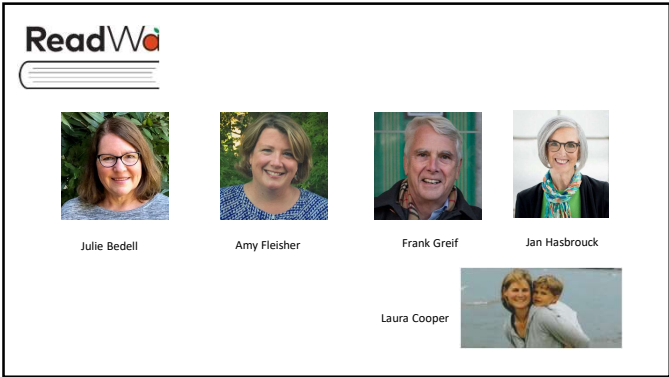




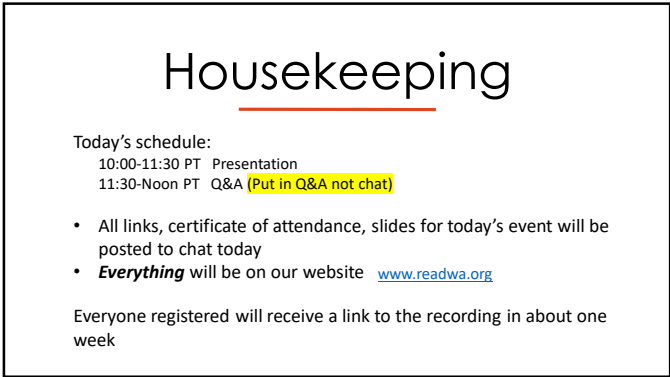
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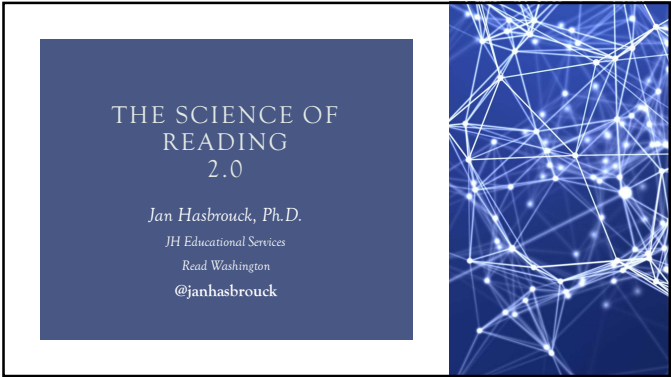
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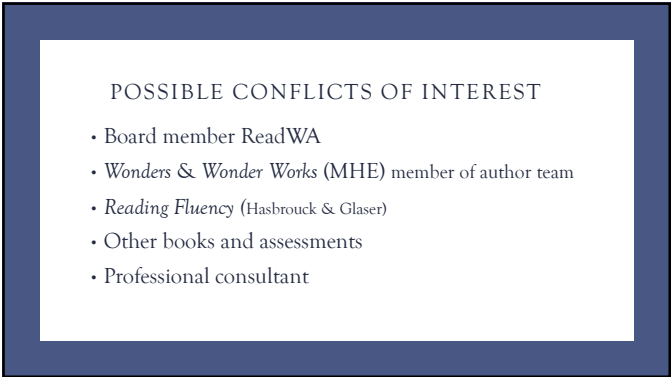
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6



7



8

TEACHING IS A SCIENCE, ARTFULLY
APPLIED

- Education is a relativistic, situational profession
- Requires constant stream of decisions

“There is nothing an excellent teacher always does (except think) or never does (except abuse a student). Every other teaching behavior is appropriate in some situations, not appropriate in others.”

--- Hunter & Russell (1989)

9

TEACHING IS A SCIENCE, ARTFULLY
APPLIED

- **ART** of Teaching?
 - Establishing a trusting, respectful relationship with each student
 - Knowing **WHAT** to do (based on best-evidence possible) for **WHOM, WHEN,** and **HOW MUCH/FREQUENCY** (‘dosage’)

Teaching is challenging and complicated!

10

TEACHING IS A SCIENCE, ARTFULLY
APPLIED

- Dr. Donald Langenberg
 - Physicist; Chancellor U of Maryland
 - Chair of the National Reading Panel

“As a physicist chairing this Panel for two years and preparing this report, I have come to realize that teaching reading is really much *harder* than rocket science!”

11

THE “SCIENCE OF READING”?

- Clearly a **HUNGER** from educators (and parents)
 - The Science of Reading: What I Should Have Learned in College FB page (146K+ members)
 - The Reading League (40K+ members) and state chapters
 - SPELLTalk listserv (12K+ members)
 - Decoding Dyslexia, others...



12

WHAT IS THE “SCIENCE OF READING”?

“There is an extensive and rigorous body of evidence about how children learn to read and the most effective ways to teach them.”

--- Hempenstall (2016)

- Early reading development
- Foundational role of phoneme awareness
- Explicit & systematic instruction of phonics
- Role of fluency, vocabulary, comprehension

13

WHAT IS THE “SCIENCE OF READING”?

- Differing definitions
- The Reading League “A Defining Movement”

<https://www.thereadingleague.org/what-is-the-science-of-reading/>

14

• Heidi Beverine-Curry	• Kari Kurto
• Kymyona Burk	• Amy McGovern
• Kelly Butler	• Louisa C. Moats
• Linda Diamond	• Maria Murray
• Melissa Farrall	• Emily J. Solari
• Margie B. Gillis	• Laura Stewart
• Barbara Hammond	• Stephanie A. Stollar
• DeJunne’ Clark Jackson	• Pamela Toman
• Kelli Johnson	• Liz Woody Remington
• Pam Kastner	• Toni Ann Walsh
	• Dale W. Webster

15

WHAT THE “SCIENCE OF READING” IS **NOT**?

- an ideology or philosophy
- a fad, trend, new idea, or pendulum swing (stair step growth vs fads)
- a political agenda
- a one-size-fits-all approach
- a program of instruction
- a single, specific component of instruction, such as phonics

The Reading League (2022). *Science of Reading: Defining Guide*

16

WHAT IS THE “SCIENCE OF READING”?

- Overview of scientific processes
- Science of the reading brain
- Supporting language comprehension and EL students
- MTSS framework
- Equity

The Reading League (2022). *Science of Reading: Defining Guide*

17

WHAT IS THE “SCIENCE OF READING”?

- SOR is a vast, interdisciplinary body of scientifically-based research about reading and issues related to reading and writing.

The Reading League (2022). *Science of Reading: Defining Guide*

18

WHAT IS THE “SCIENCE OF READING”?

- SOR is a vast, unfinished, continuously growing, and evolving interdisciplinary body of scientifically-based research about reading and issues related to reading and writing.

19

SCIENCE EVOLVES!

- Medicine in Mind: Psychiatry’s fraught history
 - Jerome Groopman, M.D.
 - The New Yorker May 27, 2009

“As a medical student, I was taught that peptic ulcers were often caused by stress...”

20

SCIENCE EVOLVES!

- Medicine in Mind: Psychiatry's fraught history
 - Jerome Groopman, M.D.
 - The New Yorker May 27, 2009

"...experimental evidence gradually became conclusive."

21

WHAT IS THE "SCIENCE OF READING"?

- This research has been conducted over the last five decades across the world, and it is derived from thousands of studies conducted in multiple languages. The science of reading has culminated in a preponderance of evidence to inform how proficient reading and writing develop; why some have difficulty; and how we can most effectively assess and teach and, therefore, improve student outcomes through prevention of and intervention for reading difficulties.

The Reading League (2022). *Science of Reading: Defining Guide*

22

WHAT IS THE "SCIENCE OF READING"?

Interdisciplinary:

- Cognitive Psychology
- Communication Sciences
- Developmental Psychology
- General and Special Education
- Implementation Science
- Linguistics
- Neuroscience
- School Psychology

23

TYPES OF SCIENCE

- **Basic**
 - In SOR:
 - the cognitive processes that enable reading
 - Descriptive
- **Applied**
 - In SOR:
 - how people learn to read; what processes or methods are more effective
 - Normative

24

TYPES OF SCIENCE

BASIC sciences of physics and materials science

APPLIED science of architecture

"[BASIC science] helps an architect predict whether a building will stand, but the sciences don't tell you how to design a building. It can't, because designing a "successful" building requires knowing its function [APPLIED science]: how many people will the building hold? What will people do there? Do you care what the building looks like? What's your budget?"

--- Daniel Willingham (2020)

25

THEORETICAL APPROACHES TO SCIENCE

- Correspondence Theory
 - Factual knowledge, separate from beliefs
 - Deductive methods: Hypothesis testing, operationalizing of constructs, etc.
- Coherence Theory
 - Truth determined by logical alignment of beliefs (true if it makes sense)
 - Inductive methods: Ethnographic, grounded theory, lived experiences, etc.

--- Petscher et al. (RRQ 2021)

26

TYPES OF RESEARCH

- Qualitative/Descriptive
- Quantitative
 - Experimental/Quasi-Experimental
 - Meta-analysis
 - "Gold Standard": RCTs Randomized Control Trials

RCT design is essential to produce data that can be translated into clinical practice

27

CONTINUUM OF RESEARCH T0-T4

- T0: Basic studies (define mechanisms & constructs; malleable factors)
- T1: Preclinical studies (test new methods, assessments, interventions)
- T2: Clinical research studies (specific populations; efficacy)

Simos et al. (2002) *Neurology*

8 students; 7-17 years old dyslexia

8 week intense phonologically-based intervention

2 hours a day = up to 80 hours of instruction

28

CONTINUUM OF RESEARCH T0-T4

- **T0:** Basic studies (define mechanisms & constructs; malleable factors)
- **T1:** Preclinical studies (test new methods, assessments, interventions)
- **T2:** Clinical research studies (specific populations; efficacy)
- **T3:** Clinical implementation studies (real world application)
- **T4:** Population-wide

29

TRANSLATIONAL SCIENCE

"There is an extensive and rigorous body of evidence about how children learn to read and the most effective ways to teach them." – **Hempenstall, 2016**

WHY are teachers not using this information in **EVERY** classroom?

30

TRANSLATIONAL SCIENCE

- Disconnect between SOR and teacher preparation...around the world
- State and district policies
- Lack of a professional mechanism for sharing evidence
- Ignoring "translational science"

--- Solari et al. (RRQ 2020)

31

CHANGE IS HARD

Confirmation Bias:

- The tendency to search for, interpret, favor, and recall information that confirms preexisting beliefs or hypotheses. This limits ability to question information that confirms or upholds beliefs.

Conservatism Bias:

- The tendency to revise beliefs insufficiently when presented with new evidence.

32

BULLS-EYE ANALOGY

- Dr. Steve Dykstra

The Reading League
"Science of Reading: Defining Guide-Book Launch Event"
January 22, 2022

33

BULLS-EYE ANALOGY

- Dr. Steve Dykstra

SOR is not like a Google map. More like clues to a puzzle pieces of a jigsaw. We have some nice chunks put together. We have other pieces, but we don't know where they go yet. And some pieces are missing. Some parts of the puzzle we know what it looks like; other parts we have an idea what we think it might look like but we're not exactly sure...

34

BULLS-EYE ANALOGY

- Know what you are doing and why you are doing it. [research evidence *plus* clinical experience]
- Know the bullseye and know when you step have to outside; know the reason and know you could be wrong. You have to be ready to change.
- Never lose sight of the bullseye. *We don't abandon phonics or phoneme awareness because we don't know everything about how to teach them.*

--- Dykstra (2022)

35

BULLS-EYE ANALOGY

- Phonics, vocabulary, fluency: Bullseye science
- Phoneme awareness is bullseye science. The need to link PA and phonics is bullseye science. *HOW to do that is a little more vague...*

--- Dykstra (2022)

36

BULLS-EYE SCIENCE

- STRONG foundation in SOR:
 - theoretical building blocks of early reading acquisition
 - known malleable factors related to individual differences in reading and language
 - developmental differences due to external and internal factors
 - causal mechanisms to improve reading difficulties [instruction & intervention]
 - how to precisely measure literacy skills
- Cain, Compton, & Parrila (2017)

37

IMPLEMENTATION IS KEY!

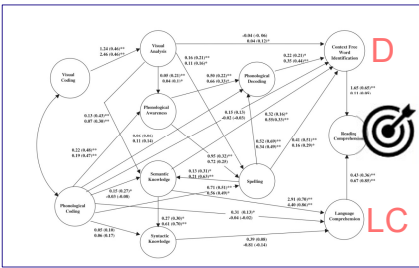
WHAT to do?
for WHOM?
WHEN?
HOW MUCH/FREQUENCY ('dosage')?

38

THE SIMPLE VIEW OF READING

- Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading, and reading disability. *Remedial and Special Education*, 7, 6–10.
- "The Simple View of Reading"
RC = LC x D

39



Vellutino, Tunmer, Jaccard, & Chen (2007). Components of Reading Ability: Multivariate Evidence for a Convergent Skills Model of Reading Development. *Scientific Studies of Reading*, 11:1, 3-32.

40

THE SIMPLE VIEW OF READING

- Hoover, W. A., & Gough, P. B. (1990). The simple view of reading. *Reading and Writing: An Interdisciplinary Journal*, 2, 127–160
- Hoover, W. A., & Tunmer, W. E. (2018). The simple view of reading: Three assessments of its adequacy. *Remedial and Special Education*, 39, 304–312

“...further detailed and tested [the Simple View of Reading model]”

41

THE SIMPLE VIEW OF READING

- Hoover, W. A., & Gough, P. B. (1990). The simple view of reading. *Reading and Writing: An Interdisciplinary Journal*, 2, 127–160
- Hoover, W. A., & Tunmer, W. E. (2018). The simple view of reading: Three assessments of its adequacy. *Remedial and Special Education*, 39, 304–312

The Simple View of Reading

RC = LC x WR

42

THE SIMPLE VIEW OF READING

- **Reading Comprehension:** the ability to extract and construct literal and inferred meaning from linguistic discourse represented in **print**.
- **Language Comprehension:** the ability to extract and construct literal and inferred meaning from linguistic discourse represented in **speech**.
- **Word Recognition:** the ability to both **identify** [decode] and ultimately recognize printed words **accurately** and **quickly** to efficiently gain **access to the appropriate word meanings** contained in the internal mental lexicon.

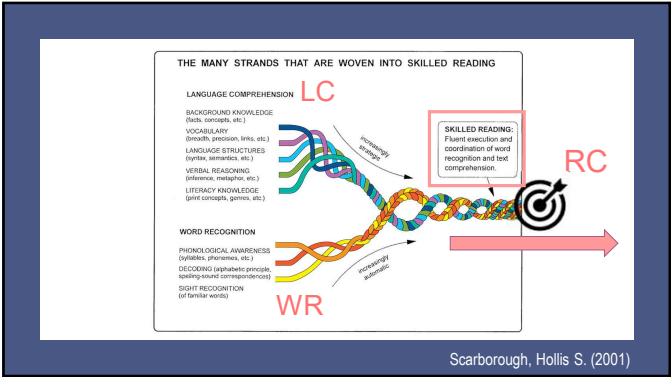
43

THE MANY STRANDS THAT ARE WOVEN INTO SKILLED READING

“...a visual metaphor for the development of skills over time (represented by the strands of the rope) that lead to skilled reading.”

The Reading League (2022).
Science of Reading: Defining Guide

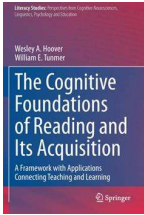
44



45

COGNITIVE FOUNDATIONS FRAMEWORK

- Hoover, W. A., & Tunmer, W. E. (2020). *The Cognitive Foundations of Reading and Its Acquisition*. Springer

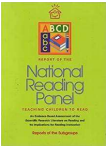


46



47

SOR: UNFINISHED, CONTINUOUSLY GROWING, AND EVOLVING...



2000

“...would most likely come to the same conclusions...”

--Schatschneider, Edwards, & van Dijk (2020)

48

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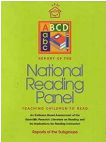
2020

UPDATES:

- Methodology (Schatschneider, Edwards, & van Dijk)
- Alphabetics: Phonics & PA (Brady)
- Fluency (Hasbrouck)
- Comprehension (Cain, Oakhill, & Elbro)
- Teacher Education (Binks et al.)
- Computer Technology (Strom)

49

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2000

Chapter 3: Fluency

S.J. Samuels, Co-Chair; Timothy Shanahan, Co-Chair; Sally E. Shaywitz

p. 3-1:
"Fluent readers can read text with speed, accuracy, and proper expression."

p. 3-5:
"Fluency, the ability to read a text quickly, accurately, and with proper expression... (p. 3-5)"

50

SOR: UNFINISHED, CONTINUOUSLY GROWING, AND EVOLVING...



2020

An Update to the National Reading Panel Report:
What We Know About Fluency in 2020

Jan Hasbrouck

"Current definitions list **accuracy first**, to emphasize that reading fluently is not the same as reading fast." (p. 29)

Plus... a few other "updates"

51

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2020

Comprehension (& Vocabulary) (Cain, Oakhill, & Elbro)

- Teach as *comprehensive, integrated* process (vocabulary, inference making, self-monitoring, text structure)
- Reading for a specific purpose
- "No strong evidence" for teaching single components of reading comprehension separately (p. 37)

52

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GROWING, AND EVOLVING...



2020

Alphabetics: **Phoneme Awareness** & Phonics (Brady)

- "In the past 20 years, the prediction of later literacy performance [based on PA] has been confirmed..."
- Challenging to acquire for some
- Not clear that phonological sensitivity necessary for phoneme awareness
- Connect sounds with letters *as soon as possible*

53

SOR: UNFINISHED, CONTINUOUSLY
GROWING, AND EVOLVING...



2020

Alphabetics: Phoneme Awareness & **Phonics** (Brady)

- Synthetic more effective than analytic
- Continue phonics beyond K-1 (dosage matched to need)
- Onset/rime ("word families") can be helpful after acquiring the 1:1 grapheme/phoneme process involved in blending
- Phonics should be *part of* engaging writing and reading activities

54

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GROWING, AND EVOLVING...



From *Decoding or Fluency Instruction in Middle School?*
March 12, 2022

"Years ago, I would have said, 'avoid phonics instruction' [for older students]. Studies had concluded that phonics at those grade levels didn't pay off. Then, I was on the *National Reading Panel*, and we found studies that showed phonics instruction could improve the decoding abilities of older students..."

55

SOR: UNFINISHED, CONTINUOUSLY
GROWING, AND EVOLVING...



From *Decoding or Fluency Instruction in Middle School?*
March 12, 2022

"More recent studies have reshaped my thinking again..."

56

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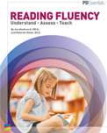
 **READING RESEARCH QUARTERLY**
A Review of the Evidence on Tier 1 Instruction for Readers With Dyslexia

Shanahan, 2021

"...the most precise expression of the best data currently available should be considered as *provisional at best and open to revision* as new data become available." p. 5

57

SOR: UNFINISHED, CONTINUOUSLY GROWING, AND EVOLVING...

 **READING FLUENCY**
A Practical Guide for Teachers

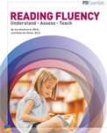
Jan Hasbrouck, Ph.D.
Deborah Glaser, Ed.D.

p. 67 (2019)
"Reading fluency is a complex skill to assess and diagnose."

(REVISION: 2022)
"We have learned that the essential component of skillful reading we call 'fluency' is complex and multifaceted. Because of this, adequately assessing reading fluency is also complex and multifaceted!"

58

SOR: UNFINISHED, CONTINUOUSLY GROWING, AND EVOLVING...

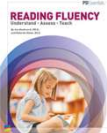
 **READING FLUENCY**
A Practical Guide for Teachers

Jan Hasbrouck, Ph.D.
Deborah Glaser, Ed.D.

p. 16 (2019)
"While there is ample empirical evidence that it is important for students to maintain WCPM rates minimally at the 50th percentile, there is no research to suggest that pushing students to have WCPM scores above the 50th percentile results in any long-term benefit.."

59

SOR: UNFINISHED, CONTINUOUSLY GROWING, AND EVOLVING...

 **READING FLUENCY**
A Practical Guide for Teachers

Jan Hasbrouck, Ph.D.
Deborah Glaser, Ed.D.

(REVISION: 2022)
"There is strong empirical evidence that it is necessary for students to read minimally at the 50th percentile to support comprehension and that reading at the 75th percentile is sufficient for optimizing comprehension. (White et al. 2021)."

White et al. (2021). Highlights of the 2018 NAEP Oral Reading Fluency Study (NCES 2021-026). U.S. Department of Education. IES

60

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Science



My conclusions from reading research

"My Conclusions from Reading Research"

Jan Hasbrouck, Ph.D.

Continuously updated...

61

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Science

Compelling evidence from a convergence of reading research is clearly indicating that **approximately 90-95%** of all students can achieve literacy skills at or approaching grade level. These statistics include students with dyslexia and other learning disabilities.

Since 1998...

62

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Science

Foorman, B. R., Francis, D. J., Fletcher, J. M., Schatschneider, C., & Mehta, P. (1998). The role of instruction in learning to read: Preventing reading failure in at-risk children. *Journal of Educational Psychology*, 90(1), 37.

63

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Science

"We think there is ample evidence to suggest that educational systems can be organized so that the vast majority of students—**close to 95 percent**—will be reasonably successful readers when these organized systems are effectively implemented."

Vaughn, S. & Fletcher, J. M. (Winter 2020-2021). Identifying and Teaching Students with Significant Reading Problems. *American Educator*.

64

SOR: UNFINISHED, CONTINUOUSLY GROWING, AND EVOLVING...

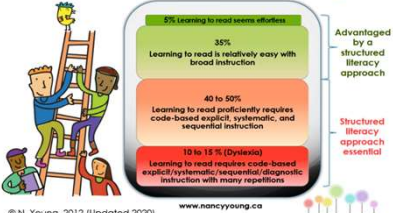


Science

Compelling evidence from a convergence of reading research is clearly indicating that **approximately 95%** of all students can achieve literacy skills at or approaching grade level. These statistics include students with dyslexia and other learning disabilities.

65

The Ladder of Reading



Advantaged by a structured literacy approach

Structured literacy approach essential

© N. Young, 2012 (Updated 2020)
Adapted by Owen (2021-01)
(Lyon, 1998; NRP, 2000; ICA, 2015; Hampshire, 2016)

www.nancyyoung.ca

Nancy Young
B.A., M.A., Ph.D.

66

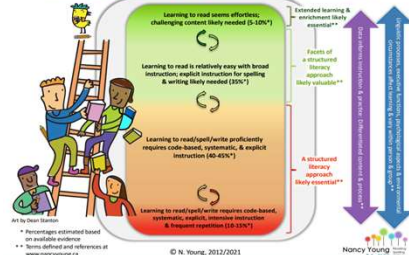
SOR: UNFINISHED, CONTINUOUSLY GROWING, AND EVOLVING...

Nancy Young
nancyyoung.ca

"...I could also improve my infographic in ways that **represented ongoing research findings** and current concerns across various fields of research."

67

The Ladder of Reading & Writing



Extended learning & enrichment likely essential**

Essence of a structured literacy approach likely essential**

A structured literacy approach likely essential**

© N. Young, 2012/2021

Nancy Young
B.A., M.A., Ph.D.

68

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GROWING, AND EVOLVING...

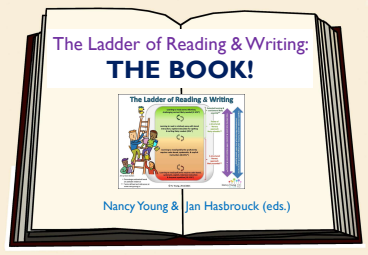
Nancy Young
nancyyoung.ca

Blog:
My Ladder of Reading & Writing:
A Synopsis of the Update! Nov 24, 2021

YouTube video overview of changes

69

The Ladder of Reading & Writing:
THE BOOK!



Nancy Young & Jan Hasbrouck (eds.)

70

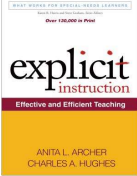
SOR: UNFINISHED, CONTINUOUSLY
GROWING, AND EVOLVING...

Explicit Instruction

- Emerged out of research initially conducted in the 1960s and 1970s ("direct instruction"; Direct Instruction)
- Validated as effective in both general and special education research
- *Effective* and *efficient* for teaching new skills
- "Bullseye science"
- More that "I do, We do, You do..."

71

16 Elements



(2011)

1. Focus on critical content
2. Logical sequence
3. Small components
4. Organize focused lessons
5. State goals & expectations
6. Review prior learning
7. Step-by-step demonstration
8. Clear, concise language
9. Range of examples/non-examples
10. Guided, supported practice
11. Frequent responses
12. Monitor student closely
13. Immediate feedback
14. Brisk pace
15. Help student organize learning
16. Distributed & cumulative practice

72

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GROWING, AND EVOLVING...

Explicit Instruction

Mark S. Seidenberg

- "Efficacy, Efficiency, and Equity: The Goals of Early Reading Instruction"
- Montag Symposium Atlanta Speech School 3/17/2022

"Over-emphasis on explicit instruction..."

73

SOR: UNFINISHED, CONTINUOUSLY
GROWING, AND EVOLVING...

Explicit Instruction

Concerns:

- GOAL: Create conditions where learning happens *without* explicit instruction
- Skilled reading is automatic, pre-cognitive
- Most of what is learned happens *implicitly* (statistical learning; self-teaching)

74

SOR: UNFINISHED, CONTINUOUSLY
GROWING, AND EVOLVING...

Explicit Instruction

- Archer & Hughes (2011)

"[Explicit instruction] is helpful to all students learning new skills and content, and is absolutely essential for struggling or disadvantaged learners." p. 17
- Treiman & Kessler (2021)

"Statistical learning is often slow and incomplete...and direct instruction improves performance."

75

WHERE DO WE GO FROM HERE?

76

PROPOSED CODE OF ETHICS

- Disagree respectfully
- Recognize the fallibility of anecdotes and personal experiences.

“The plural of ‘anecdote’ is not data.”

--- Clemens, Powell, & Vaughn (2021)

77

PROPOSED CODE OF ETHICS

- Disagree respectfully
- Recognize the fallibility of anecdotes and personal experiences
- Fairly evaluate all evidence
- Identify best practices from multiple studies
- Dig deeper and seek clarification

--- Clemens, Powell, & Vaughn (2021)

78

PROPOSED CODE OF ETHICS

- **Digging Deeper & Seek Clarification**
 - **Listserv:** SPELLTalk
 - **Newsletter:** Special Education Today (John Wills Lloyd)
 - **Blogs:** Shanahan, Pamela Snow, others
 - **Podcasts:** The Science of Reading (Amplify); Teaching, Reading, & Learning (The Reading League), others
 - **Leaders:** Holly Lane, Mark Shinn, Matt Burns, Stephanie Stollar, many others

79

PROPOSED CODE OF ETHICS

- **Digging Deeper & Seek Clarification**
 - **Conferences:** Plain Talk in Literacy & Learning; The Reading League; International Dyslexia Association
 - **Institute of Educational Sciences (IES) Reports**

IES provides thorough and objective evaluations of federal programs, sponsors research relevant and useful to educators and others (such as policymakers) and serves as a trusted source of gold-standard, reliable, unbiased information on what works in education.

80

PROPOSED CODE OF ETHICS

- Digging Deeper & Seek Clarification
 - Conferences: Plain Talk in Literacy & Learning; The Reading League; International Dyslexia Association
 - Institute of Educational Sciences (IES) Reports
 - National Center on Intensive Intervention (AIR)
Intensifying Literacy Instruction: Essential Practices
Kim St. Martin et al. (2020)

81

PROPOSED CODE OF ETHICS

- Digging Deeper & Seek Clarification
 - Webinars!
 - ReadWA and so many others...
 - David Kilpatrick, Deb Glaser, Caroline Denton, Anita Archer, Nancy Young + more to come!
 - Twitter! @janhasbrouck

82

PROPOSED CODE OF ETHICS

- Have courage to reconsider
- Self-critique [conservation & conservatism bias]
- Examine and disclose conflicts of interest
- Base decisions on quality of evidence [correspondence theory], not popularity [coherence theory]

--- Clemens, Powell, & Vaughn (2021)

83

SOR: UNFINISHED, CONTINUOUSLY GROWING, AND EVOLVING...

“...the most precise expression of the best data currently available should be considered as provisional at best and open to revision as new data become available.”

--Shanahan, 2021

84

SOR: UNFINISHED, CONTINUOUSLY
GROWING, AND EVOLVING...

“Communicating aspects of the SOR where a compelling
evidence base does exist, and not overstating what we
know, is essential. We don’t know everything about
reading.”

--- Solari et al. (RRQ 2021)

85

SOR: UNFINISHED, CONTINUOUSLY
GROWING, AND EVOLVING...

“SOR is something we have to wrestle with, struggle
with. Something we’re going to sometimes disagree
about...Don’t abandon this journey of science by
getting frustrated listening to those disagreeing about
those [unfinished, continuously growing, and
evolving] outer rings.”

--- Dyskstra (2022)

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THE SCIENCE OF
READING
2.0

QUESTIONS?
CONCERNS?
REFLECTIONS?

@janhasbrouck



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ReadWaEvent

The Science Reading:
How the Brain Learns to Read
and What it Means for Classroom
Instruction

Saturday, June 11
10 AM-12 PM PT



Denise Eide

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ReadW^oEvent

The Science of
Reading Levels

Saturday, October 15
10 AM-12 PM PT



Dr. Tim Shanahan

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