Non-Profit Organization
U.S. Postage Paid
Permit No. 122 – Eugene, OR

ADI NEWS

Volume 5, Number 1 | Association for Direct Instruction, P.O. Box 10252, Eugene, Oregon 97440 | Fall, 1985

Annual ADI Excellence Awards

By Wes Becker

Awards for excellence in contributions to the application of DI technology to education were presented at the 11th Annual Direct Instruction Conference for excellence in administration, teaching, and supervision. The award committee did not make an award for excellence in university level teaching and research this year.

Excellence in Administration

This award was made to Phyllis Wilken, Principal of Garden Hills Elementary School in Champaign, Illinois. The presentation was made by Bob Dixon, co-author of *Morphographic Spelling*. The Garden Hills

PHYLLIS WILKEN

school had a high percentage of low-income and single parents with children who were not learning and showed many problem behaviors. When Phyllis was made principal, she instituted a program based on systematic use of behavior principles and Direct Instruction to provide consistent management and effective instruction throughout the school. Through visits to other schools, workshops, and inservice training, her teachers learned to implement a full range of DI programs and to focus on student progress as a primary guide to action. Parents became very involved in the school as they saw the changes. Almost every one attended PTA, and although poor, they raised money to help meet school needs. Parents also became strong supporters of the program at School Board meetings when the program was in jeopardy.

Although the Garden Hills students were well below district averages when the new program began (with expected performances in the 35th to 45th percentile range based on socioeconomic variables), they showed gains averaging .5 grade equivalents from September 1980 to 1983, with most grades averaging above grade level in 1983. They were above district wide-averages in 1985 in first grade reading, math, and language. At other grade levels they were close to or above national norms and above their predicted scores by an average of 15 percentiles.

These improvements are truly significant and are directly attributable to the leadership efforts made by Phyllis Wilken in training and supporting her teachers. She was always available, night or day, to deal with problems. She was involved and a leader concerned with what was best for kids. She is most deserving recipient of the ADI Award for Excellence in Administration.

Excellence in Teaching

The ADI Excellence in Education Award for Teaching was given to Rita Colton of San Diego, California. The presentation was made by Phyllis Haddox. I quote from her presentation.

"I first came to know Rita in the Fall of 1978 when she was a resource teacher for the San Diego Follow Through Project. I was the project manager representing the University of Oregon. Rita was assigned to assist me in the first training session in Distar Reading with teachers who had just learned that they had to change what they were doing. They were not happy. I saw that first day many attributes that make Rita an exemplary teacher—quiet competence and persistence even under adverse circumstances.

During the five years that I was directly involved in working with San Diego, there were many times Rita took a difficult stand to support the Project against forces in the District against the

Continued on Page 2

The Camden NJ Direct Instruction Project 1984-85

By George Brent
Glassboro State College
Nicholas DiObilda
Glassboro State College
Florence Gavin
Camden Public Schools

This report describes the rationale for the Camden Direct Instruction project and two studies that were completed by the project in the 1984-85 school year. The first study concerns the improvement of reading instruction. The second study concerns the use of Direct Instruction in "transitional classrooms."

Rationale: Choice of Intervention Strategy

Prior to 1978, behaviorally based improvement efforts in Camden, New Jersey had focused on changing teacher behaviors in classrooms that used a traditional, basal-dominated, instructional model. Adding systematic reinforcement techniques and precision teaching (Brent, 1977) to these classrooms helped accelerate student learning in a few areas, but appeared to have only minor effects on total student learning. It seemed that if the curriculum could be directly modified, student improvement would be much greater. But how to modify the curriculum significantly in a manner that was locally acceptable was not known.

Finally in 1978, Direct Instruction materials began to be used in an attempt to change the curriculum. The Direct Instruction materials and accompanying classroom management and teacher presentation techniques brought a promising systematic instructional program to Camden.

The choice of Direct Instruction to improve student learning was a difficult one to make since it is an intact system that forces many changes in traditional classroom practices (Gage, 1985). When new instructional materials are introduced to the classrooms, teachers must become familiar with the materials and learn the teacher presentation and classroom management skills that are specific to the new system (Siegel, 1977). New instructional materials can be the key to change, if they substitute materials proven to be effective for the traditionally used basals, but the content must be presented well if it is to reach the students.

The majority of instructional materials are often poorly designed (Collins, 1983; Engelmann, 1982; Silbert, Carnine & Stein, 1981; Holland, 1976) and rarely tested (Gall, 1981). Direct Instruction materials, on the other hand, have a clearly defined set of principles governing their design and the associated teaching procedures. Characteristics include ". . . . specifying objectives, analyzing the objectives into teachable component groups, identifying preskills, selecting examples and sequencing examples" (Becker & Carnine, 1980). The programs also feature small student-teacher ratios (during initial teaching), teacher-directed group instruction, signal systems, positive reinforcement, immediate corrective feedback, and extensive teacher training. The materials are highly structured scripts for the teachers and include a careful selection of examples for the pupils. Direct Instruction has been field-tested extensively and proven effective (Cotton & Savard, 1982).

The Direct Instruction system began in the early '60's (Becker, Engelmann, Carnine & Maggs, 1982). The most comprehensive use has been in the Follow Through Project. Here Direct Instruction has been used to teach reading, language, and mathematics to K-3 students. This application has been fully described and extensively evaluated. The Direct Instruction Follow Through Model provided the basis for the Camden Project. Due to a lack of resources, however, Camden has not fully replicated the DI Follow Through Model. Despite this deficiency, the Camden Direct Instruction Project has been able to achieve dramatic results. The discrepancies between the DI Follow Through Model and Camden's replications suggest that the level of pupil achievement reported in this paper can still be improved.

Reading Improvement Study

The Direct Instruction Reading Mastery basal series was used in a small number of elementary classrooms in grades 1-3. It was primarily used with small groups of low achievers. This analysis is based on data from the second grade students because standardized testing is begun at this grade level. Also,

Continued on Page 4

Atlantic Coast DI Conference

By George A. Smith
and Ed Shaefer
Nassau, Delaware

The First Annual Atlantic Coast Conference on Effective Teaching and Direct Instruction was a resounding success. Over 200 registrants participated in the four-day conference held July 7-10 in Delaware's Lewes-Rehoboth resort area. The keynote speaker, Jean Osborn, was accompanied by other nationally known presenters such as Geoff Colvin and Bob Dixon. Regionally-known presenters included Jane Feinberg, Paul McKinney, Will Proctor, Ed Schaefer, and George Smith. Also contributing to the success of the conference were Dee Patterson and Carl Haltom of Delaware's Department of Public Instruction. Without the help and support of these two individuals this conference would not have been a reality.

Thirteen workshops provided information and training on effective programs and strategies for: (a) teaching reading, language, math, and spelling to handicapped and non-handicapped students at all levels; (b) organizing and managing elementary and secondary classrooms; (c) adopting effective reading programs; (d) teaching and managing very low-performing and/or non-compliant students; (e) utilizing computers and associated technology; and (f) choosing, supervising, and administering effective teaching programs.

The Second Atlantic Coast DI Conference has been scheduled for July 14-17, 1986. Be on the lookout for the announcement in ADI News and come on over for some sun, surf, and Direct Instruction.

Annual ADI Treasurer's Report

Annual ADI Treasurers Report
By Wes Becker
This report is based on our financial status as of December 31, 1984.

INCOME

1. Memberships and subscriptions.		
a. Sustaining members	31	
b. Regular members	475	
c. Student members	82	
d. News only	408	
e. SRA News only	617	
SUBTOTAL	1613	$12,624
2. Book sales—Gross income		$10,083
3. Advertising		$1,936
4. ADI Conference 1984		$35,595
5. Handicapped Learners Preschool		$108,897
6. Summer school for 4-J problem kids		$5,000
7. Other		$1,339
TOTAL INCOME		$175,974

EXPENSES

Since our bookkeeping breaks expenses down by categories needed for our tax reports, I will not detail that, but rather show which activities earned money and lost money. Our total expenses were $178,242. Thus, there was a net loss of $2,768 for the year.

1. The net income from book sales of approximately $1900, along with advertising income, and membership income are the resources we balance against the

Continued, Bottom Col. 3

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 10252, Eugene, Oregon 97440. Copyrighted by ADI, 1985.

Editor . . . . . Wes Becker
. . . . . .
Associate Editors for Research. . . . . Ed Kameenui
. . . . . Russell Gersten
. . . . . Craig Darch
. . . . . Robert H. Horner

Departments
Teacher-to-Teacher . . . . . .
Administrator's Briefing . . . . . .
Dear Ziggy. . . . . Ziggy Engelmann
Analyses of Curricula. . . . . Linda Meyer
Software Evaluation . . . . . Douglas Carnine
Microcomputers and DI. . . . . Samuel K. Miller
Art Director . . . . . Susan Jerde
Layout. . . . . Wes Becker
. . . . . Springfield News
Photography. . . . . Arden Munkres
Typesetting. . . . . Pan Typesetters
. . . . . Springfield News
Printing. . . . . Springfield News

ADI Annual Awards

Continued from Page 1

Project. She often jeopardized her own position (all 90 pounds) fighting for her ideal of excellence—to insure that the children had the best possible instruction.

RITA COLTON

Rita had very positive influences on the teachers, aides, and children she worked with. Students who started out not speaking English often achieved grade-level performances and felt good about themselves. Teachers and aides felt more competent because they were. Rita has also had a strong influence on how teaching and teacher training is conceptualized in the district—firm, specific, sometimes critical, but always constructive and usually positive.

Last year, when Follow Through funding was reduced again, Rita volunteered to take a classroom. (The two other original resource teachers had already taken administrative positions.) She is back with the children and provides a beautiful model of excellence and ethical practice. I'm proud to have had Rita Colton as a colleague and as a friend."

Excellence in Supervision

The ADI Excellence in Supervision Award was given to Jean Robb from Kotzebue, Alaska. Jean's friends in Alaska put together a powerful set of documents describing all of her accomplishments. The award was presented by Randy Sprick, ADI President, who said in part:

"One reason for giving this award to Jean Robb is in response to the great efforts some people who work with Jean went to in telling us of her worth. They put together letters from superintendents of districts where Jean has trained, from community members talking about Jean's commitment to community service, from State Department of Education staff, from other trainers in the district, from parents whom Jean supervised, and from aides and teachers supervised by Jean. In all the documentation that was provided, it was clear that these are not just people who have a professional commitment to Jean Robb, but people who have a great deal of love for her."

Jean organized the training, management, and monitoring for the Northwest Artic School District. She helped to design adaptations of programs that were necessary for bi-cultural students. Peggy Peterson, a DI supervisor in Denver, writes:

"Jean had the knowledge base of the unique problems of staff and students, plus incredible insight into direct instruction, and came up with one of the best DI sites that I have worked with. I have worked in 40 of our states and Jean is at the top of the dynamic dozen, as I call them.

Jean has spent hours and hours and money for DI programs. She keeps her skills up to date. She brings in Consultants to solve specific problems. She sees that students and staff are rewarded for good teaching. She makes sure all the materials are there (no easy task because of her remote location). There is no doubt in my mind that she deserves the ADI Excellence Award."

Our best to a great leader and person! *Ed. note.* Be thinking of your nominations for next year.

JEAN ROBB

Treasurer's Report

Continued from 2nd col. above

cost of developing and publishing the ADI NEWS. We ended the year with a $2700 loss in this area.

2. The ADI Conference showed a "profit" of approximately $3000.

3. The Handicapped Learner Preschool showed a loss of about $3000. (The "Other income" above was from donations to support this school and is included in the balance.)

4. The Summer School for problem kids was a break-even affair.

We ended the year with assests (money and book inventory) of approximately $24,000. This gives us a secure base from which to contract for further issues of DI NEWS and to set up conference commitments.

ADI EUGENE CONFERENCE 1986 AUG. 4-8

A Report from Sydney, Australia

Teaching English as a Second Language with DI

By Kerry Giumelli
and Joseph Moore
Catholic College of Education
Sydney, Australia

Educators agree that children of non-English speaking background need to master English in the school-system. For example, in an article on "core curriculum" Musgrave (1981) asserted that migrant children in Australia must learn English to exercise their democratic rights and to develop interpersonal relationships with native Australians. While teachers may have no difficulty in agreeing with such statements, difficulties do exist in teaching so that students from non-English speaking backgrounds actually master English at the complex levels required.

Concluding their analysis of the relatively poor performance of migrant students in reading and numeration Bourke and Keeves (1977) stated that "more assistance" and "special assistance" must be given to migrant students "in order that they develop skills appropriate for their level of development".

The questions of what kinds of "assistance" in terms of teaching procedures, programs and skills that enable migrant students to reach appropriate levels of academic performance have only been generally answered for classroom teachers.

Kenny (1980) reported that the general consensus among Australian school authorities favoured the situational method of teaching English as a second language to migrant children, despite the fact that such E.S.L. programs have not been systematically evaluated.

The Sydney Catholic Education Office recommends a functional approach to E.S.L. teaching. The approach emphasizes:

1. The use of language appropriate to the occasion.
2. Motivation through success, i.e., children first learn language that is most relevant to their personal needs.
3. Receptive language as well as productive language in that children are exposed to language which contains unfamiliar words and is applicable to a situation. (E.S.L. Guide, 1981:1).

Children are to be given experiences and activities where they can use different forms of language according to their function. It is not a structured approach, but relies on teachers formulating a programme based on the children practising language used in common situations, as well as providing experiences to develop language competency. Such experiences include games, activities, role playing, riddles and collections of pictures, words etc.

Similarly, the recent New South Wales Department of Education (1983) E.S.L. support document states that language learning is most effective when students are motivated by a need to communicate within a meaningful context. Communicative approaches to language learning are recommended and teachers are encouraged to consider excursions, field trips, local community observations, simulation games, drama and role play to allow students to develop language.

Educators have also been trying to identify subsets of E.S.L. students for whom there might be unique approaches to teaching language. The Curriculum Development Centre (1979) stresses that "Learning English as a second language is not identical with developing English as a Mother tongue, because the learner is already competent in one language, has a different context for learning English, and usually starts at a different age. Therefore the native English speakers' syllabus is not an adequate vehicle for teaching English as a second language".

Additionally, Guest (1984) argued that "maintenance and development of the first language of non-English speaking children was crucial to the proficiency gained in English". Similarly, Thomas (1984) states, "It is much easier for the student to learn the English required to describe an already learnt concept than to have to learn a new language and concept at the same time".

Two general instructional preferences emerge from such statements.

1. Proficiency in English language is best developed using a non-structured approach building upon children's personal ideas and interests.
2. Particular subsets of learners need unique and preferred teaching approaches.

Both statements of preference can be evaluated in the light of research studies in early skills instruction in infants and primary grades. Several classroom based, large scale studies have indicated that highly structured instruction is more effective in promoting gains on standardized measures of language and other academic skills than non- or less-structured approaches. (Fisher, Berliner, Filby, Marliave, Cohen & Dishaw. 1980; Singer, 1973; Stallings, 1975; Stebbins, St. Pierre, Proper, Anderson & Cerua, 1977).

One structured approach to the teaching of early language skills is the Direct Instruction program Distar Language (Engelmann & Osborn, 1969). In common with all Direct Instruction programs Distar Language has the following components:

1. A consistent focus on academic objectives.
2. Explicit teacher presentation and demonstration of language concepts, operations and generalizable strategies.
3. Numerous opportunities for review, practice and integration of recently learned skills.
4. Completed lesson scripts indicating the exact wording to be used by the teacher for the lessons.

In Australia the program has been successfully used to enhance the language and intellectual skills of students traditionally classified as severely retarded (Maggs & Morath, 1976); moderately mentally retarded (Gersten & Maggs, 1982); Down's Syndrome (Clunies Ross, 1979); neurologically impaired (Maggs et al. 1980); disadvantaged (Maggs & Moore, 1978) and regular (Maggs, 1977).

One Australian study investigated the effects of the Distar Language Program with non-English speaking Greek, Yugoslav, and Lebanese children compared to a standard program of E.S.L. instruction. The design used was the quasi-experimental non-equivalent control group design; children were pre- and posttested on the Coloured Ravens Progressive Matrices, Peabody Picture Vocabulary Test, Assessment of Children's Language Comprehension, Boehm Text of Basic Concepts, Dailey Language Facility Test and the Baldie Language Ability Test. The data were analyzed using a repeated measure (2 x 2 factorial) analysis of variance followed by *t*-tests for significant differences between experimental and control group means. After 12 weeks of instruction the children in the experimental group (Distar Language) had made significantly greater gains than the control group (E.S.L. program) on eight of the eleven dependent variables including morphology, syntax, concept development and measures of expressive language (Kenny, 1980).

Recent research on classroom practice clearly does not support the effectiveness of non-structured language teaching in increasing student language outcomes as measured by standardized measures of language competence. Whether such approaches enhance language development in ways not assessed by these measures is both a logical and yet to be evaluated empirical question. Logically, one would have to defend an argument that language experience approaches enhance development of aspects of student language not covered in measures of intelligence, concept development, expressive and receptive language and linguistic processes (such as morphology, syntax, semantics). Such an argument has yet to be convincingly presented.

Research on the effectiveness of Direct Instruction also challenges the notion that different sub-sets of learners need unique and preferred teaching approaches. Rather, the picture emerging from the data is that teachers can select language programs that enhance the language competence of a wide range of learners. Instead of focusing on variables such as ethnicity and first language teachers should focus on the variables that can be controlled in the design of language instruction and classroom practices.

Given the quasi-experimental design of much of the classroom-based research, studies need to be replicated to demonstrate the effectiveness of Direct Instruction. Hence, the purposes of this study were to examine further the questions of:

1. The relative effectiveness of a structured and non-structured approach to early English language skills development.
2. The generalizability of a structured approach to teaching English language skills to children of non-English speaking background.

Method

Subjects

The present study involved 63 migrant children of Lebanese, Egyptian, Portugese and Vietnamese origin in two of three Kindergarten classes. Over 90% of each class are children whose parents were born in non-English speaking countries. The children came from working class backgrounds and attended an inner-city school listed in the Disadvantaged Schools programme.

The students were not randomly assigned but were placed in classes at the beginning of the year by administration staff. This was done according to alphabetical listing, whereby all children in Kindergarten were placed in alphabetical order, and the number in each alphabet position was divided evenly and placed in each class, e.g., if there were 8 children with surnames beginning with 'A' 4 would be placed in each class.

Design

The design used during the study was the non-equivalent control group design. The two classes used in the study were pretested using the Macquarie University Special Education Centre (MUSEC) Basic Language Concepts Screening Test. One class was used as a control group and followed a language programme developed by the class teacher based on Catholic Education Office and Education Department guidelines and inservice-course training. The second class was the experimental group and received language instruction by the class teacher using Distar Language 1. At the end of 20 weeks of instruction each class was posttested with the same MUSEC Basic Language Concepts Test.

Materials

The programme implemented with the *control group* used a variety of materials including games, puzzles, teacher-made worksheets and pre-reading activities. Lessons began with an oral component with the whole group for 10 minutes. The children were then given various activities to complete in order to practise what was discussed. These activities included: classifying, "picture talks", colouring, cutting, sequencing pictures, identifying, and discrimination activities. Some children received small-group instruction while the rest of the group completed independent activities. This programme relied heavily on a discussion of the different concepts based on children's experiences and providing appropriate situations to practise concepts being taught.

The children were encouraged to verbalise ideas, use standardised speech and were taught the meaning of concepts such as under/over; top/bottom;

Continued on Page 5

Camden NJ Direct Instruction Project

Continued from Page 1

the number of students involved in Direct Instruction is a large enough sample to study using conventional statistical techniques.

The grade 2 experimental students consisted of two distinct groups. One group had received instruction in Reading Mastery in grades 1 and 2 from inexperienced Direct Instruction teachers. These teachers were using Direct Instruction for the first time. The other group recieved instruction from experienced Direct Instruction teachers in both grades 1 and 2. The teachers had used Direct Instruction for more than one year. All the students in the control groups were in classrooms with experienced traditional teachers. The experienced teacher DI group had 32 students, the inexperienced DI group had 26, and the two traditional groups had 33 and 29 pupils.

All Reading Mastery teachers received a training workshop prior to using the program and several on-site clinical supervision visits.

Results

Students in the second grade were routinely tested in October and April with the Comprehensive Test of Basic Skills Level D, Form U. The test provided four scores related to reading instruction. They were Word Attack, Vocabulary, Comprehension, and Total Reading. Scale scores were chosen as the unit of analysis. The test scores from the April administration were analyzed using the October scores as a covariate. A separate 2x2 (treatment by years of teaching Reading Mastery) analysis of covariance was used for each of the four measures. With 1 and 120 degrees of freedom the F value needed for significance at the .05 level is 3.92.

Each of the four measures yielded significant differences in the two main effects and significant interactions. The Reading Mastery treatment was higher than traditional basal reader instruction. The years of experience treatment was significantly higher for teachers who had two years of experience with Reading Mastery than for teachers with one year of experience. However, an analysis of the interactions revealed that the Reading Mastery group taught by teachers with two years of experience accounted for the significant main effects. Post hoc comparisons with Tukey's HSD test indicated the two-year Reading Mastery group was significantly higher than the other three groups. There were no other differences between the group means. Results are presented in Table 1.

Table 1 contains the adjusted means, standard deviations, F values for interactions and the CTBS Norm Means for each of the four measures. The Table also contains the percentile ranks for the corresponding scale means. In each comparison, the Reading Mastery group with experienced teachers is significantly higher than the other three groups. The percentile ranks of the 2 year experienced teacher Reading Mastery group is near the national average while the percentile ranks of the other three groups is below. Though not presented here, an analysis of October means, gain means, and unadjusted April means strengthens the inference that the Reading Mastery was a more effective program of instruction for the experienced teacher group. The gain means and unadjusted April means follow the same pattern as the adjusted April means.

Table 1. Means, Standard Deviation, and Percentile Ranks on CTBS Reading

	Reading Mastery N=59		Basal Reader N=60		Interaction F	CTBS National Norm
	Experience 2 Years	+ 1 year	Experience 2 Years	+ 1 year		
Word Attack						
Mean	614	554	539	538	7.35	618
SD	85	70	92	86		
Percentile	48	21	17	16		
Vocabulary						
Mean	565	523	518	521	6.14	582
SD	57	48	47	73		
Percentile	40	22	20	21		
Comprehension						
Mean	581	499	505	491	7.01	578
SD	61	65	88	77		
Percentile	51	17	19	16		
Total Reading						
Mean	571	515	507	507	8.85	582
SD	52	50	65	69		
Percentile	44	21	18	18		

Table 2

Daily Schedule

8:30-8:40	Pupil Preparatory Period
8:40-8:45	Opening Exercises
8:45-9:15	Reading Mastery - Group I
9:15-9:45	Reading Mastery - Group III
9:45-10:15	Reading Mastery - Group II
10:15-10:35	Recess and P.E. (Gross Motor Skills)
10:35-10:50	Penmanship
10:50-11:30	Distar Arithmetic
11:30-11:35	Preparation for Dismissal
11:35-12:30	
12:30-1:30	Reading Mastery (all groups)
1:30-1:50	Recess and P.E. (Gross Motor Skills)
1:50-2:10	Distar Language
2:10-2:50	Unit Study (Sciences, Social Studies, Art, Music and Fire Prevention)

INSTRUCTIONAL MATERIALS

The instructional materials used for the transitional class are as follows:

Subject	Material
Reading	SRA Reading Mastery
Arithmetic	SRA Distar Arithmetic
Language	SRA Distar Language
Penmanship	Zaner-Bloser Penmanship
Social Studies	Unit Study (Curriculum Guide)
Science	Unit Study (Curriculum Guide)
Health	Elementary Health Guide
P.E./Motor Skills	Elementary Motor Skill Development Handbook

Art and music are integrated with other disciplines.

Transitional Classes

Transitional classes, alternatives to regular first and second grades, are designed to meet the needs of students who experience developmental lag and/or maturational lag. Because their development is progressing at slower than normal pace, they are unable to master a predetermined set of skills necessary for promotion. These students require additional time to acquire specific learning tasks.

Placing children in *transitional* classes achieves the following:

1. Provides more time for the instructional process to evolve.
2. Allows for a period of maturation.
3. Provides concentrated remedial instruction.
4. Removes the stigma of retention.
5. Reduces the number of referrals to special education.
6. Serves as an intermediate step for classified and declassified children.

The basic differences between regular first and transitional classes are methodology, class size (no more than 20), and pace. Skills are taught developmentally through highly structured and scripted instructional programs. The pace is geared to the needs of a particular group of students. A great deal of positive encouragement is given.

Students were chosen for the transitional classes on the basis of their kindergarten achievement, a system-developed checklist, and teacher judgment. The four classes were able to include 76 out of 107 identified children. The other 31 were placed in regular first grade classrooms.

The transitional classrooms were designed to reflect the Direct Instruction Follow Through Model. The classes focused on teaching reading, language, and mathematics using the SRA Distar materials. But due to a lack of resources, the classes could not completely adopt the Follow Through Model. Language and mathematics were taught to the whole group rather than small groups. Instead of 2 full-time aides, each class had one part-time aide. Teachers had much less training and supervision. A schedule and list of instructional materials is shown in Table 2.

Regular classrooms in Camden use traditional basals, one part-time aide, and have 25-30 students in them. The teachers use traditional classroom managment and teaching practices.

Promotion to grade 2 is based on the following guidelines:

Task	Criterion
1. Reading Inventory Test	- 75%
2. Reading Level Completed	-Primer
3. Reading the Dolch Primer list	- 100%

Results

Table 3 illustrates the promotion data for the identified low achievers. In the transitional class, 78% of the students were promoted. None of the low achieving students from the control classrooms were promoted. Although a true experimental study was not conducted, the results are so dramatic that the school system can say that the transitional class model is an unqualified success.

Discussion

The two studies in this report used Direct Instruction, a well-tested instructional system. Superior results were expected in Camden if the Direct Instruction programs were actually taught, i.e., taught as well as in the situations in which the programs were originally validated.

Continued on Page 5

Camden DI Project

Continued from Page 4

Table 3

Transitional Classes:

Total in Classes	= 76
Total Promoted to Second Grade	= 59
Total Going to Regular First	= 17
Improvement Greater than 50 Points on Reading Inventory Test	= 53

Regular Classes:

Total in Lowest Performing Groups	= 31
Total Promoted to Second Grade	= 0
Total Retained	= 31
Improvement Greater than 50 Points on Reading Inventory Test	= 2

As discussed above, Camden approached, but did not meet, the standards set by Follow Through. The student data correlate with the quality of the application. When the Follow Through standards are approached, student scores are highest. For example, student achievement with experienced Direct Instruction teachers was superior to student achievement with inexperienced Direct Instruction teachers. More precise measures of teacher performance than years of experience are available (Gersten & Carnine, 1982) but were beyond the resources of this project.

Recommendations

This report, last year's report (Brent & DiObilda, 1984) and published reports on Direct Instruction lead to the conclusion that for Camden, Direct Instruction is a system that accelerates elementary student skill acquisition in reading. The system works if the Follow Through implementation standards are met or at least approached. It works if used as intended.

The major reason for the success of the Direct Instruction system, in comparison with the traditional, is the use of instructional materials that are developed in accordance with effective design principles (Becker et. al., 1982). In other words, traditional textbooks are replaced with superior instructional materials. In addition, compatible and effective teacher presentation skills and classroom management practices are used. All parts of the system: materials, presentation skills, and classroom management practices must be used proficiently to achieve superior results. The outcome of the present study indicates that student achievement is higher with teachers who are more experienced with Direct Instruction.

Additional studies in Camden that compare Direct Instruction to traditional approaches are not needed if resources are limited. Camden resources would be used better to insure that the Direct Instruction classes meet, and then maintain, the Follow Through standards. Of primary concern are the following conditions:

1. Provide continued assistance to teachers so that they can reach proficiency levels in teaching Direct Instruction programs. With adequate training and supervision, teachers should reach proficiency in two years (Gersten & Carnine, 1982). Direct Instruction materials provide a clear presentation of concepts, but these are lost if they don't reach the students.
2. Allow students to have several consecutive years of Direct Instruction. Students starting Direct Instruction in kindergarten have an advantage that is reflected in later grades on standardized test scores (Becker & Carnine, 1980).
3. Emphasize the use of Direct Instruction for all students in a given classroom. The system works for low, average, and high students (Becker et. al, 1982). Teachers will have a better chance to become proficient if they can prepare for a single effective program rather than multiple programs.
4. Use Direct Instruction programs in several content areas. The Direct Instruction language and mathematics programs have not been used extensively in Camden, but national research data indicate that their use will result in increased student learning. According to the published research, the language and mathematics standardized test scores should exceed those attained in reading (Becker & Carnine, 1980). Also a teacher trained in one program can easily use others.

References

Becker, W.C. & Carnine, D.W., Direct Instuction: an effective approach to educational intervention with disadvantaged and low-performers. In B. Lahey & A. Kazdin (Eds.). *Advances in clinical and child psychology*. Vol. 3. New York: Plenum, 1980.

Becker, W.C., Engelmann, S., Carnine, D. & Maggs, A., Direct Instruction technology: making learning happen. In P. Karoly & J. Steffen (Eds.). Improving children's competence: Advances in child behavior analysis and therapy, Vol. 1 Lexington MA: Heath and Company, 1982

Brent, G., Precison teaching: principles and applications. *Education and Treatment for Children*, 1977, 1, 35-46.

Brent, G. & DiObilda, N. Camden, New Jersey Direct Instruction Project. *Direct Instruction News*, Fall, 1984, 4, 11;14.

Collins, M. Teaching spelling—current practices and effective instruction. *Direct Instruction News, Fall, 1983*, 3, 14-15.

Cotton, Kathleen, & Savard, W.G., *Direct Instruction*. Portland, Oregon: Northwest Regional Educational Laboratory, 1982.

Durkin, Dolores. What classroom observations reveal about reading instruction. *Reading Research Quarterly*, 1978-1979, 14(4), 481-533.

Engelmann, S., A study of 4th-6th grade basal reading series. *Direct Instruction News*, Spring, 1982, 1, 4-5.

Gage, N.L., *Hard gains in the soft sciences: the case of pedagogy*. Bloomington, Indiana: Phi Delta Kappa, 1985.

Gall, M.D., *Handbook for evaluating and selecting curriculum materials*. Boston: Allyn & Bacon, 1981.

Gersten, R.M. & Carnine, D.W., Measuring implementation of a structured educational model in an urban school district: an observational approach. *Educational Evaluation and Policy Analysis*, 1982, 4, 67-79.

Holland, J.G., A quantitative measure for programmed instruction. In J.G. Holland, C. Solomon, J. Doran, & D.A. Frezza (Eds.). *The analysis of behavior in planning instruction*, Reading, Mass.: Addison-Wesley, 1976.

Siegel, M.A., Teacher behaviors and curriculum packages: implications for research and teacher education. In L. Rubin (Ed.), *Curriculum Handbook*, Vol. 2. Boston: Allyn and Bacon, 1977.

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

ESL in Sydney

Continued from Page 3

up/down; the children participated in oral activities through picture talks and conversation as well as vocabulary building activities. The program was taught for approximately 30 minutes daily.

The *experimental group* was given the Placement Test included in the Distar Language 1 program to determine initial skill level. Thus, three small groups were formed, and taught the program for 30 minutes daily. Once differences between the three groups reduced, these were combined and the class taught as a whole for the remaining 12 weeks. A total of 120 of the 160 lessons in the program were taught.

The group used materials contained in Distar Language 1. This involved using the presentation books (A and B) during group work, the Story Book, and Take Home Book 1 (used at school as a written activity at the end of appropriate lessons). Concepts covered during this study were included in Lesson 1 to 120. They were *object identification*; *prepositions* (on, over, in front of); *tenses* (past, present and future); *polars* (e.g. full and not full); *plurals*; *classification*; *information* (e.g., days of week, months of year); *concept application* (generalised examples of the concepts taught).

The *language test* used was MUSEC Basic Language Concepts Screening Test. This test contains 94 items which test a range of objects covering *size* (e.g., big, wide, long, tall, widest, narrowest, short, small); *position and direction* (e.g., upside-down, closest, centre, under, over, front, bent, before, below); *quantity* (e.g., some, few, half, whole); *volume* (e.g., full, empty, more, less); *mass* (e.g., heavy, light); *temperature* (hot, cold) and *sets* (not, alike, different).

The MUSEC Basic Language Concepts Screening Test is not a standardised test and no reliability information was given. Therefore, the Kuder-Richardson Formula 21 (KR-21) reliability formula was used to measure the reliability of both pretest (reliability 0.9) and posttest (0.8).

Results

Table 1 presents means and standard deviations of pretest and posttest scores for both the experimental and control groups.

Table 1

Pre- and posttest means and standard deviations for experimental and control group subjects on MUSEC Basic Language Concepts Screening Test.

		Pretest		Posttest	
Group	N	$\bar{X}$	S	$\bar{X}$	S
Experimental	32	62.29	17.19	83.34	6.34
Control	31	61.1	13.97	78.19	8.23

The descriptive statistics in Table 1 show the similarity between the control and experimental groups at the time of pretesting on the dependent variable. The standard deviation values for both groups are large and suggest a considerable spread of performance on the 94 item test. The posttest standard deviation values are quite low and suggest that both language programs were able substantially to reduce differences between students in terms of the language skills measured.

In order to test for significant differences between the gains made by the two groups residualized gain scores were calculated using an SPSS program, Regression (Nie et al., 1975). The data were assumed to be in an ordinal scale and the Wald-Wolfowit non-parametric test for differences between groups was used (Hull & Nie, 1981; Siegal, 1956). The resultant value of z (-2.4119) has a probability of .008 and favoured the experimental group.

Discussion

The results of this study show that students taught by the Direct Instruction Distar Language 1 program demonstrated superior concept learning outcomes to students exposed to a more typical E.S.L. program. The development and use of E.S.L. programs is motivated by a belief that non-English speaking students need a unique instructional approach. The results of this study do not support such a belief—at least at the level of teaching beginning language skills to young migrant children. Both the experimental and control group programs successfully reduced differences between student language performance, and showed gains in concept development. Reducing differences between student learning outcomes, while also increasing such outcomes, is a considerable achievement especially for young naive language learners.

The findings of the study concur with those of Kenny (1980). Using a similar design Kenny assigned 32 non-English speaking Kindergarten students to either an experimental group (30 minutes per day of Distar Language 1) or a control group (30 minutes per day of the Tate "Oral English" Course). After 27 weeks of instruction the experimental group scored significantly higher on tests of Morphology and Syntax (Baldie Language Test), memory (Assessment of Children's Language Comprehension Sub-Test C and D) and the Boehm Test of Basic Concepts.

Results of this study are not definitive and the cautions that normally apply to the interpretation of results from quasi-experimental research apply here. Two more specific limitations of the research are: (1) the use of one dependent variable, and (2) lack of adequate descriptions of process variables.

One dependent variable (MUSEC Basic Language Concepts Screening Test) was used in this study. This decision was defensible in that the teachers chose not to add to the bewilderment of children in their first few days of schooling (and to the resultant demands on teachers) by assessing them on a large battery of tests. The test is valid in terms of the emphasis on concept development in both teaching approaches, but is not sensitive to other aspects of language development. For example the study does not present objective data on student's ability to verbalise in class and other school settings.

Continued on Page 7

Introducing two new Special Supplements to SRA's Reading Mastery program

Reading Mastery Seatwork
Reading Mastery Testing and Management System

These two special supplements are a direct result of suggestions that SRA has received from teachers like you... time and work saving ideas to help you —

Teach to mastery — easily, with greater confidence
Track each student's progress — conveniently, objectively
Provide practical, practice activities that are fun — without time-consuming preparation

Here's what each new product offers:

Reading Mastery Seatwork

Fun and motivating activities that reinforce and extend skills in Reading Mastery: Distar Reading I and II

Everything you asked for is provided.

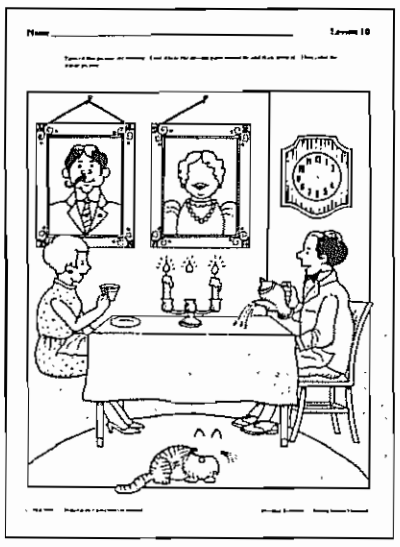
The special print (orthography), reading vocabulary and skills sequence are carefully correlated with lessons in Reading Mastery.

The blackline master format is convenient to use and saves you money.

Each book of 160 activities is a real work saver.

Activities are ready to use and require only minimal teacher direction.

Instructions are printed on each page.

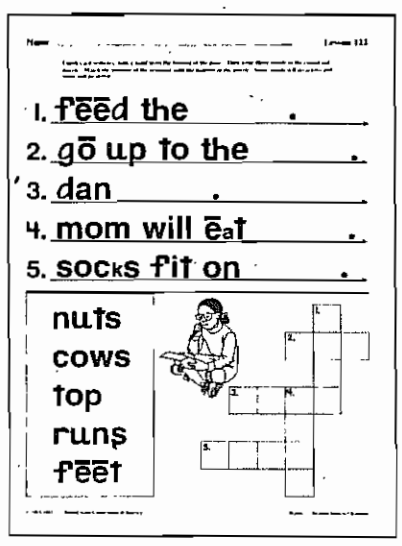


Skills include:

Decoding and Comprehension Readiness
Sound and Letter Identification
Word Identification
Sentence Structure
Literal Comprehension
Inferential Comprehension

Components:

1 Book of Blackline Masters (160 Activities) for each level



Reading Mastery Testing and Management System

Compact, easy-to-administer tests that students complete throughout the school year

Testing and tracking student progress couldn't be easier.

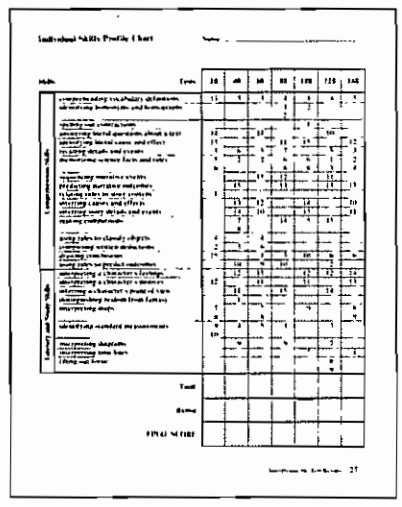
Testing begins with the placement test and continues with mastery tests after every 20 lessons.

Each paper-pencil mastery test is group-administered and requires only 20 minutes to complete.

By using test results, you can quickly identify the specific skills students have mastered.

The complete system helps you ensure continued success.

Each Student Book contains an individual skill profile chart for convenience in tracking student progress and showing minimum competencies.



The Teacher's Book contains charts that objectively measure individual and group performance... remedial exercises for students who need them.

Components:

Each test package contains 1 Teacher's Handbook and 15 Student Books

These products offer the outstanding quality you've come to expect from SRA. Order today and make Reading Mastery even more successful for you and your students.

SRA®

Mail this form to:
School Division, SRA, 155 N. Wacker Drive, Chicago, Illinois 60606

Qty.	Order#	Product	Price	Extension
_____	7-66110	Reading Mastery I Test Package	15.00	_____
_____	7-66120	Reading Mastery II Test Package	15.00	_____
_____	7-66130	Reading Mastery III Test Package	15.00	_____
_____	7-66140	Reading Mastery IV Test Package	15.00	_____
_____	7-66150	Reading Mastery V Test Package	15.00	_____
_____	7-66160	Reading Mastery VI Test Package	15.00	_____
_____	7-2071	Reading Mastery I Seatwork	24.50	_____
_____	7-2072	Reading Mastery II Seatwork	24.50	_____
			Total	_____

Bill To:

Date _____ SRA Account Number _____
Account Name _____
Address _____
City, State, Zip Code _____
Attention _____
Purchase Order Number _____
Telephone Number _____ Good time to teach _____

Ship To: (If different from billing address)

SRA Account Number _____
Account Name _____
Address _____
City, State, Zip Code _____
Attention _____
Telephone Number _____ Good time to reach _____

All orders are offers to purchase, subject to acceptance or rejection by SRA in Chicago, Illinois in accordance with SRA's published terms and conditions of sale. Prices are subject to change without notice.

- A Review -

DI Program for Affective Learning (PAL)

A Cognitive Training Curriculum
Teaching Positive Mental Health Rules
By Thomas R. Bingham, M.S.

Let your mind wander back to when you were in the fourth grade. Try to recall how you felt when somebody called you "Fatso" or "Chicken" or "Dummy" or some other such name. Or recall how you felt when you were accused of doing something you didn't do. How did you react to doing poorly on a test or thinking about giving a speech? How do you respond to events such as these now, as an adult?

Albert Ellis, the originator of Rational Emotive Therapy, pointed out a number of years ago (1973) that:

"Today, after inventing eyeglasses, radar, electronic calculators, and other perceiving-moving-thinking aids, he (man) rules supreme on this earth and is literally seeking other worlds to conquer . . . Only in the emotional area has man as yet made remarkably few advances. In spite of amazing progress in other areas, he is still not appreciably more emotionally mature, stable, and happy than he was in past centuries. Indeed, he is in some ways more childish, emotionally uncontrolled, and mentally ill than ever." (p. 18)

A common approach to helping people with emotional problems is to do psychotherapy with them. Apparently believing that prevention is better than cure, a number of recent authors have written curriculum materials to be used in the elementary school under the general heading of "affective education". Of the alternative materials available to them, readers of DI News may particularly like the Program for Affective Learning (PAL) reviewed here because, first, it appears to be a very good program, and second, it may very well be the only affective education program ever written utilizing direct instruction technology.

In the teacher's guide accompanying PAL, Thomas Bingham its author, acknowledges that Albert Ellis, the creator of Rational Emotive Therapy (RET), was a "great influence" on him. Much of the content of PAL seems closely related to a few of Ellis' now-famous "irrational" beliefs, including:

1. The idea that it is a dire necessity to be loved or approved by virtually every significant person in your life.

2. The idea that you should be thoroughly competent, adequate, and achieving in all possible respects if you are to consider yourself worthwhile.

3. The idea that certain people (including you) are bad or wicked, and that they should be severely blamed or punished for their deeds.

4. The idea that your unhappiness is externally caused, and that you have little or no ability to control your sorrows or disturbances.

PAL has a number of lessons themes related to each of Ellis' beliefs. For example, for Ellis' belief number one, the need to be loved and approved of, PAL includes lessons on: "Coping with not being liked or approved of", "Permission to be different from others", and "Coping with being called names".

What you do to deal with any problem is determined, of course, by your theory of what causes it. PAL's theoretical basis is shared by Ellis' RET and by most of the other cognitive psychotherapies, and is incorporated in one of the PAL lessons: "The relationship between what students think about a situation and how they feel about it". PAL's thesis was anticipated by Epictetus in the first century A.D. when he said that, "Men are disturbed not by things, but by the views which they take of them". PAL teaches children that it is what they think that causes their negative feelings, and that they can change how they feel by changing what they think.

PAL consists of three kits. Each kit is composed of components called "Games". Each game includes: (1) a preassessment instrument, (2) a lesson outline and sequence, (3) seatwork, and (4) a Post-assessment instrument. A helpful feature of these materials is that both assessment instruments and seatwork materials are reproducible. Each lesson is preceded by a short statement of the purpose of the lesson and a list of items to be placed on the board prior to the lesson.

The most unusual feature of these materials (and here the reviewer reveals his ignorance of DI technology) is the complete script of the teacher presentation, including the correct student response to be reinforced. Anticipating that some potential users of PAL might object that teacher scripts rob them of their opportunity to be creative, Bingham gives a number of reasons (which I assume would be familiar to ADI News readers) for providing them, the most important of which seems to me to be that the busy teacher will not need to devise a new teaching strategy for each lesson and can concentrate on childrens' learning, instead. Besides, Bingham points out, teachers will have plenty of opportunities to be creative when finding instances in students' daily lives in which principles being learned can be applied and reinforced. Teachers who wish to use PAL materials should begin with kit 1. In that kit, children learn the belief that "It's all right if you make a mistake, just try to correct it". An attempt is made to innoculate the child against the stress of making mistakes in learning PAL's (or any other) concepts.

Kits 2 and 3 include a number of other "rational" ideas, including: "What you think about something is the way you feel about it"; "When people don't like or approve of me all the time, I can still learn to feel good"; "The more time I spend blaming, the less time I have for feeling good"; and "Some people try to hurt others by calling them names. But I don't have to give them the power to upset me".

How effective is PAL? Bingham asserts that PAL will result in ". . . less blaming . . . less impulsiveness, destructiveness and belligerence . . . Name calling will decline . . . fighting and obstreperousness could be reduced . . . There is more willingness to try . . . Everyone will learn more". If PAL can, in fact, produce these outcomes, it certainly is worth using in the classroom. Unfortunately, I am not aware of any data that would substantiate Bingham's claims, nor does he provide any references. However, given the content of the program and the quality of the instructional format, it seems likely that PAL will prove to be an interesting and useful addition to a school's affective education curriculum.

Reviewed by
Gerald D. Kranzler
Professor, Counseling Psychology
University of Oregon

Reference

Ellis, Albert, and Harper, Robert, A Guide to Rational Living, 1973 edition, Wilshire Book Company, California.

Editor's note. I had planned to do a review jointly with Dr. Kranzler who is well known for his work in Rational Emotive Therapy. However, after reading his review I see a need to add only three notes. First, Tom Bingham does use Direct Instruction strategies that would be familiar to DI teachers. Second, I would love to see someone do some research with his revised program when it comes out. And third, Tom indicates that he is between publishers on his revision and that those of you interested in his program should contact him at 1921 Alta Vista Drive, Alhambra, CA 91803, Tele: (818) 282-7339.

ESL in Sydney Continued from Page 5

Information on process variables would contribute answers to questions such as the amount of group versus individual instruction, lesson pacing, provision of academic feedback, use of correction procedures, whether or not some concepts needed more examples and greater repetition. Although 30 minutes was scheduled for daily language instruction how much of that time was student academic engaged time? Did amount of academic engaged time differ between programs and within programs?

More definitive information on these variables and those relating to instructional design (sequencing of examples within concepts, across concepts, inductive and deductive strategies, cumulative review of learned skills within the experiential approach) would contribute to teachers' understanding of alterable variables (Bloom, 1980) and hence lead to more effective instruction.

This study adds to the considerable body of research which emphasizes the role of structured programs in increasing student competence in language and related academic skill areas. Traditional and contemporary preferences for non-structured, experiential instructional approaches in these areas are yet to be empirically verified. Additionally the results of this and other studies of Direct Instruction Language programs suggest that persistent attempts to identify subsets of learners in terms of ethnic and social background criteria, in the assumption that they need unique and preferred instructional programs may be in vain. It may be more profitable (in terms of increasing non-English speaking students' mastery of English comprehension and use) to implement more generalizable instructional approaches that enhance the learning of all students.

References

Bloom, B., (1980) The New Direction in Educational Research: Alterable Variables. *Phi Delta Kappan*, 61, 6, 382-385.

Bourke, S. & Keeves, J. (1977) *Australian Studies of School Performance Vol. III. The Mastery of Literacy and Numeracy: Final Report ERDC Report 13, AGPS, Canberra, A.C.T.*

Catholic Education Office (1981) An English as a Second Language Guide for Classroom Teachers. Sydney, Catholic Education Office.

Clunies-Ross, G. (1979) Accelerating the Development of Downs Syndrome Infants and Young Children. *The Journal of Special Education*. 13, 2.

Curriculum Development Centre (1979) *Language in Education: The Language Development Project, Phase 1*, Canberra, C.D.C.

Engelmann, S. & Osborne, J. (1969) *Distar Language 1.* Chicago, SRA.

Fisher, C.W., Berliner, D., Filby, N., Marliave, R., Cohen, L., & Dishaw, M. (1980) Teaching Behaviours, Academic learning time and student achievement: An overview. In Denham, C., & Lieberman, A. (Eds.) *Time to Learn.* Washington, D.C., NIE.

Gersten, R. & Maggs, A. (1982) Five Year Longitudinal Study of Cognitive Development of Moderately Retarded Children in a Direct Instruction Program. *Analysis and Intervention in Developmental Disabilities*. 2:329-343.

Guest, D. (1984) Bilingual and Community Language Programs in Victorian State Primary Schools. A New Policy. *Curriculum and Research Bulletin*. 19, 4, 22-27.

Hull, C. & Nie, N. (1981) *SPSS Update 7-9.* New York, McGraw Hill Book Co.

Kenny, D. (1980) An Application of the Distar Language 1 Program in an Infants E.S.L. setting. Comparison with a current E.S.L. Program. *Australian Journal of Special Education*. 4, 1, 9-17.

Maggs, A., McMillan, K., & Patching, W. (1980). Increasing Academic Achievement in Neurologically Impaired Children. *ASET Journal*, 12.

Maggs, A. & Moore, J. (1978) Teaching Academic Skills by Direct Instructional Methods to School-aged Aboriginal and non-Aboriginal Children with Learning Problems. *The Exceptional Child*. 25, 2, 127-135.

Maggs, A. & Morath, P. (1976) Effects of Direct Verbal Instruction on Intellectual Development of Institutionalized Moderately Retarded Children: A Two Year Study. *The Journal of Special Education*. 10, 4, 357-364.

Musgrave, P. (1984) The Base Curriculum: A base study in Cultural Planning in a Pluralist Society. *Curriculum Perspective*. 4, 2, 23-30.

N.S.W. Department of Education (1983) *English as a Second Language Education*. Sydney, N.S.W. Dept. of Education.

Nie, N. et al (1975) *Statistical Package for the Social Sciences (Second Edition) New York, McGraw Hill.*

Rosenshine, B (1983) Teaching Functions in Instructional Programs. The Elementary School Journal. 83, 4, 335-351.

Siegal, S. (1956) *Nonparametric Statistics for the Behavioural Sciences*. New York, McGraw Hill.

Singer, B., (1973) *The Effects of Structured Instruction on Students*. Final Report USOE Region II.

Stallings, J. (1975) Implementation and Child Effects of Teaching Practices in Follow Through Classrooms. *Monographs of the Society for Research in Child Development*. 40, 50-93.

Stebbins, L., St. Pierre, R.G., Proper, E., Anderson, R., & Cerua, T. (1977) *Education as Experimentation: A Planned Variation Model*, Vol. IVA Cambridge, Mass.: ABT. Associates.

Thomas, J., (1984) The Rededial Teacher and Non-English Speaking Background Students. *Remedial Education*. 16, 4.

Core Concepts uses Videodisc Technology

What Can Videodiscs Do?

By Nancy Burdick
Systems Impact Inc.

Editor's note. This article describes the powerful new teaching technology made possible by videodisc players. A companion article on Mastering Fractions *which follows this one describes the application of this technology to teaching fractions.*

A new series of products being developed by Systems Impact, Inc. addresses the probelm of integrating basic concepts into the ongoing curriculum. "Core Concepts in Science and Mathematics" is designed to provide educational institutions with a contemporary curriculum focused on the teaching of basic concepts.

This series combines sound instructional design with the power of videodisc technology. The most ambitious undertaking of its kind to date, "Core Concepts" will eventually include as many as 64 videodiscs for use primarily in secondary schools. Videodisc lessons, laboratory simulations and print materials will help instructors manage and sequence instruction, present core concepts and monitor student progress.

The courses are built on proven teaching methods that promote real understanding of concepts, acquisition of skills, and problem-solving abilities. Each key concept is taught directly within a simple context. When mastery is reached, the concept is presented in a more difficult context and is combined with other related ideas. This approach to instructional design promotes lasting learning, as students are required to apply knowledge and skills in a variety of contexts over time. The series is intended to complement existing classroom practices, making a comprehensive approach to instruction possible.

Plans for "Core Concepts" call for the development of a series, of mini-courses in mathematics and science, intended to extend and enhance the regular curriculum. The mathematics sequence encompasses concepts in general math and algebra; including fractions, decimals and percents, and ratios. The science sequence addresses topics in the biological, chemical and physical sciences.

Videodisc technology has advanced remarkably in the last few years. The hardware itself has become less expensive and more compact; at the same time its performance has increased. The videodisc is now an information-age tool which offers tremendous instructional power with great ease.

A videodisc player is a table-top device that, when connected to a monitor, presents programs that are stored on discs the size of LP records. However, unlike floppy discs or records, videodiscs are practically indestructible.

A single disc has incredible storage capacity, capable not only of storing digital information, but of operating as a video or slide/tape system. Each side of the disc can hold 54,000 individual frames or 30 minutes of linear video. Two audio tracks are available.

Videodisc players contain microprocessors that let users randomly access materials; unlike videotape, on which all information is presented linearly. In addition, the videodisc makes it possible to present materials frame-by-frame, to freeze a particular frame, and to speed up or slow down any segment.

The videodisc works well in a teacher-to-classroom environment. It can present complex graphics, still frames, and motion pictures with equal facility, while remaining under the full control of the teacher. The random access feature gives instructors complete flexibility with regards to the speed, direction and sequence of lesson materials. The equipment is portable and easy-to-use. Within 10 minutes, most teachers learn that it is no more difficult to operate than a record player. And the cordless, handheld keypad allows the instructor to work from any position in the room.

These advantages have provided the impetus for the development and production of Core Concepts in Science and Mathematics.

Each Core Concept course is projected to include from 3-10 videodiscs, as well as an instructors' guide and student worksheets. These materials include key concepts found in most major curricula, yet are not designed to replace existing textbooks. Instead, the videodisc presentations will give instructors a powerful tool for focusing lessons and illustrating concepts.

The Systems Impact development team, headed by Siegfried Engelmann, includes experts in learning theory, instructional design, as well as content specialists in science and mathematics. Members of the team work together to identify courses, define content, and incorporate proven instructional principles into the lesson materials. They then prepare drafts of both vido and print materials for testing with instructors and students. Materials are revised, often several times, based on the comments and experiences of these individuals.

Mastering Fractions

Adapted from the *Teacher's Guide for Mastering Fractions.*

For the past two years, the Engelmann-Becker Corporation has been working on the development of *Core Concepts,* a videodisc series to teach math and science to high school and junior college students. The first program is the series, *Mastering Fractions,* is due to be released in November.

Program Emphasis

Mastering Fractions is a 35-lesson mini-course that teaches the core concepts of fractions—including the basic vocabulary; however, the instruction is sequenced in a manner that makes the learning relatively easy. The course emphasizes logic and consistency. It presents operations that derive from what fractions are and what they equal.

The program is designed to correct the misconceptions that many students have about fractions (such as the notion that a fraction is less than 1, and that fraction operations are generically different from whole-number operations.)

Because the program emphasizes logic and corrects misconceptions, it deemphasizes vocabulary and rote memorization of labels. For instance, students are not introduced to the labels *denominator* and *numerator* early in the program. They are taught these terms only after they have demonstrated an understanding of the relationship between the bottom number and the top number in fractions.

Instructional Design

Mastering Fractions is constructed according to Direct Instruction principles which have consistently generated effective programs.

These principles are reflected in the following program features:

A. *STUDENTS ARE TAUGHT EXPLICIT STRATEGIES FOR WORKING VARIOUS TYPES OF FRACTIONS EXERCISES.* These strategies require students to apply skills in a particular order. Often the skills that make up a strategy are taught in isolation before being linked together. Students learn the individual skills, how to link skills together, and *when* to use the strategy.

B. *DURING EACH LESSON MORE THAN ONE SKILL IS TAUGHT OR REVIEWED.* Teaching each skill occurs in more than one lesson, and more than one skill is taught in each lesson.

C. *CONCEPTS ARE CONTINUOUSLY AND CUMULATIVELY REVIEWED.* Once a concept is taught, it is *used* by the students continuously.

D. *THE AMOUNT OF PROMPTING STUDENTS RECEIVE FOR EACH CONCEPT OR SKILL IS PROGRESSIVELY DIMINISHED.*

1. The narrator on the videodisc program *shows* how the concept works, taking students through examples a step at a time.
2. Next, examples are presented that require students *to answer oral questions.* The narrator asks questions; the students answer *aloud.* The purpose of these examples is to make sure that the students are responding appropriately to the important details of the examples.
3. Next, *students work written problems.* First, students work problems a step at a time with feedback on each step. Then students work entire problems. All the problems presented are of the same type, requiring the same operational steps presented during the more structured examples.
4. On *subsequent* lessons, review and homework assignments present the newly-taught problems in the context of other familiar problems that require different operations. For example, after students learn how to multiply, fraction problems like $\frac{5}{3} \times \frac{1}{3}$ are put in the same "set" as problems like $\frac{5}{3} + \frac{1}{3} =$.

Remedies

The design of the prompts permits precise diagnosis of student problems.

The easiest tasks require oral responses. If students consistently have trouble with them, a remedy is immediately implied: *repeat the demonstration and the subsequent oral questions.*

If students are firm (at mastery) on the oral presentation but have trouble with the problems that are worked independently, a quite different remedy is implied: *give feedback on problems that the students work independently,* but *continue to present independent problems of the smae type until the students reach mastery.*

If students have mastered the oral responses and the independent problems that are presented immediately after the highly structured presentation, but have trouble with the practice problems when they appear in "mixed blocks," a third remedy is implied: *provide feedback on problems when they are presented within the context of other problems.*

Why Videodiscs?

The videodisc format permits the full range of flexibility that is not readily achieved with other teaching formats. The videodisc program incorporates the best features of microcomputer programs and videotape sequences while avoiding the difficulties often associated with these programs.

Microcomputer programs have a potential advantage of "being interactive." Translated into instructional terms, "interactive" means that the program can respond to student mistakes, patiently present corrections, and possibly present additional problems of the type missed by the student. The problems with computer programs are: they usually rely on written instructions, multiple-choice responses, and displays that are less than compelling; they cannot assure that the message on the screen is the message the student receives, or listen to what the student says; and they are usually used with individuals—not groups. Because of these problems, the "pacing" of the presentation may be very poor; the responses called for may be weak (because the choices prompt the answer), and the diagnosis of mistakes may not be precise (because the student mistakes may result from inaccurately reading what is on the screen).

Another problem with a microcomputer is that the program is severely limited by the display capacity of the screen, which means that the timing of dynamic displays or "movement" on the screen is often crude.

A *videotape program* is capable of doing an excellent job with some details of the presentation that are not handled well by a microcomputer program. The video program can show things dramatically, dynamically, and with good pacing. It can talk to the students and present the important points both orally and in writing, and thereby guarantee that the message received by the learner is the message that is transmitted.

The major problem with the videotape program is that its interactive capabilities are very limited. The program may have trouble presenting "still frames" and permitting students to work problems during the video presentation. Also, branches that present additional

to Teach Science and Mathematics

work or "corrections" are not easily accessed (or constructed).

The *Core Concepts* videodisc programs provide the best features of a good *microcomputer program and a good videotape program*. They have the "loops" or "branches" of the well-designed microcomputer program. They also provide corrections and immediate feedback on student responses. By using these features the teacher may adjust the amount and type of practice to the performance of the students.

The *Core Concepts* videodisc programs also have the strong communication features of a videotape program—oral and written messages combined with demonstrations that are graphically compelling and well-timed.

The result is a fast-paced presentation with continuous student involvement and responses, with sequences that *show* as well as *tell*, and with contingent branches that present the full range of drill-and-practice tasks necessary to bring students of varying ability to mastery.

Development of the Program

A well-designed program takes into account the nature of the *skills* that are to be taught and *the characteristics of the students*. The only way to discover facts about the students is to work with them and to observe their problems. The development of *Mastering Fractions* evolved from five different versions of the program, each modified on the basis of intensive formative evaluation of the program in the classroom. The revisions of the program came about from problems that teachers experienced in using the prototype programs and problems that students experienced.

The final program works well because it addresses a realistic profile of the typical student. Two points are very important about this profile. The first is that the students have a variety of misconceptions and skill deficiencies. The second is that these problems are not the students' fault and do not imply that the students cannot learn the skills.

Here is a list of the typical behaviors exhibited by many incoming students:

- Students do not follow instructions, even instructions that are very clear and simple.
- Students do not attend to details. Quite commonly, students leave out important signs when copying problems from the board or screen.
- Students often generalize spuriously. If teaching shows how to multiply fractions, the students will often try to "generalize" the operation to all fraction problems that are presented, including those that involve addition and subtraction.
- Students attempt to invent short-cut rules or procedures for working problems, often basing these rules on only one or two examples and creating rules that are based on irrelevant details of the examples.
- Students have great trouble applying rules that are taught. (If a rule about how to work a particular kind of problem is presented, the students will often abandon it in favor of a homemade version that works for only a few examples.)
- Students have a full range of misconceptions about fractions. Although the students may be able to perform on isolated fraction skills, they may think that:
  a. Fractions are really less than one.
  b. The "one" that is referred to in connection with fractions $\frac{4}{4} = 1$ is not really the same "one" referred to in whole number contexts like $1 + 6 = 7$.
  c. Fractions are symmetrical, which means that if $\frac{12}{4} = 3$, $\frac{4}{12}$ must also equal 3.
  d. The logic of fraction operations is unrelated to the logic of whole number operations. Students may know that if you multiply a number by one, you get the same number. And they may know that 5/5 equals 1. But they may not understand that a number times 5/5 equals the number.
- Finally, students may not have accurate writing and copying skills. In addition to possible errors in copying, students may make addition or multiplication errors, even though they are following the appropriate operational steps.

Anybody who has tried to teach typical students is familiar with their problems; however, it is very easy to draw mistaken conclusions, such as "the students cannot learn," or "they are incapable of generalizing," or "they have faulty memories," etc.

If we look at any problem students exhibit, we can trace it directly to how they were taught. For instance, the notion that fractions are really less than 1 arises from the fact that the fractions they worked with in the third-grade were less than 1, and so were many of the fourth-grade fractions.

The strategy of trying to generate a rule based on one or two examples is exactly what many of these students had been taught through discovery-learning programs.

The students' apparent inability to follow instructions is an outcome that has been soundly reinforced for years. They have received many demonstrations that the instructor talks for a while, and then tells them to do something. At that point, they raise their hands and, in response to their inquiries, the instructor shows them exactly what to do.

Similarly, the inability to "discriminate" different problem types has been reinforced by the "spiral curricula" of the elementary-grades textbooks and teaching objectives. Students have long since learned that if they are working on a particular skill, all problems will involve that skill. Later they'll work on a new skill and not use the earlier-taught skill for a long time.

To understand the student's problems and to understand that the student is not the cause of these problems (which means that there is nothing wrong with the student's neurology) implies that the focus must be directed toward better instruction. Once something has been mislearned and practiced, reteaching requires far more practice than initial, first-time teaching. The reason is that the instruction is not simply putting a new skill into an empty place in the student's head. The instruction must first wipe out the old mislearning and then replace it with the new skill.

That is the bad news. The good news is that although the students may progress slowly at first (or at the first place that their strategies are challenged by the new material), they will become competent learners if the instruction is well-designed, the feedback is clear, and the standards of performance are non-negotiable.

In other words, with a program like *Mastering Fractions* teachers can prove to themselves that virtually *all* students can learn math and learn it well, including those students who are typically written off as ones who have "no aptitude." Teachers can change that "no aptitude" judgment to one that gives promise for the student's future options. And perhaps the best part is that it doesn't involve more work for the teacher. It does require them to do things differently. The teaching is different and so are the rules for how to work successfully. And, even though many of the sequence-related and testing variables have been controlled, *the program cannot be effective without a teacher*. The teacher must make important diagnostic judgments, set standards, monitor progress, and reinforce progress. The teacher models the process and sets the rate at which the students move through the program.

Program Features Shaped by Student Tendencies

Mastering Fractions has provisions to correct the various study problems and logic problems typical students have.

Following Instructions

To prompt careful attention to instructions, the program provides variations of instructions, and presents them at a relatively high rate. The high rate gives students feedback at a high rate. The instructions are verbal or written, and both verbal and written. An instruction may tell students to "Copy the problem and then stop." Or it may tell them to "Copy the problem, rewrite the whole number as a fraction, and then stop." Or, "Copy the equation and complete it."

The variety of instructions is controlled so that students are exposed to the different instructions frequently; however, they can't predict what the next instruction will be.

Attention to Details

To counteract the students' naivete about details, like signs, the instructions require the students to write and copy a number of problems during every lesson. Although some problems presented in their workbook do not require copying, many do. The reason is that the students often *do not attend to certain details* unless they copy the problems. The students are often able to work problems in which they "fill in the blanks," but after successfully working many of these problems, the students often make serious copying mistakes when they attempt to write the same problems. Copying the problems, and copying them accurately, is a hidden curriculum that sharpens the students' understanding of details of equations and operations. In addition, the copying practice increases mechanical proficiency.

Correcting Spurious Generalizations

The students' tendency to generalize spuriously on the basis of a couple of examples (and often on the basis of an irrelevant detail) are counteracted by the program structure. Every lesson deals with more than one skill, which means that the students have to learn to switch gears, deal with different operations, and attend to different details. Yet, the first operation does not "go away." It returns on the next lesson. Therefore, students have to develop a discrimination repertoire that permits them to deal with different operations and the generalizations that pertain to each.

Also, discrimination exercises are presented. For example, after students have worked problems that involve multiplying fractions and whole numbers and after they have learned to add or subtract fractions and whole numbers, they are presented with discrimination exercises that present problems of both types in an unpredictable order. Students must now differentiate between the operations called for by the operational signs in the equations.

Every skill that is taught is channeled into discrimination blocks. Students quickly learn that they must attend both to the sameness features of an operation like adding fractions and to the differences between what is done when adding and what is done when multiplying.

Correcting Student Misconceptions

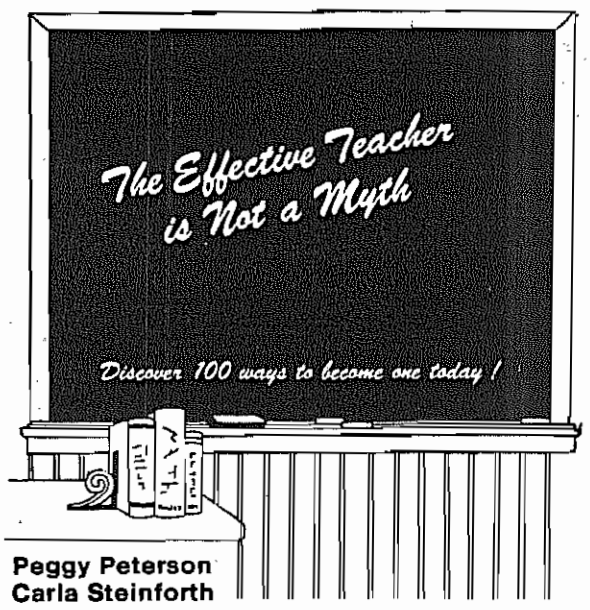
Student misconceptions and faulty strategies (such as "short cuts" that only work for some problem types) are corrected by starting at the beginning and reframing fractions in a way that makes them understandable. The reframing provides a method for decoding fractions through visualizing equivalence (on a balance beam and as circle diagrams that dramatize the equivalence), and enough practice to assure that the skills are learned well enough to serve as a foundation for subsequent skills.

Also, the explanations that are presented refer to the basic logic or analyses presented earlier. For instance, when multiplying by fractions of 1, students are reminded that fractions of 1 equal 1. The outcomes that occur when numbers are multiplied by 1 are therefore the same as those obtained with fractions of 1.

The explanation of the concepts and basic steps are repeated frequently in the program, because they serve as building blocks for the more complicated skills. Also, the verbal questions the narrator presents help keep these strategies from being reduced to automatic, unconscious operations that the learner performs.

The guiding principle for the presentation and review of strategies is: **Only if the student understands the logic of fractions as decodable entities that can be translated into pictures, and as values that interface with whole numbers, is the student in a good position to learn the more abstract operations that are presented in algebra and all higher math.**

For more information contact Systems Impact Inc., 440 MacArthur Blvd., N.W., Suite 204, Washington, D.C. 20007



By Peggy Peterson
Carla Steinforth

100 Ways to become an effective teacher based upon the latest information about effective schools. A complete guide to expanding your teaching competencies. Ready to use tests of basic skills competencies, (in-program tests), classroom management forms and techniques, teaching tools and strategies, and homework plans, etc. Written by two teachers with over 35 years of classroom teaching experience. A must for the effective teacher.
(3 ring notebook ---over 500 pages)
(Kindergarten through sixth grade.)

SPEAK THE EFFECTIVE TEACHER VOCABULARY

Effective Teacher
1. Effectiveness Criterion List
2. Definitions/Characteristics

Models
3. Learning/Classroom

Future Trends
4. Self-Learning/Home Learning
5. Social/Technology Influences

CREATE TEACHER EFFICIENCY

Teacher Competencies
6. 60 Teacher Competencies for effectiveness

Instructional Program Design
7. Formulation of basic objectives
8. Integration of objectives and units at grade level
9. Teacher "Time on Task" Techniques
10. Evaluation forms for materials/activities

Control of School Environment
11. Create a democratic workplace
12. Structure special school events
13. Control outside interruptions
14. Integrate "pull out" programs
15. Plan parent involvement

Promoting Professional Image
16. Self assessment profile
17. Promotion of professional status
18. Professional growth options

Personal Organizer
19. A two-year personal organizer

AFFECT STUDENT ACHIEVEMENT

Independent Work
20. Train students for independent activities
21. Immediate correction procedures
22. Ways for students to seek individual assistance
23. Methods for varying independent learning tasks
24. Student generated record keeping forms

Ways to Increase Student Time on Task
25. Independent work
26. Basic Skills and other subject areas

Establishment of Academic Expectations
27. Academic Expectations List
28. Implementation procedures
29. Work incentive's program
30. Absenteeism solutions
31. Profile student interests/habits
32. Special considerations: cultural/mainstream students

Support Activities
33. Homework incentive program
34. Peer/Resource tutoring

DESIGN CLASSROOM ORGANIZATION

Time Management
35. Organize schedules
36. Design daily openers
37. Setting the stage for daily/weekly/monthly activities
38. Establish daily routine procedures
39. Plan review maintenance

Work Space Management
40. Physical organization of learning stations
41. Equipment/supply set-up and distribution
42. Work closure techniques
43. Transition techniques

Student Management
44. Time on task motivators
45. Student job assignments
46. Behavior incentive programs
47. Independent/small group work habits
48. Student work continuity

Instructional Management
49. Lesson plan design
50. Substitute packet

Material Management
- **Student Materials**
  51. Desk organizers
  52. Work related materials
  53. Homework assignments
  54. Long range projects
- **Teacher Materials**
  55. Personal materials
  56. Basic Skill program materials
  57. Subject area organizers

Long Range Management
- **Monthly Management**
  58. Change learning stations
  59. Vary student activities
  60. Seasonal community calendar events
- **Periodic Management**
  61. Program review and up-dates
  62. Objective assessment and up-dates
  63. Other periodic management techniques

IMPLEMENT INSTRUCTIONAL STRATEGIES

Student Placement and Assessment
64. General information on testing
65. Entry program placement
66. Diagnostic analysis
67. In-program assessment
68. Periodic assessment of skill mastery
69. Record keeping / Report of progress
70. Skipping procedures
71. Remedial procedures

Use of Data
72. Analysis - what does the data tell you ?
73. Performance / Comparison - compare basic skill programs with grade level expectations
74. Prescription - what do you do now ?
75. Alternatives - outline and implement options
76. Evaluation - where are you ?
77. Profile student achievement

Lesson Analysis
78. Concept/Vocabulary identification
79. Objective analysis
80. Procedural analysis
81. Lesson scripting for individual/group learning needs
82. Teacher task analysis

Efficient Teaching Techniques
83. Lesson schedule procedures
84. Grouping procedures
85. Lesson presentation techniques
86. Advantages of signals
87. Demonstration/modeling
88. Pacing patterns
89. Guided practice
90. Correction procedures
91. Student error charts
92. Questioning strategies for student response patterns
93. Extension of question/thinking skills
94. Follow-up activities

Behavior Motivations for Effective Teaching
95. Teacher behaviors that ensure academic success
96. Coping techniques for different student behavior types
97. Positive reinforcement strategies
98. Non-verbal techniques
99. Student incentive input
100. Administrator/Teacher incentive input

COST: $59.95
Plus $4.00 for Shipping and Handling
(please enclose check or purchase order)

----------**ORDER FORM**----------

QUANTITY (ET)_____
NAME _____
ADDRESS _____
CITY _____ STATE ____ ZIP _____

EXPANDING DEVELOPMENT
P.O. BOX 2226
EVERGREEN, COLORADO 80439
(303) 674-5003

Transforming Teacher Reluctance into a Commitment to Innovation

By Russell Gersten
University of Oregon
Thomas R. Guskey
University of Kentucky

In recent years an increasing number of school districts have initiated school improvement programs. Based on the findings of research studies on effective teaching practices (Brophy, 1979; Guskey, in press) and effective school practices (Edmonds, 1982; Purkey & Smith, 1983), the principle goal of these programs is to improve academic achievement. And in most cases, this translates to improving students' scores on standardized tests (Cuban, 1984).

The research on effective schools indicates that all administrative levels of education are to some degree important in an improvement effort, from the state and district down to the building and individual classroom. However, there is little doubt that the most direct—and perhaps most powerful—influence on student learning is the classroom teacher. Regardless of the commitment or expertise of building principals and superintendents, classroom teachers remain the crucial component in any school improvement program. Teachers are the ones who work most directly with students and, therefore, are the primary ingredient in any effort to improve students' performance.

Yet, teachers are often reluctant to try new ideas or innovations that require them to change the way they teach. Most of what teachers know about teaching, what they feel works for them instructionally, has been gained through personal experience in the classroom (Lortie, 1975). This knowledge typically comes through a series of trials and errors, verified in some fashion over time. In many ways, it is a sort of folk wisdom. To change the way teachers teach core academic areas (reading and math) means disrupting this hard-earned sense of stability, questioning aspects of their "knowledge" of teaching practices. It also may mean risking making errors, and perhaps some failures.

Little is known about the process by which teachers' reluctance toward new ideas or innovations can be transformed to a sense of commitment to innovation. One component of a recent comprehensive study (Gersten, Carnine, Zoref, & Cronin, 1986) did address this issue directly. The results of this study, coupled with the results of research by Guskey (1982, 1984) on mastery learning, provide several intriguing insights into the process of change. In addition, these results offer fairly clear directions for facilitating educational change and directions to avoid.

The Direct Instruction Study

Context of the Study

In 1978, a Federally-supported compensatory education program (part of the Follow Through Project), operating in a large urban district, was asked by the U.S. Office of Education to adopt a more effective instructional model. At the time the schools in the district were offering a self-sponsored "laissez faire" approach in which teachers determined their own curriculum emphases and instructional time allocations. Under this approach the achievement levels of Black and Hispanic students in reading, language arts, and mathematics at the seven Follow Through schools had remained consistently low, ranging between the 20th and 28th percentile on standardized tests. The district was given six months to select a research-based instructional model and begin its implementation.

Administrators in the district selected Direct Instruction, a highly structured, basic skills approach, using the Distar Reading and Language curricula. This selection was made without input from the teachers in the Follow Through program. The decision to select Direct Instruction was largely due to the documentation of its success in inner-city school districts in an evaluation funded by the U.S. Department of Education (Stebbins, et al., 1977). In addition, one school in the district had been using Distar with its Hispanic students and had demonstrated significant achievement gains. However, it was clear from local records (Emrick & Peterson, 1979) that the major motive behind the decision was the Federal government's demand that the district either use a different approach or lose over a million dollars in federal support.

Because of lengthy negotiations, the decision regarding program implementation was not reached until late summer. Thus, teachers were not informed of the program adoption until they returned to school in early September. Two days of preservice training were provided for the teachers. Then all 21 Follow Through teachers in kindergarten and first grade were asked to implement the Direct Instruction Model. Second-grade implementation was delayed for one year. Consultants from the University of Oregon were asked to make regular visits to the district to provide technical assistance, monitor implementation, and train the district's own staff development personnel in specific techniques for superivsing Direct Instruction programs.

Direct Instruction is a very structured academic program. The reading, language, and mathematics curricula include teachers' guides that spell out in detail exactly how teachers are to present a new skill, exactly which examples should be used to present a new concept, how much practice will be required, how to assess student mastery on an ongoing basis, and how to correct student errors. The model calls for an intensive academic focus, beginning in kindergarten . . . a major shift at that time in the district.

This approach was dramatically different from the "laissez faire" approach used previously in the seven Follow Through schools. The method of supervision was also rather unique. New teachers were observed at least once a week. The supervisor provided specific feedback on how the teacher was doing, perhaps suggesting alternative teaching techniques, sometimes actually demonstrating how to use a new technique by "taking over" a group for 5-10 minutes. Supervisors also reviewed placement and grouping decisions, primarily on the basis of students' performance on criterion-referenced tests. They also pinpointed classroom management problems and suggested approaches for improving motivation of low-performing students, noise level, etc. Teachers receive a weekly "technical assistance" form containing the supervisor's analysis and suggestions.

In short, extremely great changes were required of these teachers. Many expressed initial resentment, resistance, and frustration. A study was conducted to analyze program implementation comprehensively and the accompanying changes over a two-year period. Part of this research involved in-depth interviews with all teachers in the program. These interviews were conducted each spring by an agency unaffiliated with either the school district or the Direct Instruction program staff. The information gathered over this two-year period by the interviewers offers unique insights into the evolution of teachers' attitudes toward structured educational models and the process of change in general (Emrick & Peterson, 1979; Cronin, 1980, 1983).

Findings

Magnitude of Change

All teachers reported that the approach to teaching represented by the Direct Instruction program was different from both the way they had been trained and the way they had previously taught. The only exception was one beginning teacher. The two differences most frequently mentioned by the teachers were the amount of structure and the heavy "time-on-task" emphasis on skills. Not a single teacher had used a format as structured as that used in teaching the Distar curriculum. Some reported feeling initially stifled by a program in which "all decisions are made for you." Others resented the loss of control over determining the amount of time devoted to reading, language arts, and mathematics. But none of the teachers felt that Direct Instruction was a particularly difficult approach to master. The Distar curricula were typically perceived as concise, well-defined, and straightforward

Initial Implementation Problems

The majority of teachers expressed resentment at having no voice in the decision to adopt the Direct Instruction model. For example, one teacher said:

> The two days of preservice training would have been more helpful if I hadn't been so angry. I didn't really listen to very much after we were told (by a district staff member), "This is what we will be doing this year; like it or get out."

This problem was exacerbated by the rushed and abbreviated training program.

Once the school year began, teachers found that, for the first time in their professional careers, their performance was monitored by unannounced weekly visits from a consultant. Teachers at two schools balked at these unannounced visits and pressured the school principals to require prescheduled observation. The consultants opposed this idea, believing that it defeated the purpose of their observations. After several meetings and negotiations, the issue was resolved in favor of the consultants, with the reluctant approval of the teachers.

Strained relationships between the consultants and many teachers continued throughout much of the first year. Many teachers felt the standards set by the consultants were too high, that the observations made by the consultants were inconsistent, and that they were uncomfortable "being checked up on." By the end of the year, however, several teachers reported that the observations and in-class visits were extremely helpful. As one teacher put it:

> The demonstrations in the classroom were the most helpful part of the training. These were the real-world test of how Distar operates. More demonstrations in my own classroom would have been even more helpful, especially in the beginning.

The situation kept improving. In fact, by the end of the second year, over half of the teachers reported deriving benefits from classroom visits. Feedback in the classroom from the chief consultant was considered to be clear and relevant to day-to-day problems (Cronin, 1980, p. 28).

Philosophical Clashes and Resolutions

During the early interviews, a constant refrain voiced by almost half the teachers concerned the conflict between the basic skills "time-on-task" orientation of Direct Instruction and their own view that a teacher of young, disadvantaged children should attend to the whole child, fostering his or her emotional and social, as well as academic growth. By the end of the second year, all but one of the 23 teachers interviewed agreed that "Direct Instruction was compatible with their educational philosophy" (Cronin, 1980, p. 23).

This dramatic change in philosophy and thinking was the strongest and most interesting finding in the study. Despite the rushed circumstances of the initial training, lack of support from the principals, lack of consensus-developing or attitude-oriented activities, and sometimes unrealistically high demands placed on the teachers, most teachers' attitudes seemed to shift when the teachers saw that the new model actually helped the children learn and improved their effectiveness as teachers.

The interview team reported that "teachers seemed to derive great satisfaction from seeing their children read, speak in correct sentences, and attain more positive self-concepts . . ., teachers also mentioned increased self-reliance, greater social maturity, and a decrease in 'acting out behaviors' from their students as further by-products of experiences in the Direct Instruction program (Cronin, 1980, p. 24).

One teacher offered a partial explanation for this dramatic shift in attitude. She explained that the conflict that she initially perceived between her child-centered, humanistic, educational philosophy and the Direct Instruction model had been more "apparent than real" (Cronin, 1980, p. 23). Her statement is worthy of further comment. The senior author of this paper experienced

Continued on Page 12

Teaching Transformations to the

By Diane Boriero
University of Oregon

Transformations are rules, verbally stated or unstated, that govern the relationship between examples of a concept and responses (Engelmann & Carnine, 1982). For example, teaching addition may involve a transformation.

40 + 1 = 41
40 + 2 = 42
40 + 3 = 43
40 + 4 = 44
40 + 5 = 45

The verbally stated rule that governs the relationship between examples, 40 + 1 =, 40 + 2 =, etc., and responses, 41, 42, etc. is "when adding 2 digit numbers with "0" occupying the ones place to one-digit numbers, the one-digit number will replace the "0" in the two-digit number." This example demonstrates the difficulty in verbally describing and stating a transformation. This difficulty has resulted in the basic assumption that transformations are difficult or impossible to teach by traditional procedures (Engelmann & Carnine, 1982). However, this assumption has very little merit when effective instructional procedures are applied to transformation problems, as will later be demonstrated.

To identify a transformation a three criteria test must be applied:

- Can the same task be used with a variety of examples of the same type?
- Would the learner produce different responses for different examples?
- Is there a sameness which relates each example to each response? (Engelmann & Carnine, 1982). If the answer is "yes" to all three qustions, then a transformation is clearly implied. To demonstrate how these criteria are applied, the following examples are provided.

1. *Dressing*
a. *Task*: Learner must identify whether trainer has an article of clothing on (e.g., pants on, shirt on, shoes on, etc.).
b. Does the task involve a transformation?
   1. *Can the same task be used to process each example? Yes.* The trainer puts on an article of clothing and asks the question, "Did I put on the *pants* (shoes, shirt, etc.)?"
   2. *Is a different response required for each example? No.* The learner

Continued on Page 13

Teacher Reluctance Continued from Page 11

such a shift in his thinking in the early seventies, when he was a reading teacher in Roxbury, an inner-city area in Boston. He, too, was trained in child-centered approaches to education, yet slowly began to see that they were not helping him teach the first and second graders he was working with. Slowly, largely from feedback from the students, he realized that beginning reading is a skill requiring clear instructions, adequate guided practice on each subskill, systematic review, and high degrees of structure. He also realized that the students thrived under an intelligently structured approach, both in terms of skill acquisition and attitudes towards reading. The review, the repetition, and the insistence on mastery in no way hindered their imagination or their interest in reading or writing. In fact, the success and the consequent rise in self-esteem seemed actually to increase their interest in reading, writing, and talking about reading. The teacher interviewed by Cronin emphasized that it seemed important first to use a new method like Direct Instruction before an accurate appraisal of its value could be made.

Comparable Research on Mastery Learning

The idea that significant change in teachers' beliefs and perceptions generally *follows* successful implementation of a new innovation has also been noted in Guskey's research on the implementation of Mastery Learning (Guskey, 1983, 1984, 1985). In one study (Guskey, 1984), a large group of intermediate and high school teachers was trained in the use of Mastery Learning techniques. Following the training the vast majority of these teachers used the techniques in their classes and saw dramatic improvement in their students' learning as a result. However, a small group of teachers used the new techniques and saw little or no improvement in the learning of their students, and another small group of teachers never bothered to try the new techniques at all.

When measures of change in teachers' beliefs and perceptions were analyzed following implementation, the teachers who saw learning improvements expressed increased responsibility for student learning outcomes and more positive attitudes toward teaching. That is, they felt greater *personal responsibility* for how well or how poorly their students learned and became much more positive in their attitudes toward teaching. But at the same time, these teachers expressed diminished confidence in their teaching abilities. Apparently, gaining proof of their increased effectiveness disrupted the confidence these teachers had first expressed in their teaching abilities. These changes were experienced, however, *only* by the teachers who saw improvement in their students' learning. The beliefs and perceptions of the teachers who used the new techniques, but saw little or no improvement, and those who never attempted implementation remained relatively unchanged, similar to a control group of teachers.

Guskey concluded that inservice training and the implementation of a new innovation alone may be insufficient conditions for change in teachers' beliefs and perceptions. Apparently, teachers must first gain tangible evidence that the new practices will work in their classrooms with their students. Then, and perhaps as Guskey (1984) suggests, *only* then are significant change in teachers beliefs and perceptions likely to result.

Discussion

The idea that changes in teachers' attitudes and thinking follow, rather than precede, changes in teachers' classroom behaviors runs counter to much current practice. Many contemporary inservice programs set out initially to change teachers' attitudes or gain some sense of commitment from teachers prior to the implementation of a new program. This is often done by citations of research and/or awareness sessions whose goal is to foster positive attitudes towards the innovation.

However, Guskey's (1984) research, as well as that of Crandall and his associates (Crandall, 1982, 1983) suggest that such efforts, in and of themselves, are unlikely to bring about any real change. Serious commitment is likely to occur only after teachers have had an opportunity to use the new program or innovation and have seen that it really assists them in teaching their students, especially the difficult-to-teach students.

Since serious teacher commitment rarely occurs prior to the implementation of a new program, it is critically important to find alternative ways of encouraging teachers to engage in the new practice. Several researchers have suggested a number of ways in which this can be done. Crandall (1983), for example, found that training by a person judged by teachers to be "credible and practically oriented" is essential, especially during the early phase of implementation. This emerged as a major theme in the San Diego research study. (To be effective, trainers or consultants must provide teachers with information that is useful and applicable to their day-to-day experiences in the classroom, not theoretical overviews.)

It is equally important to provide teachers with ways to gain evidence of the effects of their efforts on valued student outcomes. Teachers need to see that the often difficult (or awkward) changes they are making result in some form of improvement. The best sort of evidence for this purpose, however, is usually not end-of-year standardized test results. In the Direct Instruction study for example, teachers' attitudes began to change when they saw their children begin to read better, speak in a more correct and more sophisticated fashion, and use their class time more efficiently. In Mastery Learning programs, teachers' attitudes began to change when they saw improvements in students' performance on weekly teacher-developed formative tests and when there was greater student involvement during class sessions. It is also important to keep in mind, however, that these changes do not occur overnight but evolve over a period of time.

We believe that the issues encountered in the implementation of this program are not unique, but are likely to be encountered in many school improvement programs. The experience has taught us two major lessons. The first is that providing competent and knowledgeable technical assistance to teachers is extremely important—and difficult to do in a sensitive but direct fashion. The second is that changes in attitudes usually follow, rather than proceed, changes in behaviors.

References

Berman, P., and McLaughlin, M.W. (1978). *Federal programs supporting educationl change. Vol. III.* Santa Monica, CA: Rand Corporation.

Brophy, J.E. (1979). Teacher behavjor and its effects. *Journal of Educational Psychology, 71,* 733-750.

Crandall, D.P. (1983). The teacher's role in school improvement. *Educational Leadership, 41,* 6-9.

Crandall, D.P., & Associates (1982). *People, policies, and practices: Examining the chain of school improvement.* Andover, MA: The NETWORK, Inc.

Cronin, D.P. (1980). *Implementation study, year 2: Instructional Staff Interviews.* Los Angeles, CA: John Emrick & Associates.

Cronin, D.P. (1983). Personal and organizational factors affecting educational program implementation: A case study. Unpublished doctoral dissertation. Palo Alto: Stanford University.

Cuban, L., (1984). Transforming the frog into a prince: Effective schools research, policy, and practice at the district level. *Harvard Educational Review, 54,* 129-151.

Datta, L.E. (1981). Damn the experts and full speed ahead. *Evaluation Review 5,* 5-31.

Edmonds, R. (1982). Programs of school improvement: An overview. *Educational Leadership, 40,* 4-11.

Emrick, J.A., & Peterson, S.M., (1979). *Implementation study: Case study report and first-year measurement development, Part I: Introduction and case study report.* Los Altos, CA: John Emrick & Associates.

Gersten, R., Carnine, D., & Green, S. (1982). The principal as instructional leader: A second look. *Educational Leadership, 40* (3), 47-50.

Gersten, R., Carnine, D., Zoref, L., & Cronin, D. (in press). A multifaceted study of change in seven inner-city schools. *Elementary School Journal.*

Guskey, T.R. (1982). The effects of change in instructional effectiveness upon the relationship of teacher expectations and student achievement. *Journal of Educational Research, 75,* 345-349.

Guskey, T.R. (1984). The influence of change in instructional effectiveness upon the affective characteristics of teachers. *American Educational Research Journal, 21,* 245-259.

Guskey, T.R., (1985). *Implementing mastery learning.* Belmont, CA: Wadsworth.

Huberman, A.M. (1983). School improvement strategies that work. *Educational Leadership, 41* (3), 21-25.

Lortie, D.L. (1975). *Schoolteacher: A sociological study.* Chicago: University of Chicago Press.

Purkey, S., & Smith, M. (1983). Effective schools: A review. *Elementary School Journal, 83,* 427-452.

Stebbins, L.B., (Ed.). (1976). *Education as experimentation: A planned variation model,* (Vol. IIIA). Cambridge, MA: Abt Associates.

Stebbins, L.B., St. Pierre, R.G., Proper, E.C., Anderson, R.B., & Cerva, T.R. (1977). *Education as experimentation: A planned variation model* (Vols. IVA-D: An Evaluation of Follow Through). Cambridge, MA: Abt Associates.

will respond either "Yes" or "No" to each example presented.

3. *Is there a sameness which relates each example to each response?* *No*. All responses are either "Yes" or "No".

The three criteria test was *not* met for this task, thus, a transformation is not implied.

2. *Addition*
   a. *Task*: Learner is given a set of 9 unsolved equations and instructions to solve them. These questions involve adding two-digit numbers with "0" occupying the ones place to one-digit numbers (e.g., 40 + 1 =, 40 + 2 =, etc.).
   b. Does the task involve a transformation?
   1. *Can the same task be used to process each example? Yes*. The learner is presented an unsolved problem with the symbols "+" and "=", 40 + 1 =, 40 + 2 =, etc. for each example.
   2. *Is a different response required for each example? Yes*. The nature of the response will depend on the example, thus each response will be different (e.g., 41, 42, 43, etc.)
   3. *Is there a sameness which relates each example to each response? Yes*. The responses are all two digit numbers which are formed by replacing the "0" in the two digit number with the one digit number for each equation.

A transformation requires an implicit or explicit logical rule relating changes in examples to changes in responses. Once the problem has been identified as a transformation, a sequence can be designed to teach it. This sequence should be designed according to the juxtaposition principles and rules for transformations sequences (Carnine & Stein, 1981; Engelmann & Carnine, 1982).

There are four juxtaposition principles: (1) wording, (2) setup, (3) difference, and (4) sameness (Engelmann & Carnine, 1982). These juxtaposition principles are designed to make the communication as clear as possible to the learner and to demonstrate what is the same and different about all the examples.

Wording and setup principles suggests that the wording and setup for *initial* teaching sequences should remain the same from example to example. Both the wording and setup principles are useful in isolating the critical features(s) (i.e., those features that should control responding) of the concept as quickly as possible.

In contrast to concept teaching, transformations use only positive examples. To focus the learner's attention on minimal differences in positive examples which lead to different responses, the sequence first juxtaposes examples that differ in just one feature. Then, to show the range of application of the rule, widely differing examples are shown (Carnine, 1976, Engelmann & Carnine, 1982). Finally, examples are presented that bear no predictable relationship to one another. The first two to five examples are modeled and the rest are used as testing examples. The entire sequence should communicate the concept within 20 examples (Carnine, 1976; Engelmann & Carnine, 1982). The major advantages of using these principles to design instructional programs are: (1) more efficiency (teach more information in less time), and (2) more power (facilitate generalization).

The following sequence demonstrates how the juxtaposition principles are applied according to these rules for teaching the transformation of adding two-digit ("0" in tens place) to one-digit numbers. In the first three trials [A] minimal differences are demonstrated by changing one thing at a time, and in the remaining trials [B] the sameness is shown by presenting widely differing examples. The wording [C] and setup [D] principles were also followed. The formats used in the remainder of this paper are modeled after sequence formats presented in *Theory of Instruction: Principles and Application* (Engelmann & Carnine, 1982)

EXAMPLES	TRAINER WORDING
1) 40 + 5 =	"LISTEN, MY TURN." "40 + 5 = 45," "WHAT DOES 40 + 5 =?" "45"
2) 40 + 8 =	"LISTEN, MY TURN." "40 + 8 = 48," "WHAT DOES 40 + 8 =?" "48"
3) 90 + 8 =	"LISTEN, MY TURN." "90 + 8 = 98," "WHAT DOES 90 + 8 =?" "98"
4) 30 + 6 =	"LISTEN, MY TURN," "30 + 6 = 36," "WHAT DOES 30 + 6 =?" "36"
5) 40 + 5 =	"ANSWER?"
6) 60 + 8 =	"ANSWER?"
7) 90 + 2 =	"ANSWER?"
8) 30 + 6 =	"ANSWER?"
9) 70 + 8 =	"ANSWER?"
10) 20 + 1 =	"ANSWER?"
11) 90 + 7 =	"ANSWER?"
12) 50 + 4 =	"ANSWER?"

Transformations that are difficult to describe verbally, are considered among the more difficult rules to teach. Likewise, individuals with severe mental retardation are considered among the more difficult population to teach. Individuals with severe mental retardation generally require more time to learn and have greater difficulty generalizing than do nonhandicapped learners. Based on these assumptions about teaching transformations and individuals with severe handicaps, many educators have concluded that people with severe mental disabilities cannot learn transformations (Snell, 1978; Stephens, 1979). However, a study conducted by Boriero (1984) demonstrated that individuals with severe mental retardation *can* learn transformations in a relatively short period of time and successfully generalize to untrained examples of the transformation when juxtaposition principles and transformation rules are followed.

The major purpose of the study was to demonstrate that individuals with moderate and severe mental retardation could efficiently learn transformations and generalize to untrained examples. A second objective of the study was to show that by designing instructional sequences using the juxtaposition principles and transformation rules, efficiency and generalization power could be facilitated.

The study compared two different sequences designed to teach time-telling and addition transformations. One sequence was designed according to the juxtaposition principles and transformation rules. The basic differences between the two approaches were the selection and sequencing of examples.

Subjects

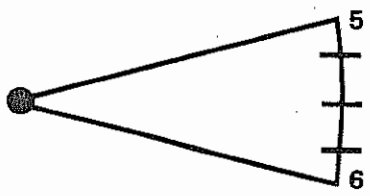
The subjects were 12 individuals with moderate and severe mental retardation. These 12 subjects were randomly assigned to one of 4 conditions:

1. Time-telling sequence juxtaposition principles.
2. Time-telling sequence no juxtaposition principles.
3. Addition sequence juxtaposition principles.
4. Addition sequence no juxtaposition principles.

Thus, three subjects participated in each condition.

Procedures

The time-telling task consisted of the learner identifying "the hour" when the hour hand varied between two hours. For example, the learner would verbally respond "5" to the hour hand when it varied one to three minutes between 5 and 6.



The addition task required the learner to add two-digit numerals with "0" occupying the ones place, to one-digit numerals (i.e., 40 + 2 = 42).

Juxtaposition Principles and Rules Followed

Time telling. Six numbers (5, 6, 10, 2, 8, and 11), the position of the hour hand between hours, and the position of the numbers on the clock were chosen to develop examples that demonstrated sameness and differences. This sequence also represents a full range of positive variation in the examples of the transformation.

	EXAMPLES	TRAINER WORDING
[A]	★ " 5+"	"This is 5 hour." "What hour?" "5"
	" 6+"	"This is 6 hour." "What hour?" "6"
	"10++"	"This is 10 hour." "What hour?" "10"
[B]	"2+++"	"What hour?"
	"11+++"	"What hour?"

★The hour hand varied between hours according to the number of "+" signs. Each "+" sign represents 1 minute.

The first two examples demonstrate minimum differences [A] and the rest show the range of sameness [B]. In the minimum difference examples, the only changes that occur from example to example are the position of the hour hand and physical appearance of the number. However, these are very small changes in both position and appearance. The rest of the examples demonstrate the range of sameness because each example is maximally different in physical characteristics, position of hand between hours, and position of hand on clock. The same setup and wording was used in each example. The setup was the instructional clock which was a large red felt circle with black felt numerals 1-12 attached, and the hour hand. The wording is the same from example to example.

Addition. This sequence was designed just as the time-telling sequence.

EXAMPLES	TRAINER WORDING
1) 40 + 5 =	"Listen, my turn." "40 + 5 = 45." "What does 40 + 5 =?" "45"
2) 40 + 8 =	"Listen, my turn." "40 + 8 = 48." "What does 40 + 8 =?" "48"
3) 90 + 8 =	"Listen, my turn." "90 + 8 = 98." "What does 90 + 8 =?" "98"
4) 30 + 6 =	"What's the answer?"
5) 70 + 8 =	"Answer?"
6) 20 + 1 =	"Answer?"
7) 90 + 7 =	"Answer?"
8) 50 + 4 =	"Answer?"

Minimum differences are shown in the first three examples [A] and sameness is shown across the remaining examples [B]. The setup and wording are the same for each example (e.g., the symbols "+" and "=," horizontal presentation of facts and answer).

Juxtaposition Principles and Rules Not Followed

Time telling. Six number (2, 3, 4, 5, 6, and 7) were chosen to design this sequence. However, these numbers were selected and sequenced according to the way they occurred on the clock. The hour hand was placed exactly between numbers and did not vary. Juxtaposition principles and transformation rules were not followed to design this sequence.

EXAMPLES	TRAINER WORDING
2	Listen, my turn. What hour is in the first circle?" "Two." "What hour is in the second circle?" "Three." "The little hand is between hours. When the little hand is between hours, we say the first number." "What is the first hour?" "Two."
3	"
4	"
	etc.

The major problem created by not following the priniciples and rules in this case is that the sequence demonstrated a limited range of positive variation. All the hours except "7" were on one side of the clock and the hour hand did not vary between hours.

Addition. Eight addition facts were selected for this addition sequence. These facts represent a limited range and were taught in the order they would normally occur.

Continued on Page 15

Effective Correction Procedures For Teaching Retarded Adults

By Isabelle Egan
Teaching Research (Oregon System of Higher Education) and Long Beach, CA School
Russell Gersten
Larry Irvin
University of Oregon
Reported by Russell Gersten[1]

Portions of this article are adapted from a manuscript currently under review for the *American Journal of Mental Deficiency*.

One of the cornerstones of DI is the use of appropriate correction procedures when errors are made. The importance of correction procedures has also been stressed in the behavioral literature on teaching and training severely handicapped individuals, although with rather a unique slant.

Throughout much of the early seventies, the pivotal figure in the field was the late Mark Gold. Gold argued that through the use of behavioral technology severely retarded individuals could be taught to perform complex vocational tasks (such as assembly of bicycle brakes). His early demonstration projects were extremely influential in the field. Gold's orientation away from testing and intricate assessment and towards training with built-in criterion-referenced probes was equally influential. In our view, the most questionable tenet in the Gold canon was his argument that those involved in training moderately and severely retarded clients should not waste their time providing verbal feedback to the clients, who cannot possibly understand what the trainer is talking about. Rather, one constant, non-punishing cue should always be used by the trainer to make the worker aware that what he or she is doing is incorrect. If the client makes an error, the trainer should merely say, 'Try another way."

In our work with severely retarded individuals we became aware of the wide variations between the clients. Some clients, though quite weak in expressive language and physical coordination, appeared to have relatively sophisticated receptive language. It seemed that, these workers should not be further deprived of the use of language in their vocational training—merely because of their diagnostic label or a theoretical viewpoint. If a client understood the meaning of "flat", "bent", "up", "same", it makes sense to provide feedback to him or her that takes advantage of this knowledge. That is, to correct the worker with phrases such as "Put the flat side up" or "Put this one in so that the tops are the same."

Up until 1980, little research had addressed this topic—and the few studies that did incorporate verbal prompts or corrections into the training (Close, Irvin, Prehm, & Taylor, 1978; Gold & Barclay, 1973; Walls, Ellis, & Zang, 1979) provided inconclusive results. These studies were analyzed and critiqued by Egan. She found that all the previous studies had used two-choice discriminations. In a two-choice discrimination, giving specific information about flatness, roundness, etc. is irrelevant. As long as the trainer somehow conveys to clients that they are wrong—be it "Put the flat side up" or "Try another way" or an emphatic "No"—they will try the other option.

Egan also pointed out that the earlier studies failed to measure the receptive language abilities of the subjects. For many low-functioning clients, specific verbal feedback may be dysfunctional. It is only for those clients with some language skills that specific corrective feedback would be recommended.

In the late seventies, Irvin & Gersten (1982) developed a measure of receptive language for moderately and severely retarded individuals, the *Trainee Performance Sample*. This measure dealt with comprehension of the type of simple directons and corrections typically encountered in vocational training. The details of reliability and validity of the instrument are reported in Irvin, Gersten, & Heiry (1984) and Irvin, Gersten, Taylor, Close, & Bellamy (1981). With the development of such an instrument, it became possible to seriously evaluate our hypothesis—that the use of specific verbal corrective feedback would accelerate the vocational training of severely retarded individuals with relatively sophisticated receptive language skills, but have no effect on the acquisition of skills by subjects with very low receptive language skills. In the present study, a four-choice visual-motor sorting task was employed which involved difficult visual discriminations and easy physical manipulations so that effects due to specificity of verbal feedback could be evaluated clearly.

Procedures

Subjects

Thirty-eight adults with low-moderate to severe mental retardation participated in the study. They were enrolled at two work activity centers in the State of Oregon. All subjects were living at home with their parent(s) or foster parent(s) or at a group home.

Subjects obtaining a Trainee Performance Sample Receptive Language score of eight (out of 12) or above were considered *high scorers*, and those scoring seven or below were considered *low scorers*. Subjects within each of the receptive language groups were then randomly assigned to the two training conditions—specific and non-specific verbal corrections. Subjects ranged in age from 19 to 41 years.

Apparatus

The materials for the criterion task were electrical terminals approximately one inch in length. They differed in shape only at one end, where some were round, some pointed, some flat and some bent. A small cardboard box, approximately 10 inches in length, with four compartments, served as a bin for the terminals. Each compartment was partially covered by a cardboard flap upon which a sample of one of the four terminals was attached for the match-to-sample training trials which are described below.

Training was conducted at a small table with side-by-side chairs for the trainer and the subject, in well-lighted, quiet rooms at the activity centers.

Experimenters

Eight trainers were employed in the study. Each of the trainers had worked, or was currently working, in a work activity center for retarded adults. Trainers were randomly assigned to one of the two conditions. They were trained by the experimenter to the criterion of correct performance before training was begun. The training was conducted at the training sites, and involved demonstrations by the experimenter and role-playing practice by the trainers. Trainers were randomly assigned to one of the two different training conditions.

Reliability

To assure consistent training procedures and fidelity of treatment, inter-rater agreement regarding scoring of subjects' performance was assessed on a random basis 16 times throughout the study.

Procedure

Each training session lasted approximately 20 minutes and was conducted over consecutive days until the subject had either reached training criterion or been trained a total of 120 minutes (i.e., 6 days). Criterion was 2 out of 3 consecutive complete trials correct—one trial being 16 matches, or 4 of each of the 4 terminal end shapes.

Training

Each task was demonstrated once to the subject. Then training on the task began. The 16 terminals (4 of each shape) were replaced in a pile on the table in front of the training bin. Objects in the pile were again in no particular order or orientation. The trainer said, "Now, you do it," and pointed to the pile of terminals. On the 2nd through 6th days, the trainer said, "Well, I want you to do it again, today. Go ahead," and pointed to the pile of terminals and the bin. Subjects were allowed 2 tries for every discrimination as described below.

Subjects who matched a terminal correctly on a *first try* were given various types of social reinforcement such as pats on the back and verbal statements. For the specific verbal correction group, the trainer said, "Good! That's a _____ (round, bent, pointed, flat) end. Put it with the rest." For the non-specific verbal correction group, the trainer said, "Good! That's the same; do the rest."

If the subject made an *error on any first try*, the response was followed by either a specific or non-specific verbal correction procedure, depending on the training group. The specific verbal correction was: "No, that's a _____ (round, bent, pointed, flat) end. Put it with the (round, bent, pointed, flat) ones." The non-specific verbal correction was: "No, that's not the same. Put it with the one that's the same." The subject was then given one more chance to perform correctly.

Consequences for correct performance on the second try consisted of a low key statement of verbal praise like "Good." Subjects were not allowed to push the terminal into the bin after a correct match on the second try. The trainer pushed it in.

On the second try, if the subject made an error or did not respond within five seconds of the correction for the first attempt, the trainer said, "No, it goes here," pointing to the correct matched sample. If the subject did not put the terminal next to the matched sample within five seconds, the trainer manually guided the subject's hand to do so. The trainer pushed the terminal into the bin. No data was recorded at this point and no consequation delivered.

After all sixteen terminals were in the bin, they were emptied out onto the table, reshuffled and put into a pile again. The subject was told to "Do it again." This procedure was continued for approximately 20 minutes per day until: (a) a total training time of 120 minutes had passed, or (b) criterion (2 out of 3 consecutive trials) was reached, whichever came first.

Dependent Measures

The following dependent variables were measured:

1. Whether or not the subject met criterion within 120 minutes of training.
2. Time to criterion.
3. Training trials to criterion.

The latter two were only recorded for subjects who reached criterion within 120 minutes.

In addition, two other dependent measures were recorded for purposes of secondary analyses. These were:

1. Percent of accurate responses on the first try.
2. Percent of accurate responses immediately following a correction procedure.

This last variable was of particular relevance for this study.

Results

Table 1 presents the number of subjects in each condition who met criterion within the allocated time. The data in Table 1 suggest the expected interaction. In fact, a significant interaction was found. For the High Receptive Language subjects, 80% met criterion with specific feedback and only 50% with non-specific feedback. For the Low Receptive Language subjects, the difference is much smaller, 33 percent versus 22 percent, respectively.

Table 2 presents descriptive statistics for three dependent variables—percent of subjects meeting criterion within 120 minutes, minutes in training, and trials to criterion. The reader is reminded that the latter two variables were only meaningful for those subjects who reached criterion in less than 120 minutes. Data are presented by treatment condition for: (a) all subjects, (b) those with high receptive language, and (c) those with relatively low receptive language skills.

Continued on Page 15

Corrections Continued from Page 14

Table 1. Number of Subjects Who Met Criterion by Treatment and Receptive Language Level

	Specific Correction	Non-Specific Correction
High Receptive Language	8 (80%)	5 (50%)
Low Receptive Language	3 (33%)	2 (22%)
All Subjects	11 (58%)	7 (37%)

Table 2. Percent of Subjects Meeting Criterion, Mean Time Necessary to Criterion, and Mean Trials to Criterion by Treatment Group and Receptive Language Level[1]

	Specific Verbal Feedback			Non-Specific Verbal Feedback		
All Subjects	N	Mean	SD	N	Mean	SD
Percent meeting criterion	19	58	49	19	37	48
Minutes in training	11	70.2	49.1	7	89.3	47.9
Trials to criterion	11	10	9.3	7	15.3	17.42
High Receptive Language Level						
Percent meeting criterion	10	80	40	10	50	50
Minutes in training	8	37.5	33.1	5	42.2	47.2
Trials to criterion	8	10.1	8.8	5	18.4	19.8
Low Receptive Language Level						
Percent meeting criterion	9	33		9	22	

[1]Minutes in Training and Trials to Criterion are only reported for Ss who met criterion within 120 minutes

For the clients who met criterion, mean number of minutes in training and mean trials to criterion are reported on Table 2. The average training time is quite similar for the two methods.

Percent Correct Immediately Following Correction Procedure

Correction procedures had the strongest effect on the trial immediately following the correction. For high receptive language level subjects, 86 percent of the responses were correct after specific verbal corrections, and 61 percent after non-specific verbal corrections. The pattern was similar for low receptive language subjects (67 percent vs. 45 percent).

The statistical analysis indicated significant main effects for type of correction procedure. This means that regardless of the measured receptive language level of the subject, the specific verbal correction had a significant impact on performance on the trial after correction.

No significant differences were found on *percent correct on the first attempt*. This indicates that the specific verbal corrections had the impact exactly where expected—on the trials immediately following a verbal correction.

To summarize, regardless of receptive language level, specific correction procedures led to better performance on the trial *immediately* following the correction. However, only for those with higher language skills, did the specific verbal procedure have a long range impact significantly enhancing acquisition of these complex vocational skills within the allotted two hours of training time.

Discussion

The results of the current study suggest that severely retarded workers who score higher on a receptive language test (that measures ability to respond to words, phrases, and concepts used in vocational training) will benefit when specific verbal corrective feedback is used in training. Those with low receptive language skills benefit equally from specific or non-specific verbal feedback. For the client with relatively strong receptive language skills, altering the trainer's speech and behavior (Close, Irvin, Prehm, & Taylor, 1978) may be as important as the alteration of the stimulus dimensions of the task urged by earlier writers in the field (Gold, 1973; Irvin & Bellamy, 1977). These earlier writers encouraged that non-verbal procedures, such as gradual reduction of color-coding and exaggerated cue differences, be used in training. An increased focus on providing comprehensible verbal feedback to trainees appears to be in order.

References

Close, D., Irvin, L., Prehm, H., & Taylor V. (1978). Systematic correction procedures in vocational skill training of severely retarded individuals. *American Journal of Mental Deficiency, 83*(3), 270-275.

Gold, M. (1973). Research on the vocational habilitation of the retarded: The present, the future. In M.R. Ellis (Eds.), *International review of research in mental retardation, 6.* New York: Academic Press.

Gold, M. & Barclay, C. (1973). The effects of verbal labels on the acquisition and retention of a complex assembly task. *The Training School Bulletin, 70,* 38-42.

Irvin, L. & Bellamy, T. (1977). Manipulation of stimulus features in vocational-skill training of severely retarded individuals. *American Journal of Mental Deficiency, 81*(5), 486-491.

Irvin, L., Gersten, R., & Heiry, T. (1984). Validating vocational assessment of severely retarded persons: Issues and applications. *American Journal of Mental Deficiency, 88*(4), 411-417.

Irvin, L.K., Gersten, R., Taylor, V.E., Close, D.W., & Bellamy, G.T. (1981). Vocational skill assessment of severely mentally retarded adults. *American Journal of Mental Deficiency, 85*(6), 631-638.

Irvin, L. & Gersten, R. (1982). *The Trainee Performance Sample.* Milwaukee, WI: Ideal Developmental Labs.

Walls, R., Ellis, W., Zane, T., & Vanderpool (1979, April). Tactile, auditory, and visual prompting in teaching complex assembly tasks. *Education and Training of the Mentally Retarded,* 120-130.

Teaching Transformations

Continued from Page 13

EXAMPLES	TRAINER WORDING
40 + 1 =	"40 + 1 = 41." "What does 40 + 1 =?" "41"
40 + 2 =	"40 + 2 = 42." "What does 40 + 2 =?" "42"
40 + 3 =	"Answer?"
40 + 4 =	"Answer?"
40 + 5 =	"Answer?"
40 + 6 =	"Answer?"
40 + 7 =	"Answer?"
40 + 8 =	"Answer?"

It was predicted that subjects trained with the sequences designed according to the juxtaposition principles and transformation rules would reach criterion in less time and more successfully generalize than subjects who were trained with the sequences not following juxtaposition principles and transformation rules. This prediction was tested using the following procedures.

Subjects in each condition were trained using modeling, prompting, correcting (model-lead-test format), and reinforcement procedures (points given for appropriate behavior and correct responses). All subjects were trained in the same setting. Training sessions were 20 minutes long for each subject.

Criteria for each task was 100% accuracy for two consecutive trials. When criterion was met, subjects were presented with probes. These probes consisted of five untrained examples similar to training examples and were used to assess immediate generalization. A tape recorder was used to tape all training and probe sessions. Tapes were then used to compute training (percent accuracy and time to criterion), generalization (percentage correct probes), and reliability data. The only difference between conditions was the selection and sequencing of examples and content presented.

Results

Results showed no difference in accuracy ($t = 1.72$, p greater than .05) or time to criterion ($t = .20$, p greater than .05) between subjects trained with transformation sequences designed using juxtaposition principles and transformation rules and those who were trained with the sequences not following these principles and rules. However, a significant difference was found between the two in terms of immediate generalization (p less than .001). Specifically, ten of the twelve subjects trained with transformation sequences designed with juxtaposition and transformation rules performed with higher percentages of accuracy on generalization stimuli, than those trained with the other sequences.

Discussion

These results demonstrate that individuals with severe mental retardation can learn complex transformations and can successfully generalize to untrained examples. Another important finding is that generalization is greatly facilitated through the use of juxtaposition principles and transformation rules. The results on time to criterion and accuracy can best be interpreted by considering the amount of information presented relative to the time required to reach criterion and the amount of generalization. More information was presented and greater generalization resulted for subjects trained with time-telling and addition sequences designed according to juxtaposition principles and transformation rules, relative to the time required to reach criterion, than subjects trained with the other sequences.

These findings have important implications for transformation research with moderately and severely handicapped learners. The present study demonstrated that students with moderate and severe handicaps could learn math and time-telling transformations, and that generalization was facilitated through the use of juxtaposition principles and transformation rules. However, given the emphasis on teaching functional community-referenced skills (e.g., cooking, self-care, vocational, etc.) (Bellamy & Wilcox, 1981; Gold, 1980; Snell, 1983; Brown, Branston et al., 1979; Brown, Falvey et al., 1979), rather than academic skills, the true utility of using transformation rules is untested. Questions related to the effectiveness of juxtaposition principles and transformation rules on acquisition and generalization of functional skill transformations need to be addressed in future research.

References

Bellamy, T., & Wilcox, B. (1981). Secondary education for severely handicapped students: Guidelines for quality services. In B. Wilcox & A. Thompson (Eds.), *Critical issues in the education of autistic children and youth* (pp. 241-261). Washington DC: Department of Education, Office of Special Education.

Boriero, D. (1985). *The effects of transformation versus task analysis sequencing on efficiency and immediate generalization for trainable mentally retarded individuals.* A masters thesis presented to California State University, Stanislaus.

Brown, L., Banston, M.B., Hamre-Nietupski, A., Pumpian, I., Certo, N., & Gruenewald, L. (1979). A strategy for developing chronological age-appropriate and functional curricular content for severely handicapped adolescents and young adults. *Journal of Special Education, 13,* 87-90.

Brown, L., Falvey, M., Vincent, B., Kaye, N., Johnson, F., Ferrara-Parrish, P., & Gruenewald, L. (1979). Strategies for generating comprehensive, longitudinal and chronological age-appropriate individual educational plans for adolescent and young adult severely handicapped students. In L. Brown, M. Falvey, D. Baumgart, I. Pumpian, J. Schroeder, & L. Gruenewald (Eds.), *Strategies for teaching chronological age appropriate functional skills to adolescent and young adult severely handicapped students.* Madison, WI: Madison Metropolitan School District.

Carnine, D.W. (1976). Discriminating stimuli that appear between two discriminative stimuli along a numerosity continuum from stimuli that appear beyond one of the discriminative stimuli. *Eugene, OR: Follow Through Project, Technical Report 76-1, Appendix B: Formative Research Studies.*

Carnine, D.W., & Stein, M. (1981). Organizational strategies and practice procedures for teaching basic facts. *Journal of Research in Mathematics Education,* 12, 65-69.

Engelmann, S.E., & Carnine, D.W. (1982). *Theory of instruction: Principles and applications.* New York: Irvington Publishers.

Gold, M.W. (1980). *"Did I Say That?"* Champaign, IL.: Research Press.

Snell; M.E. (1978). *Systematic instruction of the moderately and severely handicapped* (2nd ed.). Columbus, OH: Charles E. Merrill.

Stephens, B. (1979). *Training the developmentally young.* New York: The John Day Company.

Teaching Reading to the Learning Handicapped

By Stacey J. Kasendorf
Curriculum Resource Teacher
Learning Handicapped Department
San Diego City Schools

In a large urban school district, where mobility is a significant factor, a K-12 reading program for all Learning Handicapped students does not seem feasible. However, this goal was successfully accomplished in the San Diego Unified School District, where the target population includes more than 125 teachers and over 1300 students.

The project began in March, 1982, when eight special-day-class teachers field tested the Corrective Reading (SRA) program in 3 secondary schools. Results from this study showed positive growth in the word attack and word identification subtests of the *Woodcock Reading Mastery Test*. More encouraging, however, were the teachers' and students' attitudes about the positive academic gains, reduction of behavior problems, confidence in students' reading abilities and high teacher-student interaction.

During the following school year (1982-83), Corrective Reading was implemented in the Secondary schools in one of four regions within the city. Thirty teachers and 167 students were involved in this implementation, again proving positive growth. Effective training, conducted by SRA consultants and authors of the program, was one of the key factors in the success of the program.

In the Spring of 1983, a small study was conducted in selected elementary schools using Reading Mastery and Corrective Reading. The results continued to prove that direct instruction in reading, taught effectively by trained teachers, was the outstanding method to use with learning handicapped students of all ages.

The Fall of 1983 was the exciting beginning of full implementation. Over 125 teachers were trained from August through October by key authors, consultants and San Diego Unified resource staff. This overall implementation required three main components: school board approval and support, an evaluation design, and teacher training.

The district Evaluation Services Department assisted with the data collection and compilation. Teacher attitudinal Surveys were disseminated with random teacher interviews as a follow-up.

The evaluation design included a pre- and posttest for randomly selected students in each classroom. Students in grades K-3, who were instructed via the Reading Mastery I and II programs, were tested on the *Woodcock-Johnson Psychoeducational Battery Part Two*, Reading Cluster. Students in grades 4-12 were taught with the Corrective Reading (Decoding) Program. These students were pre- and posttested on the *Woodcock Reading Mastery Test*.

The final data will be disseminated to the School Board in September. For that reason, tables and graphs are unavailable at this time. The overall growth showed a 6 month gain in reading for *all* students in grades K-12 in 7 months of implementation. Phenomenal Statistics were also available for individual students. For example, one fourth grader made 24 months growth in total reading in seven months.