

California Education Round Table Intersegmental Coordinating Committee Alliance for Regional Collaboration to Heighten Educational Success (ARCHES)

STEM Learning Opportunities Providing Equity (SLOPE)

DID THE SLOPE PROGRAM IMPROVE 8TH GRADE ALGEBRA I TEST SCORES?

Project Overview

THE PROBLEM: What Challenge Did the Program Try to Address?

Many students struggle in Algebra I, which impacts their schooling far beyond that single course. Algebra I is an entry-level course and a prerequisite for placement in many more-advanced courses. In addition, Algebra I provides a foundation for subsequent science and related courses. Students who are not successful in Algebra I have restricted future academic opportunities and are often more educationally marginalized than their peers.

THE PROJECT: What Strategies Did the Program Employ?

The California Education Round Table¹ was awarded an i3 development grant from 2010–2015. The STEM Learning Opportunities Providing Equity (SLOPE) program was designed to promote the learning of fundamental math concepts through a specific curriculum. Teachers were provided strategic professional development opportunities and access to curricular materials designed to reinforce critical elements of standards-based math instruction. Teachers were also provided information about STEM career pathways. Students in their classes were exposed to this special curriculum in addition to the district-specific curriculum. A smaller number of students also participated in a pre-8th-grade summer session, designed to support those with additional need. A randomized controlled trial was used to evaluate the program.

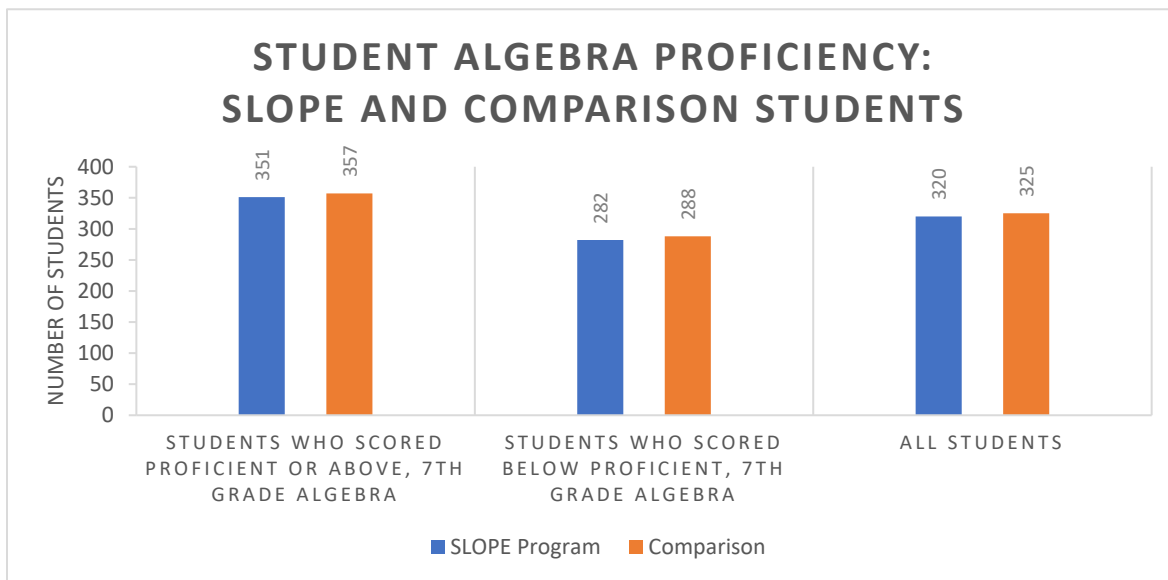
¹ California Education Round Table received an i3 development grant supported by the U.S. Department of Education's Investing in Innovation program through Grant Number U396C100135. Development grants provide funding to support the development or testing of novel or substantially more effective practices that address widely shared education challenges. All i3 grantees are required to conduct rigorous evaluations of their projects. The quality of evidence required to demonstrate a project's effectiveness depends on a project's level of scale or grant type.

THE SLOPE MODEL

- **ALGEBRA I CURRICULA.** The Algebra I instructional units consisted of three project-based STEM-oriented academic units designed to be taught at various points during the school year, and integrated into the district-selected mathematics curriculum. Teachers were trained to implement these curricula.
- **OPTIONAL SUMMER CURRICULA.** This was a four-week program consisting of three project-based, STEM-oriented academic units, requiring creative problem solving, reinforced math concepts, and skills needed for Algebra I success. Students in classes taught by teachers trained in the Algebra I curricula could opt into this program, which was taught by trained teachers.
- **PROFESSIONAL COACHING ACTIVITIES FOR TEACHERS.** Teachers were required to attend coaching and professional development sessions which focused on implementing the instructional units as intended, as well as reinforcing effective educational strategies.

Summary of Results

DID THE SLOPE PROGRAM IMPROVE 8TH GRADE ALGEBRA I TEST SCORES?



- **TEST SCORES AMONG STUDENTS WHO HAD PROFICIENT OR ABOVE 7TH GRADE MATH SCORES.** Students who achieved at least a “proficient” rating in their 7th grade math tests, and who participated in the studied curriculum, did not have 8th grade test scores that were statistically significantly different from similar students who had the traditional curriculum.

TEST SCORES AMONG STUDENTS WHO HAD BELOW-PROFICIENT GRADE MATH SCORES. Students with “below proficient” 7th grade math scores, and who participated in both the summer camp and the studied curriculum, did not have 8th grade test scores that were statistically significantly different from similar students who had the traditional curriculum.

Please see Appendices B and C for information about the evaluation’s design and the quality of the evidence, respectively.

OTHER CONSIDERATIONS

Researchers attempted to open up the “black box” of implementation; to learn more about what parts of the program were most important. However, because fidelity of implementation was low, they were unable to make such determinations. Instead, they drew several conclusions about implementation, to help improve fidelity in similar programs. Those conclusions include:

- **COMPETING PRIORITIES.** Eighth grade Algebra I teachers face many competing priorities, and allocating the amount of time expected to implement the curriculum with fidelity was often a challenge.
- **DISTRICT CURRICULUM PRECEDENCE.** Several teachers commented that their priority was implementing the district curriculum, not the one being tested (which was to be implemented in addition to the required district curriculum).

For More Information

Evaluation Reports

[STEM Learning Opportunities Providing Equity: An Investing in Innovation \(i3\) Grant Final Evaluation Report](#) (WestEd, September 2015)²

² The information and data for this result summary was collected from the most recent report as of 01/23/2020: [“STEM Learning Opportunities Providing Equity: An Investing in Innovation \(i3\) Grant Final Evaluation Report.”](#) WestEd, September 2015.

Appendix A: Students Served by the Project³

GRADE(S)													
PK	K	1	2	3	4	5	6	7	8	9	10	11	12

HIGH-NEED STUDENTS ⁱ		
Free/Reduced Price Lunch	English Learners	Individualized Education Program
Not Reported/Not Applicable	Not Reported/Not Applicable	Not Reported/Not Applicable

³These data reflect the entire student population served by the intervention, not just the evaluation sample used in the impact study.

Appendix B: Impact Evaluation Methodology⁴

RESEARCH DESIGN:

Design:	Randomized Controlled Trial
Approach:	<ul style="list-style-type: none"> ▪ Fifty-six California 8th grade Algebra I teachers were randomly assigned to either the treatment or control group. Teachers in the treatment group were trained to implement the intervention. ▪ All students were administered end-of-grade standardized state math tests at the conclusion of the year in which the program was implemented. ▪ Implementation data were collected through teacher surveys.
Study Length:	One year, although prior-year math scores were used in some of the analyses

DATA COLLECTION AND ANALYSIS

Study Setting	California public middle schools
Final Sample Sizes	<ul style="list-style-type: none"> ▪ <i>Intervention Group</i>: 1,384 students in 28 classes ▪ <i>Comparison Group</i>: 1,088 students in 27 classes
Intervention Group Characteristics⁵	<ul style="list-style-type: none"> ▪ Not Reported
Comparison Group Characteristics	<ul style="list-style-type: none"> ▪ Not Reported
Data Sources	<ul style="list-style-type: none"> ▪ California state student test scores (7th grade math and 8th grade Algebra I) ▪ Teacher implementation surveys.
Key Measures	<ul style="list-style-type: none"> ▪ Scores on end-of-year 8th grade Algebra I standardized tests

⁴ These data reflect only the evaluation sample in the impact study, not the entire population served.

⁵ Page 19 of impact evaluation report, Table 6.

Appendix C: Quality of the Evidence

WHAT WORKS CLEARINGHOUSE REVIEW⁶

STUDY	RATING
https://ies.ed.gov/ncee/wwc/Study/84088	Meets WWC standards with reservations; no statistically significant positive findings.

EVIDENCE FOR ESSA REVIEW⁷

STUDY	RATING
Not reviewed as of 01/23/2020	N/A

NATIONAL CENTER ON INTENSIVE INTERVENTIONS REVIEW⁸

STUDY	RATING
Not reviewed as of 01/23/2020	N/A

⁶ <https://ies.ed.gov/ncee/wwc/FWW>

⁷ <https://www.evidenceforessa.org/>

⁸ <https://intensiveintervention.org/>

Investing in Innovation (i3) Grantee Results Summary

Development, 2010-2015

The [Investing in Innovation Fund \(i3\)](#), established under section 14007 of the American Recovery and Reinvestment Act of 2009, is a Federal discretionary grant program at the U.S. Department of Education within the Office of Innovation and Improvement. i3 grants help schools and local education agencies work in partnership with the private sector and the philanthropic community to develop and expand innovative practices that improve student achievement or student growth, close achievement gaps, decrease dropout rates, increase high school graduation rates, and/or increase college enrollment and completion rates for high-need students.

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ⁱ “High-need student” refers to a student at risk of academic failure or otherwise in need of special assistance and support, such as students who are living in poverty, attend high-minority schools, are far below grade level, who have left school before receiving a regular high school diploma, at risk of not graduating with a diploma on time, who are homeless, in foster care, have been incarcerated, have disabilities, or who are English learners. For more information see: [Applications for New Awards; Investing in Innovation Fund-Development Grants, 81 FR 24070 \(April 25, 2016\)](#).