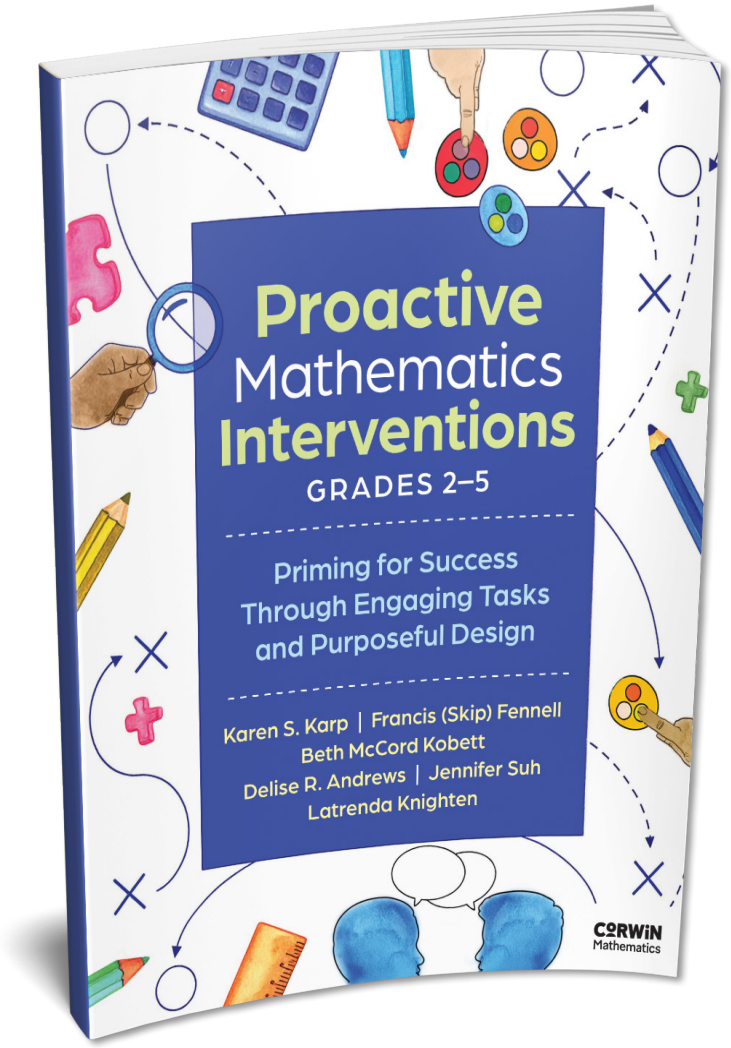


Thankyou

FOR YOUR
INTEREST IN
CORWIN

Please enjoy this complimentary excerpt from Proactive Mathematics Interventions, Grades 2-5.

LEARN MORE about this title!

CORWIN

What Are Some Key Elements of the Intervention Instruction?

We will examine more deeply the importance of key elements to intervention-focused mathematics instruction such as instruction that regularly engages students in learning via multiple representations, collaboration across teams, and our preemptive and proactive approach—Priming.

Employing Multiple Representations

As mentioned, the CSA (concrete, semiconcrete, abstract) approach in various forms has been an important instructional consideration in mathematics education for many years (Fuchs et al., 2021; Heddens, 1964; Heddens & Speer, 2009).

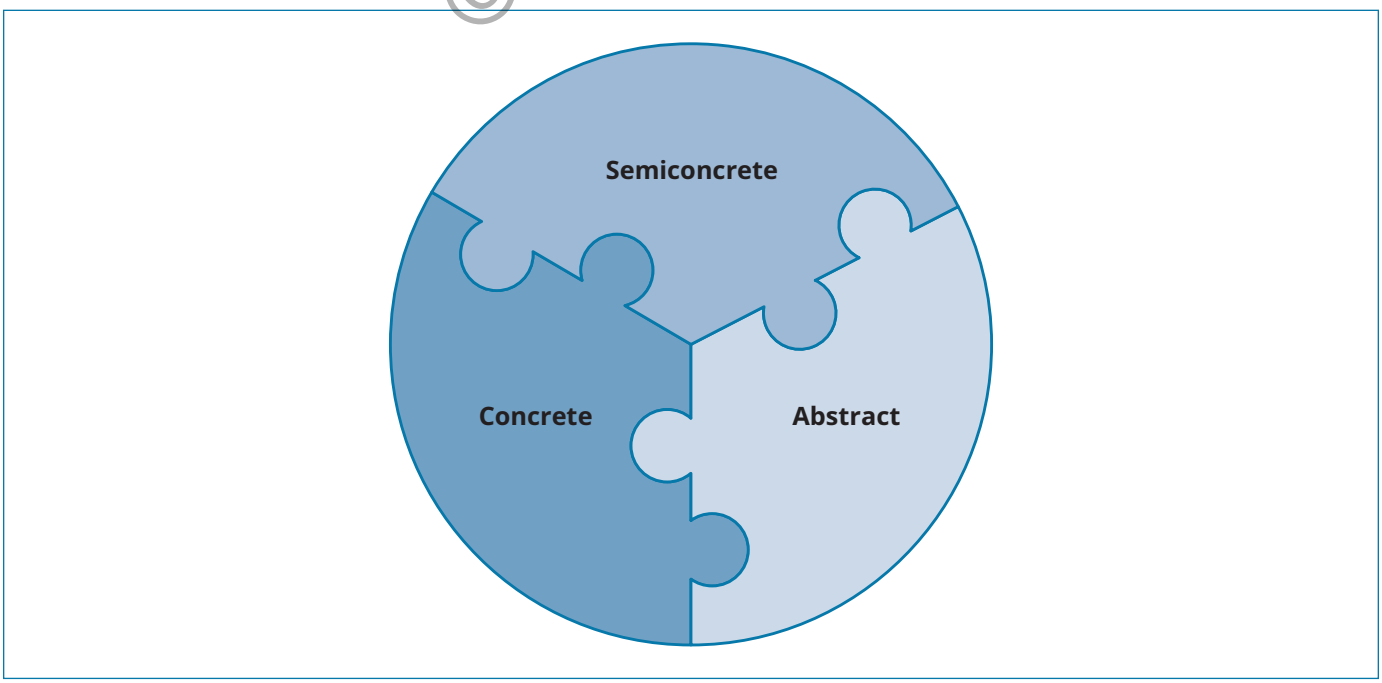
Based on Bruner's (1966) theory of enactive, iconic, and symbolic reasoning, this model reflects simultaneous and fluent movement between an instructional focus on concrete representations/models (manipulative materials), semiconcrete (using drawings, math sketches, and graphs), and abstract (incorporating symbols, numerals, equations, mentally solving problems, or using stories with mathematical ideas). The need for multiple representations does not cease as students age (Bismark & Prosser, 2024; Kestel & Forganz, 2024; Thomas et al., 2024). The use of models and visuals must not fade away.

Importantly, this approach should not be rigid, where one only moves to abstraction after the long-term experiences with the other phases. Instead, there should be intertwined and parallel modeling of number symbols throughout this use of multiple interpretations of the situations. In this way, students can directly relate the concrete models and visual representations to the corresponding numerals and equations (Figure 1.1; Van de Walle et al., 2023). Modeling the mental conversations about reasoning and sense-making in a teacher's mind may help students articulate their thinking through what is known as a "think-aloud" (Evans et al., 2024).

CSA stands for the concrete, semiconcrete, abstract approach that presents these models to show the concept from a connected set of representations. The integrated model suggests using various representations in the same time frame to highlight the linkages between them.

A **think-aloud** is where the teacher gives an account of the thinking going on in their head by saying it out loud to the students. The idea is that hearing another's mental actions can support a learner's thinking process.

Figure 1.1 Interwoven CSA - Concrete-Semiconcrete-Abstract Model



CSA often centers on combining manipulative materials, math sketches, and symbolic representations on the same concept. CSA aims to develop a concept and equip students with thinking strategies and skills needed for more independent learning. The model initially emphasizes conceptual understanding on a continuum to procedural knowledge (Skemp, 1978). In this way, it honors that both are critical components to students' mathematics proficiency (Findell et al., 2001).

This model should be aligned across the general education classroom in Tier 1 and the interventions in the Tier 2 or Tier 3 stages of RtI. Aligning instructional interventions with the CSA approach in general education classrooms provides continuity. No matter what CSA may be called (e.g., CRA—concrete-representational-abstract, CPA—concrete-pictorial-abstract), results of studies indicate that interventions and whole-class mathematics lessons regularly using the CSA instructional representations are successful with children with disabilities (Jitendra et al., 2023).

Another way to build connections between representations of mathematical ideas is by using children's storybooks. Recommended children's literature is included in the tasks found in Part 2 of the book, and there is an overall bibliography in Appendix A on the companion website. When woven into instruction, children's literature has been shown to positively affect achievement, attitudes toward mathematics, and the ability to make connections between representations (Zhang et al., 2022). These opportunities can help students consolidate their previous knowledge. They can use that foundation to develop new ideas (which are precisely aligned with the direction of our intervention approach). Reading part or all of a children's literature book together creates a shared context from which all students can draw. So reading facilitates the opportunity for interactive learning.

In addition, these stories and literature provide examples and realistic situations of how mathematics is a human endeavor. Such connections are important to honor. They connect with the students' lived experiences, thus rehumanizing mathematics (Zavala & Aguirre, 2024) and bringing a personal relationship to the learning process. Some may think that time is a barrier to this integration, but all the books do not need to be read cover to cover.

An example is using sticky notes as a guide. You can share excerpts containing the main points and the key storylines, including mathematical situations or wisdom. That way, you can still spend time on the mathematics discussion, and students will be motivated to read the entire book at another time.

Collaborating Across the Team

When the special education teacher thinks the general education teacher is responsible for teaching the mathematics content and the general education teacher thinks the special education teacher is responsible, students with disabilities sometimes become invisible. Then, who is responsible for mathematics instruction? Yes, it's both of you (Blanton et al., 2018; Karp, 2013); this must be a partnership. Collaboration is critical, and planning and implementing should be a reciprocal activity.

We know from research that the results are powerful when teachers consciously enter a professional learning opportunity, whether within a formal professional learning community (PLC), a partner PLC, a small group, or a self-selected thought partner. "Communal support structures" (Pilotti et al., 2023, p. 15) build shared leadership and collective learning. They lay the groundwork for personal growth. What may begin as a group of individuals who have "siloed practices" can eventually move to "joint responses" and a shared vision—characteristics of a team (Pilotti et al., 2023, p. 14).

We suggest beginning with the interventionist or special education teacher and the general education teacher regularly co-planning at least 4 weeks ahead of instruction planned for the general education classroom. Everything revolves around the instructional planning to prepare for the upcoming mathematics content by refreshing students' prior knowledge or constructing needed foundational knowledge. The general education teacher partners in this work by using the opening move of the new lessons based on the interventions that just occurred. They will ask questions extending the precise prior knowledge selected and practiced during the intervention (i.e., Liljedahl, 2020). We suggest the following aspects to agree on:

- consistently co-planning and co-teaching the mathematics content, with teachers co-owning and co-orchestrating the content delivery

- capitalizing on the strengths of general education teachers, special education teachers, interventionists, and math coaches, compounding the power of jointly made contributions
- working together to avoid repetitive IEP goals (i.e., needs to learn multiplication facts) that travel from year to year. Did you know the U.S. Supreme Court ruled that it is against the law to repeat an IEP goal from year to year (*U.S. Supreme Court Endrew F. et al. vs. Douglas County Colorado School District RE-1*, 2017)? That's not making adequate progress, as mandated by legislation. Think about it! How many students have IEPs that are not aligned with the law?
- avoiding IEP goals that emphasize low expectations by focusing on narrowly defined arithmetic skills, instead focusing on conceptual understanding and the Mathematical Practices
- agreeing as a team to practice "never say anything a kid can say" (Reinhart, 2000, p. 20), instead vowing to ask questions to prompt thinking. This includes when a child is working on a strategy that the teacher won't interrupt, erase what they've done, work the manipulative materials for them, or move the materials, using brief questions that are closed rather than open (Jacobs et al., 2014). We also know that "teaching as telling" does not reach an outcome of long-term learning (Lobado et al., 2005).
- addressing the role of administrators, coaches, and supervisors—what should they look for in this new collaborative arrangement? Do they know that CSA and "*doing* math" are the focus? How can they be supportive in providing time and resources to these teams?
- Aligning paraprofessionals with the intervention may require providing them with experiences related to learning more mathematics content and pedagogy background to deliver instruction.

Using a Preemptive and Proactive Approach

We repeat this here because it is essential to the success of our instructional model. We also believe this paradigm shift can "switch the script" and "change the narrative" for many students who may feel that they are not a "math person."

Rather than consistently using interventions to work backward as a reaction to a student's failure, we suggest working ahead in a proactive mode.

We call this a Rewind as we flip an old intervention model on its head. This Rewind may require a do-over of some things that have been practiced for several decades. This sequence aligns with our suggested strengths-spotting approach (see Chapter 2), in which strengths are identified and intentionally developed (Kobett & Karp, 2020). What students know and can do—their strengths—become the starting point for the intervention provided.

Again, interventions provide a preventative point where students get Primed for what is coming mathematically with a carefully choreographed set of preparatory sessions. So interventions are reoriented away from a reaction to classroom performance where the student isn't showing grade-level growth on a standard. This standard may be set as a way of working ahead of time to anticipate and then provide the perfect groundwork for upcoming lessons. This preemptive approach anticipates the needed foundational understanding of the mathematics topic using the strength-based learning trajectory-based instructional approach (Suh et al., 2022). The approach proactively provides the language, representations, and actions so that they become familiar and known to the student (Bahr et al., 2023). Interventions are reoriented from a reaction to classroom performance where the student isn't showing grade-level growth on a standard to a way of working ahead of time to anticipate and then provide the perfect underpinnings for upcoming lessons.

Delivering a solid background early on generates student confidence. It builds competence in students' mathematical ability so that students can feel and experience the agency to say, "I am a math person." In a study that interviewed secondary students with disabilities, rather than receiving sessions of reteaching content they were learning, they preferred a model of teachers presenting what they had as unfinished learning in advance

Rather than consistently using interventions to work backward as a reaction to a student's failure, we suggest working ahead in a proactive mode.

Interventions are reoriented from a reaction to classroom performance where the student isn't showing grade-level growth on a standard to a way of working ahead of time to anticipate and then provide the perfect underpinnings for upcoming lessons.

of the new content (Munk et al., 2010). Students said this approach built their self-confidence and made them feel they could participate actively in class. These are important reflections to consider.

Preloading material during intervention sessions is a teaching turnaround that aligns with a strengths-based instructional theme. Through this proactive approach, students gain knowledge and can contribute to their grade-level mathematics lessons. By now, they will already be equipped with the background knowledge that ensures success in connecting to the mathematics. Let's look at the planning model in Figure 1.2.

By capitalizing on what the teacher knows is coming up instructionally, students' best qualities as learners are fueled by prior knowledge. That "on-ramp position" leads to greater success than prior approaches that chase perceived deficits or weaknesses. Applying strengths-based approaches early on opens the chance for familiarity with the materials and, ultimately, higher performance. We will discuss more strengths-based approaches in Chapter 2. We will go deeper into the planning model in Chapter 4.

Figure 1.2 Planning Model: General Education and Special Education Teacher Teams