Research on Mastering Fractions—an Interactive Videodisc Program

by Bernadette Kelly
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The Curriculum
If nothing else, the research on educational change and innovation shows that it is crucial to assess and evaluate how well a new curriculum, new technology, or new model of teaching is implemented on a day-to-day basis by classroom teachers. The history of educational innovation is full of stories of conceptually elegant, complex educational models that worked well in laboratory school settings, but were never implemented in a serious, consistent fashion in public schools. In this chapter, the evolution of a new, technology-based curriculum—videodisc instruction—is discussed along with an examination of its use in a range of classroom settings, from high achieving to resource room instruction.

Development of the Program
The development of the videodisc program is best understood in the context of a long history of successful curriculum development and teacher training by its senior authors. Since 1968, Englemann and Carnine have been involved in Project Follow Through, one of the largest federally funded experiments in early education ever conducted. Their model—the Direct Instruction Model—was deemed highly successful in the independent evaluation (Thibbs, St. Pierre, Propper, Anderson, & Cerva, 1977). In reflecting on what led to the success of the Direct Instruction Model in enhancing student achievement, several factors recur consistently.

The first is a concern with instructional design, the details of curriculum (Englemann & Carnine, 1982). This process focuses on what many educators might consider mundane decisions: the best wording for teachers to use in demonstrating a new skill; the most effective way to correct students’ errors; the most effective strategy for introducing a concept; and the number and range of examples necessary to insure mastery of a new concept.

The second concern is the close attention to teacher behavior and classroom organization. What is the appropriate pacing for a lesson? How many questions should the teacher ask students during the active teaching phase of the lesson? What is the optimal ratio of guided practice to independent seat work activities?

Finally, a third concern that eventually distinguished Direct Instruction from many other approaches was what we call the “real-people principle,” a concern for developing a feasible classroom intervention (Gersten, Carnine, & Woodward, 1987).

Yet when the implementation of Direct Instruction over time was closely studied, Carnine (1984) concluded that in many ways, the demands that well-implemented Direct Instruction puts on the teachers were too great—in terms of both the amount and the intensity of teaching. The frustration with effective, but labor intensive instructional practices we had worked with led us to technology. Technology, it appeared, offered alternative ways to increase active teaching without the excessive costs associated with training and supervision.

Overview of the Videodisc Curriculum
In theory of Instruction, Englemann and Carnine (1982) attempt to provide a more detailed analysis of how to teach concepts and strategies effectively to students. They devote a significant portion of their book to the initial phases of instruction—the place where students are most likely to become frustrated with their progress. The purpose of this chapter is to continue the discussion of the videodisc curriculum.

Whole Language and Direct Instruction

Editor’s Note: In this issue we present three views of the “battle” between the Whole Language approach and Direct Instruction. One view comes from a school psychologist in Ithaca, New York (Chuck Baxter). Another comes from a principal and teacher in Canada (Terry Dodds and Gay Goodfellow). The third is by Ziggy Englemann in Eugene. Let us know what you think.

The Battle of the Day
A critical analysis of the seven strategies used in the Whole Language approach as they are contrasted with some principles of Direct Instruction.

by Chuck Baxter
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The battle of the day is to determine the approach in teaching children to read with precision. Do we teach generalizations and positive transfer of specific communications: OR do we accept approximation of the whole and promote an unobservant, "self-correction" feedback communication, that will generate a swell of magical synthesis of understanding? I call this battle the battle between the Direct Instruction (DI) approach to guided-case learning to read and the Whole Language (WL) approach.

In what follows, I will discuss some of the strategies emphasized by each of these approaches and the problems that may develop accordingly.

Immersion. Immersion is a strategy most emphasized by the Whole Language approach. Immersion may be the most visible strategy of the WL approach. The intention is to flood the classroom with a synthesis of language. The aim is an integration of skills by teaching many simultaneously. For example, teaching children to break-the-code in reading is done in the context of meaningful content. Consequently, as the learner learns to break-the-code, he is also being taught comprehension and the structure of writing. In operation, the reading of stories to students, the access of many books, the active mixing of reading and writing are some visible examples of immersion. Immersion may have integrative advantage at certain stages of learning.

DI programs do not automatically incorporate immersion activities around all DI practices, although many are built-in. Problems could develop in some integration of skills, as in reading and spelling. In either approach, immersion largely happens as a result of the initial learning of the teacher. While it is one of the first goals of the WL approach, emphasis is placed first on learning each skill by itself in the DI approach. However, I personally have never known an effective DI teacher who understood immersion in teaching applications of skills, nor neglected to make it a very visible part of their integrated classroom operation.

Employment. In the Whole Language approach employment is claimed to offer a more sophisticated concept than practice, for it has an added quality of meaningfulness. In other words employment means "meaningful practice." In action, this means that reading is a situation where all children are viewed as readers, as they are viewed as writers, spellers, and I suppose mathematicians, regardless of proficiency. For the less polished reader, approximations are accepted, assuming that by receiving consensus feedback (pictures and words), eventually, over a period of time, through a process of self-correction, the reader will become proficient. The teacher operates as a kind of catalyst, who asks a series of divergent questions which are to act as an aid to the learner on their yellow brick road to self-corrective proficiency.

The counterpart to WL’s employment are the DI concepts of precorrected practice of new learning, cumulative introduction of new members of a related set, and distributed review of older learning. DI precorrected practices of new learning establishes mastery with minimal error. Cumulative introduction (adding new members to a set only after previously introduced members reach criterion) insures that essential discriminations are learned. Distributed review assures retention of old learning that might be inferred with new learning. Problems may develop when it is not acknowledged that all children have not the same amount of practice or review. If this difference is not recognized, some children may be held back.

Update your Direct Instruction skills and information.
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Direct Instruction Model Receives Follow Through Grant

The University of Oregon’s Direct Instruction Model and four sites have been funded for a new round of the Follow Through Program (the 20th year). The emphasis of the IDIO is on developing and disseminating effective teaching practices for low-income students. A strong educational component will make educators aware of the performance of students, and also let them know the steps involved in adopting specific program components.

The keys to effective demonstration and dissemination are well-implemented classrooms and strong local leadership. With these keys in mind, the Direct Instruction sponsored selected sites that have: a) strong leadership; b) a history of effective programs for low-income students; c) an administrative structure that is designed to provide the staff development, supervision and schedules that would be required for model implementations; and d) a strong data-based orientation to decision-making. The local site that have been selected by the sponsor and that have been funded are Bridgeport, Connecticut, Camden, New Jersey, Dayton, Ohio and Seattle, Washington.

Key sponsors and contributors are Siegfried Engelmann and Doug Carnine (co-director), Philip Parke (project evaluator and research design consultant). Acting as teacher-trainers/consultants will be Jane Finkelnburg, Paul McIntosh and Russell Gersten (project evaluator and research design consultant). An additional site is in Florida. Excellent work in these School Practice Models that will utilize Direct Instruction programs for the instructional component. Their sites are: Florida, Arkansas, East Las Vegas, New Mexico and, Flint, Michigan.

Job Opportunities

Japanese English Language School in Osaka, Japan, is looking for 3-5 outgoing Direct Instruction teachers at the elementary and high school level. University graduates in education who have T.B.L.S.L. experience are preferred. Preference will be given to those with recreational talent. For more details please contact: Tom Benson 2505 Madison St. Eugene, Oregon 97405 Phone: (503) 683-2727

Openings for qualified teachers with dual certification, regular elementary with special education endorsement. Mountain View Elementary School is a 750-student unit of Lake Washington School District in Phoebe, Az. The school curriculum includes Reading Mastery I-VI, DISTAR Language I, Spelling Mastery A-D, Expressive Writing, Small class size, teacher aides, effective school-wide classroom management programs and organized staff development. For information contact: Dr. John Davidson, Principal Mountain View Elementary School 1502 W Mountain View Road Phoenix, AZ 85032 Phone: (602) 866-5122

And for the Teaching-Effectiveness Program.

The program aims to increase the number of correct and incorrect student responses on 40 target instructional task classroom.

The target covers the following phonics skills:

a. Letter sounds for lower case and capital letters.

b. Consonant-vowel-consonant words with lower case (e.g., fed) and capital (e.g., Fed) initial letters.

c. Words containing initial (e.g., stah) and final (e.g., lamp) consonant blends.

d. Words containing a modified vowel or diphthong (e.g., wire).

e. Words containing digraphls (e.g., join).

Target 1 teaches six letter sounds (a and t or f).

Target 2 teaches seven more letter sounds (g, l, n, r, u, and v). The target is 3 through 9 apply these sounds to word reading. The program progresses through targets by introducing new words, blends, or digraphs and then works toward generalizing them. Capital letters and the final-e rule are also included. The teacher can view student progress on either an individual or class basis. Let’s Learn Phonics also offers a procedure for placing the student at the correct level in the program and for generating printouts of practice words for the student. Each target is taught at first with an emphasis on accuracy and then with an emphasis on fluency.

Overall, Let’s Learn Phonics is a good teacher management program for teachers who wish to individualize their phonics program.

Software Review—“Let’s Learn Phonics”

by Rose Allender

Peabody College of Vanderbilt University

Let’s Learn Phonics is a software program that offers teachers a management system when teaching phonics skills. It was developed after years of working with students with special needs, not as a multi-line phonics instruction program for the classroom. The program allows teachers to collect and analyze data on students’ performance. The data consist of the number of correct and incorrect student responses on 40 target instructional tasks.

The program consists of five components: previous results, warm up, test, progress chart, and practice. Only two components, test and progress chart, are described as “essential”; the other three are described as “optional”. The teacher would use the test as a probe measure to obtain information about how well the student is doing on his or her current goal. The student with a teacher’s appropriateness for this goal should appear on the test as a test of the program. The incorrect and correct words read are recorded automatically by the computer. This information program. Teachers can observe the “return” key if the response is correct and the space bar if incorrect. After reading the set of sounds or words, the student is shown his or her general performance bar chart giving up to the number correctly read. The student also sees either a smiley or frowny face, depending on his or her performance.

A major advantage of Let’s Learn Phonics is its ability to collect, analyze, and store data for 50 individual students. It allows the teacher to use individual progress charts as well as at class profiles. Other advantages are the procedure for placing students at the appropriate starting point in the program and the user-friendly facilities (preloaded suggestions and student records). A particularly nice feature of this program is that the practice suggestions are based on each student’s current performance in the program.

It should be stressed that this program can only be used on a one-on-one basis. This severely limits it as a drill and practice program. Another limitation is that it is designed which gives a minimal amount of initial directions for new students. The program provides a systematic way of using the software by practicing on it. Teachers may also find it necessary to add systematic review of skills taught earlier, as new skills are added.

Let’s Learn Phonics is designed for IBM and “true compatible” computers. This is important to note because many classrooms have IBM compatible or Apple computers. The program was developed for an IBM compatible system.

Overall, Let’s Learn Phonics is a good teacher management program for teachers who wish to individualize their phonics program.

DI Videotapes Requested

The Association for Direct Instruction is soliciting video tapes of Direct Instruction lessons for use in Direct Instruction Workshops. We would like members to send us tapes of themselves teaching a lesson from any DI program, along with a note indicating that ADI may use the tape in workshops. ADI will promptly copy the tape and return the original to you. We are looking for tapes that do a "pretty good" job of demonstrating DI lessons with any type of students at any age group, but we do not expect (or design) "perfect" demonstration lessons. These tapes will be of immense value to ADI. Thank you for your support.
Whole Language — The Battle of the Day — Continued from Page 1

in learning and some may be just pushed through the tasks and not master them. The DI approach seeks to minimize errors as a route to faster learning. The WL approach, in emphasizing the role of meaning, may treat errors as correct responses. (See Approximation below)

Responsibility. The third strategy is responsibility. The WL-camp clearly places the responsibility for learning on the reader. They confidently state that if the teacher expects all children to read, and the learner takes responsibility in an atmosphere of immersion, self-correction, demonstration, and approximation, then all will eat at just as small a table as is necessary. Why? Because people quote psychologists who state that it is easier to learn than it is to talk, but we expect children to learn to walk and talk before they can learn to write. We expect children to learn to walk and talk before they can learn to write.

The WL-camp states that wherever the performer exhibits any approximation to the right answer, this approximation implies correct learning in the true sense. They explicitly recognize when rephrasing approximations is helpful and when it is not. For example, in learning motor skills, such as cutting with scissors, approximations will help shape progress toward the terminal response goal. Some motor responses are better or poorer than others. Students in the WL approach are the better approximations help in improving the response. However, when identifying symbols or concepts (distinctions, discrimination), the responses are right or wrong. Accepting approximations (haste for haste) is equivalent to reinforcing wrong responses and creating a need for corrective feedback. Because approximating approximations in discrimination learning is most likely to occur with examples where the terms overgeneralization, undergeneralization, and errors could be used to describe the errors.

Overgeneralization occurs where the learner judges that two similar situations are different. However, 'let's say the teacher is teaching the students to cut. Suppose the teacher tells the students, 'I want you to cut the paper.' The next day, the students come in with their cut paper and say, 'we did it.' The teacher says, 'no, you didn't cut the paper, you cut the book.' This is an example of overgeneralization.

On the other hand, undergeneralization occurs where the learner judges that two different situations are similar. For example, the teacher says, 'I want you to cut the paper.' The next day, the students come in with their cut paper and say, 'we did it.' The teacher says, 'no, you didn't cut the paper, you cut the book.' This is an example of undergeneralization.

The WL approach recognizes that the learner's response is ambiguous and that the teacher must leave these ambiguities in instruction so the learner may experience these ambiguous realities of life; that we all learn from our mistakes. The teacher tells the students that there are consistent, immediate, and overt consequences, we often learn from our mistakes. However, it is very likely that in early language learning situations, where appropriate generalization is dependent on subtle discriminations between similar situations that are to be mastered. The WL approach recognizes that these generalizations can lead to both positive and negative consequences. It is also logical to expect that in these situations where approximations appear different that in fact are the same, when the learner gives consistent feedback to help to accurately identify the sameness, that the learner will more frequently generalize.

Finally, the focus is on self-correction feedback, where the teacher's responsibility to correct for possible errors by developing flawlessness is not the same as the learner's. The teacher evaluates whether the learner is making progress toward the terminal goal of learning. The WL teacher, who is infinitely distracted or confused, who successfully and responsibly self-corrects by selecting feedback will basically teach himself to read. It is these circumstances that make for a marvelous scene. But what of those learners who become more confused by these ambiguous situations? What is left for these children? Are they of a different sort who can't take responsibility for themselves? Are they the ones who need to be labeled so they may receive a special service for those "who are not in position to teach themselves"? The argument for creating a learning environment where there is immersion, demonstration, synthesis, and congruence is that it establishes a more enriching environment. But where these strategies are the primary or total focus, these dangers are likely to remain apparent. As long as it becomes a process for sorting between those who are able to teach themselves and those who need to be taught. Is this what we are about in education — sorting?

The DI teacher, on the other hand, assumes that there is always going to be relevant, consistent feedback in academic learning, the teacher must take responsibility for providing this feedback. It is assumed that pre-corrections, communications, communications where ambiguity is eliminated and replaced by clarity, become a more effective aid in the development of a high degree of understanding of original learning. Which in turn leads to the positive transfer of those understandings or generalizations to the learning of new generalizations. The DI specialist views the learning of mistakes as a deterrent, not as a method of achievement in academics. Consequently, there is a great deal of emphasis on the sufficient practice and systematic (distributive) review of carefully selected examples, both in teaching demonstrations and in the learner's independent work. The student who is consistently shown the learner exhibits a 70% first-time correct performance. Under those circumstances where the learner makes mistakes, appropriate feedback is given, feedback is given, appropriate feedback is given, according to the type of mistake the learner is making. These corrective procedures usually prevent the learner from making the same mistake in the future.

So in summary, I view us at a crossroad.

What do we do? Do we, according to our orientations, enrich, reload, and attack each other from the back? Do we insert cold generals of the opposing line by giving them early restlessness, and sort out the research that supports our side? Do we say, "What is new?" Or do we say, for a change, collaborative efforts by combining the best of each approach and develop a synthesis of models that will prove the test? If the real war is against failure and non-flourishing learning environments, isn't it possible that if these approaches joined forces we could get an increased use for self-correction unless a person gives it to him or her.

It is fairly well known that there are two consistent feedback types: type A, the high frequency of mistakes while attempting to learn. One is that they are more easily confused, especially by similar situations, but this one is not always easily distracted by the irrelevant. Consequently, the fast learning student of the WL teacher, who is infinitely distracted or confused, who successfully and responsibly self-corrects by selecting feedback will basically teach himself to read. It is these circumstances that make for a marvelous scene. But what of those learners who become more confused by these ambiguous situations? What is left for these children? Are they of a different sort who can't take responsibility for themselves? Are they the ones who need to be labeled so they may receive a special service for those "who are not in position to teach themselves"? The argument for creating a learning environment where there is immersion, demonstration, synthesis, and congruence is that it establishes a more enriching environment. But where these strategies are the primary or total focus, these dangers are likely to remain apparent. As long as it becomes a process for sorting between those who are able to teach themselves and those who need to be taught. Is this what we are about in education — sorting?

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"Ideal teachers are those who use themselves as bridges over which they invite their students to cross, then having facilitated their crossing, joyfully collapse, encouraging them to create bridges of their own." This quote from Leo Buscaglia’s book, Living, Loving, and Learning, describes the process we hope to share with you in this article. It appears to many educators that there are at least two conflicting philosophies to teaching languages: Whole Language and Direct Instruction. From our point of view as classroom teachers, we feel that the children are often the casualties in this "war"; but we must always put the child first. We need to adjust our instruction to ensure that children are successful, both in the school environment, and later, in the "real world," as they move forward with sufficient skills to meet the challenges of living and working in tomorrow's society. We find it difficult to disagree with the following statement made by Goodman and Wann in their article, "A Reading Program to Live With" (Language Arts, Volume 58): "The overall instructional program must place reading in its proper context. The instructional procedures and materials must help students focus on meaning for themselves as readers/thinkers; this is best accomplished by immersion in a total language arts program. Reading, like listening, speaking, and writing, is used to learn about the world. It is important to keep reading at such a part of the total curriculum as possible, and continuous practice to thirty minutes daily lesson. When teachers keep in mind that they are teaching reading when they are focusing on social studies, science, art or literature, it helps their students understand that reading is a functional part of everything one does in a literate society." However, our experiences have proven that if you eliminate those daily 20 - 60 minute skill lessons, many children do not ever become efficient, effective, and confident readers. We believe a total language arts program must include the specific teaching of reading skills as a part of the integrated whole. Sequential and meaningful instruction is mandatory.

Whole Language theory is based on children's reaction to literature. Direct Instruction's goal is to teach the action of reading, so that once children have the necessary skills they may then go on to react to what they have read, applying their knowledge and skills to new situations. Our experience with the typical Whole Language reading programs is that they begin with children reading to print; often from listening to the teacher and the story. The students rarely have the opportunity to initiate that most important interaction between student and the written word. The reason we continue to have the Direct Instruction model as the core to our classroom programs is because it teaches the skills the children need to have in order to meet the printed page independently.

We have found no other programs to be as efficient and effective as the Direct Instruction Reading Mastery programs in teaching both beginning and more advanced decoding skills. For that reason, our initial primary reading programs focus almost entirely on Reading Mastery I, II, and the Fast Cycle programs, as this is the point in most children's development when their language skills are often considerably more advanced than their decoding skills. For the purpose of this discussion, we define the Action of Reading as the process in which the printed page is meaningful to the student who can react to it.
Theories, Theories, Theories—A Critique of Logic of Whole Language Arguments

by Siegfried Engelmann
University of Oregon

Most theories associated with a subject like reading are simply prejudices; and like prejudices, these theories have a strong immunity to facts or the basic canons of science.

The International Reading Association (IRA) has historically been a comprehensive supporter of theories that should have been discarded before they were preposed—if we use either data or logic as a criterion for acceptance of a theory. Possibly the various theories, and resulting practices, endorsed by this body are accepted because they usually foster teachers, and at the same time, exonerate them from being responsible for student failure.

The quintessence of inadequate theories is one promulgated by Kenneth Goodman, past president of the IRA and a self-styled "linguist." Goodman's theoretical contribution is the "Whole Language" approach for teaching reading. The description of the theory is replete with romantic terms that apparently make teachers feel good all over (such as "contextual approach," "whole child," "sensitivity to the needs of the child," "creative development," etc.). Apparently, there are no serious implications that anyone who fails to adopt whole language apparently doesn't care about children.

Three spokespersons for the approach (Jean Atwater, Carole Eideley, and Barbara Floren) lay out the logic of "whole language" in an article published in Reading Teacher (1987), which is the official publication of the IRA.

The key theoretical premise for Whole Language is that, the world over, babies acquire language through actually using it, not through practicing its separate parts until some later date when the parts are assembled and the totality is finally used. The main assumption is that the model of acquisition, through real use (not through practice exercises), is the best model for thinking about and helping with the learning of reading and writing and learning in general.

Language acquisition (both oral and written) is seen as natural—not in the sense of the mere recording of language in the sense that when language (oral or written) is an integral part of functioning of a community, it is used around with neurophysiologically, it is learned "incidentally." ...Little use is made of materials written specifically to each reading or writing. Instead, Whole Language relies heavily on literature, on other print used for appropriate purposes (e.g. cake-mix directions used for really making a cake, rather than for finding short vowels), and on writing for varied purposes (p. 145).

Where is the evidence that this approach works? There is none, despite the fact that the article quoted above is followed by nearly a full page of "references." A close cousin to the Whole Language approach is the "open classroom," which tended to be in vogue during the '70s. Much of the same logic that characterizes the Whole Language approach seemed to inflate the "open classroom" approach to the status of "whole child" language. A comparison of how low-income kids showed that the open classroom approach occurred at a frightening rate. Kids received "instruction" from kindergarten through third grade, performed below the 15th percentile on a standardized test of reading achievement (Stebbins, et al., 1977; Becker & Campline, 1980). In other words, the average "poor kid," who went through this "treatment," was a non-reader at the end of the third grade. Of course, neither the open classroom approach, nor the Whole Language approach, believes in standardized tests.

At Atwater et al. (1987) put it:

"Book Open Classroom and Whole Language educators oppose standardized testing. The difference is based on their opposition to instruction. Open Classroom proponents claim that standardized tests fail to test what teachers are teaching... The tests, in other words, are insignificant.

What about whole language educators, on the other hand, argue that the tests fail to test what the tests themselves claim to be testing (i.e. reading). That is, they are "invalid" (p. 155).

The question is: who do we listen to? Of them. But kids who perform below the 15th percentile, at the end of third grade, are not going to be able to demonstrate proficiency in reading in any context, "valid" or "invalid.""
guage, but if we can look at it from the perspective of the "noecho" who is learning to read, written language is quite different from oral language. The learner has already mastered the basic grammar and much of the vocabulary of the oral language. Furthermore, the written language that is to be learned is not just any old written language, but one that the learner already knows. Therefore, no new grammar is to be learned (at least for the introduction to reading) and no new words are to be learned.

In addition, the learning of initial written language is analogous to only one aspect of oral language (not oral language in all its manifestations), which is: statement repetition. If we were to tell the learner, "Say this: The horse is brown," we would have taken one of our language games. We'd see if we can get to the task of having the student really read the sentence: The horse is brown. The only difference is the source of the statement that is new, because in a language game, it's the squiggles on the page, which the learner transforms and orchestrates into the appropriate sounds. When the learner reads it silently, the sentence is: The horse is brown; say this: The horse is brown; learning it." But initially, the learner (hopefully) will read out loud and will read a language he understands.

The standards, or criteria, for judging the adequacy of the oral reading are the same as those for judging adequacy of the statement repetition. We would say that the learner has learned "The horse is brown," the attempt is wrong, just as it would be wrong if the learner responded that way to an oral statement-repetition task. The learner has learned to read, therefore very narrow and unique—unlike anything experienced by the learner before.

The learner must learn a system for decoding arrangements of written symbols. Since the learner has never done anything like this before, we can't argue from analogy, because there is none. We can't use information about how the learner acquires oral language and then extrapolate, because the reading task doesn't actually involve learning a new language, only a system for expressing a familiar language.

So the entire argument is spurious. If we want to know what the best methods are for introducing reading, we should look at different methods for introducing reading, in which case NO teacher seriously interested in kids would use Whole Language.

But, just as an exercise, let's consider the other points in the argument:

**Premise 1:** Babies acquire language through actually using it, not through, practicing separate parts. Wrong. Babies babble "Da da doo do." That babbling is practicing a part—the sounds, the clumps, the patterns. We could point out other separate parts that the little guy practices, but more to the point is the fact that the premise begs the question. Oral language is a skill. The only areas for applying the skill are producing utterances or responding to verbalizations. So it is impossible for babies to practice without using the mother. Says, "Can you touch your nose?... Oh yes, touching your nose." The baby is practicing language and using it (even though no words are coming from this little guy's mouth).

Another way of looking at this premise is like this: The baby doesn't start out with language. When the baby learns language, it doesn't emerge as a heap with the kid suddenly knowing everything he is to know about language. Instead, it unfolds a discrete skill at a time. It is only when the learners have practiced "separate parts," because that's all the baby learns—separate parts.

**Premise 2:** Oral language is learned incidentally. There is no question. Oral language is used with infants only to refer to things in the infant's world. If incidental means that something is part of various other activities, the argument applies only to various other activities, the word "incidental" is misleading. How else could the learner practice language other than the "incidental"? The "incidental" means that the written language refers to things in the infant's world. The baby receives peripheral "incidental" because the language would allow something or focus on some activity or situation.

The argument of "incidental language" is argument: "Written language is best learned incidentally." Incredible! Not merely preposterous, or outrageous, but incoherent. As an analogy it is unique—different. Also, the skill level of the learner is different—attention span, ability to respond to verbal instruction, knowledge.

Finally, the setting is different—possibly 30 kids and one teacher. So let's say that some misguided soul was so convinced by the rhetoric of "Whole Language" argument that he decided to teach reading in a manner that is analogous to the way babies actually learn language. The teacher would spend a significant portion of the time involved in the kids early training of babies is pretty much a one-to-one game, often with two parents and possibly other siblings engaged in the teaching and reinforcement. If we don't provide instruction or "usage" individually, we're pretty much destroying the only resource the kids have—oral language.

A teacher wise enough to take a calculator and put in some simple numbers quickly discovers that one can't really teach reading in a way that is analogous to initial language training. If the teacher worked individually with each kid for ten minutes—just ten minutes, compared to the hours of interaction and feedback that babies receive from their parents—the teacher would spend five hours a day on reading (10 minutes times 30 children), and even then the child would receive a paltry ten minutes of "usage.

Therefore, the teacher cannot use the individualized format. Instead, the teacher will have to work in small groups or teams. What is the difference between a group of five making a cake, and tell herself that all children are interested in it. But the teacher is making up kids, and is not providing the type of feedback or interaction that are easily remotely analogous to the ones an infant receives when learning to use oral language "incidentally." Also, the teacher has gotten away from one meaning of "incidental" to another.

When oral language is used incidentally, it is an ongoing adjourn to whatever activity the baby engages in. The toddler grasps a cup from the coffee table and the mother responds. The toddler says "up," and the baby responds with a baby smile and the mother responds. And so forth. The whole interaction with the cake-mix routine, where all we have are some sterile words on a piece of paper, with no direct interaction between the words and the activity. The teacher is not running around holding up signs that say: "Yes very good, more than one cup," or "No, no. Set the oven at 375.", Instead, the teacher is using "oral language," not "written language." In this situation, "incidental" means that the written language is an unnecessary part of the activity, an add-on, quite different from the "incidental" use of language by "babies the world over."

In summary, the Whole Language argument is a study in futility. The argument is simple-minded, at best. Yet, in states like California, Washington, and Arizona, Whole Language is the big thing. The National Council of English teachers have a strong investment in it (which may demonstrate that these folks don't know very much about either language or logic). And the approach is actually treated as a serious approach, even though it doesn't have a shred of evidence to support the notion that it works well, let alone that it is the "best" approach.

But the most disturbing aspect of the Whole Language orientation is the lack of empathy with kids. On the surface are buzz words that imply concern about nurturing the whole child. Even a casual analysis, however, reveals an almost unbelievable lack of ability to look directly at James and Linda as human beings and to empathize with the problems they'll encounter in learning to read. These problems are very specific and can be obviated only through a hard-minded approach to analysis of the problem, not fustications of rhetoric. To arrange instruction so kids learn, well and also learn what they are smart, is not achieved if the teacher simply emotes and pats together a montage of activities that happen to excite her. What excites her is perfectly irrelevant.

If she's a pro, she'll convey the idea that she's excited about those activities that will effectively teach James and Linda. And if, she doesn't have this orientation, she should encourage her to leave the classroom before we permit her to teach in a manner that is sloppy and ineffective (unless we think it's all right for her to pursue her interests at the expense of our kids). But understand, this argument is not for all. The reason "Whole Language is a big thing has nothing to do with fact or logic. It is based on what a lot of teachers "like."

**References**


Research on Mastering Fractions — Continued from Page 1

confused and misunderstand what is being taught. By controlling the number and type of examples presented, by providing detailed, step-by-step instruction fashioned on specific instructional objectives, and by incorporating strategy-based correction procedures, instruction can be successful for a much wider range of students. These findings have been reviewed (e.g., Moore, 1986) and supported by an appreciable amount of empirical research. This work has been seen by some (Brophy & Good, 1986; Tarver, 1986) as a necessary adjunct to the research on effective teaching. In considering which technology would best support the teaching of this unit, the teachers chose one of the commercial instructional packages available. It was found that the graphics and sound capabilities of the medium were a primary consideration, as they allowed a prescriptive format that was much closer to the traditional Direct Instruction methodology of teaching. Voice-over narration in the videodisc program was also a consideration to listen to the explanation of concepts as they were presented visually. The graphics were not of only very high quality, but what can be seen on computers used in today’s schools, but they had a dynamic presentation of information that even traditional, teacher-based instruction cannot duplicate. For example, in the videodisc program Mastering Fractions (Systems Impact, 1986), the relationship between the commonly used pie diagram and the number line is demonstrated by continuous animation. At one point, the pie, divided into three equal sections, unfills onto the number line and thus directly maps the concept of thirds onto this familiar scale of measurement.

A second, but equally important consideration, was the need for a structured group presentation. Unlike computer assisted instruction, which is typically geared toward individual configurations, a videodisc can be operated from a distance as the teacher walks around the classroom. Moreover, as group instruction, it distinctly separates instructional roles. That is, the videodisc is the source of initial explanations, graphic demonstrations, and guided practice problems. This frees the teacher from the task of curriculum presentation and allows him to focus on the monitoring of the group and on individual assistance. This separation of responsibilities directly addresses the frustrations and concerns of many of the earlier Follow Through experience.

Evaluation of the Videodisc

Well before a master copy of the program was pressed on a disc, it was subjected to extensive field testing. Skilled Direct Instruction teachers presented the program as it was scripted for the final disc version. This was done in at least three separate schools.

The program designers used videodisc segment

made with lower quality graphics to pilot test some of the visual presentations. Student errors and teacher feedback permitted developers to make necessary adjustments and refinements to the program. Fi

ally, after the videodisc program became commercially available, it was tested and used by the researchers. Observers associated much of this decline to poor classroom management. The importance of this variable was also noted when instruments for the subsequent study were being field tested (Woodward, 1987). It was a growing concern for the use of this technology in more typical, uncontrolled settings that led us to the following study.

Evaluation of the Videodisc Program in a Naturalistic Setting

The purpose of this final research study was to evaluate how a group of eight teachers, with no prior experience in implementing technology, would implement the Mastering Fractions program. Thus, even though the initial videodisc package had been rigorously field tested (Kelly, Caroline, Gersten & Grossen, 1986) and demonstrated as effective with low achieving and special education students, questions continued to exist as to the minimal amount of training would use the program.

There were two major concerns in this research project. The first concerned the extent to which the teachers used the technology and implemented the curriculum as intended. The second was an examination of how teachers felt about using this new technology and how it altered their roles as teachers.

A recent overview of the literature on staff development and curriculum implementation by Shores, Joyce, and Bennett (1987) concluded that what "teachers think about teaching (practices) determines what teachers do in the classroom" (p. 85). When teachers implement a new curriculum with little understanding of what they are doing or why they are doing it, they tend to misconstrue its use.

Implementation of the Study

Eight special education junior-high and high-school teachers who were selected for the study based on the skill level and type of programming in their mainstream classes. Of the teachers who were approached, eight agreed to participate. Their main interest in utilizing the videodisc curriculum was that fractions was an area very hard to teach, and that they were dissatisfied with their students' success in conventional curricula. Thus they were anxious to try something new. Following the teachers' initial two-hour in-service session, teachers rated a video vignette which provided an overview of videodisc technology, an introduction to the fractions curriculum, a demonstration of how to operate the videodisc equipment, and guidelines for proper implementation of the program in the classroom.

Certain recommendations for implementation were stressed during the training: (a) spending at least 45 minutes of the class period for the lesson presentation and corresponding workbook exercises; (b) assigning student performance at the designated Checks for Student Progress (CSP) points in the videodisc lesson and providing appropriate remediation; and (c) monitoring class work to ensure that students correct their mistakes.

The in-service training was designed to parallel the amount of in-service orientation generally provided by publishers of standard print curricula. Because there was only limited time available for "hands-on" practice with the videodisc equipment, teachers were encouraged to spend time familiarizing themselves with the equipment before presenting the first lesson to their students.

Results of Teacher Observations

Two observations of each teacher were made during the first week of the six-week videodisc lesson. With this observation, implementation levels were quite high. All but one of the eight teachers carefully followed the procedural guidelines outlined in the in-service session. The most commonly observed difficulty in the early lessons was the remote control device: teachers occasionally misdirected menus on the computer or punched an incorrect button on the remote control, high of which resulted in their accessing a wrong segment of the disc. Additional assistance was provided for four of the eight teachers in this area.

Some teachers tended to provide students with additional explanations of the lesson concepts on a one-on-one basis, and others had difficulty understanding the videodisc presentation, or when conducting a worksheet. This had been discouraged in the training sessions because adding, lengthy explanations sometimes lead to greater confusion with these kinds of students.

Subsequent observations during the remaining five weeks of the implementation revealed that teachers and students became more familiar with the routines of the program and the method of presentation within one or two weeks. As the lessons progressed, teachers incorporated their own teaching and management styles, while generally maintaining the integrity of the videodisc program implementation.

Certain procedures were more difficult for some teachers, e.g., structured care tasks assigned the nurse’s directions and re-working problems when their answers did not match correctly-worked problems displayed on the monitor. The videodisc program was able to adapt to the procedures in classrooms where the teacher was clear and consistent in his or her behavioral expectations.

All participating teachers had been observed teaching a main class on two occasions prior to the videodisc program implementation. It was reported that the most notable difference in classroom variables observed before and during the implementation related to student success rates. Observers found a mean percent-correct score on workbooks increased from 74.6% to 86.8% once the videodisc program was in use.

Levels of student on-task were almost identical before and during the videodisc program (75% and 76% respectively). However, teachers reported that students seemed much more involved in the videodisc lessons than they had been during regular instruction. This was corroborated by many students who reported that they found the videodisc lessons more interesting than conventional math instruction.

Other factors that contributed to slowed progress through the curriculum were lengthy or frequent additional teacher explanations, high rates of student absenteeism, and a wide range of student abilities within an individual classroom. Despite these difficulties, teachers reported that overall student mastery of the content was considerably higher than would be expected with conventional instruction. On a criterion-referenced posttest was 77%, with individual group means ranging from 64% to 90%. Observational data suggests that an implementation that closely follows the recommended procedural guidelines results in a high level of student mastery. Lower levels of mastery occurred in classrooms where certain key procedures were not implemented, for example, if the teacher failed to conduct the specified check-and-remediation procedures, or if the teacher did not assign the specified daily workbook exercises.

For completion of the videodisc program, each teacher was observed on two more occasions to explore whether the videodisc program.
The Association for Direct Instruction is pleased to announce the 14th Annual Eugene Direct Instruction Training and Information Conference. The conference will be held at the Eugene Hilton Hotel and Conference Center in downtown Eugene. We hope that you will be able to make the Conference the highlight of your summer and join other professionals from around the country in furthering their 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 Hula Censer for the Performing Arts, a world class performance hall. Within blocks of the conference site are scores of restaurants catering to a variety of tastes. Eugene's setting will make the Conference a rewarding professional experience as well as a relaxing vacation for you and your family. To help remove old friendships or make new acquaintances, a picnic has been planned for Monday afternoon.

**Featured Speakers:**
Zig Engelmann • Paul McKinney

**Other Presenters:**

**Sessions**

**A** Teaching the Beginning Reader
- Reading Mastery II and Fast Cycle I & II
- Reading Mastery III, IV
- Corrective Reading, Decoding
- Advanced & Corrective Arithmetic
- Teaching Academic Survival Skills
- Teaching Reading
- Teaching Children to Teach DI Programs
- Solutions to Classroom Discipline Problems

**B** DISTAR Arithmetic I & II
- Effective Spelling Instruction
- Teaching Beginning Language Skills
- Overview of Direct Instruction Programs
- Computers and Instruction: DIGITAL
- Introduction to Direct Instruction Techniques
- Managing Severely Handicapped Learners
- Issues in Implementation of a DI Curriculum
- Overview of new Corrective Reading Programs
- Overview of Effective Spelling Instruction
- Teaching Facts and Facts in the Content Areas
- Teaching Expressive Writing Skills
- Basic Readers: Selecting, Transitioning to 1 Adapting
- Computers and Instruction: The Classroom Assistant

**D** Video Disk Instruction in Math
- Direct Instruction Supplemental & Translational Activities
- Overview of Aspects of Supervision & Monitoring of DI Programs
- Targeting At Risk Children in Grades K-6
- Overview of Discrete Instruction Research
- An Integrated Approach to Direct Instruction
- A Direct Instruction Approach to Secondary Science Instruction
- Teach Your Child to Read in 100 Easy Lessons
- A Direct Instruction Model for Handicapped Preschools
- Overview of Direct Instruction Theory
- Study Skills
- Managing Chronic Behavior Disorders and Serious Emotional Disabilties

**Session Information**

There are 40 sessions offered during the 5-day conference. Participants may attend up to 4 sessions. There are either training or informational sessions. The focus of training sessions is on specific teaching behaviors. Task practice is involved in each of these sessions. The goal of informational sessions is to provide the kind of detailed information needed to implement successful techniques or understand the topic.

The sessions are scheduled in 4 time periods. Each participant will choose one "A" session, one "B" session and either one "C" session or one "D" and one "E" session.

**Session Descriptions**

A. "A" Session Descriptions

1. Teaching the Beginning Reader • Pyllis Haddock Regular grades K-1, non-readers in remedial grades 1-2. How to teach beginning students to read and how to teach remedial students — those who read very poorly or not at all. This session will provide training in Reading Mastery I and Reading Mastery Fast-Cycle. Participants learn the basic information and skills needed to implement the program — placement, acceleration, scheduling, grouping, presenting, proceeding, evaluating.

2. Reading Mastery II and Fast Cycle I & II • Ann Glang Grades K-2. Specific training on rationale, implementation, placement, grouping, acceleration and other aspects of Reading Mastery II. Information and training on Fast Cycle. This session is for average to above-average students and reviews the content of Reading Mastery I (6-12 months) in 170 lessons, or 1 school year. Participants will receive a copy of the Reading II and Fast-Cycle Teacher's Guide.

3. Reading Mastery III, IV, V, VI • Gary Davis Regular grades 2-6 for students performing on grade levels 3-4. These programs present a careful sequence for teaching comprehension and decoding skills to students who have mastered the basic skills. Programs provide for meeting the full range of comprehension and decoding objectives, including management systems for monitoring student progress, and teach all component skills (vocabulary, rules, information, map skills, context analysis) needed for students to completely understand the expository and fictional selections presented in the program.

4. Corrective Reading, Decoding • Gary Johnson Regular class, low performers grades 3-5, remedial grades 3-6. How to teach students to accurately decode, increase rate, build vocabulary and read for information in books, newspapers, and magazines. Training will be provided on the NEW 1986 edition of SRA's Corrective Reading decoding programs: Decoding A, Decoding B, Decoding III, and Decoding C.

5. Advanced and Corrective Arithmetic • Maria Collins Regular grades 1-6, remedial 2-6. Specific training on SRA's Corrective Math and Mathematics Module. Programs present specific strategies for teaching addition, subtraction, multiplication and division. Includes facts on operations and story problems.

6. Teaching Academic Survival Skills • Marilyn Sprick Regular & remedial grades 3-7. This session will provide teachers with procedures for teaching students general academic survival skills. Participants will learn techniques for easily evaluating student ability, setting up group instruction systems, and designing grading programs. Sessions will include teaching students to manage time, write reports and book reports, complete homework, complete long term projects, keep track of assignments, note taking, and use rehearsal strategies for learning new information.

7. Teacher Training. Teaching Others to Teach DI Programs • Linda Youngmayer This session will focus on the elements of teaching others (teachers, aides, etc.). Direct Instruction skills in areas such as conducting training workshops, monitoring techniques and data collection. Participants attending this session should possess advanced teaching skills in one or more DI programs.

8. Solutions to Classroom Discipline Problems • Randy Sprick K-12 & Special Education. Participants will learn specific techniques for solving common types of behavior problems including absenteeism, disruptive classroom behavior, students not completing homework, tardiness, student apathy towards grades, inefficient transitions and tattling. Participants will learn a variety of practical strategies for increasing student motivation and reducing misbehavior. Some of the strategies covered include the use of rules, effective grading policies, consequences, ignoring, and procedures for helping the at-risk student.

9. Diagnosis, Correctives and Firming Procedures • Zig Engelmann For experienced Direct Instruction teachers and administrators only. This session presents information and practice on effective correction and firming procedures. The session also presents rules for efficient diagnosis of student problems and simple, direct remedies.

10. Overview of Direct Instruction Research and Theory • Wes Becker (1) A review of the major principles and analysis underlying the success of DI programs developed by Engelmann & colleagues. The overview draws heavily from Beeler's book Psychology for Teachers (SRA, 1980). Handouts include portions of this book. (2) A review of the major research findings on the effectiveness of DI programs. Participants receive handouts covering this research that may be useful in influencing others. NOTE: This material is repeated as Overview of Direct Instruction Theory (D) and Overview of Direct Instruction Research (R). Do not sign up for either of these sessions if you take this.

11. Instructional Techniques for Severely Handicapped Learners • Ann Argobust Technical information on how to teach the severely retarded learner. Techniques for establishing a base of instruction, firming responses, expanding tasks, summarizing generalizations and designing appropriate programs and schedules. Techniques for dealing with students with particular learning problems such as short memory, short attention span, superstitious behavior during multiple step tasks, and restricted receptive language.

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dic learning might have affected their teaching in any way. Observations revealed a notable increase in the use of guided practice in the lesson presentation — from an average of 3 problems per lesson to 9 problems per lesson. Guided practice was used to help students understand the concept. Teachers also indicated independent practice that students could complete more successfully. Mean accuracy on independent work sheets increased from 75% before the video
dic implementation to 85% after its com-
pleteness. While these preliminary findings are not definitive, they indicate that video
dic technology in the classroom can be an effective medium of instruction, and may also have a positive impact on conventional teaching programs.

Results of Teacher Interviews
A semi-structured 40- to 50-minute inter-
view was administered to all teachers after they had been using the videodisc curriculum for five to six weeks. This section will present highlights of the findings. (For a more comprehensive analysis, see Woodward and German, 1988.) Table 1 presents the results of the interview.

Table 1. Teachers' Perceptions of Use of Interactive Videodisc to Teach Fractions

<table>
<thead>
<tr>
<th>A. Technical Issues</th>
<th>Percent Yes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Do you find the videodisc itself hard to use?</td>
<td>0%</td>
</tr>
<tr>
<td>2. Do you have problems with the remote control?</td>
<td>25%</td>
</tr>
<tr>
<td>3. Is the decision menu easy to use?</td>
<td>25%</td>
</tr>
<tr>
<td>4. Are there problems with the学生 material?</td>
<td>38%</td>
</tr>
<tr>
<td>5. Does it end up slowing down progress?</td>
<td>88%</td>
</tr>
<tr>
<td>6. Do you use these frequently to playback chapters that the students need additional practice on?</td>
<td>25%</td>
</tr>
<tr>
<td>7. Do you use it all the time to teach the material?</td>
<td>25%</td>
</tr>
</tbody>
</table>

Table 2. Overall Perceptions

<table>
<thead>
<tr>
<th>B. Overall Perceptions</th>
<th>Percent Yes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Do the students seem to be learning the skills?</td>
<td>100%</td>
</tr>
<tr>
<td>2. How would you rate your experience with the program overall on a scale of 1 to 5, with 5 being the highest and 1 being the lowest?</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Table 2 also uses a key word method to summa-
rate results on the more open-ended ques-
tions.

Technical Issues. All teachers found the interactive videodisc easy to use, consider-
ing the complexity of the technology, and the fact that very few of the teachers had previ-
ous experience with any type of educa-
tional technology up to this point, this is an unusual finding. The main reason for the lack of serious problems may be the fact that the interactive videodisc curriculum was de-
volved in a student component with conventions.

In their review of the research on educational innovation, Loechle and Zecher (1985) indicated that educational innovations are much more likely to succeed if they do not conflict radically with the basic or-
 ganization of classrooms and the basic in-
teracting programs already in progress.

Another major factor seemed to be that the interactive videodisc per se is not very difficult to use. In one teacher's words, it was only a bit more difficult than one a homoc
VCR. Teachers did experience some techni-
cal problems. Twenty-five percent had prob-
lem with the remote control (item 2). Some were confused with the logistics of using the

duction menus for remediation and review, both during the lesson and after quizzes. These problems seemed to reduce dramati-
cally with time and practice.

Utility of remediation and guided practice.

The videodisc curriculum was inten-
ded to provide some remediation and guided model of effective classroom instruction formulated by Brophy and Good (1986). Some of the ottermories of this model is the use of guided practice and frequent assessment of student understanding of each small instruc-
tional unit. The Checkpoints for Student Progress (CSPs) incorporated into all aspects of the program allows the teachers to determine when brief review segments are necessary.

All teachers found the videodiscs to be effective. New teachers were successful in helping students master the material. Two of the eight felt the extensive use of remediation and guided practice was important for the teacher to determine when brief review segments are necessary.

Overall Perceptions. Some teachers indicated that they did not use the videodiscs for remediation and for review purposes. The observers found that teachers were implementing the guided practice and remediation segments properly. Some classes rarely needed additional review, whereas other, lower performing classes would often need extra practice. These find-
ngs suggest that the CSP/guided practice/ reme dial mechanism is a flexible one. Some

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Conference Sessions—Continued from Page 9

29) Teaching Facts and Fact Systems in the Content Areas - Gary Davis Regular grades 3-5, remedial grades 6-8. Teaching on super-effective procedures for using visual-spatial dis-
plays to teach various topics in social studies and science. Based on Your World of Facts, Levels 1 & II (ERAS). Teaching shows how to introduce fact systems and how to form even very low performers through the game for-
matic that is part of the program. Shows how to develop visual-spatial displays for teach-
ing difficult-to-teach relationships.

30) Teaching Expressive Writing Skills - Jerry Sibert Regular grades 3-8, remedial 6-12. This program is designed for remedial students and teaches the most difficult first steps in ex-
pressive writing through a basic sentence writing strategy that are applied to simple reporting and interesting activities. Shows how to write.

31) Reading Programs: Selecting, Teaching, and Evaluating - Ed Sprick Addresses the concerns of administra-
tors, special educators and regular teach-
ors who have students who must work in a basal test. The session will cover the critical diagnostic materials between major reading sys-
stem programs and how these differences affect learning. Participants will learn "when" transparent reading systems are appropriate for "what" students. Guidelines will be given for pre-
visional supplementary work on traditional skills. Includes testing basal level for and use of DI techniques with basal le-

32) Computation and Computers - The Classroom Assistant - Melissa Hayden Participa-
tors will learn about a new software design for use with the Classroom Assistant, a computer networking system for teaching grade-appropriate mathematics con-
tenational information. Students respond on in-
dividual keyboards and responses are scored and analyzed by a single computer. The Classroom Assistant programs are: Practice Assistant, Lecturer Assistant, Coaching Assist-

33) "DT" Session Descriptions

34) Videodisc Instruction in Math - Paul McKeown Specific training on rationale and implementa-
tion of these videodisc base courses, developed by S. Engelmann. Fractions, Decimals, Percents, Ratios. The courses can be introduced to intermediate students. Includes method of using the computer to give students who lack the skills covered in these courses.

35) Direct Instruction Supplemental & Transition Activities - Troy Hall Regular and remedial grades K-2. Specific examples of videotape and learning center games for both reading and math as well as supplemental reading material will be shown.

36) Overview of Aspects of Supervision and Monitoring of DI Programs - Linda Youngworth. This class will focus on an analysis of a school's supervisory superstructure including evaluation, instruction, training, monitoring, data collection and decision making. Course will primarily be lecture style with student involvement.

37) Targeting "At Risk" Children in Grades K-5 - Direct Instruction Approach - Ann Arbergast. This session will assist teachers in identifying potentially at risk and at risk children in Grades K-5. Specifically children who are withdrawn, seek out adult attention and/or are frequently truant.

38) Overview of Direct Instruction Theory - Wes Becker A review of the major principles and applications underlying the success of DI programs developed by Engellmann & colleagues. The overview of theory drawn from Becker's book, Psychology for Teachers (ERAS, 1986). Handouts include portions of this book. NOTE: This is the same as half of the A Session Overview of DI Research and Theory. Do not sign up for this session if you intend on taking the A session.

39) An Integrated Approach to Direct In-
struction - Terry Dobbie For teachers of read-
ing in grades 5-12. In this session participants will learn how to integrate listening, writing, speaking, spelling and reading skills using Direct Instruction. Using the Corrective Com-
pensation Program as the basic curriculum. Materials will be provided that outline ways and concepts that need to be taught to students who have an understanding of the thematic novels used as a supplement to Direct Instruction reading instruction.

40) "DT" Session Descriptions

41) A DI Approach to Secondary Science Instruction - John Niewel National and co-
tent of two video-disc courses developed by S. Engelmann: Earth Science and Understand-
ing Chemistry and Energy. The instructional organization and the courses will be explained. Procedures for placement and presentation will be detailed.

42) Teach Your Child To Read in 100 Easy Lessons - Phyllis Hadlock Training for pre-
school and younger ages who do not have Direct Instruction experience. The book, Teach Your Child To Read in 100 Easy Lessons (Simon & Schuster), is an adaptation of DIS-
TAR Reading Fast Cycle for parent use at home. It can also be used as a low cost training program. The 100 lessons are de-
signed to teach children as young as 4 years old the skills necessary to read on a second grade level.

43) Overview of Direct Instruction Theory - Wes Becker A review of the major prin-
ciples and applications underlying the success of DI programs developed by Engellmann & colleagues. The overview of theory drawn from Becker's book, Psychology for Teachers (ERAS, 1986). Handouts include portions of this book. NOTE: This is the same as half of the A Session Overview of DI Research and Theory. Do not sign up for this session if you intend on taking the A session.

44) Study Skills - Mary Glicken Regular grades 3-6, Learning Handicapped Grades 3-6. Participants will watch demonstrations of lessons, will practice teaching lessons and will receive handouts that illustrate the strategies learned in the session. The session will also include demonstrations of learning strategies that are part of Skills for School Success, published by Curriculum Associates.

45) Managing Chronic Behavior Disorders and Serious Emotional Disturbances - Jane Garber Issues in managing students with special educational needs in regular classrooms as well as those in self-contained, SED classrooms. Includes an overview of behavior of students with emotional problems will be presented. Techniques for manage-
ment of escalated and out of control behav-
ior, non-compliance, impulsiveness, passive aggressive resistance and withdrawal behav-
ior will be presented and practiced. Particip-
ants will receive the manual Managing Behavior in Behavior which summarizes models and procedures for working with students who have emotional problems.

46) Reading Programs: Using the New Model for Handic-
apped Preshoolers - Georgia Layton A classroom-based model for teaching readiness and reading skills to moderately and severely handicapped (as used in the ADI Early Education Program) will be described. Curriculum objectives and procedures for teaching will be described. Focus will be on strategies to enhance efficiency will be discussed.

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classes will easily take advantage of these procedures, yet it is always available if students are experiencing problems with a particular concept or skill.

Active participation/interactive teaching. The teachers found that students participated more in the lesson with the videodisc than with conventional teaching. Again, the effect was clearly instructional. On an efforting of the interviews, one teacher commented:

"The videodisc instruction consistently shows high correlations between student response rate during the lesson and growth in achievement."

The videodisc curriculum was set up to require students to respond frequently during the lesson. The teachers felt the videodisc system succeeded in this goal.

Perceptions of the overall utility of the videodisc curriculum. All eight special education teachers felt the students were mastering the skills. As mentioned earlier in this chapter, these teachers had previously found fractions one of the most difficult topics in math instruction to teach. They also were disaffected with most existing curricula. In years past, many students had failed to learn several of the major topics covered. During the open-ended portion of the interviews, the teachers indicated the specific strategies that they had found to be successful—the use of a number line, the instructional strategy for finding a common denominator, the teaching of improper fractions. Finally, teachers were asked to provide a global rating of the videodisc curriculum on a 1 to 5 scale. The mean was 4.5, an extremely high rating for an innovative practice.

Results on Open Ended Items

Table 2 presents a brief summary of how teachers responded to the open-ended questions. As might be expected, they unanimously found the graphics and special effects to be the best features of the curriculum. They all mentioned how the computer graphics could visually demonstrate relationships and concepts so much more elegantly, with so much more examples, and so much more quickly than they could with a chalkboard or overhead. All but one of the teachers also stated that the students seemed much more interested and attentive to the bright colors, and visual excitement of the graphic displays.

However, half the teachers also were sensitive to the innovations in the curriculum design. They talked about the orchestration of skills across many lessons, the range of activities incorporated into each lesson. They indicated how this type of subtle orchestration would be extremely difficult, if not impossible, without the aid of technology. Finally, two of the eight teachers mentioned the provision for remediation as one of the best features of the curriculum.

Two factors emerged as weak features of the program for some teachers (see Table 2). One of the teachers felt the curriculum was too juvenile for remedial high school students. Three of the eight felt there was too much paperwork involved in the rather complex mastery learning system that involved daily checks of independent seatwork, as well as group checks of daily quasi-performance.

We next asked teachers to indicate how teaching with the interactive videodisc curriculum was different from their conventional curriculum. The majority of the teachers stated that the videodisc presented the key principle in the design of the curriculum, that things were broken into much smaller steps than is typical. The teachers cited the advantage of such an approach for teaching low-performing students.

Several of the teachers also felt that with this curriculum, they were able to monitor student performance more frequently and more precisely than before. They talked about how their role had shifted from an individual who primarily explains and demonstrates new concepts to one who primarily makes sure students understand the new material, and helps those students with problems. All eight teachers thought the interactive videodisc had great potential for future use in both special education and regular classroom instruction, particularly in the areas of mathematics and science.

Since the videodisc curriculum is so much more structured than conventional curricula, and the role of the teacher much more precisely defined and delineated, we concluded by exploring teachers’ reactions to these constraints. Seven of the eight teachers liked the way everything was structured and laid out for them. They all felt that as a result of the videodisc, they did “less talking” and explaining. Seven of the eight indicated how the videodisc freed them up to perform other teaching functions with more precision. They were now able to monitor carefully how all students were doing, provide praise and encouragement to students for effort, or provide brief, focused instructional unit. The structure of the videodisc allowed them to teach in a more interactive fashion, to more closely follow the model of teaching that research has found to be effective, particularly for low-achieving students (Brophy & Good, 1986).

When some individuals first see the videodisc, they indicate that teachers won’t like it that, essentially it replaces the teacher. So we were curious to see how these teachers felt after six weeks of implementation. We asked whether they felt “replaced” by the videodisc. Three quarters gave a rousing “no.” They saw their role as providers of feedback and support as essential. They also saw the importance of what several called “the human factor,” the need for an adult to make instructional decisions.

Summary and Conclusions

A repeated theme in the different evaluations of the videodisc Mastering Fractions curriculum is that technology can solve specific instructional problems. This is most obvious in the labor intensive part of active instruction, where teachers must present information, check for understanding, provide corrective feedback for errors, and monitor group and individual performance on a continual basis. Technology of this kind can help separate the roles of instruction, allocating to the videodisc dynamic, well-paced presentations and freeing the teacher to closely monitor student performance. Based on the perceptions of all of the teachers in the last study, this separation of roles is neither demeaning nor threatening. On the contrary, the videodisc program made classroom instruction more effective.

A second observation in this technology need not always call for a radical shift in classroom practices. Unlike a microcomputer laboratory, the visual instructional device is not an ancillary, necessary by-product of the setting, videodisc instruction melded well with group instruction in the classroom. Again, results from the naturalistic study indicated that the program made teaching easier and more effective; an observation which is confirmed by the high levels of implementation and positive rating by the teachers at the end, and the growth in student achievement.

To be sure, the success of the Mastering Fractions program is not the result of the inherent features of the technology. Rather, reconfirms a thoughtful integration of instructional design and effective teaching practices with a particular technological medium. Well designed videodisc instruction, then, can offer a focal point for merging research based principles of curriculum design and classroom instruction.

References


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A Field Trial of Mastering Fractions Videodisc Program

by Steve Carter and
Jalie Rice
Centennial Elementary School
and
Steve Ragan
Lewis Clark State College

The use of media of varying kinds, including modern technologies, in today's classroom has been validated as effective and efficient when used appropriately to meet specific objectives. A wide variety of technologies are available for classroom use. Major obstacles to their consistent and effective usage of specific technologies occur because of such factors as reliance on tradition, over-reliance on the ten-as-the-curriculum, initial capital cost, and time needed to purchase of new technologies, and teacher unfamiliarity and fear of a new technology. Adoption of one of the newest technologies, videodiscs, is likely to be slowed by many of the above limitations.

Traditionally, the teacher is the focus of attention in instruction, and so is not just a person who closely monitors and corrects students' responses while a technology presents the information. Also, most teachers rely heavily upon and follow closely whatever textbook has been chosen by the district for use in the classroom. Both the traditional role and the reliance on textbooks predominate in education regardless of the superiority of alternatives in terms of student learning.

Another factor in the resistance to newer technologies is cost. A videodisc player costs from $400 to $700 and programs of a sophisticated instructional nature often cost from several hundred to several thousand dollars per disc. At first glance this seems to be a huge investment for a rather small amount of "material." Of course, the focus should really be on how much material or media is bought per dollar, but how much learning occurs per student per dollar spent.

In this article, the authors relate their experience in forgetting the obstacles and testing out a new technology.

The Setting

The project undertaken by the writers of this article, involved the use of one videodisc program, Mastering Fractions, to teach a regular mainstream class of fifth grade students. The project began in February, 1987, as a cooperative venture between Centennial Elementary School, Lewis Clark State College, and The Columbia Direct Instruction Association.

The class involved in the project was a typical fifth grade class including a heterogeneous mix of students who were very bright, average, slow, and in skill levels. One of the students in the class could be described as moderately learning handicapped. The classroom teacher had not been, and was not, formally trained in the use of the media beyond simply watching a demonstration of the use of the hand-held remote control unit. The resource room teacher was involved in the extent that he monitored the progress made by the mainstream handicapped child and offered consultation to the classroom teacher as she normally would have. The College of Education faculty member offered an initial demonstration of the media and assisted in the analysis of the data collected.

The Program

The Mastering Fractions program consists of three discs that take students through all of the basic concepts involved in mastering fractions from developing skills in identifying fractions, through developing skills in adding, subtracting, multiplying, and dividing fractions; and working with a limited number of "story problems" involving fractions. The 25 lesson program is designed to be taught in 35 to 45 minute lessons.

As displayed in Figure 1, the Mastering Fractions program has been previously validated in its efficacy. The data in Figure 1 show that the students in that study approached or exceeded the mastery average in skills, and the present study hoped to replicate those data with a new group of students. Lessons may be presented on a daily basis or they may be presented only two or three days per week. Main lessons, quizzes, review lessons and tests are provided. Guidance is provided within the disc-based program regarding selection of review lessons, depending upon the performance of the students in the class.

In this particular instance, the classroom teacher followed the program closely and took data as quizzes and tests were appropriate for the students skills development. The classroom teacher used the manual provided with the media as a guide for moving through the lessons. No special provisions were made for bright, average, slow or handicapped students, except that students not mastering a lesson could review it, on their own time. The program was completed by the students in approximately three months.

The Results

The results of the project showed mastery of all of the skills by approximately 90% of the students. The three students who did not master (at the 80% level) all of the skills were either about so much of the time that practical review was impossible within the project time period, or handicapped. In the case of the handicapped student, significant progress was made in mastering approximately 75% of the skills presented. The upper half of the class consistently mastered the skills quickly and moved through the lessons on, basically, a first trial basis. Students in the lower half of the class used review time during their free time to master lessons.

Limitations

As with any study, this project has its limitations. There was no attempt to form a control group. Because of this, generalization of the results are limited. It is incorrect that the gains were made. It is correct that the handicapped child was treated just like other children and not only performed above expectations, but was not a detriment in the performance of the class.

Discussion

As the results indicate, the level of mastery achieved by the students in this class is far above the average achievement levels attained through textbook coverage of the same material. It is rare, for example, unusual for 50% of a class to be able to perform at mastery levels in fractions when they are in junior high school to say nothing of the fifth grade.

Another remarkable result of the project is the inclusion of a moderately learning handicapped student in the program taught to the entire class. Considering the level of the handicap involved and the fact that the student did not hold back the rest of the class, as it is often feared by regular classroom teachers, the progress made by the student was excellent. The successful use of the media by a regular classroom teacher with no training in the use of the program demonstrates the efficacy of the program as a stand-alone program requiring little introduction and no teacher expertise.

The cost-effectiveness of the media should be apparent to anyone. There were no training costs. The material and equipment (one videodisc player) cost approximately $2,500. Thus, the project cost less than $100 per child to teach a very difficult skill often not mastered even by adults. As more than one classroom is in a building and more than one instructional program are purchased for use in the building the cost effectiveness becomes obvious. With six hours in an instructional day and 25 students using the media each hour the program costs per student for one year only become less than one-third that of the average textbook. As the cost is amortized over three to five years the effective cost per student really becomes pennies rather than dollars.

Conclusion

The use of videodisc instruction (Mastering Fractions) can be a successful experience for normal fifth grade students where once it was frustrating. It can represent a way to mainstream very difficult students successfully into a classroom for part of a "real world" learning activity. It represents the true free-time, play time, art or P.E. mainstreaming that has been the rule in the past. And, it can represent a cost-effective alternative to expensive, but initially less expensive, materials.

Mastering Fractions in this setting was extremely successful. The media facilitated skill development for all students, increased instructional mastery to 90% of the students, and proved useful in the effort to mainstream significantly handicapped students.

Recommendations

In light of the limitations of this report, the following recommendations seem in order:

1. If it has not by time this article is published, Mastering Fractions should be validated in a well-controlled experimental research study. Such a study would not only add validity to the present and past studies, but, if successful, could add generalizability to the effectiveness of the program.

2. Data should be gathered on the effectiveness of the program at other levels of public schools. While it is correct that fractions, as a curriculum area, is appropriate for fifth and sixth grade students, there are certainly older students who could potentially benefit from review instruction in the program. Also, brighter younger children might be accelerated by using this program.


3b Kelly, J., et al., in this issue.

Figure 1. Mastering Fractions Validation Mean Score by Lesson

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DIRECT INSTRUCTION NEWS, SPRING, 1988
by Calvin V. Edlund* Robert E. Tingle
San Juan Unified School District
*This project was funded by REH Grant RGO70804954, Secondary Handicapped Children's Model Project
Editor's Note: This study was carried out 8 years ago and was never published. It seems the effort of differing amounts of train in DI teaching methods on gains made in Reading (decoding) and Spelling on the WRAT by Secondary Handicapped students. The statistical analysis used the students (N = 48) as the basis for assessing error terms. It would have been more appropriate to use the number of teachers (N = 6). However, the outcomes (especially for Reading) show differences related to training which are suggestive. There is a need for more extensive studies of the impact of teacher training on performance with DI materials. If anyone is planning such studies, I would be glad to critique them for you beforehand.

Direct Instruction has become an increasingly applied technology in the classroom (Alt 1976, 1977; Brazeau, Maggs, Monath, 1975; Enggelmam, 1968; Maggs and Monath, 1976; and Robbins, 1976). This technology is based upon several principles which acknowledge that behavior (including academic skill) is learned and can be taught. As such, the emphasis are upon knowing and applying the principles regarding how behavior is learned and a thorough acquaintance by the teacher with the skill to be learned, in all its sequences, so that the skill can be properly presented to the learner. This, then, would provide a strategy across ability levels or disabilities which would have the effect of simplifying and unifying education.

For a teacher to become proficient in Direct Instruction, intensive training would seem to be required. Direct Instruction includes several components such as: (a) program and instructional materials, (b) procedures, (c) motivational strategies, and (d) procedures for and evaluation of student progress. The question raised by this paper is what length or intensity of training is needed to produce an effective DI teacher.

This study sought to observe the effects of various degrees of teacher training intensity in DI teaching on achievement on the academic skill growth of secondary learning handicapped students.

Method
Subjects
The six teachers who participated in this study were credentialed for both regular and special education instruction. The had an average of 6.5 years teaching experience in special education classes as head teachers with secondary learning handicapped students in the San Juan Unified School District. The teachers who had not received training in the project were 48 in number. They were identified by psychologists as having average intelligence (IQ range between 90 and 110) with one or more learning disabilities and or behavior dependency below expectation in one or more academic skill areas (at least 1.5 standard deviations below, using the Wechsler Intelligence Scale for Children—Revised and the Wide Range Achievement Test). Their ages ranged from 12 to 19 years.

Project trainers were credentialed teachers (regular and special education) who had received 6 weeks training in Direct Instruction and had successfully taught Direct Instruction in their special education class for two years or more prior to the project. Two teachers were given six weeks training in Direct Instruction, two were given one week of training in Direct Instruction, and two more (the control group) received no training in Direct Instruction. The six teachers were randomly assigned to one of the three groups.

The results of the training on performance with DI materials. If anyone is planning such studies, I would be glad to critique them for you beforehand.

The dependent variable was the academic skill gains in reading and spelling the student made after having been exposed to Direct Instruction for a school year. The nine items of the standard score test were given the Wide Range Achievement Test (WRAT) by credentialed psychologists or trained clerical teachers. The student group's reading and spelling scores were analyzed in the study. A one-way analysis of variance was used to determine if the group mean differences were present and the point data of all the groups of students, the time between pre-and post-testing, the time between pre-and post-testing, and the statistical reliability of the difference of the student gain scores in Reading and Spelling. Student scores in Reading and Spelling were compared for all three groups.

Results
Since the direct instruction did not require all tests to be given at the same time, the results were variable in test dates. Average pretests were in March, but the means for each group were very close to each other. Average pretest scores were in February and again, they differed little across groups. The time between testings did not differ for the groups. Pretest means by groups were examined (see Table 1). Standard scores on the WRAT percents of 100 and a standard deviation of 15 (like IQ scores) and do not increase from year-to-year (on the average). The Denham measures show the students about 1.5 standard deviations below the mean in Reading and 2.0 in Spelling. (Assuming the mean age of the group is between 14 and 15, these standard score means imply average grade-equivalent scores of 5.0

![Table 1. Standard Score pretest means by Group in Reading and Spelling.](image)

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Discussion
This project did not set out to study the effectiveness of Direct Instruction. The authors felt this has been demonstrated in several other studies referred to in the opening paragraphs. This project sought to study ways of effectively training teachers in the skills of Direct Instruction which would maximize its effectiveness in terms of student academic skill growth. The training emphasized understanding Direct Instruction as a set of scripted classroom procedures for the teacher. The primary emphasis was placed on script and test administration, and immediately following the training, in implementing the procedures for the classroom for the school year. The use of student academic growth as the measurement of the teacher training effectiveness was felt to be the most realistic measure of effectiveness.

The importance of this study is in the direction of extending our knowledge regarding the teacher training process. The project sought to simplify as much as possible the teacher behavior to be learned by teachers for technical evaluation purposes, but also to expedite the training. The scripted format seemed most suited. It is interesting that as precise as the scripted format was, the more intensive or extended training was overall more effective. The suggestion here seems to be—precise teaching behaviors require time to acquire for effective performance.

References
Brazeau, S., Maggs, A., & Monath, P. Teaching experiences...
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