DIRECT INSTRUCTION IN PRESCHOOL

The earliest DI studies focused on challenging beliefs about development and the capacity of children to learn skills that are normally unpredicted. For instance, Engelmann (1967b) taught two groups of preschool children (a middle-class group and a disadvantaged group) a program designed to induce "formal operations" as described by Piaget. The results suggested that preschool children could learn reasoning patterns that required them to "construct propositions about propositions" and could learn other skills deemed developmentally far beyond their age, such as relative direction (X is north of the tree, but south of the house). The ingredient that caused these outcomes was instruction.

In a similar study, Engelmann (1971) taught six-year-old disadvantaged children the skills deemed analytically necessary to pass the Piagetian tests of conservation of substance, volume, weight, and the test of specific gravity. The teaching procedures violated everything that Piaget suggested was necessary for the acquisition of these skills: no real-life objects were presented, no manipulation of objects was performed by teacher or children, no process of change (only outcomes) was shown to children, and no long time period was provided for assimilation and accommodation.

The five children in the study passed the tests for volume and weight. Four of the 5 children passed the test for conservation of substance and 3 of the 5 children passed the test for specific gravity (considered the most sophisticated of the tests.) These children also passed a generalization test on specific gravity that involved steel balls (large and small) that were placed in mercury. None of the children passed the Piagetian test of speed because it was impossible to teach the pre-skills for this test without violating the restrictions placed on the teaching, so no instruction was provided. The children's overall achievement raises serious questions about developmental theory and its predictive value. The intervention that caused these children to solve problems that baffle many 13-year-olds was instructional, not developmental, and it involved less than four hours of instruction.

A third study by Engelmann (1967a) attempted to teach conservation of substance and Piaget's compensatory argument in 54 minutes without using real objects. Of the 15 six-year-old non-conserving students, ten passed a test of generalization that involved clay balls and related applications (which had not been taught in any form during the initial training).

In addition to these studies, 4- and 5-year-old disadvantaged preschool children were taught using early DI practices in the Bereiter-Engelmann preschool (from 1964 through 1969). Children attended the preschool for half days. Their curriculum consisted of daily lessons in reading, language, arithmetic, music, and art.

The evaluation of the second cohort of children (1965-67) showed that when the children were in their kindergarten year, their grade level performance in arithmetic was 2.6 and in reading was 2.5. Although nearly all of the children were selected on the basis that they came from eminently disadvantaged homes and had siblings in classes for mentally retarded students, their mean IQ had gone from 96 to 121 (Bereiter, Washington, Engelmann, & Osborn, 1969). Other documentation showed that the higher performers in the preschool had mastered math operations (including simple algebra) that are usually not learned by fifth graders (Anti-Defamation League film, 1967).

The purpose of these early studies was to set limits and show the extent children labeled as "low" or "immature" could pass children who were labeled as "high" or "mature." The logic is that if low performers perform higher than high performers, the definition of low performers is suspect. The implications are that if great acceleration of performance is possible in all areas, including those related to cognitive operations, the science of instructional design is a substantial force in creating change in children's performance and potential to learn.

The final set of research that underpins DI practices has to with normatively unpredicted achievements that involve skills that are highly unfamiliar to the student. The DI assumption is that familiarity and performance are closely related. If a child requires a great deal of practice to learn basic skills, the performance does not suggest that the child lacks potential, but that the child is relatively naive. A further assumption is that with appropriate practice, the student's performance will change, not only on the targeted skills, but also on those that are related. This orientation to skills would not lead the teacher to be discouraged if the student initially required many trials to learn the initial set of skills or information presented in the program sequence. The student's performance would simply signal that the material is highly unfamiliar to the student and that with sufficient practice, the student's rate of new learning will change.

Source:

Adams, G., & Engelmann, S. (1996). Research on Direct Instruction: 25 years beyond DISTAR. Seattle, WA: Educational Achievement Systems. pp. 108-109.

Other references:

Engelmann, S. (1967). Teaching Formal Operations to Preschool Advantaged and Disadvantaged Children. The Ontario Journal of Educational Research, 9(3), 193-207.

Engelmann, S. (1971). Does the Piagetian approach imply instruction? In D. R. Green, M. P. Ford, & G. B. Flamer (Eds.), Measurement and Piaget. (pp.118-126). Carmel, CA: California Test Bureau.