Audio-Taped Problems

Why Is This Strategy Useful?

Mastering basic math facts (addition, subtraction, multiplication, division) is essential for the development of more advanced math skills. In addition to responding accurately, mastering basic math facts requires the ability to recall the facts quickly and with little effort. This skill, referred to as fluency or automaticity, helps free up cognitive resources and working memory capacity to enable problem solving. The audio-taped problems strategy aims to increase the automatic and rapid retrieval of basic math facts. This strategy is appropriate for elementary school students in general and special education classrooms.

Description of Strategy

Students listen to an audio recording of a person reading a series of math fact problems and are instructed to try to write the correct answer before the tape recording provides the answer. At first, there should be sufficient delay between the question and the answer to allow students to come up with an answer independently. The repeated problems should have shorter delays (about 2 seconds) between the question and the answer to discourage finger counting and promote automatic responding.

Research Evidence

One correlational study and two case studies are described here as examples of the research evidence supporting this strategy. The first study included 18 students in a third-grade general education classroom. Three students performed below grade level, and none of the students performed at a mastery level. The students responded to three sets of 12 questions about basic multiplication facts. Each set was repeated four times. The taped problems strategy was associated with a steady increase in students’ multiplications facts fluency.

The two case studies used a single case subject design and compared the effects of taped Problems to the cover, copy, and compare strategy. In both studies, results showed that both strategies enhanced math performance and math fluency of elementary school students with a low level of cognitive functioning. Taped problems took approximately 30% less time to implement and resulted in more rapid increases in math fluency; therefore, it was considered more efficient.

Sample Studies Supporting this Strategy


A multiple-probes-across-tasks design was used to evaluate the effects of a taped-problems intervention on the multiplication fact fluency of 18 students from an intact general education third-grade classroom. During the classwide taped-problems intervention, students were given lists of problems and instructed to attempt to complete each problem before an audiotape player provided the correct answer. Varying time-delay procedures were used as the intervals between problem and answer presentations were adjusted. Initially, there was a brief time delay between problems and answers. Delays were adjusted in order to promote quick, independent responding. Across all three sets of problems, results showed immediate and sustained

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increases in multiplication fact fluency after the intervention was applied. Discussion focuses on future research related to the taped-problems intervention and the need for the development and empirical validation of effective, efficient, and acceptable classwide interventions.


Response-to-intervention models of service delivery are designed to identify, prevent, and remedy students’ academic skill deficits, including mathematics skills deficits. Although educators have developed procedures for enhancing math skills, further research is needed to establish interventions that are both efficient and effective for students functioning at a range of abilities. Researchers used an adapted alternating treatments design to evaluate and compare responsiveness to two interventions intended to improve the addition—fact fluency of a student with mild mental retardation. During cover, copy, compare (CCC), a student was instructed to read a list of math problems and answers, cover each problem and answer, write the problem and answer, and check her response. During the taped-problems intervention (TP), the student received a packet of problems and was instructed to complete each problem before the answer was provided by a corresponding audiotape. A third set of problems served as a control set. To allow for precise comparison of learning rates across interventions, 7.5 minutes were allotted for each intervention. Results showed that both interventions affected increases in addition fluency, with TP yielding more rapid increases. Discussion focuses on the need to provide practitioners with empirically validated interventions as well as the need to compare interventions using precise measures of learning rates in order to identify more effective and efficient interventions.


An adapted alternating treatments design was used to evaluate and compare the effects of two procedures designed to enhance math fact accuracy and fluency in an elementary student with low cognitive functioning. Results showed that although the cover, copy, compare (CCC) and the taped problems (TP) procedures both increased the student's math fact accuracy and fluency, TP was more effective as it took less time to implement. Discussion focuses on the need to develop strategies and procedures that allow students to acquire basic computation skills in a manner that will facilitate, as opposed to hinder, subsequent levels of skill and concept development.