

What Works Clearinghouse



I CAN Learn[®] Pre-Algebra and Algebra

Program Description²

The *I CAN Learn[®] Education System* is an interactive, self-paced, mastery-based software system that includes the *I CAN Learn[®] Fundamentals of Math* (5th–6th grade math) curriculum, the *I CAN Learn[®] Pre-Algebra* curriculum, and the *I CAN Learn[®] Algebra* curriculum. College algebra credit is also available to

students in participating schools through the 121 lesson CLEP program, an open enrollment dual-credit program for middle and high school students. Studies included in this WWC review assess the effectiveness of the *Pre-Algebra* and *Algebra* components of the *I CAN Learn[®] Education System*.

Research

One study of *I CAN Learn[®] Pre-Algebra* and *Algebra* meets What Works Clearinghouse (WWC) evidence standards and four studies meet WWC evidence standards with reservations. The five studies included 16,519 eighth-grade students from middle schools in California, Florida, Georgia, and Louisiana.³

Based on these five studies, the WWC considers the extent of evidence for *I CAN Learn[®] Pre-Algebra* and *Algebra* to be medium to large for math achievement.

Effectiveness

I CAN Learn[®] Pre-Algebra and *Algebra* was found to have positive effects on math achievement.

	Math achievement
Rating of effectiveness	Positive effects
Improvement index ⁴	Average: +5 percentile points Range: -7 to +16 percentile points

1. This report has been updated to include reviews of 15 studies that have been released since 2005. Of the additional studies, eight were not within the scope of the protocol, and seven were within the scope of the protocol but did not meet evidence standards. A complete list and disposition of all studies reviewed is provided in the references. Additionally, one study that met standards with reservations in the previous version (Kirby, 2005c) will now be eligible for review as part of the WWC high school math topic area. (The protocol for the middle school math topic area was revised to narrow the scope from examining any students in grades 6 to 9 to examining only those students who are attending middle schools or junior high schools. Studies examining students in grade 9 who are attending high school are included in the high school math topic area).
2. The descriptive information for this program was obtained from a publicly-available source: the program’s website (<http://www.icanlearn.com/default.asp>, downloaded August 2008). 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.
3. The evidence presented in this report is based on available research. Findings and conclusions may change as new research becomes available.
4. These numbers show the average and range of student-level improvement indices for all findings across the studies.

Additional program information

Developer and contact

JRL Enterprises, Inc. developed and distributes *I CAN Learn*[®]. Address: 400 Poydras Street, Suite 1000, New Orleans, LA 70130. Email: info@icanlearn.com. Web: <http://www.icanlearn.com>. Telephone: (504) 263-1380.

Scope of use

Between 1995 (when it was first implemented) and 2008, the *I CAN Learn*[®] system has been used by almost one million students in elementary, middle, junior high, and senior high schools, and community colleges across the United States.

Teaching

The *I CAN Learn*[®] *Fundamentals of Math* curriculum contains 121 lessons with more than 40 hours of instructional video, and the *Pre-Algebra*, *Algebra* and *Geometry* curricula contain 424 lessons with more than 120 hours of instructional video. Custom curriculum alignment to state, district, and school standards is accomplished by selecting appropriate lessons from the *I CAN Learn*[®] *Lesson Database*, which contains over 500 multimedia lessons. The curricula can be used online via the Internet or through school LANs or WANs, provided that the courseware is installed on a local server.

Research

Twenty-seven studies reviewed by the WWC investigated the effects of *I CAN Learn*[®] *Pre-Algebra* and *Algebra*. One study (Kirby, 2006) was a randomized controlled trial that meets WWC evidence standards. Four studies (Kerstyn, 2001; Kerstyn, 2002; Kirby, 2004a; Kirby, 2004b) are randomized controlled trials or quasi-experimental designs that meet WWC evidence standards with reservations. The remaining 22 studies do not meet either WWC evidence standards or eligibility screens.

Meets evidence standards

Kirby (2006) assessed the impact of the *I CAN Learn*[®] system on math achievement in Orleans Parish schools in New Orleans, LA that randomly assigned students to *I CAN Learn*[®] or control

Teachers can manage their classrooms through the *I CAN Learn*[®] *Classroom Explorer Class Management System*, which keeps track of student attendance, homework, and test grades. It can also help in developing individual learning plans to meet diverse student needs. A one-to-one student-to-computer ratio and one-on-one interaction with the classroom teacher lets each student progress at his or her own pace.

Cost

The cost of an *I CAN Learn*[®] system depends on its configuration and terms of support. Using a school's existing hardware, individual subscriptions allowing access to more than 500 lessons cost \$43.48 per student. Varying support plans including training, professional development, curriculum alignments, implementation planning, and other pedagogical support are available and encouraged with a cost range from \$400 to \$20,000 per year. A complete traditional classroom installation of hardware and software is available, which includes 30 workstations with all curriculum and class management software, computer hardware, network wiring, furniture, and three years of comprehensive onsite educational support. The cost for this traditional classroom installation is \$200,000; the cost for a laptop cart configuration is \$170,000.

classes during the 2003–04 school year. The study included 2,400 eighth-grade regular education students from 13 schools (1,082 *I CAN Learn*[®] students and 1,318 traditional mathematics students). *I CAN Learn*[®] classes were compared with classes using a traditional curriculum.

Meet evidence standards with reservations

Kerstyn (2001) conducted a classroom matched-pairs quasi-experimental design to investigate the effect of the first year of implementation of the *I CAN Learn*[®] system on math achievement of eighth-grade students in Hillsborough County Public Schools in Florida. At the beginning of the 2000–01 school year, 58 *I CAN Learn*[®] classes (1,222 students) were matched with

58 traditional mathematics classes (1,314 students). The *I CAN Learn*[®] system was implemented with four separate samples of students enrolled in four math courses: Algebra 1 (8 classes, 175 students), Algebra 1 Honors (8 classes, 150 students), MJ-3 pre-algebra (32 classes, 678 students), and MJ-3 Advanced (10 classes, 219 students). The effectiveness of the *I CAN Learn*[®] system is reported separately for each of the four study samples in the Findings section.

Kerstyn (2002) continued the investigation of the *I CAN Learn*[®] system during the second year of implementation in Hillsborough County Public Schools with a quasi-experimental study of a different sample of 1,871 eighth-grade students in 129 *I CAN Learn*[®] classes compared to 9,254 eighth-grade students in 468 traditional classes. The *I CAN Learn*[®] system was implemented with four separate samples of students enrolled in four math courses: Algebra 1 (18 classes, 231 students), Algebra 1 Honors (10 classes, 188 students), MJ-3 pre-algebra (64 classes, 1,028 students), and MJ-3 Advanced (37 classes, 424 students). The students in these *I CAN Learn*[®] classes were compared to students enrolled in four corresponding math courses that were taught using a traditional instruction method: Algebra 1 (48 classes, 964 students), Algebra 1 Honors (81 classes, 1,706 students), MJ-3 pre-algebra (264 classes, 4,929 students), and MJ-3 Advanced (75 classes, 1,655 students). The effectiveness of the *I CAN Learn*[®] system is reported separately for each of the four study samples in the Findings section.

Kirby (2004a) assessed the impact of the *I CAN Learn*[®] system on math achievement in a California middle school that randomly assigned students either to *I CAN Learn*[®] classes or comparison classes during the 2003–04 school year. The study included 204 eighth-grade students (91 students taught by one intervention teacher and 113 students taught by two comparison teachers) in Bret Harte Middle School in Alameda County, CA.⁵

5. The study authors provided the WWC with the number of teachers in each condition.

6. The extent of evidence categorization was developed to tell readers how much evidence was used to determine the intervention rating, focusing on the number and size of studies. Additional factors associated with a related concept—external validity, such as the students’ demographics and the types of settings in which studies took place—are not taken into account for the categorization. Information about how the extent of evidence rating was determined for *I CAN Learn*[®] *Pre-Algebra* and *Algebra* is in Appendix A6.

The intervention teacher used the pre-algebra *I CAN Learn*[®] mathematics curriculum. The comparison teachers used the state-adopted Glencoe pre-algebra textbook. Because there was only one *I CAN Learn*[®] teacher, it is not possible to separate the effect of the teacher from the effect of the *I CAN Learn*[®] system. This study meets WWC standards with reservations because of this confound.

Kirby (2004b) assessed the impact of *I CAN Learn*[®] on math achievement in a northwestern Georgia middle school that randomly assigned students either to *I CAN Learn*[®] classes or comparison classes during the 2003–04 school year. The study included 254 eighth-grade students (91 students in *I CAN Learn*[®] classes and 163 students in traditional classes) in the Gilmer County School District. In the *I CAN Learn*[®] classes, one teacher facilitated instruction using the computerized curriculum. Students in the comparison classroom used a traditional math curriculum delivered by their teachers. Because there was only one *I CAN Learn*[®] teacher, it is not possible to separate the effect of the teacher from the effect of the *I CAN Learn*[®] system. This study meets WWC standards with reservations because of this confound.

Extent of evidence

The WWC categorizes the extent of evidence in each domain as small or medium to large (see the What Works Clearinghouse Extent of Evidence Categorization Scheme). The extent of evidence takes into account the number of studies and the total sample size across the studies that meet WWC evidence standards with or without reservations.⁶

The WWC considers the extent of evidence for *I CAN Learn*[®] *Pre-Algebra* and *Algebra* to be medium to large for math achievement.

Effectiveness Findings

The WWC review of interventions for Middle School Math addresses student outcomes in the math achievement domain. The findings below present the authors' estimates and WWC-calculated estimates of the size and the statistical significance of the effects of *I CAN Learn*[®] *Pre-Algebra* and *Algebra* on students.⁷

Math Achievement

Kirby (2006) reported a positive and statistically significant effect of *I CAN Learn*[®] on the math exam from the Louisiana Educational Assessment Program (LEAP) test. The WWC confirmed this finding after correcting the statistical significance level for clustering. The effect size was large enough to be considered substantively important according to WWC criteria (an effect size at least 0.25).

Kerstyn (2001) reported positive but not statistically significant effects of *I CAN Learn*[®] on the Florida Comprehensive Assessment Test (FCAT) math exam for Algebra 1, Algebra 1 Honors, MJ-3 pre-algebra, and MJ-3 Advanced courses. The effect size for each of these samples was not large enough to be considered substantively important according to WWC criteria (an effect size at least 0.25).

Kerstyn (2002) reported a positive and statistically significant effect of *I CAN Learn*[®] on the FCAT math exam for students in MJ-3 pre-algebra classes. The WWC confirmed this finding. The author also reported negative but not statistically significant effects for students in the Algebra 1, Algebra 1 Honors, and MJ-3 Advanced courses. The WWC confirmed that these

negative effects were neither statistically significant nor large enough to be considered substantively important by WWC criteria (an effect size of at least 0.25). Thus, *I CAN Learn*[®] showed a statistically significant positive effect for MJ-3 pre-algebra students and indeterminate effects for Algebra 1, Algebra 1 Honors, and MJ-3 Advanced students.⁸

Kirby (2004a) reported a positive and statistically significant effect of *I CAN Learn*[®] on the General Mathematics exam from the California Standards Test. The statistical significance of this effect was confirmed by WWC analysis. The effect size was large enough to be considered substantively important according to WWC criteria (an effect size of at least 0.25).

Kirby (2004b) reported a positive and statistically significant effect of *I CAN Learn*[®] on the Math exam from the Georgia Criterion-Referenced Competency Test. The statistical significance of this effect was confirmed by WWC analysis. The effect size was large enough to be considered substantively important according to WWC criteria (an effect size of at least 0.25).

In sum, in the math achievement domain, the WWC reviewed findings from 11 samples reported in five studies.⁹ Four of these samples showed statistically significant positive effects, and the remaining seven samples showed indeterminate effects. One of the samples was examined in a study that used a strong design.

Rating of effectiveness

The WWC rates the effects of an intervention in a given outcome domain as positive, potentially positive, mixed, no discernible

7. The level of statistical significance was reported by the study authors or, where necessary, calculated by the WWC to correct for clustering within classrooms or schools and for multiple comparisons. For an explanation, see the WWC Tutorial on Mismatch. For the formulas the WWC used to calculate the statistical significance, see Technical Details of WWC-Conducted Computations. In the cases of Kerstyn (2002) and Kirby (2004a; 2004b), no corrections for clustering or multiple comparisons were needed. In the cases of Kerstyn (2001) and Kirby (2006), a correction for clustering was needed, so the significance levels may differ from those reported in the original study.
8. Findings for subgroups, such as MJ-3 pre-algebra students who were not Florida Comprehensive Assessment Test (FCAT)-exempt and MJ-3 pre-algebra students exempt from the FCAT, are reported in Appendix A4, but are not included in the WWC rating of effectiveness for the intervention.
9. The four courses in the Kerstyn (2001; 2002) studies—Algebra 1, Algebra 1 Honors, MJ-3 pre-algebra, and MJ-3 Advanced—were treated as separate studies because they examined effects of *I CAN Learn*[®] on different samples of students using different curricula.

The WWC found *I CAN Learn*[®] Pre-Algebra and Algebra to have positive effects for math achievement

effects, potentially negative, or negative. The rating of effectiveness takes into account four factors: the quality of the research design, the statistical significance of the findings, the size of

the difference between participants in the intervention and the comparison conditions, and the consistency in findings across studies (see the WWC Intervention Rating Scheme).

Improvement index

The WWC computes an improvement index for each individual finding. In addition, within each outcome domain, the WWC computes an average improvement index for each study and an average improvement index across studies (see Technical Details of WWC-Conducted Computations). The improvement index represents the difference between the percentile rank of the average student in the intervention condition versus the percentile rank of the average student in the comparison condition. Unlike the rating of effectiveness, the improvement index is based entirely on the size of the effect, regardless of the statistical significance of the effect, the study design, or the analyses. The improvement index can take on values between -50 and +50, with positive numbers denoting results favorable to the intervention group.

The average improvement index for math achievement is +5 percentile points across the 11 samples in the five studies, with a range of -7 to +16 percentile points across findings.

Summary

The WWC reviewed 27 studies on *I CAN Learn*[®] Pre-Algebra and Algebra. One of these studies meets WWC evidence standards; four studies meet WWC evidence standards with reservations; the remaining 22 studies do not meet either WWC evidence standards or eligibility screens. Based on the five studies, the WWC found positive effects in math achievement. The conclusions presented in this report may change as new research emerges.

References

Meets WWC evidence standards

Kirby, P. C. (2006). *I CAN Learn*[®] in Orleans Parish Public Schools: Effects on LEAP 8th grade math achievement, 2003–2004. New Orleans, LA: Ed-Cet, Inc.

Additional source:

Kirby, P. C. (2004c). *I CAN Learn*[®] in Orleans Parish Public Schools: Effects on LEAP 8th grade math achievement, 2003–2004. New Orleans, LA: Ed-Cet, Inc.

Meet WWC evidence standards with reservations

Kerstyn, C. (2001). *Evaluation of the I CAN Learn*[®] mathematics classroom: First year of implementation (2000–2001 school year). (Available from the Division of Instruction, Hillsborough County Public Schools, 901 East Kennedy Blvd., Tampa, FL 33602).

Kerstyn, C. (2002). *Evaluation of the I CAN Learn*[®] mathematics classroom: Second year of implementation (2001–2002 school

year). (Available from the Division of Instruction, Hillsborough County Public Schools, 901 East Kennedy Blvd., Tampa, FL 33602).

Kirby, P. C. (2004a). *Comparison of I CAN Learn*[®] and traditionally-taught 8th grade general math student performance on the California Standards Test, Spring 2004. New Orleans, LA: Ed-Cet, Inc.

Kirby, P. C. (2004b). *Comparison of I CAN Learn*[®] and traditionally-taught 8th grade student performance on the Georgia Criterion-Referenced Competency Test. New Orleans, LA: Ed-Cet, Inc.

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

Barrow, L., Markham, L., & Rouse, C. E. (2007). *Technology's edge: The educational benefits of computer-aided instruction*. Federal Reserve Bank of Chicago, Working Paper Series:

References (continued)

- WP-07-17. This study is ineligible for review because it does not disaggregate findings for the age or grade range specified in the protocol.
- Brooks, C. (1999). *Evaluation of Jefferson Parish technology grant: I CAN Learn® Algebra I*. (Available from the Department of Educational Leadership, University of New Orleans, New Orleans, LA 70148). The study does not meet evidence standards because the intervention and comparison groups are not shown to be equivalent at baseline.
- Brooks, C. (2000). *Evaluation of Jefferson Parish technology grant: I CAN Learn® Algebra I*. (Available from the Department of Educational Leadership, University of New Orleans, New Orleans, LA 70148). The study does not meet WWC evidence standards because the intervention and comparison groups are not shown to be equivalent at baseline.
- Buckler, M. L. (2007). *Comparison study of 8th grade math MAP scores of four Missouri middle schools using the I CAN Learn® math lab in academic years 2005 and 2006*. Unpublished master's thesis, Northwest Missouri State University, Maryville, MO. This study is ineligible for review because it does not use a comparison group.
- Gill, J. C., & Gifford, C. S. (2001). *Evaluation of Jefferson Parish technology grant: I CAN Learn® Algebra I*. Unpublished manuscript, University of New Orleans, LA. The study does not meet WWC evidence standards because the measures of effect cannot be attributed solely to the intervention—there was only one unit of analysis in one or both conditions.
- I CAN Learn®. (2006). *I CAN Learn® math in Missouri: 8th grade*. New Orleans, LA: Author. This study is ineligible for review because it does not use a comparison group.
- I CAN Learn®. (2007). *New York City middle school 385*. New Orleans, LA: Author. This study is ineligible for review because it does not provide enough information about its design to assess whether it meets standards.
- I CAN Learn®. (2007). *Northridge middle school algebra readiness students significantly outperform traditionally taught students*. New Orleans, LA: Author. This study is ineligible for review because it does not provide enough information about its design to assess whether it meets standards.
- I CAN Learn®. (nd). *I CAN Learn® success in Birmingham*. New Orleans, LA: Author. Retrieved from http://www.icanlearn-results.com/view_AL_BIRM.asp. This study is ineligible for review because it does not provide enough information about its design to assess whether it meets standards.
- Kirby, P. C. (2003). *I CAN Learn® results for Orleans Parish schools 2001–2002*. New Orleans, LA: I CAN Learn®. The study does not meet evidence standards because the intervention and comparison groups are not shown to be equivalent at baseline.
- Kirby, P. C. (2004d). *I CAN Learn® in Collier County, Florida*. New Orleans, LA: I CAN Learn®. This study is ineligible for review because it does not use a sample within the age or grade range specified in the protocol.
- Kirby, P. C. (2005a). *Comparison of I CAN Learn® and traditionally-taught 7th and 9th grade student performance on the Texas criterion-referenced tests, 2000–2004*. New Orleans, LA: Ed-Cet, Inc. The study does not meet evidence standards because the intervention and comparison groups are not shown to be equivalent at baseline.
- Kirby, P. C. (2005b). *I CAN Learn® results in Milwaukee, WI*. New Orleans, LA: Ed-Cet, Inc. Retrieved from <http://www.icanlearnresults.com/pdf/WI-SUCCESS.pdf>. The study does not meet evidence standards because the intervention and comparison groups are not shown to be equivalent at baseline.
- Kirby, P. C. (2005c). *I CAN Learn® Algebra I in Catoosa County, Georgia*. New Orleans, LA: Ed-Cet, Inc. This study is ineligible for review because it does not use a sample within the age or grade range specified in the protocol.
- Kirby, P. C. (nd). *I CAN Learn® results in Mississippi*. New Orleans, LA: Ed-Cet, Inc. The study does not meet evidence standards because the intervention and comparison groups are not shown to be equivalent at baseline.
- Kirby, P. C. (nd). *I CAN Learn® Algebra I in Central Falls, Rhode Island, 2005–2006*. New Orleans, LA: Ed-Cet, Inc. Retrieved

References (continued)

from <http://www.icanlearnresults.com/pdf/I%20CAN%20Learn%20Report%202005%202006%20RI.pdf>. The study does not meet evidence standards because it does not provide adequate information to determine whether it uses an outcome that is valid or reliable.

Kirby, P. C. (nd). *Texas district performance on TAAS and TAKS, 1999–2003. I CAN Learn® in Fort Worth Independent School District*. New Orleans, LA: Ed-Cet, Inc. The study does not meet evidence standards because the measures of effect cannot be attributed solely to the intervention—there was only one unit of analysis in one or both conditions.

Oescher, J. (2002). *I CAN Learn® education success in California*. New Orleans, LA: I CAN Learn®. The study does not meet WWC evidence standards because the measures of effect cannot be attributed solely to the intervention—there was only one unit of analysis in one or both conditions.

Oescher, J., & Kirby, P. C. (2004). *I CAN Learn® results in Dallas, Texas: 9th grade 2003–2004*. New Orleans, LA: I CAN Learn®. The study does not meet WWC evidence standards because the measures of effect cannot be attributed solely to the

intervention—there was only one unit of analysis in one or both conditions.

Parrott, D. E. (2005). *A study of comparison for students in a computerized mathematics classroom I CAN Learn® and students who are in a traditionally taught classroom*. Unpublished master's thesis, Northwest Missouri State University, Maryville, MO. The study does not meet evidence standards because the intervention and comparison groups are not shown to be equivalent at baseline.

Scafide, K. (2004). *Effects of I CAN Learn® on math achievement in Gwinnett County Middle School*. New Orleans, LA: I CAN Learn®. The study does not meet WWC evidence standards because the measures of effect cannot be attributed solely to the intervention—there was only one unit of analysis in one or both conditions.

Zinn, L. F., & Bolton, J. W. (2006). *EETT grant evaluation: Year 2 report. Williamsport area school district*. New Orleans, LA: I CAN Learn®. This study is ineligible for review because it does not use a comparison group.

For more information about specific studies and WWC calculations, please see the [WWC I CAN Learn® Pre-Algebra and Algebra Technical Appendices](#).