

Math Instruction for Students with Disabilities

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This is the third article in John O'Connor's series on how special education leaders can effectively become champions of GREAT instruction to radically improve the achievement and performance of students with disabilities.

Many students with disabilities struggle with mathematics. Fortunately, the National Mathematics Advisory Panel has provided specific insight into instructional practices that can be beneficial for all students and specifically students with disabilities. The Panel was charged with using "the best available scientific research to advise on improvements in the mathematics education of the nation's children." In 2008, they released their report that made wide ranging recommendations to increase the achievement of all students. In a small, but powerful section, they made recommendations for math instruction for "low achieving students and students with learning disabilities." A few of the highlights are provided below.

Recommendations for All Students

Through the decades, various approaches to mathematics instruction have been popular. The pendulum has swung from an intense focus on math computation skills ("back to basics") on one end to approaching instruction primarily through problem solving activities on the other. The Panel states neither end of the pendulum is appropriate. Mathematics instruction "must simultaneously develop conceptual understanding, computational fluency, and problem solving skills. Debates regarding the relative importance of these aspects of mathematical knowledge are misguided." In order to be competent in math, students need to acquire proficiency in all three legs of the mathematics school. They need to understand the concepts of mathematics, fluently compute numbers, and apply both of those skills in problem solving scenarios. Likewise, much has been argued about teacher directed versus student centered instruction. Is one approach primarily superior to the other? The Panel says no. "High-quality research does not support the exclusive use of either approach." Therefore, mathematics instruction should place mutual importance on conceptual understanding, computational fluency, and problem solving skills and that instruction should include a variety of practices including teacher-directed work and student centered activities.

Recommendations for Low Achieving Students and Students with Learning Disabilities

Based on a review of rigorous research, the Panel made recommendations regarding mathematics instruction for struggling students. It is interesting that students with

identified disabilities were grouped with low achieving students. For those of us who work in schools, that is not surprising. We know that in many classes a student with an identified disability sits next to a student who does not qualify for services, yet they both have learning needs that are very similar. Because of the complex way in which we determine who has a disability, some students are able to access special education while other students have very similar profiles and needs and yet don't qualify.

The Panel recommends the use of explicit, systematic instruction. That instruction should include intentionally sequenced instruction and materials that highlight critical components. Teachers should provide clear demonstrations and guided practice. Students should be given the opportunity to ask questions and demonstrate their thought processes through "thinking aloud" as they complete mathematical tasks. Decades ago, Anita Archer and her colleagues coined the phrase "I do it, We do it, You do it" to succinctly describe this sequence of explicit instruction. Students with disabilities need this highly structured and organized approach to learning mathematics. The Panel states, however, that students also need some less explicit instruction. "This kind of instruction should not comprise all the mathematics these students receive. However, it does seem essential for building proficiency in both computation and the translation of word problems into appropriate mathematical equations and solutions."

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