

What Works Clearinghouse



Mathematics in Context (MiC)

Effectiveness No studies of *Mathematics in Context* that fell within the scope of the Middle School Math review met WWC evidence standards. The lack of studies meeting WWC evidence standards means that, at this time, the WWC is unable to draw any conclusions based on research about the effectiveness or ineffectiveness of *Mathematics in Context*.

Program Description¹

Mathematics in Context is a middle school mathematics curriculum for grades 5 through 8. *Mathematics in Context* was developed to align with the 1989 National Council of Teachers of Mathematics (NCTM) Curriculum and Evaluation Standards. It is also based on the Dutch Realistic Mathematics Education approach of first engaging students in understanding real problems and then gradually moving to abstract concepts.

Rather than focusing on one mathematical domain at a time, *Mathematics in Context* teaches students to explore the relationships among different domains of mathematics (such as algebra and geometry) and to develop strategies for reasoning through problems mathematically. *Mathematics in Context* also encourages students to collaborate on problem solving.

The WWC identified 27 studies of *Mathematics in Context* that were published or released between 1983 and 2007.

Five studies are within the scope of the review and have an eligible design, but do not meet WWC evidence standards.

- One study used a quasi-experimental design, but did not meet WWC evidence standards because the measures of effect could not be attributed solely to the intervention - the intervention was combined with another intervention.
- Four studies used quasi-experimental designs, but did not meet WWC evidence standards because the intervention and comparison groups were not shown to be equivalent at baseline.

Twelve studies are outside the scope of the review because they have an ineligible design that does not meet WWC evidence standards, such as having no comparison group.

Ten studies are out of the scope of the review, as defined by the Middle School Math protocol, for reasons other than study design.

- One study was conducted outside the geographic area specified in the protocol.
- Nine studies did not assess students' math achievement or were not studies of the effectiveness of *Mathematics in Context*.

¹The descriptive information for this program was obtained from publicly-available sources: the program's website (<http://128.167.140.34/math/mathincontext/>, downloaded August 2008), Romberg and Shafer (2008), and Holt, Rinehart, and Winston (2005). The WWC requests developers to review the program description sections for accuracy from their perspective. Further verification of the accuracy of the descriptive information for this program is beyond the scope of this review.

References Studies that fall outside the Middle School Math protocol or do not meet evidence standards

- Adams, L. M., Tung, K. K., Warfield, V. M., Knaub, K., Yong, D., & Mudavanhu, B. (2002). *Middle school mathematics comparisons for Singapore Mathematics, Connected Mathematics Program, and Mathematics in Context (including comparisons with the NCTM Principles and Standards 2000)*. Retrieved from University of Washington, Department of Applied Mathematics Web site: <http://www.amath.washington.edu/~adams/full.pdf>. The study is ineligible for review because it does not include an outcome within a domain specified in the protocol.
- Becker, J.R. & Rivera, F. (2006). *Sixth Graders' Figural and Numerical Strategies for Generalizing Patterns in Algebra*. Proceedings of the 28th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education. Mérida, México: Universidad Pedagógica Nacional. The study is ineligible for review because it does not use a comparison group.
- Brinker-Kent, L. (2000). Connecting integers to meaningful contexts. *Mathematics Teaching in the Middle School*, 6 (1), 62–66. The study is ineligible for review because it does not examine the effectiveness of an intervention.
- Bush, W. S. (2005). Improving research on mathematics learning and teaching in rural contexts. *Journal of Research in Rural Education*, 20(8), 20-28. The study is ineligible for review because it does not include an outcome within a domain specified in the protocol.
- Conway, P.F., & Sloane, F.C. (2005). *International trends in post-primary mathematics education*. Dublin: National Council for Curriculum and Assessment. The study is ineligible for review because it is not a primary analysis of the effectiveness of an intervention.
- Herbel-Eisenmann, B. A., Lubienski, S. T., & Id-Deen, L. (2006). Reconsidering the study of mathematics instructional practices: The importance of curricular context in understanding local and global teacher change. *Journal of Mathematics Teacher Education*, 9(4), 313-345. The study is ineligible for review because it does not include an outcome within a domain specified in the protocol.
- Holt, Rinehart, and Winston. (2005). *A longitudinal study of the instructional effectiveness of "Mathematics in Context"*. Orlando, FL: Holt, Rinehart, and Winston. The study is ineligible for review because it does not take place in the geographic area specified in the protocol.
- Meyer, M. R. (1997). Mathematics in Context: Opening the gates to mathematics for all at the middle level. *NASSP Bulletin*, 81 (586), 53–59. The study is ineligible for review because it does not examine the effectiveness of an intervention.
- Remillard, J. T. (2005). Examining key concepts in research on teachers' use of mathematics curricula. *Review of Educational Research*, 75(2), 211-246. The study is ineligible for review because it does not include a student outcome.
- Rickard, A. (2005). Constant Perimeter, Varying Area: A case study of teaching and learning mathematics to design a fish rack. *Journal of American Indian Education*, 44(3), 80-100. The study is ineligible for review because it does not use a comparison group.
- Romberg, T. A. (1997). *The development of an "achieved" curriculum for middle school mathematics or Mathematics in Context: A connected curriculum for grades 5–8*. Madison: University of Wisconsin, Wisconsin Center for Education Research. The study is ineligible for review because it does not examine the effectiveness of an intervention.
- Romberg, T. A., Carpenter, T. P., & Kwako, J. (2005). Standards-based reform and teaching for understanding. In T. A. Romberg, T. P. Carpenter & F. Dremock (Eds.), *Understanding mathematics and science matters*, 3-26, New York: Routledge. The study is ineligible for review because it does not examine the effectiveness of an intervention.
- Romberg, T. A., Webb, D. C., Folger, L., & Shafer, M. C. (2005). *The Longitudinal/Cross-sectional study of the impact of teaching mathematics using Mathematics in Context on student achievement: Differences in performance between Mathematics in Context and conventional students*. Monograph No. 6. Madison, WI: Wisconsin Center for Education Research. The study does not meet WWC evidence standards because the intervention and comparison groups are not shown to be equivalent at baseline.
- Additional citations for this study:**
Romberg, T. A., & Folger, L. (2005). *The Longitudinal/Cross-sectional study of the impact of teaching mathematics using Mathematics in Context on student achievement: Three treatments data*. Technical Report No. 52. Madison, WI: Wisconsin Center for Education Research.

References *(continued)*

- Romberg, T. A., & Shafer, M. C. (2005). *The Longitudinal/Cross-sectional study of the impact of teaching mathematics using Mathematics in Context on student achievement: Implications and conclusions*. Monograph No. 8. Madison, WI: Wisconsin Center for Education Research
- Romberg, T. A., Folgert, L., & Shafer, M. C. (2005). *The Longitudinal/Cross-sectional study of the impact of teaching mathematics using Mathematics in Context on student achievement: Differences in student performance for three treatment groups*. Monograph No. 7. Madison, WI: Wisconsin Center for Education Research.
- Romberg, T. A., Shafer, M. C., & Wagner, L. R. (2005). *The Longitudinal/Cross-sectional study of the impact of teaching mathematics using Mathematics in Context on student achievement: Problem solving assessments*. Working Paper No. 15. Madison, WI: Wisconsin Center for Education Research.
- Romberg, T. A., Shafer, M. C., LeMire, S., & Folgert, L. (2005). *The Longitudinal/Cross-sectional study of the impact of teaching mathematics using Mathematics in Context on student achievement: Covariant and regression analyses of Mathematics in Context Longitudinal/Cross-sectional study data*. Technical Report No. 54. Madison, WI: Wisconsin Center for Education Research.
- Romberg, T. A., Shafer, M.C. (2008). *The impact of reform instruction on student mathematics achievement: An example of a summative evaluation of a standards-based curriculum*. New York: Routledge.
- Romberg, T. A., Webb, D. C., & Folgert, L. (2005). *The Longitudinal/Cross-sectional study of the impact of teaching mathematics using Mathematics in Context on student achievement: Standardized test data for Mathematics in Context longitudinal cohorts in 1997-2000*. Technical Report No. 51. Madison, WI: Wisconsin Center for Education Research.
- Romberg, T. A., Webb, D. C., Folgert, L., & Shafer, M. C. (2005). *The Longitudinal/Cross-sectional study of the impact of teaching mathematics using Mathematics in Context on student achievement: Measures of student performance*. Monograph No. 4. Madison, WI: Wisconsin Center for Education Research.
- Romberg, T. A., Webb, D. C., Folgert, L., & Shafer, M. C. (2005). *The Longitudinal/Cross-sectional study of the impact of teaching mathematics using Mathematics in Context on student achievement: The impact of MiC on student achievement*. Monograph No. 5. Madison, WI: Wisconsin Center for Education Research.
- Shafer, M. C. (2005). *The Longitudinal/Cross-sectional study of the impact of teaching mathematics using Mathematics in Context on student achievement: Instruction, opportunity to learn with understanding, and school capacity*. Monograph No. 3. Madison, WI: Wisconsin Center for Education Research.
- Shafer, M. C. (2003, April). *The impact of Mathematics in Context on student achievement: Preliminary findings*. Paper presented at the meeting of the National Council of Teachers of Mathematics, San Antonio, TX. The study does not meet WWC evidence standards because the intervention and comparison groups are not shown to be equivalent at baseline.
- Shafer, M. C., & Folgert, L. (2005). *The Longitudinal/Cross-sectional study of the impact of teaching mathematics using Mathematics in Context on student achievement: Student attitude inventory gain score data*. Technical Report No. 53. Madison, WI: Wisconsin Center for Education Research. The study is ineligible for review because it does not include an outcome within a domain specified in the protocol.
- Tarr, J.E., Reys, R.E., Reys, B.J., Chavez, O., Shih, J., & Osterlind, S.J. (2008). The Impact of Middle-Grades Mathematics Curricula and the Classroom Learning Environment on Student Achievement. *Journal for Research in Mathematics Education*, 39(3), 247-280. The study does not meet WWC evidence standards because the measures of effect cannot be attributed solely to the intervention – the intervention was combined with another intervention.
- Additional citation for this study:**
- Reys, R., Reys, B., Tarr, J., & Chavez, O. (2006). *Assessing the impact of standards-based middle school mathematics curricula on student achievement and the classroom learning environment*. Washington, DC: National Center for Education Research.
- Webb, D. C., Burrill, J., Romberg, T. A., Ford, M., Kwako, J., & Reif, J. (2001). *NCISLA middle school design collaborative second year student achievement technical report*. Madison: University of Wisconsin, National Center for Improving Stu-

References *(continued)*

- dent Learning and Achievement in Mathematics and Science. The study is ineligible for review because it does not use a comparison group.
- Webb, D. C., Ford, M. J., Burrill, J., Romberg, T. A., Reif, J., & Kwako, J. (2001). *NCISLA middle school design collaborative third year student achievement technical report*. Madison: University of Wisconsin, National Center for Improving Student Learning and Achievement in Mathematics and Science. The study is ineligible for review because it does not use a comparison group.
- Webb, D. C., & Meyer, M. R. (2002a). *Summary report of student achievement data for Mathematics in Context: A connected curriculum for grades 5–8*. Madison: University of Wisconsin, School of Education, Wilson Center for Educational Research. **(Study: Ames Community School)**. The study is ineligible for review because it does not use a comparison group.
- Webb, D. C., & Meyer, M. R. (2002b). *Summary report of student achievement data for Mathematics in Context: A connected curriculum for grades 5–8*. Madison: University of Wisconsin, School of Education, Wilson Center for Educational Research. **(Study: Miami-Dade Public Schools)**. The study is ineligible for review because it does not use a comparison group.
- Webb, D. C., & Meyer, M. R. (2002c). *Summary report of student achievement data for Mathematics in Context: A connected curriculum for grades 5–8*. Madison: University of Wisconsin, School of Education, Wilson Center for Educational Research. **(Study: Michelangelo Middle School)**. The study is ineligible for review because it does not use a comparison group.
- Webb, D. C., & Meyer, M. R. (2002d). *Summary report of student achievement data for Mathematics in Context: A connected curriculum for grades 5–8*. Madison: University of Wisconsin, School of Education, Wilson Center for Educational Research. **(Study: Palisades School District)**. The study is ineligible for review because it does not use a comparison group.
- Webb, D. C., & Meyer, M. R. (2002e). *Summary report of student achievement data for Mathematics in Context: A connected curriculum for grades 5–8*. Madison: University of Wisconsin, School of Education, Wilson Center for Educational Research. **(Study: Placer Hills Unified School District)**. The study is ineligible for review because it does not use a comparison group.
- Webb, D. C., & Meyer, M. R. (2002f). *Summary report of student achievement data for Mathematics in Context: A connected curriculum for grades 5–8*. Madison: University of Wisconsin, School of Education, Wilson Center for Educational Research. **(Study: Prince William County School District)**. The study is ineligible for review because it does not use a comparison group.
- Webb, D. C., & Meyer, M. R. (2002g). *Summary report of student achievement data for Mathematics in Context: A connected curriculum for grades 5–8*. Madison: University of Wisconsin, School of Education, Wilson Center for Educational Research. **(Study: Providence School District)**. The study does not meet WWC evidence standards because the intervention and comparison groups are not shown to be equivalent at baseline.
- Webb, D. C., & Meyer, M. R. (2002h). *Summary report of student achievement data for Mathematics in Context: A connected curriculum for grades 5–8*. Madison: University of Wisconsin, School of Education, Wilson Center for Educational Research. **(Study: Red Clay School District)**. The study does not meet WWC evidence standards because the intervention and comparison groups are not shown to be equivalent at baseline.
- Webb, D. C., & Meyer, M. R. (2002i). *Summary report of student achievement data for Mathematics in Context: A connected curriculum for grades 5–8*. Madison: University of Wisconsin, School of Education, Wilson Center for Educational Research. **(Study: Verona Area School District)**. The study is ineligible for review because it does not use a comparison group.