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The Realities of Instructional Leadership: An Intensive Study of Four Inner City Schools

by Russell Gersten
William Green
Gary Davis

A decade ago, Dan Lortie (1975) wrote that the literature on education was "full of prescriptions, and short on descriptions." In the past 10 years, we have seen a burgeoning of both—an impressive increase in detailed descriptions of effective teaching practices and a few thoughtful approaches towards improving staff development. Unfortunately these have been coupled (especially since the release of *A Nation At Risk*) with a phenomenal number of mandates, harangues, and hastily developed remedies for school improvement.

For one reason or another, much of the energy has gone into training principals to become instructional leaders. States such as Kentucky, California, and Texas have recently mandated "crash" training for principals in clinical supervision, procedures for evaluation, and/or other aspects of instructional leadership. These mandates and courses are loosely based on the early research of Edmonds (1979), Weber (1971), and Brookover and his colleagues (1979), who described the few truly effective inner city elementary schools as possessing principals who appeared as strong, charismatic instructional leaders with high expectations, and who actively monitored students' progress through the curriculum.

Several years ago, in "The Principal as Instructional Leader: A Second Look," (Gersten, Carnine, and Green, 1982), we argued that one cannot expect these "knights in shining armor" suddenly to emerge. Like Edmonds, we saw a need for an individual knowledgeable in all aspects of the instructional program, and able to support teachers and provide specific help to teachers when problems arose. But unlike Edmonds, we thought this person need not be the principal. In many ways, it seemed that an individual such as a curriculum supervisor, master or mentor teacher, or remedial reading specialist might be more appropriate to perform this function. On the basis of our experience in Project Follow Through, where instructional programs succeeded despite different, and occasionally antagonistic principals (see Meyer, Gersten, and Gutkin, 1985), we concluded that it is not terribly important *who* performs these activities, as long as the principal or central administration doesn't actively undermine their work (Berman and McLaughlin, 1977). Often principals are *not* in the best position to perform many of these activities, because of the other responsibilities which they have (Pinero, 1982; Morris et al, 1981) and their lack of both training and orientation towards instructional concerns (Lortie, 1982).

Subsequent research (Crandall, et al., 1982? has tended to support this position. Research on innovation and school improvement conducted in the early eighties tended often to pinpoint a supervisor, facilitator, coordinator who was responsible for the success of the innovation. Rarely was the principal the prime change agent.

Overview of the Current Research Project

Around 1982, our research emphasis focused on developing an understanding of how these "facilitators" operate—what type of training is optimal, what problems they face, what sort of support systems enhance or impede their work. We also attempted to

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Videodisc Instruction

Teaching Fractions to Learning Handicapped and Remedial Students

by Bernadette Kelly
Douglas Carnine
Russell Gersten
Bonnie Grossen

The National Assessment of Educational Progress reported that, nationally, "performance of fraction computation is low, and students seem to have done their computation with little understanding" (Lindquist, Carpenter, Silver, & Matthews, 1983). For example, the assessment found that only one-third of the U.S. seventh-graders can add ½ and ⅓. The problem is even more pronounced for handicapped students.

Research on effective instructional practices with special education students gives some clues about how to improve instruction. Englert (1984) measured mildly handicapped (M.H.) students' growth on a range of basic skills measures and correlated this growth with observed teacher performance. More effective teachers (classified on the basis of high student academic gain) *provided appropriate academic feedback to student errors more frequently* than did less effective teachers. The more effective teachers also *maintained pacing and higher student success rates* throughout each lesson. This set of variables has been found to be effective with low performing students in regular classroom settings (Good & Grouws, 1979; Gersten, Carnine & Williams, 1982; Rosenshine, 1983).

However, improved teacher training and improved teacher presentation techniques may not be enough. The curriculum itself is being called into question. A report from the National Council of Teachers of Mathematics on the National Assessment said, "It is necessary to reconsider the when, how and what of the fractions sequence; some topics may need to be introduced earlier, others may need to be approached differently" (Carpenter, Coburn, Reys & Wilson, 1976).

This study compares the effectiveness of a traditional basal approach to teaching fractions with an innovative videodisc curriculum designed to teach basic fractions skills. *Mastering Fractions* (Systems Impact, 1985) incorporates sophisticated principles of curriculum design (Engelmann & Carnine, 1982) and harnesses the capabilities of the videodisc. The basal program *Mathematics Today* (Harcourt Brace Jovanovich) was selected from four widely adopted basals as the text most similar to the videodisc program in terms of five aspects of curriculum design: Lesson structure, review procedures, discrimination practice, example selection, and the use of clear, explicit strategies.

However, important instructional differences remain along those dimensions. The next section compares the two programs and cites research conducted on those dimensions. For a fuller discussion and additional research findings, see Gersten and Carnine (1984), Silbert, Carnine and Stein (1981), and Stein, Jenkins and Arter (1983).

Comparison Between the Videodisc and the Basal Approaches

Lesson Structure

Each *basal* lesson begins with an introduction, followed by an explanation of the student-book pages, and then independent work. This structure results in students working independently for the last part of each lesson. Long periods of independent work may give rise to student inattentiveness (Gall, Gersten, Grace & Erickson, in press).

Mastering Fractions has a short explanation followed by problems that

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DI Professors Under Attack at Boise State University

Editors note. The following article from the BSU *The University News* and a flyer written by Students for Academic Freedom in Education (S.A.F.E.) are about two DI professors who are in trouble because of their educational beliefs. The Association for Direct Instruction is actively supporting their defense.

RESIGNATIONS REQUESTED

by Mark Peters
The University News

Special education professors Mary Anne Wheeler and Maria Collins were recently asked to resign by the College of Education administration.

Wheeler, who has taught at BSU since August of 1985, said that after being asked to resign, she received a letter on Feb. 27 stating that her contract for next year would not be renewed.

Collins, who is a second year teacher at BSU, said that as of now, she still holds her contract.

Both Wheeler and Collins said they were asked for their resignations because of their support and involvement in teaching the direct instruction model to their students.

Direct instruction is a method of teaching that involves the classroom as a whole in an intense learning program. The method involves every student at the same time, and "leaves nothing to chance; everything you want the children to learn, you teach them directly," according to Lynn Jeffers, a special education teacher in Nampa who is pursuing her master's degree and has received counseling from Collins.

Both professors said they were accused of not being general enough in their curriculum. Wheeler said that she does not teach a strict direct instruction model in her classes, but that "DI is all they are hearing about, so they think that is all I'm interested in."

Collins said that "when you come in with new ideas that are very contrary to the existing system, it's often something that is not acceptable." She said her goal has always been to train teachers to teach effectively.

Wheeler said that "research is showing that this is one of the most effective methods (of teaching) we have at this time."

Richard Hart, dean of education, and Ken Hill, chairman of the teacher education department, both declined comment on why they asked the professors to resign. Hart said that he could not even verify that they have been asked to resign.

Wheeler and Collins said they would be very pleased to see the formation of a research project demonstrating the effectiveness of various teaching methods and measuring the results.

Collins, whose work includes more than 200 presentations in the western U.S. and Canada, said the main "misconception with this model is that it's just rote learning." She added that direct instruction involves teaching comprehension and cognitive-oriented tasks.

Wheeler said one reason the model is not popular with some people is because it is a lot harder to implement than some of the other methods.

A petition, distributed by students in the education field, had approximately 246 signatures last week, from students and teachers who support Wheeler and Collins. Two more petitions, one for Wheeler and one for Collins, have been circulated asking the administration to reconsider the decision.

Donna Batazzo, a teacher edutation student, said, "the department as a whole is good, and I would support any professor who I felt was exceptional, or an asset to the university."

Students have posted leaflets saying that 60 percent of the special education department has been asked to resign and they want to know why.

"Imagine a teacher that you thought was the best that you have ever had, and then you find out they were asked to resign," Sheri Lockart, another student in the department, said.

Wheeler said she has tried to work things out according to the university's policies described in the faculty handbook. She also said she has "never known anyone to be asked to resign from their position because of it (DI)."

Collins said that "there is a lot of resistance (to) using effective, well demonstrated methods," but she said she hopes that the problem can eventually be worked out.

The direct instruction approach, which was developed by Siegfried Englemann [sic] at the University of Illinois, is a method of teaching which controls the details of what happens between students and teachers, and allows more information to be taught in a shorter period of time. *Making Schools Work*, by Robert Benjamin, describes a program of direct instruction in which teachers are provided with extensive training and are not allowed to deviate from the program. The book says the program derives from the nature of the skills to be mastered, not the nature of the individual, as with some other methods. It also said that direct instruction "has consistently delivered what other programs usually just promise."

Source: *The University News*, Volume VI, Issue 21, March 12, 1986.

60 Percent of BSU Special Education Department Asked to Resign! Why?

Dr. Maria Collins and Dr. Mary Anne Wheeler are in the Special Education area of the Teacher Education Department at Boise State University. Both have impressive credentials.

Dr. Collins received her doctorate from the University of Oregon. She went through the Instructional Leadership Program, which is federally funded. Her record is a proven one which shows her to have significantly raised the performance levels of students labelled "dyslexic", "learning disabled", and as "corrective readers". Besides having a proven record practicing the principles which she teaches students, she also has recognition among profesional peers. She has given more than 200 presentations to school boards, school districts, and at symposiums in 6 western states and Canada since 1980. Included among these is a presentation on inferential reasoning skills for the secondary handicapped at the 1985 Conference of the Association for Behavioral Analysis (the ABA). In addition, she has served as the technical advisor for a video disk program to teach math and science to secondary and college remedial students. She is co-author of a soon-to-be published reasoning skills program. This combination of supervisory and training skills demonstrated by a proven record make her an invaluable asset to her university and community. Clearly an exceptional addition to the BSU faculty for Special Education, it is inconceivable to us that the administration could want her to leave.

Dr. Wheeler received her doctorate from the University of Wisconsin at Madison which has an exceptional program for Special Ecucation. Her credentials cover a wide range of professional experiences in Special Education. At the University of Wisconsin she lectured in the Teacher Training Program in the Department of Studies in Behavioral Disabilities, serving as a clinical supervisor and assistant instructor in that program. She served as a teacher in the Adult Deaf and Blind Program at the Central Wisconsin Center for the Developmentally Disabled in Madison. She too is well recognized by her peers, having served as an editorial board member for *Improving Human Performance Quarterly* published by the National Society for Performance Instruction, Washington, D.C. She has also published articles in *Teacher Education and Special Education* and *Expanding Horizons in Therapeutic Recreation*. Again, this is the description of an individual clearly well qualified and an asset to BSU. Why ask her to leave?

The Department of Education claims to advocate academic freedom. We fear that this holds true only for those professors who adhere to the educational traditions and standards currently in vogue with the administration at BSU. "Ever since its founding in 1932 BSU has been a university with pride, determination, enthusiasm, and above all *academic quality*. It's a university charged with energy, *unafraid to try new ideas or to give you the freedom you need to develop your potential.*"

Considering these statements of support for academic freedom, why would the administration want Dr. Collins and Dr. Wheeler to resign? Both of these professors exhibit the qualities BSU says it wants for its students. They are exceptional individuals who are dedicated to meeting the education needs of *all* children, especially low performers. They have devoted long hours to assure students of the best instructional techniques necessary to be used in the field. We would like the administration to respond to the petitions and letters indicating overwhelming support for these professors from students, teachers, and community members. We would like justification for the administration's harsh and confusing actions.

By S.A.F.E. (Students for Academic Freedom in Education)

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Computer-Assisted Instruction

Effects of Instructional Design Variables on Vocabulary Learning

by Gary Johnson
Douglas Carnine
Russell Gersten

Based on the premise that word knowledge correlates highly with reading comprehension (Anderson & Freebody, 1981; Mezynski, 1983; Pearson & Gallagher, 1983; Stahl, 1983; Tierney & Cunningham, 1984), several investigators have attempted to improve students' reading comprehension skills by teaching vocabulary. These studies represent a wide range of approaches in terms of instructional methods, number of words taught, selection of words to be taught, duration of interventions, and assessment procedures. In only a few studies were students identified as either low-performing or "learning disabled". While all studies produced evidence of improved vocabulary knowledge, the effects on reading comprehension have been varied and inconclusive.

All studies which involved directly teaching word meanings to students reported gains in word knowledge. However, the methods which were most successful in teaching new vocabulary consumed the most instructional time, and even then the gains, in terms of numbers of words learned, were modest. For example, an extensive vocabulary training program designed by Beck, Perfetti, and McKewon (1982) taught 104 words in 75 thirty-minute lessons. At the end of the study, students knew an average of 85 words that they did not know prior to the program. This learning required 2,250 minutes of instruction or 20 minutes per word, an amount of time which is considerably greater than that typically devoted to vocabulary instruction in the middle grades (Durkin, 1979; Roser & Juel, 1981).

Durkin (1979) observed 4,469 minutes of reading instruction in fourth-grade classrooms and found only 19 minutes (.4%) were devoted to vocabulary instruction and only 4 minutes of reviewing word meanings previously taught. Roser and Juel (1981) observed 1,200 minutes of reading instruction in grades 1 through 5 and saw only 65 minutes (5%) of instruction time on word meanings.

Those vocabulary instruction studies, which focused on low-income, low-performing, or learning-disabled students, demonstrated that growth in vocabulary knowledge can be achieved if increased instructional time is provided (Beck et al., 1982; Draper & Moeller, 1971; McKeown et al., 1983; Pany et al., 1982). Low-performing students benefited most from the difect teaching of vocabulary in these studies and in others (Roser & Juel, 1981; Swaby, 1977). Less-skilled readers do not read extensively and are less able to derive meanings from context, although they can benefit from being taught rules for reading words in context (Carnine, Kameenui, & Coyle, 1984).

Research is needed on methods for increasing vocabulary instruction for low-performing students. To increase instructional time without increasing the demands on teachers, computer-assisted vocabulary instruction offers a hope.

Instructional Design for Computer-Assisted Instruction

The features of CAI advantageous for instruction with special education students include: individualization and self-pacing, immediate feedback about performance, consistent correction procedures, patient repetition, carefully-sequenced instruction, frequent student responding, and good motivation (Budoff, Thormann, & Gras, 1984). Yet, much currently existing software fails to provide these features in programs for special education students (Thormann & Gersten, 1984). Two instructional design considerations explored in this study are: (a) optimal set size for introducing new words, and (b) schedules of review. Relevant research on each variable is discussed next.

"Set Size" for Daily Lessons

Drill and practice programs are the most widely used CAI software (Budoff et al., 1984), but little attention has been directed to increasing the efficiency and efficacy of CAI drill and practice strategies (Merrill & Salisbury, 1984; Siegel & Misselt, 1984). Merrill and Salisbury suggest that one feature of an improved drill and practice strategy would be to have students drill on a small subset of items at a time. An area of needed research is the determination of the appropriate size of the learning set for lessons in a drill and practice program.

Optimal set size may be determined by "immediate memory span," which is defined as the number of items an individual can correctly recall after one presentation. For college age students, the typical subjects in memory span studies, the number of related digits, letters, or words that can be repeated after one presentation is between six and eight, with the number seven frequently mentioned as an average (Deese & Hulse, 1967; Hall, 1971; McGeoch & Irion, 1952). (Note, however, that problems of immediate-memory-set size may be overcome by providing memory aids, e.g., visually showing the set of concern.) One purpose of the present study was to compare the effects of different set sizes on the acquisition of word meanings by mildly handicapped students.

Review Schedule

The element of review was an important variable in the Beck et al. (1982) study of vocabulary acquisition. Words were presented in two different levels of frequency. In one treatment, each set of words was taught in a five-day cycle. All the words in the set were introduced on the first day of the cycle and reviewed when necessary, but only during that 5-day cycle. There was no subsequent review. In a second treatment, words were introduced in the same manner, but additional practice was provided after the fifth day in special review cycles. Words in this treatment appeared *16-22 additional times each*. The effect of the extra review was clear; the additional cumulative reviews significantly affected students' retention of word meanings

The Beck et al. (1982) vocabulary instruction study included spaced reviews as an instructional design variable. Research in computer-assisted instruction has demonstrated that several short-spaced reviews are more effective in increasing retention than are a few massed reviews (Gay, 1973; Siegel & Misselt, 1984). Merrill and Salisbury (1984) propose a strategy that would provide spaced reviews during a CAI drill and practice program. New items are presented to students, and only items they do not know become part of a "working pool." The number of items in the working pool would be determined empirically. Once the student meets a specified criterion on an item in the working pool, that item is removed and placed in a "review pool." Each item in the review pool is reviewed on specified dates and a specified number of times.

In summary: With below-average readers, words that receive spaced reviews are better remembered than words taught during five-day cycles, but not reviewed.

Instructional Design Differences Between the Software Programs Used in the Study

This study compares the effects of teaching vocabulary through CAI using: (a) a Small-Teaching Set and cumulative review, and (b) a Large Teaching Set without cumulative review.

The distinctive instructional design features of the Small Teaching Set program include: (a) individualized lessons which provide teaching and practice only on words the student does know, (b) a practice set which consists of no more than seven words at any time, (c) a specified mastery criterion which must be met two consecutive lessons before a word is considered learned, and (d) cumulative reviews on learned words to ensure retention.

One major difference between the two programs is the size of the teaching and practice sets. The Small Teaching Set program (Carnine, Rankin & Granzin, 1984) provides teaching on a set of three unknown words, practice on a set of no more than seven words, and cumulative review on a set of ten words. The student must meet a specific mastery criterion on each word before it is removed from the practice set. When a word is removed from the practice set, the program tests the student on new words and add words the student does not know to the practice set.

The other program, the Large Teaching Set program, teaches words in larger sets of twenty-five. It is adapted from a commercial program developed by Davidson & Eckert (1983). The student may choose to see the words in any of four types of formats: (a) a teaching display which shows the word, its definition, and one example sentence; (b) a multiple-choice quiz format; (c) an exercise in which a definition is displayed and the student must spell in the correct missing word to complete a sentence; and (d) an arcade-type game in which the student matches words to their definitions.

Another difference between the two programs is in the review procedures. The Small Teaching Set program provides daily review on words in the student's practice set and periodic cumulative review of words which the student has learned in the program. Once the student has mastered ten words, the program presents a cumulative review lesson on those words. The Large Teaching Set program provides teaching and practice on sets of 25 words. Since the program keeps no cumulative record of student errors, no cumulative review is provided. Finally, although both programs provide teaching displays and multiple choice exercises, the Large Teaching Set program includes a game format which is unlike any exercise in the Small Teaching Set program.

Method

Subjects and Setting

Thirty-eight learning disabled high school students, in grades 9 through 12 who were at least two years below grade level on standardized tests such as the *Woodcock-Johnson*, were eligible to participate in the study. These students attended a special education resource room for part of the day for instruction in reading or language arts. All students were administered a multiple-choice, 50-item vocabulary pretest. They were then matched by pretest scores and randomly assigned to one of the two treatments, either the Small Teaching Set program or the Large Teaching Set program. (Six students who scored over 80% correct on the pretest were excluded from the study). Two students decided not to participate. During the study, four students were dropped due to frequent absences, and one student was dropped when his performance indicated that his pretest score was inaccurate. Thus, a total of 25 students actually participated in the study.

Students were administered the Advanced 1 Reading subtest level of the *Metropolitan Achievement Test* (1978) three weeks after the conclusion of the study for descriptive purposes. Their mean performance corresponded to the 8th percentile, with a range between the 1st and 22nd percentiles.

The study was conducted in a large, special education resource classroom in a high school in the Eugene 4J School District, Eugene, Oregon. IBM computers and color monitors were set up in the back of the classroom, away from other instructional groups.

Materials

The *Small Teaching Set program* (Carnine, Rankin & Granzin, 1984) constructs individualized CAI vocabulary lessons by first testing a student on new words and then composing teaching and practice sets of only those words which the student does not know. An example of a teaching frame appears in Table 1.

The exercises in the practice set consist of three types of multiple-choice items: (1) the new word appearing alone with

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Design of CAI Vocabulary Instruction

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the correct definition as one of five choices, (2) the word appearing in a sentence with the correct definition as one of five choices, and (3) a synonym (or short definition) for the word appearing in a sentence with the word as one of five choices. Examples of practice exercises appear in Table 2. For the practice exercises, the program picks from a pool of four items and randomly selects items to present. The student must get two items per word correct before the lesson ends, unless time runs out and the student selects the "escape" option to terminate the lesson.

In order to reach mastery criterion on a word and have it removed from the practice set, the student must identify the word's meaning two consecutive times on two consecutive lessons or, in other words, four times in a row across two lessons. The word then becomes a "learned" word and moves from the practice set to the "review set." Once ten words have been "learned" and moved to the review set, the program provides a cumulative review test on the review set. Any words missed on this cumulative review test are put back in the practice set, and the student must again meet mastery criterion on the word.

The *Large Teaching Set program* (Davidson & Eckert, 1983) teaches words in sets of twenty-five. The program comes with nine levels of 75 words each for grades 4 through 12. However, for the purposes of this study, the same 50 words used in the Small Teaching Set program appeared in the Large Teaching Set program as two sets of 25 words (see "Word Selection" below).

Each time the program is run, the student goes through the same 25 words in the same order. Unlike the Small Set program, some of the words will be words the student already knows, since there is no individualization. At the beginning of the lesson, the program presents a menu with a choice of four formats: "word display," "multiple choice quiz," "sentence completion," or an arcade-type game.

These activities include two word display and multiple choice quizzes similar to the Small Teaching Set program, and two that are quite different. Sentence completion involves spelling the new words, and the arcade activity involves matching exercises in a game format. For details, see Johnson (1985).

Feedback to Students

Both CAI programs provided immediate feedback to students on the accuracy of their responses. The verbal nature of positive feedback to students when they answered correctly was similar in the programs. In the Large Teaching Set program, when the student answered an item correctly, a message such as, "Nice going" or "Keep it up, (*name*)," appeared. When the student answered an item correctly in the Small Teaching Set program, the message, "Yes, the answer is _____," appeared.

The arcade-type game provided a type of reinforcement not available in the Small Teaching Set program. When the student accurately "shot" the correct answer, the answer was momentarily highlighted, and a score for that shot appeared briefly in the middle of the screen. Accompanying sound effects were turned off, in order not to distract other students and teachers in the room.

Table 1. A Teaching Frame from the Small Teaching Set Program.

The word ESTABLISH means SET UP.

Susie will ESTABLISH a new procedure for our meetings.
Susie will SET UP a new procedure for our meetings.

The bank is going to SET UP a new branch on the other side of town.
The bank is going to ESTABLISH a new branch on the other side of town.

Table 2. Two Practice Forms from the Small Teaching Set Program

They are working to ESTABLISH an organization to protect whales.

1. make legal
2. elect
3. fund
4. set up
5. join

The doctors are going to SET UP a new eye care clinic.

1. employ
2. attend
3. operate
4. cancel
5. establish

Both programs also provided feedback on the number of words correct. The Large Teaching Set program did this by giving the student a percent correct score at the end of an activity and then displaying any words missed. The Small Teaching Set program listed words on which the student had yet to meet mastery ("currently reviewing") and words mastered ("already learned").

Selection of Words for the Study

The Large Teaching Set program provides words, definitions, and exercises for 25 nouns, 25 verbs, and 25 adjectives for each level. Prior to the study, a list of those 450 words was given to six middle school and high school special education teachers in the district in which the study was to be conducted. These teachers picked words from this list which they considered important and useful for mildly handicapped secondary special education students to know. An initial list was constructed of 107 words which were considered important by two or more special education teachers. A final list of 25 verbs and 25 adjectives was developed for use in the study. All of these words were from the words commonly covered in grades 7, 8, and 9.

The same 50 words were entered and used in both the Small Teaching Set and Large Teaching Set programs. The same definitions were used in both the Small Teaching Set and Large Teaching Set programs. *The authors did not always agree with the definitions or items that appeared in the Large Teaching Set program.* For the purposes of the study, exercises written for use in the Small Teaching Set program were the same or very similar to items which appeared in the Large Teaching Set program. The differences between the effects of the programs, if any, were intended to be a function of instructional design features.

Procedures

Following pretesting (see Measures below), all subjects received computer-assisted vocabulary instruction during a 20-minute session each Monday through Thursday. Since the 45-minute periods were divided into two separate sessions, some students began the period with a computer session and then returned to their regular instructional group, while other subjects first attended their instructional group and then completed a session on the computer. Although students were randomly assigned to treatments, only students in the same treatment condition worked on the computers during any session to ensure that students were not able to observe the other treatment. The computers were spaced apart and the color monitors turned so that, as much as possible, students were unable to see the monitor screen of any other students in the same treatment. Care was taken that no vocabulary instruction, other than that provided by the computer programs, took place during the study.

The experimenter for the study was a doctoral student in Special Education at the University of Oregon. The experimenter was present for each session to ensure that the sessions lasted exactly 20 minutes, that students actively worked on the computer with minimal talking, that they completed as many lesson activities as possible during the 20 minutes, and that they took the optional reviews of missed words at the end of the "multiple choice quiz" exercises in the Large Teaching Set program. The experimenter also completed checklists on each student's daily progress.

No other management system was required for the students in the study. Although the special education resource room teacher told the students on the first day of the study that they could earn the same number of points while on the computer that they might earn in their regular instructional group, no further mention of points was made during the study. Only occasionally did some students have to be reminded not to talk to others. One student had to be reminded to press the keys, rather than pound on them, when the screen said, "Press ENTER." Another student had to be warned about talk-outs, and this was the student who was present for only seven sessions and after that was absent so often that he did not complete the study.

Familiarization with the computer and word-reading practice. During the first 5 minutes of sessions 1 and 2, the experimenter taught the students how to load the program disks and start up their programs. Most students had little, if any experience operating a computer. During the next 5 minutes of the first two sessions the experimenter provided word-reading practice on words that were to appear in the program. The words were printed in short columns on two practice sheets, and students took turns reading columns out loud. If a student misread a word, the experimenter told the student the word and directed the student to repeat the word and reread the column from the beginning.

Eight students, four in each treatment, displayed difficulty in accurately decoding and pronouncing words during word-reading practice. These students each scored 40% correct or less on the pretest. Two additional 5-minute word-reading practice sessions were held, prior to sessions 3 and 4, for these students.

Mastery criterion for Large Teaching Set. The experimenter told the students in the Large Teaching Set program that their goal was to get a score of 84% correct (21 correct out of 25). They were told that if they scored 84% or higher, they could play the arcade-type game, and if they scored 84% or higher on two consecutive days, they would move on to a new activity.

On each day that the students scored 84% correct or more, the students completed the reviews and then spent the remainder of the session playing arcade the game, usually no more than twice in the time remaining. After meeting the criterion of two days at 84% correct or more on the multiple choice quiz, the student was told to select the sentence completion activity, which were done only once, without review.

After meeting criterion on the multiple-choice quiz and doing the sentence completion activity one time, the subject began the second list of 25 words, the same 25 verbs which were words 26 through 50 in the Small teaching Set program. The student followed the same sequence of activities for this second list of words. Once the student completed all activities on both word sets, the student was considered to have met mastery criterion for the study.

Measures

Pretest, posttests, and maintenance test. A 50-item, multiple-choice test requiring the student to select the correct

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CAI Vocabulary

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definition of a word was developed for use in the study. Items were similar to what appeared in the practice frames (see Table 2). This instrument had a coefficient alpha reliability of 0.79. The pretest to posttest-correlation was .68.

Transfer Measures. All students took a 10-item, open-ended oral test ("What does _____ mean?"). The test was designed to measure transfer from the visual CAI mode to spoken vocabulary. The test was administered by one of three doctoral research assistants in the Special Education program at the University of Oregon. The tester wrote down as much of the student's responses as possible and also audiotaped the test. For each word the student was asked to give a definition and to use the word in a sentence.

After the student met mastery criterion (or after session 11 for those subjects who did not meet mastery), a test consisting of three passages and inferential comprehension questions was administered. These passages contained a total of 10 verbs which were most frequently missed on the pretest. The passages were designed to assess students' understanding of the words in contexts other than the sample sentences which appeared in the programs.

An example from the comprehension test appears in Table 3.

Attitude survey. The attitude survey questioned them about working on the computer and the specific CAI programs. The items asked the students how they felt about working on the computer and how much they felt they learned.

Design

A *time-to-mastery design* was used to examine whether there was a significant difference between the times required to reach mastery by students in the two programs. Student acquisition and retention of word meanings were assessed by a criterion-referenced test. This 50-item, multiple choice test was administered: (a) after the student reached mastery, or (b) after session 11, even if mastery was not reached. Two weeks later, the test was readministered as a maintenance test.

Results

Time to Mastery

Table 4 presents a summary of the number and percentages of students who met mastery within eleven sessions and the mean number of sessions to mastery for students in both treatments. The study was terminated after the eleventh session because the experimenter felt that the students who were still struggling to reach mastery were no longer benefiting from instruction. For the students who met criteria, the mean number of sessions to mastery was 7.6 for students in the Small Teaching Set program, and 9.1 for students in the Large Teaching Set program. Results of a *t*-test indicated that this difference in sessions to mastery was statistically significant: $t(16) = 1.87, p\% = .05$.

Posttests and Maintenance Tests

The 50-item, criterion-referenced, multiple-choice test was administered to each student as a posttest after meeting mastery. Those students who did not meet mastery by the end of the 11th session were administered the multiple choice test after session 11. The same test was re-administered as a maintenance test two weeks later. A summary of tretest, posttest, and maintenance test results are presented in Table 5.

A 2 x 2 analysis of variance (ANOVA) was performed on the posttest and maintenance test scores. The between-subjects factor was type of instruction, and the within-subjects factor was time of testing.*

Table 3.

Denise enjoyed her back yard. In the fall, the yard was covered with leaves. Denise had procrastinated. Saturday was cool and crisp. Denise decided to rake the leaves. At first, her hand felt cold and stiff on the rake handle. Soon, she acclimated. She enjoyed the clear, sunny skies and the rustle of the leaves.

1. Denise raked the leaves in her yard
   a. before she was supposed to.
   b. just when she was supposed to.
   c. after she was supposed to.
2. When Denise finished raking
   a. her hands were still stiff.
   b. her hands felt fine.
   c. her hands were hot.
3. Denise enjoyed the clear, sunny skies and
   a. the sound of the leaves.
   b. the fall colors.
   c. the smell of the leaves.

Table 4. Number and Percentage of Students Reaching Mastery Criterion and Mean Number of Sessions to Mastery for Small Teaching Set and Large Teaching Set Samples

Group	N	Number of Students Reaching Mastery within 11 Sessions	Percentage of Students Reaching Mastery within 11 Sessions	Mean Number of Sessions to Mastery	SD
Small Teaching Set	12	10	83	7.6	1.9
Large Teaching Set	12	8	67	9.1	1.5

Table 5. Mean Score, Standard Deviation, and Mean Percent Correct on 50-item Pretest, Posttest, and Maintenance Test for Small Teaching Set and Large Teaching Set Samples

	Pretest				Posttest			Maintenance		
Group	N	M	SD	Mean Percent Correct	M	SD	Mean Percent Correct	M	S	Mean Percent Correct
Small Set	12	24.7	8.1	49.3	42.0	4.0	84.0	40.5	7.1	81.0
Large Set	12	24.8	8.2	49.5	43.7	7.7	87.8	42.0	7.7	84.0

Table 6. Comparison of Mildly Handicapped with Nonhandicapped Samples: Multiple-Choice Test

Group	Test	N	M	SD	Mean Percent Correct
Small Teaching Set	Posttest	12	42.0	4.0	84.0
Large Teaching Set	Posttest	12	43.7	7.7	87.4
Nonhandicapped Comparison (10th grade)	--	26	40.3	4.9	80.6

Results of the ANOVA indicated that there was no effect for type of instruction: $F(1,22) = 0.33$. Results of the ANOVA demonstrated that there was a slight drop in performance between posttest and maintenance test for students in both groups: $F(1,22) = 4.94$, $p<.05$. Mean performance was close to a mastery level for both groups on both measures, 84 to 87% on the posttest and 81 to 84% on the maintenance test. Students in both programs learned as much, as measured by the criterion-referenced posttest, and retained as much, as measured by the maintenance test.

Comparison with Nonhandicapped Students

The 50-item multiple choice test was administered to nonhandicapped 10th-grade students in a regular English class in order to compare the posttest performance of the mildly handicapped students to that of a nonhandicapped sample on the same measure. As Table 6 demonstrates, the posttest mean scores of the mildly handicapped students were slightly higher than the nonhandicapped students' mean scores. Students in all groups scored at close to mastery levels (range = 80-87%).

After a maximum of eleven sessions of computer-assisted vocabulary instruction, the performance of mildly handicapped subjects on the multiple-choice test was very similar to that of nonhandicapped 10th-grade student who had received no instruction on the same 50 words.

Transfer Measures

Each student was administered an open-ended oral test on word meanings after session 7. A maximum of two points was awarded to each item, one for a correct definition and one for an appropriate sentence. Partial credit (one-half point) was given to responses which were correct, but incomplete. Results of a *t*-test on students' scores on this measure indicated that differences between groups were non-significant; $t(22) = .45$. The mean was 6.4 for the Small Teaching Set group and 7.2 for the Large Teaching Set group; standard deviations were 4.7 and 4.4, respectively.

On the written comprehension test, differences between the two groups were again small and nonsignificant; $t(22) = .57$. The means were 1.4 and 2.1. Scores on the two transfer tests were appreciably lower than those on the multiple-choice test, as expected.

Attitude Survey

Results of the attitude survey indicated that, for the most part, students responded favorably toward computer-assisted instruction and the programs. Twenty-three of 24 students felt the

Continued on Page 7

* The pretest was not included in the ANOVA for the following reason. The time between this posttest and the maintenance test was the same for all subjects (two weeks), but the time between pretest and posttest was not the same for different students. Thus repeated measures could not be used.

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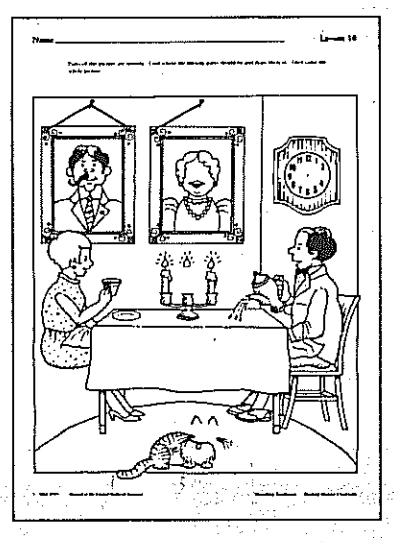

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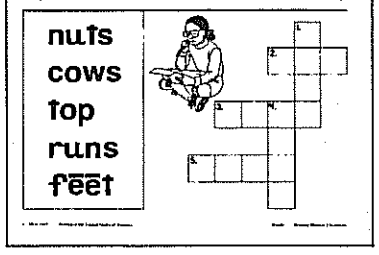

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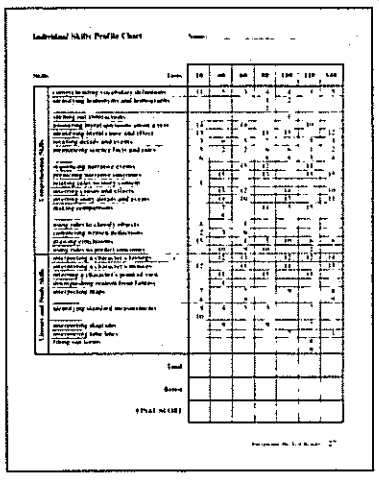

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CAI Vocabulary Continued from Page 5

computer helped them learn new words, and one student indicated that "maybe" the computer helped.

In answer to the question, "Did you enjoy working on the computer?" students answered on a 4-point scale, with 1 being "not very much" and 4 being "very much." The mean scores were 3.4 for students in the Small Teaching Set program and 2.8 for students in the Large Teaching Set program. Results of a Mann-Whitney U Test indicate this difference was significant: $U = 43.5$, $p<.01$.

Ninteen students indicated they would like to learn more on a computer, and three students indicated that "maybe" they would. Two students, both in the Large Teaching Set program, indicated they would not like to learn more on a computer.

Discussion

The results of this comparison of two methods of computer-assisted vocabulary instruction with mildly handicapped high school students will be discussed in terms of: (a) time required to reach mastery criterion, (b) growth in word knowledge, (c) transfer of learning, and (d) student attitudes toward computer-assisted instruction.

Time-to-Mastery

In previous studies which attempted to improve students' word knowledge through the direct teaching of word meanings, the effects of various instructional procedures were compared. Those studies which demonstrated sizable gains did so at an expense of considerable instructional time. This study was the first to focus on efficiency as a dependent variable.

The one unequivocal finding of the study was that subjects taught with the Small Teaching Set program reached mastery criterion on the set of 50 words significantly faster than students taught with the Large Teaching Set program. The difference in the number of sessions required to reach mastery by the two groups was statistically significant. Also, more students in the Small Teaching Set program reached mastery within 11 sessions.

Given that the groups achieved equivalent levels of performance on the multiple-choice tests, their difference in acquisition rates become even more meaningful. Students taught with the Small Teaching Set program required less time to meet mastery criterion on the words, yet their posttest performance was equal to that of students in the other treatment who took longer reaching mastery. In addition, there was no difference in their retention of word meanings.

These findings regarding the efficiency of the Small Teaching Set program may hold future import for teachers of low-performing or reading-disabled students. An efficient, computer-assisted method of vocabulary instruction could provide an additional tool for teaching vocabulary, without placing further burdens on teachers' time.

Growth in Word Knowledge

The growth in word knowledge evidenced by both groups provides encouraging support for the use of computer-assisted instruction in vocabulary with mildly handicapped students. Each group started with a pretest mean score of about 50%, after seven 20-minute sessions, each group's mean score was around 80% (Johnson, 1985, p. 67). When students were tested after reaching the mastery criterion determined for their program, or after 11 sessions for those six subjects who did not reach mastery criterion, each group's mean score was around 85%. These scores reflected a commonly accepted minimum mastery level: approximately 85% correct. Finally, on the maintenance test, administered two weeks later, each group's mean score was above 80%. Although the drop between posttest and maintenance test was statistically significant, 80% is still a high level, especially considering that students began at a 50% level.

Transfer of Learning

Students' low scores on the two transfer measures should not be surprising. Without specific training for transfer, mildly handicapped adolescents often fail to generalize academic skills (Alley, Deshler, Clark, Schumaker, & Warner, 1983). Both the oral test of word meaning and the test of passage comprehension required response modes considerably different from the multiple-choice response mode of the CAI vocabulary programs. While students scored 85% correct on the multiple-choice posttest, they score approximately 35% on the oral test of word meanings and 50% on the comprehension test. Lack of specific training on the kinds of tasks tested by the transfer measures was likely the primary reason for students' low scores. The implication is clear. Students need training in transfer of skills learned in CAI formats.

Student Attitudes toward Instruction

On the attitude survey, most students indicated they enjoyed computer-assisted instruction and the CAI programs. When asked to indicate what they specifically liked about working on the computer, perhaps the most telling response was, "It help keep your mind on what you where (sic) doing." Students' positive response to computer-assisted instruction lends credence to the claims of Budoff, Thormann & Grask (1984) that advantages of CAI with special education students include increased attention, immediate feedback about performance, immediate reinforcement, and motivation.

On the question, "Did you enjoy working on the computer?" students rated the Small Teaching Set program significantly higher, as the results of a Mann-Whitney Test demonstrated. This finding is interesting as it relates to the design of CAI programs. While the Large Teaching Set program had an "arcade" type game, the Small Teaching Set was designed to foster rapid learning. During the study, some students in the Small Teaching Set program occasionally asked the experimenter why they didn't get to play a game like the one in the other program. The experimenter wondered if this difference in programs might bias the students against the Small Teaching Set program. The results indicated, however, that the students in the Small Teaching Set program, which tailored lessons to their individual learning needs, rated that program more highly.

This finding is important for those designers of CAI programs who apparently believe that for educational software to be motivating, it must approximate computer games which are popular in video arcades and in the home video market. Results of the attitude survey in this study do not support such reasoning.

Suggestions for Future Research

This study contrasted two packaged CAI programs. The major difference between the programs related to the size of the teaching and practice sets and the procedures for individualization and cumulative review. Yet other subtle differences between the software programs may have affected the outcomes. Since an effect for time to mastery was clarly demonstrated for the Small Teaching Set program, the posttest performance levels were equivalent for the two groups, future research might focus on only the Small Teaching Set program. By varying the size of teaching and practice sets, and by comparing different schedules for cumulative review exercises, more exact effects of these variables could be measured.

The programs taught words contained in a 50-word set. Future research with the Small Teaching Set program could utilize a larger set of words and thereby better examine the effects of cumulative reviews.

A potential problem in the use of CAI in special education is the computer-presented text *may be inappropriate for teaching students with reading disabilities* (Hofmeister, 1982). In this study, eight students, four in each treatment, had difficulty reading the words during the two short word-reading practice sessions at the beginning of the study. These students scored below 40% correct on the pretest. Two additional 5-minute word-reading practice sessions were provided, but this limited amount of instruction did not overcome the difficulties these students had reading the exercises in the programs. Six of them did not meet mastery criterion in 11 sessions, yet their mean score on the posttest was 73% ($SD = 8.0$, range = 48-90). Only one student (who was taught with the Large Teaching Set program) showed no gains between pretest and posttest.

Although most learning disabled student's learned from the CAI programs, performance levels were very low on the transfer measures. These six students' mean score on the oral test of word meanings was only 17.1% ($SD = 13.5$, range = 8.5-43.5). If disabled readers are to benefit from computer-assisted vocabulary instruction, future studies need to investigate the effects of integrating teacher-directed and computer-assisted instruction. This integration should improve students' performance on oral tests of word meanings.

Summary

This study was unique in three respects. First, it was the only vocabulary study to investigate efficiency as a dependent variable. Second, no research on the use of computer-assisted vocabulary instruction had been conducted previously. Finally, all past vocabulary instruction studies were conducted with middle-grade, rather than secondary-level, students, and only one previous study had been done with special education students. This vocabulary instruction study was the first with high school students in a special education setting.

The potential impact of efficient, computer-assisted vocabulary instruction with mildly handicapped students is clearly suggested in the gains made by subjects in the study. The difference in efficiency favoring the Small Teaching Set program appears to be due to: (a) the small teaching and practice set sizes, (b) individualized lessons based only on words the subject does not know, and (c) cumulative reviews of words learned in the program. If future studies can document similar gains across larger sets of words over longer periods of time, the potential for this type of instruction may be realized. For teachers of low-performing or reading-disabled students, such findings might lead to useful instructional tools.

References

Alley, G.R., Deshler, D.D., Clark, F.L., Schumaker, J.B., & Warner, M.M. (1983). Learning disabilities in adolescent and adult populations: Research implications (part II). *Focus on Exceptional Children, 15*(9), 1-14a.

Anderson, R.C., & Freebody, P. (1981). Vocabulary knowledge, In J.T. Guthrie (Ed.), *Comprehension and teaching: Research reviews.* Newark, DE: International Reading Association.

Beck, I.L., Perfetti, C.A., & McKeown, M.G. (1982). Effects of long-term vocabulary instruction on lexical access and reading comprehension. *Journal of Educational Psychology, 74,* 506-521.

Budoff, M., Thormann, J., Gras, A. (1984). *Microcomputers in special education.* Cambridge, MA: Brookline Books.

Carnine, D., Kameenui, E.J., & Coyle, G. (1984). Utilization of contextual information in determining the meaning of unfamiliar words. *Reading Research Quarterly, 19,* 188-204.

Carnine, D., Rankin, G., & Granzin, A. (1984). *Learning vocabulary.* Unpublished computer program, Eugene, Oregon.

Davidson, J.G., & Eckert, R.K. (1983). *Word attack!* [Computer program]. Ranchos Palos Verdes, CA: Davidson & Associates.

Deese, J.E., & Hulse, S.H. (1967). *The psychology of learning.* New York: McGraw-Hill.

Draper, A.G., & Moeller, G.H. (1971). We think with words (therefore, to improve thinking, teach vocabulary). *Phi Delta Kappan, 52,* 482-484.

Durkin, D. (1979). What classroom observations reveal about reading comprehension instruction. *Reading Research Quarterly, 14,* 481-533.

Gay, L.R. (1983). Temporal position of reviews and its effect on the retention of mathematics rules. *Journal of Educational Psychology, 64,* 171-182.

Hall, J.F. (1971). *Verbal Learning and retention.* Philadelphia: Lippincott.

Hofmeister, A.M. (1982). Microcomputers in perspective. *Exceptional Children, 49*(2), 115-121.

Johnson, G.L. (1985). Computer-assisted vocabulary instruction with mildly handicapped high school students. Unpublished doctoral dissertation. Eugene, OR: University of Oregon.

McGeoch, J.A., & Irion, A.L. (1952). *The psychology of human learning.* New York: Longmans, Green.

McKeown, M.G., Beck, I.L., Omanson, R.C., & Perfetti, C.A. (1983). The effects of long-term vocabulary instruction on reading comprehension: A replication. *Journal of Reading Behavior, 15,* 3-18.

Merrill, P.F., & Salisbury, D. (1984). Research on drill and practice strategies. *Journal of Computer-Based Instruction, 11*(1), 19-21.

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Videodisc Fractions Continued from Page 1

students work. This pattern of explanation followed by student written activities is presented for several concepts in each lesson. By presenting explanations with questions periodically within each lesson, more students remain attentive. Independent work is done in shorter, more frequent, segments to increase the amount of academic engaged time.

Review Procedures

In the basal program, a skill is introduced and practiced, but then "disappears" for several days. For example, *Mathematics Today* teaches multiplication of fractions in one lesson. In subsequent lessons, other skills are introduced, including multiplication of whole numbers and fractions, and multiplication of mixed numbers. However, for the next three lessons students work with word problems, reciprocals, and division, after which students are expected to perform the multiplication of fractions independently on review and test lessons.

In *Mastering Fractions*, the skill of multiplying fractions is introduced and then practiced *on every subsequent lesson in the program*. Each new skill that is taught is reviewed cumulatively, or else incorporated into more complex skills.

Discrimination Practice

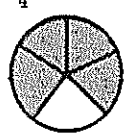
Students who learn to carry out certain steps again and again on the same type of problem may have difficulties when they encounter different problem types mixed together on a test. For example, a 14-day unit in the basal program introduces adding and subtracting fractions. In the next unit, students learn the strategies for multiplying and dividing fractions. No practice is given on *discriminating* between the strategies (e.g., multiplication and addition). In the review and test lessons, the problem types are still separated. Students never receive discrimination practice between strategies. After the two units, fractions operations do not appear again in the text *for the remainder of the school year*.

In *Mastering Fractions*, a skill is introduced, practiced, and within a few lessons mixed with other types of problems. For example, exercises in the lesson presentation specifically address the differences between addition and multiplication strategies. If students have difficulty making the discrimination, specific remediation is given, after which students are required to work a set of problems involving both operations. The skills are then integrated with other types of problems on every worksheet.

Darch, Carnine and Gersten (1984) compared the effectiveness of a regular basal mathematics curriculum with a curriculum program similar to *Mastering Fractions* in that it incorporated systematic discrimination practice. Students who received discrimination practice performed significantly better than students who did not on a criterion-referenced posttest and maintenance test. Englert (1984) also emphasizes the importance of discrimination practice for mildly handicapped students, to avoid confusion between related concepts.

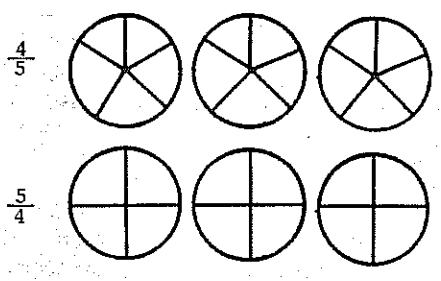
Example Selection — Range of Examples

In the basal program, when students first encounter pictures of fractions, all examples are less than one. In the next grade level, mixed numbers are introduced as a whole number and a fraction, reinforcing the misconception that fractions can only represent qualities less than one. Improper fractions do not appear until the next grade level. A common error occurs when improper fractions are finally introduced; students represent these fractions as less than one; e.g., for $\frac{5}{4}$ students write:

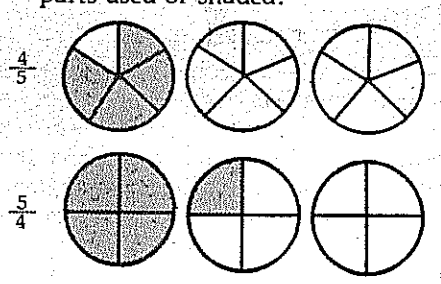


Mastering Fractions teaches students a strategy for reading and writing both proper and improper fractions from the beginning of the program:

1. The denominator tells the number of parts in each group:



2. The numerator tells the number of parts used or shaded:



The wide range of examples prevents students from forming misconceptions and gives students a more complete understanding of what a fraction represents.

In a carefully controlled experiment, Carnine (1980) demonstrated how a limited range of examples can cause students to form misconceptions. The instructional task was to write fractions of a hundred as decimals. One group of students was presented with a wide range of examples, with numerators of one, two or three digits (e.g., $\frac{185}{100}$, $\frac{2}{100}$, $\frac{75}{100}$). The other group was presented with a limited range of examples; all numerators comprised two digits (e.g., $\frac{28}{100}$, $\frac{84}{100}$, $\frac{55}{100}$). Carnine hypothesized that students in the limited range group would learn the misconception that the decimal point is always placed directly in front of the digits in the numerator (i.e., 4/100 = .4, 185/100 = .185). His prediction that these students would not be able to generalize to other examples was verified. Students in the limited range groups scored 0% and 7% respectively on the problem types X/100 and XXX/100 on the immediate posttest. Students who had received the full range of examples scored 89% and 93% respectively.

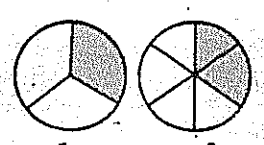
Easily Confused Labels

When highly similar terms (e.g., the terms numerator and denominator) are introduced at the same time, there is an increased likelihood that students will become confused. In the basal program, the terms *numerator* and *denominator* were introduced together in the same lesson. In subsequent fraction examples, the teacher referred to the terms *numerator* and *denominator*, and the labels appeared on some worksheets, but no systematic teaching ensured that students could successfully apply the labels to the appropriate parts of a fraction.

In the *Mastering Fractions* program, the introduction of the terms numerator and denominator were separated by several lessons, so that students were facile with one label before the other, similar label was introduced. This procedure decreases the likelihood that students will become confused and make reversals.

Explicit Strategy Teaching

In the basal program, students are not always given an explicit strategy to solve a problem. This could lead to student misunderstandings. Equivalent fractions serve as an example. In the first set of basal exercises, pictures of the two equivalent fractions, and three of the four fraction numbers are given; the students just count the number of shaded parts to complete the problem:



$$\frac{1}{3} = \frac{?}{6}$$

Students can write the fourth number and complete the equation without understanding anything about equivalent fractions. The students just count the shaded parts and write the numerator. In the final set of exercises given that day, the pictures are removed.

$$\frac{3}{4} = \frac{?}{8}$$

The student workbook says, "You may draw a picture to help you." At least some students will not be sure how many parts to draw or shade; unless, of course, they already know how to rewrite $\frac{3}{4}$ as $\frac{6}{8}$.

In *Mastering Fractions*, the strategy for equivalent fractions emphasizes this rule: When you multiply by one you don't change the value. When a fraction is multiplied by a fraction equal to one, the original fraction is equivalent to the new fraction; i.e.,

$$\frac{1}{2} \times 1 = \frac{1}{2}$$

$$\frac{1}{2} \times \frac{4}{4} = \frac{4}{8}$$

so, $$\frac{1}{2} = \frac{4}{8}$$

With this conceptual basis for equivalent fractions, students are introduced to the strategy for figuring out the missing number, given a problem; e.g., $\frac{2}{3} = \frac{[\,]}{6}$. Students identify the fraction of one they must multiply $\frac{2}{3}$ by to end up with 6ths. $\frac{2}{3}\left(\frac{\ }{2}\right) = \frac{[\,]}{6}$. The denominator of the fraction inside the parentheses is 2, so the fraction equal to one is $\frac{2}{2}$. Therefore: $\frac{2}{3}\left(\frac{2}{2}\right) = \frac{[\,]}{6}$. Thus, the missing numerator is 4. Therefore: $\frac{2}{3} = \frac{4}{6}$.

Kameenui, Carnine, Darch, and Stein (in press) compared a basal approach to introducing fractions with a strategy-based approach similar to that found in the *Mastering Fractions* curriculum. For the explicit rule-based strategy group, the teacher demonstrated concepts and skills in a step-by-step fashion. Teacher guidance was gradually and systematically faded until students were performing independently. Correction procedures directed students to the explicit instruction they had received. In contrast, the basal approach was much less structured. Emphasis was placed on activities using student discussion and the use of manipulatives. Students in the explicit strategy group performed significantly higher on a criterion-referenced posttest and on a transfer test of related fractions skills.

The Videodisc Technology

Videodisc technology has great potential as an instructional medium (Hofmeister, Engelmann, & Carnine, in press). One side of a videodisc contains 54,000 high resolution individual frames. The frames can be shown in rapid succession to create motion sequences or displayed as single frames for any period of time. Moreover, a teacher using a videodisc program has almost instant access to any portion of the disc. Using a remote control pad (very similar to the remote control for a TV) the teacher can access anywhere on the disc in a matter of seconds. Automatic stops can also be built into the disc; the program can then freeze on any predetermined frame allowing the students to work problems or the teacher to elaborate on a concept.

The *Mastering Fractions* program takes advantage of the videodisc medium to demonstrate concepts clearly. For example, when equivalent fractions are taught, a fraction is put on a balance beam. The side with a fraction tips down. When an equivalent fraction is placed on the other side, the balance becomes level. The video sequence shows what equality means in a vivid, compelling manner. Computer graphics, sound effects, highlights and other techniques also help maintain student attention.

The capabilities of the videodisc can do more than create compelling motion sequences. The videodisc can also assist the teacher in diagnosing and remedying student errors. Quizzes and tests on the disc help the teacher diagnose students as having difficulty with a particular skill area. Following each quiz, addresses (numbers) are displayed on the screen for the skills tested. The teacher enters the address for the segment that is needed, providing immediate remediation, through demonstrations and extra practice problems.

Method

A study was conducted to determine whether the instructional features incorporated into the videodisc program would have a significant effect on stu-

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Videodisc Fractions Continued from Page 8

dent performance. The study compared the relative effects of *Mastering Fractions* and a traditional basal program on student acquisition of skills in a unit on fractions. Classroom behaviors known to be correlates of learning (academic engagement and success rate during the lesson) were also measured and an analysis of students' error patterns was made. Student attitudes were also asses sed, and information on obtained levels of implementation were recorded.

Subjects

Prior to training, subjects from two high school math classes were screened for: (a) mastery of the preskills necessary to learn basic fraction concepts and operations, and (b) prior knowledge of the specific skills to be taught. One was a remedial math class containing 22 students, including 11 special education (mildly handicapped) ninth and tenth graders. The other general math class contained 12 ninth-graders in need of remedial math, along with 6 ninth, tenth, and eleventh grade mildly handicapped students. In each classroom, qualifiying students were randomly assigned to the basal text (BT) or interactive videodisc (IV) treatment. This resulted in four instructional groups. In the remedial class, 9 students were assigned to each treatment. In the general math class, 8 students were assigned to each treatment. Out of 34 subjects, only 28 completed the study and took the posttest; 26 students took the maintenance test. Table 1 shows the number of subjects qualifying in each group who completed the study.

Table 1. Distribution of Subjects in the Four Instructional Groups

	Remedial Math	General Math	
Basal			
MH*	5	5	10
non-MH	3	3	6
Videodisc			
MH	6	1	7
non-MH	1	4	5

*mildly handicapped

Measures

Preskills screening test. A screening test, developed by the experimenter, was administered to ensure that students had mastered the requisite whole number skills for a unit in fractions (i.e., facility with basic addition, subtraction, and multiplication facts). The first part of the test comprised ten of the more difficult facts. All students who were tested achieved at least 80% and were eligible for the study based on this criterion.

The second part of the screening test was criterion-referenced to the skills to be taught in the fractions unit. Students who scored above 50% on this part were ineligible for the study. Ten students were excluded based on this criterion. Eligible subjects were grouped in pairs, matched on Total Math scores from the California Achievement Test and on pretest scores. Individual students within each pair were then randomly assigned to the two treatment conditions. The mean scores on a 6-item pretest for the videodisc and basal groups were 2.4 and 2.1 respectively. (Information was not available for all students; $N = 10$ for the IV group, $N = 14$ for the BT group.)

Measures of achievement. The principal measure for the study was a criterion-referenced test developed by the experimenter. Two parallel forms were developed as a posttest and a two-week maintenance test. The test included the following skills, taught in both the IV and BT conditions: writing fractions from pictures, vocabulary (e.g., denominator), addition and subtraction and fractions with like denominators, multiplication of fractions, and multiplication of a fraction and a whole number.

Field-test versions of the CRT were given to 30 fourth and fifth graders who had had some fractions instruction. Internal consistency reliability was assessed for each form; coefficient alpha reliability was .98 for the posttest and .98 for maintenance test. Alternate form reliability was also evaluated; the Pearson correlation coefficient was .96.

Measures of classroom variables. Two classroom variables associated with higher student achievement are: (1) total time students are *actively engaged* in instructional activities (*time on-task*; Rosenshine, 1983), and (2) student *success rate* while doing independent seatwork (Fisher et al., 1980).

An observational recording form was designed to measure *active engagement* during instruction. There were two groups of students in each condition. Each group of students was observed either 3 or 4 times during the study. Student behaviors were recorded with a six-second, momentary time-sampling procedure. On-task behaviors included answering questions, writing, and attending to the lesson presentation. Behaviors recorded as off-task included doodling, sleeping, or chatting to another student. Other behaviors (e.g., passing out papers, waiting for teacher assistance) were recorded as transitional activities.

Students' independent seatwork was collected at the end of 4 observation lessons to measure *success rate.* The percent of problems attempted and the percent that were successfully completed were calculated.

Student responses on the posttest and maintenance test were analyzed to determine patterns of frequently occurring or chronic errors. The error analysis was used to pinpoint aspects of the treatments that could have contributed to student errors.

Measures of implementation. Implementation checklists were used to identify those elements of the teaching models that were consistently implemented and those implemented at lower levels. The checklists were similar to the form developed by Good, Grouws & Ebmeier (1983). All items on the checklists were operationally defined. Below are two sample items that were applicable to both instructional models.

	YES	NO	NA
1. Did the teacher award points for independent work done on the previous day?			
2. Did the teacher circulate during independent work reinforcing appropriate behavior?			

Items relating specifically to the IV model (e.g., whether the teacher checked student performance at the specified points in the lesson, or administered a daily review quiz) were developed using the videodisc teacher's guide. Items applicable only to the basal text method (e.g., whether the teacher provided an opportunity to use manipulatives; or whether the teacher supplied examples in addition to those presented in the text) were developed using the basal text teacher presentation book. Each item scored in the "Yes" category by the observer was tallied, and the percent of total checks possible was calculated for each lesson observed.

Measures of student attitudes. A questionaire was developed, based on the work of Fennema and Sherman (1976). Students were asked their opinion on a 3-point scale in response to a series of statements that related to students' evaluation of their math ability and of the relevance of fractions for daily life. For instance,

1. I think I could handle more difficult fractions.
2. Learning fractions is a waste of time.

Items were read to students one at a time and the question asked, "Is this true for you?" Students responded to each item with: Yes, No, or Don't Know.

Materials

Interactive videodisc. The materials required for implementation of the IV fractions curriculum were: A videodisc player, the videodiscs, consumable student worksheets, and teacher answer keys.

Each videodisc lesson took approximately 30 minutes to complete. Lessons typically began with a brief quiz covering the essential skills introduced in the previous lesson. The lesson presentation followed next—an explanation followed by written problems for each of several skills. After completing the lesson, students were assigned independent problems for seatwork. The worksheets comprised 20 to 40 items, including a variety of skills that students had learned thus far.

In the IV curriculum, every fifth lesson was a test. Teachers used the tests to determine whether a review of particular skills was necessary from any of the four lessons preceding the test lesson.

Basal text. The materials required for implementation of the BT fractions curriculum were: A teacher presentation book (with answer keys), student textbooks, and consumable worksheets. In some lessons, manipulatives were also used, e.g., paper strips or fraction pie models.

Each 30-minute lesson was designed to teach a single objective. Each lesson began with an introduction, in which the teacher used discussion and demonstrations to develop ideas. Next, the teacher guided students through several examples in the student textbook before assigning in-class problems. After completing the lesson, follow-up activities, usually involving manipulatives, were used to consolidate the concept developed in the lesson. Students were then assigned independent problems for seatwork. The worksheets comprised 20-40 items focusing on the student objective introduced that day.

Review tests were provided at the end of the unit, sampling each of the major skills and concepts that had been introduced. Teachers used the results of the review test to reteach concepts and skills that students had not mastered. The unit test was presented the next day. The review and unit tests sampled the same skills in the same order, and had a standardized test format.

Procedures

The teachers were the experimenter and a research assistant from the University of Oregon. Each teacher taught one condition for one-half of the study, then changed conditions for the remainder of the study.

Monitoring implementation. The teachers were observed on 4 occasions to assess the level of implementation in each classroom. Teachers received specific feedback on their performance, using the Implementation Checklist (discussed under *Measures*). Throughout the study, teachers discussed any problems associated with the implementation of the two approaches.

Observers. Two trained observers recorded students' time on-task and percent correct responses on independent worksheets, on 3 or 4 occasions for each group of students. Before collecting the experimental data, the observers practiced using the instruments until interobserver reliability exceeded 85 percent.

Administration of measures. Criterion-referenced tests were administered to all students participating in the study immediately following the completion of the unit (posttest), and two weeks after completion of the unit (maintenance test).

Students' on-task behavior and success rate, and the levels of implementation were measured on the second, fourth, seventh, and ninth days of the intervention. The experimenter conducted student attitude surveys before and after completion of the study.

Results

The primary dependent variable was student performance on the 12-item criterion-referenced tests (post and maintenance). A 2 x 2 analysis of variance (Anova) was performed on the CRT scores. The between-subjects factor was the instructional method (videodisc versus basal text); the within-subjects (repeated) factor was the time of test (post and maintenance). Significant main effects were found for the instructional method ($F = 17.28$, $p < .001$) and for time of test ($F = 4.53$, $p < .05$). There was no significant interaction. Thus, the effect was maintained over a 2-week period. Figure 1 shows the mean scores for students in each condition on the post and maintenance tests. The IV group scored at a clear mastery level and was about 20% above the BT group.

Students in the videodisc and basal conditions were on-task 96% and 84%, respectively, during observation periods. A Mann Whitney U Test indicated a significant difference between the two conditions ($U = 3.5$, $p < .005$). Students' performance on independent seatwork was 92% for the BT group and 94% for the IV group.

Levels of implementation were extremely high in both conditions; 93% of the possible implementation behaviors were observed in the BT condition, and 94% in the IV condition.

Responses from the student questionnaires were summarized and assigned a score ranging from -1 (all negative responses) to +1 (all positive responses) for the students' perception of: (a) their

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Videodisc Fractions

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ability to be successful in fractions, and (b) the relevance of fractions for daily life. Students in both conditions made similar gains in perceived ability; the IV group made larger gains in perceived relevance. The results are summarized in Table 2.

Table 2. Mean Responses on Pre and Post Attitude Measures of Perceived Competence in, and Relevance of Fractions*

	Pre	Post	Gain
Competence			
IV	.08	.81	.73
BT	-.20	.58	.78
Relevance			
IV	.08	.57	.49
BT	.16	.31	.16

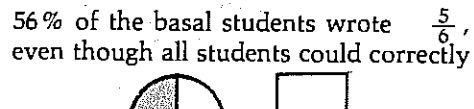
*Scores range from -1 (very negative) to +1 (very positive).

Discussion

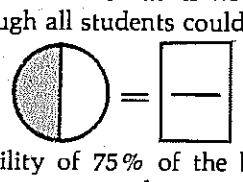
The results of this experiment suggest that the different methods of instruction produce different levels of student mastery of the content covered. The students receiving videodisc instruction scored significantly higher both on the criterion-referenced posttest and on the maintenance test. The videodisc scores also dropped less dramatically over time—a non-significant drop of 1% compared to a drop of 7% for the basal text students.

While a significant difference was found between the two conditions for students' on-task behaviors, it should be noted that levels of on-task were high in both conditions. Students receiving the basal lessons were well motivated and actively involved during the lesson. This would imply that the quality of the IV curriculum—not merely the teaching procedures used in the study—was largely responsible for the differences in student performance.

Patterns of student errors also confirm the importance of the specific differences between the programs. For example, a large proportion (75%) of students in the basal treatment made errors when asked to write the fraction for a diagram representing a fraction greater than one. Given the diagram



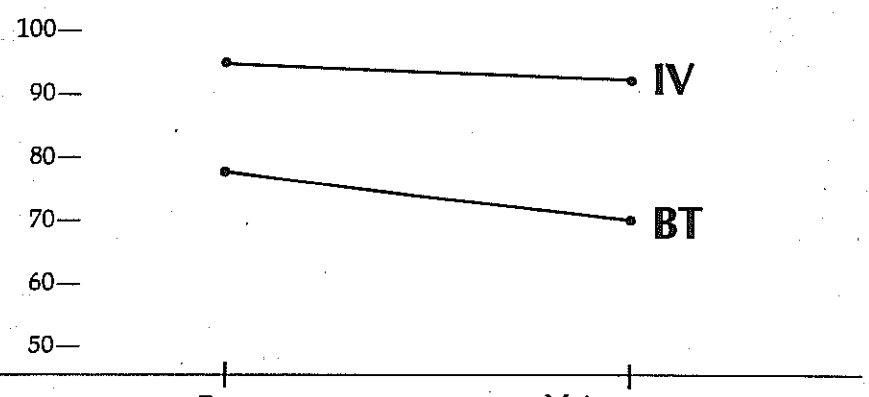
56% of the basal students wrote $\frac{5}{6}$, even though all students could correctly identify



as $\frac{1}{2}$.

The inability of 75% of the basal text students to extrapolate to fractions greater than one is a predictable consequence of all examples being less than or equal to one during the treatment intervention. In contrast, only 8% of the videodisc students, who had been exposed to fractions greater than one, exhibited this error on the post test. This parallels the results of the Carnine study (1980) cited earlier.

Figure 1. Mean Percent Correct Scores on the Post Test and Maintenance Tests for Interactive Videodisc and Basal Treatments



Standard Deviations

	Post	Maintenance
IV	.98	1.14
BT	2.19	1.88

Advantages and Disadvantages of the Videodisc Medium

There are other important advantages resulting from using the videodisc medium in the classroom, apart from the instructional capabilities already discussed. First, the videodisc presentation frees the teacher from demonstrating at the front of the classroom, and enables the teacher to move among the students and monitor their performance.

Second, a well designed videodisc program can improve the quality of instruction provided by less confident (e.g., reassigned) teachers. Not only does the videodisc program provide clear initial demonstrations, but also provides frequent checks on student performance which can help the teacher diagnose student errors and select appropriate remediation procedures.

Third, the discs are highly durable. Surface scratches do not hinder the video or sound quality when the disc is played. The quality of the disc does not deterioriate over time. The durability of the disc and long lasting quality of the audio and video result from the laser technology. The laser beam reads the grooves that lie below a heavy coating of plastic.

The most obvious disadvantage of the videodisc medium—as with any new technology—is the cost. However, the cost of hardware has already dropped substantially. Also, presenting videodisc lessons to *groups of students* makes the technology more affordable. The combined cost of the hardware and software for a program such as *Mastering Fractions* is about the same as two Apple microcomputers and one or two inexpensive math software programs. If the videodisc is used 5 periods each day with classes of 20 students, 100 students are served each day. In contrast, 2 microcomputers used for 5 periods each day serve only 10 students.

The capability of the videodisc medium to incorporate state of the art instructional design features, together with its cost effectiveness, speaks to its potential as a powerful instructional tool.

References

Carnine, D.W. (1980). Relationships between stimulus variation and the formation of misconceptions. *Journal of Educational Research, 74*(2), 106-110.

Carpenter, T.P., Coburn, T.G., Reys, R.E., & Wilson, J.W. (1976). Notes from national assessment: addition and multiplication with fractions. *The Arithmetic Teacher, 23*(6), 137-142.

Darch, C., Carnine, D., & Gersten, R. (1984). Explicit instruction in mathematics problem solving. *Journal of Educational Research, 77*(6), 351-359.

Englemann, S., & Carnine, D. (1982). *Theory of Instruction: Principles and Applications.* New York: Irvington Publisher, Inc.

Englert, C.S. (1984). Effective direct instruction practices in special education settings. *RASE, 5*(2), 38-47.

Fennema, E., & Sherman, B. (1976). Fennema-Sherman mathematics aptitude scales. *KSAS Catalogue of Selected Documents in Psychology, 6*,(1),31.

Fisher, C.W., Berliner, D.C., Filby, N.N., Marliave, R., Cahen, L.S., & Dishaw, M.M. (1980). Teaching behaviors, academic learning time and student achievement; an overview. In C. Denham & A. Lieberman (Eds.), *Time to Learn.* Washington, D.C.: USOE National Institute of Education.

Gall, M., Gersten, R., Grace, D. & Erickson, D. (in press). Determinants of effective algebra instruction: *Final Report.* Eugene, OR: University of Oregon.

Gersten, R., & Carnine, D. (1984). Direct instruction mathematics: a longitudinal evaluation of low income elementary school students. *The Elementary School Journal, 84*(4), 395-407.

Gersten, R.M., Carnine, D.W., & Wiliams, P.B. (1982). Measuring implementation of a structured educational model in an urban school district: an observational approach. *Educational Evaluation and Policy Analysis, 4*(1), 67-69.

Good, T.L., & Grouws, D.A. (1979). The Missouri mathematics effectiveness project: An experimental study of fourth-grade classrooms. *Journal of Educational Psychology, 71*, 355-362.

Good, T.L., Grouws, D.A., & Ebmeier, H. (1983). *Active Mathematics Teaching.* New York: Longman.

Harcourt Brace Jovanovich (1985). *Mathematics Today.* New York: Author.

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document and analyze their day-to-day impact on teachers (and instructional aides). We were less interested in studying "effective" inner city schools than in studying *schools attempting to become* more effective, because we thought this was the best way to document patterns of effective (and ineffective) instructional management. The site that agreed to participate is one of the 20 largest districts in the country. As part of its school improvement program, the district had hired at least one consulting teacher for each elementary school with a high proportion of low income, minority students. The sole purpose of the consulting teachers was to assist in the implementation of the instructional programs.

The schools operated two distinct academic programs—All Schools Achieve Program (ASAP) and Direct Instruction (DI). ASAP is a district-developed program based on principles of mastery learning and the research on time-on-task and time allocation. Teachers use traditional basal reading and math series; however they follow semi-scripted teachers' guides, developed by the district, in teaching the lessons. The guides highlight selected skills in each lesson. Additional worksheets were developed to provide practice on these skills. There are also ASAP series in Spanish for students in bilingual programs. Students are tested at the end of every unit (approximately once a week), and students who fail to pass the unit test are given a one-day "reteaching" lesson. Other students are provided with enrichment activities. The teachers' rate of progress through the curriculum and allocation of time during the day to basic academic skills are monitored.

If ASAP can be considered a structured approach to teaching, Direct Instruction (DI) must be considered highly structured. In DI teachers use scripted lesson formats oriented towards the type of academic skill being taught. The format guide provides teachers with exact wording to use, specific procedures for correcting errors, review procedures , etc. In the DI classrooms, teacher performance is monitored not only in terms of rate of progress through the curriculum and student performance on unit tests, but also for the extent to which teachers are using the teaching procedures specified in the manual (such as immediate correction of student errors or rapid instructional delivery).

Neither school improvement model is a unique approach to school improvement. What is unusual is the district's decision to hire consulting teachers in each school to assist in the implementation of each model. The consulting teachers have no other responsibilities. Their only role is to assist in the implementation of ASAP or DI by: (a) overseeing appropriate placement of students, (b) ensuring that each classroom has the proper materials, (c) monitoring teacher implementation of ASAP or DI, and (d) providing technical assistance. There are some ambiguities in the job descriptions provided, and—as will be seen—they were the cause of certain conflicts for the ASAP consulting teachers. The training procedures were quite a bit more extensive for the consulting teachers in the Direct Instruction program than in the ASAP program; this affected how they viewed their respective roles.

The focus of this study was an analysis of the role of the consulting teacher and what she or he did to enhance or impede implementation of ASAP or DI. This was done by extensive observations of the day-to-day operation of the consulting teachers by two individuals with extensive experience as program supervisors, teacher trainers, and educational consultants. The observations followed the model used by Rowan, Bossert, and Dwyer (1982). The observer recorded all the activities seen, but also talked to the consulting teacher to assess such things as her reasons for certain actions, or her future plans for a certain activity. A total of 34 days were spent observing the consulting teachers.

Each of the 105 teachers served by the consulting teachers was inteviewed. The interviewer asked specific questions about the monitoring functions of the consulting teacher and the technical assistance and help provided. Teachers were asked to both describe and evaluate the quality of services received, and their sense of the utility of having a consulting teacher. They also discussed the role of the principal in the instructional management process. Six instructional aides from each school were also interviewed.

To gain a richer picture of the context in which the consulting teachers worked, the principals in the four schools were interviewed and observed for a total of 38 days. The research staff also attended meetings on instructional issues (faculy meetings, team meetings between consulting teachers and principals, and any meeting with central office personnel.) Finally, we observed a random subsample of classrooms to get a sense of implementation of ASAP and DI in terms of academic engaged time, allocation of time, and student success rate doing independent seatwork.

The study was conducted in four rather large urban schools. In each school, the preponderance of students were low income; 91% qualified for free or reduced lunch. Ninety-three percent of the students were minorities (Black, Latino, or Asian). Each of the schools was fairly large (ranging from 500 to 1150 students). Student mobility rates were extremely high, often as high as 49 percent. This means the average teacher was responsible for 48 rather than 32 students at some time during the course of a year. The principal might be responsible for 1500, not 1000, students per year. The overall achievement level of these schools was quite low in reading; for example, average 5th grade scores ranged from the 5th to 22nd percentile on a standarized achievement test. Math performance was adequate, ranging from the 39th to 61st percentile. There was some evidence of improvement in achievement over the past years due to ASAP and DI. Three of the schools had both ASAP and DI programs; one school had only the ASAP program. Two schools each had a consulting teacher for the Spanish ASAP program as well as one for the English ASAP and the DI program.

This article will report only the preliminary findings. More extensive analyses of the data are currently being conducted and will be released in the near future (Gersten, Green, Davis, Bourbeau, Darch, Carnine, and Johnson, in preparation). In this paper, we will highlight the findings on the role of the consulting teacher.

We went into the study believing that the core of successful school improvement is a well-trained, responsible instructional leader who is knowledgeable in all details of the instructional program (Gersten and Carnine, 1981; Carnine and Gersten, 1984). We thought the key person was likely to be the consulting teacher(s). We saw the role of the principal as being essentially one of knowledgeable support—of both the consulting teachers and the teaching faculty. On the basis of the findings of this study, we see no reason to revise our views, but, watching this model in operation, we do see some definite directions for other interested school districts to follow and some problem areas where failure is possible.

Observations on the Role of the Consulting Teacher

Positive Aspects

In 1978, prior to the implementation of the programs the senior author observed classrooms in several of these schools. The contrast between 1983 and 1978 was dramatic, and largely due to ASAP and DI. The most dramatic contrast between 1978 and 1983 was the increased allocation of time to academics—a dramatic increase in academic engagement rate. We also saw a concrete move toward students covering as much material each year as their middle-class peers, which was certainly not the case five years previously. The monitoring of classrooms by the consulting teachers certainly played a role in these changes. Watching the day-to-day operations of these programs, it became clear that some type of program facilitator is necessary at each of these large schools. There were incredible amounts of materials that needed to be distributed in order to maintain: (a) three different reading groups and two math groups in each classroom, (b) enrichment and remediation programs, and (c) the testing of students (many of whom were not proficient in English) who needed to be placed or re-placed due to the high mobility rate.

Another striking difference over the five years was the schoolwide adoption of the principles of mastery learning—not in a formal sense, but in a prosaic, day-to-day sense. Virtually every teacher in the school acted as if she or he were responsible for each child mastering the lesson content. If this didn't happen, teachers discussed the issue with the consulting teacher or their peers or in some cases arranged for grade-level meetings. Teachers talked about units or skill sequences that were difficult to teach, rather than students who found it difficult to learn. This level of discourse is atypical for elementary schools, and, largely is due to the ASAP and DI programs as embodied in the consulting teachers.

Research on effective school improvement effort has indicated that visible commitment to the innovation is essential (Gersten, Carnine, and Green, 1982; Purkey and Smith, 1983; Little, 1982). Often, this research suggests that the principal should display the commitment. However, we found consistently that the resource teachers, not the principals, displayed the most visible commitment to the innovation (this was true in nine of the ten cases, an extremely high proportion). Typically, the principals supported ASAP often with formal pronouncements; they didn't even bother to pay lip service to Direct Instruction. They implemented the former because it was district policy; they often implemented the latter because of additional external (federal) funding, parent preference, and high test scores.

Visible commitment came from consulting teachers, who consistenly explained and clarified the program, provided emotional support to teachers trying new procedures, as well as providing materials, and, helping with placement. In *War and Peace*, Tolstoi points out how in the long run the sleepy-eyed, pragmatic General Kutuzov won out over the flamboyant Napoleon, largely by attending to the day-to-day details of supplying the troops with food, supplies, ammunition, and by his patience. In watching the consulting teachers in action, we were reminded of Kutuzov and of the type of change that had been achieved over the four years.

Limitations in the Performance of the Consulting Teacher

As we came to know the consulting teachers and watched their daily routines and procedures for handling problems, we noted a clear demarcation line identifying the point at which the consulting teachers would intervene. Generally, they felt very comfortable training and correcting the work of instructional aides and substitute teachers new to ASAP. They usually were quite specific and helpful (as assessed by interviews) with teachers new to ASAP, again providing guidelines on how to schedule, arrange materials, place students, manage and organize a classroom.

Unwritten Laws and Informal Covenants

On the other hand, there seemed to be an unwritten law—never give feedback to a teacher that may be perceived as critical, unless the teacher violates a specified ASAP procedure. Thus, the only critical feedback teachers received was when their record keeping was sloppy, when their curricular pacing was too slow, when they failed to follow an ASAP teaching format, or when they violated a district policy (e.g., letting students do math worksheets during reading time). Except for the two DI consulting teachers, the ASAP consultants virtually never dealt with specifics on teacher behavior.

Of course, reasons were given. The primary one was that, according to district policy and state law, consulting teachers could *not* "evaluate" teachers: they could merely provide "help" in the way of technical assistance. Exactly where "assistance" ended, and evaluation began, no one knew. The tendency was to err on the conservative side. Several told stories of the early years of ASAP when some teachers threatened to sue two consulting teachers for "evaluating" them if the consulting teachers provided any suggestions critical of a teacher's classroom

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behavior. They were told they must respect each teacher's individual teaching strategies and style. Occasionally, however, we observed teachers whose only apparent "strategy" was going over the homework and seatwork in round-robin fashion and then announcing the next day's assignment. Several failed to take time to review or clarify material that was obviously confusing to the students. Some consulting teachers were extremely frustrated by the situation; others accepted this as their fate, occasionally trying to "assist" the principal in working with the few truly weak or disorganized teachers. Often, though not always, these efforts ended in limbo due to the principal's failure to follow through with suggestions made by the consulting teacher.

Another reason for this phenomenon was given by the district office. When asked why the DI resource teachers gave specific, detailed, and seemingly evaluative feedback and the ASAP resource teachers did not, we were told that giving such feedback would be perceived by teachers as "evaluative" and it would make teacher feel "uncomfortable". Because the district wanted to make sure the new program (ASAP) would be viewed in a favorable light, and that there would be no problems with the teachers' union, consulting teachers were advised, in the beginning stages of implementation, to not give any evaluative feedback to teachers.

The problem of close supervision is hardly unique to this district or state. Whenever serious school improvement efforts are undertaken, this situation is likely to recur. Lortie (1975) and Weick (1976) described the norms of teacher autonomy and equality prevalent in American schools. In a study of resource consultants working with special education students mainstreamed in regular classrooms, Morvant (1984) concluded: "The job of the resource consultant centers on coordination, collaboration, and consultation with other teachers. Yet the established norms of autonomy and equality of teachers pose a serious barrier to this model."

Weick (1976) described schools as "loosely structured organizations characterized by multiple goals." Although loose coupling between means and ends is less true for an ASAP/DI school than a typical elementary school, much of Weick's analysis still held true. The result was a hampering of the performance of the consulting teachers.

In our observations, we saw the organizational constraints of the position and the inner turmoil that it caused in several of the consulting teachers, who felt limited to the role of material suppliers, monitors, and trainers of instructional aides and subs. A few supplemented these duties by developing innovative approaches for accelerating students who showed academic promise, and in providing emotional support to teachers, especially the newer teachers. Yet, there were definite limits to what they did—and could do—professionally.

We became most aware of this clash when interviewing one of the teachers, actually one of the most competent, motivated teachers we observed. We asked her to describe the type of feedback and technical assistance she received from the consulting teacher. She indicated that years ago she had received a few pointers in teaching the new ASAP math program. "But," she said, "why should anyone give *me* advice on teaching reading? I've been teaching reading for 13 years and there's very little I don't know." While this attitude may have made sense in her case, the teachers in the majority of classrooms observed could have used feedback on methods to enhance their teaching.

The teachers in these schools had very challenging teaching assignments—a large number of students enter the school with limited language backgrounds in both the English and Spanish languages. These teachers were in need of knowledge on current research on effective practices, and help in how to transform this knowledge into practice, not because they were weak teachers, but because some of the conventional methods they were trained in don't necessarily work with "at risk" students.

"Another Country"

Within several weeks, we became aware that more than organizational constraint operated on the ASAP consulting teachers. After reviewing our field notes, including the formal interviews and informal discussions based on classroom observations conducted with them throughout the year, an image developed in our minds. In a sense, we felt as if we were, in James Baldwin's phrase, in another country. *Not once did we see or hear any awareness of the concepts in any of the classic articles on teacher effectivenes, such as Barak Rosenshine's "Teaching Functions in Instructional Programs" (1983) or Jane Stallings "Beyond Time on Task" (1980) or the recent Brophy and Good (1984) synthesis of research on effective teaching of basic academic skills.* It was as if an invisible barrier existed, and these ideas never crossed the threshold of these schools. Granted, lip service was given to the characteristics of effective schools and administrative aspects of research on effective teaching—time on task, time allocation, pacing through the curriculum. And some real strides had been made in the concept of mastery learning. Throughout the four schools, there was a sense that if a child failed a unit mastery test, something must be done (other than merely go on to the next lesson). However, we rarely observed much in the way of reteaching lessons, obstensibly an essential component of mastery learning. Only 2% of the teachers ever received any assistance from the consulting teachers in reteaching the lessons.

By and large, though, none of the subtle findings on effective teachers, what Stallings (1980) called "Beyond Time On Task," were known or communicated. Issues such as maintaining a high student success rate during a lesson (Fisher et al., 1980; Gersten et al., 1982), providing clear explanations of concepts with several relevant examples, the use of guided practice prior to independent seatwork (Good and Grouws, 1979), or the importance of immediately correcting student errors without spending too much time with a student (Stallings, 1975), never came up in the observations.

The last decade has provided some solid research on teaching procedures that enhance the achievement of low income "at risk" students such as these. We came to see that the consulting teachers needed extensive training in understanding these concepts and how they are applied in the classroom. Many of these concepts are not intuitively obvious. For example, we were all taught that good teachers challenge their students, yet research now shows low-performing students need to work at a 90 percent or higher success rate. Similarly, the natural human tendency is to nag the child not paying attention rather than praise the four or five with their eyes on the teacher. As we observed, we became convinced that understanding and implementing these concepts could dramatically raise achievement (Stallings 1980, Anderson et al. 1979, Becker 1977). Extensive training, however, would be necessary. In the next section, we describe some elements essential to that training.

As we observed the consulting teachers in action, we were constantly struck by the type of questions they did *not* ask, the observations and analyses they did not make. For example, in analyzing an observed lesson, we would almost automatically ask ourselves questions such as:

1. Is the teacher modeling the strategy or process for the students?
2. Are adequate range of examples presented of the new concept?
3. Does the teacher check for understanding, i.e., see if students have understood the new concept before moving on to the next segment of the lesson?
4. Does the teacher immediately correct student errors, or merely call on another student? If errors are made on complex problems, does the teacher merely give the correct answer or guide the student through the correct strategy?
5. What is the overall student success rate during the lesson? Is it at the 85-90 percent level research suggests is most successful?

In analyzing the notes written by the consulting teachers in the ASAP program, and our conversations with the consulting teachers, we found that *questions* were virtually never asked.

Sadly, this lack of knowledge of research on principles of effective instruction was not limited to the consulting teachers. Rather, it appeared to be a shared, schoolwide phenomenon. When we attended instructional team meetings involving the principal, the consulting teachers, and the special education and remedial reading facilitators (in the one school that held such meetings), we observed the same lack of knowledge. For example, in one school a meeting of the instructional team was held because the kindergarten teachers responsible for bilingual and limited-English-proficient students wanted to retain ("leave back") one third of the students because they "failed to pass" Level One of the Spanish reading program, and thus seemed unable to deal with the first grade reading materials. The teachers reported how they had tried their best to get the "low" students to learn the material—they had grimaced, jumped, even pounded on the floor to help the students remember the 5 short vowel sounds that constitute Level One. Not one person in the meeting ever expressed an opinion on the curriculum—of how teaching the 5 reasonably similar short vowel sounds in succession is likely to be frustrating, of how teaching all 5 vowels before teaching any consonants *deprives* the beginning student of gaining a sense of how the seemingly abstract vowels and consonant sounds *blend* into real words. Nor did anyone show any awareness of the principles for enhancing retention of new material, of distributed practice and cumulative review (rather than the relatively ineffectual techniques of grimacing and jumping up and down). The meeting ended in a stalemate, with the teachers wanting to retain the children, the principal refusing for social-political reasons, but no one learning anything about more effective approaches for teaching the students. This was but one of the many missed opportunities we observed, occasions where knowledge of research on effective instruction could have remedied problems.

Contrast Between ASAP and DI Consulting Teachers

Up to this point, little has been said about the three consulting teachers in the DI program. Their behavior, and the nature of their role was dramatically different. Unlike their ASAP colleagues, these individuals did feel comfortable giving teachers specific feedback on their performance. They did, on occasion, take over a reading group and model an alternate approach for a teacher. For example, they would demonstrate how to assess whether all students had mastered a skill before going on to the next section of the lesson.

In the interviews, the teachers indicated they did not mind this type of feedback. Though perceived as awkward at first, most came to appreciate receiving some real, specific feedback on their work. One teacher, who was in the midst of a conflict with her consulting teacher, said, "At least it's all above board and direct. If a suggestion doesn't work—which sometimes happens—I can always try it for a few days and report to Grace on what happened. If it does work, then things have really improved."

When we queried whether the feedback was perceived as critical, many indicated that there were several reasons why this was not so. One teacher indicated that the two consulting teachers she had worked with in the DI program "practice what they preached. . .They always included positive, as well as negative/critical, feedback. They made a point of following up and looking for any change in the specific areas they pinpointed." In our observations, we noted that the consulting teachers trained in the DI model tended to:

a. Phrase feedback/suggestions to teachers in terms of enhancing student performance (e.g., instead of saying, "Spend more time on the phonics skills section of the lesson," they might say, "If you spend more time on the phonics skills section of the lesson, and check that all students know these skills, story reading will improve.")
b. Present the feedback to teachers in small, manageable units, normally focusing on only one area per observation.

These principles may seem banal, but they were effective in working cooperatively with teachers and changing specific teaching behavior.

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The question remains—how did these two very different models exist in the same schools in the same district with the same teachers' union? Probably the major reason is DI began as a small-scale externally-funded program, and, because of the external funding, was somewhat free to develop its own policy. Another reason cited was that DI was initially so different a way of teaching that many teachers didn't mind receiving "help." We were told that with a model like ASAP, which is much closer to traditional teaching from a basal reader, teachers were more likely to resist directive "help." Yet ASAP, when properly implemented, did demand quite a bit of change on the teacher's part.

Probably the major reason the DI model worked was the amount of training and the quality of training given to the consulting teachers. By this point in time, many of the consulting teachers were experts capable of providing specific remedies to instructional problems. Each consulting teacher had served a sort of apprenticeship, working with either an experienced consulting teacher or an outside consultant to learn how to supervise, how to analyze an instructional situation, and how to communicate to teachers. Initially, the new consulting teacher watched the senior person at work and discussed what she saw. At times, the two discussed their observations and analyses, and the senior person indicated why she would work on this skill rather than that skill. In ASAP, the consulting teachers essentially relied on their own experience; the inservice training they received focused on the ASAP procedures. And, as we saw, much of their involvement with teachers was on procedural issues. It was only with aides, or inexperienced teachers, that they felt comfortable providing actual technical assistance.

We don't want to conclude this section by giving the impression that all was well with the DI program. By and large, the teachers found this intensive type of inservice supervision most helpful the first year or two when they were new to DI. It was less clear that the model was helping them during the third or fourth year, as some were struggling with more sophisticated issues, such as how to enhance the program in the area of writing or oral language. More could have been done with peer support, including observations of fellow teachers, even using experienced teachers to coach new teachers or aides.

These concerns, though, are relatively minor. The DI model did meet the need voiced by 67 percent of the ASAP teachers of providing some type of specific feedback on how to enhance their work. In addition, the model did routinely address many of the issues raised in the research on effective teaching.

The conclusion we reached was that without the training offered to the consulting teachers in the DI program, the model would not have worked. This type of training is fairly unusual in school districts and, on the surface, rather expensive. The coaching model (Showers, 1985) is used in two ways. First, peer coaching as a means of training the new consulting teacher. Second, the more effective DI consulting teachers used coaching as one of their primary means of working with teachers. If they observed a problem, they took over the group for a few minutes to demonstrate a solution. They told the teacher what they were doing and why, and then asked the teacher to practice the new skill. They returned to observe how the teacher was doing on the skill. This type of coaching needs to be distinguished from the "model lesson," a technique sometimes used in ASAP. Here, the consulting teacher would occasionally teach a full 30 minute lesson (as opposed to a 3-8 minutes segment). Model lessons tended to always be one-shot affairs. In the interviews, the new teachers indicated these lessons were useful, they showed how all the pieces fit. But a full 40 percent of the experienced teachers indicated the model lessons were not useful. In the words of one teacher, "She did the lesson just like I had been doing it, right out of the Scott Foresman teachers guide . . . I learned nothing new."

Conclusions

On the basis of this study, one could conclude that, by and large, principles and procedures of instructional management that are clearly articulated tend to be well implemented, and those instructional management practices that are unclear, either because they are broadly defined, or ill-defined, or very subtle, tend not to be implemented. This can be viewed as either a source of pessimism or of optimism. The reasons for pessimism are obvious. By and large, the ASAP consulting teachers only implemented the "lower order" instructional leadership functions. They all checked that the required charts were up-to-date; most checked if a teacher's rate of progress through the curriculum was slower than that recommended by the district or if a teacher was deviating from the recommended time allocation. Many observed to see if teachers were following the ASAP teachers guides, and discussed major discrepancies with the teacher. On the other hand, rarely was time spent in any of the more subtle areas of instruction--ways to enhance student motivation, strategies for correcting errors, providing clearer models of new concepts to students. Good and Grouws (1979) found the same in their study of staff development in mathematics.

Is there any hope, then for the training and development of individuals who can serve as effective instructional leaders--or at least managers--who can help teachers improve their performance to meet the needs of low-performing or "at risk" students?

The answer, and the source of optimism, lies in the initial observation--what is clear tends to be well implemented. Our findings lead us to believe that if consulting teachers were shown specific models of reteaching lessons, and learned the principles behind these lessons, and were sanctioned to work with teachers in this area, the majority of the consulting teaching would work with teachers on reteaching lessons. Certainly more than the 2 percent we found. Similarly, if the consulting teachers were taught about effective corrective feedback, they would begin to look at teaching situations in this light and begin to provide teachers with useful feedback. The observations of the DI consulting teachers would support this view. By and large, they performed in the fashion in which they were trained. With this approach, as with any other, some were more sensitive, more skilled, more communicative than others. But the basic model they operated under was more detailed and exhaustive, more attentive to research findings, as well as more ambitious. This model did not assume everything was okay, but rather that there were areas where specific feedback from a skilled professional could enhance the teacher's professional skill in reaching the students.

The tacit basis of ASAP was that teachers are the instructional experts or that so little is *really* known about teaching that there's little a consulting teacher can communicate. Phrases like accommodation to teaching styles and teaching strategies are used. When the consulting teachers did offer teachers feedback, they often based it on their own experience and folk wisdom. And while this was useful tc the novice teacher, it failed to meet the needs of some of the others. The belief that the teachers' education stops when they receive their credential, that they know everything they need to know about teaching students 3 years below grade level, that they know of research generated 15 years after they received their training, is absurd.

In large part, the district was selected for the study because it had made the commitment to hire consulting teachers to assist and manage the implementation of ASAP and DI. Despite the limitations we observed, we felt this was a wise decision. In each of the schools studied, we saw that the principal was not the appropriate person for the task. The emotional support, material support, and the monitoring functions supplied by the consulting teachers were crucial to the success of the two models.

Teachers rated the helpfulness (in their day-to-day teaching activities) of the consulting teachers higher than that of fellow teachers or the principal. Additionally, teachers were asked who they sought help from when they had questions about instruction. Eighty-six percent indicated they would ask the consulting teacher first. This indicated to us the potential power of the consulting teacher in school improvement efforts even though we did not see their potential fully realized.

In all schools, there was strong evidence that the overwhelming majority of teachers support the ASAP (91 percent) and DI (95 percent) programs and see real benefits in these programs. The bulk of the teachers appear to find the

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The Association for Direct Instruction Announces the 12th Annual

Eugene Direct Instruction Training & Information Conference

PLACE: Eugene Hilton Hotel & Conference Center
DATES & TIMES: August 4-8, 1986 8:30 am-4:00pm daily
FOR: Teachers,of Regular and Special Education, Supervisors, Administrators, and Aides of all grade levels
FEE: $125.00 for the 5-day Conference

The Association for Direct Instruction is pleased to announce the 12th Annual Eugene Direct Instruction Training and Information Conference. The conference will be held at the Eugene Hilton Hotel and Conference Center, in downtown Eugene. We hope that you are able to make the Conference the highlight of your summer and join with other professionals in furthering your skills and knowledge of instructional technologies. There is a full range of sessions designed for teachers, aides, supervisors, and administrators whose goal is to promote educational excellence in all facets of education. Previous participants will find new course offerings in a number of areas of interest.

After a day of work, participants will enjoy evenings in Eugene. Next door to the Hilton is the Hult Center for the Performing Arts, a World class performance hall. Within blocks of the conference site there are scores of restaurants catering to a variety of tastes. Eugene's setting will make the conference a rewarding professional experience as well as a relaxing vacation for you and your family. To help renew old friendships or make new acquaintences, a picnic has been planned for Monday afternoon. A new feature added to the conference this year is 2 no-host social hours. On Tuesday and Wednesday evening trainers will be available to answer questions and provide an opportunity for making new contacts.

SESSIONS

A Teaching the Beginning Reader
A Reading Mastery III, IV, V, & VI
A Teaching Reading Accuracy & Fluency
A Basal Reading Programs: Selecting, Transistioning to, & Adapting
A Teacher Training: Teaching Others to Teach DI Programs
A Solutions to Classroom Management in K-6
A Generalized Compliance Training
A Computer Courseware: A Direct Instruction Perspective
A Overview of Direct Instruction Research and Theory
A Diagnosis, Corrections and Firming

B Teaching the Beginning Reader
B Reading Mastery III, IV, V, & VI
B Advanced & Corrective Arithmetic
B Teaching Oral & Written Comprehension Skills
B Distar Arithmetic I & II
B Effective Spelling Instruction
B Overview of All Direct Instruction Programs
B Solutions to Secondary Classroom Management
B Direct Instruction for the Severely Handicapped Learner
B Video Disc Instruction in Math
B Classroom Technology and Direct Instruction

C Effective Spelling Instruction
C Reading Mastery II and Fast-Cycle I & II
C Teaching Beginning Language Skills
C Teaching Facts and Fact Systems in the Content Areas
C Teaching Academic Survival Skills- Study Skills
C Managing Students with Emotional Problems
C Direct Instruction Approach to Teaching Secondary Science

D Overview of Direct Instruction Theory
D Supplemental & Transitional Activities Related to DISTAR
D Becoming a Nation of Readers: Issues & Implications
D Overview of Classroom Technology and Direct Instruction

E Teaching Expressive Writing Skills
E Overview of Aspects of Supervision & Monitoring of DI
E Direct Instruction & Mainstreaming
E Teach Your Child to Read in 100 Easy Lessons
E Overview of Direct Instruction Research

Trainers and Presenters:
Jean Osborn, Siegfried Engelmann,
Wes Becker, Doug Carnine, Randy Sprick, Bob Dixon, Gary Johnson
Marilyn Sprick, Geoff Colvin, Gary Davis, Phyllis Haddox, Linda Youngmayr,
Kathy Madigan, Lynne Anderson-Inmann, Maria Collins
and other Direct Instruction Authors & Trainers

Conference Session & Events Schedule

	Mon.	Tues.	Wed.	Thur.	Fri.
AM	A	A	A	A	C/E
PM	B	B	B	C/D	ends at 1 PM
Evening Events	Picnic	Meet the authors	Meet the authors	Annual ADI Meeting	

Early Registration•• Sunday 6:00 pm to 7:30 pm
Registration•• Monday 8:00 am to 9:00 am
Opening Session•• Monday 9-9:30 am
Daily Sessions begin at 8:30 am

There are 34 sessions offered during the 5-day conference. Participants may attend up to 4. Sessions are either training or informational sessions. The focus of training sessions is on specific teaching behaviors. Task practice is involved in each of these sessions. The goal of informational sessions is to provide the kind of detailed information needed to implement successful techniques or understand the topic.

The sessions are scheduled in 4 time periods. Each participant will choose one "A" session, one "B" session and *either* one "C" session *or* one "D" **and** one "E" session.

Instructional Leadership

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structure generally helpful to them and to their students. This was especially true for newer teachers.

The principles on which ASAP and DI are based--teaching to mastery, immediate remediation of student learning problems, active teaching, structured teaching of basic academic skills, and rapid movement through the curriculum--continue to make sense to the large majority of teachers.

One of the most impressive effects of ASAP and DI is quite subtle and a bit difficult to describe. Essentially, we found the overall level of discourse—among teachers and resource teachers, among teachers and instructional aides, and among teachers themselves—to be more focused and professional than is typically found in elementary schools. Teachers speak about student problems in terms of the specific skill areas that students are not mastering (e.g., operations with mixed fractions) rather than referring to students by global labels such as "slow learner." This is not to say that teachers never talk about non-academic issues, but that specific teaching problems and issues are consistently raised. This specificity is, in our view, a cornerstone of school improvement (as the work of Ron Edmonds and Judith Little and other have shown).

References

Anderson, L., Evertson, C., & Brophy, J. (1979) An experimental study of effective teaching in first grade reading groups. *The Elementary School Journal, 79,* 193-223.

Becker, W. (1977) Teaching reading and language to the disadvantage — What we have learned from field research. *Harvard Educational Review, 47,* 518-543.

Berman, P. & McLaughlin, M. W. (1977) *Federal Programs supporting educational change, Volume VII: Factors affecting implementation and continuation.* Santa Monica, CA: Rand Corporation.

Brookover, W., Beady, C., Flood, P., Schweitzer, J., & Wisenbaker, J. (1979). *School social systems and school achievement. Schools can make a difference* New York: Praeger.

Brophy, J. & Good, T. L. (1984) Teacher behavior and student achievement. In M. C. Wittrock (Ed.) *Third handbook of research on teaching.* New York: Macmillan.

Candall, D. P. et al. (1982). *People, policies, and practices: Examining the chain of school improvement.* Andover, Mass: The Network.

Carnine, D. & Gersten, R. M. (1984). Direct instruction mathematics: Longitudinal evaluation of low income students. *Elementary School Journal, 84* (4), 395-407.

Edmunds, R. Effective schools for the Urban poor. *Educational Leadership,* October, 1979, *37,* 15-24.

Fisher, C. W., Berliner, D. C., Filby, N. N., Marliave, R., Cohen, L S., and Dishaw, M. M. (1980). *Time to learn.* The National Institute of Education.

Gersten, R. M. & Carnine, D. (1984). Improving reading instruction: A case study of direct instruction with some thoughts on the logistics of educational change. in J. Osborn (Ed.). *Research base of literacy.* Boston, Mass: D. C. Heath.

Gersten, R.; Carnine, D. Green, S. (1982) The principal as instructional leader: A second look. *Educational Leadership,* December 1982, *40,* 47-50.

Good, T. L. & Grouws, D. A. (1979). Teaching and math learning. *Educational Leadership, 37* (1), 39-45.

Little, J. W. (1982). Norms of collegiality and expermentation: Workplace conditions of school success. *American Educational Research Journal, 19,* 325-340.

Lortie, Dan C. (1975) *School teachers: A sociological study.* Chicago: University of Chicago Press.

Morris, V. C., Crowson, R. L., Hurwitz, E., & Porter-Gehrie, C. (1981). *The urban city principal: Discretionary decision-making in a large educational organization.* University of Illinois at Chicago Circle.

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A Multiple Gating Approach

Standardized Screening of Behavior Disordered (SSBD) Pupils in the Elementary Age Range

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Children with severe behavior disorders (SBD) are consistently ranked by school professionals as representing one of the highest service priorities among all the handicapping conditions served by the public school system. However, the current screening and identification procedures for this population are frequently regarded as deficient by local educational agencies, state departments of education, and federal agencies in the area of special education (Grosenick, 1981; Grosenick & Huntze, 1980; Haring, Jewell, Lehning, Morrell, & White, 1984; Noel, 1982).

Barriers to effective screening-identification and service delivery efforts for the school-age SBD population include the following: (a) an inadequate conceptualization of behavior disorders among school-age children, (b) a failure to distinguish between behavior disorders and discipline issues in program practices, (c) a federal definition of severe emotional disturbance that has limited content validity and even less practical utility in providing a foundation for accommodating the needs of this population, (d) philosophical conflicts over effective approaches and appropriate outcome measures, and (e) territorial conflicts among different professions regarding responsiblity for the problems presented by the SBD student. This listing is by no means inclusive or exhaustive; however, it does partially explain why the SBD school-age population is, at once, both inadequately served and substantially underserved by school systems.

Walker, Reavis, Rhode, and Jenson (1985) have noted that school-based accommodation procedures targeted for the SBD child are characterized by a focus on control and containment, rather than on treatment, remediation, or prevention. For example, over 75% of SBD pupils are currently served in self-contained classrooms or in more restrictive settings (Grosenick & Huntze, 1980; Noel, 1982). In a national survey of LEA program practices for the SBD population, Grosenick and Huntze (1980) found that of all children receiving homebound instruction, 41% were behavior disordered, even though SBD students comprise an extremely small portion of the total handicapped population identified and served by schools.

The range of program options normally available to children with severe behavior disorders includes: (a) self-contained classrooms, (b) special schools, (c) out-of-district placements, (d) residential placements, (e) consultant teachers, and (f) homebound instruction. The great majority of students who are referred by teachers and subsequently placed in such settings are those with conduct disorders whose behavioral characteristics are: (1) externalizing in nature, i.e., directed toward the social environment, and (2) extremely aversive to teachers and peers (Achenbach, 1979; Ross, 1980; Walker, Hops, & Greenwood, 1984).

Except in rare instances, school-age children are not systematically screened for behavior disorders that can powerfully affect their school success, long-term adjustment and social development. As with many other handicapping conditions that directly affect and impinge on the schooling process, referral by the classroom teacher often represents the only avenue such children have to diagnosis, evaluation, placement, and, ultimately, access to existing therapeutic services. Research by Ysseldyke and his colleagues (Ysseldyke, Algozzine, & Epps, 1982; Ysseldyke, Algozzine, Richey, & Graden, 1982) indicates that school psychologists and child study teams administer tests and collect data to essentially confirm or certify the validity of the teacher's referral. In the great majority of cases, the referral is certified—even when data gathered by the child study team do not support the decision to certify the student as handicapped (see Ysseldyke et al. above).

It is apparent that the classroom teacher is a very important link between behavior disordered children, and programs and services that could be of significant value in remediating their problem(s). At present, school systems have very little control over who gets referred and evaluated for possible services. Analyses of existing school practices indicate that children whose behavior is aversive to teachers and peers (noncompliant, aggressive, defy teacher) and/or disruptive of classroom atmosphere (tantrum, disturb others, steal) are those with the highest probability of referral (Grosenick, 1981; Noel, 1982; Walker et al., in press). This probability may vary considerably as a function of the teacher's tolerance level, behavioral standards and perception(s) of the effectiveness of existing school services for coping with the problem. (See Gerber & Semmel, 1984; Hersh & Walker, 1983; Walker & Rankin, 1983.)

Research evidence on both current and historical school referral practices (Gerber & Semmel, 1984; Haring et al., 1985; Walker et al., 1985) indicates that the great majority of behavioral referrals involve externalizing behavior problems, i.e. behavioral excesses (aggression, conduct disaorders, hyperactivity) that are directed outwardly toward the external social environment. Behavior disorders of this type are highly aversive to school personnel, difficult to manage, and are usually consequated via control, containment, or punishment strategies.

Child behavior problems of an internalizing nature that represent problems with self, e.g., depression, phobias, disturbances of affect and social withdrawal/isolation, are far less salient and aversive for most teachers. Such problems are regarded as "child-owned" rather than "teacher-owned" (Brophy & Rohrkemper, 1980) and teachers are much less likely to assume responsibility for them or to refer pupils manifesting them to existing services. However, studies indicate that children with behavior disorders of this type are severely at risk for a range of developmental disorders and adjustment problems (Hops, 1983; Robbins, 1966). There is increasing evidence that social withdrawal and depression are the major presenting problem(s) in a significant number of children referred for psychological treatment (Reynolds, 1984; Strain, Cooke, & Appoloni, 1976). Recently published meta analyses of studies predicting academic failure indicate that internalizing behavior problems are a powerful predictor of achievement difficulties.

Teacher referrals of behavior disordered pupils are highly idiosyncratic and often based upon subjective, teacher-generated criteria. Thus, referral and access to needed behavioral services by individual pupils are not mediated by objective criteria and standardized procedures that have some generalizability across teachers. As a result, teachers become the primary gatekeepers of which pupils do and do not access existing services via the referral process. To get referred, a pupil's behavior usually has to be either highly aversive to the teacher and/or the pupil is perceived as consuming too large a share of the teacher's time and expertise in the management-instructional process.

The authors have designed a three-stage, standardized, screening and identification procedure that addresses many of the problems and issues discussed above in serving the SBD school population in the elementary age range. A major goal of the procedure's use is the systematic and mass screening-identification of pupils who are ap-

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Conference Registration Form

Please fill out the registration form completely and mail to ADI.
Make checks payable (U.S. Funds only) to ---**Association for Direct Instruction**
Because space is limited, early registration is recommended. Please use an address where you will receive your mail up until the conference.

Name _____ Phone ( )_____
Street _____
City _____ State _____ Zip _____
Have you had previous experience with Direct Instruction?_____ What taught?_____
Have you attended the Eugene Conference previously? *Yes No* Please rate your skill level:
Advanced Medium No experience

I would like to register for the following (list one "A", one "B", and either one "C" or one "D" and one "E" session):

"A" _____
"B" _____
either C "C" _____
or D & E "D" _____
"E" _____

I am an Association for Direct Instruction member: *Yes No*
I will attend the picnic: _____ Number attending____
I would like to attend the "Meet the Trainers" event on ____ Tuesday and/or _____ Wednesday.
(I have enclosed $5.00 for each evening)
I am interested in staying at the Hilton. Please send me a reservation envelope: *Yes No*
I am interested in staying at the Vally River Inn. Please send me a reservation envelope: *Yes No*
Please send college credit information *Yes No*
Please return this form with your check or District Purchase Order to: ASSOCIATION FOR DIRECT INSTRUCTION
P.O. BOX 10252, EUGENE, OR 97440

For office use only: Number_____ Fee____ Check____ PO#_____ By:___

Screening Behavior Disorders Continued from Page 15

propriate referrals to special education and who may ultimately qualify as behavior disordered. It is intended that use of the procedures use will give an equal chance for all children to be identified for *externalizing* and *internalizing* behavior problems.

This article provides an overview of the system, a rationale for its use, and data on the development and preliminary testing of the instruments comprising the three screening stages. The authors were recently awarded a three-year, field-initiated research grant from the Office of Special Education and Rehibilitation Services to develop, norm, and field test the system. A copy of the Standardized Screening of Behavior Disorders instruments (SSBD) can be obtained from the senior author for the cost of reproduction and mailing.

Overview

The screening-identification procedure described herein consists of three separate, but interrelated, stages and is known as a multiple "gating" screening device (Loeber, Dishion & Patterson, 1984; Walker, Hops & Greenwood, 1981) in that it contains a series of progressively more expensive and precise assessments, i.e., *gates*. The first gate, or assessment, involves teachers' systematic evaluation of all children in their classes, via the use of rank ordering procedures, on the extent to which students appear at risk for either *externalizing* or *internalizing* behavior disorders. The second gate also relies upon teacher judgment of student behavior and requires that pupils who are identified and ranked highest in Stage One on the *externalizing* and *internalizing* behavioral dimensions are rated in Stage Two by the teacher in terms of the *content* of their behavior problem(s): (1) on a critical events index, and (2) on a frequency index that assess child status on exemplars of *externalizing* and *internalizing* behavior problems. Rated pupils who exceed normative criteria on the Stage Two instruments are then independently assessed in Stage Three within natural settings via direct observations conducted by a school professional other than the teacher, e.g., school psychologist, social worker, counselor, and so forth.

In Stage Three, a school professional assesses the target pupil(s) on two important measures of school adjustment using direct observation procedures. These are: (1) academic-engaged time recorded during independent seatwork periods, and (2) amount and quality of social behavior during recess periods on the playground. The target pupil's status on these measures is compared to age- and sex-appropriate normative levels to determine initial eligibility at this stage. Those pupils whose behavioral levels exceed normative levels on these codes are referred to special education for further evaluation and testing for determination of eligibility. In this process, child study teams may administer a range of standardized tests and diagnostic procedures and collect any other data relevant to the referral decision.

Procedures and instruments through the first part of screening Stage Three are completely standardized and self-contained. Stage Two and Three instruments will have normative levels established on them to: (a) facilitate decision-making in moving from one screening stage to another, and (b) assist in determining eligibility in relation to generalized normative criteria.

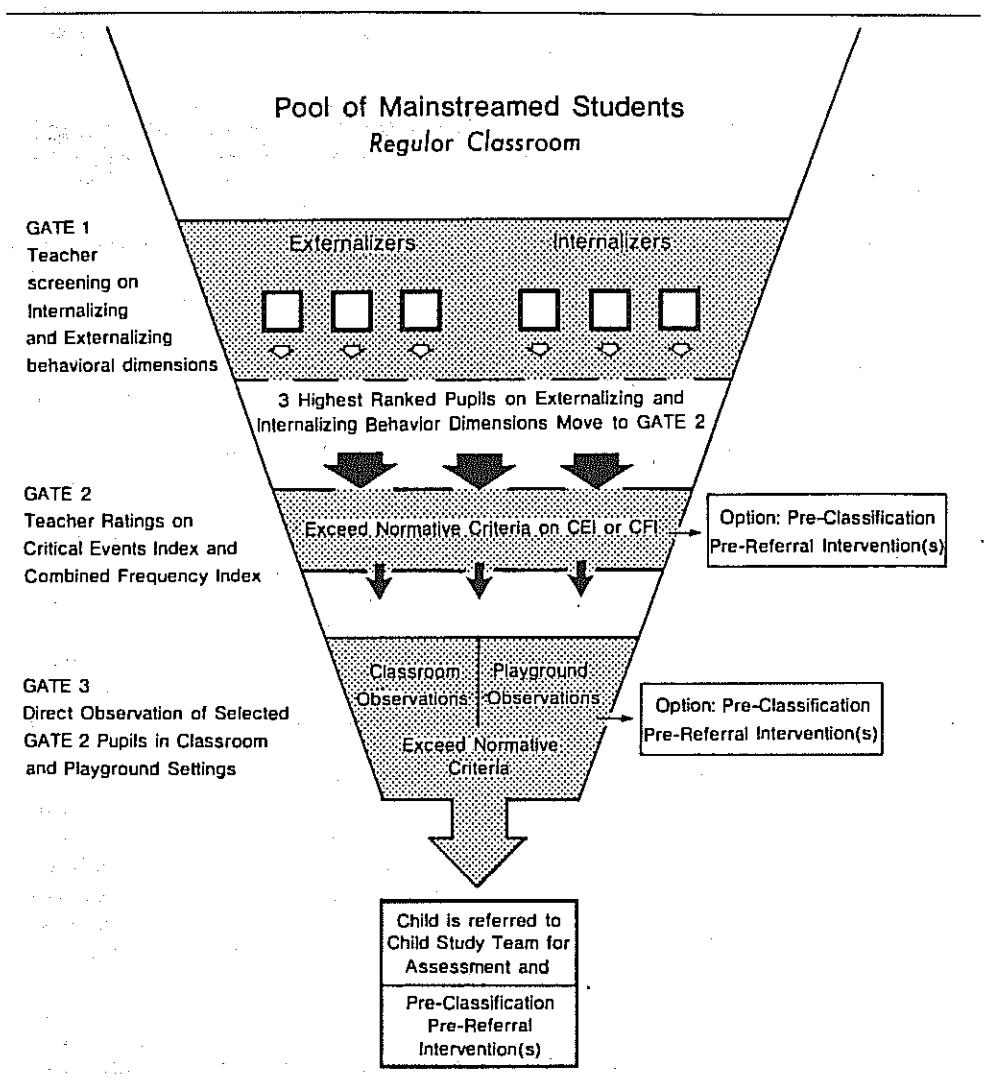

Figure One

Multiple-Gating Assessment Procedure for Identification of Behavior Disordered Students

It is recognized that pupils identified in Stage One and/or Stage Two may exceed normative levels and expectations for the referring setting, but may not meet the necessary criteria for certification as SBD. This outcome highlights the importance of using empirically-based normative criteria that are independent of a specific setting and generalized in nature in certifying referred pupils as severely behavior disordered.

In this screening-identification procedure, each screening stage becomes progressively more expensive in terms of assessments made. However, the probability of the student meeting eligibility requirements increases as one moves through each stage. Figure One below graphically illustrates the screening and identification processes involved in the SSBD's application.

The results of each assessment stage serve to validate those of the previous stage(s). At the completion of Stage Three, data and information are available to: (a) define the specific content of the referred child's behavior disorder (i.e., adaptive behavior deficits and maladaptive behavior excesses) for the purpose of planning a remediation program, and (b) make normative comparisons to determine the pupil's relative behavioral status and eligibility. The system's component procedures were designed to be compatible with P.L. 94-142 regulations in screening and the determination of eligibility.

Rationale

The screening and identification procedure described above is based upon seven very important assumptions. These are:

1. Teachers, as a rule, tend to over-refer pupils with aversive, externalizing behavior disorders and to under-refer those with less aversive, internalizing disorders.
2. Teacher judgment and appraisal of child behavior is a valid, accurate, cost-effective, and greatly under-utilized resource in the screening–identification of the full range of SBD children in the school setting.
3. Relatively undemanding screening-identification procedures can be implemented in school settings that: (a) take full advantage of the numerous opportunities that teachers have to evaluate and make judgments about pupil behavior under different conditions, (b) require teachers to evaluate pupils in relation to the *full range* of behavior disorders occurring in the school setting, (c) require the teacher to systematically screen each pupil enrolled in his/her class, and (d) provide an equal opportunity for pupils to be identified for both externalizing and internalizing types of behavior disorders.
4. A combination of teacher rankings/ratings and direct observations are necessary to adequately assess child behavior for the purposes of screening, identification and determining eligibility. In this context, it is important to obtain teacher assessments of both *adaptive* behavioral competencies and *maladaptive* social behavior(s) that disrupt behavioral-social adjustments.
5. Academic-engaged time and social behavior on the playground are important indicators, respectively, of the two major behavioral adjustments students are expected to make in school. These are teacher-pupil adjustment within a classroom context and peer-to-peer social adjustment within free-play settings (Walker, McConnell, & Clarke, in press).
6. Externalizing and internalizing dimensions encompass almost all of the behavior disorders that are commonly observed to occur in school.
7. Early identification of children exhibiting *externalizing* and/or *internalizing* behavior problems is of crucial importance, since numerous studies document the long-term stability of such behavior (see Roff, Sells, & Golden, 1972; Waldrop & Halverson, 1975). Similarly, follow-up studies have shown that elementary age school children who are rejected by their peers on sociometric instruments tend to have significant mental health problems up to 13 years later (Cowan, Pederson, Babigian, Izzo, & Trost, 1973).

Until the last decade, there was a professional consensus that teacher judgment was not valid or useful in making decisions about student behavior. This was largely due to four decades of research that showed teacher judgments about student behavior/performance attributes relevant to school success to be *negatively* correlated with the equivalent judgments of clinicians (Walker, 1982). However, when teacher judgment of student behavior/performance is validated against external *accuracy* standards/criterion such as achievement, direct observations, sociometric ratings and so forth, it has proven to be highly accurate and very cost effective (see Boldstad, 1974; Greenwood, Walker, Todd, & Hops, 1979; Gresham, in press; Lakin, 1982; Nelson, 1971; Schaefer, 1982).

Except in relatively rare, but notable, cases (see Kirschenbaum, Marsh, & Devage, 1977), teacher judgment has not been used systematically in mass screening systems to identify at-risk students. Reports of such mass screening efforts in relation to child behavior disorders have also been conspicious by their relative absence in the professional literature. Without systematic, mass screening efforts of the type proposed herein, the SBD student population will continue to be greatly underserved in school settings because of their relative inability to access needed services.

It is extremely important that teacher judgment be supplemented with direct observations of the target student's behavioral adjustment in classroom and playground settings. SBD students characteristically experience great dif-

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ficulties in these two adjustment areas and deficient performance within them is often indicative of more serious problems. In this regard, the system described herein is not intended to replace, but simply to augment the data-collection and decision-making processes currently in use by child study teams in LEAs.

Instrument Development and Preliminary Research

The SSBD incorporates information and procedures from several different sources and lines of research. These include: (a) research on the accuracy and validity of *structured* teacher judgments regarding child behavior in the classroom, (b) bi-polar behavioral classification systems, (c) the use of teacher ranking procedures to order pupils on dimensions related to classroom performance and adjustment (i.e., achievement, popularity, social contact frequency, and so forth), and (d) the development of normative data bases and decision criteria on both teacher rating instruments and direct observation codes (Greenwood et al., 1979). The instruments and procedures in each of the three SSBD stages have been developed and refined in prior research by the authors and their colleagues.

For example, the SSBD Stage One ranking procedures were derived from prior research by Greenwood et al. (1979) on the successful development of a model screening and assessment system for identifying preschool children at risk for social withdrawal. Ranking procedures of this type were extensively tested with a large number of teachers at the preschool level. The Stage Two instruments (Critical Events Index and Behavioral Frequency Index) were developed from prototype item lists previously contributed by Walker and his colleagues (Walker, 1982; Walker et al., 1985). These items have been extensively trial tested, refined, and socially validated by both regular and special education teachers as measures of teacher behavioral standards and child behavioral status (Walker & Rankin, 1983; Hersh & Walker, 1983). The Stage Three observation codes were derived from behavioral definitions and coding instruments reported in the professional literature, as well as from coding systems developed and refined by the authors in prior research.

A prototype version of the SSBD model screening procedure was developed in November, 1984. The system has been extensively trial tested since that time. For example, the instructions and procedures in assessment Stage One have been revised on three occasions in response to feedback from trial usage of the SSBD with samples of preschool, regular, and special education teachers. To date, the system has been used in screening over 500 pupils in school districts within Oregon and Washington states. In addition, limited trial studies have been conducted of the instruments comprising assessment Stages Two and Three. Pilot studies and their results to date are reviewed briefly below.

Interrater Reliability

During the 1984-85 school year, the Stage One ranking procedures were trial tested in 15 classrooms that involved team teaching or teacher-aide instructional situations. In each case, both teachers appeared to have equal knowledge of the pool of children screened.

Across these classrooms, interrater correlations were consistently higher for *externalizing* than for *internalizing* rank ordering dimensions and ranged from approximately .15 to .85. The authors invested considerable time and effort in making the two sets of definitions as behavior specific and mutually exclusive as possible, and retesting them. In the final set of trial tests for the Stage One procedures in the 1984-85 school year, the interrater reliability coefficients on the externalizing *and* internalizing rank-order dimensions ranged from .89 to .94.

Test-Retest Stability

Estimates of the test-retest stability of the Stage One rank ordering procedures have been estimated to date for two-, three- and four-week time intervals. A test-retest estimate of the stability of the final form of the Stage One ranking procedures involving four teachers and a three-week interval averaged .83 (Rho) for *externalizing* and .74 (Rho) for *internalizing*. A subsequent, one month test-retest estimate of the stability of the Stage One teacher rankings involving 17 elementary teachers yielded an *externalizing* Rho of .76 and an *internalizing* Rho of .74.

The stability of the Stage Two frequency index was also assessed over a one month period. This instrument uses a Likert-scale rating format and consists of two sections. Section one consists of 12 items that measure *adaptive* teacher and peer related social behavior, and section two consists of 13 items that measure *maladaptive* social behavior directed toward either teachers or peers. The test-retest *r* for 69 elementary pupils rated by their respective teachers (N=17) over a one month interval was .88 for the adaptive items and .83 for the maladaptive items.

Concurrent Validity

Multidisciplinary teams of school professionals had previously placed a certified behavior disordered pupil in 10 of the regular classroom settings sampled in the above studies. The authors and their colleagues did not discuss or mention these pupils in discussions of ranking tasks with the involved teachers. Results indicated that 9 of the 10 pupils were placed in the top three ranks by their teachers on the *externalizing* behavioral dimension. The tenth pupil was ranked fifth on the *internalizing* dimension. These results suggest that the SSBD is sensitive to already identified pupils who have been previously identified as behavior disordered.

Discriminant Validity

The academic-learning-time code in assessment Stage Three was used during the past year as one measure within an ongoing study of normal and antisocial fourth grade boys. The ALT code was used to conduct assessments on two separate occasions for 36 subjects (20 normal; 16 antisocial) within an academic setting. The ALT percentage was 85% and 68% for the normal and antisocial pupils, respectively. This difference was statistically significant and suggests that the code is sensitive to behavioral differences known to exist between these two populations of children.

Table 1 contains means, ranges and standard deviations on the Stage Two rating instruments for a sample of 10 BD pupils and a sample of 6, randomly selected normal pupils. The 10 BD pupils were included in the concurrent validity study described above. These results suggest the Stage Two instruments may discriminate between BD and normal children. However, much larger samples will be necessary to answer this question definitively.

Observation Code Interobserver Agreement. The two observation codes were trial tested extensively in natural settings during the 1984-85 school year. Interobserver reliabilities were consistently in the .80 to .90 range for both codes and observer training times on the codes were quite brief.

These preliminary studies and results suggest that the instruments and procedures comprising each of the assessment stages of the SSBD show promise of achieving the functions for which they were designed. A major study of the SSBD, involving test-retest rankings and ratings over a one month period by 18 elementary teachers and behavioral observations of high ranked externalizing and internalizing pupils as well as unselected, contrast pupils, is currently being conducted. A report of this study should be available in September, 1986.

Table 1. Means, Standard Deviations and Ranges for Normal and Behavior Disordered Elementary Aged Pupils on the SSBD Stage Two Instruments

	Critical Events Index (CEI)					
	Externalizing Index			Internalizing Index		
	Mean	SD	Range	Mean	SD	Range
Normals (N = 6)	.83	.93	0-2	1.0	1.09	0-2
Behavior Disordered Pupils (N = 9)	4.6	1.73	2-7	.90	3.0	0-9

	Combined Frequency Index (CFI) For Externalizing and Internalizing Behavioral Dimensions					
	Adaptive Behavior			Maladaptive Behavior		
	Mean	SD	Range	Mean	SD	Range
Normals (N = 6)	43.8	6.36	34-51	19.8	5.84	13-27
Behavior Disordered Pupils (N = 9)	26.9	7.34	20-42	38.6	5.56	30-45

Conclusion

The major advantages of the screening-identification model proposed herein are that: (a) it requires the teacher to evaluate *each* pupil in his/her class in relation to standardized and carefully specified criteria, i.e., *externalizing* and *internalizing* behavioral descriptions, (b) it provides each pupil with an equal chance to be identified for externalizing *and* internalizing behavior problems, (c) it combines teacher rankings/ratings and direct observation data in the appraisal of child behavior, and (d) it represents a standardized assessment procedure with accompanying normative data on both teacher rating and direct observation instruments. The authors believe the system's use will produce higher quality referrals, will prove to be cost effective, and will effectively screen mainstream pupils who may be at risk for behavior disorders. However, it should be noted that the validity, cost efficiency, and practical utility of the system remain to be demonstrated.

References

Achenbach, T. (1979). The child behavior profile: An empirically based system for assessing children's behavioral problems and competencies. *International Journal of Mental Health*, 7(3-4), 26-40.

Continued on Page 18

Screening Behavior Disorders

Continued from Page 17

Boldstad, O. (1974). *The relationship between teachers' assessment of students and students' actual behavior in the classroom.* Unpublished doctoral dissertation, University of Oregon, Eugene.

Brophy, J., & Rohrkemper, M. (1980) *Teachers' thinking about problem students* (Research Series, Vol. 8). East Lansing MI: Institute for Research on Teaching. Michigan State University.

Cowan, E.L., Pederson, A., Babigian, H., Izzo, L.D., & Trost, M.A. (1973). Long-term follow-up of early detected vulnerable children. *Journal of Clinical and Consulting Psychology, 41,* 438-446.

Gerber, M.M., & Semmel, M.I. (1984). Teacher as imperfect test: Reconceptualizing the referral process. *Educational Psychologist, 19*(3), 137-148.

Greenwood, C., Walker, H.M., Todd, N., & Hops, H. (1979). *SAMPLE: Social assessment manual for preschool level.* Available from CORBEH, Center on Human Development, University of Oregon, Eugene OR 97403.

Gresham, F. (in press). Conceptual issues in the assessment of social competence in children. In P. Strain, M. Guralnick, & H.M. Walker (Eds.), *Children's social behavior: Development, assessment, and modification.* New York: Academic Press.

Grosenick, J. (1981). Public school and mental health services to severely behavior disordered students. *Behavior Disorders, 6,* 183-190.

Grosenick, J.K., & Huntze, S.L. (1980) *National needs analysis in behavior disorders: Adolescent behavior disorders.* Columbia: University of Missouri Department of Special Education.

Haring, N.G., Jewell, J.P., Lehning, T.W., Morrell, V.E., & White, O.R. (1984, October). *A study of statewide identification and service delivery to children and youth with serious behavior disabilities.* Interim report to the Division of Special Services and Professional Programs, Special Education Section, Office of the Superintendent of Public Instruction. Seattle WA: University of Washington Research Organization (UWRO), University of Washington.

Hersh, R., & Walker, H.M. (1983) Great expectations: Making schools effective for all children. *Policy Studies Review* [Special issue], *2*(1), 147-188.

Hops, H. (1983). Children's social competence and skill: Current research practices and future direction. *Behavior Therapy, 14,* 3-18.

Kirschenbaum, D., Marsh, M., & Devage, J. (1977). The effectiveness of a mass screening procedure in an early intervention program. *Psychology in the Schools, 14*(4).

Lakin, K. (1982). Research-based knowledge and professional practices in special education for emotionally disturbed children. In C. Smith & B. Wilcots (Eds.), *Current issues in behavior disorders—1982* (pp. 13-20). Des Moines: Department of Public Instruction.

Loeber, R., Dishion, T.J., & Patterson, G.R. (1984, February). Multiple gating: A multistage assessment procedure for identifying youths at risk for delinquency. *Journal of Research in Crime and Delinquency, 21*(1), 7-32.

Nelson, M. (1971). Techniques for screening conduct disturbed children. *Exceptional Children, 37,* 501-507.

Noel, M. (1982). Public school programs for the emotionally disturbed: An overview. In M. Noel & N. Haring (Eds.), *Progress or change: Issues in educating the emotionally disturbed* (Vol. 2, pp. 1-28). Seattle: University of Washington.

Reynolds, W.M. (1984). Depression in children and adolescents: Phenomenology, evaluation and treatment. *School Psychology Review, 13*(2), 171-182.

Robbins, L. (1966). *Deviant children grown up.* Baltimore: Williams & Wilkins.

Roff, M., Sells, S.B., & Golden, M.M. (1972). *Social adjustment and personality development in children.* Minneapolis MN: University of Minnesota Press.

Ross, A. (1980). *Psychological disorders of children: A behavioral approach to theory, research and therapy* (2nd ed.). New York: McGraw-Hill.

Schaefer, E. (1982). Development of adaptive behavior: Conceptual models and family correlates. In M. Begab, H. Garber, & H.C. Haywood (Eds.), *Prevention of retarded development in psycho-socially disadvantaged children.* Baltimore: University Park Press.

Strain, P.S., Cooke, T.P., & Apolloni, T. (1976). *Teaching exceptional children: Assessing and modifying social behavior.* New York: Academic Press.

Waldrop, M.G., & Halverson, C.F. (1975). Intensive and extensive peer behavior: Longitudinal and cross sectional analysis. *Child Development, 46,* 19-26.

Walker, H.M. (1982). Assessment of behavior disorders in the school setting: Issues, problems and strategies. In M. Noel & N. Haring (Eds.), *Progress or change? Issues in educating the emotionally disturbed* (Vol. 1, pp. 11-42). Seattle: University of Washington.

Walker, H.M., Hops, H., & Greenwood, C.R. (1981). RECESS: Research and development of a behavior management package for remediating social aggression in the school setting. In P. Strain (Ed.), *The utilization of classroom peers as behavior change agents* (pp. 261-303). New York: Plenum Press.

Walker, H.M., Hops, H., & Greenwood, C.R. (1984). The CORBEH research and development model: Programmatic issues and strategies. In S. Paine, T. Bellamy, & B. Wilcox (Eds.), *Human services that work* (pp. 57-78). Baltimore: Paul H. Brookes.

Walker, H.M., McConnell, S., & Clarke, J.Y. (in press). Social skills training in school settings: A model for the social integration of handicapped children into less restrictive settings. In R.J. McMahon & R.D. Peters (Eds.), *Childhood disorders: Behavioral-developmental approaches.* New York: Brunner/Mazel.

Walker, H.M., & Rankin, R. (1983). Assessing the behvarioal expectations and demands of less restrictive settings. *School Psychology Review, 12,* 274-284.

Walker, H.M., Reavis, H.K., Rhode, G., & Jensen, W.R. (1985). A conceptual model for delivery of behavioral services to behavior disoriented children in educational settings. In P. Bornstein & A. Kazdin (Eds.), *Handbook of clinical behavioral serpices with children.* Homewood IL: Richard D. Irwin, 700-74.

Ysseldyke, J., Algozzine, B., & Epps, S. (1982). A logical and empirical analysis of current practices in classifying students as handicapped. *Exceptional Children, 49.*

Ysseldyke, J., Algozzine, B., Richey, L., & Graden, J. (1981). Declaring students eligible for learning disability services: Why bother with the data? *Learning Disability Quarterly, 5,* 37-44.

Instructional Leadership

Continued from Page 14

Morvant, M.)1984). *The work of resource teachers in ten elementary schools: Models and realities. Dissertation,* University of Oregon, College of Education.

Pinero, U. C. (1982). Forces affecting the principal's role in an inner-city setting. *The Elementary School Journal, 83,* 161-170.

Rosenshine, Barak. (1983). Teaching functions in instructional programs. *The Elementary School Journal, 83,* 335-351.

Showers, B. (1985). Teachers coaching teachers *Educational Leadership,* 43-48.

Stallings, J. A. (1980). Allocated academic learning time revisited, or beyond time on task. *Educational Researcher, 9.*

Weber, G. (1971) *Inner city children can be taught to read: Four successful schools.* (Occasional Paper, No. 18). Washington, D. C.: Council for Basic Education.

Weick, K. E. (March, 1976). Educational organizations as loosely coupled systems. *Administration Science Quarterly, 21,* 1-19.

— A Review —

SET: Scales for Effective Teaching

by Stevan J. Kukic
Susan L. Ryberg
Donald Link
Janet Freston

Published by The Change Agency, Salt Lake City, 1985. Price for basic SET Manual $49.95. (See advertisement in this issue for address.)

Scales for Effective Teaching is the result of an attempt to apply current research on effective teaching practices to teacher-evaluation using "behaviorally anchored" rating scales. The goal is a non-threatening, objective evaluation system that can help teachers improve. The manual itself consists of 23 pages, plus a 16 page appendix containing the rating scales. Three additional forms are included in the package. These are the Pre-observation Form, the Data and Profile Form, and the Goal Setting Form.

The Pre-observation Form is used to set up the observation. The teacher lists: (a) the specific teaching objective for the period of observation, (b) special student problems, (c) special considerations, and (d) where the observer should sit.

The Data and Profile Form is used to record the observation data for the 9 scales to be rated from "what is heard and seen" during a 30 minutes observation. Also, there is space to record data on five scales to be rated from a 15 minute interview. Finally, a profile based on ratings from 1 to 5 for each of the 14 scales is completed.

Ratings of 3 or higher are considered adequate teaching. For lower ratings, the Goal Setting Form is used to target goals and activities for improvement.

The scale names are as follows:

(From Observation)

1. *Learning Outcomes:* Communicates goals to students and checks to see that they are understood.
2. *Utilization of Instructional Media/Materials:* Is media or material appropriate to the learning task?
3. *Instructional Techniques:* Preplans, reviews, uses advanced organizers, gives clear and organized presentations, gets feedback, etc.
4. *Academic Learning Time/Student Involvement:* Asks questions, gets individual and choral responses, reacts to idleness, gives appropriate seatwork asssignments, controls distractions, etc.
5. *Positive Reinforcement of Student Academic Responses:* Provides immediate positive reinforcement based on student needs.
6. *Correction of Student Academic Responses:* Corrects all student errors.
7. *Classroom Discipline:* Has a plan, states expectations, uses reinforcers and punishers as appropriate.
8. *Instructional Style:* Is enthusiastic (and gets the students enthused), uses fast pacing, has positive interactions.
9. *Instructional Efficiency:* Has good pacing (again), few distractions, short transitions—aimed at maximizing achievement possibilities.

(From Interview)

10. *Monitoring of Student Progress:* Frequently collects student performance data and relates to teaching goals.
11. *Communication:* Constructive communication with parents and staff.
12. *Teamwork:* Works with other staff to encourage and help them. Meets own job responsibilities.
13. *Organizational Commitment:* Meets school goals and policies.
14. *Professional Development:* Reads journals, attends workshops.

Evaluation

Overall, I see the approach taken as a good first attempt at developing a sound evaluation system. If you currently lack an evaluation system that focuses on effective teaching behaviors, SET would be a reasonable choice to help improve your evaluation system.

I think the manual and scales could be improved in the following ways:

1. Develop specified training procedures for supervisors who use the scales.
2. Establish interobserver reliability for supervisors and specify the training required to reach a given level of reliability. (This would also lead to the revision of scales where reliability is low.)
3. Back up the claim that use of the system "in fact leads to the improvement of teaching." No data have been provided.
4. Specify interview questions. Presently, the user has to devise the questions using "sample indicators" from the scales.
5. I found many of the rating scales inadequately defined. For example, what are *appropriate* instructional materials? There is no definition or examples of *positive reinforcement* in Scale 5. Examples do show up later in Scale 7 on Discipline, but there are no rules to guide when what kinds of reinforcers are appropriate and how they should be delivered. Many of the scales require the rater to rate two things at the same time, and the scales assume they vary in degree together. That is very unlikely. For example, in Scale 9, Instructional Efficiency, a rating of 5 involves "pace of instruction maximizes achievement" and "transitions are smooth and brief." A rating of 1 involves "inappropriate pacing" and "awkward, time-consuming transitions." What do you rate if pacing is good and transitions are not? The scaling for Scale 10 on Monitoring goes from 5-daily, 4-weekly, 3-periodically, 2-end of units, to

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SET – Review

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1-few or no attempts to monitor. What do you do with three times a day or three times a week? A more careful definition of *ranges* would be helpful.

6. Finally, the authors need to specify more clearly where it would be inappropriate to use their procedures. What are the limits in the application of the scales in various kinds of high school classes? Are they appropriate for P.E., music, art, etc.?

SET has a lot of promise as an aid in improving teaching. The fact that I could criticize some of the details was made possible because they did get down to specifics.

Reviewed by
Wes Becker
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CAI Vocabulary

Continued from Page 7

Pany, D., Jenkins, J.R., & Schreck, J. (1982). Vocabulary instruction: Effects on word knowledge and reading comprehension. *Learning Disability Quarterly, 5,* 202-215.

Pearson, P.D., & Gallagher, M. (1983). The instruction of reading comprehension. *Contemporary Educational Psychology, 8,* 317-344.

Roser, N., & Juel, C. (1981, December). *Effects of vocabulary instruction on reading comprehension.* Paper presented at the annual meeting of the National Reading Conference, Dallas.

Siegel, M.A., & Misselt, A.L. (1984). Adaptive feedback and review paradigm for computer-based drills. *Journal of Educational Psychology, 76,* 310-317.

Stahl, S.A. (1983). Differential word knowledge and reading comprehension. *Journal of Reading Behavior, 15,* 33-50.

Swaby, B. (1978). The effects of advance organizers and vocabulary introduction on the reading comprehension of sixth grade students. *Dissertation Abstracts International, 39,* 115A.

Videodisc Fractions

Continued from Page 10

Hofmeister, A.M., Engelmann, S., & Carnine, D. (in press). Observations from the development and field testing of an instructional videodisc program. *Journal of Special Education Technology.*

Kameenui, E., Carnine, D., Darch, C., & Stein, M. (in press). Two approaches to the development of mathematics instruction. *Elementary School Journal.*

Lindquist, M., Carpenter, T.P., Silver, E., & Matthews, W. (1983). The third national mathematics assessment: Results and implications for elementary and middle schools. *Arithmetic Teacher, 31*(4), 14-19.

Rosenshine, B. (1983). Teaching functions in instructional programs. *The Elementary School Journal, 83,* 335-351.

Silbert, J., Carnine, D., & Stein, M. (1981). *Direct Instruction Mathematics.* Columbus: Merrill.

Stein, M., Jenkins, J.R., & Arter, J. (1983). Designing successful mathematics instruction for low performing students. *Focus on Learning Problems in Mathematics, 5*(2), 79-99.

Systems Impact, Inc. (1985). *Mastering Fractions.* Washington, D.C.: Author.

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