MASTER

Why Is This Strategy Useful?

Struggling students, students with disabilities, and students with mild mental retardation do not always have the same level of memorized math facts as do their peers. Researchers have found that instruction for these students should include step-by-step explicit instruction that gradually adds new strategies to students’ existing repertoires. Ideally, this instruction should take place in the context of one-to-one support or as a small group instruction. (Self-instruction is an alternate approach during which teachers model problem solving strategies by verbalizing each step of the solution and students gradually learn to use the strategy with prompts and praise. The INQUIRE abstract on self-instruction provides further explanation of this strategy.)

Description of Strategy

The Mathematics Strategy Training for Educational Remediation (MASTER) program is a series of lessons in multiplication and division. The lessons are designed to help students with learning disabilities understand multiplication as repeated addition, understand strategies like reversibility ($3 \times 8 = 8 \times 3$), memorize basic multiplication facts, understand division as repeated subtraction, understand the connection between multiplication and division ($6 / 3 = 2$ because $2 \times 3 = 6$), and understand application of multiplication and division to real situations. The multiplication lessons are about basic procedures, multiplication tables, and specific problems with one and two digit numbers. The division lessons are about division procedures, division without remainders, and division with remainders. After the lessons, the teacher works through specific problems with the student individually. First, the student solves a problem with the help of materials. Second, the student learns to find a mental solution and learns to check the solution. Third, the student learns ways to shorten, automatize, and generalize the solutions using self-instruction. The teacher gives students the chance to use their own solutions or strategies. The teacher leads the student to use the strategies and to discuss the solution steps aloud. Then, the teacher encourages the student to use the most efficient strategy. The teacher helps students use simple multiplication and division facts to solve more complex problems.

Research Evidence

At least one randomized control trial provides support for the MASTER strategy. In the study, 84 students with learning disabilities aged 9 to 14 were randomly assigned to treatment or control groups. The measures were parallel pre- and post-tests of multiplication and division problems. The students in the experimental groups had significantly higher post-test scores than the control groups. Transfer tests taken three months after the post-test showed that the effects were maintained for both groups.

Sample Studies Supporting this Strategy


Available at: http://ldx.sagepub.com/cgi/content/abstract/32/2/98.
In this study, the utility of a Mathematics Strategy Training for Educational Remediation (MASTER) program was examined. The effectiveness of the program, designed to encourage strategy utilization with multiplication and division problems, was investigated for 84 students with poor mathematics skills, some of whom had learning disabilities (n = 42) and others with mild levels of mental retardation (n = 42). The results showed that the use of the self-instruction program resulted in significant improvement over the general instruction program. Furthermore, far transfer was found for the children with learning disabilities in the experimental group when they used effective problem-solving strategies on nontrained tasks. The results are consistent with previous findings suggesting the importance of self-instruction in mathematics training programs.

Additional Resources
