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Setting Aims for Precision Learning

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Setting instructional goals is one of the most important activities of special educators. When goals are clearly known by students and teachers, corrective action can be initiated quickly to ensure continued progress when a student's performance deteriorates (Howell, Kaplan, & O'Connell, 1979). Setting ambitious goals has been shown to have a positive effect on how special education teachers teach, as well as how their students achieve (Fuchs, Fuchs, & Deno, 1985; Fuchs, Fuchs, & Hamlett, 1989).

Aims and Precision Teaching

Selecting performance goals, specifically *aims* (proficiency levels stated in terms of rate of correct and incorrect responding), has been an integral feature of the precision teaching and learning process from its inception (Gaasholt, 1970; Haughton, 1972). In one of the earliest discussions of aim selection, Haughton (1972) noted that certain performance frequencies are important to later growth in a particular response as well as in related responses. In other words, at certain levels of performance children struggle to improve; however, if they move beyond that level, they can accelerate to higher performance frequencies. Haughton asserted that frequencies in very basic skills, termed *tool skills* (e.g., letter writing or saying sounds), that are performed at sufficiently high rates correlate highly with a student's success on more complex skills that incorporate the tool skills. For example, if students wrote digits at a rate of 30 per minute, they would subsequently be successful in more complex mathematics problems (Gaasholt, 1970). Clearly, attention to aims is important to the special educator's instructional planning and decision-making process. Systematic procedures are needed to guide special educators in choosing aims that are high enough to ensure success on subsequent skill development, steady movement through the curriculum, and attainment of performances valued by mainstream teachers.

Research on appropriate aims for various behaviors is a continuing process. Numerous investigators have pointed out that more work is necessary to identify performance frequencies that represent proficiency (Evans & Evans, 1985; Evans, Evans, & Mercer, 1986; White, 1985a; Wilson & Majesterek, 1989). Generally, research on aims falls into two categories: descriptive and developmental.

Descriptive Research

Descriptive research examines performance rates of different populations (e.g., students who are learning disabled versus those who have no handicaps) on various skills such as writing letters or numbers. An example of such data obtained on a particular population of students was reviewed by Howell and colleagues (1979). They reported data obtained from screening 11,000 primary age children in Washington State. Some of the minimal aims suggested were as follows:

- Say first- and second-grade words, 80-100 per minute.
- Say third-grade words, 100 per minute.
- Say words in context for first to third grade, 100 to 150 and up.

Wood, Burke, Kunzlemann, and Koenig (1978) reported adult performance rates across 40 topics in mathematics skills. They found, for example, that multiplication facts were written at 80 correct per minute with O errors and division facts at 47 per minute with O errors.

Deno and his colleagues (1982) probed a national sample of 562 students in grades 1

through 6 on standard tasks such as reading passages, spelling words, and writing samples. Some of their findings of mean correct and incorrect oral reading responses per minute using preprimer through grade 3 material were 57 correct and 10 incorrect in grade 2;114 correct and 4 incorrect in grade 4; and 147 correct and 6 incorrect in grade 6. For spelling, data indicated mean correct/incorrect responses of 6/11, 19/8, and 27/6 words per 3-minute sampling in grades 2, 4, and 6. For writing, a story starter idea to stimulate students' writing responses yielded 16/4, 35/3, and 47/6 mean words correct/incorrect per 3-minute sampling for grades 2, 4, and 6.

Developmental Research

The second category of research on aims examines the relationship of certain performance rates to subsequent skill development. In one study, students who wrote answers to mathematics facts at a rate of 30 to 40 per minute moved through a curriculum of progressive difficulty more easily than those performing below a rate of 30 (Haughton, 1972). Similarly, a strong relationship was found between saying sounds correctly and oral reading fluency. Results from third and fourth graders in a study of reading indicated that an aim of 100 words per minute is important to advancing through subsequent reading curricula.

Evans and Evans (1985) conducted two studies. The first was to determine whether or not high (120), medium (90), or low (60) rates of saying sounds per minute among first graders were related to subsequent progress on saying consonant-vowel-consonant (CVC) real and nonsense trigrams. Results indicated that the optimum rate was 90 sounds per minute. The second study was similar to the first, except that writing answers to basic addition facts was related to mastery of addition facts at the next level of difficulty. An optimal rate was not found, but the fact-writing rate was found to be related to the mean number of other mathematics skills mastered (e.g., measurement or operations).

While research is limited, the evidence suggests that: (a) it is important to set sufficiently high aims to assist learners in becoming fluent in skills; (b) aims assist teachers in instructional decision making; and (c) aims should be based on criteria reflecting the usefulness of a skill both immediately and for later functioning.

Selection of Aims

Suggested Proficiency Rates

Suggested proficiency rates have been drawn from various sources over the years. Some suggestions, such as those discussed earlier, result from data gathered from special project reports, studies, or expert opinions. Mercer and Mercer (1985) have completed a comprehensive review of a number of suggested proficiency aims in reading and mathematics skills. Table 1 shows ranges of proficiency values for some of those skills.

Peer Data

A commonly suggested data source for selecting aim values with local meaning is to use peer data (Epstein & Cullinan, 1979; Howell et al., 1979; Van Houten, 1979; White & Haring, 1980). The following steps are suggested:

1. Select a class of nonhandicapped peers. Typically, a special educator will know the mainstream class and teacher in which a student with handicaps is to be placed. The special educator should ask the regular educator to select a student (or group of students) with skill mastery in the area of interest. An average regular education student could be chosen, but average performance poses potential difficulties since it may represent mediocre achievement. Choosing a student who has thorough skill mastery, however, will provide a helpful example of proficient performance.

2. *Probe.* The teacher obtains timed 1-minute performance samples of the peer(s) for 3 days and selects the median correct rate and incorrect rate. The median value should represent typical performance on the task and serve as a guide to a proficiency aim. Teachers can construct written probes by writing items such as basic mathematics facts or functional vocabulary words to which students respond orally or in writing. Items can be placed in rows or in

Table 1

SUGGESTED AIM RANGES BY SKILL AND GRADE LEVEL

	Correct	*Error*
Reading Rates		
Say Isolated Sounds		
(K–3)	36–52	0–4
Say Words in Text		
(K–3)	50–132	0–2
(4–6)	100–200	0–2
(Adult)	100–252	0–2
Written Math Rate		
Digits in Simple Addition and Subtraction	50–125	0
Addition and Subtraction		
(2–3)	20–90	0–2
(3–4)	40–90	0–2
(4–5)	40–90	0–2
Basic Multiplication Facts		
(5–6)	40–90	0–2
Basic Division Facts		
(6)	40–90	0–2

boxes drawn on the probe sheet. There should be a sufficient number of items to provide students with activity for at least 1 minute. (Shorter or longer time periods for probes may be necessary, depending on the number of items to which the students must respond.) Students can write responses on the probe sheet or respond orally as the teacher follows along and scores on a duplicate probe sheet. After a l-minute probe, the count of correct and incorrect responses can be recorded.

Adult/Child Proportional Formula

Using an adult-to-child proportional formula has been suggested as another way to select proficiency aims (Eaton, 1978; Haring & Gentry, 1976). This approach employs ratios of adult tool skill rates (or those of any competent performer) and adult performance rates in conjunction with student tool skill data to determine students' performance aims. The following steps are recommended:

1. Select an adult and probe. An adult is given a timed performance sample on a particular task such as multiplication problems. Next, the adult is probed on a tool skill necessary for the particular task. The student is probed on the same tool skill and is asked to work as fast and as accurately as possible.

2. Use the proportional formula. The formula that follows is solved to determine the student's performance aim for the particular task:

$$\frac{\text{Student aim rate (to be solved)}}{\text{Student tool skill rate}} = \frac{\text{Adult task performance rate}}{\text{Adult tool skill rate}}$$

For example, if an adult wrote 140 numbers per minute (tool skill rate) and wrote numbers in answers to multiplication problems at 70 per minute (task performance rate), and the student wrote numbers at 80 per minute, the student aim rate for multiplication would be 40 (x / 80 = 70 / 140).

Conclusion

Setting appropriate aims for students is an important tool in precision teaching or any other form of data-based instruction, and it requires experience and judgment on the part of teachers. The methods for determining aims described in this article can help teachers in this task. However, the best guides to aims are often learners themselves. Teachers should encourage students to go as fast as possible. (Some teachers achieve high aims by simply challenging students to beat their own best performance or to exceed the teacher's performance on the same task.) Teachers are often surprised by the high rate of performance and steady movement through the curriculum that can occur when their students are taught, in a stimulating manner, skills that possess functional utility. For a comprehensive discussion of issues and considerations important to determining aims, the reader is encouraged to read a series of articles by White (1984; 1985a; 1985b; 1985c).

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