

Research: Addition Facts 0 to 9

Study 1

Overview

A field test was conducted that involved 22 teachers and 109 elementary students who were experiencing difficulties learning math. This student group included 102 students with learning disabilities (LD), 5 students with emotional disabilities, and 2 students who were at-risk for school failure. The field test took place in seven school districts in both small-group (less than 7 students) and larger group (7 to 18 students) instructional arrangements. The teachers were trained to use programs in the Strategic Math Series. Different groups of students were taught addition facts, subtraction facts, multiplication facts, and division facts, depending on their needs. Students were taken through a series of lessons for each topic that included lessons where they manipulated concrete objects, lessons where they drew pictures, and lessons where they used numbers.

Results

The four students who received instruction in the Addition 0 to 9 program earned a mean score of 40% on the acquisition pretest and a mean score of 98% on the posttest. With regard to fluency, the students produced an average of 10 correct digits per minute during the first lesson, 18 correct digits per minute at the completion of the program, and 18 correct digits per minute three to five days after instruction ended. The latter fluency measure was administered by examiners unknown to the students in school locations outside of the classroom where instruction took place.

Conclusions

The results show that students with learning difficulties in math are able to learn basic addition facts through use of the Addition 0 to 9 program. The students in this study acquired addition knowledge and improved their ability to solve addition facts with fluency. They also generalized their fluency with addition facts to new situations where new examiners administered the test at levels that exceeded initial baseline rates and matched mean instructional rates.

Reference

Mercer, C. D., & Miller, S. P. (1992). Helping students with learning problems in math to acquire, understand, and apply basic math facts. *Remedial and Special Education*, 13(3), 19- 35,61.

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Study 2

Overview

Multiple field tests were conducted that involved 56 teachers and 248 elementary students who were experiencing difficulties learning math. These field tests took place in seven school districts in self-contained, resource, and general education classes. The teachers were trained to use programs in the Strategic Math Series. Different groups of students were taught addition facts, subtraction facts, multiplication facts, division facts, and place value concepts and skills, depending on their needs.

Results

Substantial gains were made by the students in all areas. See the figures below for the results in each math area. Figure 1 shows the results on untimed acquisition tests, and Figure 2 shows the results on timed proficiency tests (i.e., fluency tests). The number of students participating in each field test is shown beneath each pair of bars on the graph.

Figure 1: Students' percentage scores on untimed math tests.

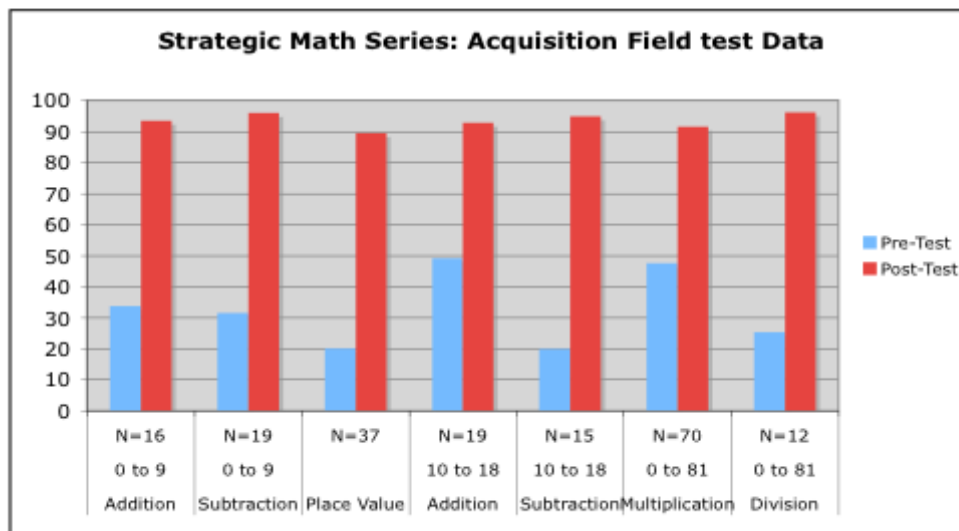


Figure 2: Number of digits correct per minute on timed fluency tests.

The results for the *Addition Facts 0 to 9* program are shown in the first pair of bar graphs in each figure. Students earned a mean score of 34% correct answers on the acquisition pretest and 93% on the posttest. They produced an average of 11 correct digits per minute in baseline and 21 digits per minute after instruction.

Conclusions

The programs in the *Strategic Math Series* produce significant gains in student performance on math acquisition and fluency tests across several areas of mathematics. In addition, these programs all produce socially significant final performances with students earning scores around or above the 90% level on acquisition tests in all areas.

Reference

Miller, S. P., & Mercer, C.D. (1998). *Strategic Math Series professional developer's guide*. Lawrence, KS: Edge Enterprises.

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