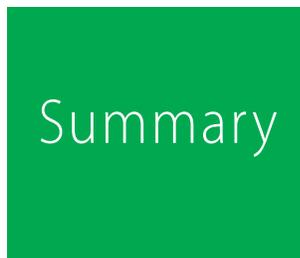


Math education practices for students with disabilities and other struggling learners: case studies of six schools in two Northeast and Islands Region states



Institute of Education Sciences
U.S. Department of Education



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Summary

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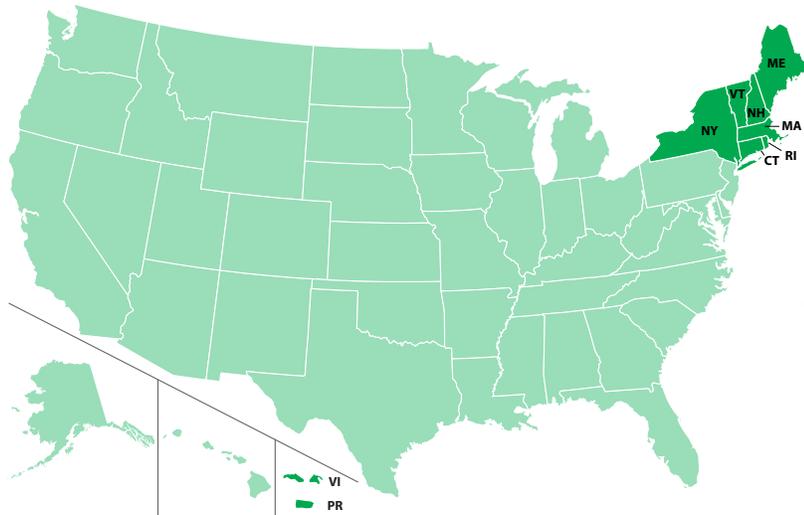
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Math education practices for students with disabilities and other struggling learners: case studies of six schools in two Northeast and Islands Region states

This report describes in-depth practices at six schools that are making targeted efforts to improve math education for students with disabilities and other struggling learners. It examines each school's practices for improving the math learning of all students as well as specific supports for students with disabilities and other struggling learners and identifies the challenges that schools face to serve students with diverse needs.

The No Child Left Behind (NCLB) Act of 2001 requires states to ensure that all students make adequate yearly progress in achieving proficiency in English language arts and math. This study examines how six diverse schools have responded to the challenge of educating their students in math, particularly students with disabilities and other struggling learners. The report intends to help educators by providing examples and ideas to consider for their own school or district efforts to improve math teaching and learning.

A multistep nomination and screening process was used to select six schools—three from Massachusetts and three from New York—for the study. All the schools educate general education students and students with

disabilities and serve medium- or high-need populations.¹

Education leaders (state special education leaders, district superintendents, special education directors, math coordinators, university professors, and leaders of research projects focusing on math education and students with disabilities) were asked to use their knowledge of district or school initiatives to nominate schools that were making strong, targeted efforts to improve the math learning of students with disabilities and other struggling learners. To provide a common set of nomination criteria, the research team provided a list of suggested practices (drawn from the research literature) and asked the education leaders to identify the school's strengths in these areas. This nomination process yielded 38 schools, 19 each in Massachusetts and New York. Ultimately, six schools (three from each state) were selected for the report's case studies. These schools were deliberately chosen to illustrate a wide variety of practices adopted by schools perceived by education leaders to be exemplary in their math education efforts.

School practices in seven areas—classroom math instruction, math supports and interventions, assessment, collaboration, professional

development, leadership, and school culture—guided the collection and analysis of information from the six schools. These areas were selected after a rigorous review of research in the field.

During six two-day site visits researchers collected primary documents, observed classrooms, and spoke with administrators and staff, including principals, special educators, general educators, and math coaches. The report provides a descriptive analysis of each school's practices, structured around three research questions:

- How do schools provide math education to students with disabilities and other struggling learners? What practices are used and how are they implemented?
- What do school leaders and teachers identify as their school's strongest practices for improving teaching math to students with disabilities and other struggling learners?
- What do school leaders and teachers identify as their greatest challenges for improving math teaching and learning for students with disabilities and other struggling learners?

The six schools have made diverse efforts to improve math instruction for students with disabilities and other struggling learners. Cedar Elementary School used a central math lead teacher, who helped struggling students by providing direct support to students and teachers and by playing a key role in analyzing district and state math assessments for all of the school's students. At Redwood Elementary School an experienced administration and

talented teaching staff helped boost student achievement through a consistent, school-wide instruction model. At Maple Elementary School professional learning communities and a clear school mission enabled a close-knit staff to build a strong, structured, but flexible collaboration to support struggling students. Aspen Elementary School applied an inclusive philosophy, supporting the learning of struggling learners with a variety of services and learning environments. Beech Elementary School provided extensive support and intervention services before, during, and after school. It used in-house math coaches to support math instruction and dedicated teachers to help design and analyze assessments for students in grades K–2. At Willow School teachers took advantage of the expertise available in a K–8 school by pairing middle-grade teachers with elementary-grade teachers in the lower school grades.

Although each school found its own ways of providing math instruction to students with disabilities and other struggling learners, many schools adopted similar practices:

- *Classroom math instruction.* All schools provided students with disabilities access to the general education math curriculum. All schools had highly experienced administrators and staff in key roles that were relevant to math and special education and teachers who described using similar kinds of instructional strategies for making math accessible. And all schools used published math programs and provided teachers with support for implementing them. Five schools used an inclusion model as their primary classroom placement for students with disabilities. Three

schools had implemented schoolwide instructional models.

- *Math supports and interventions.* The schools deliberately created specific staffing arrangements or additional programs to provide math support services for struggling students without Individualized Education Programs (IEPs). Two schools had a teacher whose full-time job was to provide math support to struggling learners. Four schools had formal out-of-class math programs. Three schools offered support through flexible staff arrangements. Three schools had implemented a Response-to-Intervention program for math.
- *Assessment.* All schools used experienced staff to analyze state assessment results and share their findings with the entire faculty. Five schools conducted frequent benchmark testing, and four schools used assessments to identify struggling math learners in grades K–2.
- *Collaboration among teachers.* Five schools scheduled common planning time and held regular grade-level meetings. At five schools general educators collaborated with special educators through coteaching, meetings, and other arrangements. Districtwide collaboration was uncommon but highly valued.
- *Professional development.* All schools had highly experienced in-house math leaders to provide curriculum and instructional guidance to teachers. Math leaders also provided support to special educators. None of the math leaders evaluated teachers. Collaboration among colleagues at

five of the six schools played a key role in teachers' professional development.

- *Leadership.* Principals at each school described a variety of governing approaches and management styles for their organizations. Staff at all schools described school leaders as empowering, respectful, and supportive.
- *School culture.* Teachers at all schools described collegial and supportive staff cultures that promoted higher levels of creative risk-taking and job satisfaction among staff. Teachers commonly described a nurturing staff culture of shared responsibility and high expectations. Many staff and administrators described their schools as safe and stable environments that were conducive to learning—schools in which students, including those with disabilities, feel accepted by their peers.

Teachers and administrators at the case study schools consistently identified several practices as particularly effective:

- A strong, collaborative staff culture that provides staff members with ongoing, in-house professional development.
- Development and retention of high-quality staff.
- Use of a variety of math instruction practices to meet the needs of struggling learners and students with disabilities.
- Strong and supportive school leaders who encourage teachers to grow and give their best efforts to students and the school.

- Extensive out-of-class math support.

Teachers and administrators at the case study schools also consistently identified several challenges:

- Insufficient staffing for student math support and insufficient time for math instruction.
- Inadequate math content knowledge among many teachers.
- Lack of high-quality math assessments and interventions for students in lower grades.
- The inherent difficulties of raising achievement levels among students with high and often multiple needs.

Staff members at the case study schools identified a number of practices—including in-house math leaders, strong leadership, and collaborative school cultures—that may be beneficial to other schools. Findings from this study call for further research on how the roles of math specialists, schoolwide leadership practices, and different forms of teacher collaboration may affect math learning for students with disabilities and struggling learners.

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Note

1. Medium- and high-need student populations are based on percentages of students eligible for free or reduced-price lunch in both Massachusetts and New York and, in New York, also on percentages of students with disabilities and students with limited English proficiency.