
Thank you for your request to our REL Reference Desk regarding evidence-based information about kinds of instruction that are more or less effective for different genders. Ask A REL is a collaborative reference desk service provided by the ten regional educational laboratories (REL) that, by design, functions much in the same way as a technical reference library. It provides references, referrals, and brief responses in the form of citations on research based education questions.

The information below represents the most rigorous research available. Researchers consider the type of methodology and give priority to research reports that employ well described and thorough methods. The resources were also selected based on the date of the publication with a preference for research from the last ten years. Additional criteria for inclusion include the source and funder of the resource.

Question: *Is there research on the kinds of instruction that are more or less effective for students of different genders?*

Search Process

Key words and search strings used in the search: *instruction AND gender, effective instruction, gender differences, boys, girls*

Search databases and websites:

1. ERIC, <http://www.eric.ed.gov/>
2. JSTOR, <http://www.jstor.org/action/showAdvancedSearch>
3. Google Scholar, www.google.com/scholar
4. Institute of Education Sciences (IES) Resources, <http://ies.ed.gov>
5. What Works Clearinghouse, <http://ies.ed.gov/ncee/wwc/>

Sample Citations Retrieved:

Math and Science

Ben-Chaim, D. Lappan, G., & Houang, R. T. (1988). The effect of instruction on spatial visualization skills of middle school boys and girls. *American Educational Research Journal*, 25(1), 51-71. doi: 10.3102/00028312025001051

Abstract/Summary: This study was conducted to investigate differences in spatial visualization abilities and effects of instruction on spatial visualization skills of fifth through eighth grade students by grade, sex, and site. About 1,000 students from three sites, representing a wide range of socioeconomic status, participated in the study. The spatial visualization unit engaged students in concrete activities, building and drawing solids made of cubes. The instrument used was the MGMP Spatial Visualization Test, with a test-retest reliability of .79, and Cronbach's reliability coefficients for various groups of students ranged from .72 to .86 on the pretest and from .82 to

.88 on the posttest. Before instruction, there were significant differences in spatial visualization performance by grade (increasing with age), by sex (favoring boys), and by site (increasing with socioeconomic status). After instruction, fifth through eighth grade students profited considerably from instruction, and the gain was similar for boys and girls despite initial sex differences. Retention of effects persisted after a 4-week period and after 1 year.

Carr, M., Jessup, D. L., & Fuller, D. (1999). Gender differences in first-grade mathematics strategy use: Parent and teacher contributions. *Journal for Research in Mathematics Education*, 30(1) 20-46. doi: 10.2307/749628

Abstract/Summary: Examines how parents and teachers influence the development of gender differences in mathematics strategy use in the first grade. Conducts interviews with children about their strategy use and uses questionnaires with parents and teachers. Reports that boys correctly used retrieval during the first grade more than girls; girls correctly used overt strategies more than boys.

Casey, B., Sumru, E., Ineke, C., & Young, J. M. (2008). Use of storytelling context to improve girls' and boys' geometry skills in kindergarten. *Journal of Applied Developmental Psychology*, 29(1), 29-48. doi: 10.1016/j.appdev.2007.10.005

Abstract/Summary: Two studies investigated the effects of a storytelling-context for teaching geometry skills to kindergarten girls and boys. In Study 1, the story+geometry intervention consisted of an adventure story teaching geometry through part-whole-relations puzzles. Learning was assessed through transfer of skills, using a pre-/post design comparing intervention and control groups. A near-transfer task included new puzzle-problems with the "same" puzzle-pieces as the intervention, and a far-transfer task used a "wider variety" of puzzle-pieces. In Study 1, using diverse suburban students from a lower-middle-class-community, boys improved independent of intervention/control condition on the near-transfer task, whereas girls showed greater improvement with the intervention, than without it. No effects of condition or sex were found on far transfer. Study 2 compared two types of interventions (storytelling+geometry versus geometry-alone) to determine effectiveness of a storytelling-context separate from geometry-content. Findings for the Study 2 sample of diverse kindergartners from a high-poverty urban community showed that storytelling-contexts were more effective than de-contextualized formats for learning geometry across both near- and far-transfer tasks. Across studies, girls benefited more than boys from the geometry-content interventions (both with and without a story context).

Halpern, D., Aronson, J., Reimer, N., Simpkins, S., Star, J., and Wentzel, K. (2007). *Encouraging Girls in Math and Science* (NCER 2007-2003). Washington, DC: National Center for Education Research, Institute of Education Sciences, U.S. Department of Education. Retrieved from <http://ncer.ed.gov>.

Abstract/Summary: The goal of this practice guide is to formulate specific and coherent evidence-based recommendations that educators can use to encourage girls in the fields of math and science. This practice guide provides five recommendations for encouraging girls in math and science. The recommendations are as follows: Teachers should explicitly teach students that academic abilities are expandable and improvable in order to enhance girls' beliefs about their abilities; teachers should provide students with perspective and informational feedback regarding their performance, focus on women who achieved great things in the math and science world in order to promote role models, foster long-term interest by showing girls careers in math and science that aren't gender biased, and teachers should provide opportunities for students to engage in spatial skills training.

Wold, S. J., & Fraser, B. J. (2008). Learning environment, attitudes and achievement among middle-school science students using inquiry-based laboratory activities. *Research in Science Education*, 38(3), 321-341. doi: 10.1007/s11165-007-9052-y

Abstract/Summary: This study compared inquiry and non-inquiry laboratory teaching in terms of students' perceptions of the classroom learning environment, attitudes toward science, and achievement among middle-school physical science students. Learning environment and attitude scales were found to be valid and related to each other for a sample of 1,434 students in 71 classes. For a subsample of 165 students in 8 classes, inquiry instruction promoted more student cohesiveness than non-inquiry instruction (effect size of one-third of a standard deviation), and inquiry-based laboratory activities were found to be differentially effective for male and female students.

Reading

Catsambi, S., Mulkey, L. M., Buttaro, A., Steelman, L. C., & Ray, P. (2012). Examining gender differences in ability group placement at the onset of schooling: The role of skills, behaviors, and teacher evaluations. *Journal of Educational Research*, 105(1), 8-20. doi: 10.1080/00220671.2010.514779

Abstract/Summary: The authors analyzed the Early Childhood Longitudinal Study-Kindergarten Cohort (ECLS-K) national data set to investigate gender differences in ability group placement in American kindergartens. They found that in kindergarten, within-class ability grouping was widely used for reading instruction, with boys being underrepresented in high-achieving reading groups and overrepresented in low-achieving ones. Gender differences in reading group placement were consistent across classrooms and were explained by student-level characteristics. Boys' underrepresentation in high reading groups was explained by their lower reading skills at kindergarten entry, as measured by the reading test scores available in the

ECLS-K. By contrast, boys' overrepresentation in low reading groups was only partially explained by their lower test scores. Compared with girls of similar social background and reading test scores, boys continued to have higher chances of placement into a low reading group. This remaining gender difference was explained by the lower teacher evaluations of boys' reading skills and approaches to learning. Boys' disadvantages in reading group placement at school entry raise concern over their further academic success. (Contains 3 tables, 1 figure and 3 notes.)

Marinak, B. A., Gambrell, L. B. (2010). Reading motivation: Exploring the elementary gender gap. *Literacy Research and Instruction, 49*(2), 129-141. doi: 10.1080/19388070902803795

Abstract/Summary: In an attempt to more clearly understand the erosion of motivation in some readers, a number of researchers (Mohr, 2006; Smith & Wilhelm, 2002) and organizations (The Education Alliance, 2007) have called for the investigation of gender differences in all readers, including young children. Consequently, this study focused on younger, average achieving readers. Specifically, 288 third-grade average readers were studied. Two constructs consistent with expectancy-value theory (Eccles, 1983), self-concept as a reader and value of reading, were examined. The results suggest that third-grade boys and girls who are average readers are equally self-confident about their reading ability; however, boys value reading less than girls. This finding sheds new light on the complexities of motivation and gender differences. (Contains 4 tables and 1 figure.)

Prado, L. & Plourde, L. A. (2011). Increasing reading comprehension through the explicit teaching of reading strategies: Is there a difference among genders? *Reading Improvement, 48*(1), 32-43.

Abstract/Summary: The relationship between the intentional teaching of reading strategies and the increase in reading comprehension was studied. The Northwest Evaluation Association (NWEA) reading pretest and posttest scores of 57 subjects were analyzed to see if there was a significant increase in performance after the reading strategies were taught. The study also analyzed the difference in how the boys performed in comparison to girls and the results were discussed to see if there was a correlation with gender and reading gains and losses. There was a significant increase in the NWEA post-test scores after the students had received specific reading strategy instruction.

Referrals

Organizations:

- Northwest Evaluation Association: <http://www.nwea.org/>
- The Education Alliance: <http://www.educationalalliance.org/>
- National Association for Single Sex Education: <http://www.singlesexschools.org/>
- Education.com special edition on gender differences:
<http://www.education.com/topic/gender-differences/>

Federally Funded Resources:

- US Department of Education, Institute of Education Sciences (IES) Resources,
<http://ies.ed.gov>
Publication search engine available at: <http://ies.ed.gov/pubsearch/>
- What Works Clearinghouse, <http://ies.ed.gov/ncee/wwc/>
- Center on Instruction (<http://www.centeroninstruction.org>)

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