ADL Excellence Awards
Made at Annual Conference

by Wes Becker

Awards for excellence in contributions to the application of DI technology to education were presented at the 12th Annual Direct Instruction Conference, Eugene, Oregon. The Conference was the biggest ever, with more than 550 participants. Awards were made in teaching, supervision, and research.

Dr. Corene Casselle
Excellence in Supervision

The award for excellence in supervision was made to Dr. Corene Casselle, Assistant Professor at the University of Nevada, Las Vegas. Dr. Casselle was one of the early trainers at the Berenzer-Engelmann preschool (in a program to train master teachers of the disadvantaged, sponsored by the Carnegie Foundation.) From the beginning, Dr. Casselle has been dedicated to teaching children to be competent. One of her first DI tasks was providing training and supervision for the Nichols Avenue School in Washington, D.C. Her performance and expectations for teachers and aides didn’t always make friends, but they did lead to better student learning. She also helped train Fellows Through Teachers and aides in East St. Louis, Illinois and Flint, Michigan.

In 1977, Corene completed her doctorate in education at the University of Nevada, Las Vegas. In 1979, Dr. Casselle and her family moved to Libera, West Africa for three years, to supervise a program for improving teacher education and basic skill development in rural schools. One item from her vitae is most telling: “Supervised and managed five projects and 35 personnel for the efficient and effective operation of the project support system.”

In 1977, Dr. Casselle founded a non-profit school in Las Vegas designed to teach reading (and other arithmetic, and language). This school is called the Institute for the Study of Individual Skills. The school was re-opened by Dr. Casselle after returning from Liberia in 1982. Dr. Casselle has been teaching reading at the University of Nevada during 1985-6. She was named educator of the year by the Las Vegas Magazine in February, 1984.

Corene Casselle is a truly a most competent and dedicated educator in the best of DI traditions.

Excellence in Teaching

The award for excellence in teaching was given to Shirley Lehais from the North Thurston School District in Olympia, Washington. Shirley runs a resource room at South Bay Elementary School. Shirley was at the University of Illinois when Berenzer and Engelmann were running their experimental preschool. At that time, she did not consider their approach very favorable. About five years ago, she allowed a student-teacher to use DISTAR in her classroom and because of what she saw happening to student learning, she began to use DI herself. Shirley has been responsible for much of the DI interest in the North Thurston School District. She provides DI in-services both before and after school and offers supervisory help to others.

Excellence in Research

The award for excellence in research was given to Dr. Robert Horner, Associate Professor, Division of Special Education and Rehabilitation, at the University of Oregon. Dr. Horner was our keynote speaker at the Eugene DI Conference last year. He received his S.A. from Stanford in 1971, his M.S. from Washington State in 1973, and his Ph.D. from Oregon in 1978. Prior to returning for his Ph.D., he worked as a behavior therapist for multiply handicapped boys and as a teaching parent for emotionally disturbed boys and girls.

A Response to Attack on DI
Preschool Programs by
Schweinhart, Weikart, & Larner

by Russell Gersten
University of Oregon

Editor’s Note: This article critiques a widely publicized study purporting to attack DISTAR. It should be of considerable interest to DI members. Reproduced from a prepublication manuscript with permission from Early Childhood Research Quarterly. The paper will be published in Vol. 1, 1986, p. 293-302.

There were several interesting features to the recent exploratory study of the potential long-term effects of preschool by Schweinhart, Weikart, & Larner (1986) “Consequences of Three Preschool Curriculum Models Through Age 15,” which appeared in the first issue of Early Childhood Research Quarterly. However, there were also some puzzling aspects to the study, a few curious omissions, two lapses in methodology and several serious flaws in interpretation that need to be pointed out. In particular, the author’s penchant for interpreting non-significant results has led to serious misconceptions about the findings.

This is particularly important because, as most readers of this journal know, the report’s findings have been picked up by the popular press, and it has strongly influenced policy makers. The media news can be almost excused for their hype because when researchers fail to follow conventional scientific guidelines. S. (1986) in the New York Times reported that “placing children in an early educational experience can do serious harm,” and cautioned against the use of highly structured programs that, according to the study, “appear often to lead to antisocial behavior, delinquency, and even violence later on.”

In the study, three groups of 18 fifteen year olds—all having experienced one of three different preschool programs when they were four years old—were compared. In all earlier research reports, the three types of preschool were labeled High Scope, Language, and Child-Centered Nursery. In the current report, the Language group is renamed “Distar.” This is an inappropriate choice. None of the students in the first two waves used the Distar curriculum: the few students in the third wave who used it, did so for only four months out of the two years of the program. Rather, according to the program directors (Berenzer, 1986; Engelmann, personal communication) these students were taught basic language concepts, shapes, number concepts, colors and letters in a systematic way based on the principles of Teaching Disadvantaged Children in the

Dr. Russell Gersten
Preschool (Berenzer & Engelmann, 1966). Calling this group Distar has created widespread confusion and misinformation about the Distar curriculum program which has been successfully used with disadvantaged students in the elementary grades (e.g., Stehling, et al. 1977).

Due to the extremely small sample size (18 in each experimental preschool condition) and the use of only one site, the authors should have emphasized that this is clearly an exploratory study of the later effects of various preschool models. Policy decisions never have been—and hopefully never will be—based on studies involving brief interims and performance on one test of a sample of 18 adolescents.

Disparities in Characteristics of the Samples

Consider characteristics of the three samples involved in the study. They were comparable on many demographic variables, with at least four important exceptions:

Continued on Page 2
**DI Presentations at ABA**

At the Annual Meeting of the Association for Behavior Analysis (ABA) in Milwaukee, Wisconsin, four presentations related to Direct Instruction were made. These were sponsored by the DI Special Interest Group with Paul Weisberg, Chairperson and Kathy Madigan Scribe. The four programs are described below:

1. **SYMPOSIUM** on "Field Testing of Direct Instruction Programs". Chair: Robert S. Weisberg, Tuscaloosa City School System, Tuscaloosa, AL. The discussant was Howard Farris of Western Michigan University, Kalamazoo. The presenters were:
   - Maria Collins, Boise State University, Boise, ID, on "Evaluating and revising the CAI Reading Program with secondary school handicapped students".
   - Paul Weisberg, University of Alabama, Tuscaloosa, "Developing and evaluating calendar formats for instructionally naive students".
   - Nancy J. Lindahl, Kalamazoo Public Schools, Kalamazoo, MI, and Howard Farris, Western Michigan University, Kalamazoo, on "Evaluating the Expressive Writing I program with junior high special education students".

2. **SYMPOSIUM** on "Application of Direct Instruction Principles When Teaching People with Severe Disabilities". Chair: Russell Gersten, University of Oregon. The discussant was Anthony Corbo, Southern Illinois University, Carbondale. The presenters were:
   - Ruth Falco, Western Oregon State College, Portland, on "Design of instructional programs for people with severe disabilities".

**ABA – 1987**

**Association for Behavior Analysis, 13th Annual Convention. General Hotel, Nashville, Tennessee May 25-28, 1987.**

Submit an abstract or membership invitation, write ABA, Department of Psychology, Western Michigan University, Kalamazoo, Michigan 49008.

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**ADI Expands Consulting Services**

The Association for Direct Instruction is expanding its services to provide districts and teachers with a larger number of training options and with consulting services, which are shaped to the needs of the school or district. ADI will offer a series of workshops and institutes during the school year of 1986-87 and will be contacting school districts to assess their needs for consulting services. Workshops and consulting will be conducted on the west coast - primarily Washington, Oregon, California, Utah, and Arizona.

An arrangement with the University of Oregon permits ADI to offer one unit of college credit for each 11/2 day workshop at an attractive price of $50. In addition to the workshop fee, the workshops will provide 10 contact hours and will be on training. The workshops for the current school year will cover the following topics:

- Teaching the beginning reader (training on Mastery 1.0 and 1.2)
- Teaching expressive writing (training on Expressive Writing 1.0)
- Teaching spelling (training on Spelling Mastery 1.5 and Corrective Spelling Through Morphology)
- Teaching science (training on the middle grades (training based on efficient procedures for teaching Earth Science and Beginning Chemistry)
- Teaching arithmetic in the middle grades (training based on the Systems Inquiry Model, classes dealing with fractions, decimals, percents, and ratios)
- Managing students with emotional problems (training based on the Direct Instruction techniques for diagnosing and remedying inappropriate behavior)
- Teaching decoding to the corrective reader (teaching based on Corrective Reading A. B. C.)
- Teaching corrective arithmetic based on Systems Impact videodisc programs and Math's Corrective Arithmetic Module.

The workshop trainers have presented at the annual Eugene summer conferences. They include Dr. Phyllis Haddox, Dr. Geoff Colvin, Dr. John Noel, Dr. Gary Johnson, Robert Dixon, Jerry Silbert, and Gary Davis. Some of the workshops that are planned will be scheduled in conjunction with meetings and workshop conducted by Dr. Randy Sprick and Marilyn Sprick.

All trainers for the workshops are certified. All have demonstrated great technical skill in teaching children; all have a comprehensive record of teaching teachers and aides; and most have been responsible for massive program implementations that require coordination of all details, from designing schedules for schools that permit the greatest latitude in appropriately placing students in instructional groups to handling the problems of material logistics and providing in-service programs of teachers. ADI trainers are the best. In the next ADI News, we'll run profiles on several trainers and list some of their achievements.

The ADI Board feels that the workshop consulting service is timely because of the increased popularity of Direct Instruction programs. During the past two years, the sales of Direct Instruction programs have increased more than 25%, and the west coast is largely responsible for the increase. A few years ago, using DI programs felt very isolated, and often had to work in an environment that ranged from non-supportive to hostile. That situation is changing, particularly on the west coast. Even larger school districts (which were historically opposed to DI) are implementing DI programs. Many teachers are teaching the Direct Instruction way for the first time. So there is an increased need for good training and consulting. ADI plans to satisfy that need. The workshop schedules are not set beyond November, but they will be soon. If your district or school has particular needs for training or consulting, let us know—soon. Call Bryan Wickman at (503) 485-1163, and he'll either set something up or put you in touch with the appropriate trainer.

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**ADI Excellence Awards**

Continued from Page 1

Dr. Robert Horner

His publications, including books and book chapters, are in the 60-plus range. (I didn't take the time to count them!) Since 1982, he has been the principle investigator on a five-year contract funded by the Special Education Program, U.S. Department of Education, in the amount of $1,400,000. Those who heard his keynote speech at the DI Conference Annual Meeting last year, or have followed the many summaries of his research in the DI NEWS, will appreciate his contributions to the integration of DI teaching theory and behavioral analysis.

In his numerous research studies, Dr. Horner has demonstrated the effectiveness of DI and behavioral therapy in designing strategies for teaching severely handicapped learners generalizable community-living skills. These studies include such skills as table setting, dressing, street crossing, grocery shopping, telephone use, use of vending machines, and work-skills useful in a sheltered workshop. In addition, Dr. Horner and those working with him have developed numerous packages for teachers to use in applying what has been learned to assist the severely retarded in developing community-living skills.

Dr. Horner's contribution to our field is truly outstanding.
The Name of the Game is: Reading Mastering Tournament

by Nancy Turpin
Tuscaloosa City Schools
Tuscaloosa, Alabama

Tuscaloosa City Schools have been under Court supervision for over two decades. In 1971, the Federal Court and the Justice Department accepted a compensatory instructional program in lieu of busing for three elementary schools serving all black, mostly poverty-level children. Within the order approved by the court was that the schools serve children in the bottom three standings in reading and math through D 1 3 R A Reading or the Reading Mastery Series in order to raise the academic performance of the students attending those schools.

The Reading Mastery III and IV Levels (Englertman and Hanner, 1982; 1983) are very rich in science and social studies content and they contain a periodic cumulative review of content known as Fact Games. The games are played in small groups every ten lessons, with the students answering specific questions about the material they have studied. There is a high degree of responding, and excitement is generated when classroom groups complete the highest scores or become the school's winning teams.

The Compensatory Schools had most of their third, fourth, and fifth graders reading in levels III and IV; and, in 1984, several teachers decided to have Fact Games competition among teams within each school. The cross-classroom competition was set for the end of the school year for all children in Reading Mastery III and IV.

The competition was limited to those students in Reading Mastery IV. They were older and more sophisticated, requiring less supervision from teachers as they played in groups.

Role of Coordinator
Four schools engaged in competition (an additional school had qualified as a compensatory school in 1981). Within each school, a teacher served as a tournament coordinator. Her responsibilities included: (1) accumulating questions for the competition from other teachers; (2) analyzing the teams within her school; (3) arranging for school-level competitions; and (4) representing her school to plan for the inter-school competition which occurred toward the end of the school year.

Question Selection and Source
All teachers having students in the competition submitted questions for the tournament. These questions could be drawn either from the Reading Mastery IV Fact Games and Skillbooks or from important information about concepts the students had difficulty retaining. The selected questions were of the multiple choice, true/false or short answer variety. Answers to questions in the early rounds were of the convergent kind rather than open-ended; whereas final-round questions tested for more difficult thinking.

Three sets of 20 questions each were selected from all submitted questions. The first set contained the easiest questions, taken from Fact Games and those found frequently in the Skillbook, such as: "What does the planet is called, Saturn or Uranus?" The last set was the most difficult, reserved for the final round and the top three teams in the competition. These involved reasoning skills and contained answers that were never directly stated in the Reading Mastery program. In this case, the answers could be short sentences requiring a statement about a relationship between two facts. "Tell the difference between a patent and a patent attorney," is an example of a final-round question.

The first two sets of questions were put on small cards and were color-coded according to the round in which they were to be used. Each team played with its own set of cards. The last, most difficult set of questions was printed only for the moderator in the final round.

Forming the Teams

Fourth-and fifth-grade children, who were being instructed in Reading Mastery IV and had reached lesson 30 by March, were allowed in the competition. Included were mainstreamed special education, Chapter 1, and regular program students. The school coordinator ranked these youngsters on a roster from the top-performing student, attaining the highest lesson number completed, to the weakest performer, at the lowest completed lesson. She created a roster of four members by drawing first the top name and then the bottom name and then back to the top and so forth, until four names were selected for each team. The rationale was to match smart students with slower learners so no team would be at a disadvantage.

Children on the roster were called to the cafeteria and were seated as teams. Each group selected a team name, such as Jaguars, Falcons, or Bears. The date of the first round competition was then announced.

Within School Competition-First Round
The first round had members belonging to the same team who played against each other. This round gave the children the experience of intramural competition and put them to the setting, the questions, and the format. Teams were seated around a table with a pile of colored 3x5 question cards and an adult monitor who had an answer sheet and kept the game moving. Children took turns reading the questions aloud and answering them. They were allowed five seconds to think. If correct, they kept the card; if wrong, they returned it to the bottom of the deck. At the end of the first five-minute game the students totaled the scoring cards and gave this information to the monitor. After the first game an average team member would earn four to seven points.

The cards were gathered up, shuffled, and games two and three were played in the same way. After the third game, points for the top members were tallied. The first round was not a competition round, but served as a means to identify a child's position on his/her team.

Within School Second Round
According to their team ranking: eig., top scorer, high-middle scorer, low-middle scorer, or low scorer, each student could earn entering-second-round points based on how he/she fared in the competition.

Teams were split up and regrouped for tournament competition. According to their entering-second-round points, each team could earn entering-third-round points or enter into tournament groups of four. Students earning the highest entering-second-round points were competitors within the same tournament group. In the same way students earning the lowest points played against each other in a lower round. Each team consisted of members comprising high-middle and low-middle teams. Thus, every tournament group had students from different teams.

The second round was played exactly as the first. The students played three games, three rounds, and the points earned were converted into entering-final-round scores based on the point distribution outlined in Table 1.

These earned points were brought back from the second round tournament competition. Each team received the Jaguars. Since points were always assigned according to scoring position after a second round was played, the top scorer in a tournament round always brought back the same number of points to his or her team. The top scorer of a "smart" tournament group brought six points to his or her team as did the top scorer of a "slow" tournament group. Likewise, the lowest scorer of a "smart" tournament group brought back the same two points as the lowest scorer of a "slow" tournament group (see Table 1). In case of ties, the teams played an extra round, assigned the same points indicated in Table 1. The three teams receiving the highest total final-round scores in each school were selected to play in the inter-school tournament.

Inter-School Competition
Before assembling the three top scoring teams from each of the four schools, each school played a first round using the second set of questions which were more difficult that the first. This within-school competition allowed for practice using a new set of questions and for members to earn entering-second-round points for the inter-school tournament. The members on a team played each other to earn entering-second-round points which allowed the inter-school director to then place members in homogeneous second-round groups according to their individual scores. This procedure was identical to the one used in forming the tournament groups for the within-school competition.

Table 1. Arbitrary Point Assignments Based on Position on a Team

<table>
<thead>
<tr>
<th>Point Assignment for Different Outcomes</th>
<th>Team Players</th>
<th>Tie for Top</th>
<th>Tie for Middle</th>
<th>Tie for Low</th>
<th>Tie for Top Low and High</th>
<th>Tie for 3-Way Low and High</th>
<th>Tie for 3-Way High</th>
<th>Tie for 5-Way High</th>
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<tbody>
<tr>
<td>Tie for Top</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>4</td>
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<tr>
<td>High Middle</td>
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<tr>
<td>Low Middle</td>
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<td>Low</td>
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Table continued on Page 4
Response to Attack on

1. Level of mother's education. The mothers of students in the child-centered Nursery group had significantly more education. This might tend to favor the mothers in the Nursery group, as Schweinhart, et al., mention.

2. Unequal representation of the sexes. Of the 18 students in the Direct Instruction sample, 10 (56%) were boys. For the High School sample, 7 (42%) were boys, and for the Nursery sample, 8 (46%) were boys. Considering that the focus of the delinquency subscale items is on problems typical of teenage boys, this might tend to bias results in favor of the High School and Nursery groups (Berliner, 1986).

3. Frequencies of parents out of the home. Not only did the Direct Instruction group have the highest percentage of non-participants (31% as opposed to a mere 12 percent for the Nursery group and 3 percent for High School students), but in the majority of the sample, the parents were employed (44 percent versus 38 and 33 percent respectively). Among the sample that was employed, the majority of the single-parent families were headed by the mother, more of the Direct Instruction mothers were not employed during the afternoon school hours, which may have had an impact on their social behavior through absence. Here we might also have a bias in favor of the Nursery group and High School.

4. Amount of preschool experience. This fourth point is extremely important, and one which is dealt with rather lightly by the authors. Thirty-nine percent of the teachers in the Direct Instruction (DI) and Nursery School samples experienced only one year of preschool, while 61 percent experienced two years of the intervention. In contrast, 86 percent of the High School students experienced a full two-year intervention. This might tend to bias results in favor of the High School.

In an earlier report on the academic and social progress of these students, Weikart, et al., (1979) argued that students in the control group should not be included in the analyses. They explained that “since children in Wave 5 (called the ‘control’ in the current study) experienced different educational programs as three year olds and were not exposed to the two pre-intervention years in one of the three CD Project programs; they are not included in the longitudinal sample.” Since only 20 percent of the High School sample in the current study experienced one more year of treatment than did the other two groups, their reasoning still seems sound. Schweinhart, et al., (1986) now assert that the second year of preschool had no impact on subsequent performance. But how can one be sure it has no impact on the child’s behavior in adolescence until after the evaluation is complete? Clearly, the unequal amounts of preschool is a potential source of bias, favoring the High School group.

Thus, despite the random assignment of subjects to treatment at age three or four, several demographic factors were operating then that potentially favor the Nursery and/or High School groups. This conclusion is different than Schweinhart, et al’s. assertion. “We conclude from the analyses presented in Tables 1 and 2 that any outcome differences between the High School group and the Diast (sic) group are probably not attributable to group differences in program-entry characteristics” (p. 96, p. 24).

The Validity of the Measures

The authors used what many would consider a narrow range of measures. Many reasonably objective measures were available, but not utilized: e.g., school achievement (grades and standardized test scores), suspensions and reten- tions, truancy, and special education placements. Unlike previous work by Weikart and colleagues, this study relies almost entirely on self-report, or self-report measures, all of uncertain reliability and unknown, rather dubious validity.

The self-report measures included: (a) Perceived Locus of Control—Blair’s (1961) scale, with an unacceptably low internal consistency measure. (b) a measure of self-esteem, the Rosenberg (1965) scale, with an acceptable coeffi- cient (r = .70). Neither of these measures, according to their validity data reported. The cross of the evaluation hinged on data gathered by self-report procedures, by a structured interview covering a range of antisocial activities which was rather unfortunately labeled “Juvenile Delinquency Scale,” and by a rather scattered series of questions on family life and life at school.

The only reliability measures reported are internal consistency estimates. While coeffi- cient alpha is an accepted measure of gauge reliability of academic measures, it is inappropriate for self-report measures, since if a child is dishonest or distortions information in either direction—either by concealing local legal or shameful criminal activities or by “boasting” about non-existent criminal activities—he or she would almost inflate the coefficient alpha. A measure of temporal stability would have been superior.

No validity data was provided on these self-report measures, and reading the results of some items on the scale, one wonders about the teenagers’ veracity. When asked, “Have you ever . . . argued or fought with parents?” the conclusion from the analyses presented is that at age 18, 11% (95% confidence interval 6 to 18), 52% of the students answered “yes.” If the children were well-behaved in applying skills learned in school to the demands of adult life (p. 27). Reliabilities for each subscale are reported; they are quite low, ranging from .30 to .65 with a mea- nian of .58. The reliability of this measure borders on being unacceptably low. No validity information is...
reported. Information on the number of suspensions was collected, but, for some strange reason, not analyzed by curricular model. Only the overall mean was reported.

Interpretation of Results

It is interesting to see what would have happened if the data from this study had been reported and analyzed by a team of independent evaluators, such as the professional groups used to analyze and discuss the evaluation of Follow Through—rather than a team of the three curriculum approaches evaluated. Unlike Schwinhart et al. (1986) they would use the conventional .05 level of significance. The authors failed to report the results of their analyses on the basis of the three curriculum models. As a result, the authors would not interpret non-significant findings. And, thus, I believe a quite different picture of the DI Program would emerge.

This mythological report would begin with the objectives of the study—a mean of 2.2 suspensions for the entire sample of 54. It would indicate that no significant differences were found among the three samples. The authors would then conclude that the results of their study were not significant. It is, presumably, the case. Next, the report would indicate that half of the students had been arrested at least once by age of 15. Again, apparently no significant differences existed between the groups.

The report would next indicate that there were no significant differences in self-esteem, as measured by the Rosenberg scale. The location of control measure would be dropped due to its low reliability (Table 1 includes the only items for which significant differences were found). This of course assumes the results for these items with the entire sample of 54. It would instead use the Alpha Correlation Scale, which is presumably the case. The report would indicate that half of the students had been arrested at least once by age of 15. Again, apparently no significant differences existed between the groups.

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The authors would indicate that the lack of significant differences between the three preschool models is not surprising, considering the array of experiences in school and out of school since the age of four that were much more likely to have an impact on their lives. The report would conclude that, while preschool appeared to help all three groups during the primary grades (as evidenced by some elevation in IQ scores) and preschool achievement scores in first and second grade), the students didn’t appear to be doing well in junior high school. The authors have serious problems in school and with the courts. They might well conclude that more effective education in elementary and high schools and junior high schools might have helped.

Summary of Findings

What can one conclude from these data? It is often said that DI is not doing very well; half have been arrested, and many have been suspended from school. For suspension rate and self-report of arrests, no differences were found between the three curriculum models. Nor were there differences in self-esteem. Of the numerous self-report categories (including damage to school property, serious fights, stealing, use of weapons) no differences are significant. The achievement level of the students is unknown. No normative data are presented for the Adult Performance Level survey, so we cannot ascertain how these students fared compared to their peers. All we know is that of the ten subscales of the Adult Performance Level, differences between the three samples were significant on only one. Significant differences were found in only three areas—sports participation, being appointed to an office or job at school and running away from home. Though many would consider playing basketball or being on the track team nice, surely failure to do so is not a cause for alarm. It is unclear that any of these are evidence of juvenile delinquency. Students may well have good reasons for running away from home.

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Achievement and IQ

During the Elementary Grades

In their report, Schwinhart et al., (1986) also devote a considerable amount of time to summarizing their findings on the achievement of these students in first and second grade, and their IQ’s up through fourth grade. Of course, many of these interpretations are a bit misleading.

The mean growth in IQ between the ages of 4 and 10 for all three groups is impressive. Students increased in the program with a mean IQ of 79 at the age of 3, and the average IQ at age 10 was 93. However, the readers should note that the sample size was 55 at pretest and a mere 20 at posttest. Schwinhart et al., might also have pointed out that the predictive validity of IQ scores obtained before the age of 5 is close to zero (McCall et al., 1975). The reason for this may be clear if one thinks about the difference between the type of items a three year old takes versus those a ten year old takes in the Stanford-Binet.

Though there were no significant differences in IQ scores at age 10 between the three experimental samples, the Direct Instruction group mean was over one standard deviation higher. It is odd that this is the one time Schwinhart et al., chose not to report a non-significant finding, one that meets common criteria of educational significance. It is also strange that no IQ measures were administered to these 13 year olds.

The achievement data based on the California Achievement Test indicates that no significant differences appeared between the three samples in achievement in first and second grade. However, the achievement level at both grades was at or near grade level. Again, one wonders why no measures of achievement were collected or reported for students at age 15. The high suspension rate in junior high school may indicate that academic achievement is not at a very high level. Other longitudinal studies in junior high school may have noted increasing losses against the norm sample in the later elementary grades.

Summary of Problems

Aware of the problems in extrapolating from a study based on such a small sample, Schwinhart et al., (1986) indicated that "theories require restraint in its use and interpretation" (emphasis added), (p. 43). Yet in the next sequence, in a high policy impact, their conclusions are clearly drawn. Their choice of the phrase "pressure cooker" to describe the Benefic-Englmann approach for teaching language concepts was immediately picked up by the popular press. This is despite the fact that a naturalistic observation study failed to find any significant differences, in how teachers treated students, between the people labeled "pressure cooker" and Weikart's own "cognitive" approach (Seidert, 1966). The perception of verbal feedback was essentially the same for the two groups, as was the percent of pupil significant differences found. In time, teachers spent on management. Interestingly, neither were there any differences between the two approaches in the percent of time teachers spent on affect issues. The only difference was that significant numbers of the preschool intervention group went on in the Direct Instruction preschool.

In response to the New York Times article (Hechinger, 1966), after noting the unequal demographics, Carl Beretl (1968) stated, "For those who advocate direct instruction with harsh discipline, it may be important to know that the spectacular rate of increase in the retardation group reported (McClelland, 1970) that punishment was not used and discipline problems were virtually nonexistent."

Beretl then asked, "How could direct instruction at age three or four have led to delinquency at age 15?" It is equally hard to imagine how, with such unequal demographics, the high proportion of males in the direct instruction sample, and/or the higher number of students coming from homes without parent supervision, contributed to the few significant differences found. In addition, the children's experiences in kindergarten, elementary school and junior high school would certainly have some impact on their lives at age 15. Yet nothing has been recorded about the children's later lives. Material on the current demographics and status of the students' families might also help illuminate these interesting differences. Obviously, home situations change over a 12-year period, particularly when, as in this group, such as Michigan, and these factors should have been recorded.

Though a few statements appeared in the article formally stating that further research is needed before policy conclusions can be drawn, the findings make numerous inferences regarding the impact of the curricula used in preschool on children's future delinquency. At times, the text is written as if it were a report that includes the actual behavior (e.g., "The Ois group engaged in five times as many acts of property violation as ..." (p.34)). The authors' setting of an extremely liberal, 10 significance level is inappropriate. In a study such as this, we need to be sure before inferences are made.

Table 1. Mean Scores on Items Where Significant Differences Were Found by Schwinhart, et al., (1986)

<table>
<thead>
<tr>
<th></th>
<th>Direct Instruction</th>
<th>High Scope</th>
<th>Nursery</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult Performance Level Survey</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupational Knowledge</td>
<td>(All other scales non-significant)</td>
<td>2.4         3.7      3.7</td>
<td>.04</td>
<td></td>
</tr>
<tr>
<td>Self Report</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. You ever run away from home?</td>
<td>.38</td>
<td>.17</td>
<td>0</td>
<td>.02</td>
</tr>
<tr>
<td>4. Appt to a school office or job</td>
<td>0</td>
<td>12%</td>
<td>3%</td>
<td>.02</td>
</tr>
<tr>
<td>Participation in Sports</td>
<td>17%</td>
<td>50%</td>
<td>44%</td>
<td>.02</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>25%</td>
<td>44%</td>
<td>.28</td>
</tr>
<tr>
<td>Other</td>
<td>Never</td>
<td>50%</td>
<td>66%</td>
<td>.28</td>
</tr>
<tr>
<td>5. What is your family feel about how you're doing?</td>
<td>0</td>
<td>6%</td>
<td>6%</td>
<td>.03</td>
</tr>
<tr>
<td>Great</td>
<td>Poor</td>
<td>63%</td>
<td>33%</td>
<td>.06</td>
</tr>
<tr>
<td>Above Average</td>
<td>Poor</td>
<td>33%</td>
<td>3%</td>
<td>.06</td>
</tr>
</tbody>
</table>

* Standard deviations unavailable

* 0 = never, 1 = once, 2 = twice, 3 = three or four times, 4 = 5 or more

* Type of statistical test performed is unavailable
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<table>
<thead>
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<th>Quantity</th>
<th>Price</th>
<th>Extension</th>
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</thead>
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<td>$580.00</td>
<td></td>
</tr>
<tr>
<td>7-7346</td>
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<td></td>
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<td></td>
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<td>7-57348</td>
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<td></td>
</tr>
<tr>
<td>7-57349</td>
<td>14.85</td>
<td></td>
</tr>
</tbody>
</table>

SRA

Examples from Teacher Presentation Book D

DIRECT INSSTRUCTION NEWS, FALL, 1986
An Evaluation of the Mastering Fractions - Level-One Videodisc Program

by Ted Hasselbring
John Kenworthy
John Branford
The Learning Technology Center
George Peabody College for Teachers
Vanderbilt University
Nashville, Tennessee

This report describes an evaluation on the use of a one-shot fluorides program for teaching fractions. The evaluation was conducted under a contract from the Tennessee Board of Education. The primary purpose of the evaluation was to determine the effects of the Mastering Fractions - Level-One Videodisc program (Systems Impact, Inc., 1986) on student achievement in fractions. A secondary purpose of the evaluation was to evaluate teacher and student attitudes toward this instructional program.

Problems with Instructional Media Evaluations

Over the past decade, much of the research in instructional technology has attempted to isolate the influence of various media on learning by comparing the relative effectiveness of different media. This has been done by receiving similar subject matter from different media. For example, a large number of researchers have compared the effects of media delivered instruction (i.e., T.V., computer, videotape) with more traditional teacher delivered instruction, however, most of these research efforts have failed to control for instructional content and methodology.

Recently, a number of researchers have challenged the fruitlessness of simple media comparison studies for determining the effect of technology on learning. For example, even in cases where dramatic changes in achievement or ability have followed the introduction of a medium, as was the case in a study by Schwarz (1977), it has been argued that it was not the medium that caused the change, but rather a curricular reform that accompanied the change. Clark (1983) has argued convincingly that instructional technologies are... more vehicles that deliver instruction do not influence student achievement any more than the truck that delivers our groceries causes changes in our nutrition" (p. 445). Clark has suggested that the positive outcomes attributed to learning from media are as likely to be due to the content and the curricular reform that accompanied the change as to the instructional technology available. For Clark, a major problem in instructional research is the failure to control for the nature of the instructional treatment. The clear implication of Clark's argument is that instructional research should focus on the content, the methodology, and the instructional technology available, rather than simply on the instructional technology used.

Although the stated purpose of this evaluation was to determine the effectiveness of a videodisc program for teaching fractions, the media (i.e., videodisc) was not the primary target of the evaluation. Rather, the focus of the evaluation, as several researchers have suggested, was to determine the effectiveness of the underlying instructional methodology since the videodisc medium is simply the medium for transporting the instructional program. Thus, this evaluation was conducted in two parts. Part 1 was an experimental study that examined the effectiveness of the pedagogical methodology underlying the instructional program apart from the videodisc medium. Part 2 of the evaluation was a descriptive investigation of the effectiveness of the videodisc program when placed in a normal instructional setting. By studying the results from two parts of this evaluation, educators gain valuable insights into the possible effectiveness of an instructional methodology and how this methodology can be transported in the classroom through the use of technology.

Methods

In this section, a description of the materials and procedures that were common to both evaluation batches will be described.

Mastering Fractions Program: A Description

Mastering Fractions is an interactive videodisc program that is a part of the Core Concepts videodisc series produced by Systems Impact, Inc. (1986). The scope and sequence of Mastering Fractions covers the following instructional objectives:

1. Discriminating whether fractions are more than, less than, or equal to a whole.
2. Decoding fractions so they are understandable on the number line.
3. Writing whole numbers and other values as fractions.
4. Comparing different fractions.
5. Ranking fractions by size.
6. Rewriting whole numbers on number lines as fractions.
7. Rewriting fractions as mixed numbers.
8. Simplifying fractions.
9. Multiplying fractions by whole numbers.
10. Adding and subtracting fractions with unlike denominators.
11. Rewriting mixed numbers as fractions.
12. Dividing fractions.

The Mastering Fractions package consists of three double-sided videodiscs, an Instructor's Manual, and Student Response Booklets. The three videodiscs contain 35 lessons that include mastery tests, quizzes, remedial exercises, and a summary of each lesson. The Mastering Fractions includes a videodisc player (home or commercial model) with remote control unit, headphone jack, and color video monitor (25-inch monitors are preferable).

Instructor's Manual: The Instructor's Manual is divided into nine parts: an overview of Mastering Fractions and the equipment, a list of contents, instructions for using the videodisc equipment, teaching procedures, rationale and instructional features of the package, a glossary, a diagnostic test, and answer keys.

Student Response Booklets: Student Response Booklets are consumable and are coordinated with each videodisc lesson. The daily worksheets typically present between 25 and 35 problems and can be completed in 15 to 20 minutes. Teachers are encouraged to grade each lesson's worksheets before moving on to new lessons and to give the students feedback on any mistakes. The worksheets also provide the teacher with information about misconceptions or errors students may be exhibiting.

Placement Tests: A ten-item placement test may be administered before the introduction of the program to identify student strengths and weaknesses to be placed in the program or to provide baseline data for student improvements. The placement test suggests that students missing no more than two items on the placement test do not need the Mastering Fractions. Those missing three or more items are candidates for the program.

Computation skills: The Placement Test described above is not only a computation skills. If students have not mastered basic addition, subtraction, and multiplication skills they should not be placed in the program. If there are questions about a student's basic math skills, a 20-item multiplication quiz provided with the Mastering Fractions Instructor's Manual should be administered.

(Ted Hasselbring, John Kenworthy, John Branford, The Learning Technology Center, George Peabody College for Teachers, Vanderbilt University, Nashville, Tennessee)
Evaluation of Mastering Fractions

Instructional methodology. The instructional methodology underlying the Mastering Fractions program can be summarized by six fundamental instructional functions summarized by Rosenblatt and others (1986), as follows:
1. Review (check previous day's work and reteach, if necessary)
2. Present new content/strategies
3. Guided student practice and check understanding
4. Feedback and corrective feedback (and reteach, if necessary)
5. Independent student practice
6. Weekly and monthly reviews.

Each Mastering Fractions lesson follows these six fundamental instructional functions. The typical lesson begins with a paper and pencil quiz on the concepts presented the previous day. The quiz consists of a series of short frames shown on the video monitor. Five to ten problems are shown and at the end of the quiz the answers are given and the student is asked to check their work. The teacher then evaluates the class's performance on the quiz. If 80% of the class successfully answers the quiz questions then they move on to the lesson. If less than 80% were successful, then the teacher goes through a remediation sequence before proceeding through the lesson.

Each instructional sequence in Mastering Fractions is characterized by a lively presentation of a fraction concept by a narrator/actor. Focusing throughout all instructional sequences, the programs provide ample opportunity for the students to respond to prompts by the narrator. Excellent graphics and sound are used to visually and auditorily present concepts being taught.

The instructional sequence of the lesson begins with a short review of previous concepts by the narrator. The students are asked to orally answer the questions posed by the narrator in the video. There is a pause in the program for responses. At any time the teacher may stop the video sequence to allow additional time for responding. At the end of the lesson the teacher may choose to reteach by taking the students back to the high level sequence on the video. The video sequence is correlated with the current concept, or if no remediation is needed the teacher continues the video sequence.

The students use paper and pencil throughout the lesson for solving problems presented to them during the video instructional sequence. The students divide their paper into two equal halves by drawing a vertical line down the page. On the left side the student writes the problems and answers. The right side is used for correcting errors. The students are encouraged to correct errors by having the written problem and writing the correct answer. Dividing the paper with a vertical line makes it easier to see which sections have problems. By separating the students, the teachers are able to focus on the individual and have all remediation sequences correlated with all remediation sequences.

At the end of each lesson the students are assigned practice problems in the Student Response Booklets. The lessons in the video sequence are often repeated on video. There are 25 to 35 questions per lesson. Teachers are encouraged to grade the practice problems before going onto the next video sequence.

At the end of every fourth teaching lesson, a review test is administered. Each test is divided into parts covering a specific skill. Test summary forms are provided to aid the teacher in organizing remediations that are needed within each lesson. After all remediations have been administered the teacher may move on to the next lesson.

Mastering Fractions contains a total of 35 lessons: twenty-eight instructional lessons and seven test lessons occurring after every fourth teaching lesson. The instructional lessons take between 30 and 50 minutes to complete without remediation. Presenting tests and remediations take between 15 and 40 minutes depending on the performance of the students. Ideally, the 35 lessons should be presented one per class period. Thus, if used consistently, the entire Mastering Fractions program can be completed easily in seven to nine weeks.

Dependent Measures
Pre-Posttest. The pre-posttest was developed from the Mastering Fractions objectives and a scope and sequence chart for fractions from a sixth-grade grade level. The test is designed to develop that included test items measuring each of the 32 objectives covered in Mastering Fractions as well as those fraction skills listed in the basal scope and sequence chart. All students participating in the evaluation (Part 1 and 2) were tested prior to the beginning of the evaluation and again at the end of the study.

Mastery tests. The two-page mastery test reviews information taught in the previous four lessons. Reliabilities were calculated for the pretest (.93) posttest (.93) and the seven mastery tests (.68-.90 average = .80). The Alpha coefficients indicate good internal consistency.

Teacher Logs. Teachers kept daily logs on the use of Mastering Fractions. In these logs teachers recorded the number of minutes spent grading homework, the number of minutes spent reteaching the lesson, and comments on the effectiveness of the lesson. These logs were mailed to the project coordinator on a weekly basis.

Teacher Interviews. Following the evaluation, the teachers were given a structured interview to gain information that may have been omitted from the written information and an overview from the teachers concerning the program. Interviewers used a set of predetermined questions, however, both the teachers and interviewers were free to discuss any issues concerning the use of Mastering Fractions.

Student Interviews. A randomly selected set of students was also interviewed. Four students were selected from each class participating in the evaluation. An equal number of males and females was represented. Interviews of questions was used to structure the interview, but the interviews were not constrained by the questions.

Part 1: Experimental Study
Part of the evaluation was an experimental study designed to test any novelty effect attributed to the new medium of Mastering Fractions before comparing its effectiveness to another instructional medium. In this study, the control group of students was compared using two presentation formats: (a) videotape, and (b) a teacher using overhead transparencies. In condition (b), a half-time aide was added to help monitor student performance. These two conditions were then compared to a third teacher-presented curriculum (part 2) that served as a control condition.

Subjects
The study was conducted in the Metropolitan Public School System. The Metro Nashville system represents an urban school setting serving approximately 55,000 students. The classes studied were four sixth-grade math classes from an intercity middle school. Two of the classes were classified as high ability and two were classified as average-ability classes. A total of 63 students participated. The racial make-up of the students was 40% Caucasian and 60% Black.

Procedures
The study compared the effectiveness of the Mastering Fractions videotape program with two contrast conditions. In the first contrast condition, the teacher used all of the Mastering Fractions materials except the videotape itself. The teacher attempted to emulate as closely as possible the instructional method found in the Mastering Fractions curriculum. Thus, students in this treatment condition received the same instructional content as students in the videocassette condition, the only difference being that the Mastering Fractions content was presented totally by teachers. The overall gains from overhead transparencies and not by videotape.

Table 1. Mean, Standard Deviation, and Percent Correct on the Pretest and Posttest for the Experimental and Control Classes

<table>
<thead>
<tr>
<th>Class</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Percent Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>MF-Video</td>
<td>43.40</td>
<td>61.80</td>
<td>43.60</td>
</tr>
<tr>
<td>MF-Teacher</td>
<td>43.40</td>
<td>61.80</td>
<td>43.60</td>
</tr>
<tr>
<td>Control</td>
<td>30.10</td>
<td>52.92</td>
<td>36.93</td>
</tr>
<tr>
<td>Pretest</td>
<td>6.24</td>
<td>12.12</td>
<td>6.95</td>
</tr>
<tr>
<td>Posttest</td>
<td>14.10</td>
<td>20.10</td>
<td>14.10</td>
</tr>
</tbody>
</table>

The second condition was also teacher presented. In this condition students received the fractions curriculum used by the Metro Nashville Public School System. The Metro fractions curriculum is a spiraling procedure where the students receive fractions instruction several times throughout the year, with each spiral through the curriculum building on the previous instructional sequence. Two of the four experimental classes, one high-ability and one average-ability, were randomly divided with half of each class being assigned to the Mastering Fractions Videotape (MF-Video) condition and the other half being assigned to the teacher emulated Mastering Fractions (MF-Teacher) condition. Students were assigned to the Mastering Fractions significant difference from the ANCOVA. The results from the Scheffe indicated that the students receiving the Mastering Fractions treatments did not score significantly different from each other on the posttest.

Finally, data from the two Mastering Fractions treatments were analyzed in terms of the percent of problems solved on the pretest, posttest, and seven mastery tests. On Mastery Tests 5 through 25, students in both treatment conditions scored significantly higher on tests 5 through 10 correct with an average of 91.5%. There was an unexplained drop (to the low 70s) in the scores on tests 11 through 15 for the high-ability groups. This drop in performance was not evident in the posttest when the high-ability groups

8 DIRECT INSTRUCTION NEWS, FALL, 1986
averaged 87.5% correct. Although the average-ability groups scored below 80% on the pretest this should be expected since they did not complete the field tests.

The results of the data analysis form the basis for several conclusions. First, the achievement gains resulting from the use of Mastering Fractions can be attributed to instructional content and methodology. There appears to be little novelty effect as a result of the videodisc medium. Second, Mastering Fractions was more effective than the existing fractions curriculum used in the experimental school.

Part 2: Descriptive Study

The purpose of Part 2 of the evaluation was to compare Mastering Fractions videodisc program on student learning in a variety of situ settings. There were no attempts in this evaluation to compare Mastering Fractions against other programs.

Subjects

Three school systems were selected by the Tennessee Valley Authority as field sites for the program. These sites were chosen based on demographic characteristics that were representative of the region as determined by TVA. Geographic location and size of the school systems were the two primary criteria for selection. The three sites were: Ashville, North Carolina, Avery County, North Carolina, and Lauderdale County, Alabama.

In Avery County a class of 28 ninth grade students enrolled in a general mathematics class participated in the program. In Asheville, four classes and three teachers participated in the evaluation. The Asheville classes included one fifth grade with 5 students, two academically average sixth grade classes totaling 26 students, and one ninth grade general math class with 28 students. In Lauderdale County, one class of 25 low average eighth graders in general math and one class of 22 ninth graders in general math participated.

Procedures

All teachers were first given a one-day training session on the videodisc fractions. Following training, each field site received one set of Mastering Fractions discs, an Instructor's Manual, and enough Student Response Booklets for each participating student. The 48-hour pretest was given to each student. Following the pretest, teachers were instructed to use Mastering Fractions as described in the Instructor's Manual. All teachers kept a daily log that described the use of the program. The log was returned each week by mail to the project coordinator.

Consistency of implementation varied across the field sites. Some teachers used the program on a daily basis while others were much less consistent. Data showed that the beginning of the field study and the number of school days needed to complete the program are shown in Table 2.

As shown in Table 2, the teacher in Class 4 completed only 25 of the 35 lessons. The reason reported for this was that the teacher did not complete all 35 lessons because the lessons were becoming too difficult for her class and that they were getting tired of the program.

Every five lessons, the teachers administered a Mastery Test to the students. These tests were graded by the teachers, but not mailed to the research coordinator for scoring verification and analysis.

At the completion of Mastering Fractions, all students were post-tested using the same test that was used for the pretest. In addition, four students were run

Table 2. Number of Days Required to Complete the Mastering Fractions Program in the Field Sites

<table>
<thead>
<tr>
<th>Class</th>
<th>Beginning Date</th>
<th>Ending Date</th>
<th>Number of school days to complete 35 lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>1/10/86</td>
<td>3/22/86</td>
<td>36 days</td>
</tr>
<tr>
<td>(2)</td>
<td>1/10/86</td>
<td>3/22/86</td>
<td>36 days</td>
</tr>
<tr>
<td>(3)</td>
<td>2/10/86</td>
<td>4/21/86</td>
<td>51 days (25 lessons)</td>
</tr>
<tr>
<td>(4)</td>
<td>1/14/86</td>
<td>3/22/86</td>
<td>48 days</td>
</tr>
<tr>
<td>(5)</td>
<td>1/10/86</td>
<td>4/22/86</td>
<td>75 days</td>
</tr>
</tbody>
</table>

A second possible explanation for why the greatest gains were found in classes where Mastering Fractions was used consistently is that perhaps these teachers were simply more dedicated and better teachers. This would suggest that the Mastering Fractions program is not effective. Even though the instructional content of the program is held constant through the videodisc medium, if teachers fail to use the program in the prescribed manner, then the benefits of the program are weakened. It is possible that the relationship we found between higher mastery scores and consistent use of the program is an artifact of good teaching. Since the research on effective teaching shows that good teachers are more organized, it is possible that consistency of use is simply a measure of organization and structure.

Although all classes receiving Mastering Fractions showed significant achievement gains, one rival hypothesis is that these gains were a result of a novelty effect produced by the videodisc medium. The results from Part 1 of this evaluation suggest that this rival hypothesis should be rejected. The posttest scores comparing Mastering Fractions Videodisc Program with traditional instruction showed no significant differences between the two groups. This result suggests that the videodisc medium was not contributing to the instructional content and methodology of the instructional program.

It is important here, however, to point out that the discussion above does not suggest that the videodisc medium is not important to the Mastering Fractions program. On the contrary, it would be virtually impossible to produce across the board student gains without the use of the videodisc medium. The videodisc medium provides educators with the ability to capture high quality interactive instructional sequences that can be easily transported from classroom to classroom without a resultant degradation in the quality of instruction. Also, we had to use a half-time teacher whenever the Mastering Fractions Teacher condition. This is not an insignificant cost.

In summary, the videodisc medium is an effective instructional device under the instruction used by the Mastering Fractions Teacher treatment, first they were able to be used in the content and methodology of the Mastering Fractions program. Second, they would have a higher achievement. Even though we were not able to change the content and methodology from presentation and year to year. With the videodisc medium this is not a problem since the instructional content and methodology is built into the videodisc and is unavailable. By combining the sound instructional content and methodology of Mastering Fractions with the videodisc medium the result is a robust instructional package that is transportable from classroom to classroom. If used as designed, Mastering Fractions provides teachers with an effective and motivating tool for presenting an extensive fractions curriculum.

Although data from this evaluation showed that the use of results in statistically significant pre- to posttest gains, it could be hypothesized that these gains would have occurred regardless of which program was used. However, data from Part 1 of this evaluation does not support this hypothesis to be rejected. The results indicated that the videodisc medium in the Mastering Fractions treatments (Video and Teacher) scored significantly higher on the posttest than the videodisc minus the alternate curriculum. The most significant aspect of the finding is that even though the average-ability groups receiving the Mastering Fractions treatments received only 25 of the 35 lessons, these students still scored significantly higher on the posttest than even the high-ability group that received the alternate fractions curriculum. This finding would suggest that when used correctly, even a portion of the Mastering Fractions program could be more beneficial to students than existing fractions instruction.

Teacher and Student Perceptions

Teacher Interactions. When asked about the difficulty in operating the videodisc player, all of the teachers in the study said that it was either "easy."
Mastering Fractions
Continued from Page 9

or "moderately easy" to operate. The only difficulty reported was that sometimes pressing the "TAP" button instead of the "STEP" button on the remote control caused the program to fast forward which required a few extra minutes to find the appropriate place in the program again.

When asked how Mastering Fractions was useful as a teaching tool the responses included:

"It presented material in a way that was interesting to the students. It allowed the students to visualize the concepts they were learning."

"The videodisc presented material slowly and in a step-by-step manner so it was easy for the children to learn."...

The sound effects and movement were always changing so it kept the students' attention.

"Almost all of the students did more work than normal. They responded well to the disc, and their grades improved considerably."

When questioned about any negative aspects of the program the teachers all agreed that there were only a few negative aspects. Some that were reported included:

"The program did not emphasize simplification nearly enough to satisfy teachers' recommendations."

"The students became bored with the copying of problems from the video screen."

"I would shorten some of the lessons that were repetitive and sometimes present more that one per day."

"The students became frustrated with the darkened answer boxes and needed more explanation and computations in the workbook."

When the teachers were questioned on how their students liked Mastering Fractions, the common response from all of the teachers was that the students liked the program more at the beginning than at the end. However, one teacher said:

"Now that the program is over they ask everyday when we will be able to do that program again."

One comment that seems to testify how the teachers felt about Mastering Fractions was:

"I loved being able to access a disc. The fractions program was well thought out and used sound teaching concepts. The program is that we 'human-type teachers' like to do things our way and we are all different. I prefer to integrate the use of the disc in with my regular program and not use it in a canned approach such."

Student Interviews. When asked what they liked most about Mastering Fractions the students gave a variety of answers. All had positive comments about the program. Some of the most common responses included:

"Starts easy and gets more difficult then goes on to the harder lessons."

"The tests and reviews were easy."

"Explains the problems well and gives lots of practice."

"Received great grades."

"Made fractions much easier to understand."

"Talked about the problems and showed pictures of the fractions, didn't just give assignment with no instructions."

"The animation was very good."

"Better to understand."

"When asked what they liked least about the program, the most common response was that by lesson 25 or 30 they were getting tired of doing fraction. Some of the comments were:

"After a while there were too many reviews."

"The pages were long and we had to do them even if we were getting 100% correct each time."

"Didn't progress as fast as regular math, had too many quizzes."

Even though the students said that they tired of the program, when asked how much they learned about fractions, 93% of them responded with, "a lot," or "more than I expected." Thus, I felt that they were learning from the program.

Further, when asked if Mastering Fractions was a "good teacher," every student interviewed responded with a "yes." When asked why they felt that way their responses were:

"The program made it easy to pay attention, it was more interesting."

"The program taught with pictures and graphs which made it more interesting to watch."

"Explained it more than the teacher does, easier to understand."

"It gave examples and showed you how to do the problems before giving you assignments."

"The program adds-on from past lessons."...

When asked, "If you had a choice as to how you would learn fractions, what would it be?", three-fourths said that they would like to learn fractions on a computer. None of the students said that they would like to learn from a teacher.

When asked how they would make the program better, a variety of comments were given. They included:

"Cut out some of the reviews and introduce the short ways to do the problems."

"We already knew the short ways and go back to the long ways was a pain."

These comments were especially interesting in that Mastering Fractions avoids teaching "short cuts" since it is often difficult to cut out that students the greatest difficulty when they move into algebra. Often the short cuts that they have learned are conceptually inaccurate and lead to misunderstanding in higher level math course.

Other comments on how to improve the program included:

"Make the problems harder."

"Would take out the reviews."

"Changed the pace, make it go faster."

Finally, when asked what their feelings about this course were, the general responses included:

"Would like to learn other subjects from the videodisc."

"Like the disc, something new and different."

"Bored with the disc or the program, maybe another subject would be more fun."

"Looked forward to using the videodisc each day."

"The program was more fun than regular class."

"I left it on."

"Liked it much better than regular books and class."

The overall response of the students who were interviewed was quite positive. In the interviews it was clear that the students felt that they had learned a great deal from the program. When asked how they felt that they had learned something they usually responded with, "I did well on the quizzes and the tests." One student explained that the instruction was that they were tired of the program toward the end. However, a number of students said that they were worried that other subjects being presented on video-disc which would indicate that they were either learning algebra, decimals, and fractions and not of the videodisc medium.

Summary
The results of this evaluation suggest that Mastering Fractions, when used as described above, is an effective instructional tool for teaching fractions concepts and skills to students exhibiting a wide range of ages and abilities. It appears from this evaluation that the effectiveness of Mastering Fractions, like other instructional programs, is somewhat dependent upon the commitment and quality of the teacher using the materials. In other words, the program does not appear to be teacher-proof.

The results of the evaluation further suggest that the achievement gains attributed to the use of Mastering Fractions are a result of the instructional content and methodology underlying the program and are not attributed to a novelty or the effects of the video medium. Thus, when used appropriately, one should expect for students to attain the instructional objectives as outlined in the Mastering Fractions program.

Finally, it would appear that Mastering Fractions is regarded highly by both students and teachers. Teachers find the program easy to implement and the technology is to be preferred. However, they report that the program is instructionally sound and highly motivating to students. Similarly, students report that they enjoyed using the program, that they felt that they learned a great deal from the program, and that would recommend the use of Mastering Fractions with other students.

References

Is DI Only
by Edward Schaefer
Cape Henlopen High School
Nassau, Delaware

Direct Instruction, as a set of generic teaching strategies, has amassed a solid support base in the educational community over the past ten years (Cotton & Savard, 1982; Rosenthal & Stevens, 1980; Rosenthal, 1985). In the same manner, a variety of Direct Instruction curricula (such as the Diast Reaching, Reading, and Arithmetic [DRA]) have proven remarkably effective in promoting student achievement in basic skills (Cotton & Savard, 1982; Fabre, 1985). Such curricula are based upon two premises: 1) that students learning in the classroom is a function of environmental events and 2) we, as educators, can increase the amount of students' learning by carefully engineering the details of student interaction with the classroom environment. The curricula integrate those generic Direct Instruction teaching strategies with a set of curriculum design features drawn from empirical behavior theory (opposed to the "Big Battery", logical analysis of concepts and tasks, and the empirical analyses of classroom teaching, now the use of time and personnel (Becker, et al., 1981).

At times, however, one hears that Direct Instruction is not effective, especially, direct instruction programs are appropriate only for low achievers; and that such programs would be debilitating effect on average and above average students (Gilliglott, 1947; Depeaux, 1972). That such programs are appropriate for most low achievers would seem to be a matter of fact (Becker & Carine, 1980). That they are appropriate only for low achievers would appear to represent a position based more upon assumptions, philosophies, and perceptions than upon empirical evidence.

It is our purpose here to present empirical evidence that would address the appropriateness of one such Direct Instruction program, Reading Mastery (Engelmann, et al., 1983), for average and above-average students in regular classroom settings.

Reading Mastery is a direct instruction basal reading program for grades K-6. The programs for grades K-2 are revisions of the Diast Reaching Series (1974 & 1975 editions). As such they emphasized accuracy and speed, both for the beginning reader, and the development of literal and inferential comprehension.

Reading Mastery program for grade 3 is also a revision of a previous edition of the Diast Reaching. Reading Mastery Level III emphasizes reasoning and reference skills; comprehensive vocabulary and complex sentence forms; the interpretation of maps, graphs, and timelines; and the application of facts, rules, and schemas to a wide variety of contexts. Levels IV-VI are entirely new and reflect the problem-solving skills and reading in the content areas. Students are taught to comprehend new vocabulary and sentence forms, acquire information about the world, evaluate problems and solutions, and complete research projects.
for Low Achievers?

Levels V & VI emphasize literacy and writing skills. Students are taught to comprehend figurative language and prepare a balanced portfolio to center them on the primary battery of the Stanford Achievement Test. They are taught to analyze characters, settings, plots, themes, and arguments to infer the main idea. They are taught to write to complete writing assignments; and to apply these skills to the classic novels (e.g., To Kill a Mockingbird), short stories (e.g., The Necklace), biographies (e.g., Harriet Tubman), poems (e.g., Casey at the Bat), and expository articles (e.g., Schools in the 1860's) provided in the program, and to any such material encountered outside their formal reading program.

Engelmann & Carnine (1982) report a study in which the previous edition of the Distar Reading program was used by a class of 30 average and above-average second graders and a class on the primary battery of the Stanford Achievement Test showed a mean reading grade level of 4.1 years. The difference between the distribution of scores and the expected distribution was significant at the 1% level. The students selected were taught for one hour a day, five days a week, for two months. Table 1 lists the gains (SRA, 1983) by the program authors of the revised (Levels V & VI) and new levels (Table 1). The results for the two reading programs were consistent. The first group were taught with a full-range of below-average, average, and above-average performance levels. The class with the first generation levels, while the second group of students used Reading Mastery for both of her reading classes, the second grade class and Keys to Reading for the first grade class.

In Table 1 there is also a comparison between the new program and the revised program and the students in the third grade class. The results are better with the new program for students in Grades 1-2. The difference in gain scores on the comprehension test between the two programs was significant. The students in the second grade class also showed better results on the revised program than on the new program. The results suggest that the new program is more effective than the old program.

Table 1. CTBS Scores Reading Mastery Pilot

<table>
<thead>
<tr>
<th>Grade</th>
<th>Vocabulary</th>
<th>Comprehension</th>
<th>Total Reading</th>
<th>Spelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economy 1</td>
<td>66.7</td>
<td>72.4</td>
<td>5.7</td>
<td>63.5</td>
</tr>
<tr>
<td>Economy 2</td>
<td>58.6</td>
<td>65.0</td>
<td>6.4</td>
<td>58.0</td>
</tr>
</tbody>
</table>

Average Reading Mastery 58.0 65.5 7.5 56.7 66.8 10.1 57.6 66.3 8.7 58.6 62.6 4.6

Table 2. CTBS Scores Reading Mastery Pilot

<table>
<thead>
<tr>
<th>Grade</th>
<th>Vocabulary</th>
<th>Comprehension</th>
<th>Total Reading</th>
<th>Spelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economy 1</td>
<td>71</td>
<td>69</td>
<td>-2.0</td>
<td>69.7</td>
</tr>
<tr>
<td>Reading Mastery 1</td>
<td>63.0</td>
<td>65.3</td>
<td>2.3</td>
<td>68.1</td>
</tr>
<tr>
<td>Reading Mastery 2</td>
<td>77.4</td>
<td>77.0</td>
<td>-4.1</td>
<td>72.1</td>
</tr>
<tr>
<td>Reading Mastery Avg.</td>
<td>68.8 69.9 1.1</td>
<td>67.5 70.5 3.0</td>
<td>68.2 70.2 2.0</td>
<td></td>
</tr>
</tbody>
</table>
Two Case Studies of Instructional Management in

by William Green
Andrew College
Russell E. Frenster
Bruce Miller
Martha Monvent
University of Oregon

This research was supported by the National Institute of Education (NIE) but does not necessarily reflect the views of the agency.

An earlier version of this paper was presented at the annual conference of the American Educational Research Association, Chicago, Illinois, March, 1985. The authors wish to acknowledge the contributions of Douglas Cauchy, Adrienne Allen, Craig Darch, Anita Archer, Margie Tomice, and Margie Myrick in the development and implementation of the research. The authors wish to thank Phil Runkel for his invaluable work on earlier versions of this paper.

In 1983, Ron Edmonds concluded that "we know far more about the characteristics of effective schools than about how they achieve. Maintenance." That assertion is still true today. The purpose of this study was to document two schools involved in the process of school improvement, two schools attempting to become more effective. In particular, we were interested in the role of the principal. Studies have consistently shown that, in schools that are unusually effective in serving low-achieving, low-income students, the principal is perceived as an instructional leader. Many—some legislators to educational researchers—have made the seemingly reasonable inference that the principal must take a strong role in instructional management if a low-achieving school is to improve its academic performance. Yet, in an unpublished four years ago (Gersten, Carnine & Green, 1983), it is unclear from the research just what the role should look like, which specific activities on the part of the principal had to improve in the quality of classroom instruction. Most of the studies relied on teachers' reports of the principal's behavior (e.g., Cawabarner, Soder, & Jacoby, 1986) or brief visits to the school (e.g., Berenfield, 1979). A major goal of this study was to fill this gap—combined with detailed naturalistic observation—exactly what principals do in schools undergoing school improvement. Unlike previous studies of this nature (e.g., Bontemps, Dwyer, Rowan & Lee, 1982; Merriam, 1981) we examined schools in the throes of improvement activities, rather than schools that already were deemed effective. An important secondary theme in the research was the role of the instructional supervisor in the process. Many researchers (Hall, 1986; Cook and Loucks, 1986) have discovered that change in schools often requires the efforts of two individuals—the principal and an instructional supervisor/con- sidering teacher. Each of the schools in the study had a consulting teacher on the staff. The main role of the consulting teacher was to support the All Schools Achievement Program, our pseudonym for the district's school improvement program. We attempted to describe the role of this individual, their working relationship with the principal, and the impact they had on teachers. For reasons that will become clear as one reads this report, due to circumstances beyond our control, this aspect of the study was not very successful. One of the consulting teachers was promoted right in the middle of the study; another was recently hired and did not seem representative of those in similar positions. In fact, the role of the consulting teacher became the major impasse of a subsequent study conducted in the same district (Gersten, Green & Davis, 1986). In the present report, we merely share our observations of what we saw, and what teachers told us about the two consulting teachers.

The case study involved 29 days of observation at each school. The principal was observed for 5 days, the instructional supervisors (called consulting teachers) for 5 days. In addition, interviews probed teachers' perceptions about what the instructional management team actually does, and their assessment of its usefulness. The result is a detailed account of the actual instructional management activities conducted in two inner-city schools in a suburban district in the year of a school improvement program. Both schools served primarily minority, low-income students, and showed growth in achievement over the past four years, although one appeared to be more successful than the other.

A conceptual framework based on research conducted by Gersten and Carnine (1981) on instructional leadership guided analysis of instructional management in each school. This framework consists of six instructional management functions derived from an extensive review of the research literature on school improvement and successful educational innovation. Essentially, for a school improvement effort to be reasonably well-implemented, these six functions must be performed either by the instructional supervisor or the principal (Gersten & Carnine, 1981; Gersten, Carnine & Green, 1982; Green, 1982).

These functions are listed in Table 1. As can be seen, the four functions are directly observable. The latter two require a greater degree of inference from the observer.

Setting

The study took place in a large urban school system implementing a school improvement program in 35 elementary schools. In 1987, the school district was directed by the court to improve the reading, math, and language scores of its inner-city students within the next five years or face mandatory busing of students.

Since 1978, all 35 schools had been engaged in a school improvement program called the All Students Achievement Program (ASAP). The purpose of ASAP is to increase the quantity and quality of reading, math, and language in the elementary grades and, as a result, to raise achievement test scores. ASAP was developed entirely by the district and incorporates effective teaching practices including: mastery learning, time on task, and minimizing classroom disruption. It borrows, as well, certain components from the Direct Instruction (DI) model (Becker, Engelmann, & Carnine, 1981). Some of the 35 schools also use Direct Instruction in their first grade classes instead of the ASAP program. This study examines the dynamics of instructional management in two of the 35 schools. A subsequent study examined instructional management in four additional schools (Gersten, Green & Davis, 1986).

To be included in this study, achievement test scores at the school had to show improvement over the past three years. Continued on Page 13

Table 1. Instructional Management Functions

<table>
<thead>
<tr>
<th>Activities and Behaviors of Instructional Managers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Provide supplies and curriculum materials.</td>
</tr>
<tr>
<td>2. Actively monitor student progress (using curriculum—or—criterion-referenced tests).</td>
</tr>
<tr>
<td>4. Provide specific, concrete, technical assistance to teachers (includes interpretation of test results, specific feedback based on observations, and interpretation of curriculum).</td>
</tr>
</tbody>
</table>

Climate Variables

5. Visible commitment to the instructional program (symbolic actions and statements).

6. Norms of collegiality, providing a climate of improvement, emotional support of teacher.

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12 DIRECT INSTRUCTION NEWS, FALL, 1996
Schools with Low-Achieving Students

In addition, the principal had to be willing to participate in the study. The teachers in the sample were often under pressure from administrators and parents to improve student achievement. The mix in the school was 70% minority (21% Black, 23% Hispanic, 26% Asian, and 26% Caucasian. All classrooms use the ASAP program. Haskell Hills Elementary is one of the larger elementary schools in the district with an enrollment of just over 1000 students. Seventy-eight percent of the students are classified as minority, with the Asian population (41%) being the largest. Black and Hispanic make up the remainder. Most classro,

rooms use the district-developed ASAP program in reading and language arts. Six elementary teachers use Direct Instruction.

Methodology

Yin (1981, p. 2) stated that the need to use case studies arises whenever "... an empirical study is designed to test a contemporary phenomenon in its real-life context, especially when the boundaries and causes are not clearly evident." The study ex-

amines administrative leadership in its natural setting, the relationships among teaching staff, and the impact of the relationship on teaching staff.

The study was a qualitative case study observational methodology with semi-structured interview techniques. At the core of the study were the observa-

tions of the principals and supervisors. In addition, 27 percent of the teachers in each school (randomly selected) were in-

terviewed to obtain a detailed view of their perceptions of instructional management at the school. The data from these interviews were analyzed with qualitative techniques to ascertain commonalities and differences between the schools.

Observations of Principals and Supervisors

Before the observations, the principals and supervisors were interviewed for approximately two hours, using two lines of questions. The questions dealt with the administrators and supervisors' goals, how they developed the curriculum and staff development for the school year. In addition, questions about the current instructional management style, the students and what other administrative problems were asked. All of these orientation inter-

views were conducted by the senior author.

The method of observation was ex-

plained to each member of the manage-

ment team individually. They were told that they would be observed for one hour, followed by a question period, usually one day at a time. We were asked to be involved in everything that went on during the observation period. We were present for all classroom visits, and any meetings they would attend. Subjects were assured that the observations were not made available to others. Because the intent was not to disturb the day-to-day man-

agement of the school, the members of the management team were told to signal if a particularly sensitive situation came up and we would leave.

We tried to be unobtrusive, but asked clarifying or probing questions when appropriate.

Extensive field notes were gathered during the observation of the manage-

ment teams. When a particular activity took place the time was written. Each-

nly the time activity changed the time was again written and an entry was made in account of what happened during the observation with the amount of time devoted to each.

The observation data were assembled into chronological, narrative records that included interview notes, observation field notes, documents, and in-

terpretative records from the field

researchers in each setting. Analysis included pattern and Strauss (1987) "comparative method" framework. Categories from records, interpre-

tation, and contradictions with each category were noted and compared across the two schools.

"Typical days" for each administrator and supervisor were then written (Green 1985). These typical days are presented in this report. Finally, the behavior of the adminis-

trators was analyzed using the six instructional management functions (Gersten & Carnine, 1981).

Teacher Interviews

The interviews included an account of what teachers reported about the use of the Administrative Support Functions in their schools and their perceptions of the instructional program used in their school. The interviews and organization around the six instructional management functions. The interviews were structured format was selected because it provided quantifiable categories of responses to questions, yet also lent itself to the crafting of rich ana-

litical information.

The response to 38 of the items fit into one or more of the categories in these cases, the interviewer checked the category under which the response fell. The remaining questions were open-ended, and detailed notes on the teacher's response were recorded by the interviewer. The two categories of ques-

tions are illustrated in items 21-22 below:

1. How do you think the principal feels about the ASAP or DI pro-

gram?

2. No. If yes, in what ways?

Interviewers were administered by two individuals with extensive experience in the ASAP program. One was an advanced graduate student, the other a consultant for the school district. They each conducted and several of the interviews. Interviewers were trained by the authors and reliability checks were adminis-

tered.

Since three interviewers coded the responses independently, it was essential that inter-rater reliability be estab-

lished. During three of the interviews, two interviewers were present, and each was asked to code independently. The reliability coefficient of the coding was 94 percent agreement.

Results of the Case Study Observation of Administrative Leadership

The purpose of this section is to describe the dynamics of instructional management in two inner-city elemen-

tary schools so that the need to write "typical days" in the lives of the management teams provide detailed, specific accounts of how the instructional management teacher like in grade-

<especially. The focus is on the working relationships between the members of the in-

structional management staff, as well as the attributes, beliefs, and philosophy of management personnel.

Monroe Meadows School

Excerpts from a typical day: The prin-

cipal, Kim Smith, Kim arrives at school shortly before 8:00 and goes to her desk. She looks at the mall on her desk. At 8:12 the nurse comes in to talk about a special lesson she is giving in special education classes. The discussion is about the student and makes decisions about the care of the student. Kim tells her that she needs to see the child or whether the case should be held over until the next day. A teacher comes in to see Kim at 8:20. This teacher had referred a child for counseling and the psychologist had given her a form to fill out. She is not sure how to answer some of the questions, and asks Kim for help. They discuss the form together.

At 8:26 Kim is on her way to the yard. She tells several students who are sweep-
ging the yard to come to class early. Kim does a good job. The students put the grounds in shape early the next day.

At 8:30 Kim talks about her career education lab. The teacher tells her she has organized a number of lessons so that the students can work with the rest of the school. Kim is asked about the difficulty of the job. She has to prepare lessons and duplicated. She tells Kim that teachers from other schools have visited her, and she has spent about three hours helping each teacher. Kim tells her she should apply for one of the "mentor teacher" positions that are being developed by the district and funded by the state.

Kim approaches Kim about a writing class she wants to take at one of the local universities. She has applied for a scholarship. She teaches a gifted cluster that emphasizes writing. Kim en-

courages her to apply and they discuss possible interview activities for the staff if she participates in the class.

At 9:16 Kim visits both career educa-

tion classes. In one room she watches students conducting an experiment. The students are very orderly. A point is made about the experiments and the students seem interested in what they are doing.

By 9:22 Kim is in the computer lab. She watches and asks questions of the staff. She explains that the assignment. Kim ex-

plains to me that each student is sched-

uled to do the computer work. In the lab there are 90 students who belong to a computer club and use the lab the other day is not set.

At 9:29 Kim goes to another class-

room. She visits a second grade class and another. Her pattern is to enter the classroom quietly so as not to interrupt the students who are working on the computers. After a few minutes, then go over to look at the ASAP charts that each teacher is required to have. These charts show curriculum progress and scores on mastery tests. Occasionally she asks students about his or her seatwork.

At 9:47 Kim goes to the counseling center and talks to the counselors about students who have been having difficul-

ties. Donna, the counseling teacher, comes to see Kim to review what he about the ASAP book orders for the following year and is particularly concerned about the number of books each teacher receives. Kim asks if the student is a second grade teacher who is making the book order, and yet has trouble speaking English all the time. She feels that the teacher has turned the scale around, marking the student with special needs with a one instead of a four. This was found to be true later.

Back in her office, the telephone rings at 9:55. Kim is discussing the cafeteria. Monroe Meadows being chosen as an out-

standing school by the state department of education. She believes that it was chosen and going to the state capitol to be given an award by the state superintendents. At 11:43 Donna comes in to see Kim about a teacher in the ASAP program. She is meeting with other schools.

The role of the principal. Kim Smith

provides most of the direction for in-

structional management. A few of the day-to-day details of the job, such as deciding who gets the time to attend, are delegated to the ASAP consultant. Following Kim's advice, the third critical in the individual is the nurse, Darla Bath, who played an analytical role at Monroe. She coordinated special education testing and placement, and worked closely with the teachers on problems and academic problems. By dealing with many of the problems a principal role is expected to deal with, it freed up much of Kim's time for instruc-

tional issues. In this way, Kim was able to put more emphasis on helping the management staff focus on the instructional program.

Kim was actively involved in the development of the ASAP team. She was involved in writing the All Students Achievement Program (ASAP) and provided in-service training on the program. She is also involved in writing for other schools as well. She had been in-

curred in a University of Texas study of
an Inservice teacher training program housed in the college's research and had served as a trainer and dissemination speaker for both the Texas A&M and AASP. Kim really believes in the concepts underlying AASP (mastery learning, active teaching, and collaboration) and has been very helpful to me.

Kim could be described as a "doer." She frequently stopped rather lengthy explanations to answer questions from the subject by saying, "Yes, but what do you want me to do? Can we decide what needs to be done?" In reading the field notes, we found few statements that could be classified as philosophical. Kim usually told her accomplished something, not why she did it. Her attitude and beliefs were integrated into her actions. Because she delegated other responsibilities (such as lunch duty or handling of behavior problems), she was able to make classroom visits on regular basis, (unlike most other principals in the district.) Kim often visited classrooms twice a week. Through her actions, she communicated clearly that her priorities were the instructional programs.

Kim appeared to view herself as an instructional leader. She was able to, and in fact, actively assist those teachers with her classrooms and a great deal of time. When we discussed working with the teachers, I asked her about specific behaviors, Kim said that she believed that the staff should be at the heart of the curriculum. Her usual pattern was to give a series of suggestions and not to tell them, "Now you have to change this." Rather, "What would you think about doing more?" Maybe we can figure out how to make your life easier.

Part of the ability to build a strong instructional staff is in being able to hire competent teachers who are compatible with the program and philosophy of the school. Kim was able to do this. She knew the rules and regulations and found ways to use them to her advantage. Also, Kim protected the new teachers she hired. Often, new staff are transferred from school to school as population shifts. Kim has been able to build and (protect from transfer) an excellent staff.

Excerpts from a typical day: The AASP consultant, Donna, interviewed Felty. Donna arrives at school at 8:35 with a large bouquet of flowers. She goes to the language arts classroom, and the flowers in vases in each table in the room. She washes some art supplies and cleans up the area. The room looks pleasant.

At 8:43 Donna goes to her office. A teacher comes in to talk to Donna about the note she had written. Donna had written a note thanking her for teaching her for the time to talk to a visitor from the Rockefellor Foundation who was studying women in computer and other science related careers. She explained to me that she tried to write notes every day to teachers who do positive things.

Another teacher comes in asking for material for Donna doesn't have. She makes a phone call regarding the material. Donna finishes up a following up on the competency testing program for sixth grade students. If the teacher is not competent by the teachers, she will do the testing.

At 8:51 a teacher comes in to ask for competency test materials. They discuss the testing materials. The teacher comes in to talk about a student who needs reading help. Donna suggests that the Chaplin will come, but if she couldn't, Donna then takes a break and eats a pastry.

At 9:25 Donna goes to the computer lab. She then goes back to her office for the School Advisory Council (SAC) meeting. Donna reads the minutes; Kim leads the discussion about the items on the agenda. The meeting lasts until 9:50. Donna takes notes of the meeting and tells Kim she will get her a copy.

Donna spends the remainder of the day in her office. She keeps the students, gets materials for teachers, and works at various tasks at her desk.

The role of the AASP consulting teacher. This was Donna's first full year as a consulting teacher. Most of her previous experience had been as a teacher in middle income schools not using AASP. Prior to the position at Timberview, she had been a teacher of the disadvantaged. Many of the teachers at Monroe Meadow knew the AASP instructional concept, and they always gave Donna the opportunity to do other than to think about the program over the course of the year. In fact, up until the third week, the teachers were unable to read or interpret the curricular charts, although this was considered an important part of the instructional materials. By June, she could read the charts and compare each classroom's progress with the standard AASP formula. This change could have been due to the frequency of the SAC meetings.

Her typical mode of working with the teaching faculty was an indirect one. She'd talk about the students and teacher who worked with them in casual, informal ways. For example, when she arranged for teachers to observe each other as part of a peer coaching project, she provided no structure or criteria for the observations, attended note of the observations, and never spoke to the teachers about the project.

Donna also did not believe in actively interfering with the instructional program. Rather she was available to listen. She noted that, about 90 percent of the time, she worked one-on-one with teachers who just need someone who will listen and that she performs the role of the "resident administrator." Her aide, who appeared either competent, handled all requests for materials and supplies, and as well as tutoring some of the weaker students. Donna emphasized everything but instruction, in subsequent research, we found few Individual teachers who totally disregarded the standards of their jobs so blatantly. She told us she aspired to create a physical environment that is comfortable and supportive for both students and teachers.

In sum, Donna typically left the teachers alone, but did help them out with minor matters. She went out of her way to avoid giving the impression that she was not aware of what was going on. She was aware of Donna setting foot in a classroom. If she did, she appeared uncomfortable and unfamiliar with the reading program and with the AASP procedures.

Management Case Studies

Haskell Hills

Excerpt from a typical day: The principal, Green, here is on his way to the ramp area where all students arrive. He wraps around the area greeting students. Mrs. Green starts a conversation, "How is your day going?" He eastern student comes to give him a hug, Mrs. Green talks to the teachers on ramp duty and hugs them.

Milledge, the AASP consulting teacher, comes up to Tim in the ramp area. She says that teachers are getting later and later in picking up students. Milledge, "They will truly do anything for you, Tim. You need to be careful to them." Tim, "Yes, I agree, I'm getting angry about it." Several other teachers are briefly discussed—a teacher who is not doing well, nasty with students, and the growing student population. The meeting is informal and brief, about four minutes. This is a typical pattern for these two.

At 10:00 Tim starts to make his way to the classrooms. Anthony, a special education child, comes running down the hall, "He's back up! He's back up!" Anthony is at the door talking to Tim. Tim tells both boys to come over and talk to him. He talks quietly to both boys.

At 10:07 Tim enters the first room. He goes over to the teacher, hugs her, and talks to her about the students. Tim wanders around the room putting his hands on shoulders, tossing hair, and then walks out. This is the typical pattern of classroom visitation. He visits 30 classrooms in the course of an hour.

In one room, the teacher asks him to stay and listen to the students read. He sits for awhile, then asks the children to give themselves a hand. Some students hug and kiss him.

In one class he stops the math lesson, has the students give themselves a hand, then walks out. The students apparently are used to this and get right back to work. When Tim enters the room, he is always interrupting the class. He often hugs the teachers in the middle of a lesson presentation. Yet teachers seem to enjoy his visits.

The role of the principal. Instructional management at Haskell Hills was informally organized. Meetings between the principal and the teaching staff were informal and brief. Tim Green did not view himself as instructionally involved. However, he did take an active role in setting the social climate.

Milledge, Tim was always ready to explain and philosophize. Because of these extensive monologues, it was fairly easy to piece together a colorful mosaic of his attitudes and beliefs about leadership in an ethnically mixed, inner-city school. He decided whether he likes it when otherwise remember his name and touch or hug him, "So I try to touch or hug others whenever I can. I remember his name and touch or hug him, "So I try to touch or hug others whenever I can. It's important to me."

These data suggest that Milledge had a commitment to the academic program. Haskell Hills carried out a number of special programs and activities. "Spirit" activities designed to increase positive feelings for the students about themselves and their school were much in evidence. The school had an official logo found on posters, banners, stickers, badges, T-shirts—"Seemingly" everywhere you look. The school song, "Pride in Haskell Hills" was seen all around the school.

When asked by a student what his job was, Tim replied, "To play with the kids and help the teachers." This sums up his attitude and beliefs simply and powerfully.

The role of the consulting teacher. The principal delegated the bulk of instructional support to the AASP consulting teacher, Milledge Pierce. However, six weeks after the start of the year, Milledge took an administrative position in another building, therefore no typical day has been observed. However, he did talk to Tim about his job, he was able to discern certain patterns in her behavior.

Milledge told us that one of her strengths was frankness: she was direct and action-oriented. She got things done but not without creating some dis-
Continued from Page 13

Results of Teacher Interviews

The semi-structured teacher interview consisted of 38 questions. The questions were grouped according to instructional management functions in Table 1, thus facilitating a focus both on specific administrative and teacher behaviors and on feelings regarding the ASAP program. For these interview questions, data has been generated that highlights teachers' perceptions of administrator's instructional management skills and the level of commitment toward the ASAP program in each school.

The interview questions used several separate scoring formats. The majority of the questions required a simple yes or no response. The remainder of questions used a 5-point scale, where the higher the number, the more positive the response. Table 2 presents a comparative profile of each school on items from six areas relating to successful program implementation as discussed in the instructional management function.

Data from the interviews reveals that teacher behavior was highly related to the level of commitment to the ASAP program. By comparing the data between the two schools, the impact of administrative behaviors on the level of commitment may be seen.

In terms of the details of ASAP monitoring, Monroe teachers consistently find the testing more unit the Haskell teachers. We can infer that the erratic monitoring at Haskell led teachers to put less value on these tests. However, even at Haskell Hills, 83 percent of the

neutral scale. When asked whether unit mastery tests should be continued, all Monroe teachers were all in favor of continuation while a significant proportion (25%) at Haskell Hills were not. This is ironic when considering the fact that most Haskell Hills teachers felt the unit tests were accurate in determining mastery. One possible explanation is that neither the principal nor the consulting teacher at Haskell Hills ever worked with the teachers in showing them how to use the tests to improve instruction.

The Technical Assistance items help flesh out the picture. All teachers at both schools felt the consulting teacher had been of some help to them—though we believe, based on our observations, the help may have only been in the area of supplies and materials and arranging for help. A review of their job description indicates an emphasis in these areas. We also learned that Donna Felkey replaced a consulting teacher who had developed

n a high degree of credibility for technical assistance. Teacher perceptions of Donna may have been influenced by the context created by the previous consulting teacher.

Most teachers reported receiving some type of feedback after formal observation by the principal. Although, interestingly, 18 percent of the teachers at Monroe indicated Kim did not supply them with feedback. The picture shifts dramatically when teachers were asked whether the feedback was specific enough to help them change in their classrooms. While 71% of the Monroe teachers responded affirmatively, only 47% of the Haskell teachers did so. Further, only ¼ of the teachers in either school reported actually making changes as a result of formal observations and feedback. This may be related to the low level of follow-up reported by both faculties.

Table 2. Comparison of Teacher Perceptions Relating to the Level of Commitment to the ASAP Program at Haskell Hills and Monroe Elementary Schools

<table>
<thead>
<tr>
<th>Teacher Performance</th>
<th>Monroe</th>
<th>Haskell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring ASAP by Consulting Teacher</td>
<td>100%**</td>
<td>51%</td>
</tr>
<tr>
<td>Monitoring ASAP by the Principal</td>
<td>100%</td>
<td>31%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percentage Responding in the Affirmative</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>N</th>
<th>18</th>
<th>11</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Monitor Student Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Are unit tests accurate in determining mastery?</td>
</tr>
<tr>
<td>4. Should unit test be continued?</td>
</tr>
<tr>
<td>5. Is cumulative test useful to the principal?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical Assistance to Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Have you been given feedback after an observation?</td>
</tr>
<tr>
<td>7. Was the feedback specific enough to help you make changes?</td>
</tr>
<tr>
<td>8. Have you made the suggested changes?</td>
</tr>
<tr>
<td>9. Did the principal or other personnel follow up on the suggestions in any way?</td>
</tr>
</tbody>
</table>

Mean Ratings on Climate of Improvement Items

1. Principal's feelings about ASAP* 5** 4.13
2. Strong commitment to ASAP throughout the school 5** 4.13
3. Teacher's individual feelings about ASAP 4.63** 3.17
4. Help fellow teacher in implementing ASAP 3.88 2.86
5. Have consulting teachers been helpful? 5.00 5.00

* p<.05
** p<.01
a p<.10
b p<.05 3; where 5 was very positive and 1 was negative
Management Case Studies

Continued from Page 15

Monroe School

At Monroe, we found evidence of five of the instructional management functions discussed previously. There was no evidence, however, of any type of feedback to the teachers on any instructional issues or problems. The one effort at staff development attempted that year, a series of peer classroom observations, was disorganized and nonproductive. Visible commitment to ASAP by the principal was extremely high at the school. The principal made numerous statements supporting the program, actually read articles dealing with components of ASAP (such as mastery learning, classroom management, and effective teaching) and spoke at other districts on ASAP.

Kim monitored classes more often than is typically expected of a principal. She spent a good deal of time in class-rooms observing instruction. Occasionally she reviewed the student progress charts, though not in the systematic fashion that a principal her size would. Kim’s monitoring, however, carried a symbolic value, and appeared to have little impact on the teaching environment. Teachers were highly committed to ASAP and perceived their principal as highly committed, as well. Kim made deliberate decisions that conveyed her priorities to be instruction, discipline, and curriculum. Crowson, Porter-Gehrle, and Hurwitz (1981) would call discretionary power to determine instructional management staff (especially the remarkably talented school nurse) in order to free up time to visit classrooms. Kim was highly visible throughout the school. She appeared to have a thorough understanding of ASAP, and was well read on the topic of classroom management.

The consulting teacher, on the other hand, did not demonstrate either knowledge or commitment. We did not observe Donna taking the lead in any instructional support activities. She rarely monitored classrooms, but the fact that the principal did seem to mitigate against any serious negative effects. We also noticed during discussions that she did not seem to know basic definitions such as the meaning of ASAP program. Her ignorance was particularly striking in a school with so many knowledgeable administrators. However, however, make sure teachers had needed materials. Too often, she delivered the materials in a manner that seemed level of vague emotional support to the teachers.

The majority of the teachers at Monroe believed in ASAP and were supported in their beliefs by the principal who stated whose words and behavior conveyed symbolic and active support to the instructional management staff. The principal’s actions seemed to be translated into a web of collegial support focused on instructional improvement.

Haskell Hills

The instructional management functions were carried out at Haskell Hills to a much lesser degree than at Monroe. Nevertheless, the instructional management teacher lent support to ASAP by their words or actions. Though the principal visited the classroom, she was clearly less highly visible, focused on providing support and emotional recognition to students and teachers (and himself), rather than on the quality of teaching. Tim Haskell, the principal, also did not demonstrate any enthusiasm for the major job of teachers—Instruction in reading, language, and mathematics was almost detached from instructional issues. During the orientation interview, Tim said he had no idea what the purpose of the instructional management activities was to the ASAP consulting teacher.

The consulting teacher seldom visited classrooms and said she did not complete district Technical Assistance forms when she did visit. She didn’t believe in the data from the ASAP mastery learning charts. Though an articulate, energetic and sensitive person with interesting ideas about education, her failure to “play by the rules” and follow Aspen procedures and guidelines resulted in a degree of confusion and a certain amount of goodwill—off by the teaching faculty. Her approach was not one of driving, and she couldn’t seem to believe or feel about the students. She was sympathetic to the problems faced by the teachers, and her frustration at not being promoted created a bit of tension between her and the teachers. Since she did not want to make decision about ASAP instructional issues, he did not monitor the consulting teacher’s interaction with the teachers.

The consultations were taken on many administrative responsibilities usually associated with a vice principal, making scheduling classrooms to deal with increased enrollment, supervising substitute teachers, and planning for a budgetary emergency. Neither the consulting teacher’s training nor her attitude toward ASAP lent themselves to this type of work. However, the teachers remained at Monroe. Granted, she was helped by the fact that redistricting created a small but growing proportion of majorly (Caucasian) students from a middle income neighborhood. However, the principal had focused on ASAP and school staff remained at Monroe. Further, the principal delivered a special program for gifted students and organized a small meeting to discuss issues that affected students. (These programs also provide excellent services for the bright minority students at the school.) Further, the principal insisted that all classrooms, even those involving gifted students, follow the ASAP guidelines. The mixture of active recruitment of superior teachers, developing curriculum, and staff restructuring results in an almost uniformly highly level of teaching.

It is important to note that the modus operandi of Tim Haskell, the principal, did have some definite positive effects. At Haskell, children seemed very comfortable with one another and with adults. In a large urban, multi-ethnic school, a comfortable, supportive atmosphere is difficult to achieve and therefore is particularly striking. Activities designed to boost morale and school spirit were included.

Extraordinary effort in this direction was, in evidence. It was apparent that the teaching staff put much time and thought into building good relationships and that the principal was the catalyst. However, by not emphasizing academic issues Tim did his students a disservice.

Academic growth from the minority students at the school was modest. We had originally hoped to examine the dynamics of the entire management team, including the role of the consulting teacher in some detail, but found we were unable to do so. Neither seemed to fill the role in the way the district intended to be filled.

Donna Felkey seemed to be fairly in-competent, by any standard, with little comprehension of the issues involved in educating low-achieving students. By being pleasant to the teachers, she reduced the potential for conflict. The fact that the principal was strong, as was the teaching faculty, made her role perhaps unnecessary. In the case of Mildred Pierce, we were unable to collect enough observational data to create a full picture of her activities, due to her promotion and transfer in the middle of the study. We did gather enough material to ascertain that she served in many ways as a facto vice-principal, assisting the principal in a range of administrative responsibilities. This was good training for her future career, but left a void in the school. It was difficult to determine exactly why she felt negatively towards ASAP, or why she had a rancorous (or, at best, distant) relationship with the school.

She did share with us some of the frustrations inherent in the consulting teacher role, and told stories that were consonant with those expressed by the consulting teachers involved in the subproject.

According to Mildred, consulting teachers were in a limbo state. They were not real administrators, but they were not mere consultants. They had administrative salaries, though, many had aspirations towards being adminis-trators. In the case of the consulting teachers, their feelings of frustration may have come from their lack of training for their position. All knew they came from their early training and their own classroom experience, rather than any training in either supervision or interpersonal skills.

The case studies of these two schools, after having analyzed four other inner city schools in even more detail, we became convinced that this degree of instructional leadership demonstrated by the principal at Monroe—and the values and background she possessed—were exceptional and not what one can typically expect.

The district recognized this and appoint-ing her to a senior administrative posi-tion.

Rather than serving as an example of a typical elementary principal, Kim serves as a model of what a principal can be. This is not to say that this is an exceptional—exceptional—in the energy and spirit he brought to the school, except-ional in the energy he brought to the school. This is not to say that this was the type of leadership that fostered. In a sense, his failure to fully satisfy the needs of the students is tragic.

Proleg

Overview of Trends in Achievement at the Schools Since ASAP

The trends in achievement are presented here in reference to other data collected and as a crude gauge of improved student growth. As Rowan, et al. (1963) and most other studies that have been conducted, it is not particularly true in schools with mobility rates as high as Monroe and Haskell Hills. In other words, the rapid turnover of students would have wide variations of mobility rates among the schools, and the rapid turnover of students would have wide variations of mobility rates among the schools, and the rapid turnover of students would have wide variations of mobility rates among the schools.
Management Case Studies

Continued from Page 16

graders were tested, the progress in reading and math for the early grades does not appear in these results. Nonetheless with all these caveats, the achievement data are presented, by ethnic group, in Table 3. Table 3 presents fifth grade CTBS test results from 1980, 1983, and 1984 by ethnic group at both schools. The table reports the percent scoring at or above grade level on each subtest of the CTBS.

The pattern of growth among the minority students is erratic at Haskell Hills. At Monroe, the reader can note rather dramatic increases for the Asian and Black students in math and reading, but weaker growth for the Hispanics. Overall, Haskell seems to show some improvement for the minority students, and slight non-significant drops in reading, math, the pattern are erratic—the scores of the Hispanics rise, those of the Blacks drop. In math, there is some evidence of growth for the minority students at both schools. The trend appears to be stronger at Monroe. In both schools, there are revisions will solve some of the problems identified in the field test, and consequently, the revised version of the material will lead to more effective and/or more efficient learning. This assumption is particularly crucial in special education, where inabilities in instructional material can be magnified in the learning process and mildly-handicapped students (Darch, Carnine, & Gersten, 1983; Darch & Carnine, in press; Carnine, Engelmann, Hofmeister, & Kelly, in press).

The purpose of the present study was to empirically investigate the field test and results, B. processes by randomly assigning mildly-handicapped students to the original and revised versions of a computer-assisted instruction (CAI) program on English Usage and Carline’s Theory of Instruction (1982). Because of the relative ease of implementing the CAI programs, results of a comparison between two versions of a CAI program are deemed to differ in instructional design rather than to unintended variations in implementation of the programs.

The original CAI Program

The Reasoning Skills Program (Engelmann, Carnine, & Collins, 1983) taught students about overlapping, inclusive, and exclusive classes, and the words associated with the relationships among classes (some, all, no). Using this information and a series of rules, students drew conclusions based on evidence. The other major objective of the program was to teach students to identify logically sound arguments. For when an argument was unsound, students were taught to specify one of three reasons why it was unsound.

Data from previous research with the original CAI program (Engelmann, Carnine, & Gersten, in press) indicated that students were able to draw conclusions when they were given control statements of evidence. However, mildly-handicapped secondary students had difficulty with the second major objective of the program: identifying sound and unsound arguments. In identifying sound arguments, students had difficulty on the reasoning task. For when the reason why an argument was unsound, students responded correctly to less than 50% of the items. An analysis of the students’ errors indicated that the students had not carefully attended to the evidence and were not clear about how to decide whether the evidence could be used to draw a conclusion.

The CAI Reasoning Skills Program was revised to more clearly teach students to evaluate evidence in an argument. The following section describes the similarities and differences between the original and revised versions of the Reasoning Skills Program.

Similarities Between the Original and Revised Programs

Six features were held constant across both versions to ensure (as much as possible) that only the instructional design of the revisions would be responsible for any differences in performance between the two treatments. The original version of the program was the same in these respects:

1. Each version included 10 lessons.
2. Each program incorporated an average of 32 questions.
3. Each program contained the same approximate amount of text.
4. Each error was followed by a correction tailored to the error.
5. Missed items were presented later in the program to provide extra practice on the specific problem items.
6. Explicit strategies were modeled. Guidance was systematically faded until students were working independently.

Differences Between the Original and Revised Programs

The instructional design of the original version was changed in four major ways. All of these changes were intended to better teach students to evaluate the validity of evidence. Further, students were introduced to invalid evidence earlier. The original CAI program presented only valid evidence when students learned to draw conclusions. Because students in the previous research had mastered the validity analyzing arguments with invalid evidence, students were introduced earlier in the revised program. Students evaluated the validity of two statements of evidence before they drew a conclusion. These tasks focused student attention on the validity of evidence with the intent of reducing later problems in critiquing entire arguments.

Delay drawing-conclusions tasks. The original version introduced entire arguments with illustrative diagrams in early lessons. Though students did not seem to use the diagrams, students did practice drawing conclusions for arguments. In those tasks students did not need to evaluate the evidence. The revised version delayed drawing-conclusions tasks until after students practiced evaluating evidence.

Focus on evidence when critiquing arguments. Students were asked to evaluate evidence. Students criticized arguments by answering a series of questions. The first step in critiquing arguments was determining if the order of the classes in the conclusion was acceptable. Then students analyzed the evidence, by asking themselves if the appropriate classes (from the evidence) were named in the conclusion. That analysis was done by evaluating evidence. Next students decided whether the first work in the conclusion (all, some, or no) was correct. Finally, students evaluated the order of the classes in the conclusion.

The revised version asked students to first analyze the evidence. Then students looked for the correct first word in the conclusion and finally decided if the classes were named in the correct order. In the revised program, evaluating evidence was the first and most prominent step in critiquing arguments.

Delete non-essential vocabulary. In the original version students had to learn to identify classes by size: smallest, middle-sized, or largest. Students had to look at the placement of the classes in the evidence to be able to label the classes. Later students decided whether evidence was reliable or misleading by using a strategy that relied on the class-size labels.

The revision class-size labels were dropped, which lead to a simpler strategy and fewer teaching-learning situations. Students were asked to select the valid order of the classes in the evidence to apply the strategy. The students did not need to label classes by size.

Research Questions

The present study was designed to answer the following questions:

1. Would scores on the criterion-referenced test of analysis measure be significantly higher for the revised CAI treatment in comparison to the original CAI treatment? Since students in the original version performed well on the test, a nonsignificant difference was predicted for that part of the test.

Table 3. CTBS Results by Ethnic Group

Percent at or Above Grade Level on the CTBS in the Fifth Grade

<table>
<thead>
<tr>
<th></th>
<th>1980 Reading (prior to ASAP)</th>
<th>1983 Reading</th>
<th>1984 Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Language</td>
<td>Math</td>
</tr>
<tr>
<td>Black</td>
<td>9%</td>
<td>9%</td>
<td>19%</td>
</tr>
<tr>
<td>Total</td>
<td>9%</td>
<td>9%</td>
<td>20%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>10%</td>
<td>10%</td>
<td>22%</td>
</tr>
</tbody>
</table>

Continued from Page 16
2. Would students assigned to the revised CAI program make significantly fewer errors per lesson than students assigned to the original CAI program?

3. Would students assigned to the revised CAI program take significantly less time to complete the revised than the original version of the program?

Method

Subjects
Twenty-six secondary resource room students in a metropolitan high school setting in a western state were selected for the study. Nineteen of the subjects were certified as "learning disabled" according to local school district criteria for special education placement. Seven of the students were labeled as "educable" as determined by school personnel; these students did not qualify for special educational services. The subjects were chosen from below their peers on district-administered standardized achievement tests. These twenty-six subjects were chosen from 34 students who passed a screening measure; that is, they could discriminate small and large classes. The standard deviations for the original version of the CAI program were determined.

The twenty-six subjects were randomly assigned to one of two treatments: (a) the original CAI program, or (b) the revised CAI program. One of the subjects assigned to the original program and two assigned to the revised version were eventually dropped from the study because of (a) excessive absenteeism, or (b) inattentiveness, defined as frequently making many key responses in answering to questions.

Measures
The Reasoning Skills Test (Collins, 1965) was designed to test students' ability to answer yes-no and true-false questions by logical syllogistic arguments. This test instrument consisted of two parts: (a) 12 items in which the student was required to draw conclusions from two statements of evidence; and (b) 16 items consisting of three statements of evidence. The computer program was designed to determine whether the student was able to determine whether each argument was sound or unsound, and if unsound identify the reason. The test instrument was given to five college professors who were interested in using a computer program that could assess the test for content validity. Based on their feedback, items were deleted or changed. The alpha coefficient of the instrument was .90 for part I and .96 for part II. Total reliability was .96.

Procedures
Subjects in the study completed 10 lessons of their respective CAI program over a 12-day school period in April and May. Data collectors were trained on the appropriate program and carefully watched each student's response for 8 or 10 minutes of each lesson. The computer also kept track of errors. Subjects finished the lessons during their regularly scheduled period in the learning resource center setting. Data collectors were carefully instructed to record only those errors that were not immediately corrected by the computer to "how to touch the keys" and not to respond to any questions about specific items. Subjects had a three-minute introduction to the computer prior to the implementation of the program.

Subjects who were absent completed two lessons on the next day during the regular class period. Subjects who dropped the course were dropped if they missed two or more consecutive classes.

The criterion referenced test was administered to all subjects the day prior to the first lesson. Subjects were given no feedback about their performance. The test was presented again immediately following the last lesson of the CAI program. Students were told the results of their posttest after it was scored.

Results
Pretest scores comparing the two groups indicated no significant difference. The mean scores for the original group were 9.83 (original) and 9.82 (revised group). Standard deviations were 4.04 (original) and 2.92 (revised).

The mean posttest scores were 16.50 (original) and 22.32 (revised). Standard deviations were 4.70 (original) and 3.33 (revised). Posttest differences were evaluated by a t-test (21 = 4.46, p < .001).

Table 1 gives the means, standard deviations and t-test results for the two parts of the posttest. Part I required students to draw conclusions from two acceptable statements of evidence. Differences between the groups were not significant. Differences between the two groups on Part II were significant (t = 4.19, p < .001). This part required students to analyze an argument and evaluate its acceptability. The two groups were not identical; students were unable to identify the reason. The mean score of the revised group (10.36) was almost twice the mean of the original group (5.92). Standard deviations were 3.26 (revised) and 1.62 (original).

The number of errors per lesson made by the two treatments was compared using a t-test. The means were 2.40 (original) and 4.55 (revised). Standard deviations were 3.80 (original) and 2.20 (revised). Students receiving instruction with the revised version made significantly fewer errors than the students in the original group. Significant learning with the reasoning skills program, t (21) = 3.40, p < .01.

The t-tests were also compared for the amount of time they took to complete the lessons. The mean number of minutes per lesson was 45.68 for the original and 22.45 (revised). Standard deviations were 5.40 (original) and 2.60 (revised). Students receiving instruction with the revised version took significantly less time than students instructed with the original version of the program, t (21) = 2.44, p < .02.

Discussion
The results from the present study demonstrated no difference between treatments in performance on drawing conclusions. These results coincide with the similarities in instructional design of the two versions. The original version of the program demonstrated success in teaching mildly-handicapped students to draw conclusions. Therefore, the instructional design for teaching this skill may have been targeted by the revised version of the program.

Scores on the argument-critiquing section of the posttest were significantly higher for the revised version treatment. These results also support the instructional design changes made to teach students to critique arguments: (a) introduce invalid evidence earlier, (b) delay drawing conclusions until students learn to evaluate evidence, (c) focus on the evidence when critiquing arguments, and (d) delete non-essential vocabulary relating to the evidence. The results do not allow interpretations concerning the relative importance of the various changes.

Students assigned to the revised CAI program made fewer errors per lesson than students assigned to the original CAI program and also took significantly less time to complete the lessons. The number of errors made by students in the revised version was consistent with the posttest results: an earlier introduction and clearer explanations for evaluating evidence resulted in fewer errors. The time differences are probably the result of the fewer errors made by the revised version group. Because students made fewer errors, fewer items were repeated, decreasing the time required to complete the lessons.

The findings have several implications for special education, first, the data support the field test and revision process prior to publication or implementation of instructional material with handicapped students. Using field test results, the instructional designer was able to determine if the program revisions will increase the scores of handicapped students on tests or other criteria targeted by the revised version of the program.

Second, a model of instruction design is needed to determine the nature of the revision. As described earlier, the changes that were made during the revision of the Reasoning Skills Program were fairly complex. The decision to focus on evaluating evidence in the revised version of the program grew out of the application of a model for instructional design articulated by Engelmann and Carnine (1982). These guidelines do not derive from the conventional win- dow of instructional design. For example, a common principle of conventional instructional design is to sequence tasks from easy to difficult. Drawing conclusions is easier than evaluating evidence. Yet in the revision, the harder task was sequenced before the easier task. The harder-to-easier sequence was needed to prevent students from learning to not attend carefully to statements of evidence, a problem that appears only when students critique arguments. Third, an acceptable level of mastery must be defined. Additional comparative data presented in Table 2 indicates that the revised program produced learning at an acceptable level for the mildly-handicapped students. We compared the mildly-handicapped secondary students with their non-handicapped peers as well as college students in an introductory logic course and preservice teachers in a certification course. A one-way ANOVA showed a significant difference among the groups, F (3) = 15.5, p < .001. A Tukey post hoc comparison showed a significant difference between the preservice education students and the handi- capped, secondary non-handicapped and logic students on Part I of the posttest (drawing conclusions). A significant difference was also found on Part II of the posttest, the reasoning skills program, F (3) = 4.5, p < .05. According to a Tukey post hoc comparison, p < .05, logic students scored significantly higher than the handicapped, secondary non-handicapped students.

Table 1. Means and Standard Deviations for the Original and Revised Version Groups on Parts I and II of the Test of Final Logic

<table>
<thead>
<tr>
<th>Group</th>
<th>Part I</th>
<th>Part II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original</td>
<td>10.58</td>
<td>11.64</td>
</tr>
<tr>
<td>Revised</td>
<td>15.50</td>
<td>12.21</td>
</tr>
<tr>
<td>p-value</td>
<td>&lt; .001</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Means for Parts I and II and Total Score (with Standard Deviations) for Handicapped Students, Nonhandicapped Peers, College Logic Students, and College Preservice Education Students

<table>
<thead>
<tr>
<th>Group</th>
<th>Part I</th>
<th>Part I</th>
<th>Part II</th>
<th>Part II</th>
<th>Total</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handicapped</td>
<td>11.09</td>
<td>7.06</td>
<td>19.00</td>
<td>14.51</td>
<td>16.04</td>
<td>4.11</td>
</tr>
<tr>
<td>Nonhandicapped</td>
<td>10.94</td>
<td>6.62</td>
<td>17.37</td>
<td>13.74</td>
<td>17.01</td>
<td>3.74</td>
</tr>
<tr>
<td>College Logic Students</td>
<td>11.33</td>
<td>8.73</td>
<td>20.07</td>
<td>15.30</td>
<td>18.62</td>
<td>3.10</td>
</tr>
<tr>
<td>Teacher Ed Ss</td>
<td>8.15</td>
<td>7.29</td>
<td>15.44</td>
<td>11.51</td>
<td>16.72</td>
<td>3.56</td>
</tr>
</tbody>
</table>
The teacher can check progress for an entire class, or for an individual student either on the screen or with a printed hard copy.

The teacher can also provide additional practice on appropriate facts for each student by computer-generated printed tests.

The documentation which comes with the program is not extensive, but adequate.

The teacher is given the option of using or deleting the graphics within the program.

The programs are not noisy. This is a positive feature when they are being used in a room where instruction is taking place concurrently with computer time.

**Weaknesses**

The only thing I found to be a problem for my students (first and second graders) was the need to use the spacebar (rather than RETURN key) after making a response. This is so unlike the programs with which they are familiar, it caused them to unduly attend to the mechanics of the program rather than to learning the facts.” I would prefer that the authors alter this feature; but I would still recommend the use of the programs as they are.

My students found the graphics to be only minimally reinforcing; this is not to be construed as a criticism, only a comment.

**Recommendations**

I highly recommend the purchase of the complete program for an elementary school, special education class, or Chapter I program. I feel the price is reasonable, with back-up policy fair, and the format to be in keeping with sound instructional practices.

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### A Questionnaire for Teachers of Students with Behavior Disorders

ADI is conducting surveys to determine the adequacy of support services provided by school districts and the extent to which teachers perceive a need for training in specific skills. The questionnaire below is the first assessment instrument that ADI will be using.

If you are a teacher of students who have behavior disorders, we'd appreciate your input. Please fill out the questionnaire, add any comments you feel are relevant and return to:

Ann Arbogast, c/o ADI, PO Box 10256, Eugene, OR 97440

<table>
<thead>
<tr>
<th>How successfully do you feel your students handle the following behavior problems?</th>
<th>Have you received technical assistance or training to handle the problem behavior?</th>
<th>How effective was the training?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Explosive, &quot;bloo-up&quot; students</td>
<td>Yes/No</td>
<td>Very/Moderate/Not</td>
</tr>
<tr>
<td>2. Withdrawn students (those who do not respond to tasks presented)</td>
<td>Yes/No</td>
<td>Very/Moderate/Not</td>
</tr>
<tr>
<td>3. Students with short attention span (work with you a short period of time before becoming off-task)</td>
<td>Yes/No</td>
<td>Very/Moderate/Not</td>
</tr>
<tr>
<td>4. Students who actively try to escape when demands are placed on them</td>
<td>Yes/No</td>
<td>Very/Moderate/Not</td>
</tr>
<tr>
<td>5. Students who become physically aggressive when frustrated</td>
<td>Yes/No</td>
<td>Very/Moderate/Not</td>
</tr>
<tr>
<td>6. Students who become verbally abusive when frustrated</td>
<td>Yes/No</td>
<td>Very/Moderate/Not</td>
</tr>
<tr>
<td>7. Students who kick, throw, cry or scream</td>
<td>Yes/No</td>
<td>Very/Moderate/Not</td>
</tr>
<tr>
<td>8. Students who exhibit inappropriate behavior, such as thumb-sucking, running, masturbation</td>
<td>Yes/No</td>
<td>Very/Moderate/Not</td>
</tr>
<tr>
<td>9. Students who are alcoholic</td>
<td>Yes/No</td>
<td>Very/Moderate/Not</td>
</tr>
</tbody>
</table>

---

Check each of the training services provided by your district:

1. Regular Inservice sessions that focus on specific teaching behaviors and that provide task practice.
2. Regular Inservice sessions that do not provide practice on specific behaviors.
3. Regular monitoring of your teaching in the classroom with coaching and assignments for specific things in which you need help.
4. In-classroom demonstration with students on how to use specific teaching or management techniques.
5. Hot-line service (There is somebody in the district you call when a problem occurs and that person shows you how to solve the problem and provides specific training in how to do it).

Rate the value of the services provided by your district (1 = extremely valuable)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>not applicable</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>not applicable</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>not applicable</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>not applicable</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>not applicable</td>
</tr>
</tbody>
</table>
Field Test Revision Process
Continued from Page 18

handicapped, and preserve education students.
The drawing-conclusion results indicate that the handicapped students performed comparably to their non-handicapped peers, who in turn out performed teacher-education students. College logic students out performed all groups in critiquing arguments. These results suggest that the field test and revision process is complete. Handicapped students who received instruction with the revised CAI program scored as high as their non-handicapped peers, who could be considered to represent a criterion standard. While this quasi-experimental comparison suffers from various experimental design considerations, it provides at least some indication of the ultimate adequacy of instructional material designed for handicapped students.

In summary, the following ingredients seem beneficial in designing instructional material for handicapped students:

1. A model of instructional design with principles that can generate detailed specifications for instruction and for revising instructional material.
2. Field testing that observes and notes learner responses.
3. Revision of the instructional material if errors are frequent.
4. Repetition of steps 2 and 3 until error rates reach an acceptable level.
5. If possible, comparison of performance with a criterion group to provide a measure of acceptability.

References

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