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Measurably Superior Instructional Technology: Making Instruction Efficient

Student learning is the result of many factors, but one of the most significant in producing learning is "opportunities to respond" (Greenwood, Delquadri, & Hall, 1984). Similar to academic engaged time or active learning, "opportunities to respond" describes the ways in which curriculum and instruction evoke student responses. As student academic responses increase, learning increases. Thus, teaching strategies that keep students actively engaged in responding are generally more effective than ones that permit students to simply sit and listen. Strategies that promote fluency (many responses per unit of time) are also extremely efficient and effective (West & Young, 1992; West, 2003).

"Instructional methods such as peer tutoring, individualized instruction, programmed instruction, seat work, small reading groups, free reading, calling for frequent individual and group response, homework, and home tutoring, offer the ability to accelerate the occurrence of academic behavior and subsequent achievement gain. Similarly, ecological improvements that allow the teacher: (a) to monitor student responding, rather than engage in exposition, and (b) to limit the time students spend in transition, waiting, and looking for materials, will maximize achievement gains" (Greenwood et al., 1984).

Precision Teaching and Other Methods of Instructional Efficiency

Precision Teaching is an example of an extremely efficient method of instructional assessment and curricular restructuring. It consists of (1) performance standards for both accuracy and fluency, (2) daily evaluation of performance relative to the standards, (3) modification of instruction according to a systematic analysis of performance, and (4) large increases in opportunities to perform critical academic or other basic skills. In some classroom applications, the potency of Precision Teaching has been increased by combining it with other effective and efficient methods such as direct instruction, classwide peer tutoring, and computer-aided instructional decision-making (West, Young, & Spooner, 1990).

Research Evidence: Brief Summary

"Over a 4-year period [from 1974 to 1977] students and teachers in the Sacajawea Elementary School [in Great Falls, MT] engaged in 20 to 30 minutes per day of Precision Teaching, with curriculum and instruction that were otherwise similar to what was practiced elsewhere in the school district. Students advanced an average of 19 to 40 percentile points (depending on the subtest) on the Iowa Test of Basic Skills higher than comparable students elsewhere in the school district" (Binder & Watkins, 1990). By the end of the four-year study, fourth-grade students who used Precision Teaching scored on average above the 90th percentile while the district's average scores were near the 65th percentile. According to Binder & Watkins (1990), "these results were confirmed by the Joint Dissemination Review Panel of the U.S. Office of Education…. The improvements themselves are dramatic; but when cost/benefit is considered, they are staggering, since the time allocated to Precision Teaching was relatively small and the materials used …were quite inexpensive. Improvements of two or more grade-levels per year of instruction are common in Precision Teaching classrooms (e.g., West, Young, & Spooner, 1990)".

A year-long study of fourth grade students from Azusa, California revealed additional support for these methods. Thirty-two students from one of the four fourth-grade classrooms in the school experienced the ACT model for classroom instruction (West, Young, & Spooner, 1990) that consists of Precision Teaching, peer management of practice sessions, and computer-aided decision-making. Specifically, the approach included (1)

instructional decision-making based upon a graphic analysis of daily performance assessments; (2) one-minute curriculum-based assessments in each of three subject areas each day; and (3) classwide peer tutoring consisting largely of focused practice exercises indicated by the graphic analysis. The procedures required fewer than thirty minutes each day for the performance assessments, analysis and decision-making, and focused practice, and required only modest teacher supervision (de Ayora, 1988).

Participating students comprised the lowest performing of the four fourth-grade classrooms in the school at the beginning of the study with only four students functioning at grade-level. At the close of the study, only three of these students did not score at or above grade levels in reading, spelling and mathematics. Average improvement on standardized achievement tests for all students revealed growth of 18 percentile points across all subtests (deAyora, 1988; West, Young, & Spooner, 1990).

Summary

"Many problems in education are the direct result of using ineffective or less effective instructional techniques when more effective ones are readily available. We must learn from research which techniques are effective and which ones are not" (West, 2003). In spite of our concern about the "basic skills" crisis in American schools, research-based solutions have existed for more than three decades. The procedures described above are examples. "In federally validated research, each of these instructional technologies has been shown to produce far greater achievement and self-esteem among students than more traditional teaching practices, with favorable cost-benefit ratios when implemented in schools. These results have been obtained despite adverse socioeconomic influences on students so often blamed for failure in the classroom. These methods have not been widely adopted, partly due to political and philosophical resistance to measurably superior instructional technology among educators (Binder & Watkins, 1990).

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