ADI NEWS

VOLUME 11, NUMBER 1 THE ASSOCIATION FOR DIRECT INSTRUCTION FALL, 1991

Summer 1992 Conference Update...Save These Dates to Improve Your Skills!

July 13-16 • Rehoboth, Delaware
8th Atlantic Coast DI Conference

July 27-31 • Eugene, Oregon
18th Annual Eugene DI Conference

August 3-5 • Salt Lake City, Utah
7th Salt Lake City DI Institute

August 3-5 • Madison, Wisconsin
3rd Wisconsin Summer Conference on DI

The **Direct Instruction News** is published Fall, Winter, Spring and Summer, and is distributed by mail to members of the Association for Direct Instruction. Membership and subscription information may be found on the last page of this newsletter. 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.

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ADI Awards for Excellence in Education

At the Seventeenth Annual Eugene Direct Instruction Conference three excellence in Education Awards were made by the Board of Directors. These awards went to Barbara Dean for Teacher of the Year, Duane Bresee for Administrator of the Year, Sara Tarver for Teacher Trainer of the Year, and to Russell Gersten for Researcher of the Year.

ADI Teacher of the Year—Barbara Dean

This year the Association for Direct Instruction announced Barbara Dean as the ADI recipient for the teacher of the year. Barbara has been teaching Direct Instruction since, at least, 1978, to primary grade students in Southeast San Diego. She also served as a Follow Through teacher trainer for two years; and has trained numerous other fine teachers. When Follow Through ended in San Diego several years ago, she went back into the classroom and continues to provide exemplary instruction to first graders.

In his letter of nomination, Russell Gersten wrote: Barbara was a subject in one of my first research studies. I was extremely impressed by the achievement growth made by her students—from the 9th to the 94th percentile on the WRAT, and above grade level on the CTBS. Years later I was able to observe Barbara teach. She represents some of the best features of Direct Instruction—clear, organized... and extremely calm. Her success was evidenced by the students' reading—they not only read accurately (not one error in five minutes) but also fluently and *with* expression.

In our recent work Barbara has begun to expand her repetoire—easily integrating new concepts such as story grammar and aspects of reciprocal teaching into her Direct Instruction framework. Though eligible for retirement, she turned down a large "golden handshake" package to continue teaching another few years.

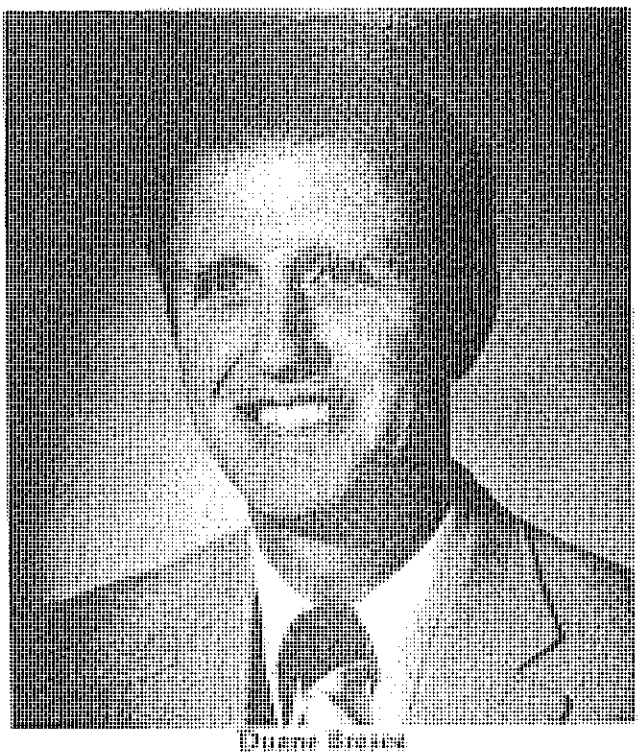
ADI Administrator of the Year—Duane Bresee

In his letter of nomination, Gary Johnson wrote:

Duane Bresee is Director of Special Services for the Sevier (County) School District in Richfield, Utah, a large rural district 150 miles south of Salt Lake City. Sevier School District teachers and administrators first recognized the efficacy of Direct Instruction teaching techniques, strategies and programs with special education populations. Administrators also saw that two features of Direct Instruction, frequent monitoring of student progress and adjusting instruction to meet individual student learning needs, fit the goals of the state of Utah's movement to Outcome-Based Education. District administrators and teachers decided in the mid-1980's to implement Direct Instruction with all children in grades K through 6 in Sevier County Schools.

Under Duane's leadership, the district has arranged for inservice training before each school year to adequately prepare all teachers and teaching assistants to use Direct Instruction techniques and programs. For the first two years of the district-wide implementation, outside consultants were hired to conduct week-long training sessions in the district. Each year since 1987, administrators, teachers, and teaching assistants have attended the ADI Direct Instruction Institute in Salt Lake City. Duane has also encouraged the participation of building administrators in providing follow-up in classrooms, and administrators are now engaged in developing a coaching model and additional methods for monitoring student performance.

In recognition of his achievements in promoting the implementation of effective instruction at the district-wide level, the Association for Direct Instruction presented Duane Bresee with the award for Administrator of the Year.



Duane Bresee

ADI Teacher-Trainer of the Year—Sara Tarver

In their letter of nomination Jane Jung, Tami Hollenbeck and Kathy Schaefer wrote:

Since Dr. Tarver's arrival at the University of Wisconsin—Madison, she has developed and refined the Learning Disabilities graduate program in the Department of Rehabilitation Psychology and Special Education. In addition to establishing the academic structure which emphasizes Direct Instruction, she also has implemented a successful practicum program in which degree candidates have first-hand experience using techniques described in her lectures. The program, which involves dozens of school districts, instills confidence in students as they begin their teaching career and also demonstrates the effectiveness of Direct Instruction to local educators. Sara has continued to be actively involved in the program and provides support and counsel for participating teachers. Her personal enthusiasm and insight into the challenges present in classrooms today is a continuing source of inspiration.

Sara's efforts to promote Direct Instruction have not only been confined to the graduate program. She has offered advanced programs in DI theory and techniques as well as on-site consultation to school districts. As founder of the Wisconsin Advocates for Direct Instruction, Sara has organized summer conferences designed to provide comprehensive training for educators, parents and administrators.

For those of you who are familiar with Sara's numerous contributions to the field of education, this nomination will be no surprise. Complimentary to Sara's academic expertise is her passion for promoting quality in education and her unique ability to instill zeal in others. Throughout the time we have worked with Sara we have appreciated her warm, encouraging manner and her positive approach.

ADI Researcher of the Year—Russell Gersten

In his award presentation, Doug Carnine made the following comments:

It's a pleasure, as a researcher, to be able to recognize the outstanding work of another researcher. I'm not going to list all the articles and chapters and grants and consultations of this person. Rather, I'll describe the attributes that make this person a model for other researchers.

The note I received asked that I talk about this person's contribution to Direct Instruction. That's not really appropriate. This person represents the highest ideal of research—the quest for understanding. As I concluded my presentation this morning, Direct Instruction will continue making its contribution only as long as it follows nature's logic. This person has unwavering belief in data, which supports many aspects of Direct Instruction but not necessarily all. His honesty as a researcher is vital to bringing science into education, which makes his integrity a cornerstone for the professionalization of education and a greater contributor to the goals of DI.

Charles Darwin remarked that he never needed to worry about quickly writing down observations that confirmed his theory. But he did have to hasten to record observations that contradicted his theory. The recipient of ADI's Researcher of the Year Award goes to a person who is the conscience of DI, our own "Charles Darwin"— a person of vision in both research and analyzing American education; a person who articulates the role of research and the importance of research findings; a person who is not afraid to speak the truth when the truth is unpopular, whether it be at a Direct Instruction Conference or at a Whole Language Conference.

Please receive Russell Gersten. ◆

Parallels in Educational Practices in the U.S. and in South Africa

by Daniel Mkhonto

Black education in South Africa and education in America may seem very different, but there are many similarities. The stated goal in both South Africa and in the United States is to move the child from the state of ignorance to the state of knowing. The ultimate goal is to give the child high-level cognitive skills in critical thinking, languages, science, and so on. These are the same.

In order to accomplish the above goals there are two components of instruction around which the educational pendulum swings: teachers and texts (methods for teaching and the design of textbooks). In South Africa, 3-year training programs result in teachers who have no practical knowledge of how to teach. The principal must work with graduates to show them basic practical methods for working with children. Texts can take the most prominent role in producing the most predictable results in achieving these goals. Good texts are critical. Educators in both South Africa and the United States believe in using and reading many different texts with different approaches to teaching. Lots of money is spent on these textbooks, but with surprisingly little follow-up on whether the books were effective in accomplishing the stated goals.

Texts in South Africa and in the United States are designed by the publishers and not by educators. The educator's aim is to develop the child's mind. The book business's aim is to sell books. These divergent aims create a paradox in education. The conflict between the book industry and the brain industry is the same in South Africa and in the United States.

I remember when I was in South Africa in September 1990. Ten text sales representatives from different publishers came to talk to and try to sell their texts to a large group of principals. The principals were making their 1991 requisitions. The principals were not the ones who would use the books, and even if they were, they could not evaluate the contents of the books in the various subjects, because they had to make their orders on the spot.

Each publisher wanted its books to be ordered and each one spoke only of the good points about their books. There was no research presented on effectiveness. There was no time to take the books and try them out first. There was no time to even show them to the teachers. Imagine the situation. What criterion will the principals use when so abruptly faced with such a decision and so little information? The same books that I read in 1962 for Afrikaans, English, and Tsonga reading are there to be adopted. This is ridiculous when you look at how little the books have evolved in 30 years. No changes were made in the books, despite the repeated failing results. Then some other books are there that use new discovery methods. The principals look at the aims and objectives of these books, they are so attractive and colorful that they cannot restrain from grasping those books. The educators are only shocked by the poor end results. The teachers can use none of these books successfully, so they generally all end up stored in the library, with the classes using no books, wasting thousands of rands of our scarce money for Black Education.

The methods used in these books are poor and ineffective. The books do not spell out how they should be used, but only show words that you do not know whether they are for students or for teachers. The poor, lonely teacher is just by himself/herself in his/her classroom and face–to–face with the books. I could not believe when I was going through some adopted U.S. basals how they also did not teach what they purported to teach. The discovery method is used in many of these books. But the teacher does not know what is to be discovered, who must discover it, or how this discovery is done. It makes no sense to try to discover what is already in the Black child, when there is nothing in the child. His parents have no education. His home is bleak. What can be discovered? The teachers ask endless questions, for which the children have no answers. The result of these methods is failure, frustration, drop-outs, and a need for real instruction.

I was surprised to find that these poor discovery methods are also widely recommended in American schools. I had thought that these poor methods were pushed on Blacks as a result of apartheid, and that the good methods were used in White schools. When I found these methods are also used in American White schools, I was shocked. I remember what I said to Kathy Jungjohann—that apartheid in my country has done us more harm than justice because all the good methods of teaching were done by South African Whites. I still remember what she said: "No, we have been in the U.S. for a long time and we use these same poor methods in our schools, although we are White and educated by Whites. It is not a matter of place or apartheid, but a matter of learning and researching that which is really useful to both the student and the

teacher." I was startled and without further comments.

To my mind you can teach children to discover the world by giving them the strategies for making these discoveries. Many people don't realize that Direct Instruction does this; it teaches strategies for discovery. Children learn a decoding strategy they can use to discover what is on any written page. They learn a count-by strategy, like counting by 5's, that they can use to discover what time it is and how to count money. By giving the children a rule about equality that children can understand, these children can discover what is the same about mathematical equations and formulas. In Language Arts, Direct Instruction teaches writing skills that can be used in many new situations. After teaching children strategies to use, they can really discover and master the world.

On that day in September, after the publishers had finished their addresses I was asked by the Chairman of the Mkhuhlu Principal's Board to pass a vote of thanks. I remarked about the conflict that I thought was taking place in the business of the day: where each publishing company wanted its books (basals) to be bought versus the intelligence that the educators wanted to achieve. I stated that life has changed so drastically and our teachers and students are faced with these changing challenges. I further stated that the publisher who will be the best is the one who will sell and publish books that address these challenges of which most importantly, should be books which are of high quality, competitive, and aimed at a dramatic transformation of Black Education making our students and teachers adequately competitive in the world market at large, today and in the future to come. This has been my main objective ever since I became a teacher.

So I fell in love with Direct Instruction, which holds the teacher responsible for the failure of the student, thereby motivating them to look for changes when failure occurs and look for effective ways to make children competitive. Direct Instruction gives both the teacher and the student strategies for teaching and learning, strategies on which so much research has been conducted. Direct Instruction predicts the child's difficulty, for example, with irregular words in reading. Direct Instruction divides the work according to the level of difficulty so as not to overwhelm the child. It gives guided practice and does not believe in the trial and error method. Direct Instruction uses time more efficiently, teaching more in less time.

In reading, Direct Instruction develops the child's self-esteem making them enjoy reading. I remember my daughter Fikile, who learned to read with Direct Instruction in South Africa. It was hard to make her go to sleep when she was reading. although she was only in the first grade, she wanted to read the newly translated Tsonga Bible. Her brother, Lucky, in the fourth grade, who did not have Direct Instruction, had no interest in reading for he did not have the strategy for reading. It is hard and frustrating for both the teacher and the child if they cannot know what to do. The teacher reads and the student says what the teacher reads without really seeing and understanding the miracle of how the teacher is reading. So many students are so vulnerable to problems of such a nature. My daughter learning Direct Instruction in the first grade, could do mathematics, reading, and English language, much better than my oldest son in the fourth grade, who had been learning from the other methods.

I feel like crying after discovering that I did not do what I ought to have done to lead my students to more creativity and expression, for I personally was even much more lost. It is now, after my training at the University of Oregon in Direct Instruction, that I feel I am a really accountable, responsible, capable teacher. I hold Edward Kameenui, Kathy Jungjohann, Mary Gleason, Nancy Woolfson, Phyllis Haddox, Darrell Vincent, Bonnie Grossen, and Bernie Kelly in the highest esteem for the great difference they have made in my life. It is hard to forget Zig, Doug, and Jerry, who are the goldmines of this wonderful instructional method, as well as Barbara Bateman.

My eyes could not believe that Eugene could still be having students with learning problems while they are just living in a factory of such wonderful teaching methodologies. I was shocked to realize that some teachers and principals in Eugene do not know about Direct Instruction. I remember when the principal at the school where I was doing my first practicum went to observe the teacher I was working with, after hearing that I came all the way from South Africa to learn the method she was using. He wanted to see what method it was that brought me from such a far away place. This is also true in South Africa. Principals do not actually know what methods are used in the first through fourth grade. They say that to know the methods is the work of the lady teachers. By doing this they neglect the most important and delicate embryonic stage in our precious, valuable education. They look at the dear, tender, innocent student bearing the scars of all our inadequate methods of teaching and blame the failure on family background and so on. The

books and methods are never checked, criticized, researched, or evaluated to find out if they are palatable and true vehicles for reaching our proposed, ultimate goal. The teacher takes little opportunity to scrutinize and really scientifically criticize the books, despite the fact that most of the publishers are not teachers and never consulted the teachers to find out what works and what these teachers need in order to teach very accountably and responsibly.

The Direct Instruction school in Houston, Texas, that was just recently broadcast on Prime Time Live, has clarified my vision for what I must do when I return to South Africa. I will not tell people what they must do. In my report back I will tell them only what I am going to do. I am going to train the teachers in my school to use Direct Instruction. No one can tell me what to do in my school. My students will perform like the students in the Black Direct Instruction school in Houston, embarrassing even the White schools. Just wait a few years and you will hear. I know our people are hungry for such a method. Our people will be able to see for themselves how powerful it is and will be begging for Direct Instruction in South Africa. ◆

Note about the author:

Daniel Mkhonto first became acquainted with Direct Instruction as a Vice Principal at an experimental Direct Instruction school in a South African homeland. Although he was soon assigned as principal to another nearby school, his interest in the method remained strong and grew stronger when his daughter entered the program. Because of his interest he was invited to come to the United States to learn more about the method and how to teach it himself. He was in Eugene from September, 1990 to June, 1991. We look forward to further news from Daniel.

Direct Instruction Special Interest Group to meet in San Francisco at the Convention of the Association for Behavior Analysis: International

May 24-28, 1992

Hyatt Regency at Embarcadero Center San Francisco, CA

If interested in participating, contact:

Dr. Paul Weisberg
Deptartment of Psychology
University of Alabama
Tuscaloosa, AL 35487

Federal Grant Provides Free Math Workshops on Improving Math Curricular Material

The Center for Improving Mathematics Educational Curricular Material at the University of Oregon is pleased to announce the availability of an inservice professional development program for educators and other professionals on how to evaluate and modify math instruction in grades 1 through 6.

The workshop, entitled "Reforming the Math Curriculum, A Challenge for the Nineties," is a one-day workshop designed to train school and administrative personnel in the skills necessary to provide effective instruction in mathematics, both in regular classrooms and special education settings.

The *Reforming the Math Curriculum Workshop* provides educational professionals with:

- Knowledge of why traditional approaches do not work.
- Research-based evaluation criteria for helping teachers and administrators to evaluate math basals.
- Guidelines for aiding teachers and administrators to modify math basals to improve their instructional efficiency.
- Illustrations of effective instructional alternatives.

Participants will develop specific skills in analyzing instructional texts with reference to:

- Lesson Organization
- Clarity of Communication
- Use of Time
- Guided Practice
- Independent Practice
- Rate of Introducing Concepts
- Background Knowledge
- Review

Specific topics will include:

1. How to predict student failure based on weaknesses in instructional design.
2. The advantages of a strand design over the traditional spiral curriculum.
3. How to identify necessary prior knowledge for a concept/skill you teach.
4. Determining component skills for complex mathematical problems. e.g.:
   - decimals
   - fractions and percents
   - ratios
   - proportions
   - multi-step word problems
5. Techniques for presenting teaching examples clearly to avoid misconceptions.
6. Methods for evaluating and excluding irrelevant activities.
7. How to introduce new concepts/skills at an appropriate rate.
8. The more difficult problem subtypes that require additional teaching to identify them.
9. How to structure lesson presentations for initial student success.
10. Guided practice before students tackle problems independently.
    - How much is essential
    - How to provide it.
11. When and how to incorporate discrimination practice between different problems.
12. Organizing review: How to do it so that students maintain the skills that are learned.

Those interested in bringing this workshop to their district or area may contact Dr. Bernadette Kelly at 805 Lincoln Street, Eugene, OR 97401 (ph.: 503-485-1163). ◆

Direct Instruction Programs Produce Significant Gains With At-Risk Middle School Students

by Jonita Sommers
Basic Skills Teacher,
Big Piney, Wyoming

The Big Piney Middle School in Big Piney, Wyoming had a program for at-risk students which had been very successful since the 1985-86 school year. Big Piney is an isolated community which has stable ranching families, but is also very dependent on the oil and gas fields. These fields allow for some permanent families, but they also lead to a large work force of transient families. When Exxon built the LaBarge-Shutte Creek project in 1985-86, they brought in 5000 workers. This group was nearly five times the population of the Big Piney area. With all the transient workers, there was a high percentage of at-risk students, so a basic skills teacher was hired. The program was designed or created to help the at-risk students in reading and math in the sixth, seventh, and eighth grades. At-risk students in the basic skills classes were students having difficulty in the "regular" classroom, and they had scored below the 50th percentile on standardized test, but they did not qualify for the special education resource room. The basic skills program was deemed so successful it was continued after the end of "The Exxon Boom."

Reason Direct Instruction was Chosen

Jonita Sommers, the basic skills teacher, received her masters at the University of Wisconsin at Madison where she learned to use the Direct Instruction programs developed by Siegfried Engelmann. After studying the theory behind the Direct Instruction programs and reading the results of the Follow Through Study, it was apparent that Direct Instruction involved worthwhile and successful teaching methods and programs to use with at-risk students. If a teacher was trained to use the Direct Instruction programs, they could be used with great success.

Theory Behind Direct Instruction

One of the most important aspects of any Direct Instruction program is the sequencing of skills. Pre-skills are taught first and the common instances of the strategy are taught until the student has the concept mastered before the exceptions are taught. Skills which are used a great deal are taught first, and information that is likely to be confused with newly taught skills is not taught at the same time. Part of a skill is taught before the entire skill is introduced to reduce confusion. Example selection is very important.

The student is told the objective and why the skill is important. Problem-solving strategies are taught instead of memorization of facts, so the skill can be transferred to other situations. Sufficient practice is provided in the lessons, and review is provided in future lessons. The teacher must diagnose mistakes and correct them immediately, so the student has instant feedback and there is no confusion. Students are motivated by positive teacher feedback, so they learn to be successful in school and feel positive about themselves.

Teacher manuals show how to present lessons—word by word. This allows the teacher to focus on student performance in small groups. Unison oral responding is used to all of the students respond at the same time and everyone is involved. A signal is given so not only the higher students respond, but everyone must participate and learn. The teacher takes turns watching each students' eyes and mouth to see if they are responding correctly, so the correct feedback can be given. The students' attention is maintained by the teacher moving through a lesson quickly. This rapid pacing allows the teacher to use the class time efficiently.

The Program Design

The basic skills program in the Big Piney Middle School covered math and reading in the sixth, seventh and eighth grades of the middle school. There were occasions when some at-risk students needed additional help in English and spelling. The basic skills classes were blocked against "regular" classes of their types, so that the at-risk students could be moved in and out as needed. The classes consisted of five to ten students which helped the at-risk students get the individual help they needed. The students were mainstreamed into the "regular" classroom as soon as they achieved grade level. This was usually achieved within a two-year period or less depending on how much the student had to gain to reach this goal. This type of pullout program was especially helpful to the transient, at-risk students, because they received academic help immediately.

Yearly Schedule Structure

The teacher's schedule was developed according to the needs of the students. The schedule was developed to service the largest number of students possible and to service the students who needed the greatest amount of extra help.

1985-86
Reading for 6, 7, 8 grades
Math for 6, 7, 8 grades
Spelling for 6, 7, 8 grades

1986-87
Reading for 6, 7, 8 grades
Math for 6, 7 grades
Spelling for 6, 7, 8 grades
English for 7, 8 grades

1987-88
Reading for 6, 7, 8 grades
Math for 6, 7, 8 grades

1988-89
Reading for 6, 7 grades
Math for 6, 7, 8 grades
Spelling for 7 grade
English for 7 grade

1989-90
Reading for 6, 7 grades
Math for 6, 7 grades
Spelling for 6, 7 grades
English for 6, 7 grades

1990-91
Reading for 6, 7 grades
Math for 6, 7 grades
Spelling for 6 grade
English for 6 grade

1991-92
Reading for 6, 7, 8 grades
Math for 6, 7 grades
Spelling for 6, 7 grades
English for 6, 7 grades

Placement of Students

Students were placed in the basic skills program if they met the placement criteria. All the children were given the Gates-MacGinitie Reading Test and the Stanford Mathematics Test when they entered the middle school. If a student scored below the 50th percentile, and the classroom teacher felt he or she was having difficulty in class, the student's standardized achievement test score and last class grade were evaluated. If the student was below the 50th percentile of the standardized achievement test, and he or she had a D or F grade, the parents were consulted. If the regular classroom teacher, the basic skills teacher, and the parents were in agreement, the student was placed in the basic skills class.

Teaching Programs Used

Following the recommendation procedures that come with the DI programs, the students were tested and placed in the appropriate SRA Direct Instruction programs at the appropriate levels.

Reading

The *Corrective Reading Decoding* program was the core of the basic reading class. In several of the classes where the students were having specific difficulty with reading comprehension, the *Corrective Reading Comprehension* program was used. These reading programs were supplemented with other reading material. All types of folklore such as fables, fairy tales, legends, tall tales, and myth were read and studied along with different types of poems at the sixth grades level. After the students were reading fluently and with confidence from the skills taught in the Direct Instruction programs, they were placed in the seventh grade reading text, *Journeys*, by Harcourt Brace Jovanovich to supplement the Direct Instruction programs. Novels with interest levels at seventh to ninth grade and reading levels at fifth to seventh grade were used to supplement the Direct Instruction programs at the seventh and eighth grade levels. A "reading workshop" teaching approach was used with the supplemental material, and the students were able to read successfully with grade level material. The reading plan can be summarized as follows:

Sixth Grade

Decoding B → *Decoding C*

Supplemental Reading Material:
Fables, Legends, Tall Tales, Fairy Tales, Myths, Poems.

Seventh and Eighth Grades

Decoding C → Novels (RL5-7, IL 7-9)
Student choice from 3 or 4.

Supplemental Reading Material:
Reading workshop setting for *Journeys*.

Math

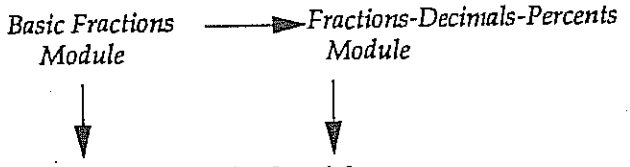
The *Corrective Math Programs* were used along with the regular classroom book, *Heath Mathematics*. The *SRA Mathematics Modules* programs were also utilized. The plan:

Corrective Math Multiplication → *Corrective Math Division*

Basic Fractions Module → *Fractions-Decimals-Percents Module*

Supplemental Math Material:
1. Grade level *Heath Mathematics* text.
2. Worksheets for other areas of remediation.

Seventh Grade



Supplemental Math Material:
1. Grade level *Heath Mathematics* text.
2. Worksheets for other areas of remediation.
3. Hands-on units (tangrams, geoboards, puzzles, fraction pies, unifex cubes, etc.)

Eighth Grade

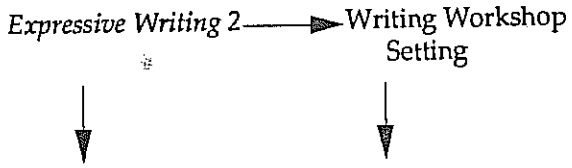
Ratios and Equations Module

Supplemental Math Material:
1. Grade level *Heath Mathematics text.*
2. Real life statistic projects.

English and Spelling

The *Expressive Writing* program was used in the basic skills English class, and it was supplemented with the *Warriner's English Grammar and Composition,* which was the regular English class textbook, and the DLM *Growth in Grammar* workbooks. For the spelling class, *Corrective Spelling Through Morphographs* was utilized the first year and the *Spelling Mastery* program was used if the students were in the basic skills spelling program for the second year.

Sixth and Seventh Grades



Supplemental Language Material:
1. Grade level English book for punctuation.
2. DLM *Growth in Grammar* for parts of speech
3. *Corrective Spelling Through Morphographs*

Structure of DI Reading Programs

One of the reasons the at-risk students were so successful in the Direct Instruction programs was because of the structure of the programs. The *Corrective Reading Decoding B* reading program did an excellent job of teaching the phonetic sounds, and it worked on comprehension skills. The *Corrective Reading Decoding C* reading program worked with phonetic skills, but it concentrated on vocabulary and comprehension. Halfway through the program, the students were required to read from outside sources, such as, encyclopedias, newspapers, and magazines along with the Direct Instruction program. This gave the students confidence in reading other material because they were able to generalize the skills they had learned.

The *Corrective Reading Comprehension B* reading program worked well for students who were able to decode words, but unable to comprehend and interpret what they had read. It not only taught reasoning skills, vocabulary, statement inference, and following directions, but it focused on language skills and science information about the body. Some of the language skills were parts of speech, subject, predicate, sentence combinations, sentence analysis, writing stories; therefore, this program tied in well with the *Expressive Writing* 2 program. The *Corrective Reading Comprehension C* reading program was appropriate for at-risk students who had completed the *Decoding C* reading program and tested too high for *Comprehension B,* but were not ready to be mainstreamed back into the "regular" classroom. This program covered organizing information, operating on information, using sources of information, communicating information, and using information for directions.

Structure of DI Math Programs

The students were able to see how to do three- and four-step multiplication and division math problems without confusion using the *Corrective Mathematics Multiplication* and *Division* programs. The *Basic Fractions Mathematics Module* did an excellent job of explaining what fractions were, along with teaching the students how to add, subtract and multiply fractions. Students also learned how to work with mixed numbers, and equivalent fractions. The *Fractions-Decimals-Percents Mathematics Module* reviewed and added to the concepts in the *Basic Fractions Module* book and taught the students how to divide and reduce fractions. The theory behind decimal numbers was explained, and the students learned how to add, subtract, multiply and divide decimals in a way that was not confusing and frustrating to them. The *Ratios and Equations Mathematics Module* book taught the students how to read story problems and set up proportions. With the basic skills learned from the Direct Instruction programs, the students were able to function successfully while using the grade level textbook.

Structure of DI Writing Program

The *Expressive Writing* 2 program was very successful in teaching the Big Piney at-risk students how to write a composition. It first taught them how to write a paragraph, which evolved into writing several paragraphs. The students learned how to write conversation and had exercises that stressed writing complete sentences with the correct capitalization and punctuation. Exercises working with run-on sentences and the

correct tense of the verb in individual passages were part of the lessons. The *Expressive Writing* 2 program gave the students a strong basic understanding, so they could successfully work in a "writing workshop" atmosphere and become ready for a "regular" classroom setting.

Results in the Big Piney Classroom

The Gates-MacGinitie Reading Test and the Key Math Diagnostic Test were used to evaluate the gains the students made. The SRA Achievement Tests were also used for evaluation, and there was little difference in the gains the individuals made regardless of which test was used for evaluation. The following charts show individual student's growth in each Direct Instruction program for every year:

Grade-Equivalent Gains in Reading Using *Decoding C* (Test: Gates-MacGinitie Reading).

Students	Number of Months in Program	1985-86 Years Gained
Eighth Graders		
A	7	+2.3
B	7	+3.5
		Mean=+2.9
Seventh Graders		
C	7	+1.5
D	7	+1.8
E	2	+.4
F	7	+2.1
G	7	-.1
H	7	+1.3
		Mean=+1.16
Sixth Graders		
I	7	+.9
J	7	+.9
K	7	+1.4
L	5	+2.1
M	3	+.6
N	7	+.7
O	7	+.7
		Mean= +1.04
Eighth Graders		1986-87
P	8	+3.2
Q	8	+5.0
R	8	+1.7
S	8	+2.2
T	8	+2.0
		Mean= +2.37
Seventh Graders		
I	7	-.2
G	7	+1.4
H	7	+1.8
N	7	-.2
J	7	+2.8
K	7	+1.0
		Mean= +1.1

Grade-Equivalent Gains in Reading Using *Decoding B* and *C*. (Test: Gates-MacGinitie Reading).

Students	Number of Months in Program	1986-87 Years Gained
Sixth Graders		
X	8	+1.4
Y	8	+.2
Z	8	+.5
AA	8	+1.1
BB	8	+1.8
		Mean= +1.0

Grade-Equivalent Gains in Reading Using *Comprehension C* (Test: Gates-MacGinitie Reading).

Students	Number of Months in Program	1987-88 Years Gained
Eighth Graders		
I	8	+1.0
J	8	+1.9
SS	8	-.1
K	8	+1.5
		Mean= +1.08

Grade-Equivalent Gains in Reading Using *Decoding C* (Test: Gates-MacGinitie Reading).

Students	Number of Months in Program	1986-87 Years Gained
Seventh Graders		
TT	8	+1.9
Y	8	-.4
Z	8	+1.1
AA	8	+.6
UU	8	-.1
BB	8	-.3
		Mean= +.47

Grade-Equivalent Gains in Reading Using *Decoding B* and *Comprehension B* (Test: Gates-MacGinitie Reading).

Students	Number of Months in Program	1987-88 Years Gained
Sixth Graders		
VV	8	+.8
WW	8	+1.5
XX	8	-.3
YY	8	-.4
ZZ	8	-.3
1A	8	-.2
1B	8	0.0
1C	8	+1.1
		Mean= +.28
		1988-89
WW	8	+1.1
YY	8	+2.7
1B	8	+2.1
1C	8	+1.5
		Mean= +1.32

Grade-Equivalent Gains in Reading Using *Decoding B* and *C* (Test: Gates-MacGinitie Reading).

Students	Number of Months in Program	1988-89 Years Gained
Sixth Graders		
1L	8	+2.0
1M	8	+2.5
1N	8	+.8
1O	8	+.8
1P	8	+1.5
1Q	8	+.7
1R	8	+.6
1S	8	+1.6
		Mean= +1.31

Grade-Equivalent Gains in Spelling Using *Corrective Spelling Through Morphographs* (Test: Kaufman Test of Educational Achievement).

Students	Number of Months in Program	1985-86 Years Gained
Eighth Graders		
A	7	+.7
B	7	+1.0
C	7	+1.0
D	7	+.7
E	7	+.4
		Mean= +.76
Seventh Graders		
F	7	-.9
G	7	+1.6
		Mean= +.7
		1986-87
F	7	+2.0
		Mean= +2.0
Sixth Graders		**1985-86**
H	4	+1.3
I	6	+.4
J	7	+.3
K	7	+2.3
		Mean= +1.07
		1986-87
H	7	+1.0
L	8	+2.0
M	8	+1.9
N	8	+1.9
		Mean= +1.7

Grade-Equivalent Gains in Spelling Using *Corrective Spelling Through Morphographs* (Test: Kaufman Test of Educational Achievement)

Students	Number of Months in Program	1988-89 Years Gained
Seventh Graders		
1T	8	+.3
1V	8	+.6
1U	8	+.7
1W	8	+1.9
1X	8	-1.0
		Mean= +.5

Grade-Equivalent Gains in Math Using *Corrective Math* (Test: Key Math Diagnostic).

Students	Number of Months in Program	1985-86 Years Gained
Seventh Graders		
A	8	+2.0
B	8	+.7
C	8	+1.1
D	8	+.5
E	6	+1.2
F	8	+1.7
		Mean= +1.2

Gains Using DI Programs With At-Risk—*Continued* —

Students	Number of Months in Program	Years Gained 1986-87
Seventh Graders		
G	8	+1.0
H	8	+2.0
I	8	+2.1
J	8	+1.5
K	8	+1.1
		Mean= +1.54
Sixth Graders		
L	8	+1.1
M	8	+2.0
N	8	+1.3
O	8	+1.3
P	8	+1.4
Q	8	+2.8
		Mean= +1.65

Grade-Equivalent Gains in Math Using *Corrective Mathematics Multiplication, Division, Basic Fractions, and Fractions-Decimals-Precents* (Test: Key Math Diagnostic Test)

Students	Number of Months in Program	1987-88 Years Gained
Sixth Graders		
EE	8	+1.6
FF	8	+.6
GG	6	+.5
HH	6	+.7
II	6	+.8
JJ	8	+.8
KK	8	+.4
		Mean= +.77
		1988-1989
FF	8	+1.5
II	6	+.5
LL	8	+1.1
MM	8	+.8
NN	8	+1.4
		Mean= +1.06
		1988-1989
1E	8	+1.7
1F	8	+.7
1G	8	+.5
1H	8	+.6
1I	8	+.2
IJ	8	+.5
1K	4	+.4
		Mean= +.66

Grade-Equivalent Gains In Math Using *Corrective Math Basic Fractions and Fractions-Decimals-Percents* (Test: Key Math Diagnostic Test).

Students	Number of Months in Program	1987-88 Years Gained
Seventh Graders		
OO	8	+1.0
L	8	+.4
O	8	+.4
PP	8	+.4
QQ	8	+.8
CC	8	+.4
		Mean= +.57

Grade–Equivalent Gains In Math Using *Corrective Math Ratios and Equations* (Test: Key Math Diagnostic Test).

Students	Number of Months in Program	1988-89 Years Gained
Eighth Graders		
L	8	+.4
O	8	+1.3
CC	8	+.8
DD	8	+.7
		Mean= +.8

Grade–Equivalent Gains In Reading Using *Decoding B and C* (Test: Gates MacGinitie Reading).

Students	Number of Months in Program	1989-90 Years Gained
Sixth Graders		
2D	8	-.1
2I	8	+1.1
2K	8	+2.3
2F	8	+2.0
2J	8	+.4
2G	8	-.6
2H	8	+1.0
		Mean= +1.9
		1990-1991
2S	8	-.7
2T	8	+.3
2U	8	+.1
2V	8	+1.6
2X	8	+.4
		Mean= +.34

Grade-Equivalent Gains In Reading Using *Decoding C* (Test: Gates MacGinitie Reading).

Students	Number of Months in Program	1989-90 Years Gained
Seventh Graders		
2A	8	?
2B	4	+1.0
1E	8	+.3
1M	8	+.2
1N	8	+2.5
1O	8	-.4
1H	8	+2.3
2C	8	+1.1
1R	8	+.3
		Mean= +.91
		1990-91
2D	8	+2.8
2Q	8	+1.1
2N	8	+1.5
2O	7	+4.8
2R	8	+1.4
2F	8	+.4
2J	8	+1.8
		Mean= +1.97

Grade-Equivalent Gains in Spelling Using *Corrective Spelling Through Morphographs* (Test: Kaufman Test of Educational Achievement).

Students	Number of Months in Program	1989-90 Years Gained
Seventh Graders		
2B	4	?
2M	8	-1.8
1L	8	-.3
1O	8	+2.1
1H	8	-.1
2C	8	+2.1
		Mean= +.4
		1989-90
Sixth Graders		
2D	8	-.7
2E	8	-1.0
2K	8	0.0
2F	8	+1.1
2G	8	0.0
2L	8	+1.8
2H	8	+.8
		Mean= .29
		1990-91
2S	8	+1.0
2T	8	+3.1
2U	8	+.2
2V	8	+.6
2W	8	+1.3
2X	8	+1.5
2Y	8	+1.5
2Z	8	+.3
		Mean= +1.08

(Ed.Note: Results on the Expressive Writing 2 program have been deleted because of difficulty in interpreting the Test of Written Language Quotients.)

Grade-Equivalent Gains in Math Using *Corrective Mathematics Multiplication, Division, Basic Fractions,* and *Fractions-Decimals-Percents Modules* (Test: Key Math Diagnostic Test).

Students	Number of Months in Program	1989-90 Years Gained
Sixth Graders		
2D	8	+1.8
2E	8	+1.5
2F	8	+1.1
2G	8	+.2
2H	8	+.9
		Mean= +1.1
		1990-91
2S	8	+.7
2T	8	+.7
2U	8	+1.4
2AA	8	+1.5
2V	8	+1.0
2BB	8	+.6
2X	8	+.7
		Mean= + .9
		1989-90
Seventh Graders		
2A	8	+.2
2B	3	-.6
1L	8	+.4
1O	8	+1.8
1H	8	+.3
1I	8	+2.0
2C	8	+1.2
		Mean= + .71

		1990-91
2D	8	+.7
2N	8	+1.4
2O	7	+1.0
2F	8	+1.4
2G	8	+1.1
		Mean= +1.12

Grade-Equivalent Gains in Math Using *Ratios and Equations Module* (Test: Key Math Diagnostic Test).

Students	Number of Months in Program	1990-91 Years Gained
Eighth Graders		
2A	8	+.2
2B	6	+1.1
2M	8	-.2
2P	4	+4.1
1L	4	+.8
2C	8	+.4
		Mean= +1.06

Conclusion

The Direct Instruction programs for reading, math, and spelling have been very successful when used with the at-risk students at the Big Piney Middle School. The research shows these programs have been successful with other students too. It appears the structure of the programs and theory behind them, which was developed by Siegfried Engelmann, is the reason the programs are so successful. The Direct Instruction programs appear to be an excellent way to teach at-risk students, if they are used by trained teachers. ◆

References

Carnine, D., and Silbert, J. *Direct Instruction Reading*. Columbus: Charles E. Merrill Publishing Company. 1979.

Dixon, R., and Engelmann, S. *Corrective Spelling Through Morphographs*. Chicago: Science Research Associates, Inc., 1979.

Dixon, R., and Engelmann, S., Steely, D., and Wells, T. *Spelling Mastery: A Direct Instruction Series*. Chicago: Science Research Associates, Inc., 1981.

Engelmann, S., and Carnine, D. *Corrective Mathematics Division*. Chicago: Science Research Associates, Inc., 1981.

Engelmann, S., and Carnine, D. *Corrective Mathematics Multiplication*. Chicago: Science Research Associates, Inc., 1981.

Engelmann, S., and Carnine, D. *Theory of Instruction. Principles and Applications*. Eugene: ADI Press, 1991.

Engelmann, S., Hanner, S., and Haddox, P. *Corrective Reading Comprehension C: Concept Applications*. Chicago: Science Research Associates, Inc., 1980.

Engelmann, S., Johnson, G., Becker, W., Meyers, L., Carnine, L., and Becker, J. *Corrective Reading Decoding B: Decoding Strategies*. Chicago: Science Research Associates, Inc., 1974.

Engelmann, S., Meyers, L., Johnson, G., and Carnine, L. *Corrective Reading Decoding C: Skill Applications*. Chicago: Science Research Associates, Inc., 1974.

Engelmann, S., Osborn, S., and Hanner, S. *Corrective Reading Comprehension B: Comprehension Skills*. Chicago: Science Research Associates, Inc., 1978.

Engelmann, S., and Silbert, J. *Expressive Writing* 2. Chicago: Science Research Associates, Inc., 1985.

Engelmann, S., and Steely, D. *Mathematics Modules Basic Fractions*. Chicago: Science Research Associates, Inc , 1978.

Engelmann, S., and Steely, D. *Mathematics Modules Fractions–Decimals–Percents*. Chicago: Science Research Associates, Inc., 1978.

Engelmann, S., and Steely, D. *Mathematics Modules Ratios and Equations*. Chicago: Science Research Associates, Inc., 1981.

Silbert, J., Carnine, D., and Stein, M. *Direct Instruction Mathematics*. Columbus: Charles E. Merrill Publishing Company, 1981.

Belmont Community School
Worcester, Massachusetts

Over ten years ago, Ron Edmonds coined the phrase, "the principal as instructional leader." At that time, Edmonds' was attempting to capture the role successful inner-city principals had taken to make their schools more effective. These principals, in his view, articulated a schoolwide emphasis on reading, writing, and mathematics. This was accomplished through high expectations for students and the belief that *teachers* were responsible for student learning.

Many dispute this vision of the principal. Some argue that schools can improve in spite of a principal's commitment to new programs. Others claim that schoolwide change is much more complicated. Surely these observations are true in some instances. Yet there are cases where principals take an *active* role in promoting change, and the effects are remarkable. John Monfredo's effort as principal of Belmont Community School provides a good example.

From the Bottom Up

What do you do when you have over 550 inner-city kids — over half of whom speak English as a second language — at the largest elementary school in the district? How do you cope with a 50 percent turnover in students every year? Most of all, how do you raise reading and writing achievement from the lowest rungs of the annual city-wide test results? In the early 1980s, for example, it was typical for Belmont's kindergarteners to rank 40th or 41st out of 41 Worcester elementary schools on the CTBS. Performance on the writing strand of the Massachusetts Test of Basic Skills wasn't much better, with Belmont students scoring at half the level of the other students in the city. Fortunately, all of this began to change six years ago.

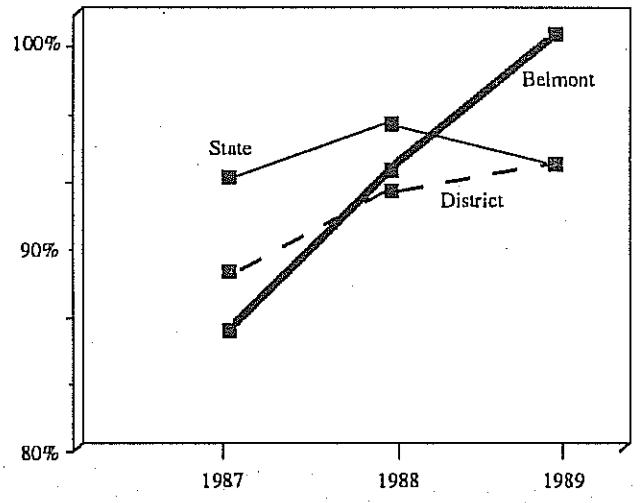
Consistently low academic performance moved the staff and administration at Belmont to focus on language arts. Once again, they looked for a new reading program that would succeed in teaching their students decoding, vocabulary, and comprehension. Monfredo, who was in his first year as principal of the school, sought the advice of Belmont's reading specialist Maureen Jasper.

Jasper and a third grade teacher had attended an inservice on Direct Instruction, and the teacher was eager to pilot *Reading Mastery III* in her classroom. Over the year, Monfredo noticed, "The children seemed so successful, and I was intrigued with its link to science. I liked its stress on mastery as well as the fact that the series had been researched."

That spring the pilot class outscored the other third grade class at Belmont on the Metropolitan Achievement Test. This convinced both third grade teachers that the Direct Instruction program was what worked with their at-risk kids. Because of this success, Monfredo's goal for the next academic year (1985-86) was to introduce the *Reading Mastery* program *gradually* in the primary grades. He wanted to use it in one classroom per grade level. As it turned out, teachers in virtually all of the classes wanted to use *Reading Mastery*. By the 1986-87 school year, the entire K-4 program was using the program, and *Distar Language* was initiated in general, bilingual, and special education classes. The school eventually adopted the *Corrective Reading Program*, and last year the use of *Reading Mastery* extended to the sixth grade.

Few schools can show the degree of change that Belmont has shown since 1984. The first year after *Distar Language* was introduced in kindergarten, the school moved from the 40th of 41 Worcester elementary schools to 16th on the CTBS. The chart below shows how reading scores on the Massachusetts Basic Skills Testing Program have changed for third graders. The data compared the percent of third grade students who passed this basic skills test in the state, in the district, and at Belmont. As Belmont students rose toward the 100 percent mark, students in the state remained about the same and some positive change was noted in the district average (due in part to Belmont students).

Percent of Students Passing the Massachusetts Basic Skills Testing Program



The 1989 Metropolitan Achievement Test scores showed third graders at grade level in reading and five months *above* grade level in language. Scores for sixth graders on the Metropolitan showed exactly the same pattern.

A Commitment to Literacy

Reading Mastery gave students at Belmont the foundation for a successful enrichment reading program. Monfredo, with the help of Jasper and other staff members, pushed for a higher level of literacy. It became a schoolwide obsession. In 1988 Belmont was adopted as a K-6 demonstration site for the "Books and Beyond" reading program.

This federally funded project stresses extended reading throughout the day. Teachers devote extra time during school reading to their students. Parents are encouraged to read to their children at night. The goal for students is simply to read as much as they can. Monfredo brings speakers into Belmont to teach parents how to read aloud to their children. He even has gone as far as sending books home with students with a sign pinned to their shirts saying, "Please read to me!" Two years ago the students checked out 50,000 books from the school library. Last year that number jumped to *75,000*.

This kind of success—in achievement test scores, in a process writing program, and in enrichment reading—was recognized in 1989. Belmont Community was one of four schools in the state of Massachusetts to make the Governor's Honor Roll. Joan Schuman, director of the Department of Education State Regional Office, summarized Belmont's remarkable achievements in this way, "They really are a showcase for how an urban district school can be successful."

Yet John Monfredo is the first to admit that these changes have not been easy. "The staff has worked hard, and we've written state grants to provide inservices in reading and writing instruction. But the students are more successful than they ever have been in reading. It has boosted their self-esteem. We believe Direct Instruction is responsible for that." ◆

Would you like to apply to a business or agency for funds for implementing a Direct Instruction program or program series?

Or would you like to fund the program through your local school budget? We will send you a model proposal with budget (that includes money for implementation and training so the program will work) for you to use as a gudie in developing your proposal. Tell us the content area, level and number of students you want to serve and give us some idea of the funding limitations. Write to:

Bonnie Grossen
ADI
PO Box 10252
Eugene, OR. 97440

Toward a Scientific Pedagogy of Learning Disabilities—*A Sameness in the Message*

by Edward Kameenui,
University of Oregon

According to literary folklore, John Keats, the English poet of the romantic period, was known to coat his tongue with black peppers just before imbibing a full glass of claret. For Keats, the sensual intensity of experience was "all" and the combustible combination of black peppers and claret provided him with a way of seeing the world *de novo*; that is, anew and through fresh eyes.

Every now and then, even a field of inquiry, like the field of learning disabilities, needs to take a Keatsian leap by peppering its senses with a way of seeing the old and familiar in a new light. Of course, the indulgence should not be overdone, but the experience could be intensely refreshing, conceptually and theoretically, or it could lead to illusions of beauty as truth, and truth as beauty. At times, it may even result in unusually creative ways of seeing the human condition.

One could argue vigorously and truthfully that the field of learning disabilities has had more than its share of experiential leaps of faith. There have been many, including Carl Delacato's (1959) neurological organization concept in which a learner's "total and uninterrupted ontogenetic neural development recapitulates the phylogenetic neural development of man" (p. 19), Newell Kephart's (1971) perceptual-motor training which reflected his belief that "all behavior is basically motor, that the prerequisites of any kind of behavior are muscular and motor responses" (p. 79), and more recently, Levinson's (1980) assertion that reading problems are a direct result of "the abnormal functioning of the cerebellum and semicircular canals of the inner ear" (cited in Harris, 1982, p.457).

Certainly, the historical roots of learning disabilities have been nourished by many an earnest and erudite gardener (Wiederholt, 1974). However, as an identified discipline, its theoretical and empirical roots still remain fibrous and close to the surface. The right mix of theory, sustained empirical application, and policy to provide the field with a more solid scientific foundation is yet to be found. But as Bruner and Postman observed in their 1949 essay entitled, "On the Perception of Incongruity: A Paradigm," such an unsettling precondition in the field of learning disabilities is probably necessary for the emergence of novel theories and new ideas, if not the clarification of old ideas. "The emergence of new ideas and new theories is generally preceded by a period of pronounced professional insecurity."

In this article, I examine an issue that has not been considered in a substantial theoretical, empirical, or conceptual way by the field of learning disabilities since Kirk and Bateman coined the term in 1962. My focus is not explicitly on learning disabilities or any of the traditional artifacts associated with learning disabilities. Instead, it is on the curriculum that has been and will be used with students identified as learning disabled.

The Call for a Scientific Pedagogy

In the original learning disabilities equation, curriculum is not considered. Interestingly, when Kirk and Bateman (1962) introduced the term *learning disabilities*, they did so as part of a percipient call for developing "a scientific pedagogy in the area of learning disabilities" (p. 74). This scientific pedagogy was ostensibly anchored to the validation of the Illinois Test of Psycholinguistic Abilities (ITPA) and required the "determination of the educability of psycholinguistic disabilities through longitudinal training of a select group of children" (Kirk & Bateman, 1962, p. 74).

The scientific pedagogy outlined by Kirk and Bateman was based on a model of diagnosis and remediation—a model that arguably emphasized diagnosis, but a model that included remediation nonetheless. Given the medical/neurological orientation of the field at the time, such a model was historically and theoretically bold. The assumption by Kirk and Bateman even then was that learning disabilities was not so deep and organic in nature that it could not be influenced significantly by instruction; that is, by what, when, and how something was taught and maintained. As Kirk and Bateman (1962) stated, "remediation is generally determined by the behavioral symptoms, not by the neurological findings" (p. 73). In the final sentence of their seminal article, they stated, "When we are able to diagnose disabilities accurately and then to prescribe appropriate remedial instruction to ameliorate these disabilities, we will have arrived one step closer to our goal—the development of a scientific pedagogy" (p. 78).

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Development of a Scientific Pedagogy

A Muse reflecting on the history of learning disabilities would find Kirk and Bateman's coining of the term *learning disabilities*, and their concurrent call for the development of a scientific pedagogy, both poignant and poetic. Of course, the field immediately took flight with the term learning disabilities and gave only ceremonial verse to its meaning. At the same time, the field unwittingly ignored the terms of Kirk and Bateman's real message about the need for the development of a pedagogy of learning disabilities based on scientific principles. As poetic justice would have it, Kirk and Bateman did not define what they meant by a scientific pedagogy of learning disabilities in their 1962 paper. Even if they had, it is questionable whether the field would have given adequate heed to their words, especially when the "professional insecurity" (Bruner & Postman, 1949) inherent in the initial development of any field of inquiry is typically heightened by its attempt to recognize "both *that* something is and *what* it is" (Kuhn, 1970, p. 55, original emphasis).

The brief history of learning disabilities is perhaps sufficient testimony to the difficulty of developing a scientific pedagogy of learning disabilities. Such a development admittedly presumes the rendering of a "science" unique to learning disabilities and the extension and sustained application of that science in the form of a "pedagogy" that is derived from the theoretical, empirical, and epistemological parameters of that very science. But the establishment and recognition of a science of learning disabilities (Kavale & Forness, 1985) that would serve as the basis for the development of a scientific pedagogy of learning disabilities requires a *history* of learning disabilities; that is, it requires the continuous, systematic, and serendipitous rumbling of past events, ideas, and actions that aggregate around the phenomenon of learning disabilities.

Kirk and Bateman weren't foolhardy, and their failure to map for the field a scientific pedagogy of learning disabilities 30 years ago may have been providential, or perhaps just intentional. As teachers, they implicitly recognized the complexity of the phenomenon of learning disabilities in their work with children. As researchers breaking new theoretical ground, they tacitly understood that a science of learning disabilities required an empirical and methodological foundation built on surprise, serendipity, discovery, insight, luck, methodological invention, and cumulative human error tempered by success (Kameenui, in press).

The extent to which a scientific pedagogy of learning disabilities can be developed today is still unclear given the requirements associated with the decision rules for a science of learning disabilities described assiduously by Kavale & Forness (1985). Most assuredly though, the development of a pedagogy based on that science would require moving beyond the model of diagnosis and remediation proposed by Kirk and Bateman (1962) and embraced wholeheartedly by the field for almost two decades (Arter & Jenkins, 1977). At a minimum, it would require the recognition of the immense complexity of learning disabilities and the importance of *curriculum* to the development of both the science and pedagogy of learning disabilities. Although we have made progress in recognizing the complexity of learning disabilities as a psychological, historical, and theoretical construct, very little progress has been made in *recognizing the structure of curriculum* as an empirical, not to mention, conceptual construct important to the development of a pedagogy of learning disabilities.

Curriculum and the Complexity of Learning Disabilities

In the last decade or so, the field came to recognize learning disabilities as more than a one-dimensional phenomenon (Adelman & Taylor, 1986; Harris, 1982). In their analysis of the "science" of learning disabilities, Kavale and Forness (1985) characterized learning disabilities as multidimensional and context dependent:

> The nature of LD demands a multiple condition paradigm that addresses the complexity surrounding the phenomenon. Such a paradigm, however, is not simply a linear combination of elements found in single condition paradigms but, rather, a multivariate and interactive stochastic configuration. This type of theory possesses the advantage of reducing heterogeneity but the disadvantage of increasing the number of parameters needed to define LD. (p. 95)

Kavale and Forness (1985) also recognized the "multivariate etiological structure" (p. 126) of learning disabilities as being a school-based phenomenon and proposed a model based on three classes of variables associated with school learning: (a) student attributes, (b) environmental components, and (c) instruction. What is interesting about this "heuristic device," as they called it, is that instructional design and the structure of the curriculum were included as elements of instruction. These elements were ostensibly factored into an extension of Carroll's economic formula of school learning that posited degree of learning as a function of the time actually spent on task divided by

the time needed to learn. Specifically, the *structure of the curriculum* directly influenced the amount of time spent on a task. Although Kavale and Forness (1985) did not single out curriculum structure, in particular, as accounting for a significant portion of the variance of learning disabilities, the recognition of curriculum by these researchers as a factor with potential explanatory power in the learning disabilities equation is especially noteworthy.

Like Kavale and Forness (1985), Mosenthal (1982, 1984) also recognized the complex, context-dependent nature of learning disabilities. However, unlike Kavale and Forness, Mosenthal explicitly acknowledged the role of curriculum in his multicontextual analysis of learning disabilities. The isolation and inclusion of curriculumm as a factor with potential explanatory power in the analyses by Kvale and Forness (1985) and Moseenthal (1982) should *not* be noteworthy. What is noteworthy is that the curriculum (that is, the materials used to teach students) has not been considered in a substantial way by researchers, practitioners, administrators, or policymakers in the development of both a science and a pedagogy on learning disabilities.

Three Dimensions of the Curriculum

In the following section, I examine three different dimensions of the curriculum in an effort to highlight the importance of each to an ongoing program of research for the development of a scientific pedagogy of learning disabilities.

The first dimension is curricular design. Tennyson and Christensen (1986) argue that the "two most important variables in designing any instruction" are "The adequacy of the analysis of the information to be learned," (p. 4) and "The selection of appropriate instructional strategies by which to present the information" (p. 4). Engelmann and Carnine's sameness analysis (1982) serves as a pivotal concept for examining these two variables, because it is directly concerned with the analysis of information and how the analysis influences the strategies used to present the information to learners.

The second dimension is the curriculum adoption process. Research on curricular materials must also consider the textbook adoption policies and practices of both general and special education. The extent to which the textbook adoption process considers the diverse learning and curricular needs of students with disabilities is simply unknown.

Finally, the third dimension is the alignment of curriculum, instruction, assessment, and educational goals and objectives. Technical advances in curriculum analysis, curriculum-based assessment, and test development have made the goal of aligning the classroom curriculum, school district and state goals and objectives, assessment, and instruction, achievable. However, achieving curriculum alignment raises special issues that require consideration.

Curricular Design: Curriculum as Communication

In *Grammatical Man: Information, Entropy, Language, and Life,* Jeremy Campbell (1982) poses the following questions:

> What do the codes used for sending messages back from spacecraft have in common with genes on a molecule of DNA? How is it that the second law of thermodynamics, a physicist's discovery, is related to communication, so that we can speak of the "entropy" of a musical score, or a page of text, or a conversation? Why are knotty problems in the mathematical theory of probability connected with the way we express ourselves in speech and writing? (p. 15)

Campbell answers these questions with one word, *information,* and as he states, "the very fact that a single concept can link so many diverse ideas is an indication of its great generality and power" (p. 15). Campbell's book is an intriguing historical treatise on information theory and the hidden grammar inherent in complex physical and cognitive structures.

Engelmann and Carnine (1982) offer a similarly intriguing and powerful concept, that of "sameness analysis," to link greatly different subjects such as spelling (Dixon), history, mathematics (Steeley, Carnine, & Engelmann), science, reading comprehension and writing composition, analogical and logical reasoning, problem solving (Niedelman), and teaching (Simmons, Fuchs, & Fuchs). In a sense, one could repeat a question similar to the one posed by Campbell earlier:

> What does a morphophonemic analysis of spelling have in common with the physical principles of convection and equilibrium? How are the recent events of Eastern Europe related to the use of number families of basic addition and subtraction facts? And how is the delivery of instruction connected to the problem solving skills of seeking and identifying relevant information in unprompted tasks?

The hidden grammar that links a wide range of complex concepts from greatly different topics is that of sameness analysis. Sameness analysis is a powerful anchoring concept. However, it is also an elusive one. Identifying, modifying, and creating structural samenesses in spelling, history, science, reading, reasoning, and so forth is not easy. In fact, it's downright difficult. The concept of sameness analysis hides more than it reveals, and as Carnine points out, the brain's ability to note samenesses is "quite indiscriminate" (p. 9), because it is difficult to "predict what constitutes information for an organism" (Rosenfield, 1988, p. 149).

Some samenesses are desirable, while others are not. The task facing teachers and curriculum developers alike is that of identifying not only appropriate samenesses, but also inappropriate samenesses (misconceptions). Moreover, identifying actions, events,

concepts, and examples that are *not* the same, but only slightly different is also important to the sameness analysis. The intent of the sameness analysis is to highlight the appropriate samenesses. In a complex information system such as a curriculum, the complexity of the system typically accentuates differences. However, sameness analysis must also identify inappropriate samenesses or misconceptions in order to avoid communicating them unintentionally.

What makes the concept of sameness analysis elusive is that it is greatly different from almost every traditional form of pedagogy. It is *not* about children's learning styles and educators' teaching styles. Nor is it about child-centered, child*ren*-centered, or even teacher-centered instructional approaches. Neither is sameness analysis about transmitting information through teaching formats, signals, fast pacing, cooperative learning, or reciprocal teaching (Kameenui, 1985). It is primarily about *transforming the structure of information* in a way that the intended message to be communicated is communicated clearly, unambiguously, and efficiently. In a sense, sameness analysis is about maximizing the clarity of a message, and minimizing the "noise" in that message. As Campbell (1982) states:

> In communications parlance, noise is anything which corrupts the integrity of a message: static in a radio set, garbling in a printed text, distortion of the picture on a television screen (p. 26).

Campbell further describes the elements of a clear message:

> A message. . . is a sequence of events spread out in time. These events are not known completely in advance. The price of a share as it moves up or down in the course of a day's trading on the stock market is a series of the same kind. . . The series are not always totally unpredictable, but they do contain an element of the unknown. . . This means that the listener is in a state of uncertainty as to what message he will actually hear. We say "uncertainty" rather than complete ignorance because he does know, at least, that the message will be one of a range of possible messages. It may be highly improbable, and therefore very hard to predict, or it may be extremely probable, in which case the listener could have predicted it with ease. But the message will not be impossible, in the sense that it violates grossly the rules of grammar or meaning; otherwise, it could not be called information at all. When the speaker sends his message, he makes one of these possibilities actual, excluding the others and resolving the listener's uncertainty (p. 28-29).

The intent of sameness analysis is to resolve the learner's state of uncertainty about a new and unknown topic through the presentation of carefully designed examples—examples that may be greatly different, but are structurally the same.

In Table 1, examples in spelling, history, earth science, mathematics word problem solving, and writing are presented. For each topic, two examples are given, both of which are greatly different in their surface features, but they are structurally the same in some way. For instance, in the topic of earth science, one example is a pot of boiling water and the other example is an earthquake. The examples are greatly different in their surface features: source of heat (stove element, earth's core), object heated (water, molten rock), and outcome (water boils, earthquake). More importantly, the examples share a structural sameness: the movement of heat in a roughly circular pattern. This structural sameness allows the learner to see how greatly different examples are the same in at least one important way. In a real sense, the learner is allowed to see "the general in the particular" through the presentation of a range of examples (Mason, 1987, cited in Prawat, 1989, p. 9). In short, the learner induces a generalization through the presentation of particular examples.

In the context of learning disabilities, creating structural samenesses in curricula are important for at least two reasons. First, the use of sameness analysis allows teachers to teach more in less time (Carnine, Silbert, & Kameenui, 1990), which is imperative if Matthew effects (Stanovich, 1986) are to be mitigated and students with disabilities are to catch up academically (Juel, 1988) and socially with their nondisabled peers. Second, the structural samenesses that students acquire serve as significant cognitive building blocks that lead to the development of more complex cognitive structures for seeing similarities and differences in what is taught and what is not taught but is left to discovery (Klix, 1983; Prawat, 1989; Tennyson & Christensen, 1986).

To develop curricula in mathematics, spelling, reading, writing, earth science, social studies, reasoning, and the like using sameness analysis or some similar set of design of curriculum principles as a pedagogical cornerstone would require a scientific pedagogy that, at minimum, considers curriculum as a significant causative factor. Moreover, it would also require a critical examination of the textbook adoption process which directly influences the curricula selected for public schools.

Summary

The development of a scientific pedagogy of learning disabilities as called for by Kirk and Bateman

Table 1. Summary of Sameness Analysis.			
Topic	**Greatly Different Examples**	**Surface Features**	**Structional Sameness**
1. Earth Science	a. **Pot of boiling water:** When heated molecules of water flow in roughly a circular pattern b. **Earthquake:** Molten sections between earth's crust and core move in constant circulation	Small scale example—stove element, watert Large scale example—earth's core, molton rock.	**Convection Cell** The circluar movement of heat away from a hot object and flow of cooler matter toward the object.
2. Social Studies	a. **Invention of Cotton Gin:** It was difficult to remove seeds from short staple cotton. The cotton gin removed the seeds efficiently and created a greater market for cotton b. **Morman practice of Polygamy:** Because of their practice of polygamy, the Mormons moved west to Salt Lake and developed a successful farm community	Economic context—cotton, demands of market Human rights context—Mormons, Salt Lake, development of a community	**Problem-Solution-Effects Analysis** The sameness is not in the events, but in the nature and sequence of events that involve identifying a social, political, economical **problem** its **solution**, and the **effects** of the solution.
3. Spelling	a. **3 Morphographs:** re- cover -ed (prefix) (base) (suffix) recovered, recover, covered b. **4 Morphographs:** un/dis -pute - able (prefix) (base) (suffix)	3 different morphemes 4 different morphemes	**Morphophonemics** By using the same morphemes in selected combinations, the following words are spelled: recoverable, repute, reputable, reputed, disreputable, disrepute, coverable, discover, discoverable, discovered, undiscoverable, undiscovered, disputed
4. Mathematics word problem solving	a. **Subtraction word problem:** Mark can get some money from his mother to help pay for a school trip. He has earned 57 dollars. He needs 112 dollars. How much more money will his mother give him? b. **Multiplication word problem:** If each shirt requires 2 yards of material, how much material will be needed to make 5 shirts?	Subtraction—linguistc features, numerical features, syntactic structure Multiplication—different linguistic features, numerical features, syntactic structure	**Number-Family Analyses** The sameness is in mapping what what is known and not known in a problem by determining if the "big" number and a "small" number are given, or if just the small numbers are given.
5. Writing: Text structure	a. **Writing stories:** Develop setting of story (characters, time, place) problem, response, outcome, and conclusion b. **Writing expositions:** Identify what is being compared/contrasted, on what, and how they are alike and different	Story grammar—characters, setting, problem, actions Topic—compare and contrast	**Text Structure Analysis** Elements to map ideas.

(1962) requires the rendering of a science of learning disabilities and a pedagogy derived from that science. But the development of such a pedagogy is necessarily incomplete if it fails to recognize that the structure of the curriculum significantly shapes the act of teaching students identified as learning disabled.

The current thinking and practice about curricula is that the universe of information that comprises a curriculum program need only be organized around subject area topics (e.g., mathematics, reading, language arts, science, social studies) and hierarchically arranged in a scope and sequence that has as its main characteristic the general ordering of skills from simple to complex. For all practical purposes, information is viewed as raw material that can be nominally organized and readily packaged and consumed with little or no transformation of its form or structure (Kaufman et al., 1990). The articles in the *Journal of Learning Disabilities* from which this paper is derived demonstrate how transforming information by identifying and developing curricula around structural samenesses can lead to a pedagogy that is efficient and effective.

The development of a scientific pedagogy of learning disabilities requires that the field embrace a conceptual model that acknowledges the importance of curriculum structure and the complexity of information. The field must also examine the intricacies of designing curricula with the same kind of commitment and passion it has demonstrated in the last 30 years for investigating the etiology and organic basis of learning disabilities. Associated with such a commitment is the need to make structural changes in the textbook adoption process and in the alignment of curriculum, assessment, instruction, and learning goals/objectives at the school district level.

These are not easy challenges. But perhaps the most difficult challenge is that of seeing something old and familiar in a new light. At last glance, the glass of claret is still full, the black peppers spicy, and many accomplishments await toasting. ◆

References

Adelman, H. S. & Taylor, L. (1986). Moving the LD field ahead: New paths, new paradigms. *Journal of Learning Disabilities, 19*(10), 602-608.

Bruner, J. S. & Postman, L. (1949). On the perception of incongruity: A paradigm. *Journal of Personality, 18*, 206-223.

Campbell, J. (1982). Grammatical man: Information, entropy, language, and life. New York, NY: Simon & Schuster

Carnine, D. W., Silbert, J., and Kameenui, E. J. (1990). *Direct instruction reading*. (2nd Ed.) Columbus, OH: Merrill.

Delacato, C. H. (1959). *The treatment and prevention of reading difficulty*. New York: Hartcourt, Brace & World.

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

Harris, A. J. (1982). How many kinds of reading disability are there? *Journal of Learning Disabilities, 15*, 456-460.

Jensen, F. A. (1931). *Current procedures in selecting textbooks*. Philadelphia: Lippincott.

Juel, C. (1988). *Learning to Read and Write: A longitudinal study of fifty-four Children from first through fourth grade*. Paper presented at the meeting of the American Educational Research Association, New Orleans, LA.

Kameenui, E. J. (1985). Direct instruction of reading comprehension. Beyond teacher performance variables to the design-of-instruction. In J. Niles & R. Lalik (Eds.), *Thirty-fourth yearbook of the National Reading Conference, Issues in Literacy: A research perspective*, (pp. 257-262). Rochester, NY: National Reading Conference.

Kameenui, E. J. (in press). Publishing in research journals: Guarding against the false and fashionable. In J. F. Baumann and D. D. Johnson (Eds.), *Publishing Professional and Instructional Materials in Reading and Language Arts*, Newark, DE: International Reading Association.

Kavale, K. A. & Forness, S. R. (1985). The science of learning disabilities. San Diego, CA: College-Hill Press.

Kaufman, M., Kameenui, E. J., Birman, B., & Danielson, L. (1990). Special education and the process of change: Victim or master of educational reform? *Exceptional Children, 57*, 109-116.

Kephart, N. (1971). *The slow learner in the classroom*. Columbus, OH: Merrill.

Kirk, S. A. & Bateman, B. (1962). Diagnosis and remediation of learning disabilities. *Exceptional Children, 29*, 73-78.

Klix, F. (1983). An evolutionary approach to cognitive processes and creativity in human being. In R. Groner, M. Groner, & W. F. Bischot (Eds.), *Methods of heuristics*. Hillsdale, NJ: Erlbaum.

Kuhn, T. S. (1970). *The structure of scientific revolutions, (2nd Ed.)* Chicago, IL: University of Chicago Press.

Mosenthal, P. (1984). The problem of partial specification in translating reading research into practice. *The Elementary School Journal, 85*(2), 1-28.

Prawat, R. S. (1989). Promoting access to knowledge, strategy and disposition in students: A research synthesis. *Review of Educational Research, 59*(1), 1-41.

Rosenfield, I. (1988). *The invention of memory*, Basic Books, Inc., Publishers, New York: Basic Books.

Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly, 21*, 360-406.

Tennyson, R. & Christensen, D. L. (1986). *Memory theory and design of intelligent learning systems*. Paper presented at the meeting of the American Education Research Association, San Francisco.

Wiederholt, J. L. (1974). Historical perspectives in the education of children with learning disabilities. In L. Mann & D. Sabatino (Eds.), *The second review of special education*. Philadelphia: Journal of Special Education Press.

Using Direct Instruction with Brain Injured Students

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Because of significant advances in medical technology over the past fifteen years, the lives of children and youth who formerly died of traumatic brain injury (TBI) are now being saved in increasing numbers. Each year, approximately 165,000 children and youth require hospitalization for brain injuries sustained in motor vehicle accidents, falls, sports, and physical abuse (Bush, 1986). Of these children, 20,000 will be left with long-lasting alterations in social, behavioral, physical, and cognitive functioning (Kalsbeek, McLaurin, & Harris, 1980; Rosen & Gerring, 1986). The incidence rates for the most severe traumatic brain injuries are higher than those for spinal cord injury, multiple sclerosis, cerebral palsy, and muscular dystrophy combined (Kurtze, 1982).

The growing population of school-aged children with TBI presents teachers with a variety of new challenges. Students with TBI have unique learning characteristics, including problems with concentration, memory, new learning, organization and planning, generalization of new skills, and thinking and reasoning (Savage, 1988).

Direct Instruction (Engelmann & Carnine, 1982) is one of the most promising approaches for teaching academic skills to students with TBI. The design and presentation features of Direct Instruction programs specifically address the learning characteristics of these students. Table 1 presents the most common learning problems associated with TBI and the components of the Direct Instruction approach which address those problems.

This article describes two case studies in which Direct Instruction programs were used to teach a variety of skills to students with brain injuries. The purpose of the studies was to evaluate the effectiveness of Direct Instruction techniques in teaching academic skills to students with severe brain injuries.

Case Studies

The case studies described here were conducted as part of a federally funded project designed to evaluate intervention strategies for families of children with brain injury and the schools that serve these children ("Home/School Support for Families of Children with Traumatic Brain Injury," Singer & Glang, 1989). As part of this project, a free tutoring program was offered to any student with a documented brain injury (i.e., hospitalization following traumatic brain injury with ensuing coma of at least 24 hours). All students who participated were at least *one year post injury*, well beyond the most rapid period of "spontaneous recovery." Instruction was provided by a certified special education teacher who had experience working with brain-injured learners.

Following an initial evaluation, the teacher began individualized instruction with each student. Students were tutored 2-3 times per week for 6 weeks.

Table 1. Learning Characteristics of Children with TBI and Relevant Direct Instruction Features.

Learning Characteristic	Direct Instruction Feature
Concentration	Rapid instructional pacing. Instructional tasks broken down into components. Student engagement maintained through high response and success rates.
Memory	Sufficient practice and review.
New learning	Skills sequenced to build on previous learning. Generalizable strategies. Sufficient practice. Effective use of corrective feedback.
Organization and planning	Problem-solving strategies. Consistent, structured instruction.
Generalization	General-case programming.
Thinking and reasoning	Instruction in generalizable learning and reasoning strategies in addition to instruction in content.

Study 1

Subject

Jill, the subject for study 1, was a 6 year old girl who was injured in a motor vehicle/pedestrian accident 12 months before the study began. As a result of the accident, she sustained a severe brain injury, with evidence of a left temporoparietal contusion. She was comatose for several months, and remained hospitalized for approximately four months.

Prior to beginning the study, Jill was tested using the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) and the Woodcock-Johnson Tests of Achievement (reading subtests only). On the WPPSI, Jill obtained a full scale IQ score of 65 (Verbal IQ score: 64, Performance IQ score: 73). Her reading performance on the Woodcock-Johnson was at the kindergarten level.

When the study began, Jill had just completed kindergarten. She had attended a special education classroom and also received speech, physical, and occupational therapies through the school district.

Procedure

Jill was tutored two to three times per week (12 sessions total). The teacher targeted beginning language and reading skills for instruction. During baseline, Jill was probed on: (1) a list of visually presented sounds, and (2) a series of simple sentences that she was to repeat (e.g. "The big bed was soft," "The fish swims in the water.")

Instruction

The teacher began instruction after baseline performance stabilized. Jill was taught beginning language and reading skills using *DISTAR Language I* (Engelmann & Osborn, 1976) and *Reading Mastery I* (Engelmann & Bruner, 1983). The order of instructional presentation varied each day.

Sentence repetition. The "Identity Statements" strand in *DISTAR Language I* was used to teach Jill to repeat statements. This skill provides the foundation for other comprehension skills and must be mastered before students can be expected to understand written text.

Sound identification. Using the sound identification strand, Jill was taught to identify individual sounds in isolation.

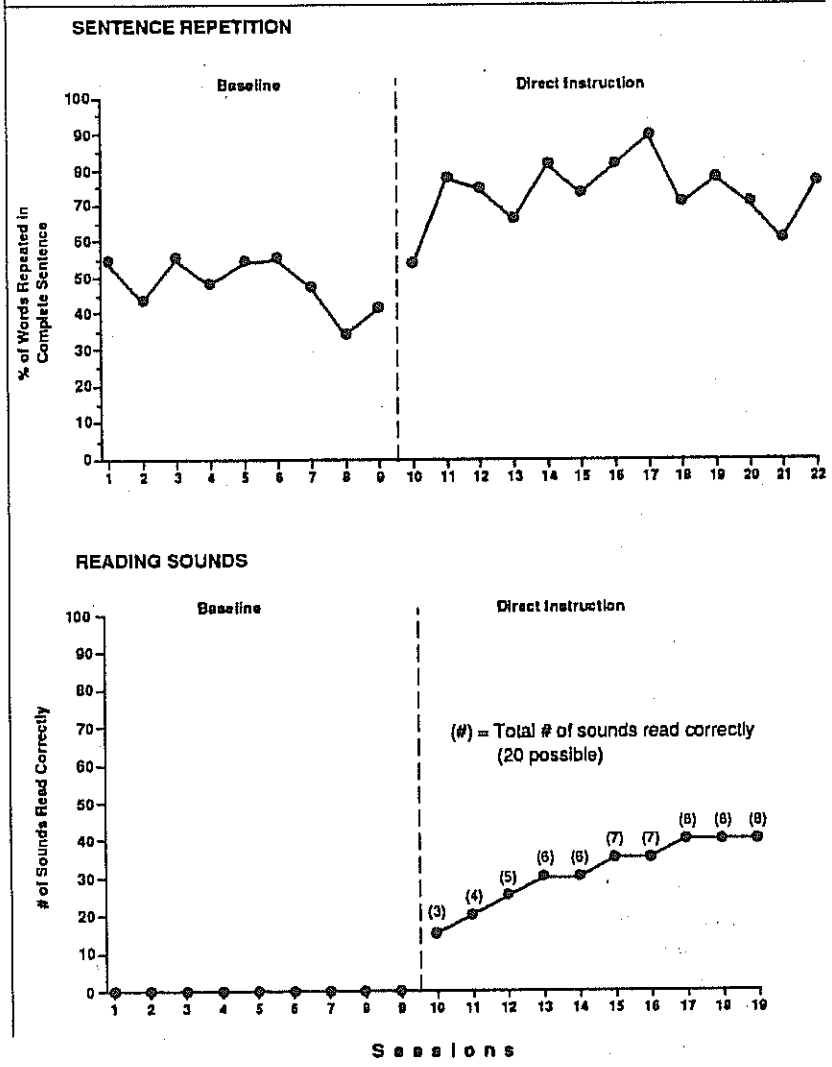
Data collection

Probe data was collected before and after each lesson on sound identification and statement repetition. The teacher wrote down Jill's response to each item and recorded whether it was correct or incorrect. A research assistant independently collected data on 16 of the 46 probes. Interobserver agreement averaged 100% (200 agreements out of 200 responses).

Experimental design

An AB design was used to determine the effectiveness of the instructional program on Jill's reading and language skills.

Figure 1. Effectiveness of Direct Instruction Tutoring in Language and Reading (Jill).



Results

Jill's probe performance is depicted in Figure 1. Significant improvement over baseline levels is apparent in both statement repetition and sound identification.

Statement repetition. On the statement repetition probes during baseline, Jill was able to repeat an average of 47.9% of the words presented. Most of the probe statements consisted of 5-6 words; but Jill was only able to repeat an average of 3 words. For example, when presented with "This tree is tall and green," she repeated, "tall green." When the teacher stated, "She is riding a bicycle," Jill repeated, "riding bicycle." It should be noted that this type of language pattern was consistent with Jill's conversational style. During the instructional period, her performance improved to an average of 72.8%. She repeated most words in all probe statements, and often repeated statements verbatim. Anecdotal reports from Jill's teacher suggested that her spontaneous speech also increased in complexity during the instructional phase.

Sound identification. As a non-reader, Jill was unable to identify any of the 20 sounds presented to her during baseline. With instruction, her performance improved rapidly to an average of 6.2 (31%) correct sounds. Most importantly, she remembered sounds from one session to the next, although there were generally 2-3 days between sessions.

Study 2

Subject

The subject in Study 2, Thomas, was an 8 year old boy who sustained a closed head injury when struck by a motor vehicle 15 months prior to participating in the tutoring program. The accident resulted in a severe skull fracture with subdural hematoma and intraparenchymal hemorrhage. Thomas was comatose for approximately 3 weeks. Prior to the tutoring program, Thomas was assessed using the Wechsler Intelligence Scale for Children-Revised (WISC-R). Thomas achieved a Full Scale IQ score of 81 (Verbal Score of 81, Performance Score of 84).

At the time of his participation in the study, Thomas had just completed the second grade. He received special education services for math and spent the rest of the day in the second grade classroom.

Procedure

Thomas was tutored twice a week over a six week period (13 sessions total). Prior to the baseline phase, the teacher evaluated Thomas and met with his parents and classroom teacher. Based on his educational goals, her assessment, and these discussions, the teacher targeted three instructional areas: deductive reasoning skills, math story problems, and addition and subtraction math facts.

The baseline phase consisted of a series of probes in each instructional area. During each baseline session, Thomas completed: (1) a worksheet with five written story problems, (2) a one minute timing on math facts, and (3) five verbally presented questions involving deductive reasoning skills. Sample items from each of the probes appear in Table 2.

Table 2. Probes for Subject 2.

1. ***Math story problem:*** Mike builds dog houses for a job. He built 8 dog houses last week. Then he built 17 more dog houses this week. He sold 5 dog houses over the weekend. Mike earns money delivering papers too. He delivers papers 7 days a week. How many dog houses does Mike have built to sell? (20)
2. ***Math facts:*** Probe sheet consisted of a random selection of addition and subtraction facts (e.g. 7 - 4, 10 - 8, 12 - 9) presented vertically.
3. ***Reasoning skills:*** All reptiles are cold blooded. A lizard is a reptile. So a lizard (is cold blooded).

Instruction

After establishing baseline performance, the teacher began instruction in each academic area. Instructional order was varied during each session. The teacher taught Thomas using the relevant strands from *Corrective Reading Comprehension, Level A* (Engelmann, Osborn, Haddox, & Hanner, 1978) and *Corrective Mathematics* (Engelmann & Carnine, 1982). The three strands used to teach Thomas are briefly described below.

Reasoning skills. The "Deductions" strand from the *Corrective Reading Comprehension Series* concentrates on teaching reasoning skills central to solving a wide range of problems. As determined by his baseline performance, Thomas needed to begin instruction with the most basic form of deductions: those involving a rule that applies to all members of a class. With this form of deduction, the student learns to apply a "rule" to a specific member of the class.

Math story problems. In working with Thomas, the teacher modified the story problem strategy taught in the *Corrective Mathematics Program* as follows:

When working a story problem, you:

1. First read the question at the end.
2. Underline what you're being asked to find out.
3. Go to the beginning of the problem and read it
4. As you read, underline words that are the *same* as the words in the question.
5. Figure out if you should add up or take away.
6. Do it.
7. Write out the answer.

Thomas was taught to solve both addition and subtraction story problems that contained a variety of distracting information.

Math facts. Over the course of the tutoring program, Thomas practiced five addition fact families (the 5+ series through the 9+ series) and two subtraction fact families (the 9- series and the 5- series).

Data collection

The teacher collected probe data twice during each session (before and after the lesson). Each day, she collected and scored Thomas' worksheets after he had completed them. A research assistant independently scored 24 of Thomas' worksheets (8 from each instructional area). Interobserver agreement on these measures averaged 99% (166 agreements out of 168 responses).

Experimental design

A multiple baseline across content area was used to evaluate the effectiveness of the tutoring program. Instruction was introduced sequentially in each area once baseline performance stabilized.

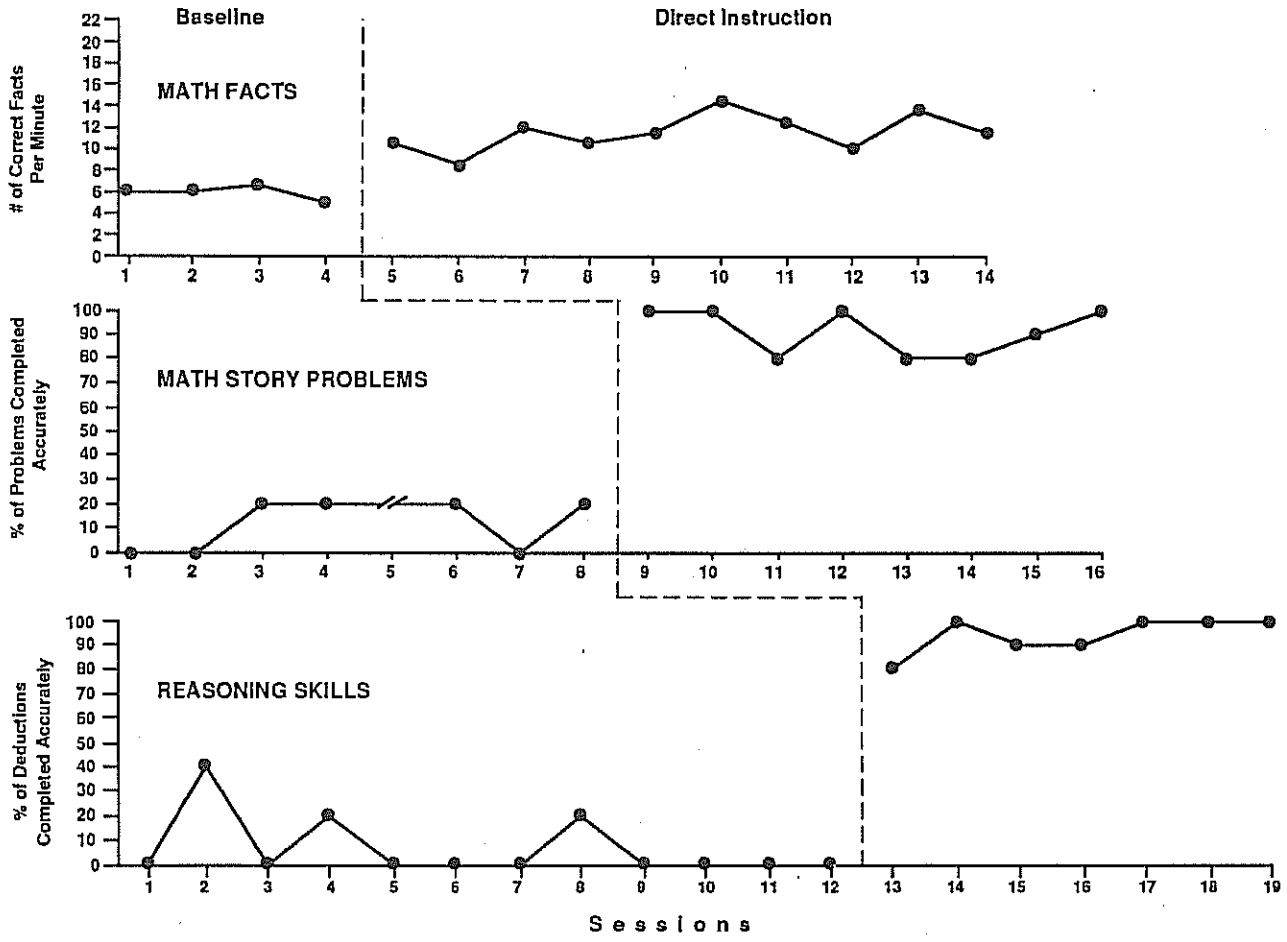
Results

Figure 2 depicts Thomas' performance in each of the three instructional areas. Once instruction was begun, Thomas made immediate and significant improvement in all three areas.

Reasoning skills. During the baseline phase, Thomas averaged 6.7% correct on verbally presented deductions. His responses indicated a complete lack of understanding of the reasoning process, and often included totally irrelevant information. A sample of Thomas' responses (in italics) to the deductive statements presented during baseline follows:

Some ice cream has nuts. Chocolate is one ice cream. So... *lick 'em.*

Figure 2. Effectiveness of Direct Instruction Tutoring in Math Facts, Math Story Problems, and Reasoning Skills (Thomas).



All mice have tails. A field mouse is a type of mouse. So a field mouse... *has little shark teeth.*

Some mountains have tall peaks. Mt. Jefferson is a mountain. So Mt. Jefferson...*doesn't move.*

During the baseline phase, Thomas' responses demonstrated a complete misunderstanding of deductive logic. As soon as instruction began, his performance improved dramatically. He no longer guessed or offered irrelevant responses. For example, several days after instruction began, he responded:

Mammals are warm-blooded. Kangaroos are mammals. So kangaroos... *are warm-blooded.*

Cows don't eat meat. A Guernsey is a cow. So a Guernsey...*doesn't eat meat.*

Thomas' performance maintained at the 80-100% level throughout the instructional period, an acceptable instructional range for a student with learning problems (Anderson, Evertson,& Brophy, 1979).

Story problems. Thomas' performance in story problems followed a similar pattern. As soon as the teacher began instruction in the story problem strategy, his accuracy increased significantly, from an average of 11.4% correct in baseline to an average of 91.25% correct during instruction.

Because all steps in the problem-solving strategy are critical to its successful implementation, it was important for Thomas to learn to follow all steps in the problem-solving strategy. Initially, the teacher guided him through each of the steps, providing corrective feedback as necessary. A key component of the instructional process was to fade these teacher prompts.

Math facts. During the baseline phase, Thomas completed an average of 6 facts per minute. His rate increased to an average of 11.5 facts per minute during the instructional period. Although this represents a significant increase over baseline performance, it is still considerably lower than what an average third grade student could be expected to complete. Thomas' slow performance can primarily be attributed to his poor fine motor skills. If he had given the answers orally rather than in writing, his performance would likely have increased substantially.

Discussion

The results of these two case studies show that the Direct Instruction approach can be effective in teaching children with brain injuries. After approximately 12 hourly instructional sessions, both students made substantial academic progress in their targeted instructional areas. The gains were seen in both discrete and more complex skills. For example, Jill improved in reading sounds and repeating simple sentences, and Thomas learned to work math story problems, a skill involving more abstract reasoning. Obviously, continued Direct Instruction for these children would be important for their future functioning. However, it is a tribute to the power of DI methodology that significant effects can be demonstrated in a short time.

Through participation in the tutoring program, both students regained skills lost after their injury. In addition, some of the gains made represented new learning; Jill, for example, had not had reading instruction prior to the study.

It may be argued that the effects demonstrated in these case studies can be attributed to factors other than the instructional methodology implemented. Students may have improved over the course of the tutoring program due to practice effects or the individualized attention provided by the tutor. Although the design of these studies does not permit an analysis of these questions, research with other populations suggests that the design and presentation variables of Direct Instruction programs are functionally related to student academic gains (e.g., Carnine, 1976; Carnine, 1978; Gersten & Carnine, 1986). Further research is needed to more fully document the effectiveness of these instructional design and presentation variables with the brain injured population. Of specific interest is a more fine-grained analysis of the relative effectiveness of the Direct Instruction design and presentation variables (e.g., cumulative and integrated review, rapid pacing, general-case programming, skills sequencing).

Results from these case studies suggest that the use of Direct Instruction teaching techniques resulted in substantial student progress over a six week period. As the population of children with TBI increases each year, so does the demand for effective approaches to meeting their instructional needs. There is a great need for continued investigation of the effectiveness of Direct Instruction techniques in meeting the the complex instructional needs of students with TBI. ◆

References

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

Carnine, D. W. (1976). Effects of two teacher-presentation rates on off-task behavior, answering correctly, and participation. *Journal of Applied Behavior Analysis, 9*(2), 199-206.

Carnine, D. W. (1978). Simultaneous versus cumulative introduction of addition facts. In D. Carnine & R. Gersten (Eds.), *Analysis of achievement data on six cohorts of low-income children from 20 school districts in the University of Oregon Direct Instruction Follow Through Model (Appendix A). Formative studies of direct instruction.* Eugene, Oregon: University of Oregon, College of Education, Follow Through Project.

Engelmann, S. E., & Bruner, E. (1983). *Reading Mastery I,* Science Research Associates, Chicago, IL.

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

Engelmann, S. E., Carnine, D. W., (1982). *Corrective Mathematics Program..* Science Research Associates, Chicago, IL.

Engelmann, S. E., & Osborn, J. (1976). *DISTAR Language I.* Science Research Associates, Chicago, IL.

Engelmann, S.E., Osborn, J., Haddox, P., & Hanner, S. (1978). *Corrective Reading Program, Comprehension A.* Science Research Associates, Chicago, IL.

Gersten, R., & Carnine, D. (1986). Direct instruction in reading comprehension. *Educational Leadership, 43,*(7), 70-78.

Kalsbeek, W., McLaurin, R., & Harris, B. (1980). The national head and spinal cord injury survey: Major findings. *Journal of Neurosurgery, 53,* 19-31.

Kurtze, J.G. (1982). The current neurologic burden of illness and injury in the United States. *Neurology, 32,* 1207-1214.

Rosen, C. D. & Gerring, J. P. (1986). Head trauma: Educational reintegration. Boston: College-Hill.

Savage, R. C. (1988). Introduction to educational issues for students who have suffered traumatic brain injury. In R. C. Savage & G. F. Wolcott (Eds.), *An educators manual: What educator's need to know about students with traumatic brain injury* (pp. 1-9). Southborough, MA: National Head Injury Foundation.

The Quest to Translate Research into Classroom Practice: *Strategies for Assisting Classroom Teachers' Work with "At Risk" Students and Students with Disabilities**

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If nothing else, the history of educational change teaches us that research does not easily find its way into classrooms (Fullan, 1982; Good, 1986; Guskey, 1990; McLaughlin, 1990). Externally imposed "solutions" to the "problem" of low academic achievement, no matter how well-intentioned or conceptually sound, have limited success in terms of classroom implementation (Fullan, 1982). These findings seem to apply to a range of innovative efforts from models of active teaching to technology-based curricula (Woodward & Gersten, in press).

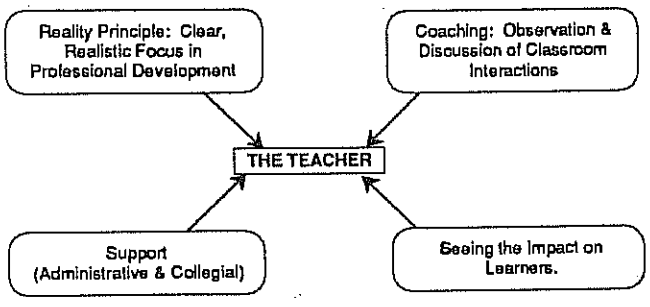
Recently, researchers from a wide range of disciplines—policy, innovation, curriculum development, teacher effectiveness, teacher thinking, school reform — have examined the process of implementing and adapting research-based practices. The first section of this paper explores that literature. It reflects our own analysis of the problems and some potential solutions — ones with direct implications for innovative curricula.

The Essential Factors in Successful Change

A synthesis of the research on successful, enduring change in classroom practice led us to isolate four essential factors. These are visually represented in Figure 1. Optimal professional development activities have the following four major components:

1. **Reality Principle: Clear, Realistic Focus in Professional Development**

Figure 1. Factors that Initiate and Sustain Change in Classroom Teaching.



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A recent synthesis by McLaughlin (1990) highlighted a recurrent refrain in the research on innovation and change—teachers crave *specificity, concreteness,* and *intensity* in all staff development efforts. Specificity is a persistent theme in the research on instructional change. As early as 1977, Doyle and Ponder noted the importance of concrete, practical suggestions to teachers by consultants or change agents. The DESSI study of school improvement (Crandall, 1981; Crandall, et al., 1982) — one of the most extensive in history — concluded that successful change efforts almost always provided concrete, usable ("classroom-friendly") remedies for instructional problems.

Many previous attempts to develop models for consultation or collaboration between special and general educators have floundered, in part because of a lack of concreteness, specificity, or intensity (Fuchs & Fuchs, 1986). When inservice educators, for example, offer teachers vague guidelines, such as "Integrate principles of child development into your teaching" or "Use student performance data to modify your teaching strategies," without providing concrete examples and procedures, implementation will be low and erratic, and growth in student achievement will be minimal (Stallings, 1975). When goals are vaguely defined (e.g., "Make the student feel good about herself," "Improve attitudes toward learning and motivation") or unclear, participating teachers often experience frustration and failure (Rosenholtz, 1989).

Research must further be translated into a manageable, comprehensible set of teaching strategies and procedures for curriculum modification. It must be concerned with the details of day-to-day *classroom instruction* if classroom teachers are to substantively change their teaching styles (Carnine & Gersten, 1985; Fullan, 1982). In a review of the staff development research literature, we labeled this the "reality principle" (Gersten & Woodward, 1990).

With the introduction of a new instructional approach or strategy, it is imperative that everyone know what the model looks like (Crandall, 1981). Model developers and local change agents need to demonstrate that new teaching techniques can work with existing or soon-to-be-adopted curriculum. If, for example, the model requires an additional hour or two per day of teacher preparation time, with no additional compensation for the teacher, few teachers will implement it (Duckworth & Fielding, 1985; Stevens & Driscoll,

1985). The reality principle by nature requires a series of compromises.

McLaughlin (1990) concluded that "planned change efforts... need to be sufficient in scope to challenge teachers and kindle interest, but not so ambitious that they require too much too soon" (p. 12). This type of modulation and balance requires artistry.

Consistent with the reality principle, an emerging view of professional development focuses on the enhancement of current practice (Smylie, 1988). The goal of enhancement is to refine and expand on a teacher's current repertoire of instructional strategies. Therefore, the process varies based on analysis and observation of each individual classroom.

Typically, when districts adopt new programs, their intent is to substitute new practices for old, rather than to *assimilate* new ideas to address perceived deficiencies in current practice. This substitution process is problematic for several reasons. It ignores *what is currently working* for teachers and their students; effective aspects of current methods are discarded along with the ineffective. The degree of change required of teachers and students is often enormous.

Substitution increases the chance that today's solutions become tomorrow's deficiencies, thereby perpetuating the cycle described above. By constantly switching methodologies, many teachers never have a chance to truly understand the subtleties of any methodology, or to engage in serious dialogue and discussion about how a given methodology can be modulated to meet the needs of their lower performing students (Gersten, Woodward, & Morvant, in press).

Deal (1990) noted that "in order to transform [practice] successfully, educators need to navigate the difficult space between letting go of old patterns and grasping on to new ones..." (p. 12). This process involves a thorough understanding of the world of the classroom teacher and the constraints teachers work under, as well as an understanding of factors leading to enduring change in classroom practice.

2. The Concept of "Coaching": Observation and Discussion of Classroom Interactions

Professional development needs to go beyond bestowing on teachers the passive role of hearing about innovative practices or simply watching demonstrations (Showers, Joyce, and Bennett, 1987; Stallings, 1980). Good (1986) observed that teaching techniques that appear to be simple require much more extensive training than was previously thought. Showers, et al. (1987) concluded, "For a complex model of teaching...about 25 teaching episodes are necessary before all the conditions of transfer are achieved" (p. 86).

The formal title of the person responsible for observing, discussing and giving feedback to teachers on new strategies and helping them analyze how to implement those strategies in their classrooms does not seem to be very important (Carnine & Gersten, 1985; Gersten, Darch, Davis & George, 1991; Idol-Maestas & Ritter, 1985; Johnson & Pugach, 1991; Joyce & Showers, 1982; Knight, et al., 1981; Little, 1984; Stallings, 1980). What *is* important is his or her competence and technical knowledge (Cruickshank, 1985; Gersten, et al., 1991). Showers, et al. (1987) used the word coach to describe such a person.

Cruickshank (1985) found that when teachers carefully and systematically analyzed their use of teaching strategies, not only did they gain insight into their role as teachers, but also student learning increased significantly. Coaches may facilitate this analysis by observing the impact of the new strategies and practices on the classroom learning environment in a non-evaluative fashion, over a sustained period of time.

Crandall's (1983) observations of school improvement led him to conclude that teachers are natural emulators. They respond well to seeing models of the new strategies conducted in their own classrooms with their own students (Joyce & Showers, 1982). Thus modeling how to teach a new social studies instructional technique, for example, is often a part of the coaching process.

McLaughlin (1990) observed that successful change requires individuals (such as coaches) who can provide "the ongoing and sometimes unpredictable support teachers needed" (p. 12). "Support" is intentionally used in the broad sense — to include technical feedback, empathy, and camaraderie.

An important adjunct to coaching is a cognitive-conceptual component. Showers, Joyce, and Bennett (1987) report in their review that adding conceptual understanding tended to *triple* the effect of programs that merely trained teachers on new techniques. They concluded that "what the teacher thinks about teaching (practices) determines what the teacher does in the classroom" (p. 85).

Asking classroom teachers to use new techniques or innovative curricula with students with mild handicaps may involve dramatic conceptual shifts for many of the teachers, including a somewhat different view of their role as teachers. Therefore, staff development must include opportunities for teachers to grapple

with these changes in discussion with colleagues.

Richardson (1990) sees a dramatic need to understand and take into account "the constant changes teachers make when meeting the changing needs of the students." She envisions staff development programs that include serious discussions of alternatives, wherein teachers provide suggestions and articulate their conceptions of effective practice. She argues that researchers "should provide practitioners not just with findings in the form of activities or behaviors that work, but ways of thinking and empirical premises related to teaching and learning" (p. 16). We think it is essential that teachers see the changes proposed as other than a set of isolated procedures and techniques.

3. Seeing the Impact of New Instructional Strategies on Learners

Teachers' attitudes toward an intervention change when they see changes in student performance (Berman & McLaughlin, 1976; Guskey, 1984). Noticeable increases in student performance are often the turning point for many teachers, leading them to a greater investment in the new techniques or innovation. While many teachers might eventually notice changes in student performance (albeit informally), explicit attention to data — increases in reading rates, the number of comprehension questions answered correctly, the time-on-task during the lesson — can accelerate this process.

Careful attention to student performance is, in fact, a characteristic of expert teachers (Kinder, Gersten, & Kelly, 1989; Leinhardt & Greeno, 1986). Decisions about whether to proceed to the next stage of a lesson are guided by a keen sense of student readiness. Coaches may facilitate this awareness by: a) linking the improved student performance to the new techniques and b) gearing the teaching toward an increased focus on student performance (versus a strict focus on the teaching acts themselves).

By focusing on the impact of instruction on learners, those involved in collaborative efforts can help teachers become more observant and reflective as they teach. Discrete changes in observed student performance (e.g., increased conceptual understanding in arithmetic because of strategic feedback) are at the heart of the dialogue.

4. Collegial/Administrative Support

The literature on school improvement (Fullan, 1982; Huberman & Miles, 1984; Loucks & Roody, 1990) indicates that lasting change in educational practice requires the interplay of a complex cast of characters (e.g., teachers, principals, central office administrators and consultants) over time. Most of this research clearly indicates that change is a process, not an event.

Early school improvement efforts focused on the role of the building principal as instructional leader and manager of any major change effort (e.g., Edmonds, 1979). However, as researchers began to conduct more in-depth explorations of successful school improvement efforts, they found that, invariably, a configuration of players was necessary for real, sustained change. Often the major manager of the implementation was not the principal, but rather what Loucks and Roody (1990) called the "local facilitator" — an individual in the district central office such as the curriculum coordinator, reading specialist, or operations manager. This facilitator, whatever her or his official position, invariably knew and cared about the proposed instructional model. The facilitator typically coordinates the day-to-day details of the entire implementation effort, linking resources to teachers in need, helping teachers with day-to-day classroom problems, and encouraging teachers experiencing difficulty. The newer research on school improvement and school restructuring contains an expanded view of instructional leadership, whereby the principal or district facilitator works in a less authoritarian fashion and actively supports collaboration between teachers. When administrators support professional dialogue between teachers and actively implement the teachers' suggestions, the school environment is more conducive to serious change (Rosenholtz, 1989).

To summarize, optimal staff development or change efforts create an environment in which teachers receive feedback on the new practices from some type of mentor teacher/coach/observer, and have the opportunity to discuss the impact of the new practices on student learning in a supportive atmosphere. This process is analogous to cognitive apprenticeship (Collins, Brown, & Newman, 1989), in that slowly the mentor shares the "secrets of the craft" and the thinking behind the thinking. The goal of such an apprenticeship is that, over time, teachers begin to analyze observed behavior during and after a lesson, and use the "data" to refine their teaching to enhance learning. This type of reflection is situated in the realities of each teacher's classroom practice.

Overview of Our Research Project

In 1989, we initiated an action research project in a large, inner city school. The purpose of the project was to develop and field-test a model for assisting classroom teachers to translate research into practice. The researchers centered their efforts on supporting teachers' use of new, research-based instructional strategies in reading/language arts instruction. In most cases, the focus of the intervention was on the lowest performing students in the class, including those diagnosed as exhibiting learning disabilities and those

considered "at risk" for subsequent school failure.

The concept of coaching was the central focus of the project; however, all four factors delineated in Figure 1 played a role. The coaching sessions tended to have a relatively narrow and clear focus; sessions often (in an informal way) alluded to observed changes in student performance. In some instances, fairly strong bonds developed between the teachers and the coaches. The collaborative effort with each teacher began with a detailed observation of classroom practice and worked toward ongoing feedback as the classroom teacher implemented new practices. The ultimate goal of coaching was an increased use of instructional practices and strategies that would enhance their effectiveness with students with learning problems.

The school districts selected three mentor teachers with relevant expertise. Two were special education teachers; the third was a Chapter One program special-

Table 1. Constructs for Effective Instruction for At Risk Students

1. Challenge
   - Explicit.
   - Implicit (cognitive challenge of reciprocal teaching, use of higher-order questions).
2. Success
   - Providing activities and tasks that students can complete.
   - Indicating to students when they are successful.
   - Appropriateness of tasks assigned to students—when necessary, teacher regulates the lesson to reach the level of students.
3. Engagement/Involvement
4. Feedback
   - Frequent and immediate.
   - Comprehensibilty of feedback.
   - Appropriateness of feedback.
5. Use of Cooperative Learning/Meaningful Collborative Learning
   - Participation in a meaningful way by lower-performing students (reading, oral and written contribution).
   - Instances of genuine cooperative dialogue.
   - Evidence that students begin to collaborate more over time.
6. Use of Scaffolded Instruction
   - Teacher provides clear explanations and guidelines.
   - Teach provides clear models using a wide range of examples.
   - Teacher provides support to students before they are asked to perform independently—this involves "thinking aloud," building on and clarifying input of students.
   - Teacher attempts to use visual organizers/story maps or other aids to help students organize and relate information.
   - Teacher provides adequate background knowledge to students/informally assesses whether students have background knowledge.
   - Teacher provides prompts to students when appropriate
   - Students use the strategies, scaffolds, procedures presented.
7. Other Key Instructional Principles
   - *Less is more*—teacher focuses on key vocabulary words and concepts, rather than presenting an exhaustive list.
   - Teacher precorrects for potential difficulties.
   - Teacher regulates difficulty (i.e, when teaching a new strategy, she/he may use a book with easy readability, and when presenting a new math concept, may use small numbers).
   - The segments of the lesson are coherent— i.e., as the lesson evolves, both observer and students see how pieces fit.
8. Affective Tone of the Classroom/Respect for Cultural Diversity
   - Use of praise/criticism: the extent to which teacher shows respect for cultural diversity.

ist. Coaching was conducted by these three mentor teachers in conjunction with three members of the research staff. Thirteen teachers were involved in the project.

The process began with a brief, informal meeting of the teacher and a mentor teacher, to introduce them to the process. The mentor then conducted two classroom observations that focused on the constructs in Table 1. These helped to clarify problems expressed by the teacher in terms of the relevant research. The constructs in Table 1 come from Direct Instruction research (Carnine, 1991; Gersten, Woodward & Darch, 1986) process-product research (Brophy & Good, 1986), and newer cognition-oriented instructional research (Harris & Pressley, 1991; Garcia, Pearson & Jiménez, 1990; Palincsar, 1986). Note that the constructs are phrased in a very non-technical fashion with minimal use of jargon. Furthermore, all the constructs can relate directly to higher order cognitive processes as well as to the development of critical background knowledge and facts. The observer focused on issues such as the following during initial observations:

- *The success of the target students during various segments of the lesson* (recorded by counting the number of questions answered correctly). The content of instructional activities is also assessed. In some cases, teachers seem to insure a high rate of success by relying on mundane tasks (e.g., capitalization, punctuation, copying definitions from the dictionary). The observer examines the extent to which learning activities that provide a sense of challenge seem to foster students' conceptual development.
- *The nature of feedback provided when students make errors.* (The observer notes whether the teacher merely calls on other students to keep the lesson moving, or provides specific information or feedback that helps the target child reach the correct answer.)
- *The number of student interactions during the discussion section of the lesson—either with the teacher or with each other.*
- *The extent to which teacher explanations are sensitive to the current conceptual level of the students.* Observers also note the number of explanations that are too difficult or verbose.

After the first two observations, the mentor/coach shared her perceptions and discussed specific options for change using the framework. These kinds of questions laid the groundwork for discussion when the coach and teacher met to begin developing a plan of action. This process was repeated on a weekly basis for a period ranging from 3 to 30 weeks, depending on teachers' interests and needs (for details, see Gersten, et al., 1991; Glang & Gersten, 1991).

In subsequent post-observation meetings, the teacher and mentor/coach assessed the impact of the new strategies on the students. Trying out new techniques in this context often helped the teacher "work out the kinks" of a new instructional approach. Moreover, it enabled the coach to guide the teacher toward understanding the connection between specifics of teaching techniques and strategies (such as the timing of feedback, the type of question asked, the amount of support provided) and their effects on student learning and motivation.

Our efforts focused on promoting a cycle of success in classroom instruction. By helping the teacher to select concrete, realistic, and easy-to-implement practices, we ensured successful experimentation by most teachers. By drawing on research-based practices known to enhance student success, we ensured that the changes would result in observable improvements in student performance. Once a strategy was attempted, continued use was supported through regular visits and clear feedback.

Research Methodology

A multifaceted approach for data collection was used to provide as rich a picture of the process as possible:

- Reading and language instruction was observed once at the beginning of the process and once toward the end of the process.
- Student progress was assessed on a weekly basis using curriculum-based assessment procedures.
- Students' attitudes toward reading were assessed using a brief questionnaire.
- The teachers were interviewed within the first 6 weeks and every 4 months thereafter. The interviewer asked them to describe the impact of the process on their students, their comfort level with the process, and suggestions for adjustments or refinements.
- Planning sessions between the mentor teacher and the university personnel were audiotaped and reviewed by the researchers.
- Meetings between the mentor teacher and the participating teachers were audiotaped (when it was comfortable to do so).
- Logs kept by the mentor teachers were reviewed by the researchers. Researchers also interviewed the mentor teachers twice in the course of the year.

In the next section, we present some preliminary findings and insights gained from the first attempts at analyses of the data generated in the case studies.

Preliminary Findings

Seven findings will be presented in brief outline form. The last will be discussed in some detail.

1. As the project evolved it became clear to us that *the focus of the intervention depended much more on the skill level of the teacher than the skill level of the target students.*

In other words, if a given student was in Mr. Clark's 5th-grade class, the intervention proposed would be very different than if the same student were in Mr. Segal's 5th-grade class. Though this seems obvious to those involved in staff development activities, it is rarely discussed in the special education literature on pre-referral intervention strategies or consultation. Typically, in the special education literature, the focus is always on the ability level of the student and the needs of the student.

2. *Working with beginning teachers is qualitatively different than working with more experienced teachers.* We learned this through our mistakes.

Special educators tend to focus almost exclusively on students with identified disabilities or those at risk for referral. Initially, we, too, assumed it was feasible to focus attention only on the four to eight lowest performing students for all classrooms. We assumed teachers possessed a basic comfort level with curriculum classroom management and mainstream instructional strategies, but could use some additional assistance with their lowest-achieving students.

With beginning teachers, however, this assumption does not make sense. These teachers needed mentoring and assistance in some of the "basics" of 4th- or 5th-grade teaching. Focusing on the most-difficult-to-teach students in their rooms was premature.

3. As we reviewed field notes and spoke to those involved in the coaching process, we became aware that the research base served merely as a *guide, not as a prescription for practice.* Often the coaches' intuitions, experiences, and biases seemed to determine which research findings were emphasized and which ignored. Also, the way the research findings were translated into practical suggestions was strongly determined by the individual preferences of the coach.

4. The observational data and informal curriculum-based assessment data did serve a purpose in terms of helping teachers understand their impact — or potential impact — on student learning, *but only when the coach actually brought the data to the attention of the teacher.*

We learned that one can never assume that just because data are being collected, a teacher will look at them. In two of the three classrooms where paraprofessionals were collecting and graphing curriculum-based assessment data on target students over a period of several months, the teacher revealed to the interviewer that she had never looked at it.

5. *Modeling of mini-lessons was frequently seen as beneficial.* By seeing a demonstration mini-lesson conducted with their own students, teachers indicated that they "saw how the pieces fit together." Seeing the procedures and strategies in operation often proved to be valuable — especially if it served as a point of reference for future discussions.

6. Despite our attempts to focus on learner performance, rather than teacher competence, there were times *that the process felt evaluative to many participating teachers.* In interviews, some teachers said that the observations by the coach did cause some discomfort. In their minds, the discomfort was offset by perceived benefits to themselves.

7. *Most of the strategies suggested for implementation required high levels of energy to implement.* Some teachers indicated in the interviews that they found these techniques unnatural when they began to use them. Our observations of teachers during initial phases seemed to corroborate this. Several teachers appeared to use the procedures in artificial ways; one could almost feel them fighting to hold themselves back and cover less material, but do it in a way such that all students grasped the concepts.

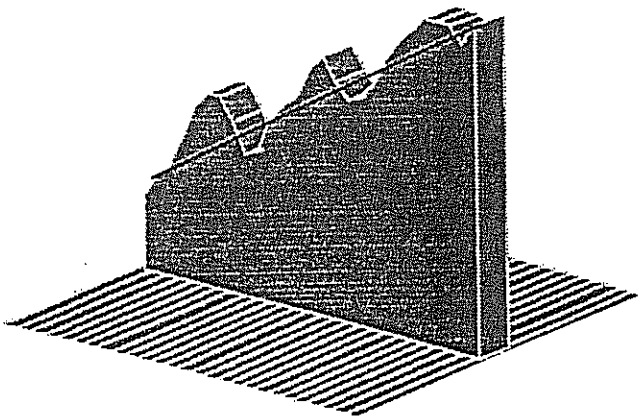
The amount of practice and review necessary for students to really master new vocabulary words or achieve fluency seemed massive to some. For example, one teacher noted that three days of work on a set of vocabulary words was boring *to her.* Yet, she noted that the students did seem much happier, more involved, more responsive, and more sophisticated in their comments.

It is important to note that some teachers took to these techniques easily. Our hope was that the awkwardness and artificiality would only be temporary, that teachers would learn to review and practice concepts with students, but in a fashion that was more interesting, both to them and to the students. This was not always the case.

8. *The "up-and-down" nature of change in teaching practice.* One of the key findings was that the change process occurred in a decidedly non-linear fashion. Figure 2 is a visual impression of a typical pattern of change for a teacher actively involved in the process. The graph reflects that, at times, instructional variables suggested in the dialogue sessions with the mentors were implemented in a consistent fashion; at other times, the strategies were ignored, or used in an intermittent, unfocused fashion.

Often, the downturns were a source of distress to the mentor teachers. As we attempted to understand this process, we concluded that several factors influenced the up-and-down, non-linear pattern. The first was that learning typically follows a pattern of pla-

Figure 2. Up and Down (Non-Linear) Nature of Change: A Visual Impression



teaus, peaks, and valleys —allowing for time to consolidate new patterns of behavior.

The rate of change was, in virtually all cases, slow. This finding came as no great surprise. One major reason for the slow rate of change was that teachers were attempting to break set patterns of behavior and substitute new ones. Change is rarely an easy or rapid process.

Though we were hardly surprised by the slow rate at which many changed old habits of teaching, we soon became aware of another serious issue. The work of Kennedy (1991) and colleagues on teachers' thinking and cognition was extremely helpful in understanding this phenomenon. It appears that in many instances, ideas suggested during the coaching process clashed with teachers' models of teaching — both explicit and implicit. There were two cases of clear philosophical clashes between the mentor teacher doing the coaching and the teacher. However, in most cases, the conflicts were much more subtle. It seems that the principles that were suggested and discussed during the dialogue sessions conflicted with *implicit* conceptions of teaching. Many of the teachers seemed to conceive of teaching simply as *presentation* of material to students, coupled with occasional supervision of assignments. In those classrooms, the ultimate responsibility for learning seemed to rest with the student.

Through the coaching process, we attempted to shift the responsibility to the teacher. The model of teaching we presented stressed the need for much more frequent interaction between teachers and their lower performing students. Teachers were constantly made aware of the need for all students to experience success.

Interviews with participating teachers revealed that many of them felt uncomfortable with aspects of the coaching process. Some felt that, when they followed the coach's suggestions, the pace of instruction was too slow, or that they were personally bored covering and reviewing the same material for several days. Our hope was that these teachers would begin to slowly see the rewards of covering fewer concepts more intensively — so that the students really learned the material. *In over half the classrooms in which we worked, that hope was not realized.*

With regard to those teachers with the most intense involvement — in terms of frequency of observation, duration of the coaching experience, and personal investment in the process—we did note a gradual shift in their conceptualization of instruction. The shift was sometimes evident in incidental remarks made to the coach, remarks that linked their instructional strategies to increased student success. In final interviews, this group of teachers alluded to the importance of the increased structure and increased interaction for their students.

The process of sharing observational data on student performance was emotionally distressing at times. Any type of close scrutiny puts self-esteem at risk (Little, 1984). We also realized that teachers have many concerns — and increased success with their lowest achieving students is only one of these. At times, teachers rejected suggestions made during the process, even though they felt the suggestions would help lower performing students. They gave as the reason (sometimes explicitly, often implicitly) that they also were concerned with their high achieving students, and did not want to make sacrifices. Suggestions such as slowing the pace of content covered for the entire class, or having the whole 5th-grade class read a novel of 3rd-grade readability so that all students could succeed, were often ignored. Special educators often are blind to teachers' dual agenda.

Conclusions

In summarizing the major findings of a decade's worth of research on teachers' thinking and teacher training and its implications for reform of classroom practice, Kennedy (1991) notes, "We now realize that the task... *entails more than teaching teachers specific techniques, and more than teaching them a vision* [emphasis added].... Teachers must grasp the significance of these new ideas, understand how these ideas differ from those they have held in the past, and be persuaded that these ideas are better than the ideas they had in the past" (p. 14).

Kennedy (1991) also noted that few developers of innovative instructional approaches in the 1960s and 70s "*took into account the deeply-held and tacit convictions*

that teachers brought with them.... They may have tried to teach teachers [emphasis added] how to behave without articulating fully their own assumptions about why this would be a superior way to behave" (p. 14). The research of Floden (in press) shows that most teachers are individuals who liked school, who did well in school, and who do not easily comprehend the world view of seemingly unmotivated, low performing students. Few recognize that some of their students may have a very different orientation toward school than they did when they were children.

That changing these views of students is an intricate, delicate, time consuming process, was verified by our research.

In the current project, we had a vision of classrooms where even the lowest achieving students experienced success, and were challenged instead of frustrated. We possessed a battery of teaching techniques and a model for providing feedback to teachers.

But our vision was not fully articulated; we had only a rough idea of how this would play out in the uncontrolled situation we were in — in which teachers used a range of curricula, or no set reading curriculum at all, and in which district mandates sometimes called for all fifth graders to read out of the same book regardless of their current reading ability. Our model evolved as we worked with the teachers.

Our preliminary findings suggest that this type of professional development requires an intensive effort. However, it, can ultimately transform a teacher's vision of teaching students with disabilities. ◆

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References

Berman, P., & McLaughlin, M. (1976). Implementation of educational innovations. *Educational Forum, 40*(3), 345-370.

Brophy, J., & Good, T. L. (1986). Teacher behavior and student achievement. In M. Wittrock (Ed.), *The third handbook of research on teaching* (pp. 328-375.). New York: Macmillan.

Carnine, D. W. (1991). Curricular interventions for teaching higher order thinking to all students: Introduction to the special series. *Journal of Learning Disabilities, 24*(5), 261-269.

Carnine, D. W., & Gersten, R. (1985). The logistics of educational change. In J. Osborn, P. T. Wilson, & R. C. Anderson (Eds.), *Research base for literacy* (pp 131-149). Boston: D. C. Heath.

Collins, A., Brown, J. S., & Newman, S. E. (1989). Cognitive apprenticeship: Teaching the craft of reading, writing, and mathematics. In L. B. Resnick (Ed.), *Knowing, learning and instruction: Essays in honor of Robert Glaser* (pp 453-494). Hillsdale, NJ: Erlbaum.

Crandall, D.P. and Associates. (1982). *People, policies, and practices: Examining the chain of school improvement*, vols. 1-10. Andover, MA: The NETWORK, Inc.

Crandall, D.P. (1981). Emulation and replication. *Teacher Education and Special Education, 4*(2), 13-22.

Crandall, D.P. (1983). The teacher's role in school improvement. *Educational Leadership, 41*(3), 6-9.

Cruickshank, D. R. (1985). Use and benefits of reflective teaching. *Phi Delta Kappan, 66*, 704-706.

Deal, T.E. (1990). Reframing reform. *Educational Leadership, 48*(8), 6-12.

Doyle, W. & Ponder, G.A. (1977). The practicality ethic in teacher decision-making. *Interchange, 8* (3), 1-12.

Duckworth, K., & Fielding, G. (1985). *Management implications of teachers' design and use of tests in high school classes.* Final report submitted to the National Institute of Education. Eugene, OR: Center for Educational Policy and Management, University of Oregon.

Edmonds, R. (1979). Some schools work and more can. *Social Policy, 9*(5), 28-32.

Floden, R.E. (in press). What teachers need to know about learners. In M.M. Kennedy (Ed.), *Teaching academic subjects to diverse learners.* New York: Teachers College Press.

Fuchs, D., & Fuchs, L. (1986, December). *Prereferral consultation: Preliminary research findings.* A paper presented at annual conference of Oregon School Psychologist Association, Eugene, Oregon.

Fullan, M. (1982). *The meaning of educational change.* New York: Teachers College Press, Columbia University.

Garcia, G., Pearson, P., Jiménez, R. (1990). *The at risk dilemma: A synthesis of reading research.* Champaign, IL: University of Illinois at Urbana-Champaign, Reading Research and Education Center.

Gersten, R., & Woodward, J. (1990). Rethinking the regular education initiative: Focus on the classroom teacher. *Remedial and Special Education, 11*(3), 7-16.

Gersten, R., Darch, C., Davis, G., & George, N. (1991). Apprenticeship and intensive training of consulting teachers: A naturalistic study. *Exceptional Children, 57*, 226-237.

Gersten, R., Woodward, J., & Darch, C. (1986). Direct instruction: A research-based approach for curriculum design and teaching. *Exceptional Children, 53*, 17-36.

Gersten, R., Woodward, J., & Morvant, M. (in press). Working knowledge: Enhancing the transfer of research into practice. *Educational Leadership.*

Glang, A., & Gersten, R. (1991). *Examining the collaborative consultation process: A qualitative case study.* Manuscript submitted for publication.

Good, T. L. (1986, April). *Training elementary teachers to implement effective teaching practices in mathematics.* Report presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

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

Guskey, T. R. (1990). Integrating innovation. *Educational Leadership, 47*(5), 11-15.

Harris, K., & Pressley, M. (1991). The nature of cognitive strategy instruction: Interactive strategy construction. *Exceptional Children, 57*, 392-404.

Huberman, A. M., & Miles, M. B. (1984). *Innovation up close: How school improvement works.* New York: Plenum Press.

Idol-Maestas, L., & Ritter, S. (1985). A follow-up study of resource/consulting teachers. *Teaching Education and Special Education, 8*(3), 121-131.

Johnson, L., & Pugach, M. (1991). Peer collaboration: Accommodating students with mild learning and behavior problems. *Exceptional Children, 57*, 454-461.

Joyce, B., & Showers, B. (1982). The coaching of teaching. *Educational Leadership, 40*, 4-10.

Kauffman, J. M., Gerber, M. M., & Semmel, M .I.(1988). Arguable assumptions underlying the Regular Education Initiative. *Journal of Learning Disabilities, 21*, 6-12.

Kennedy, M.M. (1991, February). *Following through on Follow Through.* Paper prepared for an Office of Educational Research and Improvement, U.S. Department of Education conference on the potential for a follow-up study of young adults who participated in the Follow Through program as children. Washington, DC.

Kinder, D., Gersten, R., & Kelly, B. (1989, April). *Expert math instruction for at risk students.* Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Knight, M.F., Meyers, H.W., Paolucci-Whitcomb, P., Hasazi, S.E., & Nevin, A. (1981). A four year study of consulting teacher service. *Behavioral Disorders, 6*, 92-100.

Leinhardt, G., & Greeno, J.G. (1986). The cognitive skill of teaching. *Journal of Educational Psychology, 78*, 75-95.

Little, J. W. (1984). Seductive images and organizational realities in professional development. *Teachers College Record, 86*, 84-102.

Loucks, S., & Roody, D. (1990). Using what is known about change to inform the regular education initiative. *Remedial and Special Education, 11*(3), 51-56.

McLaughlin, M. (1990). The Rand Change Agent Study revisited: Macro perspectives and micro realities. *Educational Research, 19*(9), 11-16.

Palincsar, A. (1986). The role of dialogue in providing scaffolded instruction. *Educational Psychologist, 21*(1&2), 73-98.

Richardson, V. (1990). Significant and worthwhile change in teaching practice. *Educational Researcher, 19*(7), 10-18.

Rosenholtz, S.J. (1989). Workplace conditions that affect teacher quality and commitment: Implications for teacher induction programs. *Elementary School Journal, 89*, 421-439.

Showers, B., Joyce, B., & Bennett, B. (1987). Synthesis of research on staff development: A framework for future study and state-of-the-art analysis. *Educational Leadership, 45*(3), 77-87.

Smylie, M.A. (1988). The enhancement function of staff development: Organizational and psychological antecedents to individual teacher change. *American Educational Research Journal, 25*, 1-30.

Stallings, J. (1975). *Follow Through program classroom observation evaluation.* Menlo Park, CA: Stanford Research Institute.

Stallings, J. (1980). Allocated academic learning time revisited, or beyond time on task. *Educational Researcher, 9*(11), 11-16.

Stevens, D., & Driscoll, A. (1985, March). *Applying effective instruction research to inservice in a rural setting.* Report presented at the annual meeting of the American Educational Research Association, Chicago.

Woodward, J., & Gersten, R. (in press). Innovative technology for secondary learning disabled students: A multi-faceted study of implementation. *Exceptional Children.*

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