DOINGWHATWORKS

Presentation

FULL DETAILS AND TRANSCRIPT

The Instructional Process in Interventions

December 2009

Topic: Response to Intervention in Elementary-Middle Math
Practice: Intentional Teaching

Highlights

- Characteristics of explicit teaching:
  - demonstration and modeling with thinkalouds that share the reasoning behind each step in problem solving
  - extensive practice with teacher scaffolding and sharing of reasoning with peers, to move toward independent practice
  - corrective feedback with reteaching and frequent and cumulative review
- Types of visual representations, including utility of number lines
- Transitioning from concrete to visual representations to abstract problems

Full Transcript

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Welcome to the overview on The Instructional Process in Interventions.

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Response to Intervention, or RtI, is a system of timely detection and prevention to support students who are potentially at risk. In RtI, services are organized as tiers, with Tier 1 representing high-quality core instruction for all students.

Tier 2 supplements the Tier 1 core with small-group instruction for students who need more help with foundational skills.

Tier 3 usually entails one-on-one tutoring on a few targeted skills for students who have not progressed after a reasonable amount of time in Tier 2 interventions and require more intensive assistance.

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Students who are placed in Tier 2 and Tier 3 mathematics interventions need explicit and systematic instruction to build proficiency in foundational mathematics skills.

Such instruction includes:

- providing models and demonstrations of problem solving,

- verbalizing thought processes through thinkalouds,

- guided and scaffolded practice,

- corrective and specific feedback, and

- frequent cumulative review.

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There is strong research evidence that this kind of instruction improves students' proficiency at working with operations and word problems. This is true for students of all skill and grade levels.

Let's explore the characteristics of explicit and systematic instruction in more depth.

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Systematic instruction means that teachers introduce mathematics concepts gradually and in a logical order. Students are given many opportunities to apply new math concepts in a wide variety of contexts.

Explicitness means giving clear explanations of concepts and using step-by-step modeling to show how to solve problems and perform operations. Teachers should discuss the reasoning behind each step as it is demonstrated.

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Sharing the reasoning behind using particular strategies when solving problems is referred to as a thinkaloud. Schools should look for intervention curriculum materials that include sample scenarios or dialogues that teachers can use as thinkalouds when explaining math concepts.

It is important to select instructional materials that include many examples of both easy and difficult problems so that students will have adequate practice.

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Students in Tiers 2 and 3 usually need more extensive practice in solving problems, beginning with guided and scaffolded practice. Teachers and students begin by solving problems *together*.

As students begin to master skills, they carry out more and more of the problem solving on their own.

Students are moved to independent problem solving only when they demonstrate little need for support and are likely to experience success on their own.

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During practice, students should be encouraged to talk out loud to both their peers and the teacher about their choices of strategies, reasoning behind problem-solving steps, and solutions.

When students talk about their reasoning, teachers are able to provide helpful corrective feedback. This feedback often involves reteaching and additional guided practice and should provide *specific* information about what students did accurately and what errors they may need to correct.

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Finally, explicit instruction includes frequent and cumulative review sessions to ensure that students retain

knowledge and skills. Cumulative review helps students make connections across the mathematics topics they are studying.

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Students in Tiers 2 and 3 often struggle with the meaning of abstract mathematics symbols and the relationships between symbols and concepts. These students can benefit by learning to create their own visual representations as part of problem solving, while teachers can use concrete materials and visual representations such as number lines, arrays, strip diagrams, graphs, and simple drawings to make mathematics concepts and relationships explicit.

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Number lines are especially powerful visual representations and can be used with younger students to demonstrate counting strategies, teach principles of addition and subtraction, and show and compare magnitude.

Older students can use both open and double number lines to perform operations with rational numbers.

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For students to get the most benefit from visual and concrete representations, they need systematic and consistent exposure to examples. Many intervention materials lack adequate examples of this type, so teachers may need to create their own.

While concrete objects and manipulatives are especially useful at the initial stages of concept development, they should not be overemphasized as the goal is to eventually help students move beyond such tools.

Teachers should scaffold students toward the abstract level, using manipulatives only as long as necessary. As students move away from concrete objects and visual representations and toward using abstract symbols, it is important that the language and sequence of problem-solving steps remains consistent.

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