploring current and former English learners’ math course-taking in secondary school. *American Educational Research Journal, 54*(4), 757-798.

Tun, M. (2016). What do math and language have in common? Lessons from foreign language learning. *Journal of Mathematics and Culture*, *10*(3), 148-168.

Volmer, E., Grabner, R. H., & Saalbach, H. (2018). Language switching costs in bilingual mathematics learning: Transfer effects and individual differences. *Zeitschrift für Erziehungswissenschaft*, *21*(1), 71-96.

Wakefield, D. V. (2000). Math as a second language. *The Educational Forum, 64*(3), 272-279.

Weintrop, D., Beheshti, E., Horn, M., Orton, K., Jona, K., Trouille, L., & Wilensky, U. (2016). Defining computational thinking for mathematics and science classrooms. *Journal of Science Education and Technology, 25*(1), 127-147.