ADI NEWS

VOLUME 11, NUMBER 4 THE ASSOCIATION FOR DIRECT INSTRUCTION SUMMER, 1992

FOCUS: WHOLISTIC APPROACHES

PROPOSED TITLE CHANGE

The ADI Board approved a recommendation to change the title of the *ADI News* to *Effective School Practices: An ADI Publication*. The Board believes the new title will better express the organization's mission as expressed in the ADI By-laws: "To bring to the field of education the latest in effective knowledge and procedures." In view of the national trend to completely ignore experimental research, it seems important that we highlight our interest in "effective," instead of faddish, unproven practices, as our defining feature. The current title rather highlights our interest in "DI" as opposed to possibly other effective practices. As a publication, our focus would remain centered on the needs and interests of practitioners and decision-makers.

Write and tell us how you feel about the change. Without any major objections the change will be effective in the next issue.

Article II: Purpose from the ADI By-Laws

The corporation shall have the following purposes:

1. To encourage, promote, and engage in research aimed at improving educational methods.
2. To encourage, foster, and promote the dissemination of knowledge and skills arising from research on teaching with the goal of improving the education of children and adults.
3. To sponsor training and informational workshops and conferences for parents, teachers, and others interested in education that will bring to the field of education the latest in effective knowledge and procedures.
4. To publish and distribute newsletters, journals, books, and related materials that are in keeping with purposes 2 and 3 above.
5. Any other lawful and related purpose within the scope of §501(c)(3) of the Internal Revenue Code.

The **ADI 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 back cover 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.

Editor ..... Bonnie Grossen
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A Letter from the ADI President...

I wish to draw the attention of our membership to a few changes in the ADI organization. No, we are not raising the membership fee so please read on! The most significant change has been the retirement of Wes Becker. He has been a foundation board member, ADI News Editor and Treasurer. Wes has made many significant contributions to ADI over the years and he will be sorely missed. At the last ADI Conference, here in Eugene, we paid a special tribute to Wes before his family and the conference participants. The event consisted of a moving address from Zig Engelmann, followed by a presentation of a plaque and a collector putter. A write-up of Zig's testimony and an interview with Wes are featured in this issue. We wish Wes all the very best and thank him one more time for all his work, contributions and leadership over the years.

Some changes have occurred in the Board of Directors. The membership and positions are as follows:

President	Geoff Colvin, Ph.D. Research Associate, University of Oregon
Vice President	Ann Glang, Ph.D. Research Associate, Oregon Research Institute
Secretary	Tracey Hall, Consultant, Trainer, Doctoral Student, University of Oregon
Conferences	Ann Glang, Ph.D. Research Associate, Oregon Research Institute
Membership	Chris Thurmond, Teacher 4J School District, Eugene
ADI News	Bonnie Grossen, Ph.D. Research Associate, University of Oregon
Consultant	Ed Kameenui, Ph.D. Associate Dean, University of Oregon
Regional Chapters	Jerry Silbert, Teacher 4J School District and Researcher University of Oregon

The Board has seen the need to become more directly involved in the management of ADI and to become more independent of Engelmann-Becker. Board Members will manage the organization through the portfolios listed above with paid assistance as needed. Charlene Tolles has been hired as Administrative Assistant. Judie Brantley will continue as bookkeeper. All communication to the ADI staff should be directed through Charlene Tolles.

The Board plans to focus on one particular aspect of its charter and that is service to its membership. We have tried to assess what exactly ADI does for its membership. Our most visible activities have been to conduct conferences for training in the Direct Instruction Programs and other related areas of effective instruction and to develop and disseminate the ADI News. Our other services have been more informal. Some ideas that have emerged are:

1. Provide more support to trainers and supervisors in the field.
2. Provide more support to teachers in the field.
3. Develop and support regional chapters.
4. Develop and disseminate small products related to Direct Instruction and effective practices (such as an annotated bibliography of research on Direct Instruction and other topics).
5. Provide support and guidelines for administrators in implementing programs.

If you have ideas or recommendations on any additional areas we could become more involved in to serve our membership or ideas on operationalizing these activities, please contact us. We are very interested in trying to do what we can to serve our membership. Bonnie Grossen, our new editor will use the ADI News to connect with you on improving services to our membership.

Finally, I do thank you for your membership. There is no need for me to spell out the difficult and frustrating times that face our schools and education in general. ADI feels very proud of what it stands for as articulated in our purpose (see purpose section of our by-laws included in this issue). The need for your membership and support is even more pressing.
Thank you and every best wish.

Sincerely,
Geoff Colvin
President

Contributor's Guidelines

The *ADI News* provides practitioners and decision-makers with the latest research and development news on effective teaching tools and practices. The journal emphasizes practical knowledge and products that have proven superior through scientific testing. Readers are invited to contribute to several different columns and departments that will appear regularly:

FROM THE FIELD: Submit letters describing your thrills and frustrations, problems and successes, and so on. A number of experts are available who may be able to offer helpful solutions and recommendations to persons seeking advice.

NEWS: Report news of interest to ADI's membership.

SUCCESS STORIES: Send your stories about successful instruction. These can be short, anecdotal pieces. SRA is offering $100 for each success story about SRA product implementations that is published in the coming year.

PERSPECTIVE: Submit critiques and perspective essays about a theme of current interest, such as: school restructuring, the ungraded classroom, cooperative learning, site-based management, learning styles, heterogeneous grouping, Regular Ed Initiative and the law, and so on.

RESEARCH STUDIES: Present data from your classroom or the results of scientific research. The data should guide other practitioners and decision-makers in evaluating alternative options for school reform.

TRANSLATING RESEARCH INTO PRACTICE: Integrate a larger body of empirical research into a defined practice that can be implemented in schools.

BOOK NOTES: Review a book of interest to members.

NEW PRODUCTS: Descriptions of new products that are available will be featured. Send the description with a sample of the product or a research report validating its effectiveness. Space will be given only to products that have been field-tested and empirically validated.

LIST OF DEMONSTRATION SITES: We wish to maintain an on-going list of school sites with exemplary implementations and impressive student outcomes. Submit the name of the exemplary school or classrooms, the names of the programs being implemented, and contact information so that visitations may be arranged.

MANUSCRIPT PREPARATION

Authors should prepare manuscripts according to the third revised edition of the *Publication Manual of the American Psychological Association*, published in 1983. Copies may be ordered from:

Order Department
American Psychological Association
1200 Seventh St., N.W.
Washington, DC 20036

Send an electronic copy, if possible, with a hardcopy of the manuscript. Indicate the name of the word-processing program you use. Save drawings and figures in a separate file. Electronic copy should preferably replace text that is underlined according to the APA format, with italic text.

Illustrations and Figures: Please send drawings or figures in a camera-ready form, even though you may also include them in electronic form.

Completed manuscripts should be sent to:

Bonnie Grossen, Ph.D.
Editor, ADI NEWS
PO Box 10252
Eugene, OR 97440

Acknowledgement of receipt of the manuscript will be sent by mail. Articles are initially screened by the editor for content appropriateness. The author is usually notified about the status of the article within a 6- to 8-week period. If the article is published, the author will receive five complimentary copies of the issue in which his or her article appears.

LETTERS

Dear Dr. Carnine:

I should probably start this letter in a very formal and professional manner to impress and predispose you to a request I'll be making later in this correspondence; but all I can say is, "I get it, I finally get it". After 40 years of struggle and humiliation concerning math, I am beginning to understand math and how concepts are related.

As a child, mathematics was a major obstacle. As I rose through each grade level, I became more convinced I was not very "bright" at math. All during college, when given a choice of math or science, I always chose science. Even though courses like Physics and Chemistry required mathematical calculations, math was not as threatening when presented under the topical heading of Science.

In my earlier years of teaching, I qualified as a candidate in a Federally Funded Program out of Princeton University. Its purpose was to raise the self concept of "women" with low math performance and esteem by 'reteaching' them math. I would not anter the program because of the potential of failure; the fear of failure was even more strongly present in me as an adult.

During my teaching career of 26 years, I have attempted to give my all to teaching math students to succeed and enjoy math. I've tried every new method and material on the market, and while they met one or two particular needs, most failed dismally to affect our performance and understanding of math.

After adopting the theory of direct instruction and becoming a member of ADI, I began using the Corrective Math Program and its modules and wished there was something more. Last summer, I attended a training session for Consultants in Connecting Math Concepts. It then became apparent there was something more, that my goal should be to acquire Level D of Connecting Math Concepts.

It appeared to me to be 100 times better than the current math basal I was using. I would have even been willing to do Level C in 4th grade. After your lecture at our Bellmawr School District in December of 1991, I badgered, begged and pleaded with SRA Representative, Leigh Brougher to get the program. She was instrumental in establishing CMC paper pilot in my room. She felt that your only concern being .... I would not get the year-end results I should starting the program so late in the school year.

Let me assure you, Dr. Carnine, within the first twenty lessons of Connecting Math Level D, **more material had been covered than in my entire Macmillan basal.** The 4th grade teachers in Bellmawr Park School are currently using the program in our regular education rooms. We also have one first and one third grade pilot program. **The children always want to move on – "What's next", "I love this", "I always hated math, but this is fun", "I always got poor marks in math, now I get higher marks for harder work".**

Parents have told me how pleased they are with the program. **One particular parent related how their 4th grade student helped their 8th grade student with fraction work.**

I invited our Math Curriculum Coordinator, Mr. Christy, also who happens to be our 6th grade math teacher to view a lesson. He observed and asked the children many questions about what they were doing, how and why? He later confided in me that **he had never seen such enthusiasm for math in his entire teaching career** or on task performance by pupils. He visited all three sections of math – high, average and low and had the same glowing reports. He wanted to know more!

Dr. Carnine, even though I didn't start the program until the end of January, I am on lesson 80. I always anxiously glance ahead to see what's coming next. **I don't know who's more excited, me or the children.** Next year, we will have the published texts in place in all third and fourth grades and one in first and one second.

I personally am purchasing Levels E and F to "reteach" myself math. It's been a joy using the program this year.

Sincerely,
Barbara A. Worrell
RR2, Box 274
Thorofare, NJ 08086

Annual 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 Chuck Arthur for Teacher of the Year, Stuart Greenberg for Administrator/Supervisor of the Year, and a special award was given to the Monterey County Office of Education for Excellence in Education.

ADI Teacher of the Year

The Association for Direct Instruction announced Chuck Arthur as the deserving recipient of the Teacher of the Year award. Chuck is a resource room teacher at H.B. Lee Middle School in Reynolds School District in Troutdale, Oregon. Before moving into special education, he also served as an elementary school counselor and fifth grade general education teacher. Chuck has an extensive background in behavior management and Direct Instruction. He began studying Direct Instruction research at Boston College in 1984. He has attended every Eugene ADI Conference since 1987.

As a teacher, Chuck simply refuses to believe that kids can't learn. He feels that with the right programs, teaching delivery and student motivation, learning will take place. His supervisors report that Chuck has "brought forth on the part of his students the kinds of measured achievement that most teachers in his position could only dream about." One supervisor wrote: "In almost thirty years in education, I have never seen a teacher with the dedication, perseverance, and degree of student academic success as Chuck has maintained over the past several years." Another reported that, "Chuck is never satisfied; he is always looking for ways to improve his program, and institutes his modifications with great care and preparation."

Chuck's students make impressive gains. It is not uncommon to hear that a student who reported hated reading earlier, now seems to spend every spare moment with books. Chuck is also able to involve parents who, either out of frustration or lack of interest, have not been involved in school for several years. He manages to make the parents a key part of the educational process and gain their real support.

Chuck inspires other teachers as a model of effective teaching. His colleagues report that they learn so much from working with Chuck and are consequently very pleased with their own gains in effectiveness. Chuck remains current on the latest research and applies that knowledge to his classroom. He also continually studies what is happening in his classroom and with his students, making adjustments and applying new knowledge as warranted.

In short, Chuck Arthur is a dedicated professional who makes outstanding use of the direct instruction method, who most often gets phenomenal results from previously discouraged students, and who deserves recognition for his efforts.

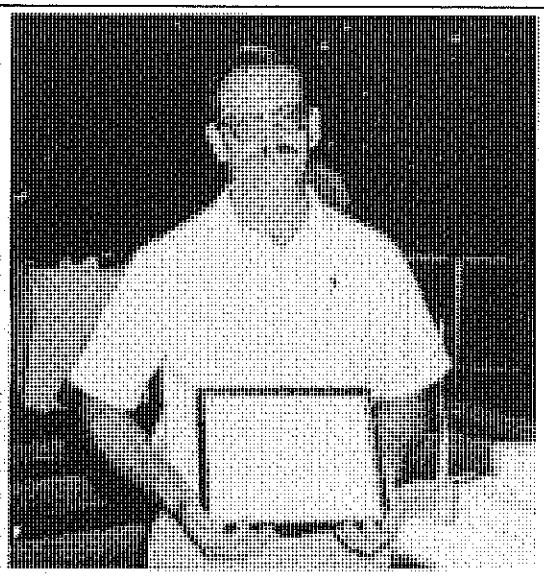
ADI Administrator/Supervisor of the Year

The ADI Supervisor of the year award has been granted to Stuart Greenberg, Supervisor, Exceptional Student Education, Broward County, Ft. Lauderdale, Florida. Stuart has been very active over several years in teaching students, training and supervising teachers in the Direct Instruction Programs. He has demonstrated all of the critical components of effective supervision: he displays a detailed knowledge of the programs, high skill levels in teaching the programs to children, excellent training skills in presenting the programs to teachers, close and frequent supervision to insure fidelity of implementation, and maintains detailed data-based records. He has had a strong influence in assisting students certified as emotionally handicapped and learning disabled make significant gains in basic skills through use of Direct Instruction Programs.

Chuck Arthur-- Teacher of the Year

He has also made major contributions in his school district at large in the area of systematic behavior management. He has provided a wonderful demonstration that the most difficult-to-teach students can make substantial gains given a tightly structured program of quality instruction and sound behavior management. Finally, Stuart has been very instrumental in assisting Principals to implement Direct Instruction Programs in regular education classes. These principals have become quite concerned that so many of their students simply cannot read. On this basis they have authorized the implementation of Direct Instruction Programs in the early grades and Stuart has assisted in training the teachers.

All told, Stuart Greenberg has made a very significant contribution to the educational performance of many students, regular and special and has helped to train many teachers in his district. He is indeed a worthy recipient for the ADI supervisor of the year.



Stewart Greenberg--Administrator/ Supervisor of the Year

It is time to make your nominations for ADI's 1993 Annual Awards:

Teacher of the Year
Administrator/Supervisor of the Year
Researcher of the Year

Send a letter of nomination to:

ADI Awards
P.O. Box 10252
Eugene, OR 97440

A special award for Excellence in Education was given this year to the "Ladies of Monterey," as they are affectionately called by all who work for and with them. Larry Lindstrom, the Director of the Special Education Planning Agency (SELPA) for Monterey County has five very talented program directors working for him: Dawn Poston, Candace Clark, Barbara Johnson, Helen Van Heusen, and Sharon Dalkey. All of these individuals comprise a team that delivers special education program support services to the special education teachers, students, and parents of Monterey County, California. As advocates of effective instruction, they have been long time supporters of Direct Instruction. But they go beyond just being supporters. They have each contributed to the wide-spread implementation and utilization of Direct Instruction in Monterey County Special Education.

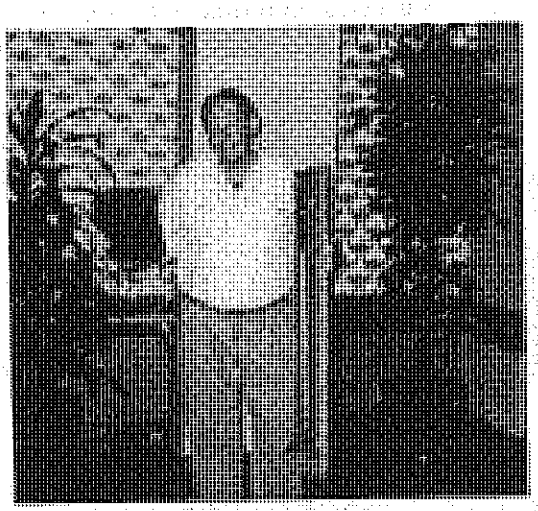
The influence of the Ladies of Monterey is evident throughout Monterey County. The special education teachers have adopted the Reading Mastery series as its basal program.

Each year SELPA provides many inservice workshops conducted by a cadre of consultants. Many teachers, psychologists, speech and language pathologists, teacher aides, and parents have been touched by the Ladies of Monterey. In fact, Monterey County has been actively implementing Direct Instruction programs for over 10 years. Consultants in Monterey County are always impressed with the level of expertise and professional enthusiasm shown by both the program directors and the participants. Most importantly, when one goes into the classroom of the teachers who have been influenced by Dawn, Barbara, Helen, Candace, and Sharon, one sees youngsters who are learning, achieving, and having a good time. Clearly, these five dynamic women are the moving force behind the success of Direct Instruction in Monterey County. Congratulations to the "Ladies of Monterey"!

Candace Clark, Helen Van Heusen, Dawn Poston, Barbara Johnson, and Sharon Dalkey

Zig's Tribute to Wes Becker on his Retirement

I knew Wes Becker by reputation long before I met him. My sister-in-law was a clinical psychology Ph.D. student, and her hero was Wes. Wes was a hot shot who held the track record at Stanford for going from an entering undergraduate to a Ph. D. in 6 years. Wes had a comfortable and prestigious position at the University of Illinois, professor of clinical psychology with smart students to work with. Wes was not entirely comfortable, however. He was concerned with effectively educating children, and had seen great discrepancies between what he was doing and what made a difference in the performance of the kids. So, after searching different approaches, Wes moved from the orientation of a developmentalist to that of a behaviorist. In the 60's, Wes provided keystone studies that showed the power of behavioral principles applied to classroom behavioral problems. These demonstrations were very important because they showed that behavioral analysis had implications far beyond the animal laboratory. At the time of Wes's behavioral studies, the project that I was working with at the University of Illinois lost its director, Carl Bereiter. I couldn't be a director because I didn't have a line faculty position. Our project was in jeopardy and the future of Direct Instruction was uncertain. Wes did what I consider to be one of the more humanitarian things a person can do. He left his comfortable position to take on the headaches of our project, which was not popular with the University and was less popular outside. But Wes accepted the directorship and the headaches that went with it. He directed the project as we moved into Follow Through, which involved working with 20 different communities and over 10,000 kids each year. The details associated with school districts reluctant to implement the programs they contracted with, were overwhelming and required the talents of a superstar director. We had that directorship with Wes, who always did what he said he'd do; never made excuses; was always prepared; and rarely wasted time. In 1981 Wes established ADI and the DI News. He became the editor, staff writer, compositor and manager. He continued in all these capacities until last spring when he retired from the University and from Engelmann Becker Corporation. To say that I will miss him is to be guilty of an enormous understatement. I was very fortunate to have been able to work with and learn from a model as capable as Wes.



Wes Becker retires with plaque and golf putter.

We'll miss you, Wes!

Retirement-Time Reflections of Wes Becker

on his Relationship with Zig Engelmann, Direct Instruction, and ADI

Interviewed by Bonnie Grossen

Summer, 1992

Wes Becker retired in the summer of 1992. He was honored at the Eugene ADI Conference with awards and speeches. His contributions have been enormous. His involvement will be greatly missed.

Q. How did you come to be associated with Ziggy?

A. This was an important accident of fate. I had been a research-oriented clinical psychologist at the University of Illinois, and had moved into educational research in about 1963. In the Fall of 1967 I held a research position with no teaching responsibilities. At this time I had known of Zig and his work with Carl Bereiter, but was not closely involved. I had a demonstration project going in a public school to show how current behavior principles could improve school outcomes. One of the big problems we encountered early, was the fact that each of four first grade teachers could not get five or six of the students going in McGraw-Hill Sullivan Programmed Reading because the method used to teach sounds was idiotic. Their manual told them to teach the names of the letters, and then the sounds, five a day. Obviously, if the kids did not already know the sounds, this would not provide adequate discrimination training. One of my Graduate Assistants, **Charlotte Giovanetti,** who also worked for Zig on the preschool program for disadvantaged kids said to me that **"We know how to do that."** Charlotte proceeded to develop a small group program based on DISTAR, for teaching sounds that followed the McGraw-Hill Sullivan sequence for introduction of sounds. It was beautiful and it worked.

Shortly after this, I was invited (as a child psychologist) to be a discussant for a symposium being held by the College of Education on early childhood education. Nancy Rambush came to present the Montessori position, Queenie Mills presented on the approach taken by child development specialists, and **Jean Osborn** described the Bereiter-Engelmann Direct Instruction program. I was taken by the careful task-analysis and teaching strategies (building skills on preskills, choice of examples, etc.) that Jean described and said how I could see great value in that approach for disadvantaged kids. Well, that night my phone started ringing. (To appreciate the following comments, you need to realize that Jean and Cookie were working on programs with Ziggy, but they first had their professor husbands call me.) The first call was from **Howard Osborn,** Jean's husband, who was a professor of Mathematics. He wanted to say some good things about the Bereiter-Engelmann program, and that because Carl had left to go to a position at the Ontario Institute for Studies in Education, the preschool program, which was supported by a grant from the Carnegie Foundation, needed an academic sponsor with faculty rank (which Zig did not have). Next, Jean called, then **Cookie Bruner's** husband (head of Anthropology), and finally Cookie. Their attack was well orchestrated. Their basic proposition was the program needed an academic figurehead who would support them. IT WOULDN'T TAKE MUCH OF MY TIME. I agreed to visit the program and talk with Zig, and give a lecture to his graduate students on some of my classroom research.

Within the next six months Zig's program had come to consume nearly all of my time and eventually my professional life. In December of 1967, Zig was invited to Washington to discuss the possibility of developing a model for teaching disadvantaged children in grades K to 3. I went along and within the next few months we were the **Engelmann-Becker Follow Through Model** based on Direct Instruction and good reinforcement procedures.

Q. Why did you work so hard to promote Zig's efforts?

A. Well first, I strongly believed in what Zig and Carl were trying to do, namely, prevent failure through good teaching. But more than that, I respected how they were going about it. Carl had started the B-E Preschool program because four years of research on teaching young handicapped children led to the conclusion that they could be taught any intellectual skills needed IF YOU HAD ENOUGH

TIME. The B-E Preschool gained time by starting first-grade curricula with four-year olds, and using methods that taught more in less time (rapid-fire, teacher-directed instruction; small groups, each with a teacher; clear-cut feedback on right and wrong responses; etc.). **Zig had set up most of the procedures and designed the curriculum. The greatest power of the program was in the design of the curriculum.**

Zig had developed his ideas about instruction through teaching his own children (I learned this later). The history of these ideas can be found in his book with his wife titled *Give Your Child a Superior Mind*. But what I read at this time was *Conceptual Learning* in manuscript form before it was published (1968, Dimensions Press, San Rafael, CA). While Zig at that time talked a lot about what went on "inside the head" in concept learning, he ALWAYS got down to the procedures the teacher needed to follow to get concepts "inside the head." At that point, I could understand him in behavioral terms. I realized that he was working on the logical analysis of knowledge that led to the teaching of larger generalizations with fewer examples. He had another basis for teaching more in less time. Since 1967, my appreciation of his genius in analysis of knowledge has grown year after year, as some 70 to 80 educational programs have been developed on the basis of his analyses.

Beyond this, I believed in Follow Through. Building up a grade at a time, we taught 9000 kids a year in 20 school districts across the country from 1970-1976. I set up the management and data systems, Zig set up the program, training, and supervision systems.

There are many other bases for the mutual respect that developed between Zig and me, but they would make this story too long. Doug Carnine played an important part in our developing relationship.

Q. What have been your most important successes?

A. In the end, the Follow Through data showed that the DI program worked the best. We showed that children from disadvantaged backgrounds could reach national averages in most basic skills. Today, few believe this outcome, including the current Bush administration, but we did do it and I HAVE THE DATA (as does Abt Associates). But according to current politicians Follow Through was one of the "failures" of the Johnson Administration's New Society program!

Through my books, various versions of *Applied Psychology for Teachers*, where I covered basic behavior management procedures and Zig's instructional design principles as a basis for establishing GENERALIZED STIMULUS CONTROL OF BEHAVIOR, I was able to influence a number of applied behavior analysts to look carefully at Ziggy's work. Galen Alessi, Paul Weisberg, Alex Maggs, and Robert Horner are just a few of the many who have understood and built on Ziggy's work through reading my publications. At the spring 1992 meeting of the Association for Applied Behavior Analysis in San Francisco, a significant proportion of the program was provided by Direct Instruction presenters, including the keynote address by Ziggy. **Dan Hursh** of the University of West Virginia played a major role in setting up this special program focusing on education.

I realized that Zig was working on the logical analysis of knowledge that led to the teaching of larger generalizations with fewer examples.

Other important successes relate to the training programs we were able to set up at the University of Oregon, the hundreds of teachers we have been able to have an impact on through ADI workshops and the *ADI NEWS*. Also the fact that Zig's programs were developed, tested, and disseminated was very important to me. Someday, others will recognize that maybe this was the most important outcome of our working together, though I take no credit for the programs per se.

Q. What do you see as the major obstacles to expanding the positive impacts of direct instruction?

A. Doug Carnine has written much on this topic and probably has the best programs going in the country for improving education. As a rule, teachers and school administrators are not professionals, who base decisions on the current research literature (as physicians and engineers do), but for the most part are "mothers" and politicians whose main concerns are feeling good and avoiding issues. Any current "philosophy of education" will do, if it uses good words and does not require changing what one is doing. Frankly, it is all very discouraging. Maybe in another 30 to 50 years....

Myths, Misconceptions, and the Thief at the Door

Randy Sprick

Randy's business, *Teaching Strategies*, keeps him very busy training teachers and consulting on effective behavior management and discipline procedures. He has authored a number of very effective and useful programs and training videotapes. Address: Teaching Strategies, Inc., P.O. Box 5205, Eugene, OR 97405. Phone: (503) 345-1442.

I appreciate having the opportunity to speak to you today. The title of this talk is "Myths, Misconceptions, and the Thief at the Door." Before I explain that rather cryptic title, I would like to point out that there may actually be two distinct groups in the audience today. One group is comprised of people who are experienced with Direct Instruction (DI) and are convinced of the effectiveness of the approach. The other group is comprised of people who are new to DI and who are understandably skeptical about the approach.

In preparing for this talk I realized that the people who are new to DI keep hearing from the trainers and the keynote speakers about how powerful and successful the approach is; how logically organized the materials are; and how much research data there is to support the effectiveness of the programs. It seems to me that someone who is approaching Direct Instruction with understandable skepticism and caution must at some point wonder, "If it is so good, has been around so long, and has so much research to back it up, why hasn't it swept the field of education. Why hasn't it been embraced by the educational community as part of the reform efforts to improve schools."

To address this question, I would like to give a little bit of information on my background and how I got involved with the Direct Instruction programs. I was first introduced to DI when I went to work as a teacher's aide in a program for emotionally disturbed children twenty-one years ago. One of the teachers had begun using DISTAR Reading and was finding it to be very successful. By December, our students who were being taught DISTAR had begun to make phenomenal progress. As a result, the team of teachers I was working with had decided to also teach DISTAR Language and Arithmetic. I was asked if I would like to teach the Arithmetic programs. I enthusiastically agreed to give it a try.

I began teaching DISTAR Arithmetic Level I to two groups of students. Within a few weeks, I was managing the groups reasonably well and having fun teaching the program. Some of the formats seemed rather silly and unrelated to anything particularly functional, but I understood the need to follow the formats and to teach the students to mastery. Within another month, I began to see how some of the seemingly silly tracks were being combined into fairly complex skills. Within six months, one of the groups had made it all the way through Level 1 and by then I could see the logic of the step-by-step sequencing and the elegance of Engelmann and Carnine's instructional designs. I was hooked as a DI teacher. The next year I had the opportunity to teach the Reading and the Language programs and the second level of Arithmetic.

The logic of the programs made so much sense to me that I was sure that DI would be embraced by the educational establishment. At that point in time, 1971 to 1973, the popular trends were open classrooms, hands-on project type approaches, language experience, wholistic, and free-school type orientations. As controversial as DI was, the logic seemed so compelling that I was sure that DI would eventually catch on and spread like wildfire. Obviously my prognostication abilities were seriously flawed.

A few years later, I had the honor of working for Engelmann, Becker, and Carnine as part of the federally funded Follow Through experiment: the largest, most expensive and most extensive educational research project ever conducted. This study was designed to compare about fifteen educational models, almost all of which were very unstructured, except for DI. I got to teach disadvantaged children on Indian reservations, in inner cities and in poor rural environments and became further convinced of the effectiveness of the programs and the approach. That was when the Follow Through data started coming in, and the results were clear and consistent in demonstrating that the Direct Instruction model was overwhelmingly successful at raising both achievement and affect of disadvantaged children, as compared to the other models and the control groups.

I was now sure that the data demonstrating DI's

now scientific analysis had confirmed. Once again, my abilities as a predictor of the future were pretty far off the mark. Which brings me back to my original question that people new to DI have to be asking, "If it is really that good, why hasn't it caught on?"

I think the answer to that question has to do with myths and misconceptions about learning and teaching. I'll tell you later about the thief at the door. John F. Kennedy once said that, "The great enemy of truth is very often not the lie–deliberate, contrived and dishonest–but the myth—persistent, persuasive and unrealistic."

I think there are some misconceptions about teaching and learning that are so persuasive and pervasive that most educators have come to accept them as the truth. I would like to point out five such myths and misconceptions that pervade education and that run absolutely counter to Direct Instruction and thus make DI seem weird or even cruel to many educators.

Myth #1–All learning should be fun and easy.

I think that this notion makes many of the current reform movements of the 1990's so compelling. If you just make it fun and make it interesting, then everything else will take care of itself. There seems to be an attitude that if it requires work, practice or repetition there must be something wrong with the teaching method. Ogden Lindsley of precision teaching fame wrote that,

"Most educators have bought the myth that learning does not require discipline—that the best learning is easy and fun. They do not realize that it is fluent performance—the result of learning that is fun. The process of learning, of changing performance is most often stressful and painful."

In DI we recognize the importance of teaching in a manner so the students are having fun; however, we also recognize that there is nothing wrong with hard work, practice to mastery, and rehearsal of necessary and critical skills. If one believes the myth that everything must be fun and easy, then structuring lessons wherein children work hard on a consistent basis–even if they are enjoying themselves–has the appearance of being cruel practice. Most people can accept that in art or in sports one must practice and work hard to achieve competence and one must work exceptionally hard to achieve excellence; but with reading, writing, and computation many educators want to believe that just making it fun and easy will be sufficient.

Myth #2–Learning is so mysterious and wondrous that you really can't analyze it, or study it, or break it into component parts.

Many of the current reform movements buy into this myth. "You can't measure learning." "You can't break a task down into parts, because a student must understand the whole." "The teacher should not be direct, the teacher should merely be a facilitator of the child's own discoveries."

One of the things that makes this myth so compelling is that the first part is so inarguably true. Learning is mysterious and wondrous! In the same way that the structure of the atom is mysterious and wondrous and biology is mysterious and wondrous. But where would physics or medicine be if the pervasive belief in the field were that you can't measure things or analyze how processes work?

I perceive these myths to be particularly dangerous because if an educator really believes these things, and a child does not learn, one cannot possibly analyze what went wrong. In fact, the failure will end up being blamed on anything or everything other than what the schools did.

For example, in one elementary school where the kindergarten and first grade teachers all adopted and implemented a number of the current reform movements, within a few years, the second and third grade teachers began expressing concerns. More children were coming to second grade unable to read and academically behind where students had been performing in previous years. The referrals to special education had increased substantially. When these concerns were voiced to the kindergarten and first-grade teachers, the response was, "We know, isn't it awful how our population of students is changing—so many more students from dysfunctional families." Even if the population had been changing this would be an appalling explanation for the failure of the school personnel to teach these children to read, but the fact is that this school is in a very stable and affluent neighborhood where there is an exceptionally high level of parental concern and support for their children. The possibility that the programs and teaching methods could be a factor in the increasing number of students failing to learn was not even considered; it must be the changing population.

I think this myth that learning is so mysterious that it can't really be analyzed hides another myth that is even more dangerous, but seemingly quite pervasive—that some children will simply not be able to learn. Educators have many explanations for

why some children do not learn. The child is dyslexic. The child is ADHD. The family is dysfunctional. The parents don't read enough to the children. The child is disadvantaged. The child has perceptual problems. The child was not ready to learn. These explanations seem to be used by educators to imply, "What can we possibly do? It is not our fault."

I had an example of this when I first began working for Engelmann. I was working as a tutor. One of the students I tested at the beginning of the summer was named John. John's parents had brought him in because he had just finished first grade and was not reading. I did some diagnostic work with John and identified that he knew the alphabet, recognized all the letter names and most of the sounds, but could not blend sounds together, had "b", "d", "p", "q" problems, and could not read, except for three or four sight words. When I talked to his mother and father, I said that if they chose to bring him in for tutoring I would put John in DISTAR Reading Fast Cycle with several other children and that I could easily have him reading by the end of the summer.

The mother looked incredulous and said, "That's great! But I do need to tell you that the school psychologist who tested John toward the end of the year thought he was probably hyperactive." Having worked with many students labeled hyperactive, I explained to the mother that although I could not comment on the validity of any other professional diagnosis, I said that I did not think that I would have any trouble keeping him focused on the lessons, and I recommended that they delay acting on the psychologist's recommendations to have the child examined by their physician to explore medication.

The mother then said that I should also be aware that the classroom teacher and the school psychologist concurred that John had perceptual problems. I carefully explained that I could not comment on their diagnosis, but that I did not see anything that would prevent this child learning to read. Nobody had systematically taught him to blend the sounds together. We went through the same routine for the label Minimal Brain Dysfunction. The parents were ecstatic with my statement that I could effectively teach him, and they agreed to bring him in for tutoring.

Later that afternoon, an angry school psychologist called me and demanded to meet with me immediately and demanded that I show her my diagnostic work that led me to the "unwarranted conclusion" that I could teach this child to read. I agreed to meet her an hour later. During our meeting she expressed that she thought I was raising false hope for this mother who had unreasonable expectations for her son. She then demanded that I show her the diagnostic tests. After looking at the work I had done with John, she pointed to a place on one of the tests and vehemently declared, "But look right here! Look where he wrote his name. You can see that that this writing is direct evidence of this child's impairments!" At that point, I looked at her and informed her that that was the place where I had written his name—not John. Admittedly, my handwriting looks like a demented first grader, but I read just fine and can sit still whenever I want.

By the way, over the summer, John flew through Fast Cycle and about half of DISTAR Reading II. His second grade teacher agreed to use DISTAR with John until he completed Level II. He learned to read with no problem at all, and his hyperactivity and perceptual problems seemed to mysteriously disappear.

Myth #3–Creating achievement targets will be destructive to self esteem.

Many of the current reform movements imply that teachers and educational systems should not communicate to students that there are specific expectations to master. For example, many primary educators are buying into the concept that no teacher should communicate to students or parents that first grade children should be reading. Some even go so far as to say that if the child is not reading by the end of third grade there is nothing to be concerned about. For some, the argument is that if the child is not ready to read, the teacher will make the child feel bad and will damage self esteem by in any way communicating that the child should expect to learn to read by the end of the year.

This concept makes sense if one believes that some children just will not learn. After all, if some of the children will not be able to learn, setting expectations is simply raising unreasonable and false hopes. However, having come from a Direct Instruction perspective and having had a chance to effectively teach many children who other educators perceived to be unteachable, I know as any experienced DI teacher knows, "I can teach that child to read!" With this confidence in one's ability to teach the child, setting achievement targets—"Look what you will be able to do at the end of the year!"—does not seem to be unreasonable and seems highly unlikely to damage a child's self esteem, in fact, quite the opposite.

Myth #4–Everything the teacher does, needs to be creative.

Having the teacher follow prescribed, formatted teaching procedures has been one of the most contro-

MYTHS, MISCONCEPTIONS, AND THE THIEF .....Cont'd

versial aspects of the published Direct Instruction programs. There is a prevailing belief that everything the teacher does, needs to be creative and anything that restricts a teacher's creativity, must, therefore, be bad or inadequate. Each of the DI trainers in the audience today has had experience with one or more sites that had been implementing Direct Instruction—with documented effectiveness and with more students proficient in reading and math than ever before; and yet, the teachers elect to end the implementation of DI programs. When asked why, the answer is either that they did not feel creative enough or that they got bored teaching the same formats year after year.

Now this may sound understandable at first glance, but imagine any other profession in which a research-proven practice was abandoned because the professionals were bored or did not feel creative enough. Think about going to a doctor. If one is going in for surgery, most of us would not feel good about having a creative surgeon. Imagine laying on the operating table and just prior to going under the effect of anesthesia you hear the surgeon say, "Hey, let's try something really creative today. Has anybody here ever done an appendectomy by going through the back? Flip her over. Let's give it a try!" That would be unconscionable and would never be allowed. The surgeon is a practitioner—an implementor of best practice. Whether s/he is bored with the procedures is absolutely irrelevant.

I take great pride that as a Direct Instruction teacher I am a practitioner. I am creative when I teach, but not regarding the content of what I teach, because I follow the proven-to-be-effective formats. However, I am creative in making constant decisions about how to pace the lessons, how to reinforce the students, how to correct the errors, how to firm up areas of weakness and so on. Anyone who gets bored teaching DI is not focusing on the right things—stay focused on the needs of the students because this provides endless diversity.

Myth #5–If it is current, it must be research-based.

With several districts that I work with, I have suggested that many of the reforms that they are considering have no systematic research to document effectiveness. One comment that I have heard recently from several teachers and principals is, "But Randy, we read about this stuff everywhere. If you pick up *Principal* or you read *Teacher*, or *Executive Educator*, all you see are article after article about these sorts of reforms. It must be research-based or we would not see so much written about it."

What people do not understand is that the publications mentioned above cannot be considered research journals. The Writer's Guidelines for *Principal* Magazine state, "*Principal* is a magazine, not a scholarly journal. Magazine articles are generally shorter, less structured, and more subjective than scholarly papers. ..... Avoid excessive documentation..... Feel free to use quotes and pertinent anecdotes from any source, including personal experience." The magazine is very honest about what it is—it is closer to *Reader's Digest* than to the *New England Journal of Medicine*. *Executive Educator*, *Teacher*, and the other publications you see in the faculty rooms of most schools, are the same. These publications are not bad or wrong, but most educators do not understand that these magazines typically write about popular trends, not proven best-practice or systematic research.

Another misconception that educators sometimes have is to assume that if they see text with references, that they are reading research. The sample below provides a parody of this misconception:

> Many people assume that if they see printed material in a book or journal that looks like this, they are examining research (Sprick, 1992). What they do not realize is that professional opinion can be referenced in the same manner (Sprick, 1992).
>
> A small group of prolific professionals with strong beliefs, can write a great deal and quote each other's ideas (Sprick, 1992). They can create a circular research base that may appear to be research (Sprick, 1992), but may, in fact, just be horseshit (Engelmann, 1968).

So back to the original question, "If DI is so logical and there is so much solid research to document it's effectiveness, why hasn't it caught on?" The answer is that these five myths are so persistent and so pervasive throughout the educational establishment that anything that runs counter to these myths is not taken seriously. If one buys into these myths, DI looks so strange that people are unwilling to believe the data or look at the logic. "I don't care about the data, I JUST don't like those programs."

So my advice to those of you new to DI--first, don't believe the myths. Then learn the programs and teach them well. See what your kids can do at the end of a year and I would guess you will be as convinced as I was after my first year of teaching the programs.

Now, with the rest of my talk, I would like to orient my comments to the people in the audience who are already convinced of the power of DI to effectively teach children. The question we have to ask is, "What can we do to get DI more widely accepted?' This brings me to the thief at the door. You need to bear with me for a true story that happened to me shortly after I moved to Eugene, Oregon.

I was living by myself out in the country west of town in a little ramshackle farmhouse. Driving home one day, there was an old beat-up car broken down on the little country road that went past my house. I stopped to ask the two men if they needed assistance. One of them said that they were on their way to their brother's house, who had a new fuel pump for their car; but they did not make it. I asked them if they would like to go to my house to call their brother. They then got in my car, I took them to my house, and let them use my phone. While one was calling, the other man—a rather scraggly looking gentleman, began to comment on my stereo. My stereo was my only possession of any value and he went on and on about what a nice system it was. When the call was completed, I drove them back to their car, waited until their brother arrived, and then went back home.

When I returned to my home, I began to wonder if I had made any error in inviting the strangers into my home. "What if they decide to come back and steal my stereo. What if...? What if...?" At this point, I decided that my worry would not help, and forced myself to put the concerns out of my mind. For the rest of the day, I thought no more about it. Until about 3 A.M. that night, when I heard footsteps outside my bedroom window, moving around the house toward my front door. Now, these were not, the walk-softly-and-don't-wake-anybody-up sort of footsteps. These were the we-don't-give-a-damn-whether-anyone-hears-us-or-not sort of foot steps. I had never understood the phrase "frozen in terror" until that moment in my life. I couldn't move. My heart was THUNDERING in my chest.

In this kind of situation, logical and sequential thought is not the way my mind works, but looking back on my actions, I must have gone through the following thought process. First, the terror was so horrible that I needed to do something to end the feeling. I needed to take action and deal with the terror. Consequently I jumped out of bed, prepared to rush to the door and confront whatever fate might be in store for me. Nothing could have been worse than the fear itself. However, on the way, I realized--I was naked. I have never been a terribly intimidating presence and, trust me on this, naked I am even less imposing. So I somehow managed to throw on a pair of pants while making my way to the front door.

By now, I heard the foot steps coming on to my small front porch. When I reached the door, I heard the foot steps just arrive at the other side of the doors. So I swung open the door--assuming that I was approaching my doom--and immediately on the other side, pointed directly at my stomach was the head of a cow, attached to the body of a cow. The cow and I were equally shocked to see the other and both of us jumped up then back. The frightened cow then proceeded to run off my porch and joined the two other hoodlum cows waiting on my lawn. All three then ran off together, no doubt to go harass some other unsuspecting paranoid personality.

How does this story relate to the question before us, "How can experienced and commited Direct Instruction teachers get the educational establishment to pay attention to our successes?" Well, that cow on my porch did not need to use logic to dissuade me of my misconceptions. That cow did not need data to prove that it was a cow on my porch--not a thief at the door. What that cow did was just to be there, looming large on my porch.

I think that is what we, as experienced and successful DI teachers, need to do. Don't attempt to hit people over the head with logical analysis or data; although we can celebrate that in DI we have lots of both. When we are facing such pervasive and persuasive misconceptions within the educational establishment, people will believe what they want. The best approach for the experienced DI teacher is to keep providing demonstrations that we are professional implementors of "best practice." Continue to provide demonstrations that you can effectively teach children who others consider to be unteachable. Keep doing the job. Loom large on the porch!

Promoting School Success–Study Skills and What We've Learned from DI

Keynote Address, 1992 ADI Eugene Conference

by Anita Archer

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When I looked at the brochure describing this conference and read the title "Beyond Academics," I was immediately reminded of a recent issue of *Instructional Leadership* that was titled "Beyond Effective Instruction." Now I don't know about you, but personally I'm still hoping that we get to effective teaching, even in my lifetime. Certainly going beyond that is not our goal.

Yet there is something beyond academics. Many of us here have focused on teaching academic subjects like reading, math, science. We find that many students do poorly in academic areas, not because of a lack of academic skills--not because they have difficulty reading, not because they lack science concepts, and so on. They do poorly because they lack a set of underlying behaviors that are critical for school success. They don't come to class on time; they don't enter properly with no pushing, no shoving; they don't do their work; they can't find their paper; they don't study for a test; they didn't even remember there was a test.

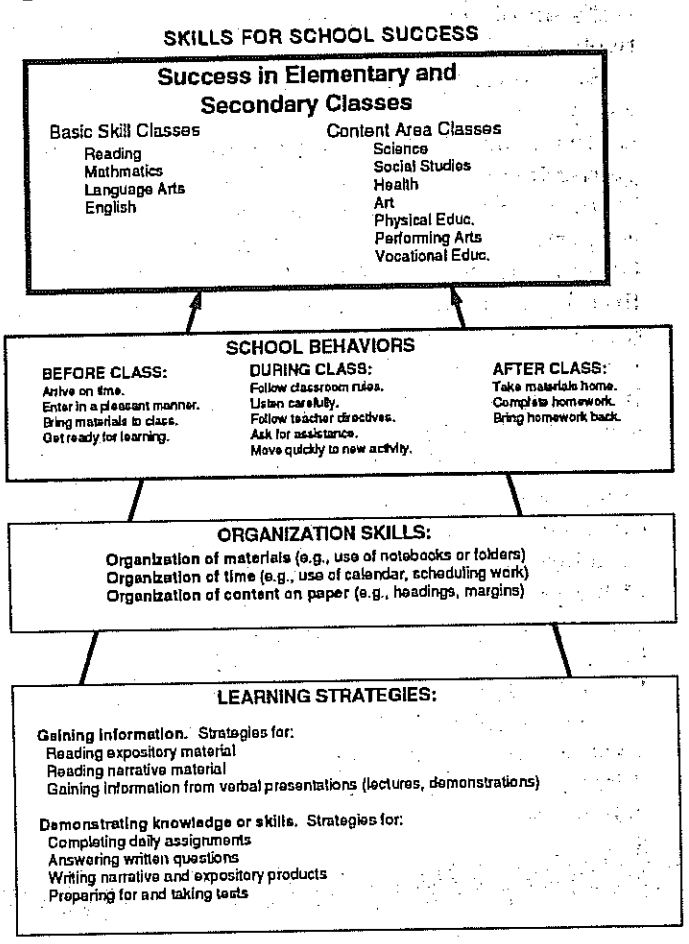
Certainly academics is the heart of teaching, but we must also teach students how to be students. For the last 13 years I've worked with my friend Mary Gleason determining what skills were important for school success and designing instruction to teach them. I would like to share with you some of what we've learned in that process and how DI has helped us know how to teach them.

If we look at the whole broad area of study skills and the things needed to be successful in school, we are really looking at 3 areas (see Figure 1). These areas we determined by questioning about 500 teachers. Some teachers think of study skills as teaching things like note-taking, but most teachers recognize that a much broader range of skills are required for school success. The most fundamental skills are what we call **school behaviors.** They are essential before we can teach anything else. For example, **before** we can teach students math or reading, we know they must come to class. Certainly academics is the heart of instruction, but if students arrive with no book, no pencil, no paper, that instruction is for naught.

And **during** class, there are certain things that we expect. We expect students to listen, to work, to ask for help when they need it. We also expect certain things to happen **after** school. We expect them to do their homework. We can teach more esoteric study skills like note-taking, but if students are not there, it is irrelevant.

Organizational skills are a second category of skills that are very significant. Many students are

Figure 1. Archer's Skills for School Success



disorganized. We've all met students that we wouldn't trust to keep a paper for 1/2 hour, much less to have it in class the next day. We've all met students who forgot there was a test today. Students need to learn how to organize their time--how to plan ahead, how to use a calendar. And they need to learn how to organize their paper--to put the name, the date, to have a margin, to write neatly and legibly. Organization skills are also a prerequisite to successful use of the more esoteric learning strategies. If students don't have pencil and paper, if they don't know when the test is, then teaching note-taking or test-taking is for naught.

Last, students need strategies. If we want students to read expository material, then they should have a strategy for doing that; if we want them to answer questions in a book, then they should have a strategy for doing that. Many students are what I call "strategy-free." (Laughter.) They are unencumbered by strategies or they are random in their use of strategies. If we want students to have strategies for learning, we must teach them those strategies.

We need to systematically teach all of these categories of study skills. They are as important as literacy skills. It is possible to go through American and Canadian education without ever being taught how to be a student. Most students don't learn these skills simply by being in school for six, or eight, or twelve years..

So we have the content-study skills. We also have a very good idea about how to go about teaching that content from DI. As I was reflecting on what I have gained from my association with Direct Instruction, I remember a very significant time in my life—there are some faculty members from the University of Oregon who might remember this—but on the very first day that I arrived on campus here, there was a faculty meeting in the Special Ed Department. As I was sitting there, Barbara Bateman, who is now a beloved friend of mine, looked at me and said very seriously, "You know nothing about instruction."

Now I had just finished working on my doctorate at the University of Washington. I had taught methods courses at the University of Washington. I had been hired to teach methods courses and be in charge of the practicum at the University of Oregon. So I was very certain I knew something about teaching. I had taught children and I had trained teachers, and I said, "Nah, I know enough about teaching."

And she said, "No! You do not know anything about teaching." Well, if you know Barbara, she is a debater, and she could see that she had found a co-debater. She said, "What do you know about instruction?"

Figure 1. What We've Learned from DI

WHAT WE HAVE LEARNED FROM

DI DI DI

Teaching Helps!!
You Can't Come Out Without An Outcome!
Strategies = More For Less
How Well I Teach = How Well They Learn
I Do It. We Do It. You Do It.
Learning Is Not A Spectator Sport.
Perky Not Pokey.
Mastery + Review = Retention
Generalization: Before, During, After
Success Breeds Success

Teach Monitor Teach Monitor Teach

TEACH WITH PASSION

"Well, here are some things I know about instruction." I said, "I know all the effective teaching research: that you need to have kids on-task, and that you need to provide instruction, and that you need to be successful with them, that you need a lot of content coverage, and you need well-designed lessons with an opening and a body and some closure, and you need active participation."

She said, "Okay, so you know a little bit about little DI."

"Little DI ," I answered, "What is little DI?"

She said, "Effective instruction. But, you don't know anything about middle DI or big DI."

"Well, let me tell you what else I know. I know about task analysis. I know how to take a test and analyze it. I know how to sequence things. I know how to set the examples, and sometimes non-examples."

She said, "Okay, I'll give you a little bit on the middle DI—not much, but a little bit. But do you know how to put that all together in brilliant curricular materials."

And I said, "See you in a few years, Barbara." And from that time, we have laughed many years about our little DI, middle DI, and big DI debate.

And yet Barbara in a sense was right, because since then, I've had an opportunity to teach many of the DI programs, and I've had an opportunity to supervise many teachers teaching DI programs. I have also taught methods courses using DI Reading and DI Math and design of instruction, and over time, I was struck by the fact that I did know very

little and that Barbara was right. Now she's not here, so please do not tell her, because I had convinced her that she wasn't. (Laughter.)

As I looked at those materials and began to teach from them, I realized that there was certainly more that I needed to know. As a connoisseur of instruction and as a person who admires instruction beyond art and ballet, I am constantly struck by the brilliance of DI programs. You know, even today, I pick up Connecting Math, and I see the brilliant sequence of the story problems, and I am in awe, as if I saw a great work of art. When I pick up *Reading Mastery* and look at the comprehension skills that are taught and the examples chosen, I see brilliance, and I bet that you all have had an experience where you said, "Ah, such intelligence, such a work of art, what a picture has been painted here." And so as I sat back and thought about what I've learned from Direct Instruction, I thought I'd take a moment to thank all the people like Ziggy and Doug and Jerry and Susie and Jean and Phyllis and Randy and Susan, and all of those people for their contribution. I'd like us to stand and really give them a great hand. (Applause.)

So what did I learn from all of this, from little DI, middle DI, and big DI, that is applicable to teaching study skills? Well the reality is, everything that we have learned in teaching reading, and language arts, and math is equally applicable to study skills or to social skills that you'll learn later this week. The mistake that we've made in study skills is constantly assuming, that because a student has been in school six years or twelve years, that student has some idea of certain skills. By assuming it, we have not necessarily taught it. But once we get beyond the fact that we should not assume it and get into teaching it, all that we have learned from little DI, middle DI, and big DI will be employed in designing those materials. So here I have summarized in my favorite way what I have learned from DI (see Figure 2). Both Mary and I used these as we developed *Skills for Schools of Success*. These have become some of my favorite adages about teaching, and some of you who have been in my training over time have learned some of these.

First, **teaching helps.** I think that this is a lovely place to start, in 1992, just a little tiny remembrance that if you want someone to learn something, it is both very effective as well as very efficient to **teach them.** There are some today who are forgetting this—that there is a great power in a brilliant teacher. If I want you to learn reading, or math, or science, or social studies, then I'm going to teach you. If I want you to learn study skills or social skills, it will be a brilliant idea for me to teach you. We must not forget that. We in DI are the vanguard of teaching. We must hold as a constant the idea that teaching helps, as a light that gives people permission still **to teach,** to remind them that it's still okay to have a **group act,** and that **teaching** is just fine today, as it will be in the future.

What else have we learned from Direct Instruction that we would employ in teaching study skills? The next step came about from my experience consulting in schools, where I do demonstration lessons. One of the things I have noticed in the last two years is that there is more emphasis on what I call activity-based instruction, than on outcome-based instruction. Every day I would meet with teachers, and they would bring me their lesson plans and say, "Teach this." And many times it was an activity with absolutely no discernable outcome—do this worksheet, do this activity, do this puppet play, do this block building. I'd say, "Now what do you want the students to learn?" And the teachers would tell me more about the activity. "But what do you want the students to learn?"

The missing component, in many cases today, is that people do not have a vision of the outcome, and **you cannot come out without an (All: Outcome).** When we are teaching programs in reading and language, arts, and math in Direct Instruction, there's no doubt what the outcome is, and that's true in study skills. Teachers have to say it—"I want you to use a calendar, and I want you to be able to record events on this and use it in planning." We need to have an outcome goal, so there's a possibility of achieving it.

Then what should we teach? One of the major consistencies of all Direct Instruction materials is they **focus not on bits of information, but on strategies.** This is the most consistent thing you see curriculum-wise in Direct Instruction programs. Instead of teaching 400 Dolch words, there is a strategic approach to decoding single syllables and multisyllabic words. Instead of just asking random questions, comprehension strategies are taught so the student has something they can generalize. And that is the same thing that has to be done in study skills. Study skills are totally strategic. For example, we teach students the strategy: Read, Cover, Recite, Check. It's a simple example of a strategy. You read a paragraph, you cover it up, you recite the information out loud, and you lift your hand and check. Students can employ that strategy when they read a science book or a social studies book, they can employ it in memorizing information. There are many

places where students could employ it, so as a result, we empower them when we teach them overarching strategies. So we need to have a discernable outcome that we're moving towards, and that outcome should be strategic—it should be a strategy.

The next one some people from the University of Oregon will recognize because that was the motto of the handicapped learner program when I was here. **How well I teach equals how well they learn.** There is no doubt about it—this is one of the core beliefs in all Direct Instruction programs. There is some relationship between what I do and how well they learn. If I teach poorly, if I use poor examples, and I lead students right into a misrule, there's a chance they won't get it. If I use clear language, and clear examples, and well-analyzed tasks, then there's a very high probability that they will get it. That wonderful video that we watched yesterday was a perfect example. Those kids were very smart. Why were they so smart? They were smart because they had a good teacher.

And then how would we teach? It is obviously no surprise that study skills demand the same instruction that math, or language arts, or reading skills would, in that you would want to follow these steps, you would want to lead the students in performing the skill, and then you would want to test to see if they could do it. There isn't a Direct Instruction person who does not know the words: model, lead, test. I prefer the term, **I do it, we do it, you do it,** because that is exactly how we teach anything, whether I'm teaching a sound or a word, or spelling, or writing a paragraph, or a study strategy, I would always do the strategy, then do it with the students, and then check them out by having them do it themselves. So if we were going to teach study skills, what three big steps would we use, everyone? (All) ***I do it, we do it, you do it.***

Thank you. Because that leads into the next thing we learn from DI programs, and that is what, everyone? (All) ***Learning is not a spectator sport.*** You know, sometimes I go to classes and I think that people think learning is a spectator sport. We have the teacher acting, and we have 30 observers, hoping that they will pick something up. And yet if there is one message that we have from all DI programs and DI research is that the more kids say things and write things and do things, the more probable it is that they will then be **awake,** (laughter) paying attention, and that they will learn things. If we were going to teach students in any academic area, including study skills, we want to proceed very systematically and have them constantly say things and write things and do things. We know they can say things together, and they can say things to their partner, and they can say things individually, they can write things down in a variety of ways, they can touch things, they can use hand signals—there's a whole range of active participation that can be used in study skills.

To be really honest, it is not necessarily a peak experience for students to learn how to use their notebook. It may not be the most memorable lesson of all time when they learn to read, cover, recite, check. So we would need even more active participation to ensure they are attending, to ensure that they get it.

And then we would want to deliver the lesson in a way that would not only maintain their attention, but increase the probability that they would process that information. Do students do better with perky or pokey—everyone? (All) ***Perky.*** No matter what we teach, we've got to have like a perky pace. We need to be alive and awake, passionate about what we are teaching, so that students can learn. Sometime recently, a person came to me and said, "You know, those DI programs are boring. I've just watched someone do it." And I said, "Uh, oh, definitely not perky—definitely pokey"—because a perky DI pace is not boring. Whether we are teaching academics or we're teaching study skills, we need to have a perky pace.

We've also learned very definitely that mastery or retention of study skills was directly related to initial **mastery and review.** If I really wanted students to retain how to use their calendar, if I really wanted them to retain how to proofread, if I really wanted them to retain how to read a table or a graph, then I have to get a very high level of initial mastery and then provide **consistent review** over time.

Recently, I've been in some schools where I've heard teachers say, "Well, our goal this year is to give the students just a flavor of math." A flavor? Either we get a whole meal of math or we don't bother. Who needs a flavor? What is this: "We're into exposure this year. Next year, we'll be into mastery"? Now I don't know about you, but personally, if there's something that is compelling enough to teach, it's compelling enough to master. We've got to empower students so they can use what we teach. What can students do with a little taste here and a little exposure there? (Laughter and applause.) We have to teach. We can't afford just to say, "Well, we'll just touch on this." We have to teach it to a high level of automaticity and mastery, so that then we can take these folks into the next place of real usage.

Yesterday, as Ziggy was talking, he touched on generalization and transfer. It has always been a part of the design of DI programs to directly prepare the students for transfer or generalization of skills. In study skills, this is the entire problem. As I was

saying yesterday, these skills are really easy to teach, but they're very difficult to get anybody to use. We've had no problem teaching people to know how to use a calendar. Getting them to actually open it up has been a bigger challenge. We have no trouble teaching them how to have a brilliant paper. But to get them to turn it in on a daily basis has been a much bigger challenge. So generalization needs an even greater focus in an area like study skills than in academics. We have to consider **generalization** even **before** we teach. For example, in teaching study skills, we ask ourselves—is this study skill one that would actually generalize and be useful in the future? Is it something that not only makes a difference at this moment, but also makes a difference in the future?

Not only before we teach, but also **while** we teach, generalization has to be considered. For example, we need to tell the kids why they're going to do it, and when they might use it, and where they might use it—all in hopes that someday they might choose to use it. We have to give them ways to generalize, and we have to give them examples that will allow them to generalize. Study skills instruction is a perfect area to use what we know about including a wide range of examples. For example, we taught one strategy for textbook reading, where we happened to use only science examples. At the end, we asked the students when would you use this strategy? They said, *"In science class."* I mean it was like perfect. We had a limited set of examples, and they undergeneralized. So as we teach it, we have to tell students why and when and where they might use it, and give them examples that show them why, when, and where.

Then **afterwards**, we also have to help them know when to generalize. For example, it seems to be useful to **tell them** to do it. (Laughter.) Telling them happens to be a particularly powerful method. So I tell them, "Use that notebook, use that calendar, use that strategy for proofreading." So in all instruction we have to attend to generalization.

One of the things that we've noticed in *Skills for School Success* and that you've also noticed in your own life is that when working with kids, **success truly does breed success.** One teacher from Bethel was telling me that students who had learned Read, Cover, Recite, Check came up to her and said, "Whew, I think we're doing better on our spelling test because we're using that strategy of read, cover, recite, check." Another teacher told me of some kids saying, "Oooh, I think we're getting fewer red marks on our paper because we're using the proofreading strategy." Or a gifted student came to me and said, "Oooh, I think I'm doing better because I have a notebook." When students are successful, that moment encourages them to be subsequently successful. We have all seen this moment.

I remember a conversation not too long ago with my dear friend, Mary Gleason. We were talking about what a teacher should do. Of course a teacher should teach, and a teacher should teach to a high level of mastery and review and so forth, but we sort of hit a philosophical note. Mary said, "Well, you know what is very important is that students come to believe that they are a learner and that they have that belief system that says, 'Oooh, I can learn this.'" Where does that belief system come from? It comes from success. The day that you say, "Ah, I'm a mathematician," or the day you figure out a problem in science and you say, "Oooh, I can do science," that is the day that will compel you forward. It is important that no matter what area that we teach, we really allow students a high level of success.

Just as in other academic areas, in study skills there are basically two things that teachers do. We can summarize our life as teachers as **either teaching** or **monitoring.** If you really think about it, if you spent your entire day teach, teach, teach, monitor, monitor, monitor, teach, monitor, teach, monitor, teach, teach, teach, monitor, monitor, monitor, teach, monitor, teach, monitor, teach, teach, teach, monitor, monitor, monitor, teach, teach, lunch, (laughter) teach, monitor, monitor, monitor, go home, come back, teach, teach, teach—what you would have is brilliant students. If our whole day were spent engaged in those two behaviors, we would have a significant increase in learning because those are the most powerful teaching behaviors. There is no research that shows that grading papers during the day, working on cutting out bulletin board letters, or making a new ditto is related to subsequent achievement. But the amount of time we spend teaching, whether it be reading or math or science or social studies or study skills, and the way in which we monitor students makes a great difference.

Finally, as I think about what little DI, middle DI, big DI has done for my own career and my own work, I will end with one of my very favorite adages that was provided to me by one of my own students. I've told this story often because it was one of the most peak experiences in my career. Three years ago, I was home in September, which in itself is a rare event, and I got a phone call. The operator said, "Would you accept a collect call from Ralph?" I said, "Ralph?" Then I said, "Could you get a last name?"

So she got a last name, and it was Ralph Bradford. I said, "Absolutely!" You see, 21 years before that time, Ralph Bradford had been a first grade student of mine. Ralph had tracked me down with great vigor. He'd called the Issaquah school district outside of Seattle, and then the University of Washington, then the University of Oregon, then San Diego State University, and then finally found me at home. I said, "Ralph, you know this is so exciting. Why, why, why are you calling me?"

"You know, every fall when students go back to school, I want to call and talk to you about what you did as a teacher," and he said the reason for this was that he knew I taught teachers. And he said, "I want you to tell them to do a few things that you did. The first thing I want you to tell them is to teach with **passion.**"

I said, "Why was that important?"

He said, "You know I knew that after that *DISTAR* lesson, if I didn't get those words, you were like going to make me do it during recess." (Laughter.) "And if I didn't get it then, I would be doing it at lunch. If I didn't have it by then, I knew I'd have to have a fist fight with my sister. You taught with bold passion, and no matter what we learned, whether it be about rocks or art or math or reading, I knew that you were going to **teach it 'til we got it**—that you **had a passion about it.**"

Sometimes people will say to me, "Oh, you know that Direct Instruction is just, you know, like boring. It's just, you know, like robots. It's just like unfeeling people." Well, that is not my reality at all. My reality is that to make those programs work, we have to be terribly brilliant and constantly making good decisions. We have to teach with total passion. If we want to teach reading, or math, or language arts, or study skills, we not only have to use great materials and all of our skills, but also teach with a great passion that says, **"You will learn."** So thank you for honoring me to be here, and have a great conference. (Applause.)

Herbie's Blue Socks and the Support for Wholistic Approaches

Wholistic instruction begins immediately with the "whole," rather than breaking the content into more manageable chunks that are later combined into performance of the whole process. For example, wholistic reading instruction begins by having children read whole stories and write whole essays. Wholistic teachers are not supposed to systematically present sounds for letters in isolations (phonics) or even systematically present whole words in isolation (the traditional "whole word" approach). Instruction immediately presents the "whole language." Similarly, children are to learn mathematics by doing mathematical problems. Teachers are not supposed to provide isolated practice in counting or in addition and subtraction facts. Teachers are supposed to provide learning environments that are as social and as natural as possible.

Advocates for wholistic approaches often cite "developmental" theories as their research base. However, because developmental theories are based on descriptive rather than experimental research, they can never be used to support or confirm the efficacy of any teaching approach—if the intent of teaching is to somehow change or improve on natural learning. Developmental psychology studies growth and aging **without attempting to change that growing process.** To the extent that educational psychology is interested **in changing the way children develop,** not just in watching them grow, educational psychology is not informed by developmental psychology. **When better learning is our business, descriptive science cannot inform us.** In order to learn about the effect that a teacher can have on learning, the research must manipulate teaching variables, not just describe growth.

The fallacy of using developmental psychology as a basis for prescribing teaching practice can be illustrated by comparing the logic of Herbie, a character in the *Reasoning and Writing* program, with the logic of wholists. Herbie sometimes makes mistakes in his thinking, but he is capable of seeing the error of his ways and eventually becomes empowered by better reasoning strategies, just as the fifth-grade students who learned from the program.

Here are similar observations that might be made by Herbie and wholists. Assume the following observations are accurate, but check the conclusions that follow:

HERBIE	WHOLISTS
Herbie realizes one day that he has been wearing his blue socks to the basketball games, and his favorite team has won every game.	Wholists realize that they have been studying children as they play, and those children all grew and learned every time.
Herbie concludes that by wearing his blue socks to the game next week, he can cause his favorite team to win.	Wholists conclude that by placing children in a playful environment, they can cause learning to occur.
Herbie also concludes that if he doesn't wear his blue socks to the game, his favorite team will lose.	Wholists also conclude that if children are placed in a non-playful environment, the children will not learn.

The fifth-grade students in *Reasoning and Writing* learned that Herbie cannot form conclusions about causal relationships from observations. Herbie can only guess about a cause from an observation. To determine if his guess is a true cause, he must test it by manipulating the suspected causal variable. Herbie should conduct this experiment: He should wear his blue socks to one game and not wear them to another. If his favorite team wins the one game and loses the next, Herbie has some evidence that wearing blue socks causes his favorite team to win. If he repeats this test many times and finds that his guess consistently predicts the outcome, he can become more and more certain that he has identified a cause. His guess (hypothesis) would now become a theory.

If Herbie conducted the experiment and found that when he didn't wear his blue socks, his team still won, he would know he guessed wrong. He would abandon his hypothesis and develop a new one. Maybe his team is just a great team. Without this kind of testing there can be no theory, in the scientific sense of the work, to explain a cause-and-effect relationship.

Similarly, a theory about the effect of instruction on learning (a causal relationship) cannot be formed simply from observations of learning. Only after a theory is properly developed, can it be used then to prescribe needed instructional changes based on descriptive observations. But instructional theory itself, the rules about the relationship between teaching and learning, cannot be derived from descriptive research (i.e., observations or correlations between observations).

Like Herbie, wholists are only guessing about the instruction that might result in better learning. Whether the teacher should provide a naturalistic, informal environment where students can "mess around," (as recommended by wholists, e.g., Salomon, Perkins, &Globerson, p. 8), or whether the teacher should provide rigorous, formal instruction (as Direct Instruction theory recommends) is not to be inferred from descriptive research.

Testing wholist recommendations becomes especially necessary when one considers the fact that the summation of all experimental research to date overwhelmingly contradicts the conclusion that wholistic methods and naturalistic environments will improve learning. On the contrary, experimental research consistently supports analytic, systematic instruction as more effective. Providing wholistic activities as a culmination for learning is part of systematic instruction. On the contrary, providing wholistic activities as initial instruction contradicts systematic instruction.

Wholists seem to be fairly successful in clouding these results with lofty discussions of "process versus product," "qualitative versus quantitative analyses," and so on. The fact remains: the relationship between teaching and learning cannot be identified without manipulating variables. Describing a problem, such as low achievement scores in education or poor sales in a business, does not indicate exactly what could be done to **change** that situation.

We can perhaps derive hypotheses about the interaction between teaching and learning by observing children learning (i.e., by reading descriptive studies), and we can identify problems and formulate new goals. But we cannot learn how to teach to achieve those goals from descriptive or developmental psychology. The "theories" we might derive from developmental psychology are only untested "hypotheses" until they have been submitted to an experimental test. Until wholists have conducted these experiments and tried their recommended instruction with real kids, they have no evidence that their theories will work.

Salomon, G., Perkins, D., & Globerson, T. (1991). Partners in cognition: Extending human intelligence with intelligent technologies. *Educational Researcher, 20*(3), 2-9.

--Bonnie Grossen, Editor

Volleyball and Other Analogies: A Response to Englert

by Stephen L. Isaacson

Editor's Comment: Steve offers a very cogent critique of wholistic methods and philosophy. He refers to the article by Englert that appears just before his in the March, 1992 issue of the *Journal of Learning Disabilities.* In that article, Englert advocates against "breaking the [writing] process down into single strategies" (p. 157). She advocates learning through "collaborative social dialogue" where the teacher's role is more like that of a volleyball coach than a traditional teacher: "The collaborative actions of the [students] are like the actions of a volleyball team in which the team jointly works to keep the ball in play. However, the teacher, like any good volleyball coach or captain, stands ready to assist the team or make a save just when the team is about to falter. Together, the team shares the cognitive work to perform the literacy activity successfully" (p.159). We believe Steve's comments are sufficiently clear without reprinting the article by Englert. Readers who wish to read Englert's article are referred to pages 153 to 172 in the March issue of *JLD*, 1992.

I appreciate this opportunity to discuss Englert's interesting paper on the sociocultural factors of writing. I have long admired her work and closely follow the Cognitive Strategy Instruction in Writing (CSIW) research (Englert, Raphael, & Anderson, in press; Englert, Raphael, Anderson, Anthony, & Stevens, 1991). Englert and her colleagues artfully bridge the world of empiricists and ethnographers with research that is both quantitative and qualitative in its analysis.

However, in addition to discussing her research, Englert here presents theory–social constructivism, to be specific–with examples from her research to illustrate the theory. Social constructivist theory is useful in understanding the role of the teacher in increasing a child's competence, and Vygotsky currently has wide appeal. Particularly valuable to educational practice are the notions that much of our knowledge is developed externally in social interaction with more knowledgeable others (including the teacher) before it is internalized as personal understanding, and that acquisition of knowledge is mediated by language. Underlying social constructivist theory, as Englert presents it, are other simple truths:

1. It is better to teach a process or strategy as a whole, rather than segment it into parts that in themselves have no meaning.
2. Teachers need to model the thinking processes as well as the overt acts of a process such as writing.
3. Students can learn from each other various ways to express a thought.
4. Students are more motivated to write when writing is shared.
5. Students' topic knowledge and metalinguistic skills expand as a result of ongoing conversations with the teacher and peers. The inner dialogue that guides independent performance begins in dialogue with others.

I will begin by discussing the research of Englert and her colleagues, reported here and elsewhere, and then address issues related to her discussion of social constructivist theory. The CSIW research supports other research findings in revealing important principles of teaching, and it contributes to current knowledge about instruction by applying those principles to the area of written expression.

First, Englert and her colleagues have shown how the use of conceptual models applies to teaching written expression. Conceptual models are words or diagrams that are intended to help learners build mental models of the system being studied (Mayer, 1989). The CSIW project provides conceptual models through explicit instruction in the steps of the writing process (planning, organizing, drafting, editing, and revising) and elements of text structures. Englert and her colleagues have shown that these conceptual models are successful in providing students with procedural knowledge about writing and a simple understanding of how texts are organized. Test-structure knowledge assists writers in two ways: guiding decisions on (1) how to categorize and label ideas and (2) how to combine these clusters of ideas

From "Volleyball and other Analogies: A Response to Englert" by Stephen L. Isaacson, 1992, *Journal of Learning Disabilities, 25* (3), pp. 173-177.

to create meaningful texts (Englert et al., in press). Mayer underscored the importance of conceptual models in helping students understand declarative and procedural knowledge, retain it, and improve problem-solving transfer.

Second, Englert and her colleagues have demonstrated the usefulness of examples to teach conceptual knowledge. CSIW teachers modeled the structures of written expression by presenting student writing samples ranging from good to poor quality, using those examples as a format for explicitly teaching students about text structure and audience needs. It is especially commendable that CSIW teachers used authentic compositions by same-age children as examples. Student compositions are attainable models of writing, unlike the examples often found in basal language arts text.

Third, Englert and her colleagues have demonstrated the importance of language and shared vocabulary in the construction of knowledge. Examining students' metacognitive knowledge, Englert et al. (in press) found significant relationships between writing ability and students' ability to talk about the component processes in writing, the translation of ideas into connected text, and revision. The language and vocabulary modeled in CSIW instruction were evident in student interviews and seemed to be an important scaffold. Research within a cognitive behavioral framework also has demonstrated that language is an important factor in learning self-instructional strategies (see Harris, 1990).

Good and Not-as-Good Teachers

Englert also makes nice use of examples, in the form of actual lesson scripts, to illustrate good and not-as-good teaching. She points out the importance of giving students an opportunity to contribute to the dialogue if the lesson and the importance of guided practice. However, she offers a few questionable interpretations about the not-as-good scripts. She refers twice to "rapid-fire questions," which are not evident in her lesson examples. In Figure 4, for example, each student makes, on the average, only two responses during an episode that should have lasted between 5 and 6 minutes. That can hardly be described as "rapid-fire." In fact, the real problem is lack of sufficient response opportunities. Close inspection of both Figure 4 and the Ms. Cartwell script reveals that the teacher does far more talking than the students. Furthermore, I am not clear on how students spontaneously leaving their seats to circle a word is a measure of confidence as a writer.

Most questions that I get from good and not-as-good special education teachers are about students like Bill—the one Englert described as "not conventionally literate." Englert writes that Bill benefited from being a member in the literacy community, which is certainly indisputable. However, because the CSIW think-sheets were not really designed for students like Bill, and because interventions other than the constructivist one were not reported, several questions about Bill remain. To what degree did Bill's status within his literacy community affect his learning? Was instruction *above* his zone of proximal development? Would the teacher have used Bill's instruction time more effectively by presenting shorter, simpler writing tasks or teaching him basic skills that would have put him on a more even footing with his peers? To really make the point, let us consider volleyball.

Volleyball and Other Analogies

Englert uses the analogy of volleyball to illustrate the principles of effective writing instruction. I tried to think of better analogies to writing, but finally decided that volleyball wasn't a bad one, at least from the standpoint of what the teacher does. To illustrate what I mean, I must refer to my own volleyball experiences.

Although I now enjoy the occasional volleyball game at the beach Fourth of July picnic, volleyball in junior high was always a humiliating experience. I had neither performance nor competence. My teammates, being the adolescents they were, had absolutely no patience with my attempts to be part of the "volleyball community." After I managed to hit the ball almost everywhere except to the other court, my teammates quickly learned to take over. When the ball would come my way, the person in back or to either side of me would yell, "Mine!" or, "Out of the way, Isaacson!" I would step aside, and they would competently put the ball in the air in the general direction it was supposed to go. I deferred to their superior skill and was actually relieved that they collaborated in my avoidance of the task. This was likely to happen even when the P.E. teacher was watching us, because, I think, he did not want to disrupt the game's momentum and wanted the players to experience success and enjoy the competition. Occasionally, when there were too many players on my team, I sat on the sidelines while the better players took over. I didn't get any better at volleyball in junior high.

One difficult skill for me was serving. When the gym teacher noticed that I and a few others could not seem to get the ball over the net, he did a very wise thing. He took me and the others aside and had us practice nothing but serves. First, he modeled. Then

he verbally prompted as we tried the serve. Next, he gave us multiple practice trials until we had the hang of it. Then he sent us back into the game. Coaches do this in other sports, as well. **I've seen baseball pitchers spend long periods of time just practicing their pitch, out of the context of the game.** Golfers practice their swing, swimmers practice their kick turn and starting dive, fencers practice their thrust, and football players practice their placekick alone on the field. As a beginning skier, I remember spending considerable time practicing my snowplow before I had to use it in context, on a real hill. I've practically never seen bodybuilders use their skill in context, but I have seen them doing many practice repetitions in a weight room. Coachers seem to believe there is benefit in isolating a skill and practicing it to mastery in order to improve its use in context.

I am both intrigued and a little wary of analogies. On the other hand, they are very useful in illustrating what would otherwise be abstract principle, making them more concrete; but they can also be slightly misleading. One shortcoming of the volleyball example is that it is an event that results in no product. It has no purpose other than physical exercise and competition. Writing is judged on the communicative effectiveness of its product, not by how much enjoyment everyone derived from the event.

Music is another analogy Englert could have used. It is a socially constructed experience, often collaborative, in which members of a music community use a shared language and communicate with a real audience. I did better at music than at volleyball. My piano teacher was well known throughout the city, and she deserved her excellent reputation. First, she did an assessment, having me play what I could. She noticed that my left hand was weaker than my right, so she assigned compositions that would build my left hand. **I didn't get to choose the songs I would play, although my teacher took my interests into consideration when selecting them.** She continually assessed my learning and skillfully coached me at the upper end of my zone of proximal development. When learning a new piece, I never began by playing it all the way through (although she often would put on a record to familiarize me with the piece and show me what I eventually would be able to do). First, we divided the piece into logical parts, and I would learn each part in turn. When teaching a new part, my reacher began by pointing out certain measures that she knew would be very difficult. First, she would explain it, then we would count out the beat a few times, then she would model the fingering, and often she would even prompt the fingering by writing little numbers above the notes. Then she would have me practice the part, often several times. Sometimes I practiced just the right hand or the left. I always took an active role in my learning. At home I practiced for hours, because I loved to play. I also was motivated by the fact that I would play for a real audience at an upcoming recital. However, I often warmed up by practicing scales and would end by taking out the hymnal to practice my sight reading skills. (Scales and hymns were not intended for a real audience.) Sometimes I would invent my own songs, or improvise on popular songs I had learned. **The interesting thing was that years of practicing scales and other people's compositions did not inhibit my improvisational creativity in the least.**

The real issue in effective instruction is not whether it is holistic or reductionist. The real issue is whether it is *complete*. If I had never been allowed to go beyond scales or prompted to combine the left hand with the right hand, I would not have become a competent performer. Similarly, if I had been taught how to play songs but not how to read notes, I would have been rather limited in my musical skill and musical opportunities. If beginning writers are never given opportunity to do anything but spell or do punctuation worksheets, they will never become competent authors. Similarly, if beginning writers are taught the process without also learning to spell or punctuate, they will be limited in their ability to communicate with others.

The real issue in effective instruction is not whether it is holistic or reductionist. The real issue is whether it is *complete*.

Holistic and *atomistic* are antithetical concepts, but not antithetical endeavors. Learning to play the piano and learning to write can be both holistic and atomistic. Learning a new piano piece began very atomistically, but mastering the piece required attention to the integrity and dynamics of the whole. Learning to write can incorporate the whole process of writing and, at the same time, look at the particulars. It is clear that Englert understands this because, although CSIW addresses writing holistically, students are taught to analyze its parts. The process is taught as a five-step sequence (planning, organizing, writing, editing, revising), different text structures are analyzed (e.g., compare/contrast vs. problem/

question. In math, for example, there is evidence that teaching tricky subskills or important preskills to mastery before they are incorporated into the whole process results in better performance, retention, and generalization, and requires less instruction time (Carnine, 1980; Kameenui & Carnine, 1986; Lloyd, Saltzman, & Kauffman, 1981). Preteaching vocabulary has a similar effect on the comprehension of both basal and content texts (Carney, Anderson, Blackburn, & Blessing, 1984; Wixson, 1986). To the best of my knowledge, similar research has not been conducted with respect to written expression. However, Harris and Graham (in press) recommend the preteaching of important concepts and vocabulary before instruction in self-instructional writing strategies, although preskills do not have to be learned to 100% mastery before they are incorporated into the strategy.

Knowledge Forms

Some readers might argue that teaching techniques for the piano are necessarily different than those for written expression. Although I believe the analogy is quite a good one, the point is well taken. Different teaching strategies are appropriate for different knowledge forms (Kameenui & Simmons, 1990). We should not over-generalize by thinking that teaching strategies that are appropriate for the *construction of meaning* are necessarily appropriate for the learning of facts, rules, or strategies.

Learning facts, for example, requires practice to reach any degree of proficiency and lends itself to rapid question-answer formats. Shuell (1990) argued that too often rote learning and meaningful learning are pitted against one another in a good/bad or either/or manner. In reality, both play an important role in learning from instruction. At times it is intelligent to memorize something by rote, especially if rote learning is a means to an end, rather than an end in itself. Spelling practice is an example of a somewhat rote task that, nevertheless, is a means to effective communication. As Shuell pointed out, during the initial phase of meaningful learning, relatively simple forms account for a large part of the learning that occurs.

Another knowledge form represented in written language is rule relationships, including rules for margins, handwriting, punctuation, capitalization, and attaching affixes to root words. In a review of research on teaching science principles, Ross (1988) found that conditions in which students acted as informants and attempted to deduce principles of experimental design through discussion were not very effective. The largest effects were found in treatments in which the teacher provided explicit rules at the outset of instruction and followed with examples that illustrated the rules. As Resnick (1987) pointed out, children's own constructions of knowledge do not always lead to accurate understanding.

Swanson (1990) emphasized that strategy instruction must be conceptualized within a broad instructional continuum. At one end is the teacher as volleyball coach who engineers instructional activities and, through dialogue, influences students' strategic use of their own mental resources. At the other end of the continuum, however, is a focus on skills and subskills that must be performed automatically to allow selective attention to focus on more purposeful, deliberate tasks.

Secretary Versus Author

Englert overlooks the knowledge forms required in the "secretary" part of the writing process. Smith (1982) first used the author-secretary analogy as a way of describing the complexity of the writing process and the ongoing tension between the two competing concerns of the writer. Author concerns include topic ideas, text structure, and key words, which signal to the reader the direction of the discourse. Secretary knowledge, relating to the shared symbols and conventions of written communication, is also important to the writing process. The secretary needs to have factual knowledge and apply rules pertaining to shared symbols of language (i.e., spelling, punctuation, and grammar). Both the author and the secretary role must be fulfilled for the writer to produce writing that has communicative effectiveness.

Englert skirts the issue of secretary concerns in her article. However, this is an important component in discussions of *complete* instruction. Graham's (1990) research demonstrated that poor handwriting and spelling present serious barriers to fluency for many students with learning disabilities. Mary Gleason and I are currently examining the issue of spelling as it is used in the context of the writing process. To do this, we had to separate the issue of how best to teach correct spelling (declarative knowledge) from how to help students derive spellings as they write (procedural or strategic knowledge). A student-as-informant strategy for spelling in context (i.e., invented spelling) is successful in increasing writing fluency, but does nothing for spelling accuracy in students' compositions (Clarke, 1988; Gleason & Isaacson, 1991). The failure of student-constructed compensatory strategies such as invented spelling to improve spelling is a clear example of procedures that are not completely successful because of deficiencies in de-

The failure of student-constructed compensatory strategies such as invented spelling to improve spelling is a clear example of procedures that are not completely successful because of deficiencies in declarative knowledge (Garner, 1990). This leaves the problem of how best to teach the necessary declarative knowledge (i.e., correct spelling) and promote its use in context. Spelling is not learned incidentally; research supports systematic instruction (Frank, Wacker, Keith, & Sagen, 1987; Graham, 1985), as atomistic or noncontextual as it may seem.

Writing for Different Purposes

One of the things I learned about volleyball was that there were different things you had to do in different parts of the court. My favorite position was in the front, because there would always be someone taller next to me who would yell "Mine!" and spike the ball back across the net. My least favorite position was in the middle of the court because there was a high probability that the ball would come my way. Then we would rotate, and I would move to the back row where I would soon have my turn at serving. One can't learn to spike from the back row or serve from the front row. Nor can one learn baseball or soccer on the volleyball court.

Englert maintains that authentic authors select their own topics. Perhaps there is a distinction between *authentic authors* and *real writers*, because real writers often do not get to select their own topics. Insurance agents have to write reports about accidents–and not just any accident, but particular accidents involving particular people. Editors assign news stories to reporters. Office workers have to write memos on whatever topics the boss wants them to report. I am not arguing that beginning writers should not occasionally be allowed to choose their own topics. However, student-selected genres and topics do not entirely represent the demands of real life, and it is not unreasonable for a teacher to assign a topic and genre. Different types of writing require different cognitive skills, and it is good that the CSIW program teaches a variety of text structures.

Summary and Conclusion

Englert and her colleagues have contributed much to our knowledge about effective writing instruction. They have demonstrated that interventions that make explicit the writing process and text structures are successful with students with learning disabilities as well as those without. Englert attributes this success to the holistic, social, and interactive nature of the instruction. However, one must keep in mind that CSIW was a package approach that included other validated instructional components. CSIW teachers presented conceptual models, used examples and nonexamples to illustrate text structure concepts, modeled thinking overtly while demonstrating the process, provided guided practice by prompting the process through dialogue and thinksheets, faded prompts as students took over more of the responsibility for the process, and taught for generalization by addressing more than one text structure and promoting student talk about the process. As Englert reported, most teachers seldom do these things, even when they claim to teach the writing process.

Englert allows for the possibility that all students with learning disabilities may not be ready for cognitive strategy instruction as it is described in her article, and professionals must acknowledge that different techniques may be more effective for students of different ages and abilities. Swanson (1990) emphasized that there must be a match between strategy and learner characteristics and that strategies must be considered in relation to a student's knowledge and capacity. Strategic teaching requires that the teacher have a repertoire of approaches along a continuum that encompasses coaching students to use their own mental resources at one end and basic skill instruction at the other.

As other authors have pointed out (Harris & Pressley, in press; Resnick & Klopfer, 1989), construction of knowledge is not limited to higher order thought processes, but is present even in simple forms of learning. Englert and her colleagues have devised an excellent multicomponent package that effectively teaches authoring skills necessary for successful communication. The task that remains is to apply techniques for teaching facts, rules, and strategies related to the secretary functions to students who need them as well.

However, the report of current writing practices among teachers of students with learning disabilities fills an important vacuum in special education research. The interventions devised by Englert and her colleagues reported here and elsewhere (Englert et al., in press; Englert et al., 1991) are exciting in their effects. Students with and without learning disabilities can benefit from learning text structures and cognitive strategies.

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Research Brief: Whole Language Instruction

Prior to whole language sweeping the country. The major reviews of reading research consistently found that research supports **systematic phonics instruction, a method that has never been used to teach reading in mainstream America.** Marilyn Adams, commissioned by the National Center for the Study of Reading to comprehensively review all the research on reading, concluded that the research supports systematic phonics instruction (1988). *Becoming a Nation of Readers* by the National Commission on Education made a similar conclusion from a research review (1985).

Without regard for this information, California departed from the traditional but non-research-based, whole word approach and implemented a "bold new whole language approach" statewide. The evidence for moving in this direction was cited as: an international literacy study that found that New Zealand had a higher literacy rate than the United States, the highest in the world, in fact. No one noticed that only school-going students were assessed in that literacy study, and that only the best 13% of New Zealand's 18-year-old's go to school, while 75% of the US's kids are in school. The cream of the crop in New Zealand versus the masses in America is hardly a fair comparison. They heard in California that New Zealand didn't use textbooks nor worksheets. No worksheets means no phonics to a traditional basal user. (To a research-based phonics teachers, worksheets have always been irrelevant to the issue of learning phonics for reading.) In any case, worksheets and basal readers became "out," and California brought "in" a non-basal whole language "framework."

Of course, publishers wouldn't stand for basal readers being "out," especially in California where statewide mandates can mean big sales, so they quickly started preparing "whole language basals," a contradiction in terms really. But never mind. Whole language started catching on all over the country and whole language basals started selling like hotcakes. Publishers, rather than research, informed us on how to teach reading.

During the whole language sweep. Stahl and Miller specifically reviewed the research on whole language and found (a) a positive effect for whole language over traditional whole word approaches in kindergarten, (b) a positive effect for traditional whole word over whole language approaches when used with poorer kids, and (c) **"strikingly larger effects" for systematic phonics used in first grade"** (p. 108). Their findings first appeared in the *ADI News*, then later they were published in the *Review of Educational Research.*

Several whole language advocates had opportunity to respond in the *Review of Educational Research* to Stahl and Miller's findings. **The responses of the whole language advocates show just how weak the basis for whole language methods was.** Two respondents claimed that whole language was different from the language experience approach that Stahl and Miller classified as whole language, and, therefore, the findings did not apply to whole language. However, by making that statement they had to concede then that no research had really been done on whole language. They acquiesced that "whole language advocates must take up the challenge ... and present clear evidence of the value of their approaches" (p. 138).

The remaining respondent to Stahl and Miller claimed that whole language approaches should not be rejected until they have been evaluated for their effects on writing in some longer term studies. She argued that if there is an effect for writing, then we shouldn't worry if reading scores are lower. "If initial differences in reading essentially even out by third or fourth grade, and if whole language/language experience approaches significantly improve writing skills, there's absolutely no point in worrying about a slight basal reader advantage on reading comprehension in first and second grade" (p. 130). She had to admit that even this is a mighty big "if" because there is no data to support it.

This was the best evidence that whole language advocates could come up with—no evidence. Yet whole language subsequently swept the whole country, not just California.

Today. Consider how widespread "whole language" is now in this country, at least as a popular word used to describe most any language instruction. Still there is no data to support it. Fortunately, it seems that many teachers misinterpret whole language to mean simply using real literature. They do what Stahl and Miller described as ideal: "integrate direct instruction of phonics with a broad program using children's literature and individual writing" (p. 109). But those are a few of our seasoned teachers. What's happening to our newly trained teachers who aren't learning anything about "direct instruction phonics." **What will happen to our kids who are taught by the teachers who have learned only whole language theories?**

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OVERVIEW OF THE RESEARCH ON READING AND DIRECT INSTRUCTION

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EXECUTIVE SUMMARY

A literature review was conducted to summarize the effects of Direct Instruction (DI) and the Whole Language (WL) approaches on achievement for exceptional students and students at-risk of school failure. Additionally, three school districts which had implemented both the DI and WL approaches with at-risk students were asked for their professional judgement of the merits of the two approaches.

The two approaches to literacy instruction differ in instructional strategies and materials. The Direct Instruction approach uses structured curricula materials, reinforcement of correct responses, and modeling of correct answers to help students acquire literacy skills. The Whole Language approach uses a less structured approach to literacy instruction; using an interdisciplinary approach, invented spelling, oral language, and writing to promote literacy skills.

A summary of the content of this report appears below:

1. All research studies reviewed found the Direct Instruction approach to be more effective than the Whole Language approach with at-risk student populations.

2. The Whole Language approach when used in isolation of other instructional approaches is not effective with at-risk students.

3. An eclectic approach to literacy is advocated by practitioners.

4. The three school districts advocate the use of the Direct Instruction as a basis for the instruction and the Whole Language strategies used to compliment the reading curriculum.

5. The research studies stressed the importance of teacher training in use of the instructional strategies.

6. The cost per student of the SRA Reading Mastery materials (DI) is less than the D.C. Heath materials (WL).

I. Introduction

The purpose of this paper is to summarize research on the effect of Direct Instruction (DI) on the achievement of exceptional students, and other student populations at-risk for school failure. Descriptive information is provided to explain the components which make the DI approach successful. Materials used in this approach will also be described.

II. Definitions

The term Direct Instruction evolved from compensatory education where a DI model had positive effects on the reading and language skills of low income students. Direct Instruction uses the behavioral approach commonly found in special education; specifically, the use of structured curricula materials, reinforcement of correct responses, and modeling of correct answers. Task analysis is used and assessment is not continuous.

Whole Language views the development of literacy to be interrelated with all other facets of language development. Generally, the Whole Language advocates assert that students can acquire literacy in much the same way as they acquire oral language–naturally (Altwerger et al., 1987; Goodman, 1986). Whole Language stresses children's writing, often using invented spelling (Harste, 1985). Whole Language attempts to improve students' "ability to think with words, and ... stimulates language development in all media of expression and reception, with the ultimate goal of reading the writings of others" (Stahl & Miller, 1989).

The term at-risk students in this paper refers to the following groups of students: low income, low achieving, exceptional education, emotionally handicapped

students and students speaking languages other than English.

III. Summary of Research Findings and Program Evaluation Results

A. Direct Instruction

Two different pre-reading instructional strategies were compared to examine their relative effectiveness on text comprehension. In the teacher-directed strategy, a DI approach, the teacher directly explained the information necessary for comprehension. In the interactive strategy, teachers lead discussions to help students integrate their previous knowledge with the new knowledge in the text. The students in this study were fifth-graders in average reading classes.

The study supported that the teacher-directed approach was more effective than the interactive-approach for text comprehension (Dole et al., 1991). This finding is supported by other research which found that direct help and explicit explanation by teachers result in improved reading comprehension (Duffy et al., 1987).

In a study of at-risk, low-achieving elementary students, the school staff used Direct Instruction with SRA commercial programs. The students were a transient group with half in the free-lunch program. The school staff integrated DI with a Whole Language approach program. Student performance on the California Assessment Program in reading and language was at the 94 percentile, on the average for third graders; sixth graders average reading and language score placed them at the 98 percentile. The school was exempt from use of the standard basal series because of its outstanding performance (1).

Another school initiated use of DI materials took place at an elementary school with 86% of the students on free or reduced lunch, a high number of second language students, and average standardized test scores below the 45 percentile at entry. The school staff designed a comprehensive approach to servicing students which included the use of DI in language instruction. Using materials such as Spelling Mastery and Expressive Writing at the middle school level, test scores improved over a four-year period (2).

One of the most comprehensive studies of DI is the research conducted on Project Follow Through (Gersten, 1985; Haddox, 1990). The Follow Through evaluation compared 13 educational approaches in 170 communities with 75,000 students. The results supported the positive effect of the DI model on language and reading achievement performance. The DI model contrasted favorably with Whole Language approaches whose students' scores were not as high.

In a follow-up study of Follow Through students who received DI instruction from preschool through grade 5, students had more grade level promotions and better reading skills than students taught with other methods (Engelmann et al., 1988). These findings were qualified by statements emphasizing the importance of implementing DI with rigorous training for DI teachers.

Another follow-up study also found the DI approach to favorably impact basic academic skills (Becker, 1977). Ten years after the initiation of Project Follow Through, the DI model produced significant gains in measures of positive affect, basic skills, and conceptual reasoning. This model included (1) daily program structure; (2) rapid-paced, teacher-directed, small group instruction; (3) approaches to secure and maintain student attention; (4) staff training; and (5) biweekly monitoring of student progress. The WRAT was used by a national evaluation firm to assess program impact. The low-income students exceeded the national norm group in reading, moving from the 2nd to the 8th stanine.

In related research, other studies of DI models have shown that more is learned in a given period of time when more teacher time is devoted to teaching highly specified behavioral goals (Brophy & Evertson, 1974, 1976; Soar, 1973). The amount of "academic engaged time" appears to be an influential variable in the success of DI models.

B. Whole Language and At-Risk Students

Gersten and Dimino (1990) conducted a review of the literature on the effect of Whole Language approaches on at-risk students. The review found the Whole Language approach was commonly advocated for low SES populations and groups of at-risk students; however, it was rarely effective. Specifically, the Whole Language approach to reading did motivate students to read, however, it did not provide systematic instruction in "how to read." The "phonics as needed" approach to reading was not found to be an appropriate strategy for teaching at-risk populations (Chall, 1989).

C. An Eclectic Approach

Adams (1990) proposed that an eclectic approach be used to teach reading since approximately 25% of middle class students do not have a knowledge of the rudiments of reading (Newsweek, Fall-Winter, 1990). Research studies have found that blended methods in reading approaches improve reading comprehension. One such blended program is the Blending All Learning Activities Nurtures Classroom Excellence Project (B.A.L.A.N.C.E.) program stresses DI as a foundation for exceptional education students but encourages teachers to integrate the Whole Language and precision teach strategies to enhance the application of the skills. B.A.L.A.N.C.E. was developed based on three premises: 1) exceptional education students benefit from a combination of approaches; 2) when teachers are trained in the strategies for implementing these three teaching approaches together, there is greater likelihood that teachers will merge the strategies in the delivery methods; and 3) for the program to be successful, extensive training needs to be provided to teachers to allow them to adapt the techniques into their daily teaching practices.

III. Current National & State Practices

The San Diego Unified School District, the Broward County School District and L'Ouverture Elementary School in Dade County are currently implementing curricula with a foundation based in the DI methods with their at-risk populations. The three educational institutions selected the DI methods for their at-risk populations after doing extensive literature reviews on the best reading practices. We contacted these educational institutions to determine the effectiveness of the DI approach with their special populations.

The Director of Special Education Programs in San Diego Unified Schools, stated that when the school district adopted the Whole Language approach for teaching students how to read, the district's special education staff also were mandated to implement this approach with their students. After two years of Whole Language implementation, the staff of special education teachers were frustrated with this method of instruction. He also found the students were not making academic gains using this approach. The Special Education department requested a waiver from the San Diego School Board to enable them to provide a reading curriculum suitable for their student population. The received the waiver and selected the DI model as a basis for their learning delivery system.

Stuart Greenberg, Director of Emotionally Handicapped students in Broward County, also had the opportunity to select a learning delivery system for the Cluster Improvement Program for emotionally handicapped and learning disabled populations. Broward County found that the DI programs were the most effective curricula with at-risk populations after an extensive review of the literature and consultations with professors from the University of Florida, Education Department; the University of Utah, Psychology Department; and the University of Oregon, Special Education Department.

Marietta Mischia, principal of L'Ouverture Elementary was given the opportunity to select a research-based reading curriculum. She worked with a team of parents and teachers to compare reading curricula for their population of students. After the review, the decision was made to use a DI program. L'Ouverture serves a population of 1,200 students which is 85% Black Creole, and 8% white, and the mobility rate is approximately 52%.

Each of the educational leaders indicated that DI was the foundation for their curricula, however, all stated they integrated other reading approaches in their learning delivery system. Each stressed that DI provided the systematic delivery of instruction while at the same time each advocated the use of other approaches to supplement the reading curriculum. Each were in agreement that the Whole Language approach motivated their students to read and brought a sense of joy into reading instruction. They stressed the need for extensive training in integrating the use of both approaches. For an integrated program to be implemented effectively, teachers need support from administrators to provide training throughout the implementation of the program, not only at the beginning of the school year.

All three institutions found that significant achievement gains were made by their students when DI programs were the foundation of the curriculum.

IV. Cost Analysis

A cost analysis of the D.C. Heath program the the SRA Reading Mastery program was conducted to determine the impact of each program on the educational budget. The dollar figures obtained reflect the cost of purchase based on the New Unit Ordering recommendation listing. The dollar figures generated were for one classroom of twelve and planning for at least five of the students on any one reading level during the school year.

It should be noted that Primary units include readiness level to third grade students. Intermediate units include third to fifth grade students. The costs for each program are shown in the table below.

Program Cost

Level	D.C. Heath	SRA Reading Mastery
Primary	$3,135.75 (R-3)	$1,223.75 (I, II, Library)
Intermediate	$1,962.50 (3-5)	$1,111.50 (II, III, IV)
K-5 Combined	$4,565.25 (R-5)	$1,825.50 (complete)

The cost of purchasing the SRA Reading Mastery program materials is less expensive for a special education classroom than program materials for the D.C. Heath program.

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National Curriculum Committee Promotes Unproven Practice as National Standard

The National Council of Teachers of Mathematics (NCTM) has formalized a set of standards that define both the nation's mathematics achievement goals for school children and the teaching practices that schools should use to achieve those goals (1989, 1991). Determining national goals for education is appropriately a political question, to be decided by society at large through a democratic process. Whether or not the NCTM is an appropriate representative of society as a whole is perhaps debatable. Nevertheless, the goals set forth by the NCTM seem acceptable to most citizens who know of them.

The most effective teaching practices, however, are not determined through a political process. Effective teaching practices are a matter of fact, not opinion. Those facts are derived through empirical observation using the scientific method, not by convening a committee. **The NCTM's teaching practices are not based on research.** The NCTM teaching practices are based on "constructivist" theories. Constructivism is the theory that argues for wholistic approaches to instruction. Attempts to empirically confirm the constructivist theory in mathematics instruction had met with consistent failure prior to publication of the standards. Not even Resnick, one of the strongest proponents of constructivism, could achieve any learning outcomes when she applied constructivist theories to teaching (1988).

In fact, the NCTM teaching standards contradict the "user-friendly explicit instruction" that research to date has consistently identified as most effective (Yates & Yates, 1990). Bishop (1990), a prominent writer on research method, pointed out that "recommendations and exhortations [in the standards] appear to be supported only by opinion–authoritative opinion, it is granted–but opinion nevertheless" (p. 357). Sweller (1990) agrees: "I do not believe we should be introducing curriculum changes of the sort advocated purely on the basis of theoretical analyses. Proper theorizing is followed up by extensive empirical work to determine the strengths and weaknesses of the theory. Depending on the results, we then may be in a position to advocate curriculum change" (p. 414).

The NCTM teaching practices are a research agenda. The document openly states that "one reviewer of the Working Draft of the Standards suggested the establishment of some pilot school mathematics programs based on these *Standards* ..." (p. 253, 1989, acknowledging that the standards were untested. The standards are upfront about being "a new research agenda" more than merely a description of the state-of-the-art in mathematics teaching. Unfortunately, this research agenda is not driving the design of the nation's basal mathematics programs. **The NCTM is using a whole generation of Americans to conduct a high-risk educational experiment.** The risk is especially great considering that the recommendations starkly contradict previous research findings. As new techniques, methods, and perhaps entirely new designs prove themselves, only then should they become the nation's standards. Experimentation should be carried out on a very small scale.

For the NCTM Commission to set forth a research agenda as a standard for America, can only be described as totally irresponsible. If the NCTM Commission did not intend their recommendations to be widely implemented, but only researched, then they should quickly call a halt to the wide-scale implementation that is occurring, until there is better data to indicate that the risk to America's children is only minimal.

--Bonnie Grossen, Editor

Note: More recent research findings evaluating the NCTM teaching practices are presented in the research report that follows.

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Raising Mathematics Problem-Solving Performance: Do the NCTM Teaching Standards Help?

Bonnie Grossen and Shirley Ewing

Very little experimental research has been conducted to test whether the teaching practices promoted by the National Council of Teachers of Mathematics (NCTM) will help the nation achieve the goals established by the same NCTM (Bishop, 1990). The NCTM teaching practices (1989, 1991) are based instead on constructivist theory (Cobb, Yackel, & Wood, 1992). Constructivist theory is inconsistent with the "user-friendly explicit instruction" that previous research has found most effective in general education (Yates & Yates, 1990) and in special education (Harris & Pressley, 1991).

Only two experimental studies have evaluated the effectiveness of NCTM "constructivist" instruction on mathematics learning (Cobb et al., 1991; Carpenter, Fennema, Peterson, Chiang, & Loef, 1989). In a full-year, second grade study, Cobb et al. (1991) found that constructivism resulted in better mathematics achievement than "traditional direct instruction" taught using the Addison-Wesley (1987) second grade textbook. There were two confounds in this study. First, the teachers administering the constructivist treatment self-selected themselves by participating in the summer institute where they received their initial training. Those teachers who did not participate became the control teachers. It is not clear whether the control teachers even knew their students would be tested. The second confound was the "extensive support throughout the school year," (p. 14) that the experimental teachers received.

Cobb et al. (1991) cite only the Carpenter et al. study (1989) as compatible with their findings. The Carpenter et al. study was free from the confounds noted in the Cobb et al. study. Teachers were randomly assigned to the constructivist and control treatments and inservice training was provided for both groups. However, Carptenter et al. introduced a different confound. The constructivist inservice workshops focused "on story problems that were relevant to the children, [while] the problem-solving emphasis of the control group's workshop was on mathematics problems that were intriguing and of a more esoteric nature. Such problems are often designated as nonroutine" (p. 507). The use of routine problems in the more effective treatment contradicts the NCTM's recommendation to include a high percentage of nonroutine problems.

No research has compared constructivist practices, as recommended by the NCTM, with nontraditional Direct Instruction (DI). DI incorporates both effective teaching practices (Rosenshine, 1986) and "considerate" curricular materials that apply research-based principles of instructional design (Engelmann & Carnine, 1991). Because most of the research supporting DI principles has been conducted with low-performing and special education students, many have concluded that DI is only for less-abled children. However, the observation that high-performing students succeed in less-structured instruction may result from the presentation of tasks that are easy for those students relative to their ability. Perhaps providing more structured instruction for high-performing students on content that is more complex relative to their ability may in fact be superior to less-structured methods, just as it is for low-performing students. If this hypothesis is true then our quest for world-class standards is better guided by applying DI instructional design principles to all content that is complex relative to the ability of the student.

The purpose of the following study was to experimentally compare the effects of instruction that is considerate of the needs of less able learners with the NCTM teaching practices. Effects were measured on heterogeneously grouped high- and low-performing students in 5th and 6th-grade. The Systems Impact series of videodisc mathematics programs were used in the considerate treatment. The senior authors of instructional design for the Systems Impact programs were Zig Engelmann and Doug Carnine. As all DI programs the videodisc instruction reanalyzed mathematics knowledge as a network of highly related strategies and schemas. The programs used a strand design, where several learning objectives are developed simultaneously over several days, then integrated into more complex skills.

Previous research has shown that the Systems Impact videodisc materials are effective with older at-risk and special education students and with

younger gifted students (Carnine, 1992). The interaction of the programs' effectiveness when younger learners of wide-ranging ability are taught in the same classroom environment has never been tested, nor has the cumulative effect of using several programs consecutively been evaluated.

The larger goal of the study is to evaluate the effect of considerate instruction versus the NCTM teaching practices in achieving the NCTM teaching goals over a two-year period. This being only the first year of implementation, a complete evaluation of the effect of the programs on the NCTM goals of higher level thinking and problem solving cannot be conclusive. Therefore, the following evaluation focuses primarily on the interaction of the instruction with high- and low-performing learners taught in the same classroom environment.

METHOD

Subjects

The entire 5th- and 6th-grade population of an elementary school in a Rocky Mountain city (population 100,000) participated in the study. The socioeconomic level of the school population was quite high; only 9% of the student population was eligible for free lunch. The school contained three 5th- and three 6th-grade classes of 25 to 30 students each. Students were heterogeneously grouped, distributing gifted and special education students evenly among teachers. One 5th grade teacher and two 6th grade teachers used the SI videodisc programs. The other 6th grade teacher and two 5th grade teachers used the NCTM Standards for Teaching Practice (1991) as implemented by the district's newly adopted mathematics basal, Scott Foresman (1991). Two classes of 5th graders receiving different treatments were matched in ability, including equal numbers of high, medium, and low performers, as designated by their previous teacher. These two classes were also maximally heterogeneous with two gifted and three special education students assigned to each class. Similarly, two classes of 6th graders receiving different treatments were also equivalent in subject selection. The third class at each grade level was not necessarily equivalent.

In addition to these subjects, the previous 6th-grade population of the same school (previous 6th grade, $\underline{n} = 56$) and the 6th-grade population of another school (other 6th grade, $\underline{n} = 43$) were used in some comparisons. These samples included gifted and special education students proportionate in number to the experimental groups.

Treatment Conditions

The use of the Systems Impact programs was experimentally compared with a NCTM mathematics program (Scott Foresman, 1991) and quasi-experimentally compared with traditional mathematics instruction (Harcourt Brace, 1985; Heath, 1985). The table below describes the experimental comparison between the "considerate" Systems Impact instruction and the "constructivist" NCTM practices.

Systems Impact "considerate" programs. The Systems Impact (SI) programs begin by assuming a mastery of whole number operations. Three SI programs in the mathematics series that teach fractions, decimals and percents, and ratio word problems were implemented in 6th grade (Mastering Fractions, Mastering Decimals and Percents, Mastering Ratio Word Problems). Only the first 2 programs were implemented in grade 5 beginning in January, because pretests indicated that pupils needed to first master whole number operations. The ratios, pre-algebra, and geometry programs are scheduled to be implemented with these 5th graders in grade 6 of the coming year.

Because the SI programs are modular in design, they do not represent a complete mathematics curriculum. Rather they provide systematic initial instruction in core concepts of mathematics that have been traditionally very difficult to teach (e.g., fractions). The programs were supplemented by cooperative learning, problem solving, and other activities from the adopted text in interludes between use of the SI videodisc programs. These activities served to maintain earlier taught skills and provide new contexts for use of the knowledge the students had gained. The important distinction in the use of the activities from the basal text was that in the considerate SI treatment, these activities were used as a culminating application activity, rather than as initial instruction.

NCTM instruction. The newly adopted Scott Foresman 1991 basal mathematics implements the NCTM Teacher Standards (1991). This program was used in the current 5th and 6th grade classes not using the SI programs. The program did not use a mastery design, but rather "spiraled" frequently through topics. Each day's lesson seemed quite different from the previous day's lesson. Students were seated in groups of four. Most lessons involved both whole group and small group discussion. The teachers maintained firm control and classes were characterized by relevant, on-task behavior.

Traditional instruction. The previous 6th grade and other 6th grade were taught using mathematics basals that used a traditional skills-based approach. Traditional skills-based instruction targeted a different objective each day and sequenced instruction by topic. This design contrasted with the alternative skills-based design of the SI programs where several objectives were developed simultaneously over time and then integrated into more complex skills. The specific traditional programs were Heath (1985; used

in previous 6th grade) and Harcourt Brace (1985, used in other 6th grade).

Procedures

The 6th grade NCTM teacher strongly preferred to use the district's newly adopted mathematics basal. The other teachers of 5th and 6th grade were randomly assigned to treatment by the principal. The two experimental classes (SI and NCTM) at each grade level (4 classes total) were taught by experienced teachers. The experienced teacher of the experimental 6th-grade SI class taught only the first two SI programs (fractions and decimals and percents) before an extended maternity absence. Her substitute, a beginning teacher, taught the 3rd SI program (ratio word problems) to the class.

The two experimental teachers of the 6th grade SI and NCTM programs were equivalent in mathematics teaching skill based on the achievement results of their previous class of students. The SI teacher's previous class had a mean total mathematics percentile of 61 on the Iowa Test of Basic Skills (ITBS) with 32% of her students scoring below the fiftieth percentile. The NCTM program teacher's previous class had a mean of 63 with 33% of her students scoring below the fiftieth percentile.

The two experimental 5th grade teachers had taught different grade levels the previous year. Com-

Table 1. *A Comparison of the NCTM Teaching Practices and Considerate Instruction*

NCTM Teaching Practices	Considerate Instruction
Not a 'tell-test' traditional method, but a 'test-guide' method.	Not a 'tell-test' traditional method, but a 'tell-guide-test' method, with guide being the major component.
Knowledge cannot be transferred, it must be invented by the learner. Knowledge grows out of solving problems in meaningful, natural contexts.	Knowledge is transferable. It is what one generation passes to the next. Knowledge is most efficiently transferred by systematic instruction.
Meaningful learning is accomplished by allowing students to develop, invent, construct their own unique strategies.	Meaning is taught by presenting carefully sequenced applications that require constant mindful discrimination.
Sequencing is a spiral design. Natural learning contexts are used.	Sequencing is a mastery design. Learning contexts are controlled so they move from tightly structured and contrived to naturalistic.
Child-directed	**Teacher-directed**
Students work in groups, engage in discussion, make presentations, take charge of their own learning. Teacher gives explanations rarely. The teacher rather plans naturalistic activities that inspire a learning need.	Teacher (or curriculum) plans and structures learning for its most efficient and reliable conveyance.
Teacher presents the problem, allows and encourages students to form their own algorithms and strategies. The more algorithms and strategies they can devise, the better.	Teacher plans and sequences explanations and applications to develop and fulfill learning needs.
Independent problem solving is the source of learning.	Teacher presents the algorithm or strategy, followed by a wide range of applications requiring constant mindful discrimination and integration with other strategies. Independent problem solving is the application of learning.

parisons of the mathematics performance of their previous students with that of students taught by other experienced teachers indicated no significant differences.

The third 6th grade teacher was a first-year teacher who used the SI programs, reluctantly at first, at the principal's request. The third 5th grade teacher was an experienced teacher who chose to use Scott Foresman.

The SI teachers were observed twice a week initially, until all the guidelines for implementing the SI programs were followed. Thereafter, the teachers were observed monthly. The experienced teachers quickly implemented the SI programs according to the established guidelines. The beginning teachers easily operated the equipment, but had greater difficulty mastering the procedures involved in responding appropriately to the behavior of the class.

The teachers using the NCTM program were also trained in the NCTM philosophy and procedures by the district. The 6th grade teacher was particularly knowledgeable of the NCTM methods and implemented them with a high level of fidelity. Observations of the 5th grade NCTM teacher indicated a strong influence of ITIP in the teacher's presentation.

Measures

Separate comprehensive mathematics pretests were administered to 5th and 6th grade classes in September. The pretest covered a wide range of mathematics skills. Internal consistency reliability was calculated using Pearson's coefficient alpha. For the 5th grade test, the coefficient alpha was .83; for 6th grade, .84.

A mid-year test was administered to the 6th grade in January. Problems for the test were selected from the mid-year test contained in the NCTM program and from the first two SI programs (fractions and decimals and percents). Coefficient alpha for the NCTM subscale was .82; for the SI subscale, .89. Some problem types were covered by both programs and were designated as a subscale of "common" problems (coefficient alpha = .89). A subscale of selected items was added because the teacher of the NCTM program was unable to cover everything in the NCTM program prior to the mid-year assessment. Items she selected as types that had been covered by the class were designated as the "selected" subscale (coefficient alpha = .41).

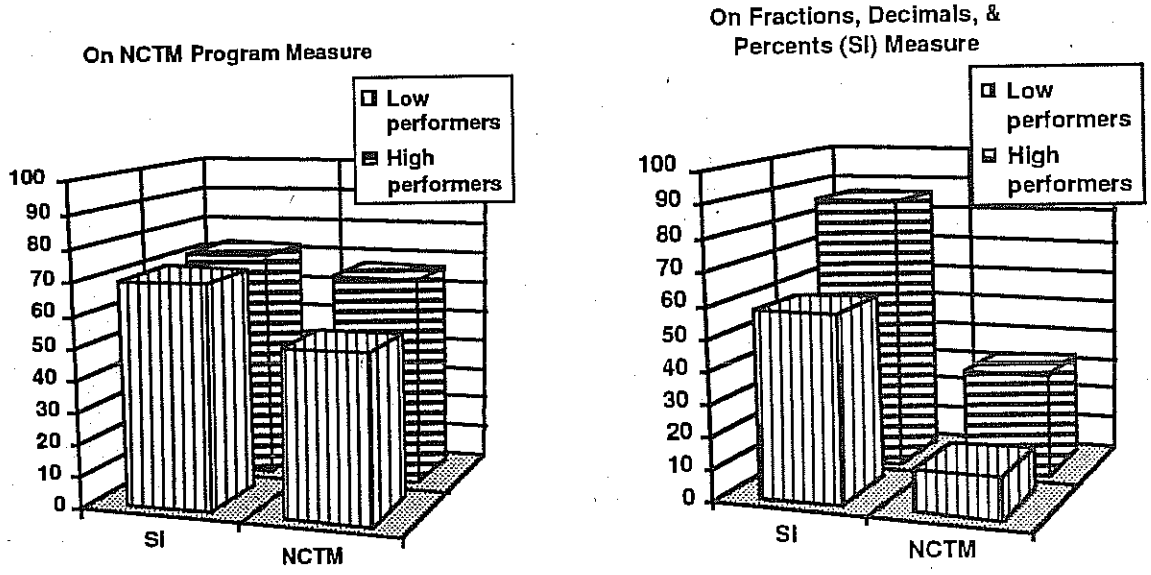
Two year-end cumulative tests were referenced to the SI programs and the NCTM program. The SI cumulative test covered a wide range of difficult problem types, including non-whole number operations and difficult word problems. The same SI test was administered to both 5th and 6th grade. The cumulative tests referenced to the NCTM program were designed by the publisher of the program as year-end "cumulative tests." A separate test was designed for 5th and for 6th grade. SI and NCTM cumulative tests were administered at the end of the year. The SI test was also administered to the previous 6th grade and other 6th grade.

RESULTS

Experimental Comparisons

Fifth grade. In September, the comprehensive mathematics pretest was administered to the 5th grade. The subjects were ranked and then divided into high-performing and low-performing halves. The performance of the higher performing half of each class was evaluated separately from the performance of the lower performing half. Because several students scored at the same cut-off point, the classes

Performance of Grade 5 Subjects on Year-End Measures

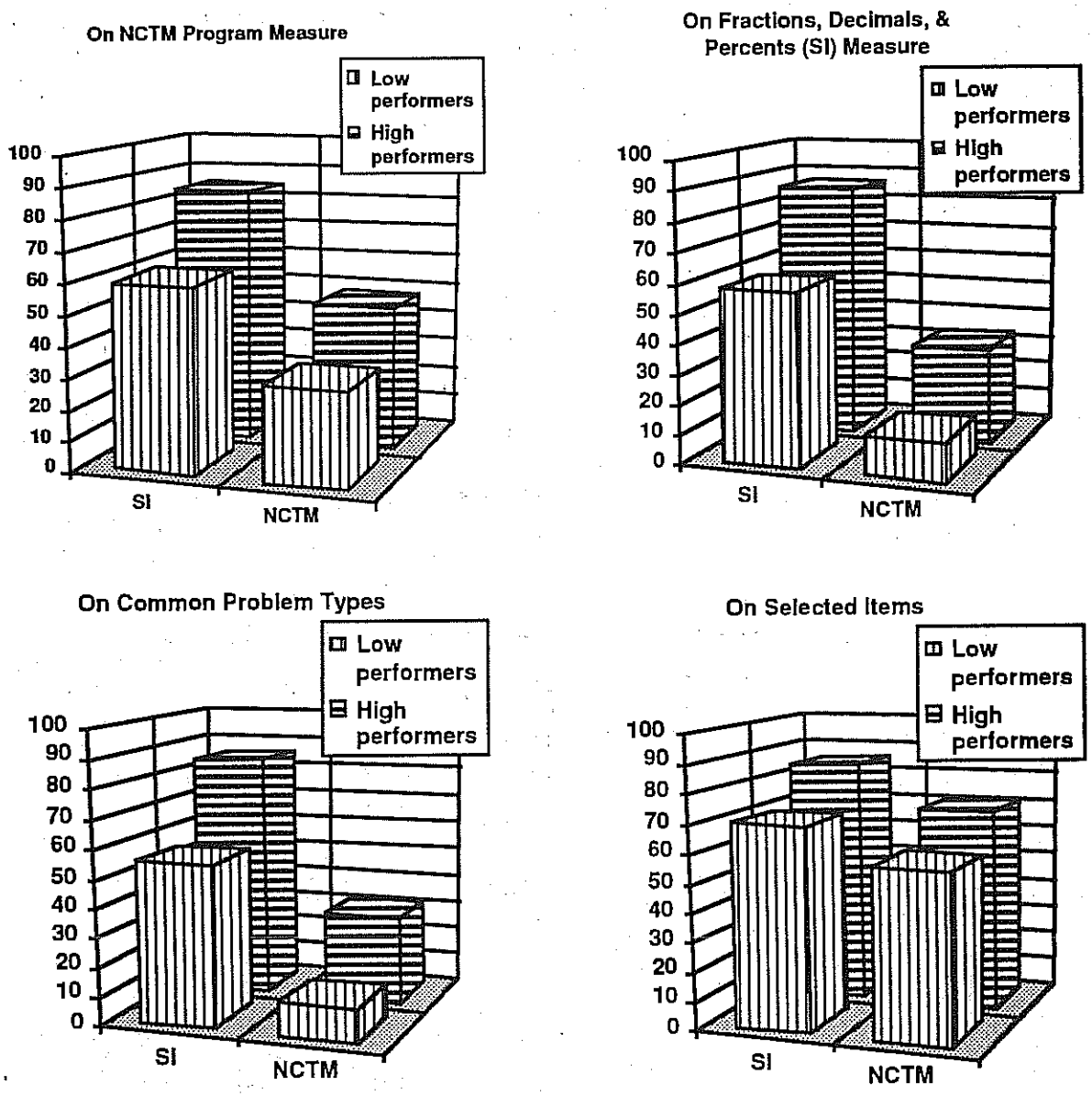


were not divided exactly in half. The same score was used as a cut-off point in both classes. The performance of a blind student in the SI class was not included in these statistical comparisons, but was evaluated separately as a case study. There were no significant differences in the performance of students across treatment for any subgroup.

In May the cumulative SI criterion-referenced test, the entire year-end cumulative test from the NCTM program, and individual problem solving tests were administered to the 5th grade. The graph below displays the performance of the ability subgroups on the SI and NCTM program tests. Differences for low performers were significant on both measures, favoring the SI group. Differences for high performers were significant only on the SI measure, again favoring the SI group.

On the individual problem solving test, the low-performing SI subjects scored significantly higher than the comparable NCTM subjects, $F(12,13) = 4.2$, $p < .01$. There were no significant differences in the performance of the high-performing subjects (SI subjects' mean score = 6.2, SD = 1.9; NCTM program subjects' mean score = 6.9, SD = 1.5).

Performance of Grade 6 Subjects on Mid-Year Assessment



Sixth grade. In September, the comprehensive mathematics pretest for 6th grade was administered. The 6th grade classes were also similarly divided into high-performing and low-performing halves, based on their performance on this pretest. There was no significant difference in the performance of the high-performing halves. However, the mean of the low-performing half of the SI group (15.5, SD =2.9) was significantly lower than the mean of the low-performing half of the NCTM program group (18.3, SD = 3.3).

The previous graphs display the mid-year assessment results for the two experimental groups on problem types from the NCTM Scott Foresman program, on the SI criterion-referenced subscale, on problem types that were common to both programs, and on the "selected" subscale.

The performance of the SI groups was significantly higher than that of the group learning from the NCTM program in 7 comparisons. The only comparison where there was no significant difference was the performance of the high-performing groups on the selected subscale. The table in the next section displays the means and standard deviations of the groups on all performance subscales.

Quasi-experimental Comparisons

Additional sixth grade comparisons. The following table displays the means and standard deviations for the experimental groups and for the non-experimental SI 6th grade class taught by the first-year teacher on the Mid-year assessment.

Means and Standard Deviations of High- and Low-Performing Groups on all Subscales of the Mid-year Assessment of 6th Grade

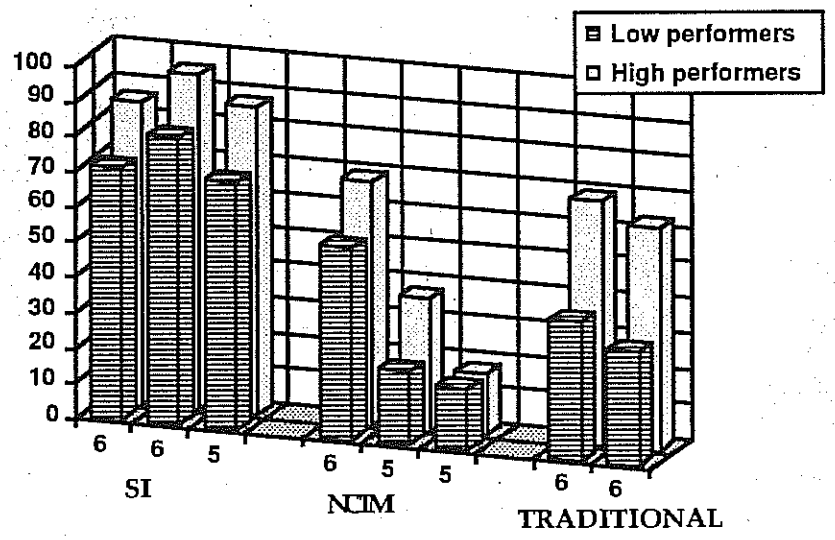
	Subscales			
High-performing Students	SI Mean (SD)	NCTM Mean (SD)	Common Mean (SD)	Selected Mean (SD)
NCTM	6.8 (5.7)	10.3 (5.0)	4.6 (4.1)	5.6 (1.8)
SI (experimental)	18.1 (7.4)	18.5 (3.0)	12.7 (2.6)	6.8 (1.4)
SI (non-exp)	13.3 (3.1)	14.9 (2.6)	8.8 (2.2)	6.8 (1.2)
Low-performing students				
NCTM	2.7 (2.4)	6.9 (2.8)	1.7 (1.8)	4.6 (1.2)
SI (experimental)	12.2 (4.6)	13.2 (4.8)	8.4 (4.1)	5.6 (1.5)
SI (non-exp)	11.4 (3.0)	12.5 (2.2)	7.2 (2.0)	6.2 (.9)
Total Class				
NCTM	4.6 (4.7)	8.4 (4.2)	3.0 (3.3)	5.0 (1.6)
SI (experimental)	15.0 (4.7)	15.7 (4.8)	10.4 (4.0)	6.1 (1.5)
SI (non-exp)	12.3 (3.2)	13.6 (2.6)	8.0 (2.2)	6.5 (1.1)

Performance of All Groups on Fractions, Decimals and Percents Measure

	High-Performers	Low-performers
SI groups	Mean percent (SD)	Mean percent (SD)
6th grade (experimental)	86 (11)	71 (19)
6th grade (non-exp)	95 (6)	81 (10)
5th grade (experimental)	87 (10)	70 (12)
NCTM groups		
6th grade (experimental)	69 (21)	54 (20)
5th grade (experimental)	37 (15)	21 (10)
5th grade (non-exp)	17 (4)	17 (6)
Traditional groups		
Previous 6th grade	69 (11)	39 (12)
Other 6th grade	63 (9)	32 (8)

Performance of All Groups on Year-End Measures

On Fractions, Decimals & Percents Measure



All groups. In May the performance of all groups on fraction, decimals and percents problems was compared separately from performance on ratios word problems. The 5th grade SI group had not learned the ratios strategy yet.

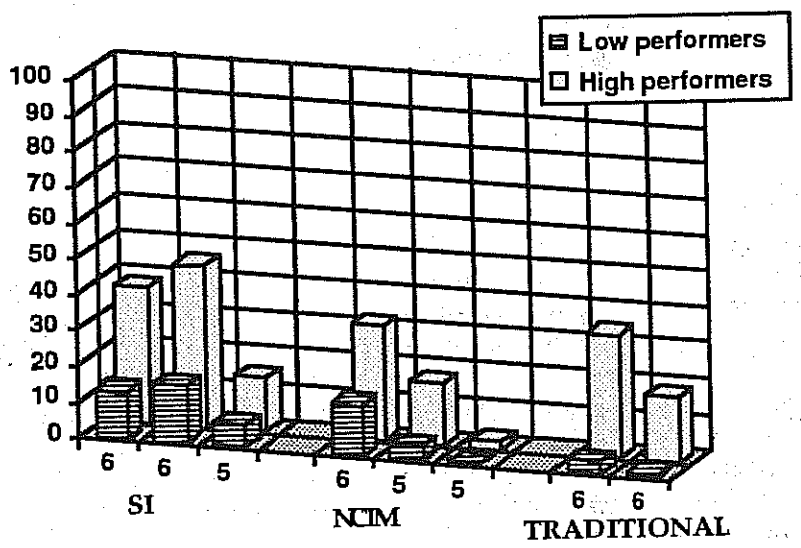
Newman-Keuls multiple comparisons statistic was used to compare the means of all groups. All three high-performing SI groups, including the 5th grade SI group, scored significantly higher than all other high-performing groups on the fractions, decimals and percents scale. The remaining 6th grade high-performing groups (NCTM program, previous and other 6th grade) scored significantly higher than the 5th grade high-performing groups learning from the NCTM program. Furthermore, the experimental NCTM 5th grade high performers scored significantly higher than the other 5th grade, both learning from the NCTM program.

All three low-performing SI groups (including the 5th SI class) scored significantly higher than all other low-performing groups. The 6th grade low-performing group learning from the NCTM program also scored higher than the previous and other 6th grade low-performing groups, which in turn scored

Percent Correct and Standard Deviation of All Groups on Ratios Word Problems Measure

	High-Performers	Low-performers
SI groups	Mean percent (SD)	Mean percent (SD)
6th grade (experimental)	38 (33)	13 (14)
6th grade (non-exp)	45 (32)	16 (24)
5th grade (experimental)	15 (20)	6 (12)
NCTM groups		
6th grade (experimental)	32 (20)	14 (14)
5th grade (experimental)	17 (25)	4 (6)
5th grade (non-exp)	2 (5)	0 (0)
Traditional groups		
Previous 6th grade	34 (19)	3 (5)

Performance of All Groups on Year End Problem Solving Measure
On Ratios Word Problems



significantly higher than the two 5th grade low-performing groups learning from the NCTM program.

All three SI high-performing 6th grade groups and the previous 6th grade high-performing group scored significantly higher than the non-experimental 5th grade learning from the NCTM program on the ratios word problems test. Other differences were nonsignificant.

The 6th grade low-performing SI group taught by the first-year teacher and the 6th grade low-performing NCTM group scored significantly higher than the previous and other 6th grade low performers and higher than the non-experimental 5th grade low performers. The 6th grade low-performing SI group taught by the first-year teacher also scored higher than the experimental NCTM 5th grade. There were no significant differences between the SI classes (both 5th and 6th grade) and the 6th grade taught using the NCTM program.

DISCUSSION

The means were compared using statistics that did not adjust for pretest differences and did not correct for family-wise error. These corrections will be made in the final report. The statistics used to evaluate differences between means may be oversensitive in some cases, and in other cases may not show the true strength of differences. An uncontrolled variable was the amount of homework assigned in the 6th grade classes. The teacher and the parents of the NCTM 6th grade group reported that these subjects did from 3 to 4 hours of homework each week. The SI classes were assigned no homework.

In view of these limitations in the conduct of the experiment and the analysis of the results, **it nevertheless seems evident that not only low-performing, but also high-performing students achieved greater gains in mathematics skills with systematic Direct Instruction than with the NCTM teaching practices.** Not only did the lower half of the SI 6th grade groups score higher than the previous and other 6th grade, but the SI 5th grade also scored higher than the previous and other 6th grade.

There was a significant reduction in the number of low-performing and "at-risk" students (those scoring below the norm-referenced mean), as indicated on the fractions, decimals and percents tests. Only 5% were in the low-performing half as defined by the previous 6th grade class's performance on the same test (50% were low performing).

Mainstreamed special education students worked remarkably well with the rest of the class in the considerate Direct Instruction treatment. The resource room teacher reported that the frequent interaction provided by the SI program helped improve the behavior and work habits of students who had difficulty attending in class. One 5th grade student who had an IEP in mathematics achieved an above grade level score in mathematics after receiving instruction from the SI programs. A blind student who worked with an aide in the SI 5th grade showed great improvement in mathematics achievement and in his attitudes about mathematics. He seemed to get a boost from responding with the class to the frequent questions presented by the SI programs. His aide

commented that the auditory stimulus from the videodisc program seemed so much clearer than the normal verbal instruction that he hears in the classroom, regardless of the fact that he could not see the video presentation.

Results for high-performing students were also favorable. On all measures the SI classes scored significantly higher than the previous and other 6th grade classes receiving traditional instruction. Comparisons of the SI program with the NCTM program also favored the SI group on all criterion- or program-referenced measures, be they from the NCTM or SI programs.

These results were achieved using Direct Instruction with students of high ability learning in the same classroom environment with students of low ability. Even though the high ability students achieved more in the Direct Instruction classroom, the DI teachers reported that they felt the high ability students were not learning as fast nor as much as they were capable of learning. By providing more homogeneous learning situations, the DI teachers believed that high performers could be challenged more.

In contrast, the high performers in the NCTM learning environment reported that they felt challenged and that the problems were often difficult for them. Yet, even according to measures designed for the NCTM program, the high performers did not seem to learn as much as the students in the DI environment, who did not report feeling challenged. Some measures indicated that the high-performing NCTM students did not even learn as much as the low-performing DI students. "Challenge" is something that teachers often seem to be view as necessary in learning, although the benefits have not been clarified by research. Assuming that the presentation of challenging tasks to students has beneficial outcomes (an unproven assumption), **the important consideration is whether the instruction should provide challenge by making easy tasks seem difficult (as the NCTM instruction seemed to do), or whether the DI instruction could not add the element of challenge by simply presenting some truly difficult tasks.**

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A TIME FOR CHANGE: A REVIEW OF ENGELMANN'S *WAR AGAINST THE SCHOOLS' ACADEMIC CHILD ABUSE*

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What time is it? It's time for a change. It's time for entrenched administrations who have lost touch with the people to go. That message was delivered loud and clear in the recent presidential election. The public was awakened to the fact that our country is in the midst of an economic war that cannot be won by doing business in the same old way. In ousting an entrenched administration, the people rejected its trickle-down economic philosophy and the discriminatory practices that emanated from that philosophy. In the words of the winning candidate, the outcome reflected a victory of "hope over fear." The people's decision to overcome fear of change and opt for hope in a new future reflects their confidence in the winning candidates plan.

In WAR AGAINST THE SCHOOLS' ACADEMIC CHILD ABUSE, Siegfried Engelmann makes the case that it's time for educational change. It's time for an ineffective educational establishment that has lost touch with the kids to go. Engelmann wrote WAR.... to awaken the public to the fact that our country is in the midst of an educational war that cannot be won by continuing the same old practices that resulted in the academic downslide of the last several decades. To accomplish this awakening, he informs the public of the games that schools and educators play to conceal their failures. He describes the sweeping changes that will be required if we are to turn the situation around. He draws from history to show that those changes will not come from within the educational system: serious pressure from an informed public will be required. And, finally, he provides a plan by which an informed public can bring the necessary pressure to bear. Of all the so-called educational reform plans being put forth today, this is the only one that has the potential to bring about the kind of real change that can put our country's educational system back in first place.

In order for Jane and John Q. Public to understand the educational dilemma in which this country finds itself, it is necessary that they understand the core problem from which many related (but seemingly unrelated) problems stem. That core problem is ignorance of the details of instruction. Engelmann says that "the system is sick because the vast majority of people in it – from educational researchers to teachers – lack technical understanding of the single aspect of the school that justifies their existence – instruction" (p. 13).

Engelmann's conclusion comes as no revelation to those of us who have come to know the many instructional programs developed by him and his colleagues over the years and have had opportunities to witness, time and time again, the effectiveness of those programs. Unfortunately, many educators do not even know that such programs exist. Having never seen well-designed and well-delivered instruction, they remain blissfully ignorant of the myriad of detailed presentation techniques, motivational and monitoring systems, correction procedures, explanations, and strategies that are essential ingredients of effective instruction. They mistakenly assume that the details of instruction are unimportant and that answers to school reform lie in global solutions such as extension of the school year, cooperative/collaborative learning, heterogeneous grouping, integrated classrooms, site-based management, etc. And the public, including the business community, is unaware of the educational system's ignorance of what should be its mainstay--instruction.

Who is to blame for the failure of our educational system? Teachers? Teacher colleges? Educational philosophers? Educational researchers? State boards of education? Publishers of instructional materials? All of the above? "Nobody is to blame," says Engelmann (p. 13). Yet he spares none of the above in his analysis of contributing factors. He begins by citing research and sharing experiences which show that most teachers do not have the technical knowledge needed to manage classrooms and deliver instruction to diverse groups of students. This lack of technical knowledge guarantees student failure. But, Engelmann adds quickly, teachers are not to blame because they are the products of their own education.

To show how teacher colleges guarantee failure of teachers, Engelmann critiques the assigned readings of a typical secondary curriculum course – writings

of well-know educators such as Floden, Kliebard, Peters, Apple and Eisner – and summarizes their rhetoric this way:

> The good guys educate; the bad guys train. The good guys recognize the institution as the school; the bad guys think of it as a factory. The good guys present stimulating heuristics; the bad guys, low level algorithms (p. 162).

With a touch of sarcasm, Engelmann adds that there is just one MINOR problem:

> All the positive findings that compensatory education works, that teachers can be trained to be effective diagnosticians and presenters, and that schools can be managed in a way that dramatically improves kid performance have come from the bad guys, not the good guys (p. 162).

In short, teachers of teachers guarantee failure by steeping their student in philosophies and practices that don't work and, at the same time, denying them access to practices that do work.

To illustrate the flaws in instructional practices recommended by educators who are considered to be the good guys, Engelmann critiques Langer's approach to teaching reading comprehension (the kind of "broad" questioning that goes along with meaning-oriented approaches such as whole language), Floden's instruction that purported to take into account different students' "schemata" by presenting subject matter in more than one way, and Resnick's position that mathematics should be treated as an ill-structured discipline which is to be learned through socially-shared problem solving activities rather than instruction. He shows how Langer's approach, at best, leaves kid with a global understanding; it fails to teach them to attend to details and subtleties that make good literature good. He shows how Floden's way of teaching concepts (for example, "photosynthesis") is sure to result in misunderstanding rather that clear and accurate understanding. He shows how Resnick's approach to teaching problem solving cannot possibly work because it is based on the faulty assumptions that kids already have pertinent questions, as well as answers, in their heads and that opportunities to share through discussion/debate/argument will bring about an unfolding of those questions and answers; it makes no provision for teaching essential questions and answers when kids are shown not to already have them in their heads. Ever so skillfully, Engelmann makes it clear that the solutions offered by these good guys are naive because they try to solve the problems that kids have, without addressing the primary cause – the curriculum. He states emphatically,

> When the curriculum fails, the teaching will fail. Period (p. 7).

Engelmann goes on to show how much of what the good guys call research really isn't research, how they fool other educators and the public by presenting opinion as though it were fact, and how they misinterpret research results as support for a particular theory/philosophy when, in fact, the results refute that theory/philosophy. He cites Resnick's interpretation of her socially-shared problem solving studies as a prime example of the contorted logic that is currently in vogue among "constructivists." In her studies, kids work in dyads (pairs) to solve simple money problems via discussion/debate/argument. Although she admitted that none of her dyads were successful at solving a simple money problem, Resnick went on to reiterate her stance that:

> If we want students to treat mathematics as an ill-structured discipline – making sense of it, arguing about it, and creating it, rather than merely doing it according to prescribed rules – we will have to socialize them as much as to instruct them (Engelmann, p. 100).

Remember that the kids in Resnick's study, according to Resnick's own words, did not even learn to DO the simple money problem, much less create it or make sense of it. **Obviously, the results of Resnick's studies refute, rather than support, her position that math should be treated as an ill-structured discipline. Her results also fail to support the theory underlying her position – Piagetian developmental theory. Yet she continues to espouse the theory. So much for the naive belief that educational researchers will guide us toward instruction that works!** Engelmann attributes the mess that math instruction is in in this country to math educators' (including Resnick's) undying love of Piagetian theory and the notion of "readiness" that stems from that theory.

The central theme of Engelmann's book is this: Academic child abuse, defined as "the use of practices that cause unnecessary failure of foundation

skills," is the result of a sorting-machine philosophy that has characterized U.S. education since its inception. "The philosophy," says Engelmann, "is based on the notion that schools do what the schools choose to do, and if kids fail, it's their own fault" (p. 58). Developmental theories, a mainstay of the sorting machine philosophy, transfer failure from the real cause – poor teaching – to the kids. The circular thinking of the sorting machine philosophy goes something like this: Johnny can't read because he isn't ready; because he isn't ready, we can't teach him to read. If we delete the "ready" parts from that sentence, we have something like this: Johnny can't read; therefore, we can't teach him to read. It follows that only the kids who already know how to read can be taught to read. If John and Jane Q. Taxpayer were aware of this contorted logic, they might ask "Why have schools?"

Redefining failure as success is another tactic that the sorting machine uses to conceal its failure. Instead of labeling Johnny as a "nonreader" (negative connotation), the sorting machine labels him as an "emergent reader" (positive connotation). End of problem! Whether Johnny's future employers will view his non-reading as a non-problem and continue to wait for him to emerge into a reader is a question that the educational establishment seeks to avoid. But, increasingly, the business community is raising serious questions about the schools' failure to teach their future employees to read, write, spell and compute. The business community knows that this country's economic war will not be won if the educational war is not won.

The sorting-machine philosophy and the theories and practices that it has spawned – developmental theory, constructivism, discovery learning, whole language – are elitist and discriminatory, says Engelmann. They have the effect of guaranteeing that many kids – kids from homes and neighborhoods in which little English is spoken, kids whose parents don't know how to read to them, kids whose parent(s) have to work long hours to make ends meet and don't have time to teach reading and arithmetic, kids whose parents are not well-educated enough to insist that the schools do what they're supposed to do and teach their kids – will not acquire the academic tools that they must have to function in our society. The sorting machine philosophy, like the Reagan-Bush trickle-down economic philosophy, ensures that the rich (the academically rich in one case, the economically rich in the other) will get richer and the poor will get poorer.

"The premise of this book," says Engelmann, "is that the problems in the schools exist because of the ignorance about what can be done with kids (versus what is being done)" (p. 11). To inform the public of what can be done, he began his book by sharing his early experiences (60s and 70s) in the Bereiter-Engelmann preschool and Project Follow Through. The Bereiter-Engelmann preschool for disadvantaged black kids "managed to teach these kids more and make them smarter than anybody else had before or after" (p. 1). In Project Follow Through, kids who had been in Engelmann's Direct Instruction model from kindergarten through third grade took first place in just about everything that was measured – reading, arithmetic, spelling, language, basic skills, cognitive skills, positive self image. Among the models that had been compared to the Direct Instruction model were several that had been derived from the sorting-machine philosophy – a model which promoted the language experience approach (from which the currently popular whole language approach grew), a model which emphasized naturalistic discovery learning (today known as whole math and whole language), and a model that focused on social development (like current approaches to teaching problem solving through socialization, cooperative/collaborative learning, etc.). The success of Engelmann's model is reflected in the following statement of the then-Commissioner of Education, Ernest Boyer:

> Since only one of the sponsors [Direct Instruction] was found to produce positive results more consistently than any of the others, it would be inappropriate and irresponsible to disseminate information on all models (Engelmann, p. 6).

But, amazingly, the sorting machine won again. The sorting-machine models which had negative effects on kids have not only survived, but have flourished and still exist today under the rubric of "constructivism." The reader of WAR.... can feel Engelmann's frustration when he states:

> After all these years, I'm still not sure I understand why it was so important for the establishment to discredit Direct Instruction. It's true that we do not do things the way that they do in traditional classrooms. But what we do works and what they do doesn't. . . Apparently, the key decision makers had a greater investment in romantic notions about children than in the gritty detail of actual practice or the fact that some things work well (p. 6).

In my own experience, I have found that younger educators and members of the business community who are unaware of this history find in difficult to understand why Engelmann is waging "war." They tend to believe that if he just promoted the kind of instruction that works in a positive manner, the education system would "buy" it and all would be well. But history does not support that naive view. The younger generation will be wise to heed Engelmann's warning against underestimation of the insidious qualities of the system. He says "I know dozens of war stories about effective teachers – ones who achieved super results – being removed from committees, being censured for stating obvious facts of failures to supervisors, and even being fired for telling the truth" (p. 189). "War" is not too strong a word to describe the battle that must be waged if we are to eliminate academic child abuse, says Engelmann.

Engelmann's chapter titled "Let's Go To Court" should be required reading for anyone who is considering challenging the authority of the educational system at any level. In describing his own case against the State of California for engaging in illegal textbook adoption practices, Engelmann laid bare the arrogance of a system which obviously believed that it could do whatever it wished without regard for procedures and regulations that had been established to protect the public. Engelmann won. But he fears the victory may be a hollow one because the system is tenacious in it's search for ways to get around the law. For example, when the Ohio legislature mandated phonics instruction in grades one through three for at least 15 minutes a day, the Department of Education got around the law by redefining "phonics" as whole language activities. Nonetheless, Engelmann hopes that by making the process of designing an effective lawsuit visible he will enable others who know something about instruction to step forward and advocate intelligent changes.

I once heard Engelmann describe his book as angry. It is. But there is humor in the anger. I found his critique of Galeano's plea for "good literature" to be quite entertaining. Galeano says, "In choosing meaningful language for use in the LES classroom, one can do no better than to use a popular old standby, Mother Goose," (Engelmann, p. 47). Then she goes on to describe numerous "shoe" activities that supposedly contribute to the "meaningfulness" of *The Old Woman Who Lived In A Shoe.* Engelmann says:

> It's interesting that Galeano's tangent involves shoes and not something like whipping or the diet the old lady provides her kids. Which brings up an interesting question of legal compliance. Programs have been zapped by the legal compliance panels in California for things like not portraying a balanced diet. But what about the cruelty of the old lady who lived in a shoe? She keeps getting pregnant. Does she blame herself or her partner? No, instead she gives her kids a prison diet and beats them. Nice lady... Does the LES first grader understand that whipping and starvation diets are all right when something is labeled "literature" but that anything modern must ooze only goodness and cooperation? Or is what's good for the Goose also good for the Mother! (p. 49)

I laughed out loud when I read an unedited transcript of Oscar Shaaf's (considered to be an expert in math education) courtroom responses to this question:

> Q. On the problem... "Jane has four oranges. Then she buys three more. How many does she end up with?"...do specific words in the problem tell how many she has at first (Engelmann, p. 121)?

The transcript makes it obvious that Schaaf had great difficulty answering the question even after it had been broken down into parts by the questioning attorney. After several restatements of the question and the court's admonishment to "listen carefully," Schaaf responded this way:

> The numbers in the problem were "six" and "three." I would say six plus three is equal to nine (p. 123).

At that point, the court asked for yet another reading of the question and then said, "Now, we are going to have a recess. If you are going to take four and three and get nine, we have got to have a recess" (p. 123). Humorous, but sad!

Engelmann's anger is the kind of constructive anger that must be aroused among the public and among educators if we are to change schools so that they no longer function as sorting machines and, instead, function as instructional facilities in which ALL kids learn the foundation skills that are essential to full participation in our society. In the final paragraphs of WAR... Engelmann points out that children who suffer from academic child abuse have

less advocacy than hundreds of endangered species; constructive anger must be channeled into advocacy for children. To lend direction to those who wish to join in this battle to end academic child abuse by advocating instruction that works, Engelmann spells out what the educational establishment must stop doing and what the public must do. To educators, he says:

1. Don't install instructional approaches unless you KNOW that they work well;
2. Don't permit textbook publishers to market products that have not been tried out with a single kid before publication;
3. Don't permit lobby groups with the loudest voices and the biggest budgets to promote practices that amount to nothing more than the opinion of the group;
4. Don't permit practices that are not working acceptably to remain in place for years without responding to the failures of teachers and children;
5. Don't respond to failure of a "reform" by blaming the children, their homes, the changing demography, or some other irrelevant factor (p. 8).

To parents and concerned citizens, he says:

1. Read what the system writes to see for yourself the gaping holes, the contradictions and the rhetoric.
2. Confront decision makers; write, call, show up at board meetings.
3. Petition boards to require school districts to provide accurate and detailed assessments of how kids perform on basic skills.
4. Align with advocacy groups (information about how to contact and align with such groups is provided).

WAR.... ends on a mixed note of optimism and pessimism:

> The situation doesn't have to be. Our kids can succeed, even those born in poverty. Our kids can receive the support, the sensible legislation, and the kind of monitoring that other endangered species receive. But such advocacy will not come about from the establishment. It won't happen unless you make it happen (p. 199).

I have confidence in Engelmann's plan for making it happen. And I know that it is up to YOU (and ME) to make it happen. So, I am going to DO something – right here, right now. I solicit YOUR story of how instruction that works (or lack of it) has effected YOUR life. Teachers, parents, kids and concerned citizens, send me your story (with or without data; I know that the "good guys" relate better to testimonials than to data and I'm willing to try to beat them at their own game). I know that thousands of success stories are out there because I hear some of them everyday – stories of how effective instruction transformed non-readers into good readers, stories of how effective instruction transformed burned-out teachers into teachers who feel empowered, stories of how effective instruction transformed embittered parents into staunch supporters of their kids' schools. I've also heard lots of stories that didn't have happy endings – stories about school systems that wouldn't allow teachers to use the kind of instruction that they know to be in the best interest of the kids, stories about kids dropping out of school, even attempting to commit suicide because of unnecessary school failure, stories about parents of kids with disabilities who must fight constantly to ensure that their kid's right to an appropriate education is not ignored.

Send me your story (Sara Tarver, 2002 Jefferson Street, Madison, WI 53711). Write it on a computer using perfect APA style, handwrite it on lined notebook paper, or scribble it on a brown paper bag. Send it with your name and address or send it anonymously. But DO SEND IT. I hope to collect thousands of stories that can be delivered to statehouses around the country (including the White House). The political establishment just might respond to pleas for instruction that works if strong support from the public can be demonstrated. Hurry! Our kids haven't another moment to waste!

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CAI in Teaching Math Facts to Students with Mild Handicaps

Cynthia D. Green
Western Michigan University

Microcomputers are increasingly used in schools today. They are a much needed medium for instruction and well-received by students as a means for improving academic skills (Watkins, 1989). However, there still exists the problem of limited time for actual student usage due to restrictions on the number of students using the machines or limited number of machines available (Bahr & Rieth, 1991).

Microcomputers have been used for mathematics concept development and drill-and-practice. Research has been conducted comparing traditional methods of instruction and computer-assisted instruction (CAI). Gleason, Carnine, and Boriero (1990) compared middle school students with mild handicaps using CAI tutorial programs and teacher-assisted groups for teaching math story problems. Campbell, Peck, Horn, and Leigh (1987) compared two groups of third grade students for mastering division problems. One group used conventional printed drills and the other group used a CAI program. In both studies, there were no significant differences between the CAI and conventional methods.

Current research has focused on comparing technology with conventional methods of teaching. This study compared two methods of technology instruction. The purpose of this study was to compare the effects of using single computers with the effects of using the Classroom Assistant (Carnine, 1988) for students with mild handicaps mastering basic math facts. The Classroom Assistant consists of a complete hardware and software system which has eight keyboards connected to a single IBM personal computer. The software for this system was specifically designed to present drill-and-practice to all eight students simultaneously as well as collect and store data. Two single IBM microcomputers were rented for individual use by students in the comparison group. Software similar to that used with the Classroom Assistant was designed for use with the single microcomputers.

Methods

The subjects were 16 elementary students who were receiving special education services. The subjects had mild handicapping conditions; seven were learning disabled (LD); five were educable mentally impaired (EMI); three were emotionally impaired (EI); and one was physically and otherwise health impaired (POHI). The students ranged in age 8 to 13 years. They attended a medium size inner city school located in the midwest.

The students were randomly assigned to the treatment groups. Group A used the Classroom Assistant system located in one of two special education classrooms. Group B used the single microcomputers located in the second special education classroom. Group A had eight students with a mean chronological age of 9 years 9 months. Five of the students were LD, two were EMI, and one was EI. The mean chronological age of the eight students in Group B was 9 years 6 months. Two of the students were LD, three were EMI, two were EI, and one was POHI.

All eight students in Group A were seated around a large table with the Classroom Assistant set-up at the front. The screen on the microcomputer was divided into eight cell blocks; four on the left-hand side and four on the right-hand side. All eight students worked simultaneously with each student working their own problems being presented on their cell block. The students worked at their own pace.

Group B used single microcomputers. The two single IBM personal computers were placed at opposite ends of the classroom. Students in Group B received the same set of problems for drill-and-practice as those in Group A. The problems were also specifically designed to be presented in the same format and same size as the problems being presented in Group A. Students in Group B always worked at the same computer for each session.

The two special education teachers met prior to the start of the study to make clear what comments would be made to the students during the study. The teachers were told to encourage all students to continue in their efforts without giving reference to right or wrong answers. All students were praised following each session for their hard work with the problems.

The two special education teachers loaded the software and started each session for the students.

The sessions lasted 15 minutes three times a week. The treatment groups practiced addition and subtraction problems at their own pace; Group A met as a group to practice while Group B practiced individually. The sessions for both groups were conducted on the same three days of the week.

Attendance was taken at all sessions which lasted a total of 9 weeks. Group A had an attendance record of 89% and Group B's record was 92%. Both groups had one individual each whose attendance fell in the 70% range.

All of the subjects received pre-and posttests using the computation portion of the Key Math Test and paper/pencil five minute timed tests with 100 problems in addition and in subtraction.

Results

The two groups were compared on the pre- and posttests using ANOVA. The greatest area of interest was to determine if students using the Classroom Assistant would score higher than students working individually on the computer. The statistics revealed no significant differences in the areas tested between the two treatment groups.

Even though there were no significant statistical differences, Group A which used the Classroom Assistant, demonstrated improvement in the 100 timed addition problems. Using the t-test for paired samples, the pretest mean score was 72.25 (SD=26.93) while the posttest mean score was 79.50 (SD=19.19). As can be seen in Figure 1, Group B virtually scored the same on the pre-and posttests for addition and subtraction.

The scaled scores from the computation portion of the Key Math Test revealed a gain in the area of subtraction for Group A while Group B stayed the same. The pretest mean scaled score for Group A was 4.38 (SD=4.35) and the posttest mean score was 5.63 (SD=3.07). There was an increase in the scaled scores from the use of the Classroom Assistant although this was not significant. In analyzing Figure 2, there was also a pattern of both groups decreasing scores in the area of addition. While this was not of significant difference, it was interesting to note that Group A's scaled scores decreased yet their addition timed scores increased.

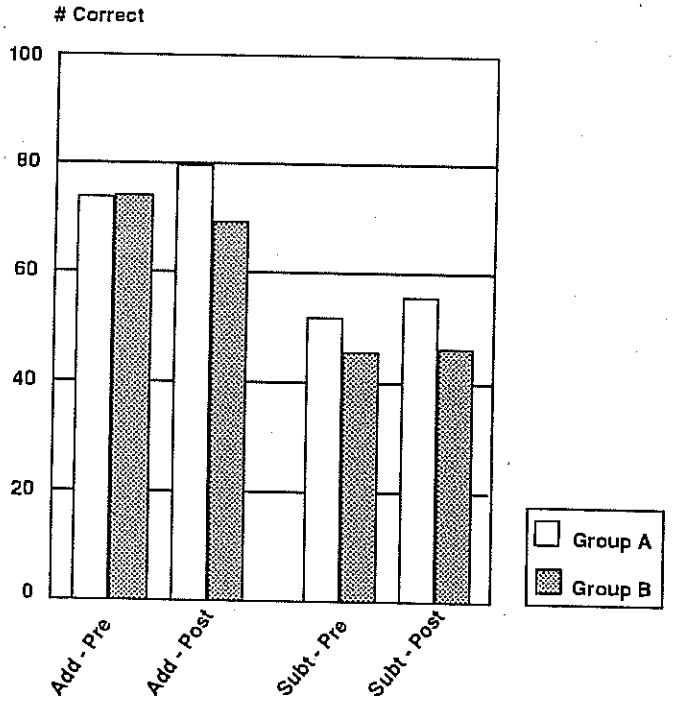

Figure 1. Pre-Post Comparisons - Means
100 Problem Timed Test

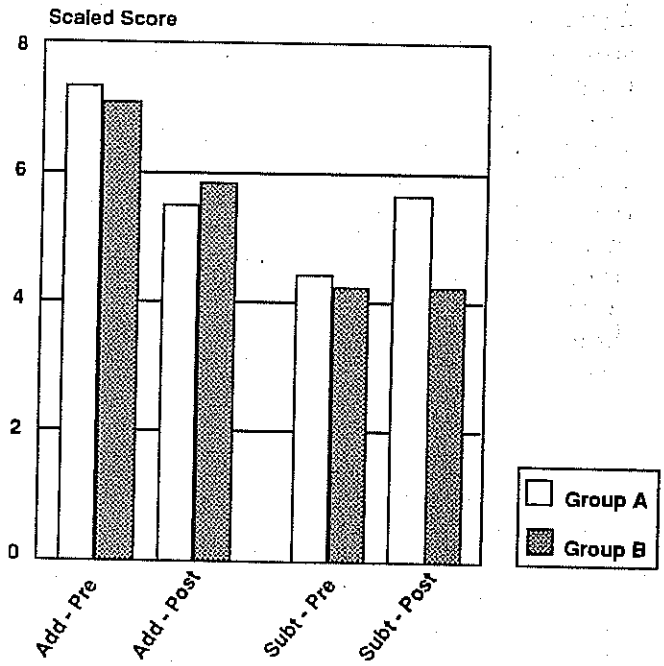

Figure 2. Pre-Post Comparisons - Means
Key Math Scaled Scores

Discussion

Although this study did not find any statistical differences, there were outcomes of value to be noted. The use of microcomputers in the classroom has increasingly utilized groups as opposed to individuals (Bahr & Rieth, 1991). The Classroom Assistant provided a valuable means of allowing eight stu-

dents to work on one personal computer while each student received the problems individually and at their own rate. The Classroom Assistant allowed the microcomputer to be in one place as opposed to several microcomputers in a lab situation.

There were two trends to be noted with this study. The first trend indicated an increase in addition timed scores by using the Classroom Assistant. The second trend came from the increase in subtraction scaled scores through the computation portion of the Key Math test. This study might be repeated for a longer period of time to determine if the trends would lead to significant differences. Perhaps a 15 or 20 week study would reveal greater differences. Toward the end of the study it became difficult to keep the students working on their addition and subtraction problems for a period of 15 minutes. This study might also be repeated using a 10 minute session rather than 15 minutes. The students were obviously eager to use the microcomputer, it was the amount of time for drill-and-practice that was too long. Microcomputer usage has been proven to be a positive means for practicing academic skills (Watkins, 1989) which this study also supported.

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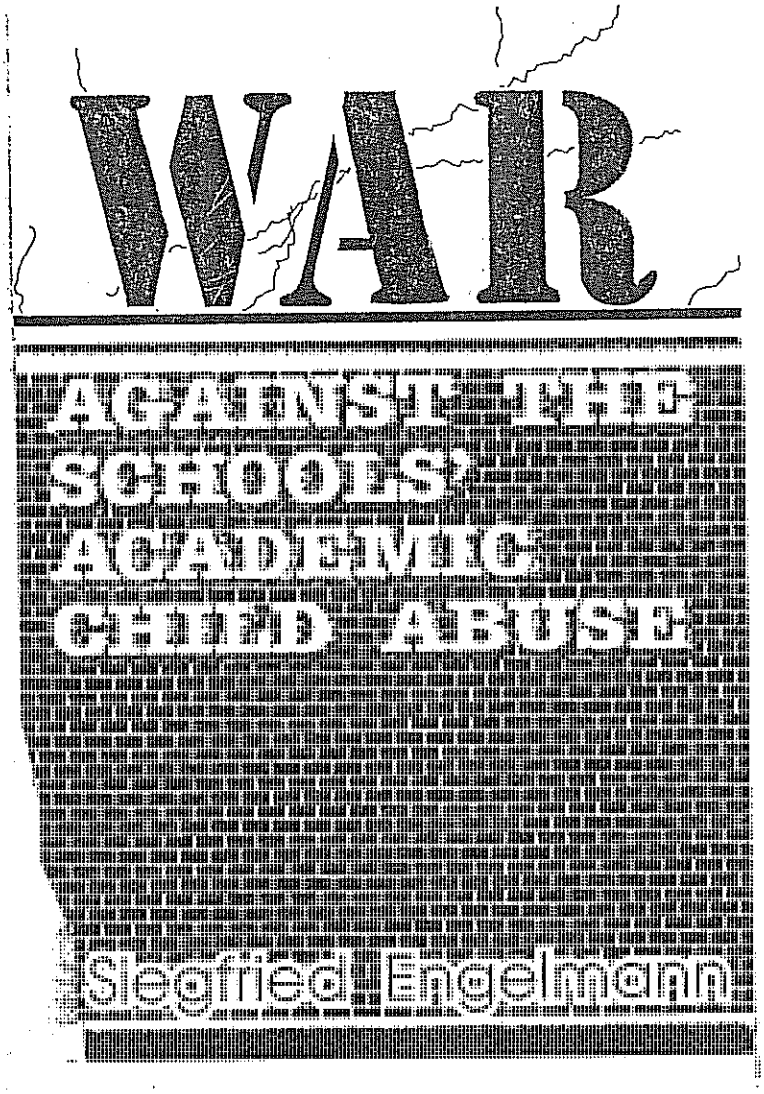

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Who sat in a pretty good class
And was taught by a pretty good teacher,
Who always let pretty good pass.
He wasn't terrific at reading,
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But for him education was leading
Straight down a pretty good path.
He didn't find school too exciting,
But he wanted to do pretty well,
And he did have some trouble with writing,
And nobody had taught him to spell.
When doing arithmetic problems,
Pretty good was regarded as fine,
Five plus five needn't always add up to be ten,
A pretty good answer was nine.
The pretty good class that he sat in
Was part of a pretty good school.
And the student was not an exception,
On the contrary, he was the rule.
The pretty good school that he went to
Was there in a pretty good town.
And nobody there seemed to notice
He could not tell a verb from a noun.

The pretty good student in fact was
Part of a pretty good mob.
And the first time he knew what he lacked was
When he looked for a pretty good job.
It was then, when he sought a position,
He discovered that life could be tough.
And he soon had a sneaky suspicion
Pretty good might not be good enough.
The pretty good town in our story
Was part of a pretty good state,
Which had pretty good aspirations,
And prayed for a pretty good fate.
There once was a pretty good nation,
Pretty proud of the greatness it had
Which learned much too late,
If you want to be great,
Pretty good is, in fact, pretty bad,
(The Osgood File, 1988, CBS, Inc.)