



About the Study

With two-thirds of U.S. eighth graders scoring below proficient in mathematics (U.S. Department of Education, 2015), schools across the country are seeking ways to support middle-grades students who struggle in the subject. One approach is to schedule additional mathematics classes during the school day to provide struggling learners with more time for instruction and support. In this report, we refer to these classes as **mathematics intervention** (MI) classes.

While recommendations for intervention practices are present in the literature (e.g., Gersten et al., 2009), little is known about how schools actually implement MI classes, including how often the classes meet, the number of students enrolled, who teaches them, and the content

focus. To address this gap in the knowledge base, Education Development Center (EDC) designed and conducted the *National Survey on Supporting Struggling Mathematics Learners in the Middle Grades*, as part of our Strengthening Mathematics Intervention project funded by the National Science Foundation. This executive summary describes the key results from schools across the United States, highlighting the national landscape of MI classes.

For this study, **mathematics intervention** classes are defined as classes taken by struggling students during the regular school day in addition to their general education mathematics classes. These classes focus only on mathematics content, in contrast to support classes, which include multiple subject areas. MI classes are for students who struggle with mathematics, including learners who do *not* have identified disabilities and those with Individualized Education Programs. (They are *not* separate special education mathematics classes.)

Who completed the survey?

In spring 2017, EDC administered an online survey to a nationally representative sample of 2,024 urban or suburban public schools with students in grades 6, 7, and 8. Approximately 43% of schools (876 schools) responded to the survey, with one respondent per school.

How prevalent are mathematics intervention classes?

In the 2016–17 school year, an estimated 69% of schools provided MI classes in grades 6, 7, or 8, with 56% providing them in all three grades. For the 31% of schools not offering MI classes, the two main reasons reported were lack of financial resources (50%) and being unable to fit the classes into the school schedule (49%).



69%

of schools had **mathematics intervention classes** for middle grades students



Results for Schools with Mathematics Intervention Classes

The survey asked the 609 respondents from schools with MI classes about their implementation of the classes: primary content focus, staffing, structures, scheduling, and types of challenges faced. This section addresses those results.

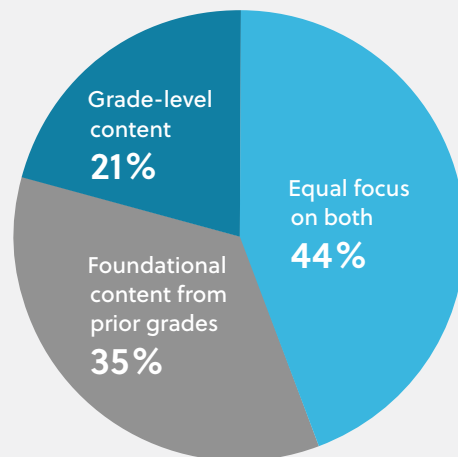
What is the primary content focus of mathematics intervention classes?

Mathematics students who struggle tend to have difficulties with their current grade-level mathematics content and also have gaps in their foundational knowledge (from prior grades). Schools face the challenging question of which content to focus on in MI classes to best meet students' needs. On the national survey, 35% of schools reported that the *primary* focus of their MI classes was on foundational content from prior grades and 21% reported a primary focus on grade-level content. The largest percentage of schools (44%) said that their MI classes had about an equal focus on foundational content from prior grades and grade-level content (Figure 1).

Who teaches mathematics intervention classes?

The vast majority of schools (85%) reported that MI classes were taught by a staff member with a mathematics-specific role (e.g., mathematics interventionist, mathematics teacher, mathematics coach, mathematics department head). Few respondents reported that MI classes were taught only by interventionists who also taught other subjects (4%) or only by special education teachers (4%).

Figure 1: Primary content focus for MI classes (percent of schools) n=607



85%

of schools reported that mathematics intervention classes were taught by **mathematics educators**



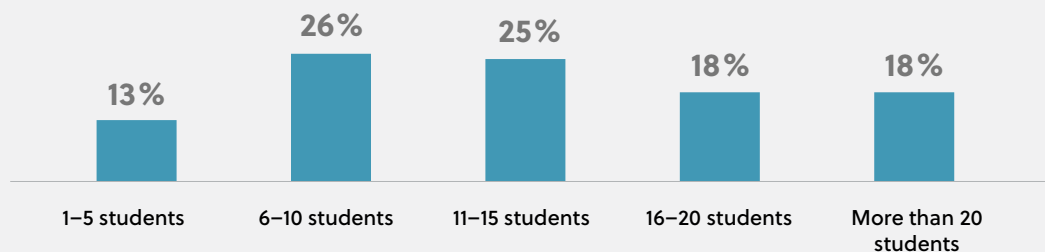


Class Size and Placement Decisions

What are the sizes of mathematics intervention classes?

The National Center on Response to Intervention (2010) recommends that intervention classes provide small-group instruction. Having a lower student-to-teacher ratio may help teachers provide more individualized instruction and help students feel more comfortable talking about their ideas and asking questions. As shown in Figure 2, 51% of schools reported that their MI classes had between 6 and 15 students. Some schools had MI classes with larger numbers of students: 18% had 16–20 students and 18% had over 20 students. As a point of reference, general education mathematics classes have an average of 22 students (Banilower et al., 2013).

Figure 2: Number of students in MI classes (percent of schools). n = 607



How do schools make placement decisions?

Schools need to make decisions about which students to place in MI classes. One recommendation is to identify at-risk learners by using standardized test scores because of the limited availability of screening measures for grades 6–8 (Gersten et al., 2009). The survey results were aligned with this recommendation: using state assessment data was the most frequently reported approach (62%) for making placement decisions. Other common approaches were teacher recommendations (53%), district-based assessment scores (41%), students' grades from their general education mathematics classes (35%), and diagnostic screening assessment scores (34%). Respondents were able to choose up to three factors that they commonly used to make placement decisions and approximately 90% of schools reported using more than one factor.

62%

of schools reported using **state assessment data** to make placement decisions



Time, Frequency, and Scheduling

How long are mathematics intervention classes?

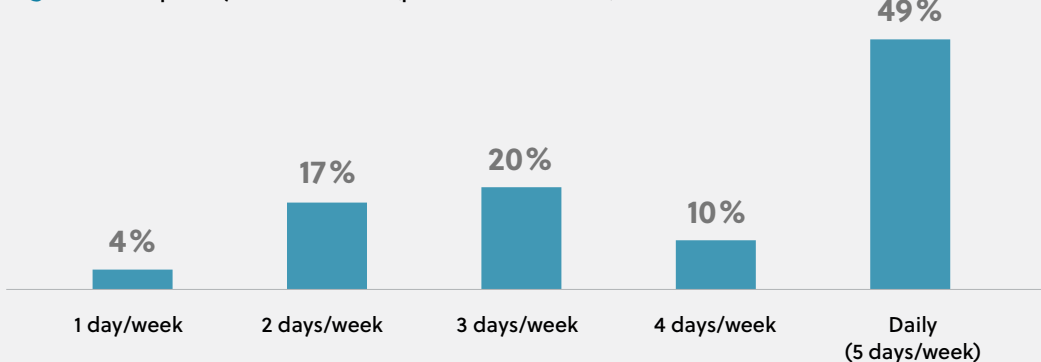
Common lengths for MI classes were similar to traditional class periods: 40–49 minutes was the most frequently reported length for MI classes (43%), followed by 50–59 minutes (26%). Classes that were shorter than 40 minutes long were reported by 22% of respondents, and only 8% of respondents reported that the MI classes in their schools were 60 minutes or longer.

How often do mathematics intervention classes meet?

Nearly half of the schools reported that their MI classes met five days a week and about 40% met two or three days a week (Figure 3). The least frequently reported schedules were four days per week (10%) and once per week (4%).



Figure 3: Frequency of MI classes (percent of schools). n = 607



What is the duration?

The most common duration of MI classes was a full school year as reported by 65% of schools. About 25% of schools reported that MI classes lasted one term, 7% indicated that they lasted 6 or 10 weeks, and 2% reported a different duration.

How do schools schedule mathematics intervention classes?

The most frequently reported scheduling method was to have students attend MI classes instead of a non-core subject, such as an elective (51%), followed by having a designated time in the schedule where all students took either an intervention or an enrichment class (38%). Other approaches were to have students take an MI class instead of a study hall or advisory class (19%) or instead of a world language class (8%).



Challenges for Schools

The national survey asked respondents to consider 14 possible issues related to MI classes and rate each one as *not a challenge*, *a challenge*, or *a major challenge* for their schools. For this report, the latter two categories have been combined and are referred to as “a challenge.”

Ninety-three percent of respondents reported that in their MI classes, students’ wide range of learning needs was a challenge; this was true for both large and small classes. This finding is consistent with the fact that students struggle with mathematics for different reasons and may have different misconceptions or gaps in their mathematics knowledge.

TOP 3 CHALLENGES

- **Students’ wide range of learning needs**
- **Students’ negative attitudes towards being in MI classes**
- **More students need MI classes than schools are able to serve**

The second most frequently reported challenge (79% of respondents) was students’ negative attitudes toward being in MI classes. Middle school students may feel negatively about MI classes for several reasons: Some students may have faced ongoing difficulties with mathematics for multiple years and, thus, may feel anxious about the subject and their own abilities. These students may be unenthusiastic about having two mathematics classes a day and, in some cases, missing an elective. Another reason may be related to the quality of instruction in MI classes; if teachers lack strategies for reaching and engaging struggling learners, students are likely to feel negatively about the experience. In light of these two challenges, MI teachers may need support and professional development on addressing students’ wide range of mathematical learning needs as well as ways to motivate and engage unenthusiastic students, helping to make MI classes a more positive experience.

The third most frequently reported challenge (72%) was that schools have more students who need MI classes than they are able to serve. To build capacity to provide MI classes to more students, schools may need additional financial resources and staffing as well as guidance on effective structures and scheduling approaches. Further, this challenge may be indicative of a broader issue: a need for schools to improve the quality of their general education mathematics instruction so that more students succeed without intervention classes.

Other common challenges reported were related to limited instructional supports for MI teachers, including having little or no scheduled meeting time for MI teachers to collaborate and communicate with other teachers about struggling mathematics students (69%), having little or no professional development focused on mathematics intervention practices for struggling learners (66%), and having little or no scheduled planning time to prepare for MI classes (61%). These three challenges suggest the need for school and district leaders to provide more support for MI teachers by scheduling time for collaboration and planning and by providing professional development.



Results for Mathematics Intervention Teachers

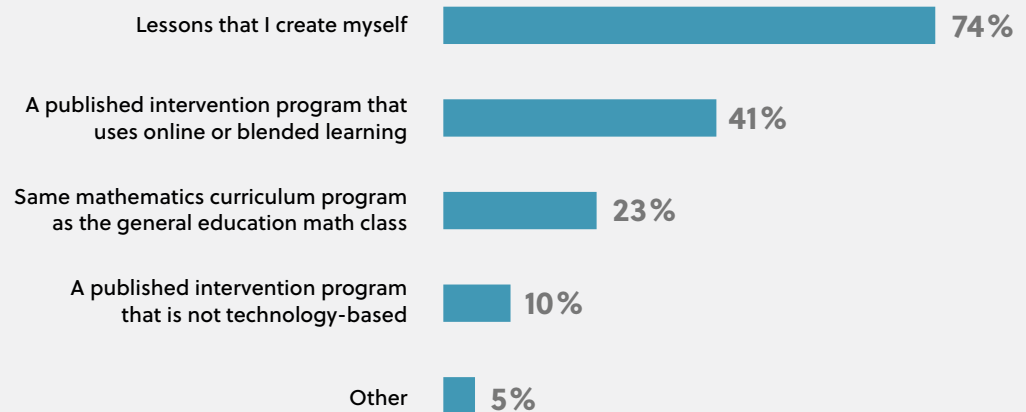
The survey respondents included teachers of MI classes as well as other educators who were knowledgeable about their schools' practices. The teachers of MI classes received additional survey questions about their lesson materials and goals. These respondents are referred to as *MI teachers* (n = 365).¹

What materials do mathematics intervention teachers use for lessons?

When MI teachers were asked to select one or two types of materials that they used most often for their lessons, they most commonly reported using lessons that they created themselves (74%). About 41% reported using a published intervention program that has online or blended learning. In contrast, a much smaller percentage of MI teachers cited using a published intervention program that is not technology-based. About a quarter used the same mathematics curriculum program as the general education mathematics class (Figure 4).



Figure 4: Percent of MI teachers who reported using these materials most often for lessons. n = 359. (The percentages do not sum to 100 because respondents were able to select one or two options.)



¹ The results for MI teachers are considered exploratory because we identified a nationally representative sample of schools, not a representative sample of MI teachers.



What are mathematics intervention teachers' goals for their classes?

MI teachers were asked to select up to three main goals that they had for their current MI classes. The three most common responses were addressing students' gaps with foundational mathematics concepts from prior grade levels (72%), reteaching and providing opportunities to practice grade-level mathematics content from students' general education mathematics classes (71%), and building students' motivation for and confidence in doing mathematics (60%).



TOP 3 GOALS

- **Address gaps with foundational concepts from prior grades**
- **Reteach and support grade-level content**
- **Build students' motivation for and confidence in doing mathematics**

In contrast, the following goals were least frequently cited: helping students with their mathematics homework (17%) and teaching test-taking strategies and practicing for district or state mathematics assessments (8%).

These findings suggest that MI classes are distinct from traditional models of support classes, which focus on test preparation and homework help. Instead, the goals that many MI teachers have for their classes are consistent with an expert panel's recommendations to focus interventions on foundational concepts and to incorporate motivational strategies to engage struggling learners (Gersten et al., 2009). Together, the top three goals suggest that many MI teachers value the importance of providing mathematics instruction that addresses students' specific needs and builds their abilities and confidence.



Implications

The survey findings reveal that implementing MI classes for struggling learners at the middle grades is now a trend across U.S. public schools. An estimated 69% of schools in urban or suburban settings provided MI classes in grades 6, 7, or 8 during the 2016–17 school year. Ideally, these MI classes offer opportunities for struggling students to get more targeted instruction, build their understanding of foundational content, and increase their confidence and success as mathematics learners. Adding these classes involves a considerable investment by schools in terms of finances, staffing, and scheduling, as well as trade-offs for students who may need to miss electives or other classes. However, little research has been done on the actual implementation and effectiveness of MI classes. In light of the widespread use of MI classes by schools, further research is needed to evaluate their impact on student learning and investigate what structures and approaches work for whom and under what conditions.

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For implementation:

The survey findings shed light on the ways that MI classes are being implemented by schools. On the positive side, many MI classes are taught by educators with mathematics backgrounds, meet multiple days per week for about 40–59 minutes, and have smaller class sizes than the average general education mathematics class. However, there is variation in the structures of MI classes, with some schools reporting practices that run counter to expert recommendations, such as large class sizes and limited amounts of instructional time. Administrators are faced with difficult decisions about how to schedule and implement MI classes within the constraints of their school contexts; more research and guidance is needed on effective structures and practices for successfully implementing these classes.



For meeting students' needs:

A common challenge revealed by the survey results is that schools have more students who need MI classes than they are able to serve. Schools may need to build their capacity to provide more MI classes and would benefit from guidance on using different structures, staffing models, or schedules, as suggested above. However, if the challenge stems from a larger issue with the quality of general education mathematics classes, then adding MI classes will not be sufficient. When large numbers of students are not reaching proficiency, we recommend that school and district leaders use a multi-pronged approach to strengthen Tier 1 core instruction in concert with implementing MI classes. Research on the effectiveness of MI classes should also examine the broader picture of mathematics instruction at schools because the impact of MI classes on student achievement may be moderated by the quality of core instruction in general education classes.





For supporting teachers:

The survey findings on other common challenges highlight the complexities of teaching and implementing MI classes. MI teachers need effective approaches for reaching struggling students who have a wide range of mathematical learning needs and may feel negatively about the subject or about taking additional mathematics classes. Because many teachers are creating their own lessons for MI classes, it is important that they have strong knowledge of mathematics content and research-informed intervention practices as well as the ability to use these practices effectively. In light of these demands, school and district leaders should consider ways to provide support to MI teachers through such avenues as professional development, mentoring, scheduled time for planning, and opportunities for collaboration. Further research is needed on effective mathematics intervention practices and approaches for motivating struggling learners as well as ways to support MI teachers in implementing these practices at the middle grades.

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Strengthening Mathematics Intervention

The *Strengthening Mathematics Intervention* project, funded by the National Science Foundation, is studying the ways in which schools provide support to struggling mathematics learners in the middle grades. In addition to the national survey described in this report, EDC conducted observations of mathematics intervention classes and interviewed teachers and mathematics leaders. Drawing on these findings, staff are creating and piloting a professional development program specifically for teachers of mathematics intervention classes, helping to build their knowledge and practices for supporting struggling learners in the middle grades.

Supplementary Materials

The survey instrument, methodology, and supporting data tables are available at <http://edc.org/accessmath>.

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