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Becoming a Nation of Readers'

National Commission Report on Reading Supports DI Practices

repared by Richard C. Anderson
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ummarized by Wes Becker

This report was produced under the uspices of the National Academy of ducation's Commission on Education nd Public Policy, and sponsored by the lational Institute of Education. The ommission on Reading was chaired by ichard C. Anderson, Head of the Cen- r for the Study of Reading at the Uni- ersity of Illinois.

The report summarizes the research- ased knowledge on reading instruction, lentifies problems with current prac- ces, and recommends possible solu- ons. The report recognizes that quality ıstruction involves many elements and ıat improvement in reading instruction 'ill require changes in many elements of :ading instruction, not just a few magi- al tricks.

What is Reading?

"Reading is the process of construc- ng meaning from written texts. It is a ›mplex skill requiring the coordination f a number of interrelated sources of in- ›rmation" (p. 7). An analogy is drawn etween the process of reading and the erformance of a symphony. While :ading can be analyzed into subskills ıat can be built up one at a time, "real" :ading takes place only when all the ieces are integrated into a smooth per- ›rmance.

In reading, being able to say the ›rds (decoding) "gives access to their ıeaning" (p. 8). Understanding what is ·ad requires a very substantial knowl- dge base to *construct* viable interpreta- ons of text. Because people differ in ıeir knowledge bases, different inter- retations of text often occur. Fluent :coding skills are essential to good ›mprehension. Second graders with the :st comprehension scores are the ones ho decode fast and accurately. When :coding skills are weak, the time spent trying to decode interferes with the in- rpretation processes. Good readers are :tter than poor readers in pronouncing ›nsense words as well (e.g., *cade*, *mot*, c.). Evidence like this supports the im- ›rtance of a fluid decoding base. The evidence shows that the average third grader can read aloud about 100 words per minute, while the rate of the poor reader is about 50 to 70 words.

Skilled readers have learned strategies for reading different kinds of material. Complex, unfamiliar material must be read differently than familiar material. Strategies should also vary with the purpose of the reading—say, for a test or for fun. Skilled readers have strategies for monitoring the process of reading and detecting problems to be solved—such as inconsistencies, unknown words, etc.

Learning to read is a lot of hard work and the practice required can become monotonous if the teacher does not work to maintain motivation. "Teachers whose classes are motivated are described as business-like but supportive and friendly" (p. 15). Teachers with motivated students "conduct fast-paced and varied lessons. Tasks are introduced with enthusiasm and with explanations of why doing them will help one become a better reader" (p. 15). Failure is not fun, and poor readers show the apathy that goes with failure. Good teachers have ways to motivate poor readers by praising steps of process (describing what the student does right).

Reading is a skill that improves with practice. Finding ways to increase practice can improve reading.

Emerging Literacy

Reading begins with the development of oral language skills at home. The knowledge base developed before school is very important to progress in reading comprehension. Once in school, the home experience continues to be important in knowledge development. Vocabulary development in particular is seen to have an important base in how parents talk about experiences their children are having. The kinds of questions a parent asks can aid or impede the development of reasoning skills. Reading aloud to preschool children is seen as an important aid to children learning to read. Records or tapes with "follow along books" can also be helpful. Having access to pencil and paper or chalkboards, with encouragement to write the letters of the alphabet, etc., is beneficial. Parents can also be tutors and directly or

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Computer Software Tested

Health Ways: a Computer Simulation for Problem Solving in Personal Health Management

By John Woodward, Doug Carnine, and Lorraine Davis

Health Ways (Carnine, Lang, and Wong, unpublished) is a computer simulation designed to teach junior high/senior high school students fundamental health problem-solving skills. Students are presented with a profile of a hypothetical character's basic health habits (diet, tobacco and alcohol use, weekly exercise, and stress level), along with hereditary and current disease information. Students attempt to change the character's habits through an arcade-like game format. In order to win a game, students must prioritize changes in health habits according to hereditary and current disease information, all the while controlling stress level and maintaining changes that have already been made. This entails moving the character's expected age (i.e., a character's life expectancy if no significant changes are made) to his or her winning age (the life expectancy if significant changes are made). Some habit changes are contingent upon successful scores on F8 — a computer looking device that generates random numbers and acts as a roll of dice.

Health Ways has a series of graded steps, from a programmed introduction of the rules and special features of the simulation to the actual games. The games are divided into easy tutorial games, more difficult ones, and speed and expert games. A help menu explains which health habits are related to a particular disease and recommends strategies for winning the games. Further information about the game, its objective, and a more detailed presentation of related health facts and concepts are presented in a printed instructor's guide and in a printed user workbook that accompany the program.

As a simulation, *Health Ways* has certain advantages over the typical health tutorial. Whereas tutorials tend to concentrate on discrete facts and concepts, often giving explicit feedback about the correctness of every response, *Health Ways* requires students to integrate their knowledge of health. Students must respond to constantly changing information by manipulating several variables at once. For example, when a player succeeds in changing a game character from a moderate smoker to a nonsmoker, the character's stress level increases significantly. Stress, in turn, must be controlled by meditation, counseling, or increased exercise. While the player attempts to make other changes in the character's profile, he or she must remember to maintain the nonsmoking change or it will return to its previous level (i.e., moderate smoking). Figure 1 depicts a successful change in smoking and its effect on expected age and stress level. To be sure, a simulation requires more preskill instruction than a health tutorial, and with some students, explicit strategy training is necessary. However, students learn to apply information in a decision-making or problem-solving context, one that models the dynamics of everyday personal health management.

There are other advantages to Health Ways that are in keeping with simulation instruction. Time is compressed, thus demonstrating to students the long-term effects of deleterious health habits in the space of a single game. Cause and effect relationships between improved habits and increases in expected age are clearly demonstrated. The interplay of several variables is presented in a controlled setting. Yet as much as simulations have been touted for many of the features just described (cf., Cunningham, 1984; Miller, 1984), empirical studies into their educational merits have tended to be less than substantiating.

Simulation Research

The effectiveness of simulations has been debated for over twenty years. Research into common simulation hypotheses — that simulations lead to increased retention, improved student attitude, and/or greater critical thinking skills — has produced results that have been either unsupportive (e.g., Cherryholmes, 1966; Pierfy, 1977) or mixed (e.g., Wentworth & Lewis, 1973; DeNike, 1976). However, much of this research has been of poor quality; often it is merely descriptive, at times control groups have not been used, and frequently students have not been random-

Continued on Page 14

Dear Editors,
Gentlemen:

We are searching for information leading to an instructional bank of long- and short-term instructional objectives for the Direct Instruction Programs. Do you have any knowledge of anyone working on a project of this nature? Also, would you please post this query in the next DI Newsletter if possible? Also any information about anyone who has used Precision Teaching strategies for monitoring the Direct Instruction Programs would be helpful.

In the Cache County School District Special Education Program we are planning on developing a bank of instructional objectives and an accompanying Precision Teaching Monitoring System for all of the Direct Instruction Programs. However, before we embark on such an ambitious project we are attempting to find out what has been done by anyone else up to this point in time. We would appreciate any information of this nature that you may have access to.

Sincerely,
Voneta Fifield
Special Education Coordinator

Help, help.

We are currently tooling up to revise the SRA's Corrective Reading Series.

Although we have limitations in what we can correct or change, we want to make the programs better, which is where you may come in.

If you know of problems with the programs, things that you would like to see changed, things that might be added, or taken away, let us know. Tell us about anything from typos to larger skills that give students problems.

We can't guarantee that we'll do everything you suggest, because we simply won't be able to do everything we want to do, but we will try.

Thank you.

The authors of the Corrective Reading Series:

Wesley Becker
Linda Carnine
Julie Eisele
Zig Engelmann
Phyllis Haddox
Susan Hanner
Gary Johnson
Linda Meyers
Jean Osborn
Steven Osborn

Send to: Association for Direct Instruction
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ATTN: Corrective Reading Revision

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Steve McAllister, Principal
Kotzebue Elementary School
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Kotzebue, Alaska 99752

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We Need More Research Reports on DI Programs Send Them to Us!

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

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

ATLANTIC COAST DI CONFEREN

Ed Schaefer of Cape Henlopen Sch District with District Office in Nass Delaware, has informed us that they holding a conference on *Effect Teaching and Direct Instruction* on J 7-10, 1985 at the Cape Henlopen Sch in Lewes, Delaware. Ed expects this c ference to become an annual event.

The conference will open with re tration at 12 noon on Sunday and cl at 11:30 AM Wednesday. Thirt workshops will provide information a training on effective programs/strate for: (a) teaching reading, langua math, and spelling to handicapped a non-handicapped students at all lev (b) organizing and managing element and secondary classrooms; (c) adopt effective reading programs; (d) teach and managing very low-performing a severely non-compliant students; (e tilizing computers and associated te nology; and (f) choosing, supervisi and administering effective teach programs.

Workshop leaders include Je Osborn, Bob Dixon, Geoff Colvin, J Feinberg, Paul McKinney, Geo Smith, Ed Schaefer, and Will Procto

Cost of the workshop is $15 for D aware residents and $100 for out of st people. This should be paid by check purchase order.

REGISTRATION IS LIMITED

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Implementing a Motivational Grading System

By Randall Sprick

Parts of this article are excerpted from Discipline in the Secondary Classroom: A Problem-by-Problem Survival Guide. *published by Center for Applied Research in Education, West Nyack, NY. All rights are reserved by the author.*

In a previous article, information was provided on features of an effective grading system. This article supplies information of how to design and implement the behavioral monitoring aspects of an effective system. This type of monitoring is especially appropriate for secondary level classrooms, but can be adapted to serve as a monitoring system for elementary classrooms as well.

One of the most important features of any motivational system is how records are kept. An efficient system should be easy for the teacher and should demonstrate to students that their behavior is continually being monitored and recorded. The difficulty lies in designing a system that is systematic and objective without requiring huge amounts of teacher time.

The steps below will help you design and implement a record keeping system that makes grading more objective, helps motivate students, and gives you a mild consequence for misbehavior.

STEP 1

Design a record keeping system. The "Weekly Record Form" (Figure 1) is a class list that provides space to code each student's behavior every day of the week. This single form can be used to record attendance, assignments, behaviors that demonstrate above or below average performance, and weekly point totals for classroom performance.

The Weekly Record Form should be kept readily accessible at all times. Some teachers will wish to keep forms for each class on a clipboard, while others will prefer to use a notebook. The Weekly Record Forms should be kept close to wherever you typically work—on your desk, propped on a podium or chalk tray, or you may wish to keep the notebook or clipboard with you.

At the beginning of each class, students should see that you have the record form ready to take attendance. If any assignments are due, you can record papers that are handed in on time while simultaneously taking roll. Through the remainder of the period, students should see you periodically using the record form. If a student walks into class late, you can quickly mark a "t" for tardy. If a student needs to be reminded to get to work, simply note an "o" for "off-task" next to the student's name. Immediate coding of these negative behaviors will teach students that they are accountable for their actions each day. When students excel, you can record an "e" for excellence or a "c" for cooperation. If immediate coding of positive behaviors would be embarrassing to students, code your notations of extra effort while students are getting out assignments, or anytime prior to your next class. Then privately, let students know that you have acknowledged their extra effort. Using the Weekly Record Form throughout the week will provide valuable information for evaluating student performance at the end of the week.

STEP 2

Determine the total number of points possible for students to earn each week. To do this, first identify the percentage of the grade you feel should be based on class behavior and effort. This percentage may be anywhere from 10 percent to 90 percent of the grade, depending on the type of class. Next, determine approximately how many points students can earn for assignments, tests, quizzes, and so on.

From this information, determine how many points students could earn for participation and behavior. Design your system so that you have at least 20 points per week based on behavior. Having 20 points possible gives the teacher more flexibility in how points are awarded. If you only had 5 points possible per week, then each day a student would either get 1 or 0 points. With at least 20 points possible, each day's performance can be awarded 0 to 4 points.

STEP 3

Establish the criteria and point values for earning class performance points. In this step, you will determine how specific behaviors will affect students' weekly performance points. Students must see a direct relationship between the behaviors you record on the Weekly Record Form and the number of points they are awarded at the end of each week.

Average student performance should automatically earn approximately 80 percent of the possible weekly performance points. If students can earn a total of 40 points each week, students would earn 32 points for average performance. Some teachers make a big mistake by awarding the total points possible to any students who did not get in trouble during the week. Students must see that they can only earn the full points by being highly motivated throughout the week. Once you have determined the number of points students will earn for average classroom performance, list the types of behaviors that average students typically demonstrate in your classroom. You can use this information to inform students how to earn the "average" number of points.

Other factors will automatically lower or raise a student's weekly performance points. Factors that automatically raise a student's grade should be those behaviors that you feel demonstrate excellence in participation and effort. These factors will vary between teachers and will also vary depending upon the type of class you have. If you have difficulty identifying behaviors that demonstrate above average student participation effort, compare the behavior of "A" students with "C" students. Try to identify classroom behaviors that typically differentiate these students. This part of a student's grade is subjective. Your job will be to teach students the kinds of behaviors that you subjectively feel are a demonstration of excellence.

Factors that automatically lower a student's grade should be behaviors that would not be acceptable in a work situation. These include such things as tardiness, disruptiveness, and late work. Several of these behaviors are listed in Table 1 with guidelines for determining the number of points that should be deducted from an "average" participation grade. The suggested points would be for a class where 20 points per week could be earned for class performance.

- *Disruptive behavior* • Students will lose points for any disruptive behaviors. Behaviors that result in a loss of class time should logically affect the student's classroom performance grades. This automatic response allows you to respond unemotionally and predictably. Students will learn that they are accountable for their behavior at all times.
- *Tardiness* • A loss of points for tardiness demonstrates to students that they can earn points for their performance once they are in class, but that being late for class will affect their overall evaluation. Students who have not learned to arrive on time will have difficulty maintaining a job.
- *Reminders about following class rules or staying on task.* • Occasionally, students will need to be reminded of rules, or they will

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Figure 1.

WEEKLY RECORD SHEET

Date Sept 14-18 Reminders

Class period 4

STUDENT	MON.	TUES.	WED.	THUR.	FRI.	TOTAL
Agner, Donna		✓ E			✓	18
Ometa, Lee		✓			✓	16
Anderson, Dan	O	✓		T- 2	✓	13
Baumbaugh, Cary		–	O		✓ E	16
Buckee, Cheryl		✓ O			✓	15
Carpenter, Dustin	O O O	✓			✓	13
Crossett, Celia		✓			✓ E	19
Deane, Russ		A (B+4)	A (B+4)		✓	16
Dorns, Jan	E	✓		O	✓	17
Edwards, Lonny		✓ O			✓	15
Felch, Yvette		✓			✓	16
Franklin, Lavar		✓			✓ E	18
Geden, Randi	A (B+4)	✓ O	E		✓	17
Green, Christopher		✓			✓	16
Hamman, Matthew	E	✓			✓	18
Johnson, Charlene		✓			✓	16
Jones, Jesse		✓ C		O	✓	17
Kemp, Lonnie		✓	O		✓ O	14
Kuntzmann, Dana	UA	UA			✓	8
MacKight, Todd		✓			✓	16
Mezick, Chonya		✓ O			– O	13
Nelson, Wendy	C	✓			✓	18
Ower, Travis		✓			✓	16
Apresta, Sam		✓	E		✓	19
Quince, Bonnie		✓			✓	16
Robinson, Eddie	O	✓		E	✓	17
Schmidling, Ruth		–	A		✓	11
Semolke, Gail		✓			A	12
Sumida, Marilyn	O	✓			✓	15
Taylor, Donny		✓	E		✓	19
Timmons, Jay	E	✓		C	✓	20
Vander Yacht, Steve		✓ O O			✓	14
West, Shaun		✓			✓	16

CODE: EXCELLENT WORK = E +1 | OFF TASK = O -1 | ABSENT = A

COOPERATIVE = C +1 | DISRUPTIVE = D -1 | UNEXCUSED ABSENCE = UA -4

BONUS POINTS = B | Late work - -1 | TARDY = T- -2

Table 1. Suggested Point Losses

Breakdown of Reduced Points	% of weekly total	Example
Any disruptive behavior	−5%	−1 point
Any reminders needed about class rules or staying on task	−5%	−1 point
Tardiness	−10%	−2 points
Late work	−10%	−2 points
Unexcused absence	−20%	−4 points
Excused absence (Made up with extra credit assignment)	−20%	+4 points
Sent out of class	−20%	−4 points

Effective Grading — Continued from Page 3

need to be reminded to stay on task. A loss of points in these areas simply tells students that they need to remember to be self-disciplined.

- *Late work* • A loss of points for late work is a clear demonstration to students that they are accountable for turning in work at a specified time. Students should automatically lose the designated points for the day, plus have a percentage of the points possible on the assignment. For example, the student might lose two participation points for failing to have the assignment ready on the day it was due, and 10% of assignment's value.
- *Unexcused absences* • If students have an unexcused absence, they obviously have not taken advantage of the opportunity to earn points. Therefore, students earn no participation points and are given no opportunity to make up the points.
- *Excused absences* • If students have an absence, they lose points, but are allowed to earn the credit they have missed through a make-up assignment. This procedure is not designed to penalize the students who are ill. It is designed to demonstrate that class time is valuable. When class time is missed, less learning takes place. Thus, a small extra credit assignment must be completed to compensate for the lost time. Students will learn that they are accountable for making up class time, and that absences are only worth while when unavoidable.

  This procedure should also apply to students who miss class due to involvement in sports, student government and other extra curricular activities. Students should understand that participation in these activities is legitimate, but that they are still accountable for class time.

  If at any point, you have a student who has a serious illness, exceptions should be made. If a student is out of class over an extended period of time, award performance points as regular work is made up.

  Some administrators object to this procedure of requiring make-up work to be able to earn the participation points. Be sure to clear this procedure with your district administration before implementing this aspect of the grading system. If you are not allowed to require make-up assignments for missed class time, you will simply have to give the full points to any students with excused absences.
- *Sent out of class* • If a student is sent out of class, she has lost the opportunity to earn performance points for the day, and has been penalized for the severity of the disruption.

Figure 2 is an example of how an eighth grade history teacher might award points. Use this form, or simply follow the suggestions below.

a. Note the participation and effort percentage.

b. Note the total weekly performance points.

c. Identify the types of behaviors that demonstrate average student performance and determine the number of points students will earn for average performance (80% of total points).

d. Identify the types of behaviors that demonstrate excellent participation and effort and determine the number of additional points earned.

e. Identify factors that will result in failure to earn points and determine the number of points that will not be earned.

f. Identify factors that will result in bonus points and identify the number of bonus points earned.

STEP 4

Assign weekly performance points. At the end of the week, your Weekly Record form will have all of the information you need to determine the student's performance points. Simply follow the steps below.

a. Begin with the number of points students can earn for average performance.

b. Add the appropriate number of points for each notation of excellence.

Continued on Page 5

The Paideia Proposal: An Educational Manifesto.
by M.J. Adler
Macmillan, New York
1982 (84 pp.; $2.95)

Padeia Problems & Possibilities: A Consideration of Questions Raised by the Paideia Proposal.
by M.J. Adler
Macmillan, New York
1983 (82 pp.; $3.95)

The Paideia Program: An Educational Syllabus.
by M.J. Adler and Members of the Paideia Group.
Macmillan, New York
1984 (183 pp.; $4.95)

People who like alliteration, trilogies, or boxed sets of books will like this series. (The box is missing, but you can always make your own.) Those who like substance in their professional reading will find this collection woefully lacking.

One might guess that in a three volume set totaling less than 350 pages, the authors are trying to articulate a message which is elegant in its simplicity and compelling in its clarity. If so, they have fallen short on both counts. The books are mostly empty—literally. There are numerous blank pages which merely pad the emptiness of thought and the articulation of the obvious appearing on the other pages. Those pages which are filled add little to our knowledge about or committment to effective schooling for all children—the central thesis of the three volumes. Each volume explains that the Greek term, "paideia", refers to the upbringing of a child and "the general learning that should be the possession of all human beings".

The Paideia Proposal discusses a philosophy of education connecting the quality of life with the quality of schooling. (So far, so good.) It goes on to articulate several global essentials of basic schooling. (By now, not so good.) The book goes on to address teacher training, the role of the principal, higher education, earning a living, and the future of education—in about 2-4 pages each. To do this, one must either write extremely efficiently or say almost nothing. The book does both.

The second volume, *Paideia Problems and Possibilities*, is even more resistable. It consists of 25 pages of background information on the Paideia Proposal, 31 questions and answers about the curriculum framework of the proposal, and 7 "problem areas" and comments relating to implementation of the proposal. The questions and problems are the kind which one would expect from a "confederate" planted into an audience one is addressing. They do not provide the kind of balanced treatment which the volume title suggests they might.

Volume three, *The Paideia Program*, provides somewhat more specificity. It discusses three kinds of teaching (seminars, coaching, and didactic instruction), ten common subject areas, and several guidelines for recognizing and structuring a Paideia School. It appears that the reader is expected to be able to reform a school along Paideia lines after completing the three volume series. However, the books do not provide sufficient details for doing so.

Don't get me wrong. There are some things about the books that I like. I like alliteration. And I like boxed sets of books. I even made a wooden box once for a three-volume series that came without one. I also like light tan or cream-colored things with brightly-colored, boldly contrasting words or designs on them. But when it comes to professional reading, I like substance as well as the next person.

A Paideia supporter might counter my criticisms by saying that I do not fully understand the Paideia system—that I am overlooking the significance of the approach. Of course, they would be right. I do not fully understand much of anything which is not fully articulated, and I often overlook the significance of things stated only in general terms or of things I have seen or heard stated many times in many other places. In my simple mind, that is simply the way I perceive the content of these books. Maybe there is something significant in this series that I am overlooking. If so, maybe someone will wake me up to it by hitting me over the head with one of the books—or with all three. At 350 pages all together, that wouldn't hurt too much. Besides, many of the pages are empty . . .

Reviewed By Stan C Paine

Effective Grading Continued from Page 4

c. Subtract the appropriate number of points for each notation of inappropriate behavior.

d. Record the total number of points earned on the weekly record sheet.

In looking at a filled in form (as in Figure 1), it may appear to require a lot of work to use the form and determine the point totals. The first week of using the form will be like learning to do any new task. Initially, it may be difficult, but with use it will become more automatic and easier. With practice, all of the coding of behavior becomes a habit that requires no additional time or effort from your teaching day, and awarding the points at the end of the week will take no more than five minutes at the end of class.

STEP 5

Design a procedure for giving students their weekly classroom performance grade. Before students leave on Friday, they should be given their weekly performance points. If students do not receive feedback about their classroom performance until Monday, the time delay may weaken the procedure. Students need frequent and consistent feedback.

Towards the end of the period each Friday, plan to spend five minutes figuring out student performance points. During this time, students should be engaged in an independent task. Once you have determined each student's weekly performance points, there are several different ways to actually give students their points. The major consideration is that students have an opportunity to see how their grade was determined.

Post the Weekly Record Form so that each student can see their performance marks and the point total for the week. The major advantage of this procedure is that weekly performance points do not have to be transferred to another sheet, and students can see exactly how their performance points were determined. The major disadvantage is that everyone's performance points are visible to everyone in the class. This lack of privacy can result in teasing, or may result in some students bragging about poor performance grades.

Provide students with identification numbers. Post the Weekly Record Sheet, but cover students' names with another sheet listing the corresponding identification numbers. This procedure ensures privacy and also does not require any transferring of performance points or performance marks. The major disadvantage is that it will take time to organize the system so that students know their numbers. However, once the system is set up, a single cover sheet can be used week after week with all of your classes.

Conclusion

A monitoring system must show students that their daily participation and behavior is important enough for the teacher to observe and record the performance of each indvidual in class. This forces the teacher to clearly teach behavioral expectations. In addition, it forces the teacher to give feedback to every student, at least once per week, on the degree to which expectation are being met. When most students realize that the teacher is continually and objectively monitoring their behavior, they try to meet the teacher's expectations.

Figure 2.

Identifying Point Values and Criteria for Specific Performance Points

SUBJECT U.S. HISTORY

GRADE 8

a. PARTICIPATION AND EFFORT PERCENTAGE 10%

b. TOTAL WEEKLY PERFORMANCE POINTS 20

c. Behavior that demonstrates average student performance
FOLLOWS RULES
FOLLOWS DIRECTIONS
ON TASK MOST OF THE TIME
PREPARED FOR CLASS

Average student performance = 80% of total possible points
= 16 points

d. Behavior that demonstrates excellent student performance and cooperation
100% ON TASK
CONTRIBUTES TO DISCUSSION
ASKS RELEVANT QUESTIONS
POSITIVELY ASSISTS OTHER STUDENTS IF ASKED

Each notation of cooperation and excellence for a given day = 10% of the total possible points
= +2 points

e. FAILURE TO EARN POINTS
(subtracted from an overall excellence or average in student performance for the week

Any disruptive behavior	(-5% of weekly total)	-1
Any reminders needed for following class rules, or for staying on-task	(-5% of weekly total)	-1
Tardiness	(-10% of weekly total)	-2
Late work	(-5% of weekly total)	-1
Unexcused absence	(-20% of weekly total)	-4
Excused absence	(-20% of weekly total)	-4
Made up by completing extra credit assignment		+4
Sent out of class	(-20% of weekly total)	-4
_____	(- % of weekly total)	____
_____	(- % of weekly total)	____
_____	(- % of weekly total)	____

f. BONUS POINTS

PEER TUTORS	+2 points
SIGNIFICANT BEHAVIOR IN BEHAVIOR OR ATTITUDE	+2 points

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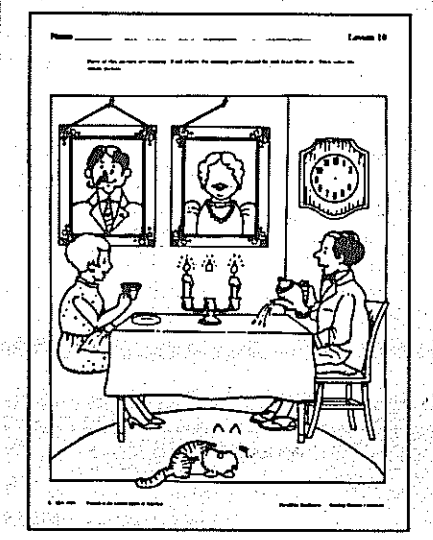

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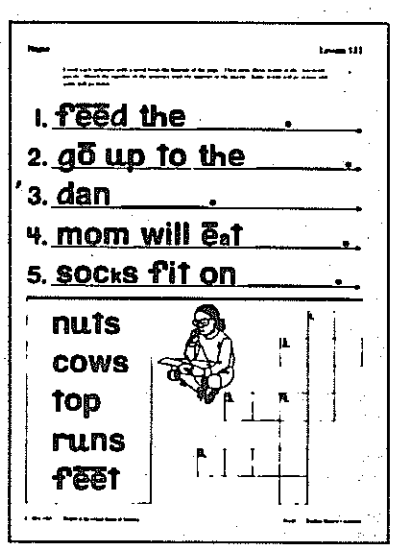

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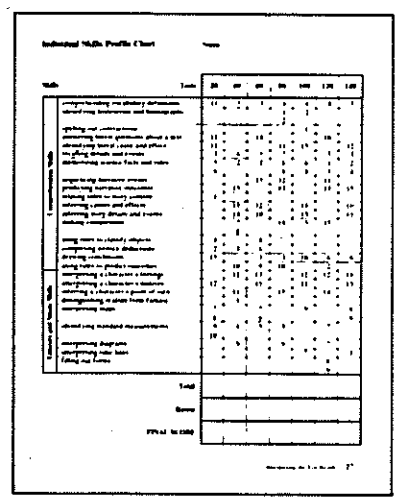

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Becoming a Nation of Readers

Continued from Page 1

indirectly teach their children to read. Many do successfully. It is suspected that computers will have an effect on early learning before too long.

During the school years, parent involvement with a knowledge of what goes on at school is associated with having better readers. Parents can and do play a critical role in their children's development of reading skills. Perhaps we need more active plans to encourage effective parental practices.

Kindergarten Reading Instruction

Those of us involved with Direct Instruction since the days of the Bereiter-Engelmann Preschool (1964) and through 17 years of Follow Through know well that kindergarteners can be taught to read and to enjoy their skills. Twenty-one years later, the *Commission on Reading* is (as far as we know) the first National professional group to endorse the teaching of a systematic approach to reading in kindergarten. "Based on the best evidence available at the present time, the Commission favors a balanced kindergarten program in reading and language that includes both formal and informal approaches. The important point is that instruction should be systematic but free from undue pressure" (p. 29-30). The children least ready for systematic reading are typically those whose oral language skills are poorly developed. For these children, ample oral language experiences should be undertaken first. This experience is especially important for children coming from non-English speaking homes. Children also need to learn concepts about written language and its functions—what words and sentences are and can do—so that they have some idea of what adults mean when they talk about reading. Take the letters STOP. Children need to learn early the relation to the spoken word "stop", and its meaning. With great variation in the entry skills of students, kindergarten teachers (like all teachers) need to be able to assess student skills and then build on them.

Durkin (1966) has pointed out that for some children ("the pencil-and-paper kids"), learning to read is a by-product of a desire to write. Writing experiences (not emphasizing good style) are recommended for kindergarten. Simple word processors are already making their way into kindergarten settings.

First Grade Reading—Basal Readers

"The observation that basal programs 'drive' reading instruction is not to be taken lightly. These programs strongly influence how reading is taught in American schools and what students read" (p. 35). It has been estimated that 75 to 90 percent of what goes on in reading is controlled by basal reading programs. Five of them are said to control 75 percent of the market. Early in this century, nearly all students were taught to read through phonic analysis. ". . . educators such as William S. Gray were responsible for turning American schools away from what they perceived to be the 'heartless drudgery' of the traditional approach. In its place, Gray and others advocated the look-and-say approach. The thinking was that children would make more rapid progress in reading if they identified whole words at a glance, as adults seem to do" (p. 36). Since the mid-fifties, this position has been under attack through such works as Rudolph Flesch's (1955) *Why Johnny Can't Read* and Jeanne Chall's (1967) classic review of the research literature *Learning to Read: The Great Debate*. Chall concluded that the evidence strongly supported the superiority of reading programs that taught phonics as one component of the program. "The picture that emerges from the research is that phonics facilitates word identification and that fast, accurate word identification is a necessary but not sufficient condition for comprehension" (p. 37-38). Most publishers have now incorporated some form of phonics into their programs, but for many it is little more than "window dressing" (Flesch, 1981).

How Should Phonics Be Taught?

The Commission Report spends a considerable space reviewing approaches to teaching phonics. They first note that approaches based on stating rules are counter productive. Students need to be able to say the sounds given the letters, not the rules. Second, they note that many programs teach skills the students can already perform, and they teach unneeded low-frequency combinations. Instruction should focus on the regular letter-to-sound correspondences and the most important irregulars.

There are two major approaches to teaching phonics—the "explicit" and "implicit" approaches. The implicit approach never "says" sounds in isolation. The explicit approach does. With the explicit approach, it is important to teach how to blend the isolated sounds. "Regrettably, an analysis of published reading programs concluded that several incorporate procedures for teaching blending that are unlikely to be effective with many children" (p. 39). The most widely-used reading programs employ implicit phonics, but many teachers teach the explicit sounds anyway—"That's how they hear it best." Some children taught with implicit phonics have trouble hearing some sounds like the short /i/ in "sit". "Ironically, therefore, implicit phonics may actually presuppose what it is supposed to teach" (p. 40). A possible problem with explicit phonics is saying some sounds in isolation, as when the sound for *b* becomes /buh/. (While we have experienced some difficulty in teaching sounds to teachers, DISTAR uses rhyming formats to get around the problem of introducing stop sounds like /buh/ at the beginning of a word.). The Commission admits the problem may be more hypothetical than real.

Kenneth Goodman (1976) and Frank Smith (1973) have criticised the phonetic approaches because "they take the child away from meaning." The Commission report points out that such a position is not inherent in phonetic approaches. Some programs have gone too far in pushing phonic instruction—far beyond the point where the student had enough sounds to be reading meaningful words and sentences. "Quite likely the problem is simply a by-product of the *false dichotomy* (emphasis added) between phonics and meaning that has dominated the field of reading for so many years" (p. 42).

Another criticism of many phonics programs is that the words the children are reading have little relation to the phonics they are learning. Thus, they do not get the practice needed for reading to become more automatic.

What works best? "The trend of the data favors explicit phonics" (p. 42). While supporting explicit phonics, the Commission also notes the importance of illustrating sounds by also presenting them in words which serve as exemplars. There is a considerable need to improve the quality of the instructional design in most basal readers on the market today. The Commission is also quite critical of the quality of the stories in basal series.

Comprehension in Beginning Reading

The Commission concludes the chapter on Emerging Literacy with a review of evidence on aspects of common reading group practices. The typical lesson has a preparation phase where new words, ideas, and motivating questions can be introduced. Next, comes reading in the group, then discussion, and finally back to a seatwork assignment.

A problem with most preparation phases is that not enough attention is given to developing the *background knowledge* needed to understand the story. "Don't have time" is the excuse. Children remember what they have just read better when background is provided during the preparation stage.

In the reading phase, students take turns reading (usually round robin is better than using volunteers). "There is no substitute for a teacher who reads children good stories. It whets the appetite of children for reading, and provides a model of skillful oral reading. It is a practice that should be continued throughout the grades" (p. 51). As oral reading develops, more silent reading should be planned for. A strong recommendation for improving fluency is to have the students read a passage silently before reading it out loud. Also, reading the same passage several times can improve fluency.

In the discussion phase, comprehension instruction may be provided (although few do), phonics lessons are given, and seatwork is explained. Teachers rely heavily on their manuals in leading discussions. Analysis indicates that many of the questions provided are "too general, leading the children afield; or tivial, focusing their thinking on unimportant details.

"While questions during the preparation and discussion phases of a reading lesson are important, these do not substitute for active, direct instruction. In direct instruction, the teacher explains, models, demonstrates, and illustrates reading skills and strategies that students ought to be using. There is evidence that direct instruction produces gains in reading achievement beyond those that are obtained with less direct means such as questions" (p. 56).

Reading lessons generally should stress "Making connections" with what you, understanding, and appreciation of the content of the story.

Extending Literacy

This section of the report critically examines the quality of textbooks related to subject matter areas and literature, the nature of teacher instruction, and opportunities for meaningful practice.

While recognizing the potential value of "readability formulas" in the attempt to control the difficulty level of texts, the Commission points out that these formulas do not examine other aspects of writing that affect comprehension—such as logical organization and clarity of sentence structure. Examinations of texts show that many fail to "lay bare the fundamental structures of history, geography, health, and science . . ." (p. 68). Many texts are poorly organized, consisting of little more than "lists of facts loosely related to a theme. Abrupt, unmotivated transitions are frequent. Textbooks are as likely to emphasize a trivial detail or a colorful anecdote as a fundamental principle . . . When textbooks make clear the connections between motive and action, form and function, or cause and effect, students understand better" (p. 69).

In examining the research on teaching practices that help extend literacy, the Commission recommends *directly teaching* critical concepts and reasoning processes. "*Direct instruction* needs to be distinguished from questioning, discussion, and guided practice. Direct instruction in comprehension means explaining the steps in a thought process that gives birth to comprehension. It may mean that the teacher models a strategy by thinking aloud about how he or she is going about understanding a passage. The instruction includes information on why and when to use the strategy. Instruction of this type is the surest means of developing the strategic processing that was identified earlier as characteristic of skilled readers" (p. 72). The report summarizes a number of studies where directly teaching strategies for attacking text led to the learning of generalized strategies that improved comprehension. The Commission recommends that such strategies be embedded in social science and science lessons and that teachers be given training in how to use these relatively "new" direct approaches to teaching comprehension strategies.

The report next examines activities where students can get independent practice in reading. They are very critical of typical seatwork activities which occupy 70% of the time available for reading, or about an hour per day. The activities often have little value in teaching reading (as when the students are asked to underline the most frequent consonant in a sentence). In contrast, students average only 7 to 8 minutes a day in silent reading.The research suggests that the amount of time devoted to workbooks or worksheets is unrelated to year-to-year gains in reading proficiency. The amount of time spent on silent reading out of school is consistently related to gains in reading achievement. However, a study of fifth graders showed that most students read very little out of school—50% average 4 minutes a day or less, while they average 130 minutes a day watching TV. The research suggests

Continued on Page 8

Nation of Readers Continued from Page 7

that independent reading may be a major source of vocabulary growth. They conclude that access to good books needs to be improved and silent reading should be encouraged more at both home and school.

Children read more books when someone helps to interest them in specific books, when guidance in choosing books is provided, and when time for reading is set aside.

Writing is an activity that supports the development of reading skills. One recent study of elementary school students showed that "only 15% of the school day involved any kind of writing activity. Two-thirds of the writing that did occur was word for word copying in workbooks. Compositions of a paragraph or more in length are infrequent even at the high school level" (p. 80). Students need to be encouraged to write more. "Writing is most beneficial when students have a reason to communicate to a genuine audience" (p. 81).

The Teacher and the Classroom

As most readers of ADI NEWS should know by now, effective teachers "schedule reading and writing activities as a priority, move through materials at an appropriate pace, stimulate and sustain children's attention, and arrange for high rates of success" (p. 92). The report examines research on grouping practices and concludes that many current practices slow the progress of lower performing children rather than facilitating it. An improvement in the quality of small group instruction is needed and students should not be "locked into" their reading group for other instruction.

Testing and Reading Instruction

In examining the roles of norm-referenced and criterion-referenced tests in reading programs, the Commission notes that better reading programs tend to use tests more. They suspect that the tests help to motivate teachers to be accountable through the feedback they provide. The report is critical of the use of criterion-referenced tests in mastery-learning type programs where reading is broken down into a series of subgoals. The Commission does not believe that learning to read involves learning one skill, adding another, adding another, etc. Rather, they see learning to read as involving the "close knitting of reading skills that complement and support one another" (p. 97). (My own view is that some mastery approaches have fragmented the learning process, but this need not be the case.) Norm-referenced tests are seen as useful, but may distract from the major goals of teaching reading if instruction focuses on just doing well on the tests. They suggest:

"A more valid assessment of basic reading proficiency than that provided by standardized tests could be obtained by ascertaining whether students can and will do the following: Read aloud unfamiliar selections from grade-appropriate social studies or science textbooks; explain the plots and motivations of the characters in unfamiliar, grade-appropriate fiction; read extensively from books, magazines, and newspapers during leisure time. A simple, practical suggestion is for teachers to tape record the oral reading of each child three times a year and keep the tapes on file for diagnosis and reporting to parents" (p.99).

Teacher Education and Professional Development

The Commission points to the inadequate time devoted to formal learning and applications in most teacher preparation programs. In elementary education, only about one-third of the undergraduate program is devoted to education courses, including "foundation courses". The foundation courses are often criticised as being too theoretical (taught often by teachers who are not familiar with classrooms). In contrast, the practica courses are often seen as too simplistic. At best, two courses are directly related to reading (Reading and Language Arts). The Commission believes teachers need more preparation in reading and other areas and recommends that 5-year training programs be instituted.

On-going professional development efforts often miss the mark. The more successful approaches involve multiple contacts with consultants over a period of time, including visits to classrooms. It also is helpful if a group of teachers band together and give mutual support in learning new strategies. Provisions for assisting the new teacher's entry into the profession should also be undertaken. Experienced, effective teachers might be assigned as mentors during the first year or two.

The closing note before the recommendations focuses on *The Ethos of Effective Schools*. Effective schools have vigorous instructional leadership, usually from a principal. Yet, the report notes that in some states, principals do not even have to know how to teach reading. Effective schools "have high but realistic expectations about the progress that students will make in reading." Effective schools "are characterized by school pride, collegiality, and a sense of community." Effective schools have "order and discipline." Effective schools "maximize the amount of uninterrupted time available for learning" (pp. 113-114).

Recommendations

"The more elements of good parenting, good teaching, and good schooling that children experience, the greater the likelihood that they will achieve their potential as readers. The following recommendations encapsulate the information presented in this report about the conditions likely to produce citizens who read with high levels of skill and do so frequently with evident satisfaction.

Parents should read to preschool children and informally teach them about reading and writing. Reading to children, discussing stories and experiences with them, and—with a light touch—helping them learn letters and words are practices that are consistently associated with eventual success in reading.

Parents should support school-aged children's continued growth as readers. Parents of children who become successful readers monitor their children's progress in school, become involved in school programs, support homework, buy their children books or take them to libraries, encourage reading as a free time activity, and place reasonable limits on such activities as TV viewing.

Preschool and kindergarten reading readiness programs should focus on reading, writing, and oral language. Knowledge of letters and their sounds, words, stories, and question asking and answering are related to learning to read, but there is little evidence that such activities as coloring, cutting with a scissors, or discriminating shapes (except the shapes of letters) promote reading development.

Teachers should maintain classrooms that are both stimulating and disciplined. Effective teachers of reading create a literate classroom environment. They allocate an adequate amount of time to reading and writing, sustain children's attention, maintain a brisk pace, and keep rates of success high.

Teachers of beginning reading should present well-designed phonics instruction. Though most children today are taught phonics, often this instruction is poorly conceived. Phonics is more likely to be useful when children hear the sounds associated with most letters both in isolation and in words, and when they are taught to blend together the sounds of letters to identify words. In addition, encouraging children to think of other words they know with similar spellings, when they encounter words they cannot readily identify, may help them develop the adult strategy of decoding unknown words by analogy with ones that are known. Phonics instruction should be kept simple and it should be completed by the end of the second grade for most children.

Reading primers should be interesting, comprehensible, and give children opportunities to apply phonics. There should be a close interplay between phonics instruction and reading words in meaningful selections. But most primers contain too few words that can be identified using the phonics that has already been taught. After the very earliest selections, primers should tell complete, interesting stories.

Teachers should devote more time to comprehension instruction. Teacher-led instruction in reading strategies and other aspects of comprehension promotes reading achievement, but there is very little direct comprehension instruction in most American classrooms.

Children should spend less time completing workbooks and skill sheets. Workbook and skill sheet activities consume a large proportion of the time allocated to reading instruction in most American classrooms, despite the fact that there is little evidence that these activities are related to reading achievement. Workbook and skill sheet activities should be pared to the minimum that actually provide worthwhile practice in aspects of reading.

Children should spend more time in independent reading. Independent reading, whether in school or out of school, is associated with gains in reading achievement. By the time they are in the third or fourth grade, children should read independently a minimum of two hours per week. Children's reading should include classic and modern works of fiction and nonfiction tha represent the core of our cultura heritage.

Children should spend more tim writing. Opportunities to write mor than a sentence or two are infrequent i most American elementary school class rooms. As well as being valuable in it own right, writing promotes ability i reading.

Textbooks should contain adequat explanations of important concepts Textbooks in science, social studies, an other areas should be clearly written well-organized, and contain importan information and concepts. Too many o the textbooks used in American class rooms do not meet these standards.

Schools should cultivate an ethos tha supports reading. Schools that are effec tive in teaching reading are character ized by vigorous leadership, high expec tations, an emphasis on academic learn ing, order and discipline, uninterrupte time for learning, and staffs that worl together.

Schools should maintain well-stocke and managed libraries. Access to in teresting and informative books is one o the keys to a successful reading pro gram. As important as an adequate col lection of books is a librarian who en courages wide reading and helps matc books to children.

Schools should introduce more com prehensive assessments of reading and writing. Standardized tests should be supplemented with assessments of read ing fluency, ability to summarize and critically evaluate lengthy selections, the amount of independent reading that goes on, and the amount and quality of writing.

Schools should attract and hold more able teachers. The number of able people who choose teaching as a profession has declined in recent years. Reversing this trend requires higher admissions standards for teacher education programs, stronger standards for teacher certification, improved working conditions, and higher teachers' salaries.

Teacher education programs should be lengthened and improved in quality. Prospective elementary teachers do not acquire an adequate base in either the liberal arts and sciences or in pedagogy. They get only a fleeting introduction to the knowledge required for teaching reading. Teacher education programs should be extended to five years and the quality and rigor of the instruction should be increased.

Schools should provide for the continuing professional development of teachers. Schools should have programs to ease the transition of novice teachers into the profession and programs to keep veteran teachers abreast of advancing knowledge.

America will become a nation of readers when verified practices of the best teachers in the best schools can be introduced throughout the country" (pp. 117-120).

Copies of Becoming a Nation of Readers *may be ordered for $4.50 each (add $1.00 if overseas) in U.S. funds payable to The University of Illinois -BNR. Send check or money order to Becoming a Nation of Readers, P.O. Box 2774, Station A, Champaign, Illinois, 61820-8774.*

Instructional Design: Coming in Out of the Cold

/ Douglas Carnine
/stems Impact, Inc.
id University of Oregon

Educational researchers are slowly entifying a repertoire of effective anagement practices for administrars and teachers that facilitate learning itcomes. Another crucial, though relavely neglected, set of practices has to with the content and organization of structional materials themselves. The eation and application of these pracces are left largely to content experts id publishers. Although instructional signers claim that these practices are ithin their area of expertise, publishers el that *conventional* instructional sign methods, like behavioral objecves and task analysis, are too limited id tend to avoid them.

The present paper explores those limitions and then offers an alternative apoach to instructional design based on *heory of Instruction* (Engelmann & arnine, 1982). The example selected to ustrate these points, constructing and itiquing arguments, was not chosen cause of the current popularity of asoning skills, but with the need to ace the reader in the role of a student. dults often have difficulty appreciating ow methods for organizing instruction- material influence the difficulty of arning. The importance of design prinples can best be appreciated when arning is demanding, a common situaon for students. Relatively difficult ontent, like the ten symbolic arugment rms in Table 1, is required to put dults in the role of students.

Conventional Instructional Design

A familiar method in conventional sign is writing behavioral objectives. behavioral objective for drawing conusions from evidence might go someing like this: Given three sets of idence, the student will write three rrect conclusions. The behavioral obctive specifies the conditions under hich the behavior occurs, the behavior elf, and a criterion of acceptable permance. Behavioral objectives clarify here students are traveling, *but not ow teachers can help the students on eir journey*.

Another conventional design method, sk analysis, addresses the "how-to's" instruction. Hierarchical task analysis agne, 1970) breaks a task or activity to components, identifies preskills, id sequences the preskills and compoents. In using task analysis to teach udents to draw conclusions, the degner might first preteach important vobulary including *arugment*, *evidence*, id *conclusion*:

rgument { All A are B. / All B are C. } Evidence
All A are C. } Conclusion

The truly pivotal concepts in arguents are *some*, *all* and *no*. Look at the iddle column of boxes in Table 2. In agram 1b in Table 2, the word *some* ows that one class overlaps another. diagram 2b the word *all* places one class inside another. In diagram 3b the word *no* shows exclusion. Overlap, inclusion, and exclusion are the primary ways one class can be related to another.

Instruction on these three relational concepts would come first when teaching the students to draw conclusions from evidence. Then the ten individual argument forms in Table 1 would be presented, one at a time, as a way of creating small instructional steps. Students would be tested on one argument form before encountering a new form.

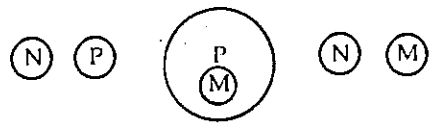
First a demonstration:

"Here are two statements of evidence:

No N are P.
All M are P.

The conclusion is No N are M. We can use diagrams to show the evidence and the conclusion.

No N are P. All M are P. No N are M.



Then comes teacher-directed practice: Read these two statements of evidence.

All S are R.
No R are T.

Raise your hand when you've figured out the conclusion.

If you have trouble, draw a diagram for each statement.

What's the conclusion? . . . Yes, No S are T.

(The teacher gives immediate feedback, correcting mistakes by drawing diagrams of each sentence.)

Next would come independent practice:

Write the conclusion for each argument.

No A are B.
All C are B.

All W are X.
No X are Y.

All E are F.
No G are F.

The teacher would test students on arguments with *no* before presenting arguments with *some* or *all*. These arguments forms would be presented with demonstrations, teacher-directed practice, and independent practice.

After writing conclusions, students would learn to critique arguments. The teacher begins with a model of valid and invalid arguments, like those in Table 3. The teacher would explain why the first argument in Table 3 is valid. "You've learned to construct arguments like this one. The second statement of evidence excludes the large class *adults* from the class *children*. *Adults* are excluded from the class of children, so *basal publishers*,

Continued on Page 10

Table 1. Ten Forms of Syllogisms in Which the Conclusion Begins with Some, All, or No

1. All A are B. All B are C.	2. All A are B. Some A are C.	3. All A are B. No B are C.	4. All A are B. Some A are C.
5. All B are C. All A are B.	6. All A are B. Some C are A.	7. All A are B. No C are B.	8. All A are B. Some C are A.
	9. All A are B. No B are C.	10. All A are B. No C are B.	

Table 2. Illustration Same, All, and No Structure

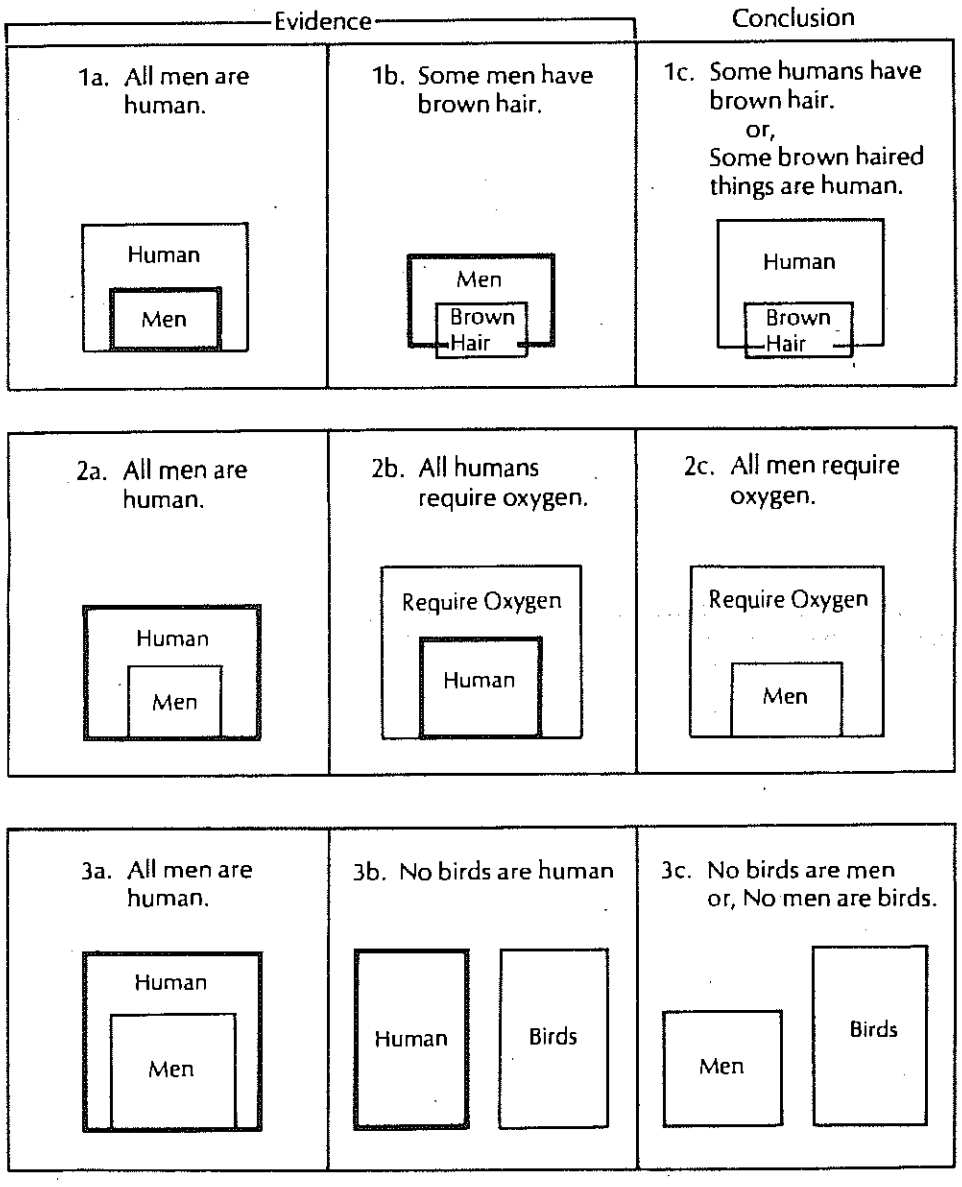
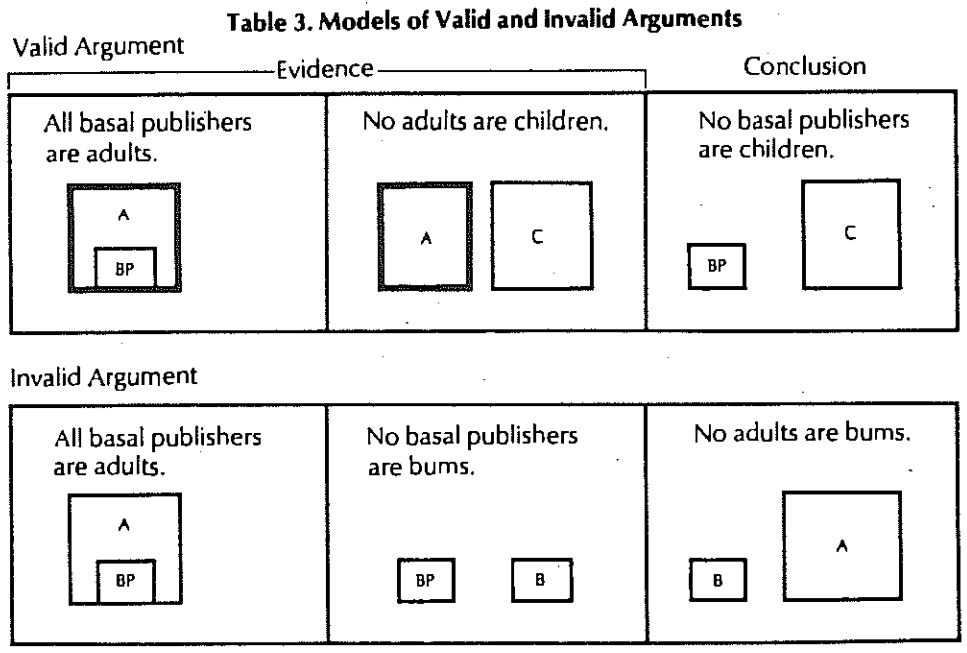


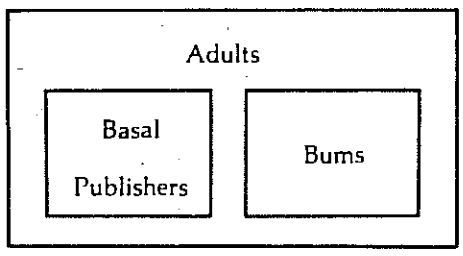
Table 3. Models of Valid and Invalid Arguments



Instructional Design Continued from Page 9

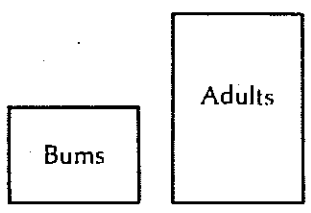
who are within the class of adults, must also be excluded from the class of children." This explanation is actually a review, since the students will already have learned to draw conclusions.

The difficult teaching comes in explaining invalid arguments like the one at the bottom of Table 3. Since both basal publishers and bums are in the class of adults, the diagram for the second statement of evidence can be drawn this way:



In this diagram *bums* is inside the class *adults*.

The diagram for the conclusion (below) shows *bums* outside the class *adults*. The second statement of evidence and the conclusion contradict each other, so the argument cannot be sound.



Following these explanations, the teacher provides guided practice on examples like those in Table 4.

Table 4.

All basal publishers are adults.
Some adults sell pornography.
Some basal publishers sell pornography.

All basal publishers are adults.
All basal publishers sell books.
All adults sell books.

All basal publishers are adults.
No basal publishers are bums.
No adults are bums.

"Look at the first argument. Is it valid? . . . How about the second argument? . . . And the last argument? . . ."

Next comes independent practice.

Test yourself to see how much you learned about constructing and critiquing arguments from the task analysis presentation.

Draw a conclusion based on these statements of evidence!

All A are B.
Some A are C.

All D are E.
All E are F.

All G are H.
No H are I.

Decide if each argument is valid:

All J are K.
No L are J.
No K are L.

No P are Q.
All R are Q.
No P are R.

All M are N.
No M are O.
No N are O.

If you found yourself haphazardly trying to decide which arguments were valid, feeling somewhat frustrated, you discovered the major limitation of conventional instructional design—*the lack of compelling strategies for working problems*. Even with demonstrations, supervised practice, independent work and other effective teaching practices, the presentation for drawing conclusions and then critiquing arguments would be very difficult for many students. When conventional instructional designers apply rather mechanical procedures (like conducting task analyses to break instruction into parts), they often accept unnecessarily awkward or complex organizations of instructional content rather than imposing strategies that can simplify the content for students. The next section illustrates how a different approach reorganizes instruction for drawing conclusions and critiquing arguments.

Theory of Instruction: Analytic Design

As far back as 1966 Jerome Bruner offered criteria for instructional design, two major ones being *economy* and *power*. Economical instruction simplifies what initially appeared to be complex. For example, $a^2 + b^2 = c^2$ simply describes the relationship between the sides of a right triangle. Power occurs when students can apply what they learn to a large range of problems. The Pythagorean theorem applies to all sorts of problems in geometry, map making, etc. Economy and power are the overriding goals of analytic design. At the heart of analytic design is *structure analysis* and *integration analysis*, which will be illustrated with the reasoning skills example.

Structure Analysis

A structure analysis identifies *patterns* that account for the answers to problems. A very simple example is addition. In 4 + 2 = [], the pattern that accounts for the answer 6 is counting four and then counting two more. The analytic designer often devises instruction in the form of *strategies* that are based on those patterns. For addition, the strategy might be to: (1) make four lines, (2) note the operational sign, (3) make two lines, (4) count all the lines, and (5) then make the sides of the equation equal by writing a numeral in the box.

In carrying out a structure analysis for the arguments in Table 2, the analytic designer looks for patterns that account for the two major dimensions of conclusions: first, the key word at the beginning of each conclusion and, second, the classes that are named in the conclusion.

One way of creating a pattern is to identify steps that can turn evidence into a conclusion. One possible set of steps involves drawing a diagram for the evidence. First, students must learn to draw diagrams for individual statements from an argument. The teacher might say:

Here's a statement from an argument:

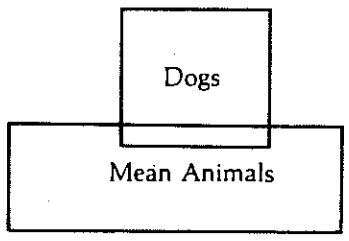
Some dogs are mean animals.

The classes in the statement are *dogs* and *mean animals*.

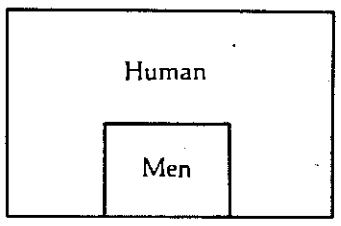
The key word is *some*.

When the key word is some, the classes overlap.

Here's a diagram that shows how the classes overlap:

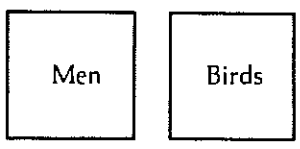


Here's a different statement. The key word is *all*: All men are human. When the key word is *all* the smaller class goes *inside* the larger class. The smaller class is *named first* in the statement. The class *men* is named first, so *men* must be the smaller class. This diagram shows the smaller class of men inside the larger class of human.



Here's a different statement. The key word is *no*.

No man are birds. When the key word is *no*, one class is outside the other class. This diagram shows the class of men outside the class of birds:



The students then draw diagrams for statements. The teacher guides them:

I'll read this statement: All roses are plants. What's the key word? . . . Yes, all. So what will the boxes for the classes show? . . . Yes, the box for roses will be inside the box for plants. Draw a diagram for the statement.

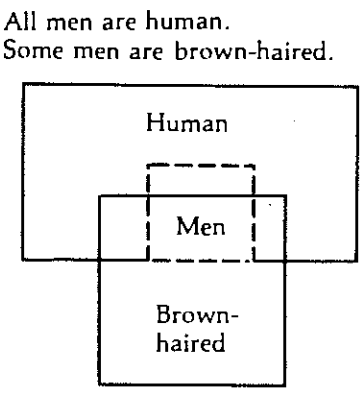
Draw a diagram for this statement: Some women are short.

Draw a diagram for this statement: No birds are coldblooded.

Once students learn to draw diagrams for single statements of evidence, they are ready to draw a diagram that shows how two statements of evidence are linked: All *men* are human. Some *men* are brown-haired. First students draw a dotted box for the class named in *both* statements of evidence.

Then they draw solid-lined boxes for the other classes named in the evidence.

All men are human.
Some men are brown-haired.



The solid-lined boxes show the conc sion: Some humans are brown-hairec

Apply the diagram-drawing stra gies to this evidence:

All men are *human*.

No *humans* are reptiles.

First draw a dotted box for the lir ing class that appears in *both* sta ments of evidence. Then draw sol lined boxes for the other two class Check your diagram against the a swer that appears after the referenc

Here's evidence with *all* as the k word:

All men are human.

All humans are living thing Draw the dotted box and the soli lined boxes for the evidence, th write the conclusion. (Check yo answers by referring to Table 10.)

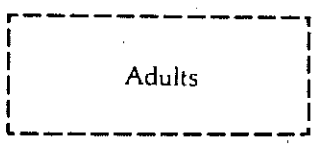
The presentation illustrates how t analytic design strategy meets t criteria for economy: (1) the strate leads to correct conclusions, and (2) t strategy is relatively clear, simple, a brief.

Test the diagram-drawing strategy f power by applying it to the full set of t argument forms in Table 1. Draw a di gram that links the two statements evidence. Remember to first draw a dc ted box for the class names in both stat ments of evidence. Then draw sol lined boxes for the other two classe You can check your answers by referri to Table 5.

Integration Analysis

In integration analysis, the analy designer *looks ahead* to see how t strategy derived through structure an ysis interacts with *other relat stategies*, in this case critiquii arguments. The instructional design compares the strategy for drawing co clusions with a strategy students cou use to critique arguments.

In making this comparison, the anal tic designer finds that the strategy f drawing conclusions will *mislead* son students when they critique argument Table 4 contains arguments to be cri qued. Students who apply the strate for drawing conclusions may think tl conclusions are sound, though they a not. The first argument in Table 4 is: A basal publishers are adults. Some adul sell pornography. Some basal publishe sell pornography. The diagram can l drawn in this way: Adults appear both statements, so it's shown as a dc ted box.



Then the other two classes are added:

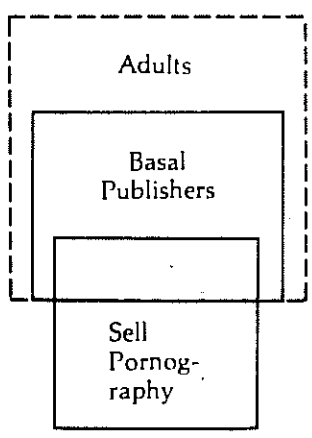
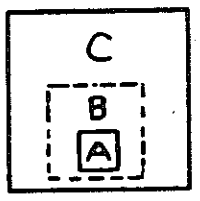
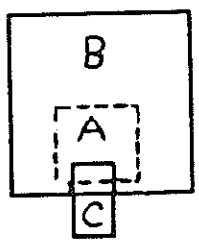


Table 5. Ten Forms of Syllogisms in Which the Conclusion Begins with Some, All or No

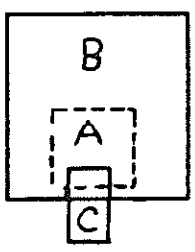


1. All A are B.
   All B are C.
   All A are C.

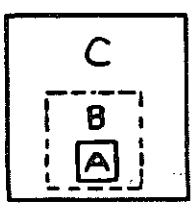


2. All A are B.
   Some A are C.
   Some B are C.

3. All A are B.
   No B are C.
   No A are C.

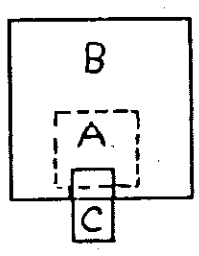


4. All A are B.
   Some A are C.
   Some C are B.



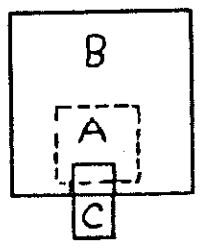
5. All B are C.
   All A are B.
   All A are C.

6. All A are B.
   Some C are A.
   Some B are C.

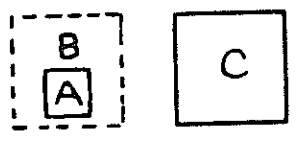


7. All A are B.
   No C are B.
   No A are C.

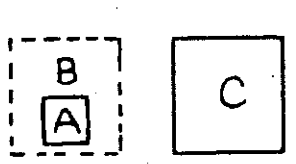
8. All A are B.
   Some C are A.
   Some C are B.



9. All A are B.
   No B are C.
   No C are A.



10. All A are B.
    No C are B.
    No C are A.



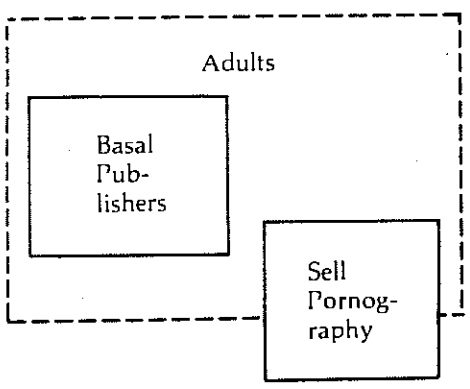
The conclusion in Table 4 is consistent with the diagram for the evidence, yet the conclusion is faulty. Basal publishers do not sell pornography. The integration analysis has revealed a serious flaw in the structure analysis. Thus, the patterns found in the original structure analysis of valid arguments must be modified: the designer must redo the structure analysis, this time inspecting both invalid and valid arguments.

A key to revising the original structure analysis lies in the fact that a different diagram can be drawn for the evidence. The pattern for the revised structure analysis is this: *If you can draw a diagram for the evidence that doesn't match the conclusion, you've shown that the argument is not valid.* We can illustrate the pattern with a different diagram of the evidence for the first argument in Table 4.

All basal publishers are adults.

Some adults sell pornography.

Some basal publishers sell pornography.



The diagram shows the evidence. Yet the classes for the conclusion, Basal Publishers and Sell Pornography, do not overlap. We cannot necessarily conclude that some basal publishers sell pornography. The argument is not valid.

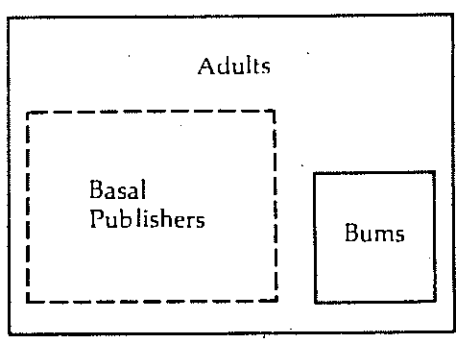
In the revised structure analysis students would be shown that a diagram for invalid evidence does not match the conclusion. The students would then be told to try to draw a diagram that doesn't match the conclusion. If they succeed, the argument is not valid. If the diagram matches the conclusion, the argument is valid. Consider this example. In the last argument in Table 4, the key word is *no*, so the classes in the conclusion should be outside of each other. Try to draw a diagram for the evidence that does not match the conclusion. First draw a dotted box for the class named in both statements of evidence. Then draw the other two classes, trying to show bums inside adults.

Here's the diagram:

All basal publishers are adults.

No basal publishers are bums.

No adults are bums.



The diagram shows the evidence. Yet the diagram does not match the conclusion. The argument is not valid.

Drawing diagrams to critique arguments is difficult. Students require lots of practice at trying to draw diagrams that don't match the conclusion. Here's an argument for practice. Draw the diagram to see if the conclusion is valid. (Check your answers by referring to Table 10.)

All A are B
No A are C
No B are C

The conclusion and the diagram don't match, so the argument is not valid. See if this argument is valid:

All A are B
No B are C
No A are C

The conclusion and the diagram match, so the argument is valid.

You can tell if the analytic design presentation helped you draw conclusions and critique arguments by retaking the test you saw earlier.

Draw a conclusion based on these statements of evidence:

All A are B.
Some A are C.

All D are E.
All E are F.

All G are H.
No H are I.

Decide if each argument is valid:

All J are K.
No L are J.
No K are L.

No P are Q.
All R are Q.
No P are R.

All M are N.
No M are O.
No N are O.

The revised structure analysis, based on the integration analysis, leads to a strategy that students can use to draw conclusions and to critique arguments. Though difficult, the strategy is both economical and powerful. The economy results from the relative simplicity of drawing a diagram for evidence. The power is reflected in the strategies handling of both argument construction and argument critiquing.

Comprehension of Primary Grade Stories

A structure analysis can also be applied to something as simple as primary-grade stories. The analysis seeks patterns that can serve as a basis for an instructional strategy, as was the case for constructing and critiquing arguments. Patterns that represent groups of stories are called story grammars. These grammars have been the basis for instructional strategies in a number of research studies.[1] Typically, basal programs approach story comprehension by asking students questions from various skill areas like sequencing, main idea, and literal comprehension. Table 6 illustrates several types of questions with a story from a third-grade basal reader (Rowlands 1982). Learning to answer these teacher questions is not the same as learning to identify and organize important information. The questions in Table 6 are clear and for the most part tap important information from the story, but they don't necessarily lead students to form a gestalt of the story. What's needed are strategies that lead students to identify and organize important information, on their own. These strategies are particularly important when the students are reading independently.

Suppose a designer conducted a structure analysis on the stories summarized in Table 7 and other similar stories. As you glance over the story summaries, note how diverse the stories are. A structure analysis for these stories would be relatively useless because specific patterns are almost impossible to identify. The best the designer might come up with is this pattern: stories tell about things that happen. The pattern is too vague to serve as a basis for a strategy.[2]

Continued on Page 12

Footnotes

1. These story patterns, called story grammar by Thorndyke (1977) and Mandler & Johnson (1977), who originated the research, have been the focus of instructional research by myself (Carnine & Kinder, in press) and others (Singer & Dolan, 1982). Teaching basic patterns on story grammar appears to help students answer comprehension questions, retell the stories they read, and remember information from stories.
2. This confusion about the structure of passages and the purposes for reading different passages is not just a comprehension problem. This confusion may also be the root of students' difficulties with expressive writing. Students who don't realize that they are to read and extract a structure, a gestalt, from a passage will have a hard time building a structure when they write. These students read in an unsystematic way and they write in an unsystematic way.

Instructional Design Continued from Page 11

Table 6. An Illustration of Basal Reader Questioning.
"Poor Bronto" from The Dictopedia: A-L, Grade 3, Roland (1982)

Once a long, long time ago, Bronto was swimming in his swamp. Some of the other animals wanted to swim, too.

"No! You can't swim. You'll just have to watch," Bronto said, stomping his great, green lizard foot. SPLASH!

Every day Bronto swam around and around. He ate all the green leaves he could find. The other animals watched and grumbled.

"Why can't we swim, too?"

"Bronto spoils all the fun."

"It isn't fair!"

Now one day it got very cold. Snow began to fall.

"Brrr!" shivered Bronto. "It's too cold to swim, I know! I'll leave the swamp and find a better place to live."

But Bronto had eaten so many leaves that he was too big to get out of the swamp by himself. The snow started falling harder and harder.

Bronto yelled, "Help! Help! KERCHOO! HELP!"

But the animals had all gone to find a warmer place to live. No one heard poor Bronto.

So Bronto sat all alone. Soon the snow was up to Bronto's knees, then to his tummy. Then it was up to his chin. The snow piled up and up and up, right to Bronto's cold little nose.

Finally, with one last kerchoo, poor Bronto died in the cold, cold swamp.

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1. Show what Bronto did with his green lizard foot. (Student should stomp foot.)
2. Do you think Bronto was a generous dinosaur? Why? (No, he was selfish; he wouldn't let other animals in his swamp.)
3. Why did Bronto decide to leave the swamp and find a better place to live? (It got cold and started snowing.)
4. What happened to Bronto because he had eaten so many leaves? (He had gotten too big to get out.)
5. Where had all the other animals gone? (To find a warmer place.)

Table 7. Story Themes for Possible Structural Analysis.

Poor Bronto kept other animals out of the swamp. He swam and ate swamp plants. It started getting cold and Bronto wanted to leave the swamp. But he was too fat and there were no other animals to help him get out. He got covered with snow and died.

The Boy Who Cried Wolf is about a boy who watched the village sheep. He liked to play and talk to others, so he found watching sheep boring. He cried out that the wolf was coming. Each time the villagers came, but there was no wolf. At last a wolf did come. When the boy cried wolf, no villagers came to stop the wolf from eating sheep.

Amelia Bedelia is about a day in the life of a maid. These quotes give a sense of the story. "'I never knew bread did magic things.' Amelia got everything she needed. Quickly she mixed the dough. Amelia Bedelia set the pan on the table. 'Now,' she said, 'you're supposed to rise. This I've got to see.' Amelia Bedelia sat down to watch. But nothing happened." (pp. 14-16) "Amelia Bedelia picked up her list. 'Make a sponge cake.' Amelia Bedelia read that again. 'I know a lot about cakes,' she said. 'And I never heard tell of that. But if she wants a sponge cake, I'll make her a sponge cake.' Amelia Bedelia put a little of this and some of that into a bowl. She mixed and mixed. 'Now for the sponge,' she said. Amelia Bedelia got a sponge. She snipped it into small pieces. 'There,' she said. 'Into the cake you go.'" (Parish, 1976, pp. 26-27)

Hansel and Gretel is about two children who are abandoned by their father and wicked stepmother in the woods. The children find a gingerbread house and begin eating it. The house belongs to a witch who becomes angry and tries to cook the children. Gretel fools the witch. The children return home to find the stepmother gone and their father grieving over them.

The *Brontosaurus* was a dinosaur that lived long ago in hot, wet swamps. It looked like a giant lizard. Its name means thunder lizard. Dinosaurs are now extinct; only dinosaur bones remain. Changes in temperature may have killed the dinosaurs.

The vagueness of the pattern is not the result of a poorly conducted structure analysis, but is a reflection of the diversity of the stories that were analyzed. In the analysis for drawing conclusions, and critiquing arguments the groups of examples were clearly defined—arguments having conclusions with *some*, *all*, or *no*. The analytic designer identified patterns and devised strategies accordingly. To conduct a useful structure analysis for story comprehension, the designer has to make smaller groups of stories so that a viable strategy can be devised for each subgroup. Creating different groups gives an analytic designer tremendous flexibility. The way stories are grouped defines the strategies that can be created.

Thus, the analytic designer places the stories in Table 7 into smaller groups. The designer might decide to group stories like *Poor Bronto*, *The Boy Who Cried Wolf*, and *Hansel and Gretel* together, and place humorous stories like *Amelia Bedelia* in a different group, and expository stories like *Brontosaurus* in yet another group.

After establishing the groups, the analytic designer completes the structure analysis. A pattern is devised for *every* group. If the group represents an important type of story, a pattern is needed as the basis for a strategy. The structure analysis of the group of stories containing *The Boy Who Cried Wolf* produces a pattern similar to that identified by story grammar researchers. The pattern leads to a problem-solution strategy that can be illustrated with *The Boy Who Cried Wolf*:

Who is the story about? "A boy."
What problem did he have? "He was lonely."
How did he try to solve the problem? "He cried wolf."
What happened when he tried to solve the problem? "Everyone came running."
How did the story turn out? "When the wolf came, he cried wolf, but no one came."
What did you learn from the story? "If you lie, people won't believe you when you really want them to believe you."

The questions are relatively simple, clear and brief; i.e., the strategy is economical. The strategy is powerful because it applies to *Poor Bronto*, *Hansel and Gretel* and many other stories as well. Once the structure analysis is complete, the analytic designer begins the integration analysis.

Integration Analysis

Integration analysis takes a strategy and compares it with other related strategies to see whether they complement or interfere with each other. In the critiquing arguments example, the integration analysis lead to a redo of the structure analysis. In looking ahead to other strategies, integration analysis can serve a different purpose, identifying times when students must apply *one of many* different strategies. Since some of these decisions are difficult for students, the designer creates instruction to help students make those decisions. For example, stories are often classified as expository or narrative. The passage titled *Brontosaurus* in Table 7 is expository. *Poor Bronto*, also in Table 7 is narrative. Integration analysis can be used to help create a framework that cues students to use one strategy for narrative passages and a different strategy for expository passages. An instructional presentation appears in Table 8. The students identify each story as an information story or as a story that tells what happens to characters. *This decision cues which strategy the students should use.*

Once students select a strategy, they apply it. The strategy for the expository passage, *Brontosaurus*, signals the students to select key information and rehearse it. Expository content is to be remembered. The strategy emphasizes this. Longer, more difficult expository passages require more complex strategies, but such strategies are not needed until later grades (Adams, Carnine, & Gersten, 1982).

The integration analysis not only emphasizes the importance of how to distinguish a new strategy from previously taught strategies, but also reminds the designer to *periodically review* the strategies. Most students will have little trouble deciding which of two strategies to apply—like simple narrative and simple expository. But as more strategies are introduced, careful review is needed to prevent students from confusing the various strategies. The integration analysis identifies which strategies are most likely to be confused with a new strategy. Those strategies are reviewed before the new strategy is introduced. Also the introduction of the new strategy points out how it differs from the potentially confusing strategies.

While the primary purpose of the structure and integration analyses is to help students learn the steps that make up strategies and when to apply the strategies, the strategies have an additional benefit. They provide a basis and context for teaching conventional comprehension skills. For stories with a problem-solution grammar, students ask themselves literal and inferential questions to identify a character's problem or how the character attempts to solve the problem. Students can answer sequencing questions by summarizing the order of events distilled from the problem-solution strategy questions. Also, students can often answer main idea ques-

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Table 8. Teaching About Narrative and Expository Stories.

Some stories give information and explanations that are important to remember. Other stories tell what happens when characters try to solve a problem.

Read *Brontosaurus* and decide whether it is an information story or a story about someone trying to solve a problem. (Students read *Brontosaurus*.) What kind of story is it? (Students respond.)

This is an information story. It gives information about the brontosaurus. Read the story again. Then make a list of the important information in the story. Pick the 3 or 4 important facts to remember. (Wait.)

What facts did you pick? (Students respond.)

Now rehearse your facts so you will remember them. (Wait.)

Now read *Poor Bronto* and decide whether it is an information story or a story about someone trying to solve a problem. (Students read *Poor Bronto*.) What kind of story is it? (Students respond.)

This is a story about someone trying to solve a problem. Let's review the questions you ask when you read about someone trying to solve a problem:

Who is the story about?
What problem does the character have?
How does the character want to solve the problem?
What happens when he tries to solve the problem?
What happens in the end?
What did you learn?

---

tions by referring to the strategy questions. For example, the main idea in *The Boy Who Cried Wolf* might be the answer to the last strategy question—What did you learn from the story? Students are more likely to see a purpose and method for learning to answer literal, inferential, sequencing and main idea questions if the questions contribute to the students seeing "the big picture."

Earth Sciences

The final example takes structure analysis outside of the realm of language arts, to earth sciences. As stated earlier, the analytic designer reorganizes content to make clear those patterns that have great explanatory power. In the earth sciences videodisc course being developed by Systems Impact, the concept of convection has great explanatory power. It can be used to explain the movement of land masses (plate tectonics, bands of earthquakes and volcanos), the ocean currents, and air movements in the atmosphere (wind and weather). Convection is the process by which matter rises when it is heated and sinks when it cools. Water rising and falling in the ocean and air rising and falling in the atmosphere account for currents in the oceans and in the atmosphere. Even solid earth is actually semi-molten. The core of the earth heats rock near the center, which rises. As the rock rises it cools, and then begins to sink. This is also convection. By initially teaching the concept convection, students have a concept they can use to make sense of the seemingly unrelated phenomena of plate tectonics, volcanos, ocean currents and wind.

Other Components of Analytic Instructional Design

As can be seen in Table 9, structure and integration analysis occur within a larger framework. The major stages in analytic design are planning, construction, and evaluation. A disproportionate amount of time has been spent discussing the analyses because they are the most creative and innovative aspects of analytic design strategies. However, the quality of the analyses reflected in a program is not the sole criteria for acceptability. Any program must be attractive and marketable. It must also be manageable when it is implemented.

Planning

The manageability of a program can be thought of as how well it accounts for the implementation constraints that exist in schools. The major constraints are scarcity of instructional time, variability in teacher competence, and the wide range of student abilities in any given classroom. The lack of time makes efficiency essential. Vocabulary instruction illustrates the importance of efficiency. If teachers had thirty minutes a day to devote to vocabulary instruction, programs of varying quality could all be used to successfully. With only ten minutes a day, however, the analytic designer must be much more ingenious to bring about adequate learning. More efficient teaching is essential.

A similar problem exists for response to variability in teacher competence. One response might be to write very elaborate instructional programs. A too elaborate program is impractical, though, because it takes too long to implement. So the designer must respond to variability in teacher competence in other ways: (1) to simplify the demands the designed program made on teachers, (2) incorporate realistic levels of teacher in-service, and (3) turn to technology for more sophisticated presentations. For example, Systems Impact is currently developing videodisc instructional courses. The videodisc can reliably present complex material in a vivid, even entertaining way and yet require little extra effort on the part of the teacher.

Marketing constraints are crucial for publishers. How can a program be similar enough to other programs to make teachers comfortable and yet incorporate sound analytic design principles? One tactic is to treat analytic design features that set a program off as marketing strengths. Suggestions about how to teach difficult skills, often left vague by authors in deference to teacher discretion, can be treated as specific suggestions to help teachers solve instructional problems. Endless variety in print material, thought to be necessary to motivate students, can be replaced with daily practice that results in students having an opportunity to master skills. The spiral curriculum, which implies that learning failures can be addressed next year, is unwound so that more students will learn what's presented during the current year.

The point of emphasizing implementation and marketing constraints during planning is to collect the designer, practitioner, and publisher into a collaborative team. Collaboration will yield a product that is both effective and acceptable.

Table 9. Analytic Design

I. Planning

A. Creative Aspects
  1. Structure Analysis:
     Strategies with economy and power. (Build schema)
  2. Integration Analysis:
     a. Identify flaws in structure analysis.
     b. Teach students when to use a particular strategy. (Develop metacognition.)

B. Mechanical Aspects
  Implementation Constraints:
     a. Time available for instruction.
     b. Teacher competence.
  Marketing Constraints:
     Promote differences as strengths.

II. Construction

A. Strategy Writing
  1. Prepare: Teach content needed for applying strategy.
  2. Demonstrate: Show how strategy works.
  3. Guide Usage: Use questions to prompt strategy.
  4. Build Independence: Drop teacher questions.
  5. Correct: Relate to strategy.

B. Practice Specification
  1. Concentrated Practice (for mastery).
  2. Periodic Review (for retention).

III. Evaluation

A. Gathering Field Test Data:
  Collect data on type of errors and frequency of errors.

B. Interpreting Field Test Data:
  Look for error patterns relating to planning and construction.

C. Revising a Program:
  1. Redo planning and construction.
  2. Conduct another field test.

Construction

Construction requires translating the strategies growing out of structure and integration analyses into the lesson components listed in Table 9. Prepare, demonstrate, guide usage (by asking questions based on a strategy), build independence (by gradually dropping teacher questions about the strategy), and correct errors (by reminding students of the strategy that leads to a correct answer).

Our research on the various aspects of lesson construction is reviewed elsewhere (Engelmann & Carnine, 1982). A computer-assisted instruction study based on the analysis for drawing conclusions can serve as an example. The major independent variable was type of correction. Following a mistake, students were either reminded of the strategy that had been presented earlier or they were just told the correct answer. Students reminded of the strategy as part of the correction showed significantly higher posttest, transfer test, and attitude survey scores (Collins, 1984).

Another important aspect of lesson construction is specifying practice. When a major strategy is first introduced, several practice examples are needed in each lesson to give students the opportunity to master the skill. Later, practice can be more sporadic, but not too infrequent. Periodic review fosters retention. Initial mastery followed by periodic review is essential for both comprehension and remembering.

Giving students several practice opportunities on a new strategy leads to very different-looking programs. In our research on teaching students to identify character motives (Carnine, Stevens, Clements, & Kameenui, 1982), students read three short passages each day for three consecutive days. All nine stories focused on character motives. Basal programs almost never sequence nine stories of the same type on consecutive days. Yet, a concentration of examples is necessary for many students to master a strategy.

Recommendations about extensive practice to promote mastery must be kept in perspective. In teaching students to comprehend word problems we found that extra practice using the procedures from math basals lowered student scores (Darch, Carnine, & Gersten, 1984). Testing and then reteaching seems to benefit students only if the strategy they apply is economical and powerful.

These and other research studies on effective teaching practices like corrections, demonstrations, and extensive practice have been receiving increasing attention from publishers and practitioners over the past few years. Hopefully, the quality of the analyses that are at the core of instruction will receive more attention during the coming year.

Evaluation

The final stage in analytic design is evaluation.

Evaluating an instructional program, which is often treated as a pro forma exercise by publishers, is another major creative activity in analytic design. If motivation and entry skills are controlled through screening or preteaching, student errors give analytic designers their major opportunity to create a truly elegant program. Without the clues offered by student errors, elegant programs cannot be designed.

Analytic designers cannot imagine every significant confusion that students will have. Student errors are puzzles that analytic designers solve by retracing their steps in the analysis and construction stages. Designers who approach these puzzles as both a challenge and a responsibility, improve their programs. The improvement comes not just from revising a program, but from field testing the revision. The revision, field-test cycle takes a lot of development time, but saves a great amount of time for teachers and students. With well-designed programs, students learn more quickly and experience less frustration.

An example of how drastically student errors can influence a program comes from the development of the Systems Impact videodisc instructional programs. For example, field test results have lead to three extensive revisions in the fractions course. With each revision hundreds of pages of script were discarded. Fortunately, each revision has yielded drastically reduced error rates.

Formal research now under way is comparing the performance of students who received instruction on a revised version of a CAI Reasoning Skills program, (Engelmann, Carnine, & Collins, 1985) with the performance of students going through an earlier version of that program. This study will provide one of the first objective measures of the effects of revising an instructional program.

Conclusion

The lack of comprehensive, viable models for instructional design explains the negligible role instructional designers play in conceiving educational materi-

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Health Ways Continued from Page 1

Figure 1. Simulated Effects of Ruby Quitting Smoking.

Before the Change in Smoking

Ages:	Today's		Expected	Winning
Year	Week	Day		
50	00	0	68	75

Will Power = 200 Stress = 20

Name: Ruby

Heredity: Hypertension
Current Diseases: Lung Cancer

A) Weight 10 pounds overweight
B) Tobacco Moderate Smoker
C) Alcohol Light Drinker
D) Exercise Light - One Time a Week
E) Nutrition See Submenu
F) Lifestyle See Submenu
G) Maintenance Menu
H) Stress Reduction Menu
I) Help Menu

After the Change in Smoking

Ages:	Today's		Expected	Winning
Year	Week	Day		
50	23	5	72	75

Will Power = 155 Stress = 50

Name: Ruby

Heredity: Hypertension
Current Diseases: Lung Cancer

A) Weight 10 pounds overweight
B) Tobacco Nonsmoker
C) Alcohol Light Drinker
D) Exercise Light - One Time a Week
E) Nutrition See Submenu
F) Lifestyle See Submenu
G) Maintenance Menu
H) Stress Reduction Menu
I) Help Menu

ly assigned to treatments (Pierfy, 1977; Bredemeir & Greenblat, 1981). These problems have plagued research into non-computer simulations as well as the sparse educational research involving computer simulations.

There have been basic design problems with simulations that go well beyond these research design and instrumentation issues. Fletcher (1971) cites four reasons for the disppointing research results: (1) poorly developed games which have not been sufficiently field tested, (2) a great variation in the quality of the games that do exist (i.e., in terms of complexity, levels of sophistication, and interaction of participants), (3) the lack of any clear relationship between the structure of the game and what is to be learned, and (4) vague administrative procedures associated with implementation of games. Though 14 years old, these criticisms remain largely true today.

A last issue in the simulation literature involves the type and quality of measures used in research. Pierfy (1977) criticized many instruments as investigator developed, claiming that they lacked basic information on their reliability and validity. On the other hand, some have asserted that the lack of significant differences in many simulation studies was due to the fact that the measures did not capture everything that was taught (Boocock & Schild, 1968; Megarry, 1979; Cunningham, 1984). Taken together, these criticisms create real problems for simulation researchers. Constructing reliable instruments that measure unusual or highly specific features of a simulation is a very difficult task.

Health Ways: A Study of Effective Instruction and a Computer Simulation

Despite the often gloomy research literature on simulations, the *Health Ways* simulation was studied in conjunction with a written curriculum. We were interested in determining the extent to which *Health Ways* augmented: (1) student recall of basic health facts and concepts, and (2) student ability to accurately diagnose and remedy the health profiles of three individuals.

The Health Ways Supplementary Curriculum was adapted from two widely used junior high school texts. Information that was not pertinent to the Health Ways simulation was deleted, and many of the unusual or difficult vocabulary words were changed or eliminated to lower the readability level of the material. The reading level of the Supplementary Curriculum was sixth grade. Thirty mildly handicapped high school students received structured teaching in the written curriculum in the first half of the class period and were randomly assigned to one of two groups for the last half. One group worked on the *Health Ways* simulation, while the other group received typical extension or application activities (e.g., students recorded and analyzed their diet over a three day period, read short excerpts from newspapers or magazines on topics related to the curriculum, completed crossword puzzles that contained key vocabulary words and concepts).

A structured teaching approach was used because of its documented effectiveness in teaching basic skills (cf., Brophy & Good, 1984; Rosenshine & Stevens, 1984). This was important, as so many simulation studies in the past have not adequately documented the type of instruction given to the "conventional" or comparison group in a study. Structured teaching, as it was used here, entailed large-group instruction for the first half of the period. Additionally, difficult decoding or vocabulary words were presented to the group at the beginning of each class, along with a cumulative review of important concepts from previous lessons. The teacher then previewed the day's reading assignment (approximately 15 minutes) and distributed written questions that were answered as the students read the lesson. At the end of the reading session, the teacher called on students for answers to the written questions and reviewed important facts and concepts in the day's lesson. For the second half of the period, students broke into two groups — the simulation groups and those who received extension activities.

After 12 days of instruction, students were tested with two measures: the Health Ways Nutrition and Disease Test and the Health Ways Diagnosis Test. The Nutrition and Disease Test was a 30 question, fill-in the blank exam designed to measure students' retention of the basic facts and concepts covered in the structured teaching portion of the lessons. The curriculum section of this test consisted of 20 questions based solely from the written curriculum. The remaining 10 questions (the simulation section) covered material that appeared in both the written curriculum and the *Health Ways* simulation. The Nutrition and Disease Test was given two weeks later as a maintenance test. Internal consistency (coefficient alpha) of this measure was .84.

The second measure, the Health Ways Diagnosis Test, tested students' ability to analyze three written profiles by diagnosing and prioritizing changes needed in bad health habits. Students also suggested appropriate remedies for improved health by responding to choice options presented by the examiner. For example, one profile showed an individual with a current illness of liver disease and a heredity of diabetes. Weight and diet information showed this individual as seven pounds overweight and eating a lot of empty calorie sweets and foods with cholesterol. She was also a light drinker. The seven other habits were acceptable (e.g., a nonsmoker, eats balanced meals, exercises five times a week), and acted as distracting information. The Diagnosis Test had a test-retest reliability of .81.

A strict criteria and a moderate criteria were used to rate student prioritizing skills on this measure. To score at the strict criteria, a student must identify and change the three most important health habits in a specific order, an order contingent upon use of current disease and heredity information. In the example above, a student would first change alcohol consumption to nondrinker (a change related to the current disease), reduce the consumption of cookies, cakes, and candies (a change related to heredity), and reduce the consumption of eggs, butter, liver, and fatty red meats (the last most important change). Moderate criteria would allow the student to change the current disease and heredity related habits in any order within the first three changes.

In addition to prioritizing, students were evaluated on their ability to control stress, to identify health problems, and to make correlated changes. The examiner increased the stress level from average to high on each Diagnosis profile after the student made two successive non-exercise changes. Only by immediately attending to this change was the student awarded points for stress management. A score for identifying a main health problem was independent of the correlated change for the problem. Thus, if the student chose to reduce cholesterol consumption (a main problem in one of the profiles) by drinking less coffee, tea, or sodas, points were awarded only for identifying a main health problem, but not for making the correlated change (i.e., eating less eggs, butter, liver, and fatty red meats).

Results of the Study

Performance by the simulation group was very encouraging. Tables 1 and 2 show the means, standard deviations, and mean percent correct for each of the measures. Three 2 x 2 analyses of variance were performed on the Nutrition and Disease Test: total test and its two parts — the curriculum section, and the simulation section. There were significant differences between groups for instructional method on the total test score (p less than .03) and the simulation section of the test (p less than .01). The difference on the curriculum section of the test approached significance level (p less than .06). All effects were maintained over time and there were no significant interactions between instructional method and time of testing.

Using t-tests, group differences on all components of the Diagnosis Test were highly significant (p less than .001). Simulation students outperformed those in the conventional group in prioritizing health problems, controlling stress, identifying health problems, and making correlated changes. Further, a Pearson correlation between scores on the Reading subtest of the Metropolitan Achievement Test (administered one day prior to instruction) and the total score on the Diagnosis test was .12. This suggests virtually no relationship between academic abilities reflected by the MAT and the problem-solving skills measured by the Diagnosis Test.

Comparisons with non-handicapped students. Scores of mildly handicapped students on the two main measures were compared with a random selection of 15 non-handicapped students in regular health classes who did not participate in

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Health Ways Continued from Page 14

Table 1. Means (M) Standard Deviations (SD) and Mean Percent Correct on the Simulation Section of the Nutrition and Disease Test

Instructional Group	Post Test			Maintenance Test		
	M	SD	Mean % Correct	M	SD	Mean % Correct
Simulation Group	7.33	1.35	73.3	6.53	2.00	65.3
Curriculum Group	5.60	2.20	56.0	5.00	2.17	50.0

Table 2. Means (M) Standard Deviations (SD) and Mean Percent Correct for the Three Groups on the Diagnosis Test

	Simulation			Curriculum			Non-Handicapped		
	M	SD	Mean % Correct	M	SD	Mean % Correct	M	SD	Mean % Correct
TOTAL SCORE	27.7	6.2	73	12.47	4.9	33	18.07	6.0	48
TOTAL SCORE WITHOUT STRESS	22.8	5.9	71	10.73	4.1	34	14.87	5.6	46
IDENTIFICATION AND CORRELATION ONLY	14.4	2.1	90	9.27	2.8	58	11.60	2.6	73

the study. This was a quasi-experimental procedure, and its purpose was to compare performance on a range of academic tasks, from basic facts to higher cognitive skills. A one-way analysis of variance showed a significant difference (p less than .05) on the simulation section of the Nutrition and Disease Test. A Tukey post-hoc comparison revealed only a significant difference between the mildly handicapped simulation group and the two other groups. One-way analyses of variance on each component of the Diagnosis test indicated significant diferences between the simulation students and those in the regular classroom (p less than .01), and equally significant differences between the regular classroom students and the mildly handicapped students in the conventional group (p less than .01).

Implications of the Research Findings

The results clearly support the view that structured teaching and a computer simulation are effective means of teaching not only basic facts and concepts, but important health-related problem-solving skills. The issue of problem-solving skills is not to be underestimated, as high school students, particularly mildly handicapped students, often do not have the opportunity to practice higher-cognitive skills in typical application exercises. When such opportunities do arise, they are usually presented ad hoc and without systematic practice. This study demonstrates that important health knowledge can be successfully taught to mildly handicapped students; knowledge that is not commonly taught in regular health classes.

This does not imply that instruction in regular health classes does not nor cannot address these higher cognitive skills. Rather, it would appear that the unit-by-unit or topical approach used in most health classes neglects the problem-solving skills of prioritizing. Students are rarely afforded the opportunity to review and integrate their knowledge of diseases, bad health habits, etc., in the cumulative manner as it appears in the *Health Ways* simulation.

The extent to which the simulation alone had an effect on students is reflected in several unprompted situations following the instructional phase of the study. In one case, a girl lamented the 10 pounds she had lost six months earlier and had now gained back. She had been thinking about this over the past weekend and decided that she hadn't maintained the changes in her habits that led to the weight loss. Maintaining changes is a central feature of *Health Ways*.

Another student, a boy who was at least 30 pounds overweight, claimed that he had been thinking about his weight because of the class (i.e., the structured teaching and the simulation) and that he was going to cut down his eating by one third. More interesting were his reasons. He clearly articulated the effects of extra cholesterol and excess body weight on the heart. To reduce his weight, he had decided to return to running rather than just weight lifting, as the former was a better form of exercise. The difference between static and dynamic exercise was presented in one lesson of the Supplementary Curriculum.

Finally, in a writing assignment given one month after the study on, "Advice that You Would Give to Someone about to Become a Teenager," two students from the simulation group wrote extensively on health topics that came from *Health Ways* and the Health Ways Supplementary Curriculum.

We do not suggest that these last three anecdotes imply that students who were in the simulation group actually changed their behavior, at least in a lasting sense. Evidence for such changes was beyond the scope of the study. However, we feel that the instruction for the simulation group was an effective first step, albeit a cognitive step, in personal health management. We assert that truly effective health education in this area is a long-term issue, one that begins with an orientation exemplified by *Health Ways*.

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Instructional Design

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als. A sufficiently complete and coherent model of instructional design can greatly improve how well students learn. In a very small way, such models make possible a Copernican revolution in the creation of instructional material. While the significance of Copernicus's thinking is typically thought to be moving the earth out of the center of the universe, there is a far more profound implication. Copernicus's work extended scientific inquiry, which had been restricted to astronomy, to earthly phenomena. Before Copernicus, heavenly interpretations accounted for events on earth. Similarly, the role of instructional designers has been somewhat ethereal. The influence is seen only on the periphery, possibly in the form of instructional objectives preteaching of vocabulary, and advanced organizers at the beginning of lesson plans in basal reading programs. With the advent and acceptance of more viable approaches to design, the actual substance of reading lessons can be improved.

This improvement hinges on the creation of strategies that grow out of structure and integration analyses and that accommodate the constraints of implementation and marketing. These strategies can then be transformed into lessons that reflect current research on effective teaching practices—(e.g., the use of modeling, teacher-directed applications, concentrated practice over several days, periodic review, etc.). The lessons are then field tested to identify mistakes made in the analysis and construction stages. After one-to-four cycles of field testing and revising, an effective, elegant program can be produced, the kind that can bring instructional design back to earth from the cold, bleak atmosphere.

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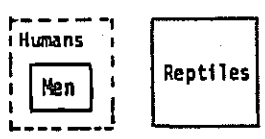
Table 10. Answers

1.

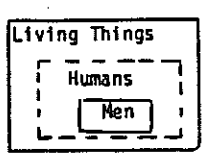


All men are human.

No humans are reptiles.

Conclusion: No men are reptiles.

2.



All men are human.

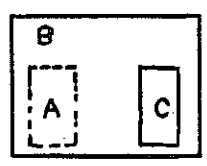
All humans are living things.

Conclusion: All men are living things.

3. All A are B.

No A are C.

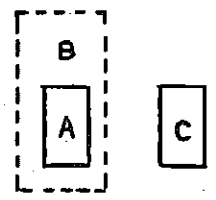
No B are C.



4. All A are B.

No B are C.

No A are C.



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– Student Progress Monitoring –

Quality Assurance in Teaching Basic Skills

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Most people would agree that it is desireable to have as many students as possible do as well as possible in learning basic skills in school. Yet few educators have developed procedures to assure that all students do well in school. Typically, the material is presented, some children do well while others do poorly, and differences in performance are attributed to differences in students' ability levels and aptitudes. While this position is hard to argue with, the outcome it explains is not inevitable.

It is quite possible to produce more consistently high level performance among students than is usually accomplished if we attend carefully to variables which affect student performance. Among these are the quality of the teaching materials, the efficiency of the organizational and instructional procedures, the effectiveness of the motivational approaches, and the sensitivity and responsiveness of the monitoring practice. In this article, we will briefly describe the approach one school uses to monitor student progress through the basic skills curriculum.

St. Alice School is a Catholic School serving approximately 200 low- and middle-income students in preschool through eighth grade. During the 1983-84 school year, staff members began receiving training in direct instruction concepts and programs. In the fall of 1984, a direct instruction curriculum was implemented in reading, writing, spelling, and math in grades K-6. Scheduling was re-organized on a school-wide basis to permit cross-grade groupings where necessary. Criterion teaching time became a part of every teacher's schedule. Still, we were not comfortable simply counting on the power of the curricular, instructional, and organizational arrangements to carry every child through the curriculum smoothly. We wanted to ASSURE that each child did well, and that required a system of on-going monitoring.

Typically students' progress is evaluated after-the-fact, when it is either too late or too inconvenient to do much about any defiencies in performance. Student differences, expressed in terms of grades, are explained in terms of aptitudes or abilities—of the student, not of the system. An alternative is to monitor student progress during the course of instruction. If this is done with sufficient frequency and specificity, effective intervention is possible when performance discrepancies are noted. The student progress monitoring system at St. Alice's School was developed as a supplemental evaluation component. Tests and grades are still given, but the monitoring system provides more frequent and more specific information about student performance—the kind of information needed if school staff are to become responsive to students' changing instructional needs.

This year, monitoring has been done in reading, spelling, and creative writing in a 3-week continuous rotation with performances in one subject monitored each week. Next year, we will add math to the rotation. Monitoring is conducted by trained volunteers and coordinated by two graduate students' in school psychology from a nearby university. The graduate students' professor serves as a consultant to the project; the school principal serves as a back-up monitor and as the link between data collectors (monitors) and data users (teachers). Students have been taught to graph the scores they receive from monitoring assessments and to interpret the patterns appearing on their graphs. Teachers have been taught to interpret assessment data and to use it for making instructional decisions, such as those relating to grouping, placement, and pacing. Teachers have also used the data in conferences with parents to report student progress. Our connection with the local university has been instrumental in establishing the monitoring program here. However, the system could be used in any community once it had been set up and initial training had been provided.

Monitoring assessments are conducted each week in each classroom. Reading assessments are done individually during students' reading seatwork time; spelling and writing assessments are group-administered. In reading, students are asked to read a passage from the portion of the reading curriculum which they are expected to have reached by the end of the year (group-level assessment). Different passages are used on different assessment occasions to avoid practice effects. On several occasions during the year, all students in a given grade are assessed on the same material (grade-level assessment). This practice has allowed project staff to develop grade level norms for the school—something which will assist in subsequent assessments and program evaluations. In all reading assessments, students are timed for one minute, after which their total words read and words read correctly are recorded. Students post their score on their reading graph and are assisted in interpreting the meaning of the emerging pattern. This process takes about three minutes per student. On three or four occasions during the year, students are also given a word list (the Harris-Jacobs Word List). The number of words read corrctly is entered in to each student's log.

In spelling, all words from all levels (A-E) of the SRA Spelling Mastery series were entered into a computer program at the beginning of the year. The program produces a randomly generated list of words at each program level for each spelling assessment. As with reading, periodic assesment of intact classes, rather than instructional groups, permits computation of school-wide spelling norms by grade level. Spelling assessments are group administered during spelling classes. Words are dictated at the rate of one word every seven seconds for two minutes. Student spelling papers are later scored by counting the number of correct words and the number of correct letter sequences, a more sensitive measure than words correct. Spelling scores are then posted, and students use posted scores to update their spelling graphs.

Assessments in written expression are group administered during a language arts period. Students are given a "story starter", an idea upon which to base a short story. They are then given one minute to think about what they will write and three minutes to write down their thoughts. Papers are later scored for number of words written correctly, and scores are posted. Students then update their writing graphs in the same manner as they maintain their spelling charts. Spelling and writing assessments can each be done in five minutes or less.

The principal and teachers scan student data logs and charts weekly to look for signs that individual students or instructional groups are having difficulty maintaining a steady rate of progress through the curriculum. Where such signs are found, they confer to determine what steps will be taken to correct the problem. Such options as greater time allocations, adjustments in the rate of covering the material; additional tutoring by peers, parents, or others; and additional incentives for good performance are among the options most often considered.

The student progress monitoring system requires considerable extra effort by those involved in the program—especially the monitors, but also teachers and administrators. However, the effort is very much worthwhile. Without it, we would not be able to remain nearly as aware of each student's rate of progress through the curriculum. And without this awareness, we would not be able to be nearly as responsive to students' changing instructional needs. Perhaps there are more efficient ways to conduct such a system. Perhaps, in time, we will find them. Until we do, we will continue these procedures, which allow us not only to hope for, but also to assure that each student will progress continuously toward mastery of the basic skills curriculum.

Improving Performance with Restricted Resources

Stan C. Paine, Principal
St. Alice School, Springfield, OR

In the three years since the publication of A Nation at Risk, pressure to raise student and teacher performance in our nation's schools has increased steadily. In the same time, the fiscal resources for fulfilling this mandate have become increasingly restricted. Widespread success in this endeavor seems distant, at best, as long as the resources thought to be essential for the job are primarily fiscal. Time is one resource whose expenditure has more power to influence human performance in schools than money. Given a current budgetary outlay for instruction, I believe that we can do more to enhance our effectiveness by careful management of time than we can by increased spending of dollars. I will illustrate this point by mentioning several temporal variables which can significantly affect educational performance without increasing eductional expenditures.

Scheduling. Do our allocations of school time reflect our priorities? In some schools, more time is devoted to lunch, recess, or organizational activities than to any single subject area. With all the planned events and "time grabbers" taking place in our day, instruction is almost relegated to the status of "What we do with whatever time is left." Instruction in academic areas must be given priority status and carefully guarded against "time grabbers".

Following planned schedules. The best thought-out schedules are only as good as people's adherance to them. Do activities start and stop on time? Are academic periods allowed to start late or end early — but not non-academic periods? Look at the logic of the schedules in the classrooms in your building(s), then spot-check implementation of those schedules to ensure that instructional time is being carefully guarded and preserved.

Minimizing transition time. Transition time is that time spent changing what is being done — from one set of materials to another or from one location to another. They occur a dozen times a day or more. If they are limited to 30 seconds or a minute, they will not seriously interfere with instructional time. But if they extend to three, five, or even more minutes each — as can easily happen without careful time management — transition time can very quickly consume a half-hour or even an hour of a school day. Direct management of transition activities can prevent this.

Using criterion time. Criterion time is time set aside each day to catch up students who have been absent, to help along a student who is having trouble keeping up with his her group, to help a group which is not maintaining adequate lesson progression, etc. In short, it is time used to help bring students to criterion in their academic subjects. Without it, students having difficulty often fall further and further behind. With it, all students can maintain both mastery and satisfactory lesson progression.

Other instructional variables can also be managed to produce better student learning without increasing dollar expenditures. First, instructional materials make a difference. The instructional power of Direct Instruction materials, achieved through careful programming, is considerably greater than that of traditional materials. Second, instruc-

Continued on Page 17

EUGENE DIRECT INSTRUCTION TRAINING AND INFORMATION CONFERENCE

Session Schedule

	Mon	Tues	Wed	Thur	Fri
AM	A	A	A	A	C/E
PM	B	B	B	C/D	1:00

Session Titles

A Transition from DISTAR; Marilyn Sprick
A Classroom Management in Grades K-6; Randy Sprick
A Generalized Compliance Training; Geoffery Colvin
A Teaching the Beginning Reader; Phyllis Haddox
A Reading Mastery 3-6; Gary Davis
A Corrective Reading-Decoding; Gary Johnson
A Supervision of Direct Instruction Programs; Linda Youngmayr/Kathy Madigan
A Courseware — DI Perspective*; Bob Dixon
A Evaluating & Implementing Software; Sam Miller
A Overview of Direct Instruction Programs; Maria Collins

B Teaching the Beginning Reader; Phyllis Haddox
B Reading Mastery 3-6; Gary Johnson
B Secondary Classroom Management; Randy Sprick
B Teaching the Severely Handicapped Learner; Geoffery Colvin
B Introduction to Logo; Sam Miller
B Corrective Math; Maria Collins
B Corrective Reading — Comprehension; Nancy Woolfson
B Arithmetic I; Jane Dougall
B DI Theory & Research; Wes Becker
B Diagnosis, Corrections and Firming Procedures*; Zig Engelmann
B Reading II
B Effective Spelling Instruction; Bob Dixon

C Effective Spelling; Maria Collins
C Reading Mastery Fast-Cycle
C Word Processing*; Sam Miller
C Compliance Training for Students at Grade Level*; Geoffery Colvin
C Arithmetic II; Ann Glang/Bernie Kelly
C Evaluating Basals*; Marilyn Sprick
C Beginning Language Skills; Annemiekke Golly
C Teaching Facts in the Content Areas; Gary Davis

D Advanced Math; Nancy Woolfson
D Structuring Classrooms for Success; Stan Paine
D Cursive Writing; Sheila Counts
D Overview of DI Theory; Wes Becker
D Punctuation Skills*; Bob Dixon
D Supplemental & Transitional Activities; Jane Dougall

E Technology & Direct Instruction*; Doug Carnine
E Overview of DI Research*; Wes Becker
E Adapting Secondary Texts*; Bob Dixon & Randy Sprick
E Expressive Writing I & II; Jerry Silbert
E Mainstreaming; Lynn Anderson-Inman
E Teach Your Child to Read at Home; Phyllis Haddox

*New Sessions

PLACE: Eugene Hilton Hotel and Conference Center, Eugene, Oregon
TIMES: August 5 - 9, 1985 Monday - Friday 8:30 am to 4:00 pm
FOR: Teachers of Regular and Special Education, Supervisors, Administrators, and Aides of all grade levels.
FEE: $125.00 for the 5-day conference

The Association for Direct Instruction is pleased to invite you to the 11th Annual Eugene Direct Instruction Conference. It will be held at the Eugene Hilton Hotel and Conference Center, in the Eugene Downtown. The conference has a number of attractions to offer professionals interested in furthering both their technical skills and knowledge of instructional technologies. There is a full range of sessions designed for teachers, aides, supervisors and administrators whose goal is to promote educational excellence in all facets of education. Previous participants will find new course offerings in a number of areas of interest.

After a day of work, participants will enjoy evenings in Eugene. Next door to the Hilton is the Hult Center for the Performing Arts, a World class performance hall. Just a few blocks away are restaurants catering to a variety of tastes. Eugene's setting will make the conference a rewarding professional experience and a relaxing vacation for you and your family. To help renew old friendships or make new acquaintences, a picnic has been planned for Monday afternoon.

CONFERENCE REGISTRATION FORM

Where-When. To be held August 5-9, 1985, at the Eugene Hilton and Conference Center, in downtown Eugene, Oregon.

How to Pre-Register.* Please fill out application form. Enclose with check or school district purchase order for the proper fee. Send application to the Association for Direct Instruction. Pre-registration before July 1 guarantees space in preferred sessions. Any session with less than 20 participants may be cancelled.

**This form covers conference pre-registration only. This does not constitute pre-registration for college credit or room reservation.*

Fees and Discounts. The conference registration fee is $125.00. Association members receive a 20% discount. Group reservations of 5 to 9 participants receive a 10% discount, groups of 10-19 receive a 20% discount. For groups of 20 or more, call for a quotation. Ask for Bryan at (503) 485-1293. The member and group discounts cannot be used together. Choose the discount that will benefit you the most. The fee does not include lodging or meals with the exception of the picnic, and coffee each morning. All training materials are included in the fee.

Hilton Room Rates. The rate for a single is $38.00 a day. Doubles will be $46.00 ($23.00 per person), plus tax. If you are interested in staying at the Hilton please check "yes" on the pre-registration form. We will then put the hotel in touch with you. DO NOT SEND ANY ROOM MONEY TO THE ASSOCIATION.

College Credit. An optional 1, 2, or 3 units of college credit through the University of Oregon are available at an additional cost of $26.00 for each unit. Persons interested in college credit should so indicate on the enclosed pre-registration form. We will send appropriate information on credit along with conference pre-registration confirmation.

Please print your name, address and phone clearly. Use an address at which we can reach you before the conference.

Name_____ Phone(_____)_____

Street _____

City_____ State_____ Zip_____

Have you had previous experience with Direct Instruction? _____

What taught?_____ How many years?_____

I would like to register for the following (list one "A," one "B," and either one "C," or one "D" plus one "E" session):

"A" _____
"B" _____
Either: "C" _____
Or { "D" _____
"E" _____

I am an Association for Direct Instruction member: ☐ Yes ☐ No
I will attend the picnic: ☐ Yes ☐ No
Please send college credit information: ☐ Yes ☐ No
I will be staying at the Hilton. Please send me a reservation envelope: ☐ Yes ☐ No
I would like to be doubled up with another participant: ☐ Yes ☐ No
Persons name (if known) _____
(If this is blank we will provide you with a name and address)

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Improving Performance

Continued from Page 16

tional activities make a difference. Procedures, such as Direct Instruction, which require extensive academic engagement and frequent opportunities to respond, seem to present far greater promise for helping more students do better in school than is the case with traditional methods. Third, motivation of both students and teachers makes a difference. Students for whom high expectations have been set and for whom incentives to learn — intrinsic or extrinsic — are available are likely to do far better in school than those for whom these conditions are not present. Fourth, frequent monitoring of student progress makes a difference. If we can catch discrepancies between desired and actual student performance quickly, we will be able to correct them before the student falls hopelessly behind.

All of these approaches are possible without increasing spending. They do require time to learn, implement, and manage, but they can be carried out with the same expenditures now being made for other materials, instructional approaches, and management systems. School improvement need not wait for large increases in spending. The opportunity for improvement is available now within your budget for the coming school year.

MICROCOMPUTERS IN TEACHER EDUCATION

Samuel K. Miller - Editor

Thoughts on the Future of Computers in the Classroom

By Bob Dixon

It's sure easier to make observations backward in time than forward. For instance, it's easier to see that we're well into Bandwagon Phase II of microcomputers in the classroom than it is to see what Bandwagon Phase III is going to be. Before I describe Phase II, I should briefly review Bandwagon Phase I.

In Phase I, microcomputers were coming and there was nothing anyone could do to stop them. The first (and so far, only) microcomputer revolution in the classroom was a purchasing revolution. We were low on chalk and teacher morale, but we somehow ended up with a new computer or two or ten. Those computers were immediately useful for at least one clear purpose: teaching students about computers. Why teach students about computers? Because computers are coming and there's nothing anyone can do to stop them. So flaunting the adage that a little knowledge is dangerous, we gave students a little knowledge.

Other uses were promised. Computers could do many of the jobs that teachers do, or as some predicted, replace teachers or otherwise radically modify their roles. Computers could also be used to deliver useful classroom tools—utilities—such as word processors.

Whatever the specifics might have been, the belief underlying Phase I was that somehow, computers were going to radically revolutionize the classroom.

That attitude is a little passe now. We discovered that we could *use* computers without knowing a byte from a bite. We found out that the non-dangerous (or least dangerous) computer programmers are professionals. We caught on to why the president of Apple Computer Company said all along that he couldn't imagine why masses of us were taking little courses on computers. (He couldn't imagine why, but he was happy about it, nonetheless.) On the brighter side, we learned that in the course of acquiring a little dangerous knowledge about programming, students might learn some very useful things on the side. A program like *Logo*, in the hands of a well-trained teacher, has such potential.

But by and large, the deluge of courses and programs on computer literacy appears to be receding rapidly.

We've also learned that far too much instructional software falls into one of two categories: (1) that which doesn't really teach, and (2) that which teaches something that could have been taught better and probably more economically elsewhere. We've discovered that if computers have any natural predisposition to do anything at all, it's adding and remembering. And they won't add and remember unless someone tells them to, and it's hard to tell them to add and remember in such a way that facilitates effective and economical learning.

Of the three general promises of computers in the classroom—literacy, instruction, and utilities—utilities have shown the greatest promise. Word processors in particular are doing well in the classroom. The credo of Bandwagon Phase II is to discard what hasn't done well, literacy and instruction, and accelerate the development and implementation of the better proven application: utilities. Marc Turner advocated this position last January in a convention of American publishers. Several publishers, it appears, have elected to jump bandwagons.

That much is just history (with more than a little interpretation thrown in). There are holdout Phase I'ers, and the approaching widespread availability of networks and network-like systems is sure to bring about something of a Phase I resurgence. But Phase II is where we seem to be now.

I will only go out on a limb regarding what's to come next to this extent: eventually, computers may have almost no noticeable impact on the classroom, or they may have a radical impact upon the classroom, or something between those extremes. That's a limb, albeit a short one.

I'm personally predisposed against too much emphasis on literacy. In the five or six years I've worked extensively with computers, I haven't learned much about them, and I don't want to. My little knowledge has all too often proven to be dangerous. But I can't take a hard line on literacy because I don't know much about it.

I do believe, however, like a sub-species of an old Phase I hardliner, that the instructional *potential* of computers is mind-boggling. The reason this point of view has fallen out of grace is, I believe, a very simple one: Phase I looked upon computers as a solution in search of problems. What we ought to be doing instead in education is identifying our instructional problems and looking for instructional solutions, including those that can be implemented via computers.

The difference in point of view is substantial. When the computer *per se* is thought of as a solution, the sources of instructional problems are often ignored. For instance, many worksheets are an instructional problem because they contain tasks that are meaningless busywork or that bear little direct relationship to the goals of instruction. Putting such worksheets on a computer may in fact temporarily motivate students to work harder, but they're just working harder on poor worksheets. No instructional problem is solved, and some new ones may in fact be created. Content area textbooks are frequently an instructional problem, especially for lower performers, because of inadequate examples, concept overloading, and inadequate review, among many other reasons. Putting content area materials on computers does nothing to improve the instructional efficacy of such materials.

I will venture to make this forecast: the future significance of computers in the classroom depends upon the extent to which instructional considerations are prioritized over any other considerations. A computer program might be of significance if it offers adequate and well-sequenced examples, numerous response opportunities, appropriate and specific feedback to those responses, and individually tailored, performance-specific review.

Once instruction is given top priority, then other "computer-related" considerations take on renewed importance, but in a proper perspective. Memory size, graphics capabilities, disk management, and the like become significant or not, depending upon their relevance to higher instructional considerations.

Once instruction is given top priority, we can stop making judgments in the abstract about the value of "program features" such as randomness, branching, variety, colorfulness, etc.

Once instruction is given top priority, we will begin to see meaningful innovation in courseware products, and new methods of developing and delivering those products will appear: educational operating systems and languages, educationally oriented central file management, and educationally dedicated hardware with keyboards, screen resolution, and other features designed specifically to facilitate better instruction.

With respect to this point of view, the future of computers and other technology in the classroom is a minor question relative to the future of instruction in the classroom. It's the mission of the Association for Direct Instruction to impact positively on that broader future, utilizing whatever resources are available for delivering the most effective and efficient instruction possible. Maybe computers will be among those resources. But then again, maybe not.

Use of DI to Teach Science to Handicapped Learners

By Elliott Lessen
and Paula Streich
Northern Illinois University

Editor's note. The use of the term Direct Instruction (with capitals) in this article is not in keeping with a ADI NEWS practices. We reserve the term for curricula where there has been appropriate structural and integration analyses of the content to be taught, the development of a formal curriculum sequence, and field testing of that sequence through several cycles. See the article in this issue by Doug Carnine entitled "Instructional Design". What the author's call Direct Instruction is an example of Rosenshine's direct instruction (little d, little i) which has been discussed many times in these pages. This is a curriculum independent teaching strategy involving "demonstrate, practice, and test."

The use of Direct Instruction has been encouraged because of the many positive features that it employs. However, the approach has mainly been utilized in conjunction with commercially prepared materials (e.g., DISTAR, *Corrective Reading*) for reading, mathematics, spelling, etc. Direct Instruction also has application to other curricular areas and can be used without commercially prepared and scripted material. Its use without commercially scripted text is predicated on the teacher's knowledge of and experience with the DI technique. The purposes, therefore, of this study were: (a) to explore the use of the DI approach in teaching science material, and (b) to determine which of two instructional strategies, traditional v. Direct Instruction, would facilitate better acquistition of science content.

The subjects for this study were two learning disabled adolescents, one female and one male. Both students were enrolled in a cross-categorical special education classroom at the middle school level. Each had been identified by state guidelines for LD. Subject 1 (female) and Subject 2 (male) were 14-1 and 14-6 years of age respectively. The independent reading level and instructional reading level for S1 were 5th and 7th grade respectively, and for S2 they were 4th and 5th grade. The study was conducted in the special education classroom.

The science content used was that in use in the regular science program in the middle school. The material was a Steck-Vaughn text and workbook. The design for the study was an alternating treatments design. Treatment A consisted of traditional teaching which involved *reading the text, discussion of any questions*, and then *giving a written test* (probe). Treatment B consisted of the use of DI. During Treatment B, the students *read the text, received quick paced repetition of the material*, and then *a written test* (probe). The probes consisted of 6 to 9 items, with the modal value being 8.

Each day, two short lessons were presented using the two approaches. The order in which the approaches were presented was randomly selected. Three units were taught during the three weeks of the study. Five reliability checks were calculated for the answers on the probes. There was 100% agreement between the raters for each of the reliability checks.

The results are shown in Figure 1 and 2. For S1, all but 2 data points were

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higher under the DI condition. For S2, all but 1 data points were higher under the DI condition. It appears that S2 had more difficulty under the traditional condition than S1. While the two subjects were reading independently at the 5th and 4th grade levels, the reading instructional level for S1 was 7th grade and for S2 was 5th grade. As the science content was from an 8th grade science text, it may be that the ability to read the material with relative ease accounted for the better performance of S1 under the traditional condition. Both subjects showed better performance under the DI approach for all three units.

While the area of science is lacking research that specifies instructional strategies that are effective and efficient for use with handicapped learners, it appears that the use of Direct Instruction may be a strategy to facilitate learning in this and other content areas. Until now, traditional techniques specified in textbook series are those used for teaching in most areas of the curriculum. It would appear that change can and should be undertaken. Further research endeavors might seek to investigate which of the two instructional strategies used in this study better facilitates maintenance of learning.

Figure 1. Percent Correct for S1

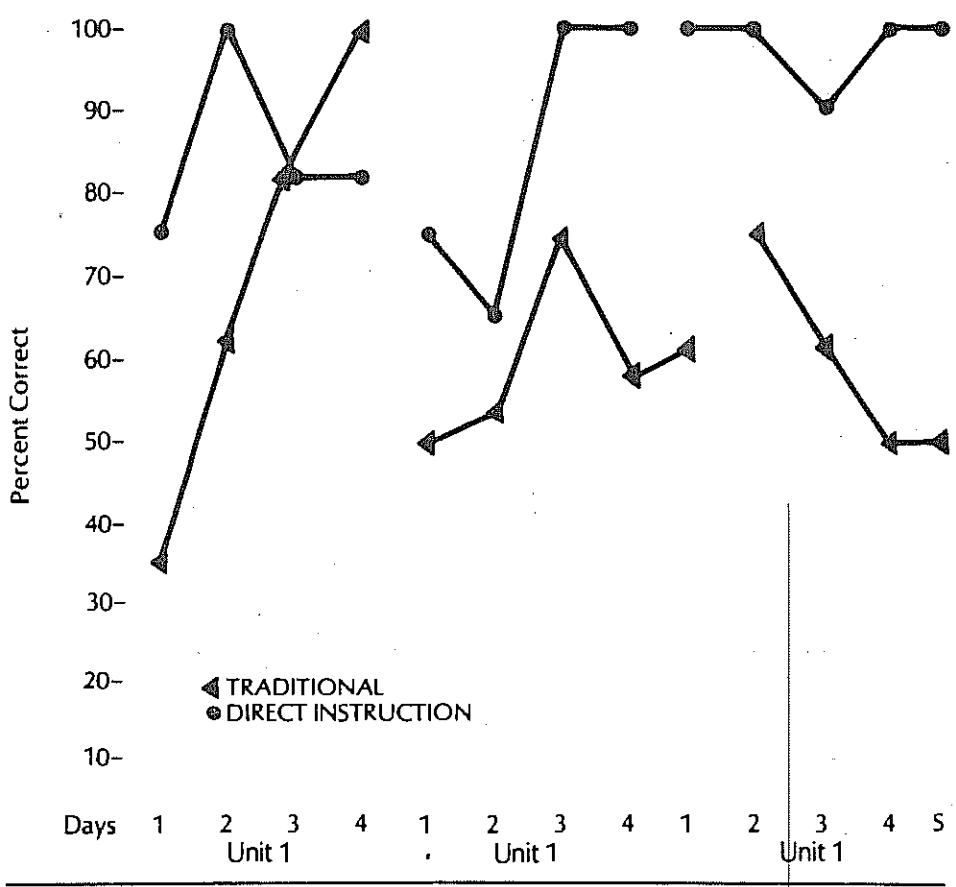
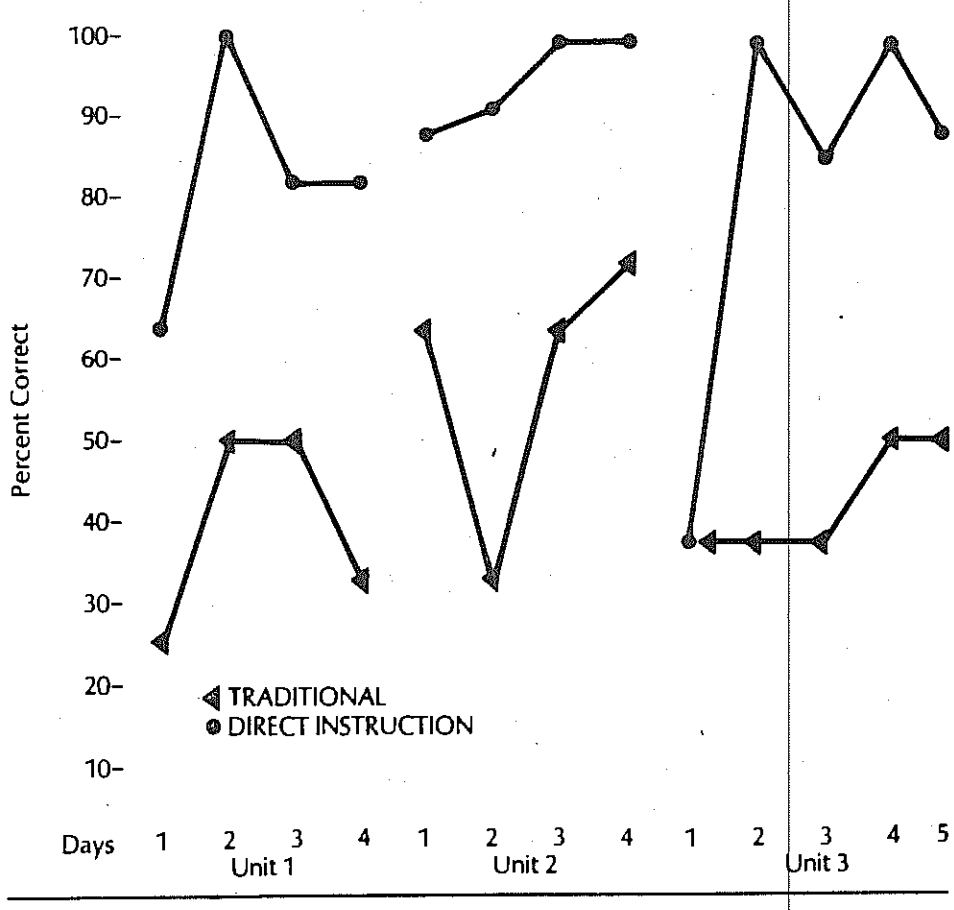


Figure 2. Percent Correct for S2



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ADI sponsored products and events include books and other materials published or marketed by the Association (DI Reading, DI Mathematics, Theory of Instruction, the Annual Direct Instruction Training Conference, and on-site training/consultation available from ADI staff or contractors).

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