Introduction to
DIRECT
INSTRUCTION

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Dedication

Our dedication of *Introduction to Direct Instruction* is twofold. First, we wish to dedicate this text to Siegfried Engelmann. Engelmann and colleagues developed the Direct Instruction model over thirty years ago, and since that time have continually improved, elaborated, and extended the model. Over the years, Engelmann has submitted his work to close empirical scrutiny through years of field-testing, evaluation, and impartial scientific investigation. Throughout, Engelmann has remained committed to the idea that student learning is our measure of success. For his tireless energy and dedication to improving the lives of children, we say thank you.

Second, we wish to dedicate this text to the countless teachers, administrators, parents, trainers, professors, and others who use Direct Instruction because it works. They have changed the lives of our children, opening doors for them that were otherwise closed, setting them on paths to success rather than failure. To their conviction for doing what is right for children and their dedication to the profession called *education,* we say thank you.

ABOUT THE EDITORS

Dr. Nancy E. Marchand-Martella is a professor of Special Education in the Department of Counseling, Educational, and Developmental Psychology at Eastern Washington University. She has worked for over eighteen years with students with and without disabilities in public and private school settings. Dr. Marchand-Martella teaches courses in effective instructional practices and assessment. She is co-editor of the *Journal of Direct Instruction* and is a board member of the National Association for Direct Instruction. She serves on the Reading First review panel for the State of Washington. Dr. Marchand-Martella has written or cowritten over ninety journal articles, book chapters, and manuals and has conducted over 130 professional research presentations and workshops. The content of her most recent publications and presentations has focused on the use of research-validated instructional practices, with a focus on Direct Instruction programs.

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Part One provides an overview and discusses the importance of Direct Instruction. In Chapter 1, Hempenstall sets the stage for the text by describing why we need quality education and how so many of our children fail to experience success and, instead, participate in a cycle of failure. Hempenstall describes the importance of using research to guide our practices and the obstacles to using research to drive education. Finally, Hempenstall defines effective instruction (**direct instruction**) and **Direct Instruction** and chronicles the history of the Direct Instruction model and its founder, Siegfried Engelmann. In Chapter 2, Watkins and Slocum describe the three main components of Direct Instruction: program design, organization of instruction, and teacher–student interactions. Watkins and Slocum note the results of Project Follow-Through, independent reviews of Direct Instruction research, and long-term follow-up investigations.

Part Two provides an overview and analysis of Direct Instruction academic programs. In particular, these chapters describe the importance of each academic area and instruction in the area, critical elements of focus, an overview of programs with corresponding content analyses and format features, teaching techniques specific to the programs, assessment and trouble-shooting aspects, extensions and adaptations, and a summary of the research supporting these programs. In Chapter 3, Waldron-Soler and Osborn describe the language programs. Stein and Kinder discuss the various reading programs in Chapter 4. In Chapter 5, Fredrick and Steventon provide a discussion of writing programs. Simonsen and Dixon discuss spelling programs in Chapter 6. Snider and Crawford discuss various math programs in Chapter 7. Finally, in Chapter 8, Harniss, Hollenbeck, and Dickson describe content area programs in history/social studies and science.

Part Three focuses on additional issues in Direct Instruction implementation. In Chapter 9, Lignugaris/Kraft describes how Direct Instruction principles can be applied to new content. A lesson plan format is provided to guide teachers in providing effective instruction to students when Direct Instruction programs are not available. Marchand-Martella, Blakely, and Schaefer discuss aspects of schoolwide implementations in Chapter 10. These aspects include critical issues and guidelines for implementing Direct Instruction programs, coaching as a means of staff development, tutoring to increase support for students, and effective supervision of preservice teachers.

Additional Chapters

Two additional chapters on Direct Instruction published in the Summer Issue, Volume 4(2), of the *Journal of Direct Instruction* (*JODI*) can be obtained by calling the Association for Direct Instruction (ADI) at (800) 995-2464, by faxing ADI at (541) 683-7543, or by accessing ADI's website at www.adihome.org. These chapters include what was to be Chapter 11: Evaluation of Direct Instruction Implementations by Timothy Slocum, Utah State University and Chapter 12: Managing Classroom Behavior by Ronald C. Martella,

Eastern Washington University, and J. Ron Nelson, University of Nebraska-Lincoln. Due to space limitations, both chapters were cut and subsequently published in *JODI*. In the chapter on evaluating Direct Instruction implementations, Slocum notes how Direct Instruction implementations should be evaluated. Slocum describes issues of assessment, evaluation, and validity, as well as formative and summative evaluation. Evaluation designs are also illustrated. In the chapter on managing classroom behavior, Martella and Nelson overview how to manage classroom behavior using primary prevention, secondary, and tertiary techniques. Martella and Nelson focus on the connection of Direct Instruction programs and their elements to classroom management. We encourage readers to purchase this issue of *JODI* for further information on aspects of Direct Instruction implementations.

Acknowledgments

FOREWORD

SIEGFRIED ENGELMANN

All details of Direct Instruction are referenced to teaching effectively. Most of the details evolved from our failure to teach something well or to achieve the effect that we had intended. Our assumption from the beginning was that children would learn if we taught them effectively. When all children did not learn or didn't learn in a timely manner, the conclusion was not that they lacked readiness or were incapable of learning, but that our procedure was ineffective and should be modified to communicate more effectively with the children. Fortunately, our initial work, starting in the 1960s, was directed at accelerating the perform-ance of preschool-age, low-performing children who had older siblings in classes for individuals with mild mental retardation. These children were relatively hard to teach and manage, which meant that, when we succeeded in teaching skills or operations, we knew that the techniques were solid and would work with the full range of students who lacked these skills or operations.

The overall strategy that evolved was to let these children's performance show where they could begin an instructional sequence—a point at which we could start a small-step staircase of skills that didn't attempt to teach everything in one "lesson," or even in a few days, but that built progressively, a little bit during each lesson. The idea was that, if children were able to learn only so much new information at a time, we would teach only that much. But if we designed the sequence properly, any child who could stand firmly on the first step of the staircase—performing perfectly on the basic skills—could learn enough to reach the next step and the next and, ultimately, reach the goal of the sequence.

The result would be that we would be able teach children anything. The trick was simply to start them where they would be successful and to design a sequence that would not overwhelm them by trying to teach too much new material during any lesson. For instance, if children could not follow directions that told them to touch the top of their paper, we taught them the difference between top and not top. If they could not say the sentence, "I touched the top of my paper," we taught the sentence. If they had trouble with large classes of sentences, we taught them. Basically, we simply tried to teach them all of the things they would have to know to learn the next thing we planned to teach them.

In addition to being sequential and characterized by small steps, the instructional sequences had to be scrupulously efficient. Children at-risk are significantly behind middle-class children both in what they know and in their strategies about how to learn and retain information being taught to them. If these children are to catch up, the task facing teachers is a paradox: to achieve more learning for these children during each period than the middle-class child in a traditional program learns during the same amount of time. The paradox is that, if these children have learned at a slower-than-average rate during their entire life, and if they are relatively naïve about learning from "instructional presentations," how

is it possible to accelerate their performance so they are able to catch up to children who know more and learn faster?

The most obvious implication is that, if we use the same programs and techniques traditionally employed with middle-class children, the children at-risk would continue to learn at a rate slower than that of middle-class children. So, in addition to having small steps that allow all children to learn everything we teach, the program would have to be designed so that it packed more total learning into each lesson than a traditional program did.

Because there is no magic in instruction, the advantage had to come about through design of the program and the various techniques the program used. If children produced unison responses, where possible, teachers would receive feedback about the children's learning at a far faster rate than individual turns could generate. If the materials were designed so that teachers did not engage in long explanations, simply short ones, and the children produced a very high rate of responses per minute—possibly ten to twenty—it would be possible to pack more practice into a period. If the program were designed so that it communicated very directly and clearly to the students, the number of misinterpretations would be reduced and learning would occur faster. If the program had no "fluff"—material that was not analytically necessary for the immediate learning objective—a great savings in time would be possible.

Eliminating the fluff requires a careful analysis of what children are to learn and how the introduction can be sequenced so that it involves a minimum of baggage. For instance, if the traditional program requires children to learn all their letters before actual reading is introduced, a great savings could occur if the reading commenced after these children learn possibly only eight or nine letters. A further savings could be realized by completely eliminating the requirement of learning letter names before reading instruction commences. These children do not need letter names, but letter sounds, to attack words. If they learn the letter names first, they must later learn the sounds, then learn to read. The letter–name teaching could be eliminated because it is not necessary.

Children entering kindergarten would first learn some language skills and become familiar with following directions and with learning from teachers. Then reading instruction would start. After fewer than thirty lessons into the sequence, children would be reading their first words.

The sequence must be not only small-stepped, efficient, and capable of generating responses at a high rate, but must be complete, which means that, if there is a skill component children need for a task like initial word reading, the program must provide it. For instance, if we expect beginning readers to "sound out" a word by saying the "sounds" of the letters in sequence and then identifying the word, we have to make sure that they have the skills they need. Again, we were able to identify some of these skills by observing the mistakes they made. Some children we worked with could not identify the word if they sounded it out in the traditional way—with pauses between each sound—for instance, in saying the sounds for the word *mat*, "mmm, aaa, t." By teaching these children to sound out without pauses, they would actually be saying the word slowly ("mmmaaat"); this made it a lot easier for them to identify the word.

But even with this modification, some children could not identify the word. Even when teachers tried to correct by modeling the sounding-out procedure, the children would either produce no response or would say the last part of the word.

"James, watch me touch the letters and say the sounds: mmmaaat.
"What word?" "*At.*"
"James, it's *mat.*"

The correction didn't work because the children lacked the skill. The simplest form of the task they failed was a verbal task that involved no written word. "Listen, mmmaaat. Say it fast." Unfortunately, that example is too hard for some children. The solution is to introduce easier examples and work up to the harder ones. Again, the children's responses showed us when we had reached the appropriate starting point, which was verbal words presented in two parts with a pause between them. "Listen: *ham burger.* Say it fast." With this starting point in place, the children practiced saying it fast with simple words, starting on the first day of reading instruction (many days before they would read their first word). These examples were followed by progressively harder words until the children practiced three-sound words and two-sound words (the hardest for them). "Listen: *nnnōōō.* Say it fast." When they completed this sequence, children had the phonemic skill they needed to approach written words. The only difference was who said the sounds. To decode, the children, not the teacher, said them. Furthermore, the children had the skills necessary for teachers to correct them, so the children figured out the word. "Listen: *mmmaaat.* Say it fast. . . . Now do it by touching and saying the sounds. Sound it out. . . . Say it fast. . . . You read the word *mat.* Good for you."

Our beginning reading program (*DISTAR Reading,* now titled *Reading Mastery*) was the first to introduce these phonemic-awareness exercises, but phonemic awareness was not an end in itself or something that had only an amorphous relationship to what we were teaching. It was a small-step progression that taught a skill that a fair percentage of children hadn't learned and that was a necessary preskill to learning and understanding basic reading procedures.

For some tasks, children need to have knowledge of letter names. So letter names were taught in the sequence, but not before children started reading, only when they needed the information about letter names. In the same way, children learned math facts, but not before they had learned the logic of math operations like addition.

The same analytical approach used in reading applies to all content and skills the children are expected to learn in school. The approach frequently results in procedures that are different not only from traditional approaches but from standards and what is typically measured by achievement tests. For instance, the tradition calls for the introduction of fractions proceeding from the "concrete singular" to the "more complex." The traditional sequence first introduces three fractions, and the children work on these extensively:

$$\frac{1}{2}, \frac{1}{3}, \text{ and } \frac{1}{4}.$$

The expectation is that they are basic examples and, from them, the children learn a fundamental understanding of simple fractions. Later teaching expands the scope. The analysis is poor and is easily contradicted by the behavior of children who go through the sequence. Children learn "misrules" about fractions because the sequence generates these misrules. In other words, it is possible for children to go through the sequence, perform

perfectly on every verbal task and worksheet task the sequence presents, and come away with serious misunderstanding of what fractions are. The most common misunderstanding is that all fractions have only one part that is colored or referred to. Another is that you don't have to attend to the top number of the fraction, only the bottom number. (To find the picture on the worksheet that shows

$$\frac{1}{4},$$

just look for the group that has four parts.) The most dangerous misunderstanding is that a fraction is always less than one group.

To avoid all these misunderstandings, the Direct Instruction sequence starts by teaching children how to analyze any fraction. The bottom number tells the number of parts in each group. The top number shows the number of parts that are "used" (colored or referred to). This analysis applies to

$$\frac{11}{7}$$

as well as it applies to

$$\frac{5}{5} \text{ or } \frac{1}{4}.$$

It requires very little time to teach and apply, and it sets the stage for everything children are to learn about fractions. "Improper" fractions are simply those that have a larger number on top than on the bottom. Fractions that equal whole numbers follow logically. (If you can count by the bottom number to reach the top number, the fraction equals a whole number.) For fractions that equal *one,* if there are four parts in each group and you wanted to color one group, how many parts would you color? So the fraction for one group is

$$\frac{4}{4}.$$

For larger fractions, the number of times you count tells the number of wholes.

The analysis even implies why it is impossible to "divide by zero." The fraction

$$\frac{7}{0}$$

tells you to count by zero until you end up with seven. It can't be done. Zero times any other number yields zero, not 7. On the other hand,

$$\frac{0}{7}$$

is easily demonstrated as a legitimate fraction—strange but legitimate. According to the analysis there are seven parts in each group but none of the parts is colored or used.

A further extension of the analysis relates fractions to division (rather than introducing labels like *numerator* and *denominator* that give the impression that fractions are something

strange and unique). Fractions are division problems that are written in a column rather than a row. The problem

$$7 \overline{\smash{\big)}\ 28}$$

is the same as the fraction

$$\frac{28}{7}$$

The Direct Instruction mathematics programs show this relationship by requiring students to treat the problems in the same way. They read the standard division problem as 28 divided by 7. Then they read the fraction as the same division problem: 28 divided by 7. These conventions promote knowledge of relationships that many students never develop going through traditional programs and virtually none develop going through programs in which they make up math algorithms.

In the end, the process that we tried to follow in developing effective instruction was to identify *all* the variables that we could manipulate within the school setting to create savings in time and make the instruction more effective. We scripted what teachers said because teachers we worked with learned faster and performed better when we did this. In a full-school implementation, we required all teachers to be part of the same plan, so that we would know exactly where the various children were performing now and would be performing at the end of the year. We needed this information to coordinate efforts from classroom to classroom, from grade to grade.

We developed recommended schedules for daily periods of instruction because we observed that, unless the instruction was scheduled this way, teachers were not able to teach enough or spent too much time on a particular subject. We grouped children homogeneously for instruction so that all children were on the same step of the instructional sequence. With heterogeneous groups, some of the children were far below where they would have to be to master everything taught in the lesson. (They would have to learn much more during the period than children who were placed on the appropriate stair.) Other children already know the material being presented and do not benefit from whatever instruction teachers provide.

We introduced behavior-management techniques and practices because without these, teachers would often not issue a ratio of praise-to-corrective comments that promote confident, positive learners. Finally, we developed detailed procedures for training teachers and for monitoring and collecting the data that helped us identify current problems. The purpose of identifying problems is not to blame teachers but to provide timely solutions to the problems so children are able to proceed at a good rate through the program.

With all these pieces in place, and with academic work in reading, language, and math beginning in kindergarten, we are able to accelerate the performance of children who were behind. At-risk schools are able to perform far above their current achievement levels.

Figure 1 shows the fifth-grade reading performance of eleven schools in Baltimore where Direct Instruction programs were implemented. All but one at least doubled its 1998 reading level. Some were implemented better than others. City Springs was the best-implemented school (it solved more of the problems and effectively controlled more of
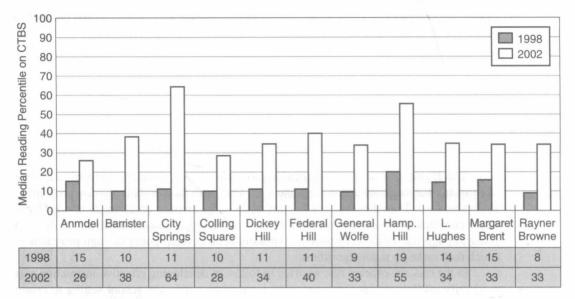
	Anmdel	Barrister	City Springs	Colling Square	Dickey Hill	Federal Hill	General Wolfe	Hamp. Hill	L. Hughes	Margaret Brent	Rayner Browne
1998	15	10	11	10	11	11	9	19	14	15	8
2002	26	38	64	28	34	40	33	55	34	33	33

FIGURE 1   Comprehensive Test of Basic Skills (CTBS) Median Percentile Reading Scores in fifth grade in eleven Direct Instruction Schools in Baltimore, Maryland for the years 1998 and 2002.

the variables), and went from an overall 1997 placement (math and reading) of 115th of 117 schools in the district to being sixth in 2002. Note that all of these schools have more than 25 percent turnover of students each year. So the average fifth-grader has been in the program less than three years. Children who have gone through the entire K–5 sequence score about 30 percent higher than the 2002 values shown in Figure 1. The data show that it can be done, but it requires a great deal of work and coordination.

During the 1960s, we worked not only with preschoolers but with a variety of school-age children who were not performing well in academic work. Some were students who failed to learn to read well or to perform well in math. To develop appropriate instruction for them, we followed a variation of the same strategy we used with children in the preschool and elementary grades. We assumed that, if the teaching was appropriate, they would learn. We recognized that most of them were victims of very bad instruction. In reading, for instance, they had been taught to guess at words, to use sentence contexts, pictures, or hints provided by teachers to figure out words. They didn't learn that, for an overwhelming number of words, a particular arrangement of letters signaled a particular pronunciation. Most of these students had gone through various, magical approaches, such as those based on the idea that students simply weren't motivated and that, if they really wanted to read, they would. In fact, these students couldn't read accurately if their lives depended on it. They came away from their attempts to read high-interest material even more frustrated because they were very confused about what reading actually involved. Their confusion was revealed by the discrepancy between their performance at reading words in lists and reading the same words in sentences. Many of them could accurately read words like *the, a, what,* and *that* in lists but would make frequent mistakes when they tried to read these words in passages. For

them, reading words in passages involved a formula far more complex than the word-reading strategy for words in lists.

Because these students had to relearn habits and notions they had about reading, the program had to be designed to provide them with both the information about what they needed to do and the amount of practice they needed to establish new habits. The approach was logical, not magical.

The corrective reading sequences that we have designed do not try to avoid the students' reading problems but rather confront them directly. The beginning parts of the sequence were designed so that, if students used any of their ineffective strategies, they would make mistakes and thereby receive immediate feedback about exactly where their current strategies must be changed. One technique we used was to design the text so it was not predictable. Instead of saying something like,

> Tim and Jim said, "Let's go to the store." So Tim and Jim went to the store,
>   the text would say,
> Tim and Jim said, "Let's go to the store." So the boys rode their bikes there.

Any guessing would probably result in a mistake. We also designed the material so there were no pictures (eliminating the possibility of predicting the text on the basis of pictures). We even created some stories so that the students read lists of words that were not actually in lists. For instance, one of the characters was a dog named Chee. When she got excited, she would say things that made no sense. The words she would say were those the students tended to confuse most frequently. For instance,

> Chee was very mad. She said, "Of what for to go that who."

Some students who could read these words accurately in a list would find this task very difficult, but it served to show them that reading is grounded in identifying the same words that the program presented in daily lists.

The common thread for all subjects and all students—from the preschooler learning to follow basic directions to the high school-age students learning chemistry—is that instruction is logical and that learners respond in lawful ways. They learn to hate reading if they can't figure out how to do it. They like reading if they succeed.

Furthermore, their performance history gives them a good idea of what to expect. Children who have learned everything teachers have set out to teach them are understandably confident that they will be able to learn the next thing teachers present. In contrast, those children who have a history of failing to learn what teachers try to teach have a pretty good idea that they will fail the next thing teachers present. So if we want children to feel good about themselves, we give them evidence that shows them they have a reason for being confident. We don't try to seduce them through slogans and songs that say how smart they are. We respond to their successes as if they are important and thereby show them how smart they are. We don't give them noncontingent praise or ignore the problems they have in learning. We view children as lawful beings who have the capacity to learn if we identify the appropriate starting point and provide them with a sufficient amount of practice.

Both the starting point and the amount of practice are determined not by applying formulas that have nothing to do with performance, but by letting the children show you, through actual behavior, what they don't know and how much practice they require to learn it. The most important rule for anyone who wants to become a superior teacher—one who is able to teach virtually any learner with an IQ of 70 or more—is to reference everything that is taught to the performance of the learner. This rule holds not only for everything in the Direct Instruction sequences but everything else teachers do whether you are teaching learners the rules about how to store the volleyballs and use them during recess, a unit on Sweden, or quadratic equations, find a starting point that permits the learners to perform at least 70 percent correctly on the tasks you present. Then proceed a step at a time, with each step referenced to whether the learners achieve mastery.

Remember, the learner is not segment to learn one way during structured lessons and learn another way in response to the unit on Sweden. It's the same learner, with the same repertoire, habits, and motivation. Sometimes, teachers fail to learn this truth. Instead of using the same positive management techniques they use during the Direct Instruction lessons, they nag and scold children at other times, and basically fail to apply what they have learned through their Direct Instruction training about teaching to mastery.

Not only can it be done, it's worth the work because the superior teacher is able to change the learner's life more than doctors, social workers, or any other professional. A superior teacher in a superior school can create options for the learner that nobody else is able to create, such as the option of going to college and becoming a journalist, an engineer, or a teacher.

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CONTENTS