Origins and Critical Elements of Authentic Direct Instruction

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Origins of Direct Instruction

Forms of interaction:

- Polls -- Tamara Bressi
- Q & A
- info@nifdi.org

Origins of Direct Instruction

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Origins of Direct Instruction

First poll – where are you located?

1. Canada
2. United States
3. Latin America
4. United Kingdom
5. Continental Europe
6. Asia
7. Africa
8. Australia
9. South Pacific

Origins of Direct Instruction

Second poll – relationship to schools

- Teacher, coach or school or district leader?
- Primary, middle or secondary schools?
- Number of years with Direct Instruction (DI).

Siegfried ”Zig” Engelmann, 1931-2017

Origins of Direct Instruction

Topics:

1. Origins of Authentic DI.
2. Development of the critical features of Authentic DI.
3. Comparison of Authentic DI with lower-case di.

Free 6-hour webinar after January:
Introduction to Direct Instruction

Origins of Direct Instruction

Champaign, Illinois:

- Four-year old twin sons, Kurt and Owen, 1963.

A homemade film demonstrates the results of a year of Zig's methodology, available at:
https://www.nifdi.org/videos/
Siegfried "Zig" Engelmann Videos

Origins of Direct Instruction

University of Illinois:

- Bereiter-Engelmann Preschool for highly at-risk students.

Film demonstrates the results of Zig's methodology only 20 minutes/day in math for one or two years, available at:

https://www.nifdi.org/videos/

Siegfried "Zig" Engelmann Videos

Origins of Direct Instruction

Goal of the instruction:
accelerate student performance.

His approach was in contrast with developmental stage theories.

Example:

Engelmann, Siegfried.(1967). "Teaching Formal Operations to Preschool Children." *Ontario Journal of Educational Research* 9 (3) 193-207.

Origins of Direct Instruction

Teaching methodology:

1. Identify and preteach prerequisite skills.
2. Teach students at their skill level with distributed practice.
3. Clearly present examples so there is one interpretation.
4. Correct students' misunderstandings.
5. Reinforce students for their efforts.

3. Clearly present examples so there is one interpretation, also known as "faultless communication".

Faulty communication: "This is porous" while running finger laterally over a single brownish colored rock.

Faulty communication: "This is porous" while running finger laterally over a single brownish colored rock.

Consistent with this presentation, "porous" could mean:

- moving your finger laterally over an object,
- brown,
- a type of rock,

as well as the intended concept.

Faulty communication: "This is porous" while running finger laterally over a single brownish colored rock.

The presentation could be made much clearer if the teacher:

1. showed different objects of different sizes, shapes and colors that are porous
2. as well as objects that are NOT porous and labeled them as such.

Origins of Direct Instruction

Third poll – how could this presentation be misinterpreted?

- Students have never seen a pencil before.
- The teacher holds a pencil in her hand and says, "This is a pencil."
- What conclusion(s) could students make that would be consistent with the presentation?

Origins of Direct Instruction

Based on the presentation alone, students could logically conclude that "pencil" means:

- something you hold in your hand
- something made of wood
- a cylindrical object
- an object with a point at one end
- a writing utensil
- any or all of the above

Origins of Direct Instruction

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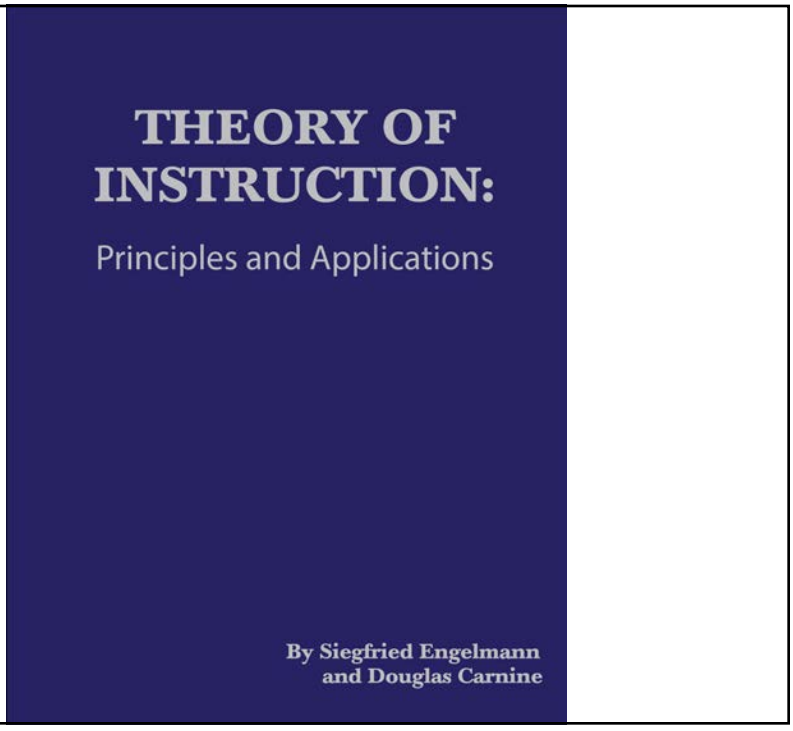


Development of critical features of DI

Lists of critical features

Guiding teaching strategies from Bereiter and Engelmann, *Teaching Disadvantaged Children in the Preschool*, 1966, p. 120:

1. Work at different levels of difficulty at different times.
2. Adhere to a rigid, repetitive presentation pattern.
3. Use unison responses whenever possible.
4. Never work with a child individually in a study group for more than about 30 seconds.
5. Phrase statements rhythmically.
6. Require children to speak in a loud, clear voice.
7. Do not hurry children or encourage them to talk fast.
8. Clap to accent basic language patterns and conventions.
9. Use questions liberally.

Development of critical features of DI

Lists of critical features

Guiding teaching strategies from Bereiter and Engelmann, *Teaching Disadvantaged Children in the Preschool*, 1966, p. 120:

10. Use repetition.
11. Be aware of the cues the child is receiving.
12. Use short explanations.
13. Tailor the explanations and rules to what the child knows.
14. Use lots of examples.
15. Prevent incorrect responses whenever possible.
16. Be completely unambiguous and letting the child know when his response is correct and when it is incorrect.
17. Dramatize the use value of learning whenever possible.
18. Encourage thinking behavior.

Development of critical features of DI

Lists of critical features

Guiding teaching strategies from Engelmann, Siegfried. *Preventing Failure in the Primary Grades*, 1969, pp. 41-60:

1. Group the children in a way that will make it possible to work with them effectively.
2. Teach children in a way that provides maximum feedback on what they are learning and where they are having difficulty.
3. Make use of the feedback.
4. Gear the presentation to the lowest member of the group.
5. Don't be afraid of looking bad.
6. Make maximum use of study periods; reduce homework to a minimum.
7. Learn to isolate the concepts.

Development of critical features of DI

Lists of critical features

Guiding teaching strategies from Engelmann, Siegfried. *Preventing Failure in the Primary Grades*, 1969, pp. 41-60:

8. Don’t use complicated demonstrations; always seek the simplest form in which to present a concept.
9. Don’t correct the child by appealing to his intuition or his thinking habits – program rules for thinking.
10. Preserve the child’s self-image, but tell him when his answers are wrong.
11. Give the children ample evidence that they are capable of learning.
12. Structure the teaching sessions so that the children work for no more than 5 to 8 minutes on a particular series of tasks.
13. Use fun examples in tasks with a payoff.
14. Concentrate on those aspects of the curriculum that can be accelerated.

Development of critical features of DI

Problem: how scale up so teachers could deliver effective instruction?

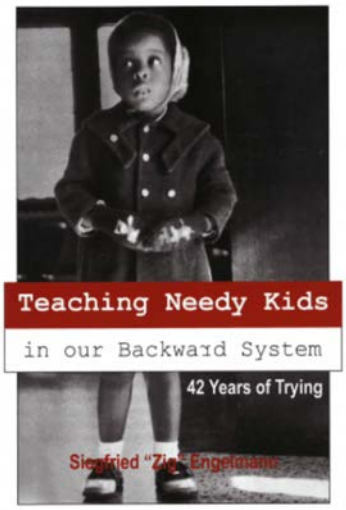
Needed even before Project Follow Through (1968-77).

Solution: develop scripts that detail the presentation and corrections.

Time required to train teachers is reduced drastically with scripts!

Development of critical features of DI

"The scripts were successful because they permitted the teacher to teach, not to be both an instructional designer and a teacher. Because the scripts relieved the teacher of the technical design details, the teacher was able to concentrate more on presenting the material efficiently and providing corrections. The introduction of verbatim scripts … limited the number of details they had to learn before they were effective. With scripts, we were able to teach new trainees more in two weeks than we had previously been able to teach in more than four months." (p. 20)



Development of critical features of DI

Evolution of the DI scripts:

1. List of examples
2. Precise wording
3. Correction procedures
4. Tryout / field test and revision

Development of critical features of DI

<u>On revising Corrective Reading:</u>

When all work is finished, we have enough charts to paper a 12-foot wall from ceiling to floor, enough copies of student material to fill four standard filing cabinets, and probably more than 2,000 pages of manuscript for each iteration of the program.

(SOURCE: Engelmann, Siegfried. (2007). *Teaching Needy Kids in our Backward System: 42 Years of Trying*. Eugene, Oregon: ADI Press, p. 209.)

Development of critical features of DI

Script conventions:

Teacher talk – what the teacher says – is in blue.

(Directions to the teacher – what the teacher does – are in parentheses.)

Student responses – what the students say or do – are in Italics.

Development of critical features of DI

Fourth poll – which of the following is false?

- Teacher talk – what the teacher says – is in blue.
- Student responses – what the students say or do – are in parentheses.
- Student responses – what the students say or do – are in Italics.

Development of critical features of DI

Script conventions:

Teacher talk – what the teacher says – is in blue.

(Directions to the teacher – **not expected student responses** – are in parentheses.)

Student responses – what the students say or do – are in Italics.

Development of critical features of DI

From di to DI:

Before creating published programs, Zig called his approach "direct instruction". From Bereiter and Engelmann (1966) *Teaching Disadvantaged Children in the Preschool*, p. 51:

The direct-instruction approach ensures that every objective can at least be attended to, and it gives the teacher better day-to-day control over pupil progress so that she will know what objectives need additional attention.

Development of critical features of DI

From di to DI:

With the publication of the DISTAR (Direct Instruction Systems for Teaching and Remediation) programs by SRA in 1968, the name of the methodology went from di to DI:

- *DISTAR Reading*
- *DISTAR Language*
- *DISTAR Arithmetic*

Comparison of DI with lower-case di

Recommended sources for constructing di / explicit instruction lessons:

Archer, Anita L. and Hughes, Charles A. (2011). *Explicit Instruction: Effective and Efficient Teaching.* New York: Guilford Press.

Boxer, Adam, editor. (2019). *The Research ED Guide to Explicit and Direct Instruction: An Evidenced-Informed Guide to Teachers*. Melton, England: John Catt Educational, Ltd.

Carnine, Douglas W., Silbert, Jerry, Kameenui, Edward J., Slocum, Timothy, A. & Travers, Patricia A. (2017). *Direct Instruction Reading* (6th Ed.). Boston: Pearson.

Engelmann, S., and Carnine, D. (1991). *Theory of instruction: Principles and applications (Rev. Ed.).* Eugene, OR: ADI Press.

Stein, Marcy, Kinder, Diane, Rolf, Kristen, Silbert, Jerry and Carnine, Douglas W. (2018). *Direct Instruction Mathematics* (5th Ed.). Boston: Pearson.

Comparison of DI with lower-case di

Recommended source for constructing DI programs:

Engelmann, Siegfried and Colvin, Geoff. (2006). *Rubric for Identifying Authentic Direct Instruction Programs*. Eugene, Oregon: Engelmann Foundation.

The authors identify seven different levels across which construction of the program must be coordinated (p. 15):

1. Presentation of information
2. Tasks
3. Task chains
4. Exercises
5. Sequences of exercises (tracks)
6. Lessons
7. Organization of content

At each level, the authors present a list of axioms that authentic DI programs must incorporate fully.

Comparison of DI with lower-case di

Other definitions of lower case di – Barak Rosenshine

- also at the University of Illinois
- visited DI sites
- synthesizer and compiler of strategies
- Rosenshine, Barak and Stevens, Robert. (1986). "Teaching Functions." In M.C. Wittrock (Ed.), *Handbook of Research on Teaching* (3rd Ed., pp. 326-91).
- Drew from: Becker, W. C. (1977). "Teaching reading and language to the disadvantaged: What we have learned from field research." *Harvard Educational Review*, 47, 518-43.

Comparison of DI with lower-case di

Other sources on the history of DI/di

Engelmann, Siegfried. (2012). *Critique of Lowercased d i (direct instruction)*. Accessed from: https://zigsite.com/Critique_of_Lowercased_di(direct_instruction.html.

Rosenshine, Barak. (2008). *Five Meanings of Direct Instruction*. Lincoln, Illinois: Center on Innovation & Improvement. Accessed from: http://www.centerii.org/search/Resources%5CFiveDirectInstruct.pdf.

S. Engelmann critiques the history of DI/di as portrayed by B. Rosenshine in the 2nd source.

How Rosenshine's 10 Principles are Manifested in the DI Programs

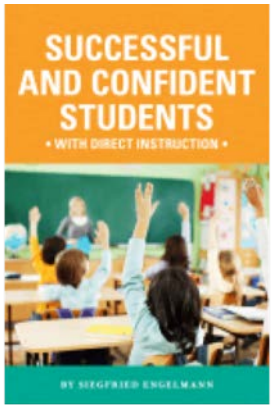
Ten research-based principles of instruction gathered from three sources:

(a) research in cognitive science,
(b) research on master teachers, and
(c) research on cognitive supports.

From p. 12:

1. Begin a lesson with a short review of previous learning.
2. Present new material in small steps with student practice after each step.
3. Ask a large number of questions and check the responses of all students.
4. Provide models.
5. Guide student practice.
6. Check for student understanding.
7. Obtain a high success rate.
8. Provide scaffolds for difficult tasks.
9. Require and monitor independent practice.
10. Engage students in weekly and monthly review.

Source: Rosenshine, Barak. (Spring 2012). "Principles of Instruction: Research-Based Strategies That All Teachers Should Know." *American Educator*, 12-19.



How Rosenshine's 10 Principles are Manifested in the DI Programs

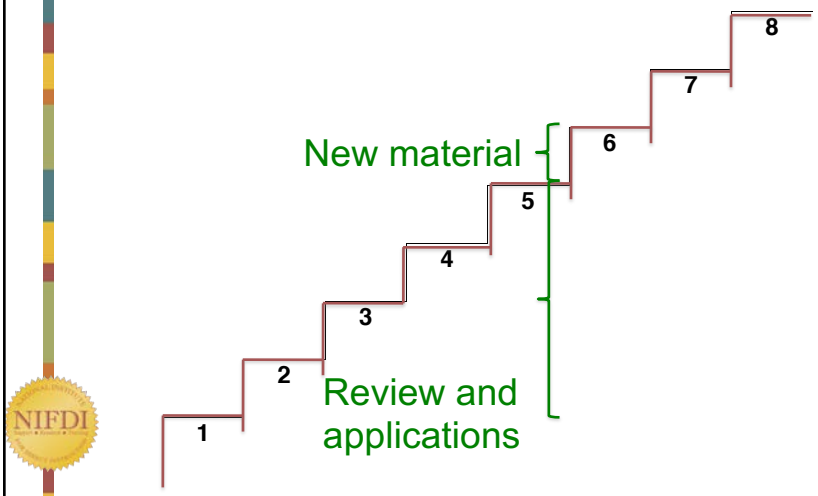
Rosenshine's Principle #1: Begin a lesson with a short review of previous learning.

DI Design:

1. New parts of a lesson account for only 10 – 15 percent of the total lesson.

2. The design is somewhat like a staircase. Students who are placed appropriately successfully move through the program as they achieve fluency/automaticity with the remaining 85-90 percent of the lesson.

How Rosenshine's 10 Principles are Manifested in the DI Programs



Development of critical features of DI

Fifth poll – which of the following is true?

1. With the incremental step design, it doesn't matter where you place students.
2. Having 85-90% review and application promotes automaticity in skills.
3. Students who don't master a lesson still have only 10-15% of a lesson to learn during the next instructional session.

Development of critical features of DI

Fifth poll – which of the following is true?

1. With the incremental step design, it doesn't matter where you place students.
2. Having 85-90% review and application promotes automaticity in skills. TRUE
3. Students who don't master a lesson still have only 10-15% of a lesson to learn during the next instructional session.

How Rosenshine's 10 Principles are Manifested in the DI Programs

Rosenshine's Principle #2: Present new material in small steps with student practice after each step.

DI Design:
New material is presented in small steps in ways to ensure that all students master basic skills as a foundation for learning more advanced skills.

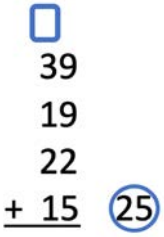
Example 1: Sound blending

Target skill: students blend phonemes together
Prerequisite skill: they say 2 words together.

How Rosenshine's 10 Principles are Manifested in the DI Programs

Rosenshine's Principle #2: Present new material in small steps with student practice after each step.

Example 2: Carrying in column addition



How Rosenshine's 10 Principles are Manifested in the DI Programs

Rosenshine's Principle #3: Ask a large number of questions and check the responses of all students.

DI Design:

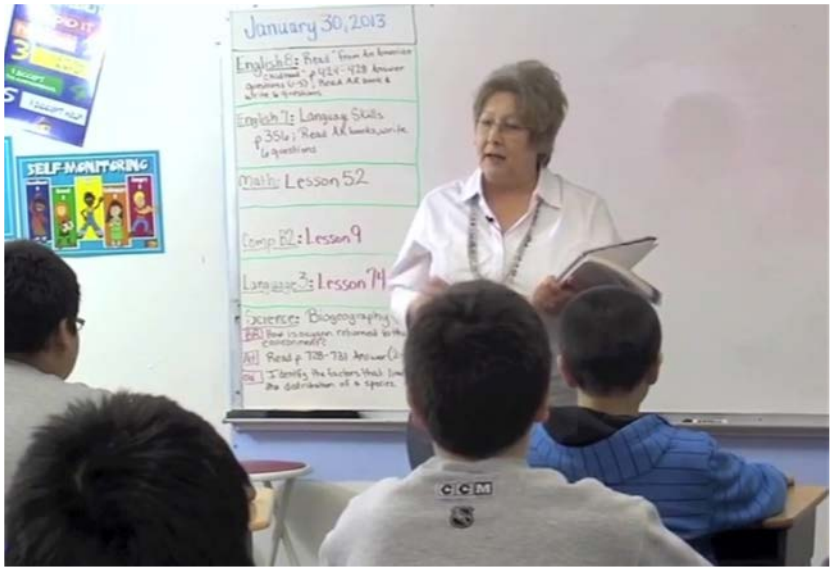
For efficiency purposes, choral responses are used as the main way of checking students' understanding during group work.

How Rosenshine's 10 Principles are Manifested in the DI Programs

Compare in your mind:

1. The number of choral responses of students in a 30-second clip of a *Corrective Reading Comprehension* instructional group at Level B2, Lesson 9.
2. The number of students in the group is 15 – choral responses are 15 times as efficient as individual turns.
3. How many responses would there have been if the teacher asked individual turns?
4. What information would the teacher have received?

How Rosenshine's 10 Principles are Manifested in the DI Programs



How Rosenshine's 10 Principles are Manifested in the DI Programs

Compare in your mind:

1. Four choral responses in 30-seconds.
2. x 15 students = 60 total student responses / 30 seconds x 2 = 120 student responses per minute.
3. Four individual responses / 30 seconds x 2 = 8 individual turn responses per minute.
4. The teacher received information on all 15 students on all questions asked; individual turns would have only given her information on one child per question.

How Rosenshine's 10 Principles are Manifested in the DI Programs

Rosenshine's Principle #4: Provide models.
Principle #5: Guide student practice.
Principle #6: Check for student understanding.

DI Design: In DI, these 3 steps are referred to as

- Model
- Lead
- Test

Anita Archer (explicit instruction):

- I do
- We do
- You do

EXERCISE 6 **Yes-and-No Questions with "Not" Statements**

1. We're going to talk about this picture. (Point to the cat.)
   a. Everybody, what is this? (Touch.) *A cat.*
      Is this a car? (Touch.) *No.*
      Is this a cat? (Touch.) *Yes.*
      Is this a dog? (Touch.) *No.*
      Is this a fish? (Touch.) *No.*
   b. What is this? (Touch.) *A cat.*
      Say the whole thing. (Touch.) *This is a cat.*
   c. Is this a fish? (Touch.) *No.*
      I can say the whole thing. This is not a fish.
      Listen again. This is not a fish.
   d. Say the whole thing with me. (Touch. Respond with children.) *This is not a fish.*
      Again. (Touch.) *This is not a fish.*
      (Repeat step d until all children can make the statement with you.)
   e. All by yourselves. Say the whole thing. (Touch. Do not respond with children.) *This is not a fish.* ●
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DI Design Poll #6:
For each of the steps **1 a-e**, indicate whether the step involves:
- a model (teacher shows)
- lead (teacher does with students)
- or a test (students do on their own).

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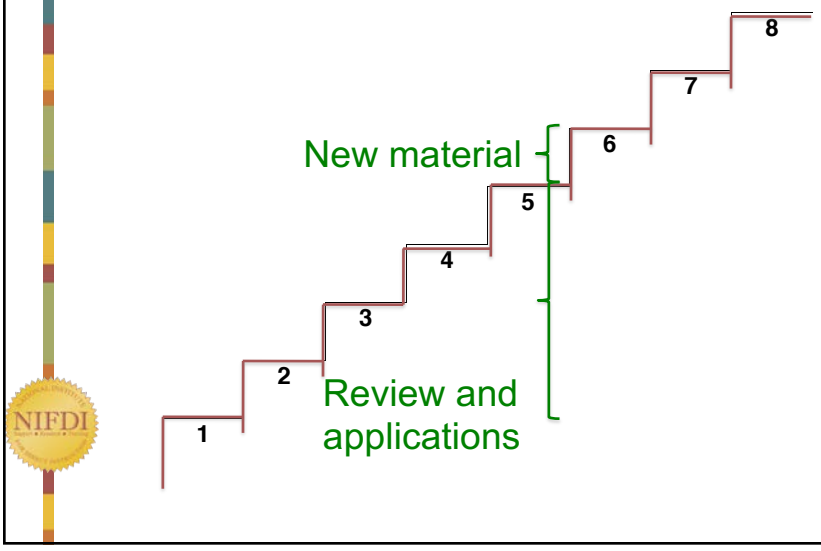
DI Design Activity Answers:
a. test
b. test
c. test & model
d. lead
e. test

How Rosenshine's 10 Principles are Manifested in the DI Programs



How Rosenshine's 10 Principles are Manifested in the DI Programs

Rosenshine Principle #7: Obtain a high success rate.

DI Design:

Place students in material that matches their current skill level (learning "step") and correct all performance errors.

EXERCISE 6 **Yes-and-No Questions with "Not" Statements**

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CORRECTIONS

EXERCISE 6

● **Error**
(Children don't say the entire sentence or don't say it correctly.)

Correction
1. Listen. Not a fish. Say it with me. (Signal.)
   (Repeat until all children say *not a fish* with you.)
2. This is . . . (signal) *not a fish.*
   (Repeat until all children say *not a fish* by themselves.)
3. Say the whole thing. (Touch.) *This is not a fish.*
4. (Repeat part 1 of the exercise.)

EXERCISE 6 Yes-and-No Questions with "Not" Statements

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Model Test

CORRECTIONS

EXERCISE 6

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3. Say the whole thing. (Touch.) *This is not a fish.*
4. (Repeat part 1 of the exercise.)

Model Lead Test

How Rosenshine's 10 Principles are Manifested in the DI Programs

Rosenshine's Principle #8: Provide scaffolds for difficult tasks.

DI Design:

Scaffolds for difficult tasks are provided throughout DI programs through leads, error corrections and prompts.

From: *Reading Mastery Signature Edition*, Grade 1, Lesson 125.

EXERCISE 2

Words with underlined parts

a. First you're going to read the underlined part of each word in this column. Then you're going to read the whole word.

b. (Touch the ball for **easy.**) Read the underlined part. Get ready. (Tap the ball.) *eee.*

- Read the whole word. (Pause.) Get ready. (Slash.) *Easy.*

c. (Repeat step *b* until firm.)

d. (Repeat steps *b* and *c* for each remaining word in the column.)

e. (Repeat the column until children read all the words in order without making a mistake.)

easy

ring

snapped

these

leave

better

about

How Rosenshine's 10 Principles are Manifested in the DI Programs

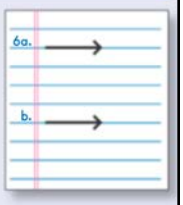
Rosenshine's Principle #9: Require and monitor independent practice.

DI Design:
Everything that is introduced in the DI programs is taught to mastery during group instruction and then incorporated into independent work. Everything that appears in independent work was taught to mastery during group instruction.

The passing criterion for independent work is 85%. Students must fix all errors. If > 25% of students miss an item, it is retaught to the group.

From: *Connecting Math Concepts*, Level C, Lesson 105.

Part 6 Work each problem.



a. There were some children in the playground. Then 19 children left. There were still 84 children in the playground. How many children started out in the playground?

b. A train started out with 330 passengers. Then 26 passengers got off the train. How many passengers were still on the train?

In group work, students have already learned to
1. identify the types of operations indicated by different wording,
2. set up problems to work using a number family procedure,
3. compute the answer correctly using the correct operation.

How Rosenshine's 10 Principles are Manifested in the DI Programs

Rosenshine's Principle #10: Engage students in weekly and monthly review.

DI Design:
DI programs include assessments such as Mastery Tests that provide information on students' knowledge of recent lessons.

The passing criterion for the MTs is 90%. Students must fix all errors. If > 25% of students miss an item, it is retaught. Remedy tables direct teachers to the specific exercises to use to reteach missed concepts.

From: *Connecting Math Concepts*, Level D

Remedy Table — Mastery Test 1

Part	Test Items	Remedy		Remedies Worksheet
		Lesson	Exercise	
1	Addition and Subtraction Facts	3	3	Part A
		4	1	Part B
		5	1	Part C
2	Number Families (Missing Number)	3	1	—
		4	4	Part D
		5	4	Part E
3	Comparison Sentences (More/Less)	7	2	Part F
		8	2	Part G
4	Expanded Notation	1	7	Part H
		2	4	Part I
		3	7	Part J
5	Count-by Problems	6	6	Part K
		7	7	Part L
		8	7	Part M

From: *Connecting Math Concepts*, Level D

Remedy Table — Mastery Test 1

Part	Test Items	Remedy		Remedies Worksheet
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		2	4	Part I
		3	7	Part J
5	Count-by Problems	6	6	Part K
		7	7	Part L
		8	7	Part M

DI Design Poll #7

From: *Connecting Math Concepts*, Level D

Remedy Table — Mastery Test 1

Part	Test Items	Remedy		Remedies Worksheet
		Lesson	Exercise	
1	Addition and Subtraction Facts	3	3	Part A
		4	1	Part B
		5	1	Part C
2	Number Families (Missing Number)	3	1	—
		4	4	Part D
		5	4	Part E
3	Comparison Sentences (More/Less)	7	2	Part F
		8	2	Part G
4	Expanded Notation	1	7	Part H
		2	4	Part I
		3	7	Part J
5	Count-by Problems	6	6	Part K
		7	7	Part L
		8	7	Part M

DI Design Poll #7

Teachers would NOT implement as a remedy Lesson 4, Exercise 7

Origins of Direct Instruction

Topics:

1. Origins of Authentic DI.
2. Development of critical features of Authentic DI.
3. Comparison of Authentic DI with lower-case di.

Free 6-hour webinar after January:
Introduction to Direct Instruction

Thanks for your interest in DI!

Back to Bryan

DON'T FORGET TO FILL OUT AN EVALUATION FORM!