Implementing RTI in Mathematics

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About this Talk

Join our experts **Amanda VanDerHeyden** and **David Allsopp** as they discuss "How can RTI play a role in helping students who are struggling in mathematics succeed?" while answering your questions about "Implementing RTI in Mathematics."

Transcript

Seymour S. Burack

What specific diagnostic tests would you suggest to determine a true Math disability such as Dyscalculia, and how would the condition be treated.

David Allsopp

There has been quite a lot of discussion about what math learning disabilities are, how they are similar and dissimilar to other learning disabilities such as ones that affect reading, and how to assess their occurrence. Traditionally, a discrepancy model has been used to determine learning disabilities in mathematics as well as other areas of learning. This typically involves looking for a significant difference between a student's IQ score and one or more scores on subtests of a mathematics achievement battery. Additionally, some have also examined significant discrepancies among achievement and cognitive processing batteries; that is, looking for any obvious inconsistencies among particular areas of mathematical abilities (calculation, application) and cognitive processing (e.g., visual, auditory, motor, processing speed, etc.). The validity of this approach has been called into question in recent years. Some researchers suggest that students with math learning disabilities have common areas of difficulty including difficulty with numeracy/number sense , slow processing speed, and difficulty with working memory. Recently, RTI has been suggested as a possible alternative to identifying mathematics learning disabilities. Fuchs, Compton, Fuchs, Paulsen, Bryant, & Hamlett (2005) suggest its use as a process for identifying mathematics disabilities at the end of the 1st grade year. They found that the best predictors for identification were 1) low performance on end of the year mathematics achievement tests that assesses 1st grade concept application and computation; and 2) poor rate of growth across the year using curriculum-based measurement (CBM). Another resource that may be helpful is a document provided by the Center on Instruction titled Screening For Mathematics Difficulties in Grades K-3 (Gersten, Clark, & Jordan, 2007) The document can be downloaded at www.centeroninstruction.org. It is important to understand that the term "math disabilities" does not refer to one type of difficulty. Mathematics learning disabilities are multifaceted and can be the result of a variety of problematic areas of learning. In addition to those areas already mentioned, language difficulties can be an issue, as can be visual-spatial processing deficits and sequencing. A multi-lens perspective is likely the best approach at this point in terms of assessment for mathematics learning disabilities. One might want to place special emphasis on areas such as

A numeracy/number sense, processing speed, working memory, and combined performance on end of year achievement test and yearlong growth demonstrated via CBM. Any assessment should include both conceptual application (i.e., reasoning, representation, communication, connections, problem-solving) and computation. Another good source for information on mathematics learning disabilities is on LDOnline.

Q ***Tracy Hurd***

How would this apply to high school students?

A ***David Allsopp***

Your question is an important one. Unfortunately, it is also one where clear answers are not readily available. Mathematics for RTI for schools generally is not nearly as advanced as it is, say, for reading. This is much less the case for high school. Compounding the issue at the secondary level is that mathematics becomes much more specialized in terms of content. Additionally, graduation requirements and state assessments are tied to particular mathematics courses (e.g., Algebra 1, Geometry 1, etc.). I am not aware of any wide-scale application of mathematics and RTI at the high school level. This is not to say that RTI is not happening at some high schools. However, in terms of systematically applied and evaluated models, there are none that I know of at this time.

The good news is that there is a research base from which secondary educators can base their tiered instruction. There are a number of mathematics instructional practices that appear to be promising from a research perspective, all of which can be applied to secondary settings. They include 1) explicit systematic instruction within authentic contexts; 2) teaching strategies for learning and doing mathematics including use of graphic organizers; 3) grounding abstract concepts within concrete experiences (concrete-representational-abstract sequence of instruction); 4) providing multiple opportunities for students to apply their mathematical understandings (both newly learned concepts and those for maintenance); and 5) continuous progress monitoring/instructional decision-making. For more information and video models of these practices and others, go to the MathVIDS website: http://coe.jmu.edu/mathvids2 For a recent synthesis of research on effective mathematics instruction for students with mathematics difficulties, see Gersten, Baker, & Chard (2006). Effective Instructional Practices for Students with Difficulties in Mathematics: Findings from a Research Synthesis. Center on Instruction, www.centeroninstruction.org .

Several articles that address effective instruction for struggling learners/disabilities are:

Gagnon & Maccini (2001). Preparing students with disabilities for algebra. Teaching Exceptional Children, 34(1), 8-15. Maccini & Gagnon (2000). Best practices for teaching mathematics to secondary students with special needs: Implications from teacher perceptions and a review of the literature. Focus on Exceptional Children, 32(5), 1-22.

Andreia Ransdell

I am involved in a team in my district that is currently designing documents to guide instruction in math at each grade level (k-5) based on the TEKS. We are establishing Big Ideas, Units of Study, Essential Questions, Ideas for Differentiation, etc. Is there a way for us to integrate already-created CBM tasks into that document? My goal is to connect teachers (in the easiest way possible) with CBM task resources already available, in the event that a student is not successful at the Tier 1 Level. To your knowledge, has this already been done? Is there a "bank" of math CBM tasks organized in such a way that would lend itself to being linked to the type of online instructional document my district is in the process of creating? Thank you in advance for your time and any input!

David Allsopp

This is an excellent question and one that I hope elicits more action on the part of researchers. To date the vast majority of probes that are available are computation driven. One exception to this is the CBM work being done at Vanderbilt University. The Fuchs' and their colleagues have developed a series of probes that include computation and application type items. You might want to examine examples that are posted online to determine the extent to which they are aligned, or could be aligned, with your district's curriculum. A summary of their work with examples of probes are provided in Using Curriculum Based Measurement for Progress Monitoring in Math (Ideas That Work, US Office of Special Education Programs & studentprogress.org). Another group (Bryant & Bryant – University of Texas) has been working on an RTI tier 1-3 project and may also have some probes that might go beyond only computation type tasks. They have been piloting a tiered mathematics intervention for early grades mathematics. More information about this project can be found at www.texasreading.org. I believe they conducted a webinar through the Access Center where a copy of the presentation can likely be downloaded. Another resource that provides examples of mathematics probes is Aimsweb.

Judy Jones

How does RTI for math differ from RTI for reading?

David Allsopp

In concept, RTI for mathematics does not differ from RTI for reading. The premise is the same - to provide all students with effective instruction that is supported by research in order to prevent school failure or the need for identification for special education services. In terms of process, there would be little difference. The structure (e.g., screening, tiered instruction, use of continuous progress monitoring) will not differ. What will be different is the type of instructional practices that will be implemented and the concepts and skills that will be emphasized. The fact is that the application of RTI for mathematics is in its infancy compared to reading and behavior. Therefore, there is much less to go on in terms of models at this point. Bryant and Bryant at the University of Texas are doing some initial research into a tiered mathematics intervention. You might find their work interesting. They describe a model for intervention at tiers 1-3. You can download a

presentation of their work at the Vaughn Gross Center for Reading and Language Arts (VGC) Web site. They also completed a webinar with The Acccess Center. There are a number of mathematics instructional practices that appear to be promising from a research perspective.

They include: