Targeted and collaborative learning experiences for educators can improve outcomes for all students, especially those with disabilities, in general education settings.

How all teachers can support students with disabilities

BY ALEXA QUINN, LINDSEY MCLEAN, AND SUSAN AIGOTTI

Martin Green is a passionate 5th-grade teacher with four years of experience. He co-teaches with Tina Murphy, who supports students with disabilities. Despite their best efforts to improve all students' mathematics learning — including strategies using visuals and meeting with students in small groups — Green worries his instruction is not meeting the needs of all his students, especially students like Jeremy. Jeremy is a bright and charismatic student with mathematics and attention difficulties who tries his best but often becomes discouraged when facing most word problems. Jeremy gets support from Murphy for about 30 minutes a day, but she and Green know that time is not sufficient to cover all the mathematics concepts in depth.

Green wishes he and Murphy could better support Jeremy and others who are experiencing difficulty, but he feels he does not have any more tools in his toolbox to try. His professional learning community (PLC) with Murphy and other teachers rarely focuses on mathematics, as reading is such a priority. When they do talk about math, the conversation focuses on the structure of the learning block, and there is no time left to talk about addressing students' challenges. Green is frustrated, but he doesn't know what to do differently.

Many teachers are underprepared to meet the needs of students with disabilities. Most have insufficient training and field experiences from their preparation programs, and once they begin teaching, they often lack collaborative professional learning about supporting students with disabilities. We need to do better.

TEACHERS UNDERPREPARED

Martin Green and Tina Murphy are not alone: Many teachers are underprepared to meet the needs of students with disabilities. Most have insufficient training and field experiences from their preparation programs, and once they begin teaching, they often lack collaborative professional learning about supporting students with disabilities.

This is a social justice issue. Students with disabilities make up 14% of all K-12 students, and they spend up to 80% of their time in general education classrooms (NCES, 2023). When teachers don't know how to meet their needs, students' skills remain underdeveloped and ultimately compound into larger challenges and feelings of inadequacy.

We need to do better. Schools should be consistently developing all teachers' knowledge and skills to support students with disabilities. The cornerstone of this development is a school culture that appreciates the rich contributions that students with disabilities bring to the classroom.

Additionally, schools should provide opportunities for teachers to practice and receive feedback on specific instructional moves that benefit all students, especially those who may need additional support.

School leaders often find it challenging to target professional learning about supporting students with disabilities to the entire faculty (general and special education teachers alike) due to scheduling and competing needs. But we believe that targeted and collaborative learning experiences for educators are possible within schools' current collaborative learning structures and that they can improve outcomes for all students, especially those with disabilities, in general elementary settings.

OUR RESEARCH PROJECT

To help general education teachers support elementary students with mathematics disabilities, a multidisciplinary team across teacher preparation and research communities set out to develop and test guidance and support materials. Our project, led by Julie Cohen and Nathan Jones and funded by a grant from the National Science Foundation (grant numbers 2010298 and 2009939), engaged dozens of experts from both general education and special education in collaborative work.

We determined focal teaching practices that could improve teachers' abilities to support students with disabilities in mathematics and developed curriculum in the form of an online module. The software we used allowed us to ensure that participants (preservice teachers) engaged with the content before moving on through quizzes and other interactive content.

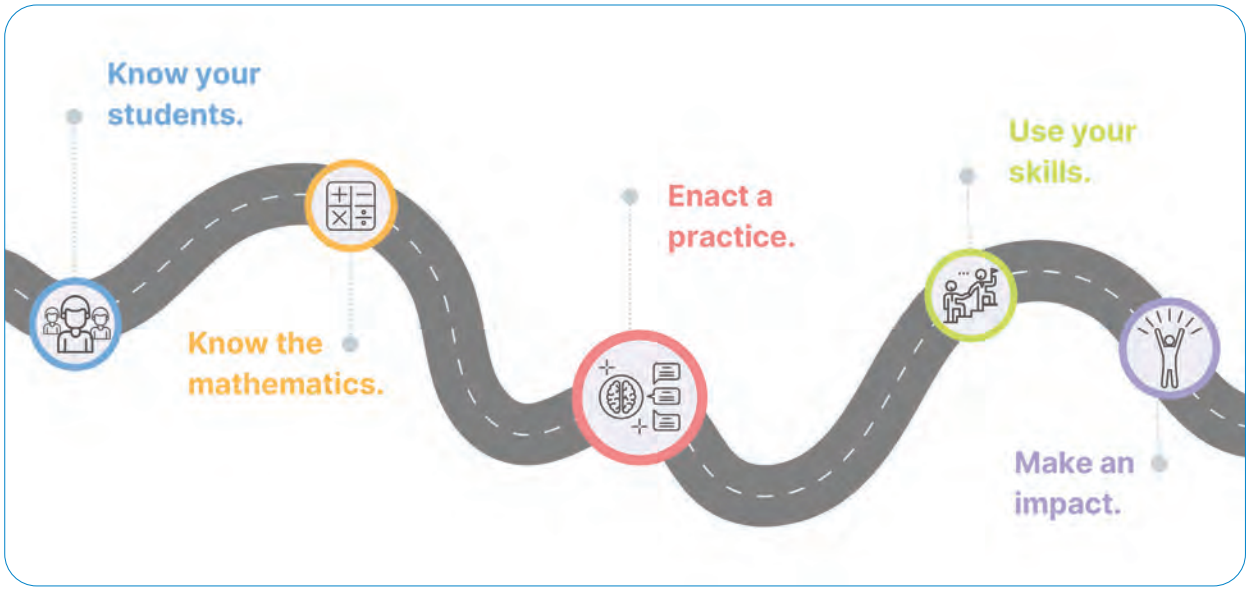
Preservice teachers also practiced these instructional moves in a simulated classroom. This structured practice allowed our team to give directed coaching to the teachers and quick feedback related to teacher clarity, teacher modeling with visuals, and scaffolding — areas that are of particular importance when working with students with disabilities.

We are still analyzing the results of the study, but we have already learned some important lessons about how professional learning can help teachers support students with disabilities in general education settings. While we focused on mathematics instruction, our project has implications across subjects.

We have identified the following key recommendations:

- Build bridges across general and special education.
- Target focal instructional practices.
- Build foundational knowledge about students and content.

SUPPORTING STUDENTS WITH MATHEMATICS DIFFICULTIES IN YOUR GENERAL ELEMENTARY CLASSROOM



This graphic illustrates an approach to guiding teachers through learning new instructional practices that will support all students, especially students with disabilities, in their instruction.

- Illustrate what the focal practice looks like.
- Build in time for practice and immediate, nonevaluative feedback.

RECOMMENDATIONS

Build bridges across general and special education.

We hypothesized that one reason for the lack of support for students with disabilities in mainstream classrooms is differing views about what high-quality instruction looks like in general and special education. If these groups are not on the same page about what should be happening in the classroom, teachers are unlikely to implement recommended practices, even when a supervisor or colleague recommends them, because those practices don't fit within their existing schema.

However, when we gathered experts from the fields of mathematics education and special education, we found there was common ground. Experts from both fields agreed on big ideas such as holding high expectations for all students and responding to individual student needs. They also agreed on content-area specifics like providing concrete models alongside instruction about abstract algorithms.

These conversations helped us develop core values and home in on a focal instructional practice for our training module. We recommend that schools use a similar process of bridge building with general education teachers and special education teachers, positioning these educators to make decisions about which practices to focus on in PLCs.

It's important to build a team that includes members of different groups, including general education teachers, special education teachers, student support staff such as speech language pathologists and social workers, school leaders, and family or community members.

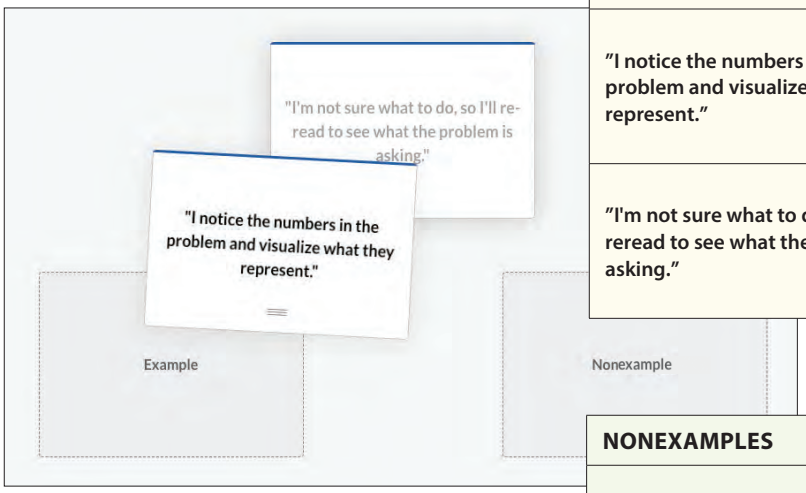
Through collaborative partnership, these parties can refine ideas and work toward consistent implementation, even if they aren't able to reach total agreement on every aspect. For example, general education teachers can anticipate potential challenges and work to brainstorm solutions before a school or districtwide rollout of practices recommended by special educators.

Target a focal instructional practice.

Based on the recommendations of our interdisciplinary team, we narrowed the focus of our professional learning module to a specific instructional practice and context: metacognitive modeling to make sense of word problems.

Metacognitive modeling is thinking aloud about thinking to make a strategy, task, or process more accessible to students. For example: "I read this problem, and now I'm asking myself, What's going on here? This will help me make a visual of what's happening in my mind."

EXAMPLES VS. NONEXAMPLES



EXAMPLES	
"I ask myself, 'What is this problem about?,' to make sure I understand it."	This is an example of metacognitive modeling beacuse there is a demonstration of **self-questioning** and an **explanation of why** the strategy is helpful.
"I notice the numbers in the problem and visualize what they represent."	This is an example of metacognitive modeling beacuse there is a demonstration of **self-talk about a cognitive strategy** to make sense of a problem.
"I'm not sure what to do, so I'll reread to see what the problem is asking."	This is an example of metacognitive modeling beacuse there is narration of a **self-regulation strategy**.

NONEXAMPLES	
"I ask myself, 'Do the key words tell me to add or to subtract?'"	This is an example of self-questioning, but the question that is asked promotes an ineffective strategy for making sense of word problems, so this is a nonexample.
"The first thing I do is always circle the numbers in the problem."	This is an example of self-talk, but the strategy that is modeled is overly procedural and does not explain the "why," so it is a nonexample.
"If you are not sure what to do, just reread the problem."	This is an example of naming a strategy students could use, not modeling it.

We selected this practice because metacognitive modeling has been shown to improve learning outcomes for students with disabilities and enhance students' mathematical reasoning and problem-solving flexibility (McLeskey et al., 2017), and because it is widely applicable to other content areas beyond math. For example, Green and Murphy could develop their instructional practice of metacognitively modeling word problems, then use this approach across content areas and instructional goals.

Narrowing the focus of professional learning to a single practice has a variety of benefits. It prompts more depth and clarity than a collection of broad goals and requires a clear specification of the target instructional practice. From the learner's perspective, more focused time per teaching practice increases the likelihood of adopting the practice. It will therefore likely result in outcomes that are easier to measure and more attainable than a broad focus and can lay the groundwork for future initiatives.

Once our team focused on metacognitive modeling, we took a variety of steps to specify this practice. We gathered related research literature, honed our definition, sought video examples from multiple settings, and had each of our team members record themselves enacting the practice so that we could iterate, clarify, and build a shared understanding of what we were working toward.

This front-end work to specify the practice before sharing it broadly is vital to presenting a clear and well-developed plan with a wider group. The table on p. 28 lists resources to support the identification of a focal instructional practice.

Build foundational knowledge about students and content.

Even when focusing on a specific instructional practice, educators need

RESOURCES TO SUPPORT THE SELECTION OF A FOCAL PRACTICE	
RESOURCE	**DESCRIPTION**
CEEDAR Center bit.ly/3sQRNFt	Resources on high-leverage practices for general and special education teachers in four categories of practice: collaboration, assessment, social/emotional/behavioral, and instruction.
CEEDAR Center bit.ly/3Peu2i3	A report on the high-leverage practices described above.
CEEDAR Center bit.ly/3PiNslU	Description of the benefits of combining high-leverage practices and evidence-based practices from special education to improve student outcomes.
Council for Exceptional Children bit.ly/45TyUQT	An outline of 22 high-leverage practices and a guide to support school leaders in developing these practices in their staff.
Institute for Education Sciences bit.ly/45NLyRv	Many guides to inform classroom practices. All guides are based on research and expert opinions.
IRIS Center bit.ly/48gmX9p	Online modules support teachers in learning about evidence-based practices and interventions to support all children, especially those with disabilities.
Project STAIR bit.ly/3PzAemm	University of Texas faculty members share strategies and resources for explicit instruction in mathematics, accessible through brief online videos.
Teaching Works bit.ly/3P8xv1K	The Teaching Works Resource Library includes online courses and resources about high-leverage practices that can be used across subject areas, grade levels and contexts to improve student learning.

critical foundational knowledge that includes knowledge about students with disabilities as well as knowledge about the mathematical content (Ball et al., 2008). This can be organized in various ways, but the key idea is to avoid focusing on an instructional practice in isolation of the information that establishes the purpose for using it and the knowledge that will allow teachers to implement it flexibly and strategically.

Although the goal of our project was to promote teacher enactment of metacognitive modeling, the interactive module we designed began by centering students with disabilities, including characteristics, strengths, and needs. Then, we moved to foundational knowledge about word problems because students encounter them repeatedly across grade levels, they pose particular challenges to students with mathematics difficulties when students' access needs are not met, and there is a significant research base regarding word problem instruction that spans both the general and special education research literature (Common Core State Standards Initiative, n.d.; Parmar et al., 1996).

Illustrate what the focal practice looks like.

After scaffolding the foundational knowledge, it is important to present clear information and illustrations of the target instructional practice. In accordance with Grossman et al.'s (2009) pedagogies of practice that provide a framework for training practitioners, we included representations of the practice in the form of a clear definition, an overview of the supporting research, and dozens of examples and nonexamples (or counterexamples), in short excerpts and longer vignettes and classroom video.

Importantly, we also provided a breakdown of what learners should notice about them. Throughout the interactive module, learners could check

their understanding in real time and access further illustrations of practice — for example, in an activity where they are asked to sort the examples from the nonexamples. Each section ended with a quiz that required participants to pass to move on.

Build in time for practice and immediate, nonevaluative feedback.

Although research shows the value of opportunities to practice instructional moves and receive feedback on them (Desimone & Pak, 2017), schools rarely provide those opportunities for teachers with a specific, structured practice in mind. In our project, we developed coaching cycles that were centered around our focal practice of metacognitive modeling. Evidence shows that written feedback has a minimal impact on a teacher, whereas live feedback from a qualified expert coach is beneficial (Kraft et al., 2018).

We used a simulation software called Mursion, along with live Zoom coaching calls. The coaches in the study were expert teachers who followed a structured feedback guide to ensure that all participants received similar feedback in an efficient order. Teachers practiced their instructional moves for seven minutes before receiving feedback from coaches on the specification of the practice, which was developed in their online modules. They also received feedback on components of teaching that are valued in the field of special education, such as teacher clarity, using visual supports, and explicit instruction. To improve their skills, teachers redid their lesson immediately after receiving feedback.

Many teacher participants told us that these sessions were the most impactful part of their learning experience and that immediately implementing the advice from the coach gave them a chance to approximate the practice more precisely.

Based on the success of this approach, we recommend that schools structure their coaching models to give feedback immediately after the observed lesson and provide follow-up for teachers to refine the practice.

We have found that teachers respond and adapt to feedback more productively when the feedback is not evaluative and provided by someone who is not their supervisor. In our project, feedback came from coaches — trained experts who used a structured protocol to provide feedback about metacognitive modeling. Coaching was not connected to a score, grade, or observation report so that teachers could try new practices without fear and embrace opportunities for growth. We recommend this kind of nonevaluative feedback and support in all school settings.

CONTINUOUS LEARNING

Improving instructional practices for students with disabilities is a continuous process, and we encourage school leaders to implement these recommendations in an ongoing way. But that doesn't mean schools should try to change everything at once.

We recommend facilitating continuous knowledge-building opportunities about one evidence-based practice at a time. With this thoughtful and structured approach, teacher growth will be sustained and support all students — especially those who need the most support.

We envision that teachers like Martin Green and Tina Murphy will make collaborative learning a habit, homing in on focal instructional practices during PLC time, applying them, reflecting together on successes and challenges, consulting with their coaches, and modeling the practices for others. The time spent will be well worth it when students with disabilities, like Jeremy, begin to see academic gains.

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