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ABSTRACT

This research abstract is based on the study, "Educational Teaching: An Approach to Improving Student Achievement, Changing Teaching Beliefs, and Identifying Effective Practices" by Stanley L. Deno. The abstract describes a 2-year study of the effects of combining curriculum-based measurement with the use of alternative teaching strategies, to determine which reforms in the student's educational program produce the best performance outcomes. Six resource specialists were selected as teacher trainers for 28 experienced, volunteer special education resource teachers working with elementary students with mild disabilities. The study found that, following the experience of experimental teaching, teachers generated more alternative interventions in response to a specific case and reduced their estimates of the proportion of students for whom a given intervention would be effective. Results indicated that the combined effects of training and experience in experimental teaching provided teachers with a greater overall knowledge of teaching interventions, changed their beliefs about individualized instruction, and allowed them to select more effective interventions for their students. (JDD)

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ABSTRACT 21
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USING CURRICULUM-BASED MEASUREMENT TO SELECT INSTRUCTIONAL STRATEGIES

In the process of instructional planning and IEP development, teachers generate hypotheses about a student's instructional needs, select instructional strategies to meet those needs, and define goals for the student's achievement. However, it is often difficult to tell whether the instructional strategies selected are the most effective for use with the particular student, or if the IEP goals represent the maximum achievement that the student can reach. By using curriculum-based measurement combined with alternative instructional strategies, a teacher can obtain the feedback needed to maximize the student's achievement.

Experimental Teaching: An Approach to Improving Student Achievement, Changing Teacher Beliefs, and Identifying Effective Practices reports a 2-year study of the effects of combining curriculum-based measurement with the use of alternative teaching strategies. This procedure uses continuous data to determine which reforms in the student's educational program produce the best performance outcomes. Through the process, a teacher can, in essence, conduct single-subject experiments comparing student performance under varied instructional conditions.

SUBJECTS

Six resource specialists were selected as teacher trainers for 28 experienced, volunteer special education resource teachers in the K–6 program. Each teacher worked with four mildly handicapped elementary students whose reading levels were at or below 50% of their grade norm. Two control groups of K–6 resource teachers (20 volunteer and 33 non-volunteer) were also selected. In Year 2, two additional resource specialist/trainers were added, and 27 of the Year 1 teachers again taught four students each.

METHOD

Each year, the experimental and control teachers were pre- and posttested in knowledge and beliefs toward instructional interventions. In Year 1, experimental teachers tested whether the original program plans or a contrast intervention was most effective for each student. The Year 1 experiment included three phases: During Phase A (baseline), experimental teachers collected data under their original program plans. In Phases B and C, they collected data under two contrast interventions. Data were collected by having students read randomly selected passages for one minute from the appropriate level of the district's mainstream reading series. At the end of each sample reading, teachers graphed the number of words read correctly. Students were tested three times per week for the entire academic year; progress within each phase was determined by calculating the slope of the graph—the slope of improvement.

The teachers were trained in curriculum-based measurement, time series research methods, and alternative interventions. Following the training, teachers selected the alternatives they wished to use. They generated "intervention contrasts" that would constitute a major change in the instructional program for reading. For example, *Whole World in Holt* was contrasted with *Merrill Linguistic*, individual reinforcement with group reinforcement, and phonics with a cross-age tutor was contrasted with free reading with a cross-age tutor.

To ensure consistency in implementation among teachers who chose the same interventions, students' objective plans were checked by the trainers and each teacher was observed in class twice during Phases B and C. Teachers using the same interventions also met for a half day on four occasions to compare notes and discuss adherence to standard measurement and intervention procedures. At the end of the year, teachers were trained to analyze their students' graphs using time-series analysis. Each graph was rated by the student's teacher and also by another teacher, who served as a reliability observer.

In Year 2, original program plans were first contrasted with one major teacher strategy, such as District Instruction or Precision Teaching, and then that strategy was supplemented with additions or modifications. For example, one teacher using Direct Instruction added a contingency management component using tokens to supplement the verbal praise that was already part of the Direct Instruction technique.

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Again teachers were trained in curriculum-based measurement, time-series research, and program alternatives, but this time the training also included a method of drawing and comparing trend lines. They were introduced to the eight major teaching strategies and selected the ones they wished to use and were trained in their selected strategies. They brainstormed to generate additions and modifications to these major strategies.

Again, there were three experimental phases; data were collected using the same curriculum-based measure and procedures to ensure consistency. Phase A was again the baseline phase, and in Phase B teachers implemented an intervention alternative. For Phase C, teachers were randomly assigned to one of two strategies to use in deciding when to modify a student's program. The first was the "treatment-oriented" strategy, in which teachers were instructed to change the intervention after each 9 to 12 reading measurements. At the end of Phase B, a slope line was drawn. After the first time series in Phase C, teachers drew the new slope (representing 9–12 data points, typically 3 to 4 weeks of data) and compared it to the Phase B slope to select the modification needed.

The second strategy was the "goal-oriented" strategy. Teachers drew the Phase B slope and were instructed to make some change at the beginning of Phase C. They located the point on each graph representing the end of Phase B and drew a goal line for the student. If the Phase B slope was less than one word increase per week, then one word per week was the goal. If the phase B slope was more than one word per week, then the slope of the Phase B line was continued as the goal line.

RESULTS

Results yielded interesting information about the effects of the training on teachers and the effects of the teacher training and decision strategies on student performance. Comparison of the pre- and posttest results for knowledge and beliefs revealed that following the experience of experimental teaching, teachers generated more alternative interventions in response to a specific case and reduced their estimates of the proportion of students for whom a given intervention would be effective. This effect was attributed to the training combined with the experience of experimental teaching, not to the training alone. Thus, this combination led to changes in teacher beliefs regarding individualized instruction.

In addition, the teachers developed skills in data-based assessment of student performance which allowed them to quantitatively compare the rate of student reading achievement under contrasting interventions. It was discovered that training in the method used for drawing progress lines (the quarter-intersect method) was effective in increasing the reliability of teachers' judgments about the effectiveness of interventions. As a result, they were better able to tailor programs to meet individual student needs.

With respect to student performance, Year 1 data (based on 95 students) showed that Phase B produced significantly higher increases in reading achievement as measured by the increase in number of words per week read correctly. Mean slopes per phase were 0.83, 1.41, and 1.04, respectively. In Year 2 (n = 98), Phase C produced the greater increase in student performance. Analysis of the effects of the two decision strategies on student performance showed that the "treatment-oriented" strategy produced greater increases in student performance than the "goal-oriented" strategy.

IMPLICATIONS

These results indicate that the combined effects of training and experience in experimental teaching provided teachers with a greater overall knowledge of teaching interventions, changed their beliefs about individualized instruction, and allowed them to select more effective interventions for their students. Further, the information gained about the alternative decision strategies implies that the traditional "goal oriented" strategy may not be the best strategy to maximize student performance. The author recommends replication of this study and further research on experimental teaching and the decision rules that foster best performance. If the apparent superiority of the "treatment-oriented" decision rules over the traditional "goal-oriented" strategy holds under replication, this approach has practical implications for policy decisions regarding the establishment of academic goals and the criterion for assessing the goal attainment.

Experimental Teaching: An Approach to Improving Student Achievement, Changing Teacher Beliefs, and Identifying Effective Practices. 1986. 99 pp. Stanley L. Deno, University of Minnesota. U.S. Department of Education Grant No. G0084000649. Available for $.82 (microfiche) or $7.68 (hard copy), plus postage, from ERIC Document Reproduction Service, 3900 Wheeler Avenue, Alexandria, VA 22304 (1-800-227-3742). EC 211 839; ED number is not yet available.

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