1983 Excellence in Education Winners Announced by ADI

At the Annual Membership meeting held in August during the Eugene ADI Conference, the ADI Board awarded for contributions to excellence in education to the following persons:

Tina Rosen

Tina Rosen won the award for excellence in the category of administration and supervision. Tina received her Ph.D. from the Utah State University working with Alan Hofmeister. Tina worked with Alan on the development of several basic skill tutorial programs. She is currently working as an educational specialist for Olympia School District in the State of Washington. Her responsibilities include teacher supervision, training, and program implementation.

Tina was one of the first people on the west coast to become involved with Direct Instruction. She attended her first workshops before the materials were even published by SRA. Before the materials were commercially available, she used Engelmann's Preventing Failure in the Primary Grades as a guide for instruction. She feels that the strength of DI lies in the fact that it teaches students to become problem solvers. She says, "Zig and the other people involved in designing Direct Instruction materials have made things easier for the students and for the teachers. It has provided a model that learning can happen. It can be done!"

Zig Engelmann says of Tina, "She is one of the best teachers and best trainers around. She is patient, but holds a very high standard of excellence for herself... She is highly respected and has an impeccable reputation as an excellent educator."

Karen Garner

Karen Garner won the award for excellence in teaching at the elementary level. Karen began her teaching career in Anchorage, Alaska as a first grade teacher. She first received training in DI in 1971 and began using DI materials in 1972.

In Palo Alto, CA, Karen taught in a team teaching situation where she was responsible for the lowest performing students. She set up an exemplary DI implementation. She is perhaps best recognized for the work she did in training teacher aides and parents to teach the programs. She was also responsible for writing grants and other administrative activities.

After leaving Palo Alto, Karen set up a resource room program in Beaverton, Oregon, where she trained and supervised six aides. Karen's aides are some of the best trained and most skilled DI teachers around. Karen's program served more than children. Without special resource room services.

Karen is currently taking time off from the classroom to be with her young daughter. A child could have no better fortune than to have Karen as a mother and a teacher.

Reading Instruction for Poverty-Level Preschoolers

By Paul Weisberg

Early Childhood Day Care Center
Department of Psychology
University of Alabama

Editor's Note. Because of the merit and length of this outstanding research study, I have deleted most of the usual references. These may be obtained from Wes Becker, ADI.

Ever since it opened its doors to poverty-level preschoolers in 1970, a major and continual objective of the Early Childhood Day Care Center (ECDC) has been to accelerate the academic achievements of its 24 children. Along with establishing language expression and learning concepts necessary for school success, the heart of its academic-based curriculum has been the teaching of reading. For the ECDC staff, the issue was never a matter of whether to teach reading or educationally at-risk preschoolers. The issue was: according to what level of reading proficiency?

Background

When we began 1982 we knew how terribly ill-equipped entering first graders from poverty homes were in skills related to reading. This led us to champion the teaching of this tool subject in our preschool setting. However, despite these strong convictions, our early efforts were not directed at generalizable word attack or decoding strategies. That responsibility, we originally thought, was the public school's. Instead of teaching the requisite skills for decoding words, we engaged in modeling and encouraging "reading-like" behaviors: going to the book area, holding a book right-side-up, turning the pages properly, looking at pictures and discussing them, listening to stories and learning about a plot, and so on (Paolomare & Bell, 1973). We soon discovered that reading did not magically evolve from these "pre-reading" activities. Reading also did not materialize when these activities were supplemented with successful instruction in learning the names of alphabet letters (Kinsaid & Weisberg, 1979). We now recognize that this skill is not necessary for decoding words (Carnine & Silbert, 1979; Samuels, 1972).

We subsequently adopted a whole-word, meaning-emphasis approach which incorporated many basal reader methods. A sight recognition vocabulary of from 40 to 60 words was possible, but only for the highest performers. It was accomplished through the initial selection of highly dissimilar words made predictable in isolation and in sentences through redundant syntactic, semantic, and picture prompts. However, caught without these reliable prompts, guessing often became the children's major word-attack strategy. The situation worsened when we programmed increasingly similar words, especially in the case of the "little" words, such as in-on, no-not, run-run, go-go, and so forth. Major problems also developed once non-content words and words not easily pictured were presented, namely, that, there, this, that, what, when, it, was, and any. Even when illustrations were available, the "picture readers," who were usually the lowest performers, had trouble guessing the right word. When reading simple sentences, they readily substituted boat for ship, cat for kitten, water for sea, and so on. We were advised to accept these and other forms of inept reading.
Columbia Direct Instruction Association Formed

A regional Direct Instruction association has been formed in eastern Washington, northern Idaho and western Montana. The "Columbia Direct Instruction Association" (CDIA) was formed to provide local support for educators, parents, and others using the Direct Instruction technology created at the University of Oregon.

While there is no formal affiliation with the Association for Direct Instruction, and none is planned, it is hoped that an informal relationship with common purposes and goals will strengthen both organizations by providing mutual support. To that end, members of CDIA are also encouraged to join ADI; and, members of ADI living or working in the region from the Columbia River area in eastern Washington through northern Idaho and into western Montana are encouraged to contact CDIA for local programming. The contact person is:

Dr. Stephen W. Ragan
Lewis-Clark State College
 Lewiston, Idaho 83501
(208) 746-2341, Ext. 220

On the agenda for the coming year (1983-84) are bi-monthly evening meetings (the dates are published in the CDIA newsletter); a series of Saturday morning workshops on various DI programs and concepts; a conference to be held in both Coeur d'Alene and Lewiston in March 2-3, 1984 on the topic of 'Technology and Education' (see advertisement in this issue of DI News); the publication of a local newsletter intended as a local supplement to DI News; and the formation of multiple local support committees in the region. CDIA is interested in contact with local DI users, and is interested in hearing from DI users, to contact our organization, or to start a local committee affiliated with CDIA.

Dear Editor:

Please note the following correction to Figure 1, page 4 in the Fall, 1983 issue article titled "A Test of the Automaticity and Psycholinguistic Model", by Carne and Williams. The two groups in Figure 1 were mislabeled. The labels should be reversed.

Thank you,
Doug Carnine

Advertising Policies and Rates

The Direct Instruction News will publish advertisements for materials, programs, books, training (conferences, workshops), and services: (conferences, workshops), and services: (conferences, workshops) related to Direct Instruction. All proceeds from the sale of advertising space will be used to help pay publication costs incurred by the News. Ad sizes and corresponding costs are as follows:

- Full page: $200
- Half-page: $125
- Quarter-page: $75

The Direct Instruction News is published Fall, Winter, Spring and Summer, and is distributed by mail to members of the Association for Direct Instruction. Readers are invited to submit articles for publication relating to DI. Send contributions to: The Association for Direct Instruction, P.O. Box 10257, Eugene, Oregon 97440.

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Excellence Awards (Cont. from Page 1)

Nancy Woollsen

Nancy won the award for excellence in teaching at the secondary level. She currently teaches in a resource room at Madison Middle School in Eugene, Oregon. Her career in education began as a teacher's aide in the Portland area. She became recognized as an excellent DI teacher while going through the Handicapped Learner certification program at the University of Oregon. While in that program she developed a reputation as a person eager to learn new methods for reaching hard-to-teach students. She consistently tried to improve her skills and expand her knowledge and abilities to implement quality instruction.

Nancy now serves as a master teacher for the placement of practicum students. This allows University students an opportunity to see and learn from an excellent resource room program. Engelman says, "Nancy is an excellent teacher, a very hard worker, and someone who puts in whatever time it takes to get the job done."

Alex Maggs

Alex Maggs won the award for excellence in the category of research and college training. Alex has conducted a research program and taught about Direct Instruction at Macquarie University near Sydney, Australia, since receiving his doctorate in 1974. He first learned about Direct Instruction from the book by Becker, Engelman, and Thomas ('Teaching—a course in applied psychology', SBA, 1971) and through the Distar programs.

His Doctoral thesis was an experimental study using Distar with moderately and severely retarded children. After finishing his degree, he directed the Special Education Research Centre at Macquarie. At the same time, he incorporated teaching about DI in theory and methods into all courses he taught, including Instructional Technology. He was funded by the Australian government to study applications of the programs to different special education groups. He worked with many master's and doctoral students on DI studies with all kinds of populations from severely retarded to physically handicapped to culturally deprived to normal. He has published more than 30 experimental evaluations in Australian and international journals. He served as the Australian representative on the editorial board of the journal Analysis and Intervention in Developmental Disabilities.

In 1976 he founded the Australian Association for Direct Instruction, with the aim of his wife Robyn, Joe Moore, and others. Since 1976, this association has held three week-long workshops modeled after the Eugene Conference. Their Association has about 100 members (and they receive our newsletter).

Besides his contributions to research and teaching about DI, Alex has applied DI strategies to teach retarded and normal children to computer programs using Basic.

Australian Behaviour Modification Association

7th Annual Conference May 14-18, 1984

The Conference will provide a multidisciplinary forum for the exchange of information on new developments in research, techniques, and theory within the behavioural approach to clinical, educational, and community problems.

KEYNOTE SPEAKERS: Alan Holmeister, K. Daniel O'Leary, Susan O'Leary

CALL FOR PAPERS: Send to Dr. Ray Birtreger, Psychology Section, Murdoch University, Murdoch 6150 Deadline for abstracts Feb. 15, 1984.

INFORMATION: Ken Rawlings, 257 Adelaide Terrace, Stirling, Perth 6000
Sequencing Examples in Discrimination Learning

By W. A. T. White, Scott Martinson, Russell Gersten, and Philip Brouwer

To function in normalized settings, individuals with moderate to severe mental handicaps must be able to make countless discriminations. For instance, when several handi capped adults learn to use a hammer, they must discriminate whether or not the nail is perpendicular to the surface. Or, when students who are labelled developmentally disabled learn to sort socks, they must discriminate whether two socks match.

Because naive (i.e., difficulty-to-teach) learners often fail to pick up naturally on cues which they are taught to use, Engelmann and Carnine (1982) have furnished specific guidelines on how to efficiently teach discrimination in their recent book, Theory of Instruction. Carnine and colleagues have conducted research in numerous settings in order to support the efficacy of these guidelines.

When teachers introduce a basic language discrimination (e.g., “to the left of”), they can present positive examples (e.g., “it is to the left of the table”) and negative examples (e.g., “it is not to the left of the table”). According to the research of Carnine and others, students learn a discrimination more easily when: (1) the teacher presents positive and negative examples, (2) the teacher initially presents the discrimination in a narrow situation, and (3) the overgeneralization of Carnine and discrimination in more complex situations.

(4) there is great variety among the positive and negative examples, (5) the teacher presents each example consistent across samples, and (6) the students learn a discrimination in a short time.

Theory of Instruction, Engelmann and Carnine have collated the principles mentioned in the previous paragraph into 10 rules for teaching basic language discriminations. The present study is a first step in investigating whether the Engelmann and Carnine sequences effectively teach discriminations. The study is also interesting in that the subjects were handicapped adults, whereas most of Carnine and associates’ research was conducted with nonhandicapped school children.

Although Engelmann and Carnine’s guidelines for designing discrimination sequences allow for some flexibility, many of their sequences are similar to the one depicted in Figure 1, which was used in the present study to initially teach the concept of parallel. The sequence begins with five examples for which the teacher provides the answer (“Those are parallel!”). The teacher tests the students on the rest of the examples in the sequence (“Are these parallel?”) and provides feedback to students as to the correctness of their answers. The sequence consistently adheres to a narrow situation of line segments of constant length against a constant background. Theory of Instruction provides the complete theoretical basis for discrimination sequences such as Figure 1.

The sequence in Figure 2 differs from a sequence that Engelmann and Carnine might suggest in two respects. The investigators realized that the subjects in the present study might incorrectly learn a mistake: that parallel means lines not touching, and that not parallel means touching. Subjects guided by such a mistake might still score as high as 75% correct on a posttest. Thus, although in a typical sequence intersecting line segments would be used, the investigators decided against using them.

The second difference relates to variability among positive examples. Note that all positive (parallel) examples in Figure 1 represent the same angle, even though Theory of Instruction espouses variety. The investigators surmised that, due to the severe handicapping condition of the subjects, only one angle for parallel should be taught during the first session. A second angle for parallel was taught during the second lesson, while the third lesson expanded the examples for naive learners, this “one-subject-of-parallel-at-a-time” strategy is detrimental.

Method

Subjects. Subjects who received the discrimination training, as arranged according to Engelmann/Carnine guidelines to teach parallel were compared to subjects who received three comparison sequences. Over the course of the three sequences (one sequence per day for three consecutive days), subjects who received the aligned sequences (i.e., the aligned sequence group) and subjects who received the comparison sequences (i.e., the Random Sequence group) were exposed to the exact same examples. Only the order in which the presentations differed between the two groups. The order of examples in the comparison sequences was randomly determined.

Subjects. Subjects were volunteers from workshops for adults who were labeled mentally retarded. The 50 adults who participated to attend were paid at their regular hourly work rates. Subjects were matched in pairs according to their scores on a test that assessed ability to learn vocational tasks from instructional input and feedback. Within each pair, one subject was randomly assigned to the Arranged Sequence group and the other subject was assigned to the Random Sequence group. Due to attrition, and to extra or “odd” clients being randomly assigned to the Random Sequence group at two workshops, sample size for the two groups was not equal.

Inclusion. All training and testing was conducted individually. Each subject received three days of training. Every subject in the Arranged Sequence group received one 15-example sequence every training day that approximated the model discrimination sequences as set forth by Engelmann and Carnine’s Theory of Instruction. The five-day’s sequence consisted of three inch, thick purple line segments. The positive examples showed segments parallel in a horizontal position. The second day’s sequence, which is illustrated in Figure 1, consisted of five inch, thin black segments. The positive examples showed segments at a 27 degree angle. The third day’s sequence was also carefully arranged, but contained examples varying in angle, length, thickness, and color. All 45 training examples over three days for the Arranged Sequence group were randomly shuffled. The first 15 cards became the day one training sequence for the Random Sequence group; the second 15 cards became the day three training sequence. Other than order of cards, training for both groups was identical.

Testing. As in training, all test examples were presented on 5 × 8 inch unlined index cards. For every test example, the subject was asked, “Are these parallel?” Ten cards were randomly selected from the 45 training cards, with the stipulation that five positive and five negative examples be selected. These cards represented the posttest, which was administered immediately after training. Results Group results on the tests are shown in Table 1. Because each test was 10 items long, it is easy to convert each mean into percentage correct. For instance, on the maintenance transfer test the 25 Random Sequence group members averaged 5.72 items correct or 57.2%. According to statistical tests, the Arranged Sequence group significantly outperformed the Random Sequence group on both tests that were given immediately after training: F(1,48) = 4.23, p = .05 for the posttest, F(1,48) = 4.14, p = .05 for the transfer test. Although the Arranged Sequence group averaged a score of 10% higher than the Random Sequence group on the maintenance posttest, and over 6% higher on the maintenance transfer test, neither difference was significant statistically. However, the differences between the two groups on the two maintenance measures represent effect sizes (i.e., differences in pooled standard deviation units) of .38 and .39. Any difference greater than .33 is usually considered educationally meaningful.

Discussion. The present study affirms that the order in which instructional examples are sequenced does make a difference, and that there is validity to the Theory of Instruction guidelines for designing

Figure 1: Discrimination sequence for teaching a subset of parallel/not parallel.

Continued on Page 5

DIREC INSTRUCTION NEWS, WINTER, 1982-83
To Improve Teacher Performance

By Ellen Adler
Educational Service District
Lane County, OR

During the past few years, classroom research has become increasingly focused on studies of effective teaching practices, which have led to the identification of specific strategies that increase student learning rate (Stallings, 1988; Caroline, 1981; Zorel, 1941). Research with mildly handicapped and other low-performing groups has shown that effective teaching can be characterized as taking place in groups which are academically focused with high student success rate (Stallings, 1988; Caroline, 1981; Zorel, 1941). Consistent monitoring of student progress and high levels of academically oriented interactions between teacher and students are also signs of an effective classroom (Hoffman & Everest, 1976; Rosemeire & Barlow, 1976).

A clear picture of effective teaching procedures is emerging from the literature. These procedures are not supervised by supervisory personnel. The data from these studies are collected in objective feedback to teachers on their performance.

Program supervisors fulfill a unique role in the educational evaluation process. Merely by monitoring teacher performance and providing supervisory feedback, the program supervisors can remedy not only in information and recommendations, but actual program change. It is very important that classroom teachers be made knowledgeable and able to communicate their perceptions of their classroom to the recipient.

At the present time, objective supervision involves the collection of classroom observation data (Piper & Elgar, 1990). Although there are a large number of classroom observation techniques in the literature, few are readily available to supervisors. Competency is more often measured by rating scales and management by objective procedures. These are subjective procedures.

Objective measurement systems are often viewed as cumbersome, intrusive, and time consuming. Easy-to-use, objective supervision instruments that can be used often, allow for within-program comparisons, and provide teachers with specific feedback are needed. The purpose of this study was to test one such instrument and to assess the effectiveness of publically posted comparative feedback. Also, of interest are teacher ratings of the validity of the Classroom Observation Data scale.

Method
Participants and Settings
Three teachers of severely handicapped students and their aides (2 each) participated in the study. The three settings were employed by the Lane Education Service District, Eugene, Oregon, and taught self-contained special education classes. All of the classes were located in public schools.

Observations were conducted within the teacher’s self-contained classroom. All students attending these TMR (truly mentally retarded) programs in the state of Oregon met eligibility criteria, and attended a full school day in a school appropriate to their age level and close to their home address. The program supervisor was also the experimenter in the study which was conducted between April and June, 1982. Two of the study teachers had taught in the program for at least two years, one was a first-year teacher, and all were committed to returning to the program for the following year.

Measurement
Data were collected on the Classroom Observation Data Code (Adler, 1982). The procedure expresses behaviors within a classroom for a 30-minute period. Students and staff are tracked across the classroom and within one or more activities. The code measures total class behaviors and does not track individual interactions between teachers and students.

The Classroom Observation Code examines three groupings of activities: Classroom Management, Student Behavior, and Task Variables. There are 20 classroom Categories in all. For example, Student Behavior includes Room, Waits, Structured Teaching, Organizing, etc. Under Student Behavior are Subcategories: Response, Inappropriate Action, Transition, etc. Under Task Variables are Age and Classroom: Individual, Group, Visual, etc. The tallies from the Category boxes are compiled into two different segments, one calculated as a percentage by combining the totals from the Category data and dividing that figure by the total number of 30-second observation units.

This Classroom Observation Code uses a sequential point sampling within a larger interval. Target behaviors in each of the three code areas are observed within a 30-second interval, which begins during the middle of a scheduled class session, and extends during the next class session. For further detail, see Adler (1982) or write to the author.

The observer uses an audiotape taping device to signal scoring intervals. Upon hearing the thirty-second signal, the observer follows a standardized scanning procedure. The observational scan follows a consistent pattern, and there is a near-to-far from the observer. This scanning procedure remains constant for all observations. In order to maintain a proper spacing of time between the observation of single student/students, an insurable second count was employed. Observation of one person and the marking of the corresponding tally takes approximately one full second. Any box in the Staff Deployment or Student Behavior area contains more than one tally. Both the Staff Deployment and Student Behavior areas now this scanning and tallying procedure.

The Task Variable area is not scanned across the classroom, but within a designated area. Although the consistent observation scan is maintained, one student is observed across the full 30-second period. As each student is observed, the task content is rated according to specified criteria.

General Procedure
Each class was observed 5 times in each of the three Observation occasions for 30 minutes during a scheduled morning time, which remained constant throughout the study. Days met the experimental conditions (field trips, more than two students absent) were non-data days. Data were given to the experimenter by the observers on a daily basis. The experimenter computed and reported percentage data. These data were posted in each classroom and were updated daily by exchanging an updated graph for the previous day’s graph.

Experimental Design
Observation times were randomly selected from class periods that had the majority of staff and students within the room and were designated by the teacher as skill development periods. Two back-to-back class periods were required for one experimental observation period.

A multiple baseline design across three classrooms (Hersen & Barlow, 1976) was used (see Figure 1). Feedback procedures were sequentially introduced to teacher, classroom, and classroom staff. The procedure for the study was to compare a No Feedback Condition (Baseline) to a Feedback Condition which involved posting of comparative data on staff instructional time. A component was from the Classroom Observation Code, Staff Instructional-Time, served as the dependent variable. Staff Instructional-Time involved the number of 30-second intervals of Structured Teaching, plus Out of Room Instruction, plus Monitoring, plus Appropriate Other divided by the number of 30-second observation units.

Interobserver Agreement
Observer reliability was the percent agreement by interval. An agreement was defined as the same number of tallies in the same cell within each interval. Any deviation in number of tallies between observers was defined as a disagreement. The calculation employed was

(Number of Agreements) X 100
(Number of Agreements + Disagreements)

During Baseline the percentage agreement score was 84 percent. In the Feedback Condition interobserver agreement was 91 percent.

Phases of the Intervention
Baseline
During baseline no feedback was given to the teachers of staff. Teachers were aware that a study was being conducted that involved coding of behaviors in the classroom. But they did not know the content of the code or the purpose of the study. At no time were teachers asked not to talk to the other teachers about the observations that were taking place in their classrooms.

Feedback Condition
Public posting of comparative data on staff instruction during the intervention comprised the Feedback Condition. The intervention involved the classroom supervisor sharing graphed data that compared the classroom’s data to other classrooms and to a standard performance level established by the supervisor on the basis of pilot data (see Figure 1). The graph was posted on a bulletin board within the classroom.

The feedback intervention was administered daily to classroom staff simultaneously. If a staff member could not be present, the teacher relayed the feedback information to that staff member. A classroom aide was designated as the person responsible to communicate the feedback results to the other teachers.

The feedback intervention was carefully scripted and contained the following information: In- class feedback on the data score, subsequent comparative feedback, and a format for teacher questions.

Results
Results are discussed in terms of: (1) the effect of the public posting of Staff Instructional-Time; (2) the stability of the feedback condition; and (3) the social validity of the feedback condition.

The Feedback Condition Staff Instructional-Time for all classrooms is presented in Figure 2. The data indicate that the teachers for the three classrooms of high variability around a stable trend line. Classroom A averaged 17 percent over 17 days within a range of 36-67 percent. Classroom B averaged 64 percent over 20 days within a range of 32-75 percent. Classroom C averaged 50 percent over 25 days within a range of 29-73 percent.

There was no public posting of staff instructional time was introduced following the traditional multiple baseline design into the A room. The feedback intervention began abruptly increase in Instructional Time is noticeable across classrooms, with a decrease in variability. Classroom A averaged 99 percent over 17 days within a range of 70-100 percent. Classroom B averaged 85 percent over 11 days with a range of 76-98 percent. Classroom C averaged 88 percent over 7 days with a range of 62-92 percent. There was no overlap of baseline and feedback condition data.

After the study was completed, the teachers filled out a code rating form (1—low to 5—high) on importance of the categories/composites to monitoring program effectiveness. It was given to them at the last staff meeting of the year with instructions for completion. They were also asked for comments on the observation and feedback procedure. This comment sheet was attached to the rating form and completed at the same time.

Results of this social validity indicated that teachers approved of the classroom observation code, and were willing to set program-wise goals based on observation. These responses allowed the teachers to be aware of good teaching/classroom management practices and were willing to work toward these goals. In addition, target teachers were keenly aware of observers and altered their performance.

References

A. The author wishes to express her appreciation to Martha Shonin and Tad Easterling for their assistance in the preparation of this paper.
Observation System (Continued from Page 4)

Figure 1: Chart posted in classroom on staff instructional related time.

during observation times. The three teachers generally agreed on the public posting of classroom data. It should be noted that one teacher found it patronizing. Use of a private feedback system, or a bar graph analysis may assist in avoiding the negative connotation connected with public posting. The importance of the immediacy of the feedback should be stressed.

In conclusion, the study demonstrated that definitions of effective instruction could be built into the framework of a reliable observation code for teachers of severely handicapped students. Providing information on comparative classroom performance data based on the code proved to be an effective method for improving staff behavior. Compilation of data throughout the school year could also offer a supervisor the performance data necessary for staff evaluation.

References

Sequencing (Continued from Page 3)

discrimination sequences. However, the variables investigated in the present study relate only to initial learning of a basic language discrimination. When these same guidelines are used in other situations, such as when the learner is being taught later on to apply the discrimination in a generalized manner to a variety of settings, they might hamper progress, and alternative guidelines might have to be used.

The utilization of principles or guidelines is still very much an art. It is like a variety of different coaching techniques in an athletic situation. The good coach uses effective techniques on the proper occasions. A poor coach might try the same techniques, but at improper moments. The discrimination sequences that Engelmann and Carnine suggest for initial learning seem to be effective techniques for just that—initial learning. On other occasions, different guidelines, from Theory of Instruction and other guides, should be considered.

When teaching technique consistently filia learning need, it seems that learning can be accelerated. In this study, after only 15 minutes of training (five minutes per day, maximum), the Arranged Sequence group continued to receive instruction carefully designed to meet their learning needs, while the other group continued with less emphasis on careful instructional design, the gap between the two groups would be expected to widen considerably.

Table 1

<table>
<thead>
<tr>
<th>Measures taken immediately after training</th>
<th>Measures taken one week after training (maintenance)</th>
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<td>N</td>
<td>Mean</td>
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<td>Posttest on trained examples:</td>
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<tr>
<td>Arranged Sequence Group</td>
<td>24</td>
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<td>Random Sequence Group</td>
<td>26</td>
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<tr>
<td>Transfer test on untrained examples:</td>
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<tr>
<td>Arranged Sequence Group</td>
<td>24</td>
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<td>Random Sequence Group</td>
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DIRECT INSTRUCTION NEWS, WINTER, 1983-84 S
APPLES FOR TEACHER

Cursive Writing Program

AUTHORS: Samuel Miller, Siegfried Engelmann
RANGE: Third and fourth grade students or older students poor in cursive skills.
DESCRIPTION: The Cursive Writing Program is a 140-lesson direct instruction program that teaches how to form the various letters, create words, write sentences, and write faster and more accurately. Special features include a simplified orthography, emphases on high-fitter combinations, and design features such as the start arrow to ensure correct paper placement. Exercises require only 15-20 minutes of daily work.
ADMINISTRATION: The program is suitable for individuals, small groups, or an entire class.
COMPONENTS: Teacher Presentation Book includes: Complete information and reproducible material for placement testing. Information on how to supplement the program. Student Workbook includes: Practice papers for each lesson. Point Summary Chart

I Love Library Books

AUTHORS: Janice Jensen, Siegfried Engelmann
RANGE: Students with first grade reading skills.
DESCRIPTION: I Love Library Books provides details for introducing 37 popular children's books as an integral component of a first grade reading program. A computer analysis has keyed each book's vocabulary with the words presented in 8 major basal reading programs so that the selected books will match the child's skills and ensure a successful reading experience. Children using this program usually start reading library books by February.
ADMINISTRATION: Either the librarian or teacher may administer this program.

Your World of Facts

AUTHORS: Siegfried Engelmann, Karen Davis, Gary Davis
RANGE: Third through fifth grade students, and remedial learners who read on at least the beginning third grade level.
DESCRIPTION: Your World of Facts is designed to supplement science and social studies programs, pre-teaching key facts and relationships. The series was written in response to the problem that students are often so concerned with the vocabulary of science and social studies texts that they fail to understand the concepts. Simple charts and pictures present each set of facts, and a game format provides interest and practice. The 40 lessons require 45-50 minutes each, but only 15 minutes of teacher-directed time.
COMPONENTS: Teacher Presentation Book contains guide information and instructions for each lesson. Student Workbooks are nonconsumable and contain 25 topics, including the solar system, the respiratory system, continents, oceans, and the internal combustion engine. Reproducible score sheet. Reproducible certificate

Speed Spelling

AUTHOR: Judy Proffitt
RANGE: Learning disabled and retarded children who have not mastered grade school spelling skills.
DESCRIPTION: Speed Spelling is a skill-based, phonetic program designed to increase spelling speed and accuracy following a systematic development of sound-to-letter correspondence. A placement test determines each student's level. Each of the 93 lessons teaches word reading, word writing, and sentence writing, and contains instructional objectives and detailed directions.
ADMINISTRATION: Teachers, students, aides, or other paraprofessionals may act as tutors.
COMPONENTS: Manual includes: Placement test. Cycling tests. 93 lessons with complete instructions. Adaptation procedures for classroom settings. Student Book includes a record of performance and is the only consumable part of the program. Word List Packet contains large-letter words and is reproducible.

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6 DIRECT INSTRUCTION NEWS, WINTER, 1982-83
DI Approaches to Teaching Spelling

By Maria Collins
University of Oregon

Editor's Note. This is the second of a two-part series on teaching spelling. The first part (Diekman & England, 1988) by Collins focused on general research findings on effective procedures for teaching spelling. This present article focuses on DI approaches to spelling.

This article describes two DI programs for teaching spelling—Spelling Mastery (Dixon & Englandman, 1980) and Corrective Spelling Through Morphographs (Dixon & Englandman, 1979). These programs will be described in relation to the research on spelling practices and effective spelling instruction (Collins, 1980). Each program will be briefly described, and then both programs will be discussed for the teacher in terms of presentation skills and instructional design characteristics.

Spelling Mastery

Spelling Mastery contains five levels (A through E) for grades 2 to 6. This program incorporates specific skills, rules, strategies, to "teach spelling skills to children who have mastered the phonetic approach" (Dixon & Englandman & Olsen, 1981). The authors have designed the levels to teach spelling words, as many as are possible. Level A includes 60 lessons, B and C 140 lessons, and level D 100 lessons. The program is designed to be used daily, each level lasting about 20 minutes. Each level reviews the skills taught in the previous level in the first 20 lessons.

Although the program is designed for grades 2 through 6, mild handicapped students, low performers, and students with learning disabilities can use it. Students should be taught in Level A only after they have mastered the one-year's worth of phonics instruction in a systematic phonics-based program. They will be better prepared to learn the spelling system of sound-to-symbol translation. Other starting points can be determined by performance on the placement test which comes with the program.

The program is based on three distinct teaching strategies: phonemic, for words with predictable sound to symbol correspondences (e.g., man, hit, stand, home); morphemic, for words made up of base words and affixes (e.g., un-asurable, disguised, possible); and the whole word, for words which cannot be taught by the other two approaches (e.g., irregular words such as meet, start, and write). The phonemic approach is stressed in levels A and B, and the morphemic in C, D, and E. The whole word approach is included throughout the levels, but emphasized more regularly in the lower levels.

Corrective Spelling Through Morphographs

Corrective Spelling Through Morphographs program is designed to be used with students in grades 4 on, who are mastered the phonetic approach, but need more instruction on the morphemic level. The program, like the other two series of the Spelling Mastery Series, incorporates rules and teaching principles to ensure that students will learn to spell words accurately and rapidly. Because this program is designed for students who are already fluent in spelling, students learn to spell the 1500 words in 240 lessons in one year (level D). Lessons require 20-30 minutes daily.

Program Design

Placement Procedures. Many spelling programs use placement procedures which often result in teaching words that students already know (Manolakos, 1973). This program occurs because it places students in broadly defined grade-level materials, rather than focusing on specific grade-level materials. The program places students in an appropriate instructional level, based on their performance on a program-related placement test. Specific error indicators indicate that students need a particular level of spelling. Students do not know how to spell the words in that sequence. In this manner, the teacher does not spend time teaching five, four, three, two and one.

Wordlist and sentence formats. Research indicates that teachers should provide written words, rather than in meaningful context (Fitton Simmons & Looner, 1977). Emphasizing the "meaning" of a word blinds the student to the distractors from the goal of teaching students to spell accurately. DI spelling programs introduce words in isolation. The most commonly utilized method is wordlists, in which words with the same letter combination or vowel are presented in a short list together. The words are presented in a random order which (of course) rules by the teacher about the sound or sound combination. For example, in level B, teaching students to spell the /v/ sound at the end of short words is introduced by the teacher in sentence form. "John is a [word list: iron, hon], a [word list: June, June]." Words of usually spelled with the letters V-E. Next, the teacher tests the students on this rule by asking, "What sound is at the end of June?" The students respond: "v-v-v." "How do you spell that word?" The teacher directs the students to spell June. This procedure is repeated with the teacher introducing the words.

The second word-introduction method in the Spelling Mastery series involves sentence-structured lists. This method focuses on words that have the same spelling, but different sounds. For example, one sentence introduced in the student material is "I thought he was trained. But we know 100 students are deliberately introduced to the difficult words "thought" and "though" so that they can see the spelling similarity. The authors do not present these sentences so that students grasp the meanings of the words, but to facilitate students' spelling these "hard words." The authors then include "editing sentences" as a strategy for students to review previously-taught words throughout the series.

The words taught in both the Corrective Spelling Through Morphographs and Spelling Mastery programs were chosen to emphasize the frequency and utility of the spelling rules principles. Although "unfamiliar" words are used, high frequency word, the word is included in the morphemic presentation so that students use the conceptual framework they've been taught to determine the correct spelling. (Garrett, 1982) has recommended a similar approach for teaching homonyms.

Although word meanings are not stressed, students are taught the meanings of selected homonyms (for example: pre means "before," re means "again," ing means "when you do something") students learn that a word like returning means "when you turn again" or previous means "to view before (others do)."

The program teaches students the meanings of many homonyms so students can discriminate in writing (and in dictated tests). Students learn to spell one homonym, such as "right" when the teacher states, "Here's a sentence. The answer is right. Here's how you spell that word right: right." The teacher then tests the students, "Everyday, spell right to be correct." Students practice spelling this word in various contexts before using it to spell homonym, write. This strategy for introducing homonyms is followed throughout both the Spelling Mastery and Corrective Spelling Through Morphographs.

Rule introduction. Both Spelling Mastery and the Corrective Spelling teach the three rules recommended by Golden and Graham (1979) as most useful.

1. Doubling the final consonant on a CVC word before adding an ending. Example: said + ed = said
2. Dropping the final e on a CVC word before adding an ending. Example: hide + ing = hiding
3. Change the v to to before adding an ending. Example: worry + er = worrier

These rules are taught progressively over the program so that students learn the rules in the order in which they are presented. For example, the doubling rule is presented and the teacher writes the words on the board: CVC + V + Y says "When a short word ends CVC and the next morphograph begins with a vowel letter, you must double this consonant" (points to the final C). The students listen and write the words and then practice applying the rule. For example, students answer teacher-directed questions about said + ed (rule applies), then said + est (rule applies). They learn that the word washer does not follow the rule, because it is not a short CVC word (words with 3 or 4 letters).

After several days of teacher-directed instruction with the above procedures, the programs introduce the students to actual words on a worksheet, in which students must apply the rule. For example, on the following worksheet words students spell "c" or "v" above the last three letters in the first word (morphograph) and then write "v" or "c" above the first letter of the second morphograph. These visual prompts aid the students in determining whether the rule applies or does not apply.

"double when CVC + V + C."

1. stop + ed =
2. farm + er =
3. wash + er =
4. swim + ing =

After using this strategy for several days, students use the same system, but the rule is not included in their worksheet. Later, the teacher dictates the morphographs and students write these words through the use of the worksheet. Eventually, the teacher dictates the complete word with no morphemic breakdown, before students actually apply the strategy in the terminal skill. These same sequencing strategies apply to the other rules as well.

Other sequencing principles. The programs are carefully designed according to the programs presented by Englandman and Carnine (1982). Pre-skills for a strategy are taught before students actually apply the CVC rule. They receive teacher instruction about the rule and its meaning. Then (v) and a consonant (c) and practice writing of or above letters before they write these words. Before students spell words, that practice spelling words like man or rub, they practice identifying the sounds in the words. Since this strategy is not a direct spelling skill, it is a pre-skilled design to ensure that students can determine all the sounds in regularly-spelled words, and to prevent reversals (example: spelling more as most).

Words that have been previously introduced are cumulatively reviewed throughout the program. For example, although the words give, live, and have are introduced in lesson 1 in level B, these words are periodically reviewed throughout the program, either in teacher dictation form or in review exercises in the student workbook. Cumulative review is particularly important for low-performing students (Lewts, and Page, 1977; Tippett, Bryant, and Payne, 1982). A host of other design principles are also embedded in the strategies: Teacher-guided worksheets. In his review of the four DI approaches, Tippett makes teaching "effective," Rosenshine (1983) recommends that teachers carefully choose the first-time, first-seat work problems before students complete workbook exercises independently. DI spelling programs incorporate this guided-practice strategy in all workbook activities. Only after students have received adequate practice on specific skills, do they work an exercise independently.

Teacher Presentation Variables. Specific behaviors to be used by the teacher during spelling instruction. Both spelling programs emphasize the teacher presentation of essential spelling skills. A specific script for the teacher to follow is provided. The teacher spends most of the teaching period directing students spelling practice, a recommendation Hillerich (1982) has made after his analysis of teacher instructional script.

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Teacher to Teacher

A "Regular" Mainstream Classroom

Sue Brent
Portland, Oregon

Imagine, if you will, a classroom of 30 children all huddled around at the beginning of the school day, correcting errors on take-homes and other seat work, hanging up coats and playing games. Now check that desk in the front of the room—the one with a teacher aide sitting next to it and the brailer sitting on top. That desk belongs to a child who is non-sighted and emotionally handicapped—namely, Sean. If you look on the right side of the room, you will notice a rather large, drafting-table-like desk with a brailer sitting on it. That desk belongs to Raini, a student who has cerebral palsy. She usually types the answers to her take-homes with a mouth-stick. Just behind her, at the end of the row, sits a third handicapped learner. Her desk is shorter than the others. Naomi has arthrogryposis. You can’t see her! Look down on the floor. She usually sits there if she’s not in her wheelchair. I doubt if she’s correcting errors—she’s gifted. It’s not that she doesn’t make mistakes, but it’s my guess she’s drawing; she loves to draw. She’s not there! I guess you went outside for a little early morning recess with some of the other children. Don’t worry. She’ll be back when the bell rings. The last person I want to draw your attention to is right up in front, seated next to Sean. Naomi has Down’s syndrome. That’s why she’s sitting up in the front. I find I remember to praise more often that way, and she sits on task longer. Nancy also has vision problems, another reason she must sit up front. She has hydrocephaly.

That’s a quick overview of our room. The other 26 students? Oh, they don’t have great problems, either. They’re not handicapped in any way. They have their moments, of course; there are a few behavior management cases. But these other students are generally non-handicapped—unless you consider the other three kids by the window playing cards. They’re identified as academically gifted, and they have a whole different set of problems that require attention. I will not go into that in this article, but I want you to know that they are in a DI Instructional reading and math programs, just like everyone else in the class. We simply move a little more quickly with them than with the other children, and we provide more enrichment activities. What grade level is this, you ask? They’re second and third graders. Is this mainstream situation hard to handle?

Yes, at times, but I don’t do it alone. I have an aide who works full-time with Raini as well as one who works full-time with Sean. I usually have volunteers and paraprofessionals from the university, too. I would not have taken on this assignment without adequate help. I also work with a half-time DJ teacher, itinerant teachers and various consultants. This classroom is an experiment of sorts. Previously I just had Raini in my class. Due to last year’s success with her, I received three other handicapped learners this year.

In this article I will illustrate how I integrated the handicapped students into my DI DISTAR reading and math groups, how I used DI to teach other subjects, and what rules and organizational systems helped keep the classroom running smoothly.

Mainstream Reading and Math

There is relatively little difficulty in mainstreaming handicapped children into a classroom which already uses DI reading or math programs—compared to one which is less structured. In fact, it is a lot easier because chances are the handicapped students have been using a structured approach in their self-contained special education classrooms. The way to prevent many of the potential problems is to plan ahead and use lots of praise. Planning takes time, but it pays off. Praise keeps children with extreme emotional handicaps and other learning disabilities on task so that the rest of the class does not become frustrated with the learning situation.

Sean

Sharin, an aide with the skill of an experienced teacher, arrived in mid-October to work with Sean. Sharin was very skilled in DI techniques and had worked with Sean for two years before coming into my classroom. When Sean arrived, my lowest DISTAR Reading II group was already on lesson 99. (The students at our school began their DISTAR training in kindergarten.) Sean was reading below that level, and he had been working throughout the summer with Sharin in both behavioral and reading problems. Sean was not ready enough trying to learn mobility in a new classroom and school, so we didn’t see any benefit in sending him to a different class to read in a group at his level. We had hoped eventually to "catch him up" to the rest of the class and integrate him into it. We had the Teacher’s Presentation Manuals prepared with clear brailled words under the written words, knowing Sean could sit next to the presenter and read the brailled words as others, with another following the cue and read visually. The DISTAR readers had all been brailled, too, so reading with the group would also have worked. But as he moved ahead, so did we, and the dream of having him reading with his peers never happened.

Mathematics was more of a success. We did the brailled pretest on the first day of school, and Sean followed along in it while I presented the chalkboard work to the group. We also had Sean take home the take-homes, because the take-home is often the major portion of a DISTAR math lesson. We did not use the same layout as the printed take-home. Skills needed to be more ordered for Sean. We also eliminated some of the extra review because it was enough of a task for Sean to complete the lesson portion of the group. After group, Sean would take his work to his seat and complete it with his brailer. Sharin would do oral review on the portions we had cut, either at the time or later in the day.

Normally during a DISTAR presentation, low performers sit right in front of the teachers for eye contact. With Sean we found it worked better to send him closest to his desk. We did this for two reasons. First, time saving, measuring, correcting, writing, and the like. Second, Sean worked on individually with Sharin at a later time during the day. Sean had changed the presentation order of the lesson so that skills Sean learned with Sharin were taught to the group. We had her teach presentation because of certain behavioral programs, Raini would sometimes need to pull Sean away from the group while he was behaving. Having Sean sit on the end of the row seemed the least distracting for the other students. Raini was patient with Sean’s need of eye contact to keep him on task.

Raini

Raini was probably the next most difficult student to plan for. To get her to school, someone had to transport her, attach her portable tray to the chair, and bring mouth-sticks for writing and turning pages. A mouth-stick is a cigar-type mouthpiece stuck onto the end of a pencil. The eraser is exposed for turning pages; lead is exposed for writing. The mouthpiece was standardized to fit all of our other students in the group. Remembering to come to group on time was Raini’s responsibility. Another student brought her to the group. The whole process was only a problem if someone forgot their responsibility and the group had to wait.

The only accommodation we made for Raini was to let her skip some of the review questions. Our DISTAR Reading II DISTAR Reading III take-homes. Either her aide or I would ask her to give the responses orally when we checked her written answers.

This was similar to reading instruction—little needed to be done to accommodate Raini’s individual differences. If we weren’t doing count-by’s, she would use the hands of the student sitting next to her, as she could not hold her mouthstick in both hands. Raini usually ate her take-home during and after group.

Naomi

There was really nothing special I did to help Naomi, other than put her in a group. As I’ve said before, she is gifted and we didn’t need any special equipment to accommodate her needs in group. If something did need to be adapted, Naomi often came up with the suggestion herself.

For both reading and math, Naomi would “walk” on her knees up to the chair, reach to carry her bag, lift her up, and because of her sitting position, it was usually easier for her to sit in the one chair. To write her own take-homes, all the children used lap boards, which worked fine for Naomi too. Naomi’s handicapper saw to it that she write in an adapted manner. She had little muscle development in her arms, so sitting cross-legged, she would use her foot to guide the pencil in her hand. She had beautiful handwriting, and she worked very hard at it. She did take a little longer to finish her take-homes, but Naomi improved in a short time. Sometimes she was a little late going out for recess, but that was her choice. She was always borrowing books to read, and the children in the group, because she would always strive for excellence.

Nancy

Nancy was at or slightly below grade level in both reading and math. However, keeping her on-task during group and after, while she was working independently on her take-homes, was a task in itself. Few things worked as well with her as the small group helped during group time. After group was the most difficult time for her to wait, almost as if the things going on distracted her. Because of her severe emotional problems, Nancy was easy to overstimulate. She wasn’t a mainstream failure, there were just too many distractions in a classroom of 30 children for it to be a beneficial placement for her.

Social Studies, Science, Creative Arts and Free-time

Free-time activities, which we engaged in after reading or math time, always saw rewarding situations. Handicapped and non-handicapped played together and shared their own special disposable and reading games which reinforced skills that had been taught. The occupational therapist with whom we worked and our consultant for the blind very creatively adapted many different games. We used brailled cards, and games which did not require vision. Raini could make checkers with the eraser end of her mouth-stick, and she had an adaptation which was like a clothepin (that she could use to hold cards. Often students would read stories to each other, just draw and color.

In the afternoon, after we had a story time for other handicapped students who didn’t fit into our instructional programs to visit, it was time for other subjects.

Direct Instruction techniques could easily be seen during the review questions in our whole group science or social studies lesson. In this type of whole group situation, non-handicapped were permitted to share and follow along. The group response and individual questions were preplanned. Raini was also employed for science and social studies. The students would work together in groups so as not to overcrowd the school grounds, measuring plant growth, or experimenting. I left it up to the students, because if nobody raised a project so all would be involved. Often these subjects were not appropriate for Sean or Nancy, so I would schedule...
Mainstreaming (Continued from Page 8)

science or social studies when they worked with an aide or specialist on other skills.
I also used DI in language arts — both for skill lessons which were in the student text and for creative writing. During creative writing I used DI to tell the students about writing, and then essentially asked them to write. I'd tell them how to write. Sean could write on his braille and Rani on her typewriter. Sharon did need to do some pre-instruction with Sean before such sessions in writing to teach him skills he had not acquired previously.

Organisational Guidelines

There were pull-out programs for everyone, handicapped and non-handicapped alike, in all subjects — talented and gifted, Title I reading and math, music, P.E., spelling, adapted P.E., physical therapy, and occupational therapy. Therefore, I found it necessary to have one big chart with each child’s schedule on it. Every child was responsible for remembering what to do and when to do it. Naomi was very independent because of her electric wheelchair. Raini had to find someone to push her to special activities and Sean had to ask for a guide.

I lived by the following set of rules:
2. Develop a set daily routine. Children get used to starting and ending activities at about the same time. There should be established routines for obtaining materials and initiating activities that can be done on the textbook.
3. Let the children know what you expect them to be doing. Go over your plans with them, explaining things clearly. Youngsters feel secure when they know what to do.
4. Warn students early about any changes. If you know reading will be interrupted by an assembly, a fire drill, or whatever, tell your kids in the morning. Also give a few minutes warning before the end of any activity.
5. Be aware of what the children are doing at all times. Arrange the physical layout of the room so you can observe children who aren’t working directly with you. A good way to deep track is to get in the habit of calling out praise to students who are on-task. It helps keep everything working or gets them back if they are off-task.
6. Set rules with the children and review them occasionally. Children have a tendency to become independent once they have the skill to handle independence grows. When children help make the rules, they are more likely to help keep them.

When things aren’t working, get the kids involved in correcting the situation. Put some of the problem solving responsibility on the children and allow them to develop solutions.
7. Set aside time in your day to listen to what the children have to say. Be a good listener as you expect them to be.
8. Take into account the children’s abilities and needs. Don’t ask kids to do things they aren’t able to do. Allow students enough time to complete tasks.
9. Take into account your own human needs and limits. Many teachers think they can do everything and that is what they do. It is wise to consider what pressures you’re under. After all, you’re the one who knows best how much different activities you can supervise at once, and how much noise you can tolerate. Be honest with yourself as to how much overtime you can put in and still function the next day. Allow time to teach skills and topics you enjoy.
10. Don’t give up on any child. There’s always something you can help every youngster. When you’re run out of methods and ideas, ask for outside assistance and be persistent until that child is helped.

It’s easy to read this list and say, “Oh, I do all those things!” We all try to do them, but many times I found myself

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Evaluation of Computer Software

By Vicky Vachon & Douglas Carmine
University of Oregon

Editor's note. Beginning with the next issue of the DI News we will start a new column on Software Evaluation, edited by Douglas Carmine. This column will detail procedures to be followed in such evaluations. This procedure column will also be useful guidance to anyone interested in the evaluation of computer software.

In recent years a new 'curriculum material', educational computer software, has been introduced to schools. Software sales are projected by market analysis to reach $500 million by 1985 (IEEE, 1981), an amount approaching that spent on textbooks per year. This substantial investment, among other factors, points to the need for software evaluation and selection of potential software purchases.

An analysis of most large courseware packages performed by the Educational Products Information Exchange (EPITE), 1980b) revealed the following findings:

1. Most programs are drill and practice for example "use in the classroom.
2. Most programs specified a target population that represents too wide an age range.
3. Most objectives have to do with recall of previously learned facts rather than higher-order skills such as prediction, application, analysis, synthesis, and evaluation.
4. Few pre-instructional strategies are used to orient the student to the content.
5. About 50% of the programs format the instructional text inadequately with reference structure as a major problem.
6. The only program that attempts to teach concepts to students does not provide systematic method of presentation based on concept-teaching research.
7. Graphics are rarely embedded in the instructional content.
8. Although all programs include a teacher's guide, these do not provide specific lesson plans or activities designed to integrate the programs into the curriculum.
9. Most programs grant user control in only two areas: of display and user interaction.
10. Although all programs use feedback for both correct and incorrect responses, most of the feedback does not remediate (only one program informs the user why the response is wrong).

While somewhat dated, these findings imply that there is an amazing amount of material that either does not make use of the unique interactive capabilities of the computer or does not meet even a minimum standard of instructional effectiveness, or both. Because distributors will not guarantee their products for instructional effectiveness, educators are forced to either depend on published software reviews or to evaluate potential purchases themselves.

There is a wide range of opinion concerning what constitutes an ideal courseware product. Because of this lack of consensus, the development of criteria and standards for evaluation is problematic.

"It can be argued that the only essential quality influencing the effectiveness of a material is the capability of bringing about learning, efficiently and effectively" (Rothley, 1981, p. 47). Criteria to predict the instructional effectiveness of CAI programs have been described in the form of guidelines (Say, 1983; Gagne, Rojas & Wager, 1981), program attributes (Cohen, 1983), and areas of instructional concern (Rothley, 1981). These criteria have been derived through essentially two approaches.

The first proceeds from an analysis of instructional design principles. Although there are several instructional design models, most share the common purpose of identifying learning outcomes and matching activities to certain events or conditions required to achieve those outcomes. Gagne and Briggs (1979) list nine events of instruction as necessary components of complete instructional acts. These events include: gaining the learner's attention, informing the learner of the objective, presenting stimulation materials, providing learner guidance, eliciting student performance, providing feedback on correctness, assessing performance, and enhancing retention and transfer. Guidelines derived through instructional design models center these events as essential characteristics of effective CAI programs.

A second approach to establishing criteria is through extensive analysis of existing courseware. In comparing effective programs developed for mainframe computers (the Plato-based model and the Stanford/CCL model), Robyler (1981) notes that programs can vary dramatically and still be instructionally effective. From the extensive review of microcomputer courseware, Cohen (1983) lists essential CAI attributes in two categories: those generic to all instructional media and those necessary to courseware design.

Several checklists, encompassing both instructional design criteria and unique courseware characteristics, have been developed. These checklists place varying degrees of emphasis on program characteristics. All CAI checklists include criteria that focus on the appropriate use of graphics, sound, and color, while criteria addressing instructional design issues are often vague. Questions such as "Is the content presented clearly?" give little indication of features required in effective presentation of material.

The criteria that more precisely address instructional issues may be able to pose the "correct" (e.g., is the program organized and presented in a sequential manner and in appropriate developmental steps). The appearance of these questions on an evaluation form does not, by itself, give the analysis of the presentation will be undertaken. The program may be organized sequentially, but with little subject to misinterpretation. To be instructionally effective, the program must teach what it sets out to accomplish. To predict instructional effectiveness, evaluation must focus on whether the content is consistent with only one interpretation—the intended one. Presentations that are consistent with one interpretation present the learner with a "faultless communication" (Engelmann and Carnine, 1982, p. 3). These communications are designed through a logical analysis of the content presented. Underlying the concept of "faultless communications" are two assumptions about the learner: (1) that the learner has the capacity to learn any quality (feature or characteristic) exemplified through examples, and (2) that the learner can generalize to new examples on the basis of sameness. In other words, learning is based on the basis of sameness. Thus, "the primary analysis of cognitive learning must be an analysis of qualities of examples and of the communications that present these qualities to the learner" (Engelmann and Carnine, P. 5).

The criteria presented in the courseware evaluation form that follows are consistent with the assumption that learning occurs on the bases of quality and sameness of examples. A program's program of content is systematically evaluated according to design principles that focus on example selection, wording, example sequence, provision for generalization of learning, review, practice and feedback.

In addition to the courseware evaluation form, three other forms are included: a coursewareстроитель, description form, and a summary form.

COURSWARE SCREENER

The courseware screen, presented in Table 1, lists eight questions for evaluating CAI programs. Evaluation is a lengthy process taking up to forty hours for a typical program (Peters, cited in Clemens, 1981). The screen form process allows reviewers to quickly identify programs that meet a thorough evaluation.

The questions address essential (yet minimal) elements of effective CAI. Programs are rated as acceptable, marginal or unacceptable with regard to each question. The decision to proceed with a more thorough evaluation will, to a certain extent, depend upon the teacher's goals for instruction; however, in some instances, evaluation will end at this point (see Design Violation).

<table>
<thead>
<tr>
<th>Table 1: Courseware Screener</th>
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<tbody>
<tr>
<td>Acceptable</td>
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<tr>
<td>1. Is the content accurate?</td>
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<td>2. Is the content of educational value?</td>
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<tr>
<td>3. Are entry skills specified?</td>
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<td>4. Is the presentation of material clear and logical?</td>
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<td>5. Is the learning that is to occur generalizable?</td>
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<td>6. Is there feedback on all errors?</td>
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<td>7. Is review provided?</td>
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<td>8. Is the program motivational?</td>
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COURSEWARE DESCRIPTION

The Courseware Description form appears in Table 2. Items contained in this form cover basic factual information necessary for the use and evaluation of CAI programs.

Source information includes the program name, publisher, required equipment (software, hardware, and peripherals), package materials, and the unit price (if available).

Program information identifies the subject matter by both general and specific topics, the target audience, and the model(s) of interaction (i.e., programs may include more than one form of instruction).

A description of the program should include an overall statement of the program's intent and general instructional strategies.

COURSEWARE EVALUATION

The Courseware Evaluation form is presented in Table 3. Criteria address content issues, instructional design, and technical (management) quality.

Although some items are readily apparent and easy to judge, others will require a careful examination of the material. To assist reviewers in using this form, examples and explanations relating to instructional presentation are provided below.

Content

Items include under the headings of accuracy, educational values and format material. Accuracy refers to the material being free from error. Error can result from factually, misinterpretation, out-of-date material, inaccurate or unconventional labeling of graphs, maps, charts, or other illustrations, misspellings or grammatical structure.

Decisions regarding the educational material of a particular program will be highly subjective. Consideration may be given to the degree of "fit" between the material and the student, the availability of the content to real-life situations and the overall goals of the individual teacher.

Programs should be free of stereotype material. Certain groups should not be over-represented at the expense of others. Representations of gender and freedom of stereotypes.

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Instructional Design
Criteria that address the design of CAI programs focus on objectives, individualization, presentation, feedback, review, motivation, and reinforcement.

1. Objectives
a. Objectives specify what the learner should be able to do upon completing the program. Clearly-stated learning outcomes provide the basis for evaluating instructional effectiveness.
b. Objectives may appear in the support materials or within the program. In the event that the program does not make objectives available to the learner, the teacher should inform students of program expectations.
c. Program content should be consistent with objectives in that the students should learn everything that the program intends to teach. A trial run of one program should provide sufficient information concerning the extent to which content is consistent with objectives.

d. Individualization
- Most programs are developed to be used by a specific group of learners—the targeted audience. Students within the targeted audience presumably possess the knowledge, skills, and maturity to successfully interact with the program content. Further evaluation may reveal the specified audience as unnecessarily restrictive or, more commonly, as encompassing too wide a range of learners. Programs that do not specify a targeted audience provide little basis for evaluating the effectiveness of the content.

2. Entry Skills
a. Program developers provide teachers with detailed information regarding the level of difficulty of the content. This information allows teachers to assign programs to students who have mastered the prerequisite skills, to provide additional instruction for students who do not meet entry requirements, or to teach the lesson in a more traditional way.

c. Pre-tests or placement tests may be available in the user-support materials or in the program. Initial testing should serve a specific purpose, to allow students who have mastered the content to test out of the program, to verify required entry skills, or to place students at an appropriate level within the program.

d. For students who have mastered more than the prerequisite skills, but who could benefit from interacting with segments of the program, additional entry points should be provided. Program segments are units that can be directly assessed.

e. Options for exiting or returning to the program’s menu should be available to the learner.

3. Presentation
a. Programs may be structured in such a way to allow teachers to individualize instruction by modifying the content. Modifications can take the form of introducing equivalent practice items, selecting the number of tasks to be presented, or specifying the amount of time allowed for interaction.

b. Most programs contain a system whereby student records are maintained by the computer. However, the extent to which these record-keeping systems vary is important to note. Systems range from simply recording a student’s performance in a drill and practice game to more complex management systems that store and manage records for complete curriculum units. The use of record-keeping components specify student mastery of the materials and pinpoint levels at which individuals are performing within the program.

Table 2 Courseware Description

| Program Name: |
| Publisher: |
| Required Equipment: Hardware Software Peripherals |
| Package Materials: |
| Unit Price: |
| Subject Area: |
| Target Audience: |
| Mode of Interaction: (check all that apply) Drill and Practice/Gaming Simulation |
| Program Description: |

Table 3 Courseware Evaluation Form

<table>
<thead>
<tr>
<th>CONTENT</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the content appropriate?</td>
<td></td>
</tr>
<tr>
<td>Is the content educational value?</td>
<td></td>
</tr>
<tr>
<td>Is the content free of sexist/biased?</td>
<td></td>
</tr>
</tbody>
</table>

INSTRUCTIONAL DESIGN

1. Objectives
a. Are objectives clearly stated?

b. Are objectives defined in the learner?
c. Is the program consistent with objectives?

d. Individualization
- Is the target audience specified?
- Are entry skills specified?
c. Is a pretest or placement test provided?
- Are a variety of entry points available?
d. Are options for exiting or returning to menu available?
- Can the program be altered?
- Is there a method of record-keeping?

3. Presentation
a. Do the activities optimally match the context?

b. Are programs (Drill and Practice, Drill and Practice/Gaming, Simulation)
- Provide opportunity for frequent interaction
- Avoid static/monotonous interactions

c. Tutorial
- Use consistent wording
- Tests learner’s ability to generalize
- Provide review

(1) Concepts (Discriminations & Relationships)
- Base examples & non-examples
- Demonstrate range of variations through examples

(a) Discriminations (labeling tasks)
- Sequenced to demonstrate differences (minimally different non-examples)
- Use continuous comparison when appropriate

(b) Relationships that systems, science rules
- Use skills as entry competencies
- Present relationships explicitly (e.g., visual display)
- Introduce new vocabulary systematically

d. Simulations
- Use component skills as entry competencies
- Present strategy as a series of steps
- Avoids learner in responding to each step
- Integrates steps into sequence
- Provides less specific direction (hikes, clues) as learner progresses
- Provides sufficient independent practice with range of appropriate tasks

4. Feedback
a. Are all errors corrected?
b. Does the program fit the context in which the error occurred?
c. Is feedback informative?

5. Review
a. Is review provided for newly acquired skills?
b. Does review incorporate previously acquired skills into more complex applications?

6. Motivation
a. Is the level of difficulty challenging to the learner?
b. Is the material presented at a good pace?
c. Are readiness levels appropriate in the target audience?
d. Is the program geared to the learner where appropriate?
e. Does the use of graphics/animation/color increase interest in program content?

7. Reinforcement
a. Is reinforcement age-appropriate?
b. Is reinforcement used appropriately?
c. Is a variety of reinforcement used?

PROGRAM UTILITY

1. Are user-support materials included?
2. Is there a Teacher’s Manual?
3. Is the program easy to operate?
4. Is the program review under normal use?
5. Can the program analyze a variety of responses?

Are information displays attractive?
Evaluating Software

Continued from Page 12

3. Presentation

To provide the learner with clear, unambiguous communications, the organization of information should optimally match the program's content. Because the structure and sequence of information according to the goals of instruction, criteria are listed under the major headings of tutorials, drill and practice, gaming and simulations. Additionally, two criteria, amount of interaction and unrestrictive response formats, are listed as essential attributes of all CAI programs.

Provisions for frequent student interaction with the content enables the learner to become an active participant in the program. It also provides opportunities for confirming the learner's understanding of the material as the program progresses to more complex concepts or content applications.

Response formats, i.e., the way in which students interact with the content should be appropriate for the intended audience, but not unnecessarily restrictive. In evaluating the program's response formats, consideration should be given to the type of response (e.g., multiple-choice, varied responses) eliciting maximum information regarding the students' understanding of the material. Could the interaction be improved by requiring the student to change the variable in the program's response? Is the content specific enough for the program to analyze a variety of input and, thus, allow students to actually produce individual responses?

Although response formats will, to a degree, be dependent upon the content and the capabilities of the targeted audience, they should be structured to provide unambiguous information about the learner's understanding of the material.

Response formats in drill and practice may require the learner to quickly recognize an answer and respond by pressing a key. These arcade-type responses may present very ambiguous information regarding the learner's performance as a result of extensive opportunities for chance responding being correct.

Tutorials

Tutorials present complete instructional units requiring little, if any, teacher supervision. The presentation of tutorial programs will vary according to the nature of the subject matter. However, some general guidelines on all tutorials should include consistent wording, tests for generalization, and adequate progress monitoring.

To make the program as clear as possible, consistent wording (or wording that is as similar as possible) should be provided. This allows the learner to focus on the relevant features of the presentation.

Teaching should culminate in a thorough test of the learner's understanding of the material through an ability to generalize to examples or problems not included in initial-teaching sequences. For those learners who have not comprehended the material, provisions for review should be included.

Tutorial content teaches basic concepts, terminologies, definitions and strategies (steps in problem-solving). Concepts are the pre-skills required for learning more complex strategies. Concept-teaching usually includes the use of examples to demonstrate precisely those features relevant to the concept. Experiments may be used to demonstrate the range of variation. By demonstrating the range of variation, the learner generalizes to new examples not included in the initial-teaching sequence.

In programs that teach discriminant functions, label examples, and non-examples should be sequenced to demonstrate both sameness and difference. To show sameness (the essential concept features), examples that are maximally-different are juxtaposed and ideally listed for dynamic presentation (label). The learner is given a clear demonstration that the changes from one example to another are not those relevant to the discrimination. To show the difference, non-examples that are identical are shown. The learner must identify the differences between similar examples and group examples with similar features.

In dynamic presentations, one example is changed into another. This process provides a basis for the learner to identify the features present. Continuous conversion is appropriate for teaching many single-concept concepts (i.e., those concepts wherein a change in a single feature creates examples and non-examples). In dynamic presentation the same irrelevant features appear in both examples and non-examples. Only the relevant feature is changed (see Engelmann & Carnine, 1982 for details). CAI programs are readily tested for dynamic presentations because of the microcomputer's graphic capabilities.

Concept relationships demonstrate how basic concepts (labels) are logically or empirically related. Logical relationships should be clearly defined and illustrated in examples of non-examples. These relationships should be carefully selected to provide a basis for understanding what is the same across pairings of examples and non-examples.

Empirically-related concepts are those that happen together. Science rules, such as "air travels to places of lesser pressure," typify empirical relationships. Programs that are designed to teach relationships among features of the same or different systems should include an initial-teaching sequence to explicitly require the use of examples and non-examples. Vocabulary is introduced, unfamiliar words should be systematically taught with definitions, examples, definitions or synonyms.

In teaching more complex relationships such as fact systems, visual displays can be used to demonstrate how various components of the problem are related in an overall structure. Visual displays are appropriate for any fact system that can be either viewed or programmed into a microcomputer. The classification system, the classification system for vertebrates, national balls of WWII.

A strategy is a series of sequential steps used to solve a problem. Strategies are applicable to a wide range of academic tasks (e.g., solving mathematical problems, spelling regular words, using context clues to derive meaning).

The structure of a strategy indicates the most efficient presentation design. Once component skills are identified, initial teaching should demonstrate the sequence and steps required to solve the problem.

Component skills should be listed as mixed items, the provision for tutorial instruction provided when appropriate. Strategies should be sufficiently flexible to enable learners to learn about alternative ways of solving the problem. Elements of the strategy can be clustered and presented with less specific direction. Once the learner can independently apply the component practice with a wide variety of problems should be provided for facilitation.

Access to review of component steps and additional practice opportunities should be provided. Drill and Practice

My educational software are drill and practice programs designed to supplement classroom instruction. Previously learned skills are reinforced through interacting with drill and practice programs often called "games". In evaluating drill and practice programs, it is important to note the levels of difficulty available within the program, the provision for cumulative introduction and review, the treatment of mixed items, the provision for tutorial instruction and the sequence of tasks.

Levels of difficulty can include such variable factors as the number of items to be completed, complexity of the required strategy, and time allotted for the problem. Program-specific instructions should modulate the maximum number of items students within the program's specified range, the program should be sensitive to the individual student's accomplishments. Control of varying difficulty levels can be easily programmed into the computer, the teacher (via a special menu) or be determined by the program itself. In the latter case, the program should vary difficulty levels based on either the learner's performance with a predetermined number of problems or the number of missed items at a particular level.

Programs that present increasingly more complex problem types should be designed to introduce new concepts into the program while maintaining review and practice for previously-learned material.

The program should also be sensitive to student errors and either re-introduce items or present a new set. A new extension of this process is the program's ability to diagnose frequent errors and provide appropriate remediation. This process may result in introducing tutorial instruction when appropriate.

The sequencing of tasks within a drill and practice program should be unpredictable so that the learner must actually attend to the question to answer it correctly. Such an unpredictability programs hold great potential for classroom use. However, it is essential to determine if the program undergoing review is actually providing the learner with appropriate opportunities to practice skills. Programs may be highly praised based on the student's willingness to participate in drill and practice activities when in fact gaming aspects supersede and, in some cases, counteract the stated purpose of the program.

Simulations

Simulations allow the learner to interact with various aspects of social or physical reality with a computer application. The error was made by using basic concepts and principles inherent to a particular simulation discover how the interaction of variables may result in varied outcomes. Successful Interaction with the simulation requires the learner to form hypotheses regarding strategy interactions which are tested in simulated applications. The overall evaluation of any simulation should focus on the validity of the model. Additionally, the program should inform the learner of Drills and practice program errant in the simulation and variables that are part of the outcome. Hints and clues may be programmed into the program to assist the learner in discovering critical features of the program. Programs may also include both the opportunity to view the model and to view the learning that occurs is generalized to real-life applications.

4. Feedback

a. The program should provide feedback to the learner immediately following an incorrect response.

b. The organization of the correction should also match the context in which the feedback is provided.

c. Errors in problem-solving strategy may be corrected through drill and practice programs.

d. Errors within a problem-solving strategy may be corrected through drill and practice steps as well.

e. Feedback should be informative.

5. Review

a. Skill-training programs should include review and practice items.

b. In addition to reviewing new skills, the program should require learners to practice previously-learned concepts in more complex applications.

c. Cumulative review of previously-learned skills should be provided to facilitate retention.
6. Motivation  
   a. The level of difficulty should be consistent with the educational level of the intended audience; however, the program should be sufficiently challenging to maintain the student's interest.
   b. Time between tasks should be minimal.
   c. Program should include exercises that appear on screen for a predetermined amount of time. These lessons can be very frustrating to students who require extra "thinking" or response time. One way to counteract this problem, especially for drill and practice programs that stress rate or fluency, is to program to include a test that establishes individual student rates.
   d. Readability is also a factor that should be considered in program evaluation. Reviewers may wish to apply a readability formula to a text-heavy program.
   e. User control is a feature included in most programs. Instructions to the learner appear in the form of "Three Space Bar for Right Button to Continue." This feature should remain consistent wherever it appears in the program. Skipping from the use of the space bar to the return key is often confusing and frustrating. User control should be granted to the learner for exiting the program, for changing within the program (returning to the menu for an alternate selection), for reviewing instructions in complex programs, for viewing scores in game situations, and for choosing the number of problems to be worked (when appropriate).
   f. An exciting aspect of computer technology is the ability to use graphics, sound, and color within the program. Although these features can, when used appropriately, enhance the lesson, a danger exists in their overuse. Sound within a program, especially if it cannot be turned off, can be very distracting within the classroom. Graphics can also be distracting in that students may attend to graphics while disregarding the accompanying text. The use of color to emphasize key words, add emphasis, and enhance the lesson, can be very distracting within the classroom.
   g. Reinforcement  
   a. Programs that include reinforcement for correct responses should use reinforcements that are appropriate to the age of the target audience.
   b. Reinforcement may also be overused. A program that reinforces every correct response may appear frustrating to students who just want to get on with the job. Sometimes just moving to the next question or exercise is adequate reinforcement for correct answers.
   c. Programs that include reinforcement should utilize a variety of reinforcers. Reinforcers may take the form of a game following successful completion of a unit, a variety of phrases or appropriate graphics.

Program Utility  
Program utility criteria assess the accompanying capabilities for students and teachers, program operation, and information displays.
   1. Student materials should be provided and include activities directly related to the program content. These can be in the form of pre-instructional activities, follow-up activities, worksheets, or testing materials.
   2. Most programs include a Teacher's Manual. This manual should contain a description of the instructional strategies and activity sequences within the program, specific suggestions for relating the program content to existing curricula or units, estimated time required for one student (or a small group) to interact with the material, resource information, and explicit instructions for operating the program.
   3. Operation of the program should require minimum computer knowledge of the intended user.
   4. The program should consistently run under normal conditions.
   5. The program should be capable of analyzing a variety of input (e.g., Y for yes). Programs that require the learner to produce variable responses should be designed to accept a wide variety of input as correct.
   6. Information displays should be attractive, uncluttered, and easy to read. The amount of text contained within each display should be controlled. The size and type of text can enhance the clarity and appeal of both graphics and text.

Recap of Rating Procedures  
Evaluation begins with previewing and using the coursework screener. Ratings are listed as acceptable, marginal, or unacceptable. The screening process quickly identifies those programs that meet minimal design standards, and those that do not. The latter group requires further evaluation.

Programs that meet minimal standards are then thoroughly evaluated according to the criteria listed in the Courseware Evaluation Form. Rating categories are listed as excellent, acceptable, marginal, unacceptable, and not applicable. Criteria are listed under three major headings: content, instructional design, and program utility. Instructional design criteria are further categorized into seven areas.

To use this form, the reviewer would first evaluate programs according to the specific criteria listed under categories and subcategories. For example, in evaluating the program's presentation of content, the reviewer would determine if the structure matches the content. The analysis of content begins with criteria listed under "All Programs." Evaluation continues with criteria listed according to program type (i.e., tutorial, drill and practice, simulation). Tutorial programs are classified according to type of content (e.g., concepts, strategies) and evaluated through more specific criteria. Upon completion of the relevant subsection, the reviewer would then rate the overall criteria (i.e., structure matches content).

**Table 4**  
**Evaluation Summary Form**  
Title: Story Machine  
CONTENT  
- E  
- A  
- M  
- U

**INSTRUCTIONAL DESIGN**  
- 1. Objectives  
- A  
- M  
- U
- 2. Individualization  
- A  
- M  
- U
- 3. Presentation  
- A  
- M  
- U
- 4. Feedback  
- A  
- M  
- U
- 5. Review  
- A  
- M  
- U
- 6. Motivation  
- A  
- M  
- U
- 7. Reinforcement  
- A  
- M  
- U

**PROGRAM UTILITY**  
- A  
- M  
- U

**STRENGTHS:** Sentences and stories are enacted through appealing graphics. Corrective feedback is given when students' response is too complex for graphic displays.

**WEAKNESSES:** The program restricts expressive writing practice by imposing rules governing the number of 'characters,' acceptable 'actions' within one story, and sentence construction.

**RECOMMENDATIONS:** Story Machine appears to have limited classroom use.

**Table 5**  
**Evaluation Summary Form**  
Title: Academic Skill Builder in Math  
CONTENT  
- A  
- M  
- U

**INSTRUCTIONAL DESIGN**  
- 1. Objectives  
- A  
- M  
- U
- 2. Individualization  
- A  
- M  
- U
- 3. Presentation  
- A  
- M  
- U
- 4. Feedback  
- A  
- M  
- U
- 5. Review  
- A  
- M  
- U
- 6. Motivation  
- A  
- M  
- U
- 7. Reinforcement  
- A  
- M  
- U

**PROGRAM UTILITY**  
- A  
- M  
- U

**STRENGTHS:** The programs in this package utilize a highly-motivating, arcade game format for drill and practice in basic facts. Support materials for both teachers and students are included. Teachers can select the rate of presentation, the problem difficulty level and the interaction time.

**WEAKNESSES:** Errors in student performance can occur from a variety of sources. Program management includes decision-making based on student performance and is therefore difficult due to the amount of random error inherent in the design.

**RECOMMENDATIONS:** In making program decisions for individual students, teachers should be aware of extraneous sources of error.
Evaluating Software
(Continued from Page 14)

Spelling
(Continued from Page 7)

provides an overview of program development. It encourages the teacher to practice writing and thinking about the process and to evaluate the program according to its strengths and weaknesses. It then suggests a series of guidelines for program evaluation. The references cited at the end of the article provide a comprehensive list of resources for further study.

Design Violations
To illustrate the use of this courseware evaluation package, three programs have been reviewed and summarized.

Island Software’s “Puss in Boots” (Table 1) is part of a “Young People’s Series,” designed to “provide young children (preschool, kindergarten, and primary grades) with practice on positional concepts.” Initial screening of this program reveals that it is inappropriate. The mechanics and practices for “puss” are identical. Although these options are not presented together in the interface, the depiction of “puss” is inappropriate.

In another frame, “Puss is positioned beyond the top of the screen so that the “next” option becomes “next to” and “in front of.” The correct answer is “next to.” However, the rest of the options show “Puss to be “in front of his boots.”

Because of the gross inaccuracies in design, it is recommended that this program be limited, if any, educational value. Further evaluation is unnecessary.

Spinnaker Software’s “Story Machine” (Table 4) is designed to provide children (ages 5-9) with practice in writing sentences, paragraphs, and stories. Students write sentences composed of words from a “dictionary.” Each sentence is enacted on the upper part of the screen. Several rules for sentence construction are given in the guide. These rules include the number of facts that appear in the story, space and sentence options for actions, and pronoun usage.

The combination of a limiting dictionary and construction rules in this program results in restrictive formats for expressive writing.

DLM’s “Academic Skill Builders in Math” (Table 5) is a program for students with disabilities. It contains an exceptionally detailed curriculum, repetitive use of materials, and a comprehensive record-keeping system. Programs are designed to encourage students to make use of an arcade-type format. Four of these programs are “Demolition Division,” “Meteor Mission,” “MinaMi and Alligator Mix.” These programs include mixed practice in division/multiplication and addition/subtraction, in which students recognize an answer and respond by pressing the space bar at the appropriate time. Each program provides problems at nine speed levels and three difficulty levels (0-3, 0-6, and 0-9). As students become more proficient, the speed at which problems are responded and the difficulty of the problems are increased. Correct responses are tallied as “Hits” while errors are recorded as “Misses.” Scores are presented at the end of the timed interaction. These scores are then plotted on a graph and printed out in a weekly progress report.

The program is designed to encourage reading, writing, and thinking. Decisions are based on a collective of nationally recognized research. A major feature of this program is the validity of decision-making based on multiple criteria. It can assess from several sources: incorrect facts, response time, “answering” the question at the target, typographical errors, and, at very high speed, the lapse time between entering the answer and having it appear correct.

The programs provide minimal feedback to students except in tallying scores. Correct feedback is not given although missed facts do reappear.

The arcadegame format of the Arcade programs provides a motivating atmosphere for drill and practice in math. However, because the reinforcing aspects of game participation are not contingent upon performance, effectiveness is dependent upon direct teacher management.

Summary
To thoroughly analyze and thus evaluate a CAI program, evaluation efforts must focus on instructional design variables in games in addition to the game’s play. These variables are particularly important for coursework because teachers can’t make modifications. This suggests that CAl programs require careful planning and design. Programs must present clear explanations, carefully selected sequence examples, correct feedback, cumulative review, and evaluation to ensure that learning will occur.

The courseware Evaluation Form presented in this article requires the review to carefully analyze programs according to these variables (as well as others). Reviews performed according to these criteria will provide a strong basis for predicting the instructional effectiveness of programs with a wide range of learners within the targeted audience.

As educators become more sophisticated in selecting effective courseware, software developers will be required to produce programs that incorporate sound instructional design principles. However, until the demand for software evolves into a critical demand for effective programs, thorough evaluation criteria and feedback will be critical.

Selected References

References


Fischer, R., & Lenart, B. Spelling research and practice. Iowa State Department of Public Instruction and University of Iowa, 1977.


Tenth Annual DI Conference
The Eugene Direct Instruction Conference will be held during the week of August 6, 1984 at the Eugene Hilton. The cost for the five-day conference will be still be $100.00 per participant.

After an opening session, participants will be able to choose from many workshops. The new sessions this year will include a session for administrators on monitoring of the effective classroom on computers and DI and intensive training sessions on working with bilingual students and the biggest change will be the offering of intensive practical sessions as a preconference workshop. These will be detailed in the next issue of DI News. If you have ideas on other sessions you would like to see, send the information as soon as possible to Conference Committee chair of ADI.

As in the past, the Conference days will be long and productive. Conference presenters will include Englemann, Becker, Carin, Sprick, Colvin, Haddox, Johnson, and many others. The cost of graduate college credit can be earned through the University of Oregon for an additional registration fee.

Direct Instruction, Winter, 1985/86
Preschool Reading

Paul Welsberg

as "insecure errors," something akin to a "false sharing game," is what Goodman and Burke (1969) presumed naive readers naturally do as they attempt to figure out the words in a sentence.

Other kinds of confusion resulted when the children heard words that sounded three, five-four, color words (blue, black, and brown were often inter- changeable) and words for commonly classroom objects (clock for chair, door for desk, etc.). We discovered that the puzzlement and stagnation over turning to reading by our preschoolers was not peculiar to this age group but work, our students reported one major difficulty when the children started out with the alphabet. About the same time, we saw Engelman’s (1968) provocative movie where previously previously preschoolers, just starting first grade, were eagerly doing basic algebra problems, and many others in kindergarten. Their programs had different goals and activities focus on the children's program. The goal and activities offered in these groups are shown in the table below.

Evaluation Design

Continuous Progress Tests (CPT) in Reading, (Reeves, Carver, & Davis, 1973), administered individually every 10 to 20 instructional lessons, provided an estimate of how well the children were mastering the concepts and skills being taught. As such, the CPT represented a valid criterion-referenced test, permitting not only periodic evaluation of the children's progress, but also the teacher's performance and the program's effectiveness as well. The results for a randomly selected group of children from the 18 month to 36 month Distar Reading 1 children on the CPT are reported elsewhere (Wendberg & Sim, 1972). A group of children in this program had a natural advantage over those who were learning in a more formal environment. All children in this No-Preschool Group were eligible for the free-lunch program and were of the same low SES and lived in the same neighborhood as children in other groups. Even so, the No-Preschool Group in neither the kindergarten nor the first grade classes were DI programs or DI representation procedures used. The No-Preschool Groups provided an estimate of the level of academic pro- ficiency of low SES children during the beginning part of their first year. Although the test data, because of the time of collection, did not tell whether these skills were established in the schools or were developed prior to schooling, they did provide a reference point against which the proficiency levels of children from the three preschools could be compared. As it turned out, the reading performance of the DI-trained Groups, especially the 1st-graders, in the areas of decoding words and comprehension, were markedly superior to those of the No-Preschool Groups. Conversely, the absolute scores in reading of the Head Start and Chil- deen reading programs closely matched those of the No-Preschool Groups on all academic measures and were statistically significant group differ- ences for this score, the scores for the No-Preschool Group and the 1st-graders were substantially higher than those of children from the three preschools.

WRAT and Related Flashing

The Wide Range Achievement Test (WRAT) (Jastak & Jastak, 1968) was given every program year to the BCDC children. In Figure 3, the average percentile scores from the WRAT were converted to conversion factors for each program year, the percentile scores for Reading were substantially higher than those of children from the three standard deviations above average) in the DI-trained 3rd-graders. Both the Head Start and Chil- deen programs essentially follow the structure of the programs of Bissell & Wengberg (1973). In all of the language, listening and speaking activities of the Chil- deen programs were taught through a unit-based cur- riculum, although the skills were of a rudimentary kind—counting, recogni- tion and naming of shapes, colors, numerals, alphabet letters, and some words for common objects. Fuller pro- gram descriptions are given in Sims and Wengberg (1982). In many respects, the goals and activities offered in these programs resembled those at the ECCDC.

A third comparison group consisted of children in the first several months of public school either in kindergarten or in first grade (comparing the kindergarten to several children, the revised program obtained a mean score of the first grading. The mean score of the first grading. The mean score of the first grading. The mean score of the first grading. The mean score of the first grading. The mean score of the first grading.
Preschool Reading (Continued from Page 16)

The G.E. in WRAT Reading for our 1st-grading ECDC children with two program years (N = 33) had been 3.8 (which was only slightly higher than the 3.65 G.E. in WRAT score for this age group and does not imply the children can read and comprehend the single books). Chief among the reasons for the higher G.E. is that our faculty, being a full-day preschool (the others were half-day) allowed for longer engaged-time in reading and more structured teaching. A more recent preschool, had the advantage of using improved DI programming materials and teacher presentation procedures.

The reason that DI-trained preschoolers are doing better in public school reading than most children know or are able to do them by the time they enter first grade or, in some cases, by the time they are taught them within the first several weeks of public school. These included the first three subscales. In Table 4, indeed, some may claim that these are not only rudimentary, but also functionally impaired for preschool the effective word-attack strategies (Carriile & Silbert, 1979). The reading, or that is by no means. Unfortunately, is never learners by an alarming number of children throughout their school years (Harmon, 1979).

Clearly, it is not a Group IV subskill category that distinguishes DI from Non-DI children, but rather the substance of word decoding. This contention is supported by parametric and nonparametric statistics, wherein no significant differences were found for the DI and Non-DI groups. For the first three subscales, either for the K-age or the 1st-reading age groupings, whereas the effects for Reading were significant (p = .0001) for each of the two age groupings. A significant between-age group (K-age vs. 1st-reading) effect was not found for the first two subskills, but the effects were reliable for Letter Naming (p = .0001) and for Reading (p = .0001). Letter Naming is not taught until the second year of Distar; thus, the K-age children and those in the 1st-read group with only one program year did not know many alphabet letters. The program × age grouping interaction was significant only for the Reading subscale (p = .0001).

The same pattern of WRAT subskill performance for the Distar groups in 1980 has been obtained for every evaluation year, especially provoking us to look for the decoding performance of the 1st-grade children with two program years. The first of 30 WRAT words, a total of 21 words should have been familiar since they were explicitly taught in Distar Reading (12 words from Level 1 and 9 words from Level II). Nevertheless, the preschoolers were able to decode a large number of never-presented words, such as size, weather, stalk, cliff, check, stuck, grammar, and library. The two-year DI-trained children had little trouble with three other word lists: the 232 Dolch sight words (Dolch, 1969), extending from primer to third grade, an average of 95 percent which were correctly read, and of the 375 words used by Durkin (1966) to identify early readers, 95 percent were correctly read. These findings suggest that the excellent decoding skills imparted to public school children by the Distar Reading program (Becker, 1977; Becker & Gorzynski, 1981) can be similarly generated with preschoolers.

Returning to the performance of the Non-DI groups, one might expect that these children, by virtue of being competent only in the rudimentary tasks, would rank relatively low with respect to their same-aged peers who comprised the WRAT standardization sample. Such is not the case. The average non-DI-trained child between 6 and 6½ years of age and about to enter first grade who obtains the raw score of 23.5 (Table 1) would place at the 47th percentile. This value compares favorably with the commonly reported 20th percentile found with disadvantaged children entering first grade (Becker et al., 1973). This favorable showing was replicated by the author with Head Start preschoolers, evaluated in 1982 (N = 88) and 1983 (N = 122) who placed, respectively, at the 42nd and 45th percentile.

That a preschool intervention program can be judged as a relatively successful project if normative data from the WRAT are used, even though its graduates are barely able to read, is possible because the skills tapped by the WRAT to gauge average first-grade reading performance are mediocre ones. Stated differently, entering first graders are not expected to be proficient at reading (not at spelling or doing written arithmetic problems). The literature on entry skills in early reading provides strong empirical support. Durkin (1966) found that less than 1 percent of 3,100 beginning first graders in California could read a minimum of 18 words from her 37-item list which consisted of words common to the primers of three basal readers. Evaluating almost 4,500 New York City children with the same list, 4 percent reached her word recognition criterion. Her select group of early readers were, furthermore, distinguished as having relatively higher IQ's (a median of 121 for the California group and 133 for the New York City group).

Evaluating the entry reading performance of over 1,000 disadvantaged urban Black children in New York City public schools, McCloskey et al. (1974) reported that only 4 percent could identify one or more words on the Detroit Recognition Test. Finally, in the nation-wide Head Start Planned Variation Primary Grade Achievement Tests

Although the amount of word recognition by preschoolers has been shown to predict later public school achievement in skills related to word meaning, and comprehension of sentences and stories (Durkin, 1974), the WRAT does not assess any comprehension skills. Thus, in our study, the reading comprehension skills was part of the DI curriculum, especially during the second year when the reading-nonreading nontransferred test was needed to assess these skills. Reading readiness tests were of no help since they also do not directly measure reading comprehension (Nurs, 1979). We, therefore, chose first grade or primary level achievement tests. For the first evaluation year in 1977, the Gotes-MacGinitie Test (Primary A, Form V; Gates & MacGinitie, 1980) was used, but since then the evaluation instrument has been the Metropolitan Achievement Test (MAT) (Durrett, Bixler, Whipplestone, Prescott, & Balow, 1971).

The median grade equivalent scores (G.E.) by MAT subscale for the 1st-grading ECDC children by program year are presented in Figure 2. (As with the WRAT, averaging was based upon raw scores converted to standard scores, from which the median G.E. and percentiles for each year could be derived.)

It is readily apparent that for measurement years the plotted G.E. either either are quite close or not differing from the first grade normative performance for the MAT. Just to single out the 1980 graduating class (given to Non-DI Groups), the corresponding percentile values by subject for the Distar children, E. W. was the 70th percentile for Word Knowledge (G. E. = 2.1); for Word Analysis, the 94th percentile (G. E. = 3.0); the 93rd percentile for Reading Stories and Stories (G. E. = 2.4); and for Total Reading (not shown in Figure 2), the 78th percentile (G. E. = 2.1).

The performance of the 1st-reading DI Groups seems remarkable in light of the fact that disadvantaged children are commonly found to be at least two or more months below grade level in reading by the end of first grade (see each of the control groups' performance data in Gray & Klaus, 1970; Miller & Dyer, 1975; and Morrison et al., 1971).
below-grade performance even occurs when they have been part of a preschool intervention project (Ramsey, 1978). The only published study this author is aware of which reported acceleration by beginning first graders on advanced reading achievement tests measuring comprehension was Dorkin’s (1966) select group of high IQ preschoolers who were taught reading skills at home.

Since the MAT contains a multiple-choice format, the raw scores of all groups from the 1980 between-group comparisons were examined to see which ones exceeded chance peripherally. Not surprisingly, both those children at the K-age and 1st-grade levels from the N-DE Project group (own) and answered at chance level on each subtest. Answering according to chance is not only one dictated by an examined for a large proportion of 90% Black first graders from five Southeastern states when they took a primary grade achievement test during the first few months of public school.

In contrast, the raw scores of the 1980 K-DE DI trained children exceeded chance on both the four-choice, 35 item Word Knowledge subtest, averaging 14 correct on a chance base of 10.85. The 25 correct items on Word Analysis and 34 correct items on Word Analysis. The K-age children, however, answered at chance level on the three-choice, 64-item Reading Sentences and Stories subtest, averaging only 11 correct items. The K-DE DI children, however, exceeded chance, averaging 26 correct items.

The answering profile of the 1980 K-DE DI group indicates that 75% of the K-DE DI children from the other program year at the ECDCD did not on the MAT. The MAT contains a total of 86 questions that ask children to decode words, as selected by the Word Analysis subtest (selecting the same word on a random basis) and on understanding simple vocabulary items, as reflected by the Word Sentences and Stories. The items in Word Sentences and Stories are selected from a list of 500 words that best identifies an aspect of a given picture). They have a harder time with more difficult reading comprehension items, as manifested by sections on Reading Sentences (selecting the sentence that best describes, or implies the meaning of a pictured scene) and on Reading Stories (selecting the word or phrase that answers a written comprehension item based upon a short reading passage).

It cannot be said that the K-DE DI children have the full complement of decoding skills to tackle any word. Having completed the program year, they have not yet learned to distinguish between long and short vowel sounds in many words. They are not familiar with the sounds made by many letter combinations (e.g., a, d, t), and they have not been taught capital letters in words containing these letters will cause problems, particularly to those who are dissimilar to their lower-case counterparts. All questions are phrased within the special Distar orthography containing macrons, joined letters, and so forth, the regionally orthographic inherent in primary grade achievement tests is likely to be troublesome.

The K-DE DI children are further limited since the first year of Distar Reading stresses reading for accuracy rather than for speed. Thus, they often do not finish all of the items on the MAT subtests that are verbal: namely, Word Knowledge and Reading Sentences and Stories. The items they do attempt, however, are more often done correctly and, if one looks at the items completed on Sentences and Stories, they are correct on 42 percent of those attempted, as opposed to only 28 percent correct when scoring is based on all of the subtest items, whether attempted or not.

Not only are the K-DE DI children penalized for taking their time to decode words, many of which are irregular, their knowledge and reasoning the meaning of many MAT words. They are not likely to know the meaning of special

favorite, lick, pasture, flat, best, and study right away, and they may not know what certain idioms mean, as in to catch a bus, water meets land, and so on.

Although they can cope with straightforward comprehension items, they are less able to deal with those items that involve symbolic and inferential-based comprehension items that bring into play much outside-informed children relationships, as in, “I bring letters to your home. I wear a uniform. Who am I?”

All is not lost, however, for the K-DE DI children. The 1st-grade children were in the same exact predicament as the K-DE DI children all before they got another year of Distar training. Fortunately, during that second year their promising decoding skills were enlarged to include a broader set of words and they were taught to read with increased fluency, speed, and expression, both during years and during independent reading activities. The greater stress on the second reading skills is clearly in developing comprehension skills, aided by the Distar Language II program which forms more complex syntax, semantic relationships, and an enlarged vocabulary, basically helping them to think more and meaning. No doubt the phonetically-based spelling components of the Distar program, combined with the opportunity to express their thoughts on paper, prompted some of the growth in decoding, as illustrated by the ones in Figure 3.

Interestingly, the one versus Two-Program Years results are similar in that both the children from the ECDCD who took the MAT, 12 and 31, respectively, completed one and two years of Distar Reading. As revealed in Table 2, length of program participation has a major effect on MAT outcomes. The standard differences between the one-year and two-year children are significant for every subtest and for Total Reading (p < .001). The absolute differences in subtest grade scores, from 0.8 to 1.0 points, are what one would expect to find in a one-year training in reading. Both groups are highest in the decoding based Word Analysis subtest, again lending credence to the power of the Reading program to teach this skill.

It is not the case that those with two program years of Distar Reading were "smarter" than those with only one year. The two groups were neither significantly different from each other in either entry Slosson IQ’s or entry WRAT scores. Furthermore, after each group had one program year, they were similar in WRAT achievement in Reading, Spelling, and Arithmetic, and in IQ.

The Future

Although there is no answer to the question, whether educationally at risk preschoolers can be taught advanced reading skills in the affirmative, the more nagging and not as easily researched question of “what happens to the graduates” is currently being pursued. We are finding that our preschoolers learn how to read in the first grade but they may not know how to read well enough to be able to read in the first grade even without any problem. Our concern rests with those leaving with only one year of Distar Reading, are they, as a public

![Figure 2: Median grade scores of first entering ECDCD children on end-of-first grade reading achievement tests. For the Gates-MacGinitie (Form 2), the equivalent end-of-first grade score at the 50th percentile is 2.2 for Vocabulary and 1.9 for Comprehension. Comparable values for the MAT subtests are 1.0 for Word Knowledge; 1.7 for Word Analysis and for Reading Sentences and Stories; and 1.8 for Total Reading (not shown).](image)

![Figure 3: Original story written by a 5-year-old girl attending the ECDCD for almost two years (Jason is a classmate and Kathy is her teacher).](image)
By James Enoch

Editor's note: James Enoch is the Assis-
tant Superintendent at Modesto Public 
Schools, California. Dr. Enoch has 
recently been recognized by the critic 
for his work in improving the quality of 
education in the district.

Restoration of Standards*


The Modesto Plan

By Linda Carnine

* Excerpted from paper presented at the October 15, 1981 conference "Improving Instruction in High Schools: a workshop for Secondary School Administrators," Eugene, Oregon. As an aid to this address, Dr. Enoch took time to thank Virgil Rankins and co-workers for the JS program that was an important ingredient in Modesto achieving its goals of higher standards.

1967-70, every indicator of quality education nearly disappeared. During the next 5 years, our schools respectable bar graphs (academic per-
formance, attendance, violence, vandal-
ism, etc.) and turn them upside 
down.

Today we have them going in the right direction again and we are getting better each year. In 1982-83, nearly 80% of all our students were at or above grade level in reading and math on the Comprehensive Test of Basic Skills. Our college-bound seniors are scoring 25-30 points above the national mean on the verbal and math portions of the Scholastic Aptitude Test. On the California Assessment Program mandated testing program for all California schools, our district is ex-
celling, by as much as 30 and 40 percent-
teile points, its expectancy bands on every area of the test at every grade level tested. Ninety-seven percent of our high school seniors pass a full battery of six competency tests and complete a re-
quired sequence of courses in one of three prescribed graduation plans.

In the critical area of what we call the Fourth R—Responsibility, we have reduced significantly vandalism and truancy.

The cost of vandalism during the most recent year was 30% below the year immediately preceding our program. We do not have serious discipline problems on our campuses. Assaults on teachers do not exist.

It is important to note that Modesto City Schools' 20,000 students do not come from a middle-class community in which such results are both com-

moneplace and easily attainable. Modesto is the fifth fastest growing com-

munity in the United States with a population of more than 150,000. Through much of the early 80's reces-
sion, Modesto's unemployment rate was second in the nation at over 20% and the high percentage of our students come from welfare homes; the percent of AIDC students was at the 92 percentile in California. We have a large and increasing number of limited English-speaking students. The socioeconomic index of our parents (a figure based on how to "make a living") is near the poverty line in the City Schools at only the 34 percentile in the state. These figures are mentioned in keeping with the notion that all this talk of reform and progress is all very well for those districts which have none of the prob-

lems they face. We still receive these figures from the State Department of Education. Sociology and economics is where we have stopped them taking seriously as predi-
cators of performance. After all, it was a long time ago that psychologists and instant sociology that got us in trouble in the first place.

A Modest Proposal

Early in 1976 we embarked on a pro-
gram which, we unashamedly conceded, represented a return to some fundamen-
tals we should never have abandoned. The program, "Academic Expectations and the Fourth R: Responsibility" was not conceived as a cure for our panacea. It was a modest proposal to get us back on the high road from which we fell. We wanted to get our Board of Edu-
cation to restore educational standards and the confidence of our clients.

We began in what may seem to some an anachronistic manner. We publicly documented our shortcomings (a euphemism for failure). Specifically, we recited the facts as follows:

1. The incidence of conflict, disruption, and crime in the nation's schools is growing at an alarming rate. This has been accompanied by a degradation in the academic performance of students.

2. The problem is becoming increasingly concerned.

3. There is no reason to believe that Modesto will be exempt from either the problems or the reaction.

We then proceeded to provide data which verified that, in fact, number 2 was upon us.

Once we had established that we were in trouble, and that didn't take much convincing, we presented our Board of Education with a statement of prin-
ciples. We had two purposes in mind. First, we wanted to get our Board on record in support of a significant change in philosophy and direction. In effect, we were saying, "If you can't fix the principles you'll find away unique you see the program we believe in.

Knowing full well that Board is better on ideas than practices, we expected and received their unanimous endorsement. (What else could they do after we had documented our failures just two weeks before?) Second, we wanted a clear signal to students, parents, and staff that we were about to sweep away a lot of conventional wisdom and we were going to do it all at once. No safe little pilot programs, no endless studies, no big committees seeking "input" and "feedback," no tinkering at the edges. One grand sweep. After all, no guts, no glory.

I would like to mention a few of these principles to give you a sense of the tone we wished to set:

1. It is essential that a public institution clearly define itself; to say unequivocally what it believes in and stands for.

2. In many school districts there is con-
siderable confusion as to the true mission of the school. We believe ourselves—over this matter of what we are about. And the Congress should not know where you're going. Lead, follow the herds.

So, we laid it all out in plain English: This is our program. We expect in be-

pact in behavior and academic perform-

cence. This is what happens to those who meet our standards. This is what hap-

pens to those who fail our standards. At regular intervals we'll tell you how we are doing. At the end of the year we will have a whole and at each school and each grade level. And these are the people who are the backbone of the district level and at each school. This process not only defines the institution for its clientele, but for its employees as well. It has been a useful guide to collec-
tive bargaining. We have avoided talking anything on the union's agenda, but we won't barter away our principles—what we believe in and stand for. We have not put anything on the Board's agenda, and we won't barter away our principles—what we believe in and stand for.

It also addresses one of the best kept secrets in America: Kids want adults to act like adults. One of the best things we have for going in education is that kids have a low tolerance for ambiguity. They want to know who's in charge. They want to know what's going on and the consequences. And they want to know that what's right and wrong today will be right and wrong tomorrow—even if ten parents show up at the Board meetings and say it isn't so.

2. The development of responsible adults is a task requiring community commitment, it cannot be left solely to the public schools.

We wanted to make two points with this statement, both of which led to specific programs we had in our package. At one level we wanted to re-
mind the community that schools are not the only public institution receiving tax dollars for the purpose of helping children. We were not getting the cooperation we needed. Instead of all the buck-passing, we were going to start asking police, the district attorney, the juvenile judges, the probation officers, and social workers to work with us. In short, we were tired of the all-purpose brushoff: "That's a school problem."

On a different level, we were challeng-
ing the unit to know what's expected of the community to outstanding students. As with most communities, there was a good deal of pretty mouth-music about the kind of young people we should en-
courage, but the real recognition was limited to star athletes. It is a kind of prolongation of adolescence on the part of adults who should know better. And the impressionable young are left with the impression that Saturday's hero is more significant than the Monday-through-Friday good citizen and scholar. In effect, we were asking the community to come up with priorities straight by getting their own straight.

3. The principal tasks of the public school community are the following: a disproportionate amount of time and resources must be given to maintaining order.

We wanted it clearly understood that there comes a point at which the schools must be able to say, "These few make it impossible for the many to continue." If we can't guarantee the safe-
ty of a child's person and property, we cannot be asked to be a model of a safe environment a child must have in order to learn anything. And that's our principal task. If children are going to be reasonably expected of us, get ready community we're going to show some of them the gate.

Continued on Page 20
Restoration of Standards

(Continued from Page 19)

4. Parents must consistently support the proposition that students have responsibilities as well as rights, and schools have an obligation to insist upon both. Let teachers and parents make it clear that schools are not nurseries to train young children to be forceful promotion of kindergartners; it's time for a little more discipline, right? Involved, responsible parents, constituents of students' rights and responsibilities provided by the Center for Law and Education at Harvard, we found an interesting consistency. Nearly every code had a specific and comprehensive schedule of student responsibilities, including detailed appeal procedures and committee structure. The section on student responsibilities was often more than a single paragraph written in general terms: "Students also have responsibilities." We had in place a little program which would link rights and responsibilities in such a way that you if your parents or teachers were present in the classroom.

5. High performance takes place in a framework of expectations:

It's a useful proposition to let people know what is expected of them. It is equally important that there be no confusion about what is expected. Failure to meet these expectations and the rewards if they are met. Mediocrity must not be accepted. Students who are not meeting the required standards must be held accountable.

6. There is nothing inherently undemocratic in requiring students to do things that are demonstrably beneficial to the community.

We wanted to make it clear that we did not count an impulse to decry or democracy to allow children, in the presence of the day, "to do their own thing." While it was once possible to assume that most students brought certain shared values with them to school, it is no longer so. Toward that end, this was to be our justification for a school program in which we believed. The school program is based on the belief that there are still some common values upon which reasonable people agree.

7. Finally, in order for a program to succeed, it must be left in place for a reasonable period of time and be assured of continued support despite periodic criticism and the lure of faddishness.

We expected criticism from those with periodic criticism and the lure of faddishness. But above all, we have a challenge to our Board. We knew there would be those long nights when parents and students would doubt the wisdom of our decisions. For the considerable rhetoric about school reform, parents tend to view the restoration of standards in much the same way they view religion—it's good for the other people, but I didn't think you meant me.

Many see the program, and just as the statement of the problems led the Board to the principles, the endorsement of the principles insured the adoption of the program.

It is important to note that while the program was in its infancy, it was not developed in a vacuum. The program was in its infancy, it was not developed in a vacuum. The program was designed with the input of parents, students, teachers, and administrators.

Note: For more information regarding the mechanisms of the Modesto program, e.g. the Special High School Graduation Plan, written Student Council Code, Active Control of Truancy, etc.—contact:

Dr. James Enoch
Modesto City Schools
626 Locust Street
Modesto, CA 95351

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Correction: Reading (Decoding B) was held, with students reading in turn:... Suddenly all the people stopped joking around. Everything was quiet, except for the sound of logs on the fire. Then Thin Jim said, "We all had a few drinks before your birthday, but we're the ones who had the party. We used to be a bunch of old people, just sitting around here. But you showed us that we can still laugh and have a good time. We've got a lot of fun left in us." Thin Jim began to choke. He had tears in his eyes.

Somebody yelled, "Let's hear it for Salt, Hip, hip, hooray! Hip, hip, hooray! Hip, hip, hooray!" Tony never forgot the sound of those people yelling, "Hip, hip, hooray!" at the top of their lungs. He never forgot the look of joy in their eyes.

All who attended the ceremony (including parents and school administrators) will never forget how "seriously" each student took the event: downtown, attentive behavior, with a look of pride as a Certificate was handed to him, with words of commendation by Guenther, Peggy McLev (consultant) and John Thorp (principal).

The enthusiasm for the direct instruction methodology is well based according to Pat Guenther and Don Hanson (Whitman), who share the following about their students enrolled in reading and spelling classes:

* Students are now more confident to read aloud; five of Pat's students have volunteered to read the Pledge of Allegiance over the school intercom.

Continued on Page 21
Research on Class Size

By Kathleen Cotton & William G. Snavard
Northwest Regional Educational Laboratory
Portland, Oregon

Author's Note. This report is one of several in a series of reviews of research literature conducted for the Alaska School Effectiveness Project. Each of the reports addresses a topic which is deemed to have an impact, actual or potential, on school effectiveness. This report is not intended to represent the "final word" on the topic considered. Rather, it represents the analysis of a particular collection of research documents at this time. There may be other documents that were not found because of time or other limitations. There may be new research published tomorrow. This present report, reading, spelling, and test indices of available information at this time. This format allows for modifications and re-interpretations of the studies, new information, or availability of new information.

Overview

The relationship between class size and educational outcomes is a contentious and much-investigated subject. Many educators, parents, students, and others argue that small classes result in higher achievement and better teacher and student morale than do large classes. This contingent contends further that these superior outcomes justify the higher costs associated with operating small classes.

These views are countered by the arguments of other groups both within and outside the educational community. Some claim that smaller classes do not necessarily promote better learning and learning environments. Others argue that, even if smaller classes are best for all students, they are simply too expensive.

In both of these sizable camps are people who speak from personal preference, others who argue from experience in educational settings, and still others who cite research findings in support of their point of view. There is no doubt that operating small classes is more expensive than operating large classes. Before considering cost factors, however, it is important to ask what is known about the relative merits of small and large classes as regards their effects on achievement and other educational outcomes.

Considerable research effort has been devoted to studying the relationship between class size and: (1) academic achievement in various subjects and at various levels; (2) student behavior/attitudes; (3) teacher morale/satisfaction; (4) instructional methods; (5) classroom group dynamics; and (6) the effects of small classes on socialization. While many well-designed and carefully conducted studies have been published, an individual seeking to extract meaningful conclusions from the class size research confronts several problems. Small classes are often defined as those limited to five to twenty students, a range that makes difficult the task of examining the relationship in one another. Some studies draw conclusions about the relationships between class size and achievement. For example, while studying the influence of other important variables on the outcomes noted. Some researchers do draw conclusions about the effects of class size generally, even though data are drawn from only one grade level. These limitations notwithstanding, some patterns do emerge from the research on class size, and these are presented in this paper.

Thirty-five documents on class size were examined. Fifteen of these were excluded, either because they were judged invalid or were not reports of research at all. Of the 20 valid studies which remained, 15 were primary sources and five were secondary sources. Ten were concerned with the relationship between class size and academic achievement in one or more areas, five examined class size in relation to one or more aspects of educational environment, and five looked at the effects of class size on both achievement and environment. Seven of the studies/reviews involved elementary students, two involved secondary students, six were concerned with both levels, and five did not specify the age/range studied.

Findings

The studies reviewed suggested three hypotheses:

1. Small classes have a positive effect on the academic achievement of elementary and secondary students.
2. Small classes have a positive effect on student attitudes and behavior, teacher morale, classroom processes, and other indicators of the quality of the classroom environment.
3. There is no optimal class size for all instructional situations. Appropriate class size is dependent on student age/grade, student aptitude, subject taught, and instructional methods used.

Each of these hypotheses has considerable support, but the third hypothesis—that there is no optimal class size in isolation of other factors—is supported by both the largest number of studies and the largest number of high-quality studies. This means that the research to date tells us that reducing class size (or, for that matter, increasing it) will not automatically produce any particular, foreseeable result. Other factors, such as the instructional methods used in a class of a given size, are as important or more important than the class size itself.

However, although a certain class size cannot be expected to lead to any particular outcome in general, the research does suggest that small classes can be beneficial in certain situations. There are indications, for example, that the achievement of disadvantaged, low-ability, special education or primary age students is enhanced by smaller classes. Very small classes, those with five or fewer students, appear to produce considerably higher achievement than average size classes, although the evidence is not always clear. This has emerged chiefly from studies of small classes in experimental situations. Some studies found both that smaller classes are beneficial and that large classes—especially very large classes—are detrimental.

The larger issue concerning the relationship of class size to various indicators of the quality of the educational environment is whether the results of the studies reviewed found better student behavior, higher teacher morale, and better classroom processes in conjunction with small classes. Moreover, the non-research writings examined indicated that students and parents generally preferred smaller classes and that teachers overwhelmingly preferred them.

Preschool Reading

Table 2

Mean MAT Subtest Scores of First-Starting Children with One versus Two Years of Distor Reading

<table>
<thead>
<tr>
<th>No. of Program Years</th>
<th>Type of Measure</th>
<th>MAT Subtest</th>
<th>One (N=12)</th>
<th>Two (N=31)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Word Knowledge</td>
<td>Mean S.S.</td>
<td>33.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mean G.E.</td>
<td>1.9</td>
<td>2.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mean %ile</td>
<td>28th</td>
<td>72nd</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Word Analysis</td>
<td>Mean S.S.</td>
<td>37.2</td>
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<tr>
<td></td>
<td></td>
<td>Mean G.E.</td>
<td>1.7</td>
<td>2.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mean %ile</td>
<td>46th</td>
<td>82nd</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reading Sentences and Stories</td>
<td>Mean S.S.</td>
<td>31.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mean G.E.</td>
<td>1.4</td>
<td>2.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mean %ile</td>
<td>22nd</td>
<td>88th</td>
</tr>
<tr>
<td>Total Reading</td>
<td>Mean S.S.</td>
<td>32.1</td>
<td>49.1</td>
<td></td>
</tr>
<tr>
<td>Total Reading</td>
<td>Mean G.E.</td>
<td>1.5</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td>Total Reading</td>
<td>Mean %ile</td>
<td>23rd</td>
<td>88th</td>
<td></td>
</tr>
</tbody>
</table>

* S.S. = Standard Scores; G.E. = Grade Equivalent Scores; %ile (or %ile) are based on an end-of-first grade norm group.

Footnotes

The author is indebted to all of the ECDC teachers who taught so well to make the children proficient at reading and so eager to succeed at it.

By giving our pre-first graders a primary level achievement test so that it is comparable with their functional reading skills, we have followed the suggestion of Hart, Tallal, and Wood (1973). We realized the problem of discriminating from primary grade-based receptive data for pre-first graders if anything, we are applying very strict standards to assess the children's achievements.

References


“TECHNOLOGY AND EDUCATION”

MARCH 2—3, 1984
TWO LOCATIONS: Spalding Hall, Lewis-Clark State College Campus, Lewiston Idaho
Ed Minster Student Union, North Idaho College Campus, Coeur d’Alene, Idaho

** OTHER TOPICS **
WORKSHOP: Precision Teaching Essentials
WORKSHOP: How To Turn On Your Micro
WORKSHOP: Software Evaluation
SESSION: DI and the Politics of Reading
SESSION: Microcomputer Report Writing
SESSION: Secondary School Behavior Management
WORKSHOP: Corrective Math
WORKSHOP: Spelling Mastery
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** DISPLAYS **
Microcomputer Hard & Software Instructional Materials

Dr. Alan M. Hofmeister, Dean, School of Graduate Studies and Associate Vice President for Research at Utah State University, Author of Micromicrocomputer Applications in the Classroom. Dr. Hofmeister’s presentation “Microcomputer Applications in the Schools” is appropriate for all school personnel - administrators, teachers, parents, and community members.

Dr. Randy Sprick, Consultant and Assistant Professor for Special Education and Educational Psychology at The University of Oregon. Author of The Solution Book: A Guide to Classroom Discipline. Dr. Sprick’s presentation “Solutions to Classroom Discipline Problems” is appropriate for both elementary and secondary school personnel and parents.

THE NINTH ANNUAL SPECIAL EDUCATION CONFERENCE

The Ninth Annual Special Education Conference will address issues of concern to a broad range of educators related to “Technology and Education.” As elements for this conference the following major areas will be discussed in a wide variety of short, small group workshops and two longer large group addresses:

1. Behavior Management — Classroom management as a major concern of educators will be addressed by Dr. Randy Sprick in large group presentations and by several other speakers in small group workshops. Behavior management as a technology is perceived to be the systematic arrangement of environmental (classroom) variables in order to change student behavior. This includes both variable which occur before as well as those which occur after the student behaves or misbehaves.

2. Direct Instruction — The development and continuing evolution of Direct Instruction as the single most effective and efficient teaching strategy available to teachers will be discussed in small group workshops. The emphasis during these workshops will be on skill and competency development rather than issues discussions, although some treatment of the philosophy will occur.

3. Precision Teaching — Precision teaching is essentially a monitoring and data display strategy designed to aid the teacher in instructional decision-making. The charting of rate data for correct and error responses provides the information necessary for predicting when a student will arrive at mastery — a tool necessary for planning annual goals and intermediate instructional objectives.

4. Microcomputer Applications — The application of microcomputers in the classroom is the final technology that allows the other maximum effectiveness and efficiency. The recordkeeping and student data management capabilities of computer managed instruction (CMI) free the teacher to spend more time working with students. The simulation and drill-and-practice potential of computer assisted instruction (CAI) provide additional instruction resources for the teacher.

For more information write or call
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An Approach to Mainstreaming – The Teacher Consultant

By Charles Arthur
Winchester Public Schools, Mass.

In working with special needs children for over eleven years, I have come to the conviction that the teaching of all children should receive the same attention, not more services to special needs children than what is now being provided for other children. This is stated without discounting the dedicated, hard work that is now being expended in most schools. The fact of the matter is there presently exists two highly researched and developed kinds of programs that are scarcely used in the greater Boston area schools. If these programs were put to use, striking improvements in the results and costs of teaching special needs children would occur. This could mean a reduction of level of learning; perhaps, it could even allow for cut backs in some areas of special education programs.

One class of programs falls under the heading of Direct Instruction. These have been developed over the last 19 years by Engelmann, Becker and others. They include the DISTAR Programs for the primary grades and the Corrective Programs for grade four and above. Most of these programs have been extensively used by special needs children, along with children identified as learning disabled. Other, and have proven to be very effective in providing the kind of instruction that many special needs children, along with other children, could receive in the regular classroom.

It is not unusual to hear about alternative curriculum programs in regular classrooms on the secondary level, but it is unusual to hear of it in the elementary school. Perhaps this is due to the fact that it is easier to use for low functioning children in regular classrooms along side the regular curriculum.

The other kind of program that can have this same impact deals with classroom instruction. This program is called Direct Instruction. This is also a set of programs.

These programs were developed and researched by Hill Walker and his associates at the University of Oregon. (See ADJ News, winter, 1982.) They include several well planned, rather sophisticated, direct instruction procedures that focus on some of the more frequent behavior problems present in classrooms.

These programs have also been carefully developed over the last 15 years. They have been tested at each step of development and have finally been put together into four detailed standard treatment packages. The are the most highly developed examples, that I know of, of behavior modification procedures for classroom use. The unique aspects of these programs are that they are contained in every detail, well tested in the final form, and are mainly designed for regular classrooms. Variations, however, can be applied to other settings.

I think that one of the major difficulties in putting either of these programs to use, and possibly one of the reasons they are not in wider use, is that, in order to gain the most benefit from them, they must be used in the regular classroom. In order to gain their full potential, the teacher needs extra help in setting them up and carrying them out. For some of the procedures, this may be quite extensive in the early stages. This means that a special needs staff member, or other trained staff member, must be able to spend more time in the classrooms. Most existing staff members are not able to spend this amount of time in the classrooms. Therefore, until some transition takes place, additional staff needs to be hired to some extent for this purpose. However, the cost of setting up and sustaining classes of students as long as they are effective, is still less per student than the cost of carrying on out programs that require more staffing.

The additional staff member, whether it be a student aide, a paraprofessional or a case-by-case basis, would work as a teaching consultant and specialist in these provides training to do this. A concentrated amount of time would be provided at the early stages of the development and it is needed to gain the initial changes in behavior with coaching. In the second stage, this would mean establishing and helping carry out pilot programs in group classrooms.

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Class Size

(Continued From Page 21)

Class Size

Recommendations

1. It would be advisable to reduce or increase class size generally in hopes of producing any particular educational objectives. The kinds of instructional methods appear to work better with—or are only possible in—smaller classes. Following the recommendations of several researches I would recommend devoting attention to improving instructional methods, rather than altering class size in general.

2. However, operating smaller classes for academically needy and younger students appears beneficial, and school are advised to make possible smaller instructional settings for such children if resources are made available to do so.

3. Additionally, since small instruction within large classes, it is recommended that schools consider ways to make small group instruction available, especially to academically needy children, for some portion of the school day. Use of aides as small group instructors, for example, could occur simultaneously with larger group activities.

4. It is not recommended that additional research on class size be initiated—at least in the kinds of research conducted to date—it is likely to produce more of the same contradictory results.
Time Management for Teachers

By Mary Meier

Editor’s note, Mary Meier has been a DI teacher for eight years. Currently she is teaching language arts and math at Kennedy Middle School in Eugene, Oregon. She is a co-author of books A and B of Mastery Spelling. In her free time, Mary enjoys swimming, reading, and bird watching.

Back in 1977 I saw an advertisement for a workshop on time management techniques. The ad listed “bankers, salespeople, managers, and administrators” but nowhere did it mention teachers. At the time I thought, “Teachers make as many executive decisions in their classrooms as any manager who runs a department with 25 or 30 employees.” So I registered for the class and over the past six years I have found a way to apply almost all of the principles which I learned during that workshop.

1. No one has enough time, but everyone has all the time there is. This cliché accurately describes the dilemma of people in positions of responsibility. Since your required tasks always exceed the time you have to accomplish them, you must give yourself limits. Decide exactly how much time you want to devote to your work. You may decide to go beyond an 8:00-4:00 day but set a limit nonetheless. When I first started teaching, I was willing to work until 6:30 or 7:00 on a weekend, but I made a rule never to work on the week-end. Some people stick to 8:00-4:00 each weekday but set aside Saturday morning for work-related tasks. Now that I am more experienced and make more efficient use of my time, I set the limit at one extra hour per day.

2. Set priorities. When you have established a finite amount of time in which to accomplish your tasks, set priorities. Even though the most important task may be boring or inconvenient, do not allow it to become distracting. Start with the most important task before you and work at it until it is completed. Then go to the second most important task. This technique is probably the simplest most powerful tool you can learn.

3. Know when to cut your losses. If a lesson did not go well, if you assigned too much written work and you simply cannot correct it all, if your bulletin boards say “Happy Halloween” or a very important task.

4. Keep all your information in two locations: A small file folder and your lesson-plan book. When you go anywhere, take your lesson-plan book. When you go to a staff meeting, take any handout. I read them, transfer any dates or appointments to your lesson-plan book and throw the paper away!

5. Get together with a colleague and agree that, for example, you will order the health files if he or she will preview the new workbooks. When your principal asks you to do a task which is part of his or her job description you can simply say, “I don’t feel that this task is part of my responsibilities as a teacher.” Obviously, if the principal insists that you take it on anyway, then you may be stuck, but it’s remarkable how often a principal will acknowledge that what he or she is asking is inappropriate.

7. Work smarter, not harder. Using these techniques will allow you to work more efficiently, accomplish more of what you want to accomplish and be able to truly enjoy your leisure time. You’ll be accomplishing the important rather than the urgent and your effectiveness should increase significantly.

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