September 2014

Prepared by
American Institutes
for Research

Promoting Student Success in Algebra I

Project Overview

Although high school graduation rates are improving in the United States, dropping out remains a national crisis, particularly for racial and ethnic minorities and students with disabilities. Students drop out of school for many reasons, but a growing body of research makes clear that students who fail Algebra I are at especially high risk.

Why is Algebra I so important? Many districts across the country now require Algebra I for graduation and subsequent advanced courses in mathematics and science. These requirements are sometimes coupled with fewer opportunities for struggling students to enroll in mathematics courses in high school that build the foundational content knowledge necessary for success in Algebra I. Enrolling underprepared students in Algebra I instead of general mathematics courses can set them on a path toward gradual disengagement and dropping out because meeting graduation requirements grows seemingly impossible.

Funded by the High School Graduation Initiative at the U.S. Department of Education, the Promoting Student Success in Algebra I project aims to provide program developers and administrators with a deeper understanding of five promising strategies for improving student success in Algebra I and, ultimately, high school graduation. These strategies, defined for the purposes of this project in Table 1, include instructional practices, professional development, instructional coaching, curriculum alignment, and supplementary learning supports for struggling students. The project is led by American Institutes for Research in partnership with Windwalker Corporation.

Table 1. Five Strategies for Promoting Student Success in Algebra I

Strategy	Project Focus
Instructional Practices	Instructional practices that mutually promote procedural fluency and conceptual understanding in Algebra I and mathematics more generally
Professional Development	Professional development that supports teachers in the design and implementation of instruction
Instructional Coaching	Instructional coaching activities in which a coach, specialist, mentor, and/or teacher leader works with other teachers to support the instructional activities within a school or schools to promote student success in Algebra I or mathematics more generally
Curricular Alignment	The scope and sequence of standards for student learning that support preparation for Algebra I by identifying skills and understanding that help students succeed in the course
Supplementary Learning Supports for Struggling Students	Double-dose algebra and expanded learning opportunities as supports that "expand" students' exposure to course content in algebra and mathematics in and out of the classroom

Objectives

- To summarize the evidence within each of the five strategies: instructional practices, professional development, instructional coaching, curricular alignment, and supplementary learning supports
- To understand how district mathematics leaders and Algebra I teachers think about and use the research available in each of the strategies
- To gain a deeper understanding of what development and implementation of the strategies look like in districts or schools with demonstrated improvement
- To use that understanding to develop technical assistance tools that support other districts and schools as they implement these strategies

Approach

To address these objectives, the work will proceed in three phases.

Phase I: Reviewing Existing Research

To summarize the evidence supporting each strategy, the project will conduct five systematic reviews of existing research. The most relevant, recent, and rigorous research available will be synthesized based on the following priority areas: studies that focused on algebra or mathematics for Grades 6–9, were published since 2005, and had strong or moderate evidence of effectiveness.

Phase II: Understanding Administrators' and Practitioners' Perspectives

To understand how administrators and practitioners think about the research on the five strategies, the project will conduct focus groups with district policymakers and teachers from urban and rural school districts across the country. These focus groups will serve as a vehicle for understanding how research on each strategy can be used to inform policy and practice focused on promoting student success in Algebra I.

Phase III: Understanding the Development and Implementation Process

To examine the implementation of each strategy, the project will conduct five in-depth profiles of practice of programs with demonstrated success in the field. These profiles will document how promising Algebra I programs are developed, detail how such programs are staffed and managed, and describe contextual factors important to developing, implementing, and sustaining a successful program or initiative.

Products

- **Research Briefs** will provide short summaries of existing research that can be used by the field to gain a brief understanding of relevant evidence for each of the five strategies.
- **Perspective Briefs** will provide short summaries of how school-based practitioners and district-level policymakers think about and use research on each of the five strategies areas as well as highlight what is missing from existing literature based on their experience.
- **Profiles of Practice Technical Assistance Tools** will provide in-depth descriptions of the implementation of the five strategies that can be used by districts and schools to develop and implement similar promising practices for promoting student success in Algebra I.

For further information about this project, visit the U.S. Department of Education's High School Graduation Initiative website (http://www2.ed.gov/programs/dropout/index.html) or contact the Program Manager, Ivonne Jaime (ivonne.jaime@ed.gov), or the Project Directors, Kirk Walters (kwalters@air.org) and Nicholas Sorensen (nsorensen@air.org).

This report was produced under U.S. Department of Education Contract No. ED-ESE-12-O-0081 with the American Institutes for Research. The views expressed herein do not necessarily represent the positions or policies of the U.S. Department of Education. No official endorsement by the U.S. Department of Education of any product, commodity, service or enterprise mentioned in this publication is intended or should be inferred.

2356_08/14