Enhancing Core Mathematics Instruction for Students At Risk for Mathematics Disabilities

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Findings from experimental intervention research support the notion of making core mathematics instruction more systematic and explicit for students with or at risk for mathematics disabilities. Core mathematics programs that utilize an explicit and systematic instructional approach provide in-depth coverage of the most critical content areas of mathematics and reflect current research on effective mathematics instruction. One such core kindergarten curriculum is the Early Learning in Mathematics *(Davis & Jungjohann, 2009) program. Recent curricular reviews suggest, however, that many core math programs fail to include the instructional design principles that have been empirically validated to increase student mathematics achievement. Teachers can follow eight specific guidelines to increase the instructional intensity of their existing curriculum and thus enhance the quality of core mathematics instruction.*

Promising outcomes are emerging from studies that target instructional approaches for students with or at risk for mathematics disabilities (MD). To date, much of this research has focused on the effects of small-group interventions (Newman-Gonchar, Clarke, & Gersten, 2009), although some recent studies have begun to investigate the impact of core math instruction on student achievement under the day-to-day conditions typically found in general education classrooms. Findings indicate that core math instruction can help prevent learning difficulties and promote critical math outcomes (Agondi & Harris, 2010; Chard et al., 2008; Clarke, Smolkowski et al., 2011).

According to the National Mathematics Advisory Panel (NMAP, 2008), core programs should play an integral part in the design and delivery of core math instruction. Math programs influence the ease and manner in which teachers deliver effective core instruction. They provide teachers with an instructional foundation when modifications are needed to increase instructional intensity for struggling learners (Baker, Fien, & Baker, 2010). On a daily basis, core programs largely define the type of math content taught and are likely to represent the main source of math instruction that students receive in a given school year (Clarke, Doabler, et al., 2011). Thus, core instruction must keep typically achieving students on track to develop math proficiency while also addressing the learning needs of students with or at risk for MD (see box, "What Does the Research Say About Math Proficiency?"). For the greatest impact, core instruction must provide in-depth coverage of the critical content of school mathematics and reflect current research on effective math instruction (National Center for Education Evaluation and Regional Assistance, NCEERA, 2009; NMAP, 2008).

Although few would argue with the idea of using high-quality math programs, research suggests that many commercially available programs are not explicit enough to meet the needs of students at risk for math failure.

TEACHING Exceptional Children, Vol. 44, No. 4, pp. 48-57.


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What Does the Research Say About Math Proficiency?

A consistent finding of research is that students with math disabilities often have difficulty developing math proficiency (Kilpatrick, Swafford, & Findell, 2001). *Math proficiency* comprises both conceptual and procedural knowledge; they are dependent upon each other in that one cannot "acquire the former without the latter" (Wu, 1999, p. 14).

Conceptual knowledge involves understanding the relationship between representations of math concepts and abstract symbols. For instance, a student with conceptual understanding of whole numbers is able to recognize that the number 5 can be represented with five blocks, five tally marks, or the written symbol of 5.

Procedural knowledge is the ability to perform math procedures fluently and effortlessly. A student with procedural knowledge can retrieve answers to basic math facts by memory. In contrast, a student who lacks procedural fluency will rely on less sophisticated strategies, such as finger counting, to solve basic math problems.

Recent curricular reviews indicate that many math programs fail to offer (a) demonstrations of target content, (b) frequent and structured student practice, and (c) procedures for academic feedback. Elementary math programs reviewed by Bryant and colleagues (2008), for example, showed lessons lacked sufficient teacher demonstrations and opportunities for student practice to build math proficiency. Similarly, Doabler, Fien, Nelson-Walker, & Baker (in press), in an investigation of second- and fourth-grade textbooks, found few opportunities for students to verbalize their mathematical thinking. Teachers, therefore, need guidelines for how to address these weaknesses of curriculum design and enhance core math instruction for students with or at risk for MD.

There are some practical guidelines that teachers can follow to make their core math instruction more explicit and systematic for students with or at risk for MD. To do so, however, teachers need to understand the construct of explicit and systematic instruction, as exemplified by such programs as *Early Learning in Mathematics* (ELM; Davis & Jungjohann, 2009). The eight guidelines we present for making core math instruction more explicit and systematic reflect the instructional design principles of ELM and the growing knowledge base of effective math instruction (Gersten et al., 2009; NMAP, 2008).

The guidelines we describe also have implications for special educators. First, because special educators regularly work with students who have experienced multiple years of failure in core program instruction, they have a vested interest in supporting general educators to prevent MD. Also, schools often rely on special educators' knowledge of evidence-based practices to design effective math instruction. This demand is increasing given the push for the delivery of evidence-based math instruction in general education classrooms (Hoover & Love, 2011). Special educators can assist schools in providing an enhanced core program to meet the needs of students struggling to reach proficiency (Baker, et al. 2010; Cummings, Atkins, Allison, & Cole, 2008).

What Is Explicit and Systematic Instruction?

Math intervention studies consistently demonstrate that students with or at risk for MD learn better in classrooms that provide explicit instruction compared to classrooms that use other types of instructional approaches (Baker, Gersten, & Lee, 2002; Gersten et al., 2009; NMAP, 2008). Gersten et al., for example, analyzed 11 studies targeting interventions for teaching students with MD. Findings indicated a large and meaningful effect ($d = 1.22$) for explicit instruction on student math achievement.

Explicit instruction is a method for teaching "essential skills in the most effective and efficient manner possible" (Carnine, Silbert, Kame'enui, & Tarver, 2004, p. 5). In a recent practice guide, the Institute of Education Sciences (IES) recommended that math interventions should provide explicit and systematic instruction when teaching struggling learners (NCEERA, 2009). The practice guide indicated that the level of empirical evidence supporting this recommendation was strong for raising mean achievement levels of at-risk learners. *Explicit and systematic instruction* incorporates (a) unambiguous teacher models, (b) carefully sequenced instructional examples, (c) instructional scaffolding, (d) timely academic feedback, and (e) cumulative review (NCEERA, 2009). Although the IES practice guide recommends these features in the context of small-group interventions, we contend that many learners would benefit if core math instruction also provided explicit and systematic instruction.

Practical Guidelines to Examine and Enhance Core Math Instruction

To make core math instruction more systematic and explicit, we suggest following eight guidelines extracted from the ELM program (Davis & Jungjohann, 2009). ELM is a comprehensive, core kindergarten mathematics curriculum specifically designed to promote students' conceptual understanding and procedural fluency in the critical content of kindergarten mathematics (see http://ctl.uoregon.edu/research/projects/elm/lesson_sampler) The ELM program consists of 120 lessons that are 45-minutes long and comprises three content areas: (a) whole number and number operations, (b) measurement, and (c) geometry. ELM incorporates research-based principles of math instruction specifically targeted to students struggling in mathematics:

- Regular use of teacher modeling and demonstrations.
- Visual representations of math ideas.

- Frequent opportunities for student practice.
- Instructional scaffolding.

We recently tested the efficacy of the ELM program (Davis & Jungjohann, 2009) in 65 general education kindergarten classrooms from three school districts in Oregon (Clarke, Smolkowski, et al., 2011). Results suggest that ELM was beneficial for all students in general and students at risk for MD in particular. Students who were typically achieving remained on track (i.e., made expected gains across the year) and at-risk students in ELM classrooms reduced the achievement gap with their typically achieving peers. Based on these encouraging results and the fact that ELM is anchored in the converging knowledge base of effective math instruction, we contend the guidelines presented in this article will serve as useful tools for teaching students struggling with mathematics.

Guideline 1: Prioritize Instruction Around Critical Content

Because instruction should target the most essential information pertaining to a domain (Carnine, et al., 2004), teachers need ways to determine the critical concepts and skills that students must master in a given school year. This is especially true for teachers in the United States who use textbooks that have been criticized for covering too many topics (Kilpatrick, Swafford, & Findell, 2001; NMAP, 2008). By prioritizing instruction around critical content, teachers can focus more instructional time on the concepts and skills that promote a sound base for more advanced understanding. For example, if students develop a fundamental understanding of whole numbers, that knowledge is likely to transfer to and lay the foundation for working with rational numbers (Wu, 2009). To identify "what" to teach, teachers should consult the content standards recognized by their respective state educational agency and national bodies (i.e., Common Core State Standards Initiative, 2010; National Council of Teachers of Mathematics, 2006). Such standards in the primary grades tend to target number sense and particular aspects of measurement and geometry.

In kindergarten, a primary focus of mathematics instruction should be on developing early number sense (Kilpatrick et al., 2001). Students who possess a sense of number can, for example, make numerical magnitude comparisons (e.g., 5 is 2 more than 3), count using efficient strategies (e.g., counting on instead of always beginning with 1), and compose (i.e., combine numbers to form larger numbers), and decompose (i.e., break down larger numbers into smaller numbers) numbers. Many children acquire a sense of number through informal learning experiences prior to entering kindergarten. However, a considerable number of children receive insufficient exposure to such informal learning experiences, or otherwise fail to learn from these experiences, and consequently enter school with a poor understanding of number sense (NMAP, 2008).

Additional content areas of kindergarten mathematics are geometry and measurement. The *Common Core Standards for Mathematics* (Common Core State Standards Initiative, 2010) recommend that kindergarten children use direct measurement, represent and interpret data, and understand shapes and spatial reasoning. Geometric and spatial thinking allow children to represent figures and better understand their spatial environment. Children also use measurement when they compare and describe the attributes of geometric shapes, money, and everyday objects. Comprehensive math instruction around geometry and measurement can improve the outcomes of children at risk for math failure (Sarama, Clements, Starkey, Klein, & Wakeley, 2008).

By prioritizing instruction around critical content, teachers can focus more instructional time on the concepts and skills that promote a sound base for more advanced understanding.

Guideline 2: Preteach Requisite Skills to Ensure Success With New Material

Students with or at risk for MD often have difficulty connecting new content with what they already have learned. Teachers should bear in mind the background knowledge that students bring to the classroom and explicitly address the prerequisite skills necessary for learning more difficult content. Teachers can use simple warm-up activities to help jumpstart students' background knowledge. These activities will allow students to make the connection between previously learned content and new material. For example, a teacher might use a counting activity (count by fives to 60) to prepare students for telling time in 5-minute increments.

Guideline 3: Carefully Select and Sequence Instructional Examples

The selection and use of instructional examples plays a major role in teaching students with or at risk for MD. Chard and Jungjohann (2006) noted that students are more likely to become confused when initial teaching examples are complex. "Real-world" problems often pose difficulty for struggling learners because these problem types typically combine different math concepts and require multiple steps to complete (NMAP, 2008). Teachers can promote success with new math content by using simpler examples at the start of instruction and increasing the difficulty of teaching examples as students gain a general understanding of the concept. It is also important to include several positive teaching examples and be selective with negative or nonexamples (Coyne, Kame'enui, & Carnine, 2007). For example, when teaching students to identify basic three-dimensional shapes, use three-dimensional shapes of varying color and size to provide a range of positive examples. For each three-dimensional shape (e.g., cone), show its two-dimensional counterpart (e.g., triangle) to help students learn how to differentiate between shape types.

Guideline 4: Scaffold Instruction to Promote Learner Independence

Instructional scaffolding is support that teachers provide to facilitate students' development of math proficiency. As students become more independent in their learning, the scaffolding is gradually withdrawn. Instructional scaffolding is essential for teaching students with or at risk for MD. Teachers can use the "I do it. We do it. You do it." approach (Archer & Hughes, 2010) to scaffold math instruction when introducing struggling learners to new and difficult content. In the "I do it" phase, the teacher explicitly models the lesson's target content (e.g., solving word problems). How long a teacher works in the "I do it" phase depends on how quickly students grasp the material. One or two instructional examples might suffice if the material is relatively easy for the majority of students, but multiple demonstrations are more appropriate if the content is more difficult and students require more support. For the "We do it" phase, the teacher guides the students in practice opportunities (e.g., solving word problems together). In the "You do it" phase, students engage in independent practice opportunities (e.g., students completing word problems on their own).

Guideline 5: Model and Demonstrate Instructional Tasks That Students Will Learn

Instruction becomes more explicit when teachers model what they want students to learn. Teacher modeling consists of unambiguous explanations and clear demonstrations. Models can take various forms, including stating simple facts (e.g., "This is a 6."), defining math vocabulary (e.g., "A fraction is a point on the number line."), thinking aloud about math procedures (e.g., "I solved this problem by adding the numbers in the ones column first."), or demonstrating a math skill (e.g., showing how to align two numbers according to their place-value positions). Archer and Hughes (2010) suggested three ways to improve the quality of teacher models:

1. *Use clear and concise language*; this helps clarify the target skill or concept.
2. *Provide several models*—but not so many so that instruction gets bogged down with a lot of teacher talk.
3. *Allow students to actively participate* in the models, such as answering questions.

Figure 1 presents an activity from the ELM program (Davis & Jungjohann, 2009) that incorporates Archer and Hughes's (2010) recommendations. In the example, students learn how to add 1 to a number. Instruction begins with five students standing in front of the class. As students are "added" to the line (up to 10), the teacher explicitly states how adding 1 is the same as saying the next number on the number line.

Guideline 6: Provide Frequent and Meaningful Practice and Review Opportunities

To help students develop math proficiency, it is imperative that teachers provide effective practice opportunities, including both guided and independent practice (Archer & Hughes, 2010; Hudson & Miller, 2006). The purpose of *guided practice* is to help support initial learning of math concepts. For example, a teacher might guide a rational count activity by helping an entire class or individual students count out 12 pennies. *Independent practice*, on the other hand, occurs without teacher assistance and helps students increase automaticity of new and previously learned content. For independent practice, students might complete computerized practice on their own to build fluency with basic math facts. Such practice opportunities should be used to (a) engage students in mathematical discourse and (b) review previously learned material.

Engaging Students in Mathematical Discourse. There is substantial variability among students entering school in the number of opportunities they have to use mathematical language outside of school (NMAP, 2008). Therefore, teachers should provide frequent opportunities for students to verbalize their mathematical thinking. Teachers can effectively promote math discourse by having students answer questions that directly relate to the target content. These questions, which can be posed to specific individuals or the group at large, might require one-word answers (e.g., "Ruby, what shape is this?") or more detailed explanations (e.g., "Camille, please explain how you measured the perimeter of the classroom."). An efficient way to organize questions posed to the group at large is to use some type of response signal. Response signals allow all students in a group to answer together. For example, a teacher might use a snap of the fingers, a tap on the board, or a verbal cue ("get ready") to indicate when students should respond. This allows teachers to control the pace of instruction and provide appropriate "think time" for those students who need additional time to answer.

Reviewing Previously Learned Material. Finally, to maintain new and previously learned material, students must be given cumulative review opportunities (Kilpatrick et al., 2001). Cumulative review helps verify whether students understand the material. Teachers can incorporate review opportunities through paper-pencil activities (i.e., worksheets) and end-of-lesson discussions. Review activities should include opportunities for stu-

The purpose of guided practice is to help support initial learning of math concepts.

Figure 1. Example Activity: Adding 1 to a Number

Teacher wording

- Say, **"Today we are going to learn how to add 1 to a number."**

- Ask 5 children to stand up in the front of the class.
- **"Everybody, how many children are standing in the front of the room?"** ("Five.") **"Yes, there are 5 children."**
- **"Let's look at the number line as we *add* or *plus* 1. We'll start with 5 because that's how many children we have."**
- Touch the numeral 5 on a number line or the hundreds chart. **"What numeral?"** ("Five.") **"Yes, five."**
- **"Each time we *add* 1 child, I'll move to the next numeral. Remember, when we *add* or *plus* 1, it's just the same as counting by ones."**
- **"Now, we're going to *add* or *plus* 1 more."** Quickly, ask another child to stand in front of the room.

  - **"Since we *added* 1 more child, I'll touch the next numeral on the number line."** Touch the next numeral on the number line. **"Everybody, what numeral?"** ("Six.") **"Yes, six."**
  - **"There are 6 children standing in the front. We're going to *add* or *plus* 1 more."** Quickly, ask another child to stand up.
- **"Since we *added* 1 more child, I'll touch the next numeral on the number line."** Touch the next numeral on the number line. **"Everybody, what numeral?"** ("Seven.")
- Repeat the preceding 2 steps until there are 10 children standing up. **"We *added* 1 with children and on the number line."**

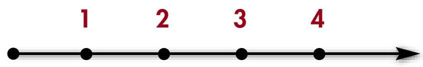
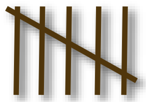
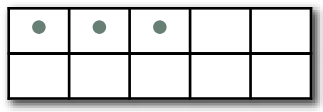
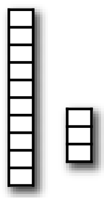
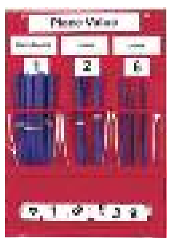
Note. Reprinted with permission from *Early Learning in Mathematics* by K. Davis and K. Jungjohann, Lesson 81, pp. 1–2. Copyright 2009 by the Center on Teaching and Learning.

dents to discriminate when and when not to apply newly learned skills (Stein, Silbert, & Carnine, 2006). For example, after having learned how to solve multidigit addition problems with regrouping (carrying ones to tens), students might complete problems that do and do not require regrouping; this will help students recognize that regrouping is only necessary for particular multidigit addition problems.

Guideline 7: Use Visual Representations of Math Ideas

Students struggling with mathematics often have difficulty grasping the relationship between math representations and abstract symbols (NCEERA, 2009). Visual models allow students to understand this important relationship across math concepts and ideas. A recent meta-analysis of math interventions has empirically supported the use of visual models by teachers and students (Gersten et al., 2009). In kindergarten, visual models typically involve number lines, hundreds charts, base-10 blocks, and ten-frames. Teachers also use rulers and two- and three-dimensional shapes. Figure 2 shows how visual models are utilized within the ELM program to build proficiency in whole numbers. An effective way to incorporate math models in instruction is by

Figure 2. Using Visual Representations of Math Ideas

Visual representations	How are they used in ELM?
Number line 	The number line is introduced when students begin working with the number 1. Numbers are added to the number line after their introduction.
 Finger models  Tally marks  Ten frames	Finger models, tally marks, and ten frames serve as concrete and pictorial representations of number. Students are introduced to these models as they begin to work with numbers 0–10.
Base-10 blocks 	Base-10 blocks allow students to develop a conceptual understanding of place value. Instruction utilizes these models when introducing numbers greater than 10.
 Place value chart  Hundreds chart	The place value chart is used to count the number of school days, starting with the first day. Every ten days, students regroup 10 ones (straws) for 1 ten (a bundle of straws). The hundreds chart provides a reference for counting, number identification, and quantity discrimination.

Note. ELM = *Early Learning in Mathematics* (Davis & Jungjohann, 2009). Graphics reprinted with permission from *Early Learning in Mathematics* by K. Davis and K. Jungjohann. Copyright 2009 by the Center on Teaching and Learning.

using a concrete-representational-abstract (CRA) approach (Hudson & Miller, 2006). As part of the CRA approach, a teacher might begin instruction with concrete examples (e.g., counting blocks) and then interweave pictorial representations (e.g., tally marks) and abstract symbols (e.g., numbers) as students grasp conceptual understanding.

Guideline 8: Deliver Timely Academic Feedback, Both Corrective and Confirmatory

Academic feedback is a teacher's verbal reply or physical demonstration to a student response. It can take the form of an error correction or a response affirmation. Correcting student errors is an important aspect of math instruction because unattended errors are likely to lead to later misconceptions (Hudson & Miller, 2006; Stein et al., 2006). An effective and timely way to correct an error is to state the correct answer and then restate the question to the student. For example, a teacher might say, "This is a hexagon. What shape is this?" If the student continues to demonstrate difficulty with the question, the teacher might have the student say the shape's name in unison ("Owen, say it with me. This is a hexagon."). Response affirmations are delivered after a student provides a correct response. By simply repeating the student's answer (e.g., "Yes, this number is 16"), teachers can use this type of feedback to extend student learning.

Using the Guidelines in Practice

Figure 3, which presents a kindergarten lesson introducing teen numbers, illustrates how teachers can use these guidelines to enhance core math instruction.

The lesson's primary instructional objective is for students to understand that teen numbers (i.e., 11–19), in particular irregular teens, are composed of one 10 and some more ones. Secondary objectives include: (a) identifying teen numbers and (b) counting on

Figure 3. Enhancing Mathematics Instruction

Everyone, let's review some numbers.
(Show the number card for 18.)
When I tap the card, tell me the name of this number. Ready, what number?
(Tap card.)
Yes, 18. Eighteen is 10 and eight more. Eighteen is 10 and how many more?
(Wait for response.)
Yes: eight more.
(Repeat with the numbers 14, 5, 11, 8, and 19. Provide a few individual turns. Confirm all responses.)

Today, we're going to learn a new teen number.
(Show the number card for 13.)
This number is 13. What number?
(Tap card.)
Yes, 13. This is how to write 13.
(Write on board.)
Thirteen is a tricky number. It ends with "teen" but does not begin with "three." Listen, THIR-teen. Say it with me.
(Wait for response.)
Yes: 13.
(Ask a few individuals to identify 13. For incorrect responses say, "This is 13. What number?")

Thirteen is 10 and three more. Thirteen is 10 and how many more?
(Wait for response.)
Yes: three. Watch as I use the cubes and ten-sticks to "make" 13. A ten stick is made up of 10 cubes. Count with me to make sure the ten-stick has 10.
(Count in unison.)
So 10 cubes and 1 ten-stick are equal or the same. How many cubes make up a ten stick?
(Wait for response.)
Yes: 10.

To make 13, I need one ten-stick and three cubes.
(Count out 3 cubes.)
Now I'm going to **count on** from 10 to 13.
(Point to ten-stick and touch each cube when counting.)
Listen. **10,** 11, 12, 13. Count with me.
TEN, 11, 12, 13. Your turn! Count on from 10 to 13.
(Provide individual turns. Confirm all responses.)

(Hand out a set of base-10 models to each student. Tell the class that they will use the base-10 models to "make" up different numbers. Provide a rationale for why it is useful to work with base-10 models; that is, base-10 models allow students to compose teen numbers into one ten and some more ones. Have number cards for 3, 7, 11, 12, 13, 14, 16, and 18. Show each card and have students identify. Then, have students "make" numbers and count the base-10 models to confirm. For numbers greater than 10, have students "count on" from 10.)

Now it's your turn to use the base-10 models.
(Show the number card for 16.)
What number?
(Tap card.)
Yes, 16. Sixteen is 10 and six more. Sixteen is 10 and how many more?
(Wait for response.)
Yes: six. To make 16, we need one ten-stick and six cubes. Use your base-10 models to make 16.
(Monitor student responses.)
Let's make sure we have 16 by counting on from 10. TEN, 11, 12, 13, 14, 15, 16. Your turn! Count on from 10 to 16.
(Provide individual turns. Confirm all responses.)

(After students have represented each number, arrange number cards in random order and have students identify in unison; tap each card so that students say the answers together. At the lesson's conclusion, remind students that teen numbers are made up of one ten and some more ones. This will help students reflect on the base-10 system.)

from the number ten. The irregular teens, which are 11, 12, 13, and 15, often pose difficulties because of their unique pronunciations (e.g., 13 is pronounced thirteen instead of *three*teen). Regular teens (i.e., 14, 16, 17, 18, and 19) are less challenging because they are pronounced by first stating the number in the ones position and then "teen" (e.g., *six*teen). Given the distinctive qualities of teen numbers, Stein et al. (2006) recommend that teachers introduce regular teens before irregular teens.

Note that the sample lesson incorporates teacher modeling ("I do it"), instructional scaffolding, and structured practice opportunities. It also includes frequent opportunities for students to respond (i.e., one for each number) as well as occasions for group responses. Enhancements such as these, based on our guidelines and the existing literature on effective mathematics instruction, require modest effort to implement and are likely to promote more promising outcomes. For example, to help students develop a firm understanding of teen numbers and the base-10 system, the lesson prioritizes instruction around one irregular teen number: 13. Assuming that students have already mastered the regular teens as well as numbers 11 and 12, the teacher will separately introduce the remaining teen number, 15, in a later lesson. A general strategy for introducing new teen numbers is about once every two or three lessons; this helps promote content mastery and minimize student confusion (Hudson & Miller, 2006).

In the sample lesson, the teacher initiates instruction with a brief review of previously learned material and then provides an overview of the lesson's target content. Clear expectations at the start of instruction help students understand what is required of them. Then the teacher overtly models how to pronounce, write, and represent the target number. As demonstrated in this example, teachers can strengthen students' conceptual understanding by linking the abstract (i.e., number cards) and visual representations (i.e., base-10 models) of numbers (NCEERA, 2009). The lesson presented in Figure 3 demonstrates how to support initial learning of new concepts (e.g., teen numbers) by leading off with a simpler instructional example. Because the possibility of student confusion increases when instruction starts with complex problems (Chard & Jungjohann, 2006), more effective instruction begins with easier examples to introduce concepts and teaches generalizable strategies—such as the "count on" strategy used in the sample lesson. This lesson plan also shows how teachers can extend student learning through timely academic feedback and incorporate signal response techniques (e.g., clapping when counting or tapping the number card) to manage responses from the entire class.

Final Thoughts

Many students experience persistent difficulties in mathematics, and the challenges that these students face are great. Only through concentrated efforts can schools hope to meet the majority of their students' learning needs, including both those students on-track for success and those struggling to learn the basics of early mathematics. Core mathematics instruction should sufficiently cover the most critical math content and adhere to the principles of instruction that are effective for teaching students struggling with math. Effective, evidence-based core math programs such as ELM

(Davis & Jungjohann, 2009) facilitate such systematic and explicit instruction. Teachers who do not have access to such programs can enhance and improve their math instruction by following the eight guidelines presented here.

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The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grants R305K040081 and R305A080114. The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.

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TEACHING Exceptional Children, *Vol. 44, No. 4, pp. 48–57.*