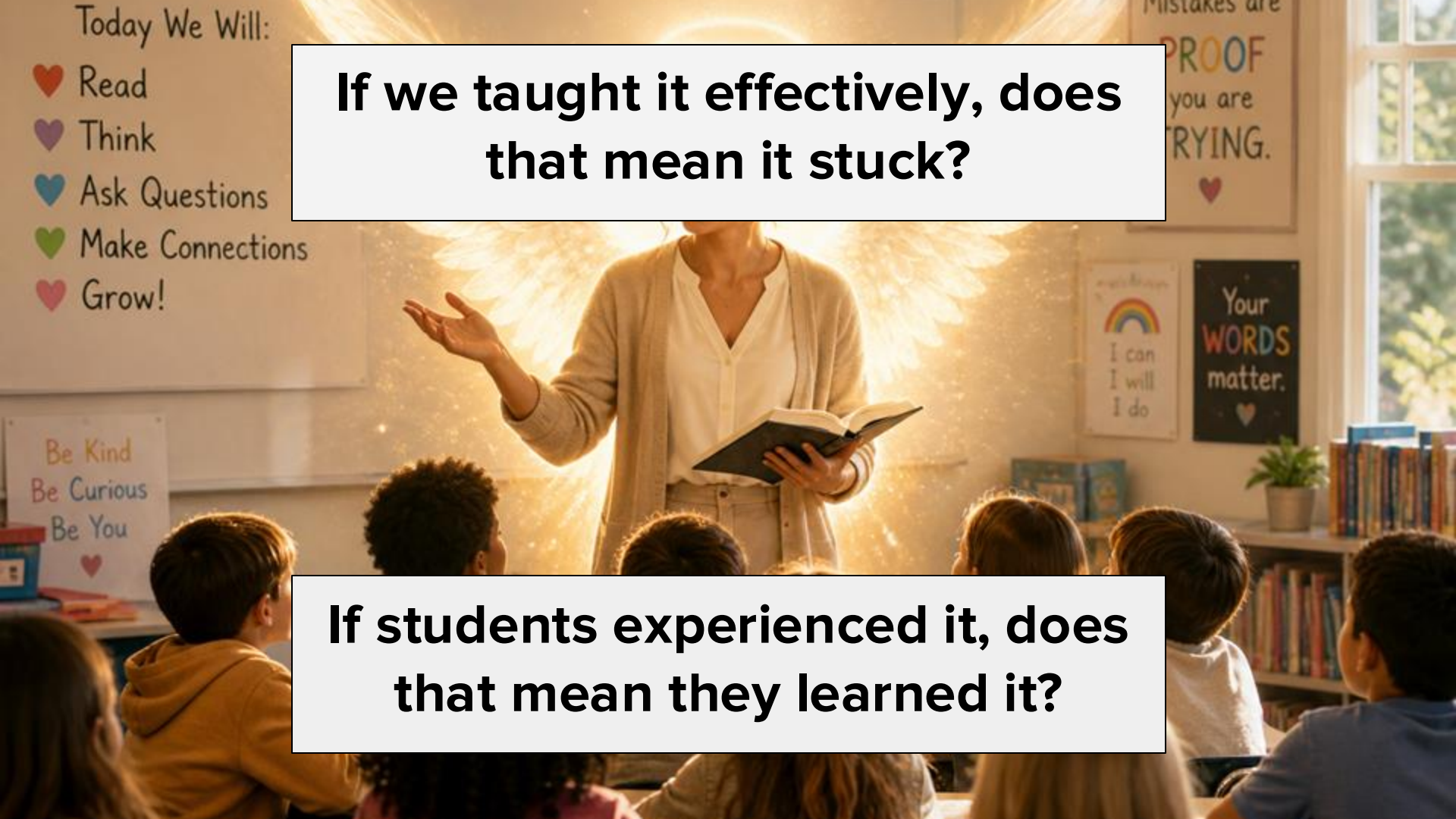

If we taught it effectively, does that mean it stuck?

If students experienced it, does that mean they learned it?

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Ohio Literacy Academy - June 4, 2026

The Science of Learning & Literacy Instruction

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Session Agenda

- → Inclusion Activity, Introductions
- → Science of Reading Frameworks
- → Other Factors at Play
- → Science of Learning Principles
- → Practical Implications

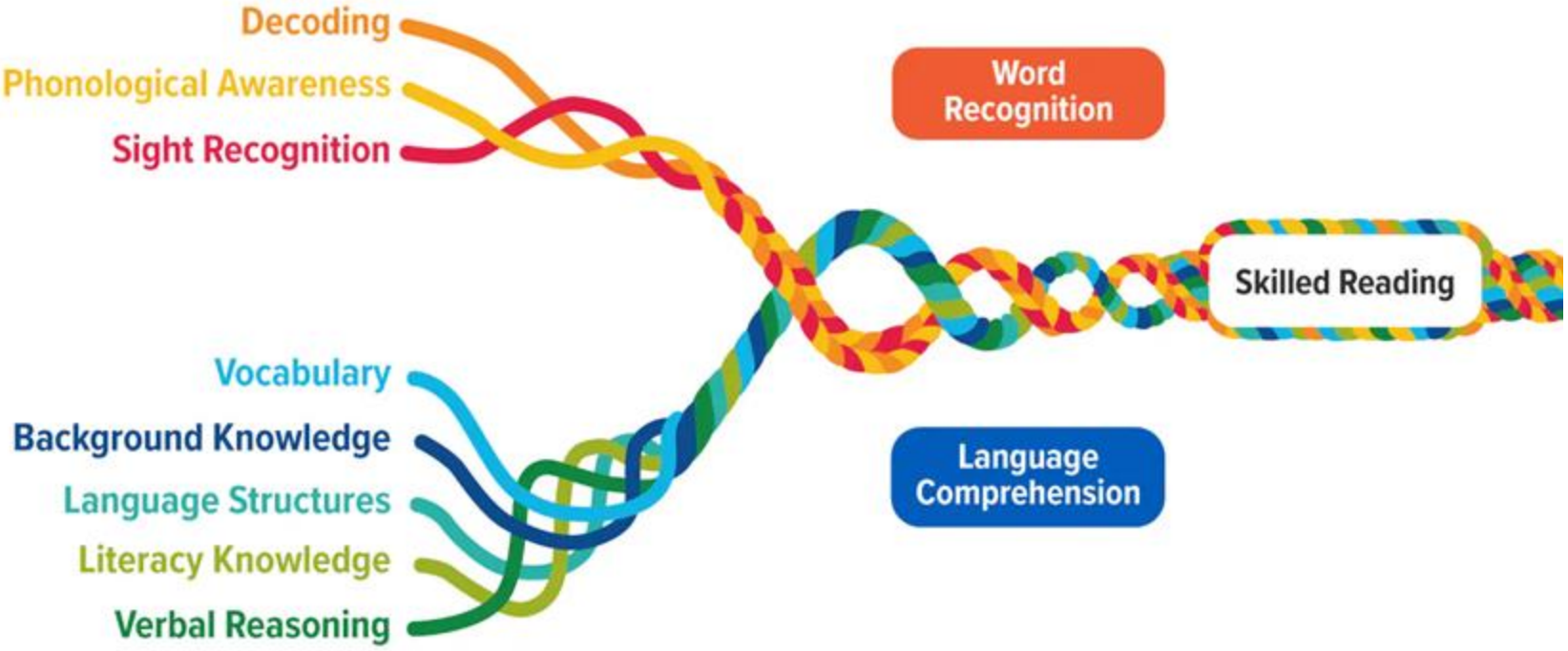
Science of Reading Frameworks

Figure 5. The Simple View of Reading (Gough & Tunmer, 1986)

% of Reading Comprehension Variance

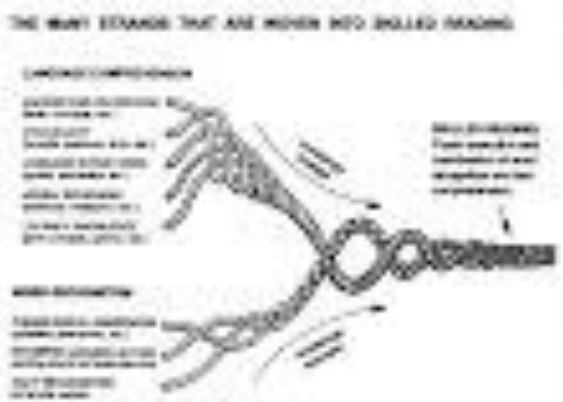
Grade	Foorman et al. (2018) n=2398, Grades 1-10	Quinn & Wagner (2018) n=1.2m, Age < 11, Age > 11
1	68%	60%
2	59%	
3	78%	
4	98%	
5	99%	
6	99%	53%
7	98%	
8	97%	
9	99%	
10	99%	

The Reading Rope



Modified from Scarborough, H. S. (2001). Connecting early language and literacy to later reading (dis)abilities: Evidence, theory, and practice. In S. Neuman & D. Dickinson (Eds.), Handbook for research in early literacy. New York, NY: Guilford Press

Q&A with Dr. Hollis Scarborough



Celebrating the first anniversary of the Science of Reading - What I Should Have Learned in College Facebook Group

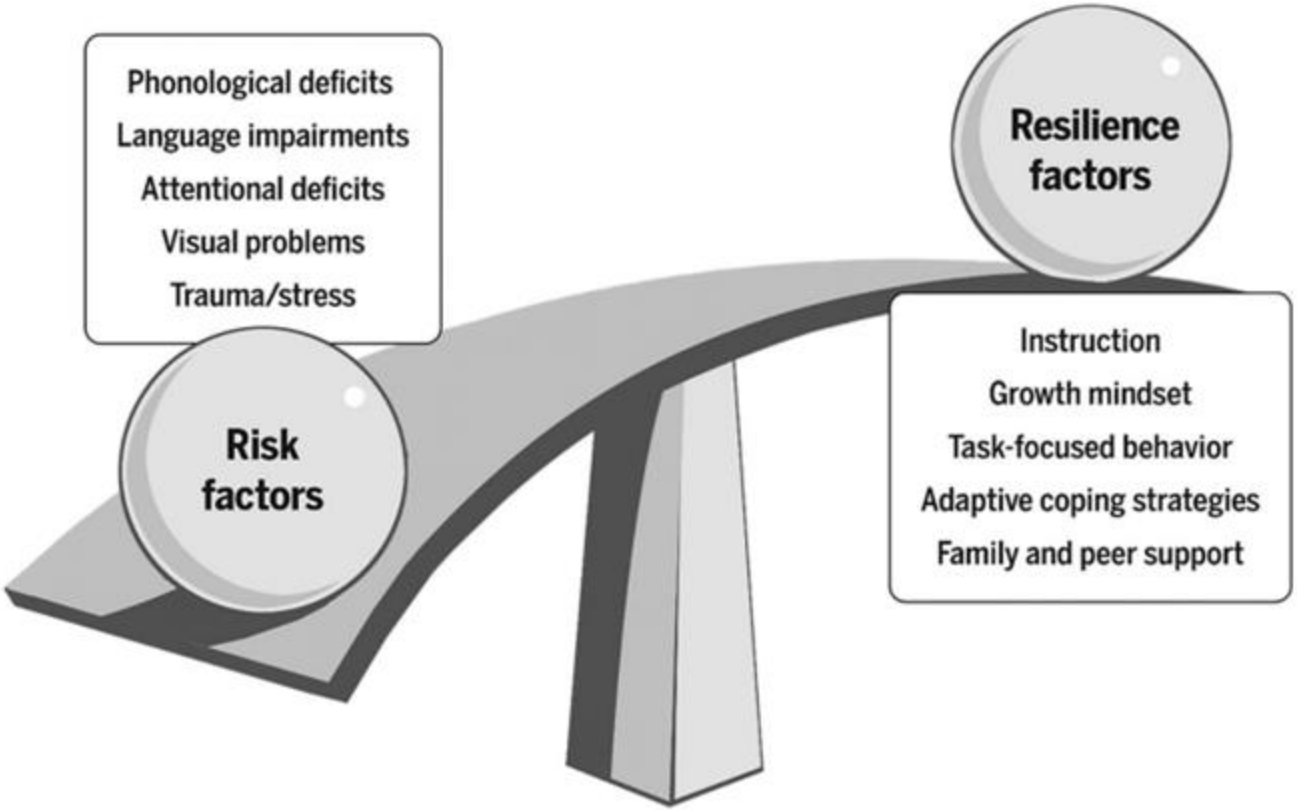
Processing & Reflection

Please turn to an "elbow" partner and have this conversation…

How has my thinking been challenged?

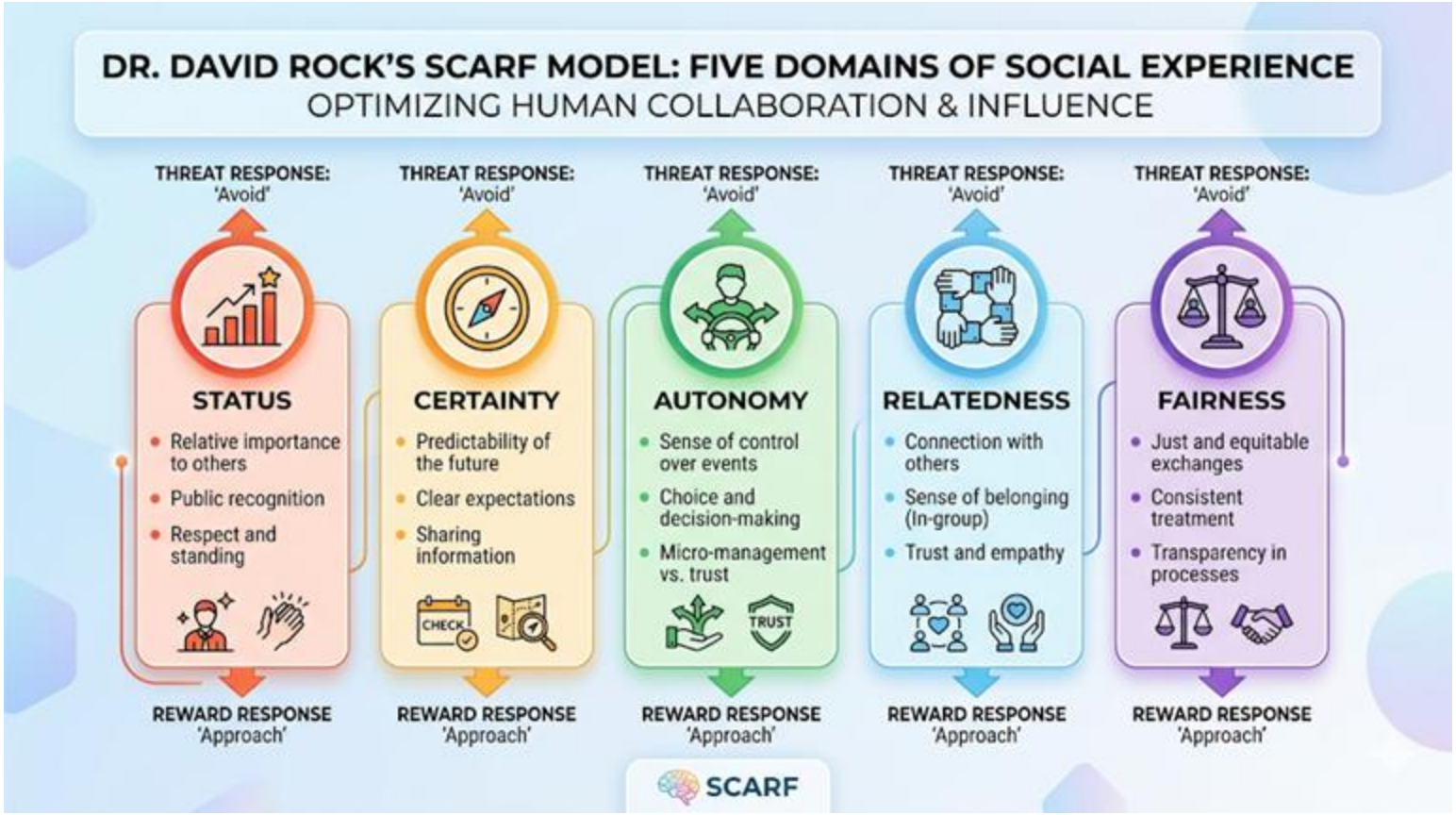
What was confirmed?

Other Factors at Play: Risk vs. Resilience



Catts, H. W. & Petscher, Y. (2022) A cumulative risk and resilience model of dyslexia. *Journal of Learning Disabilities*, *55*(3), 171-184.

Other Factors at Play: SCARF Model

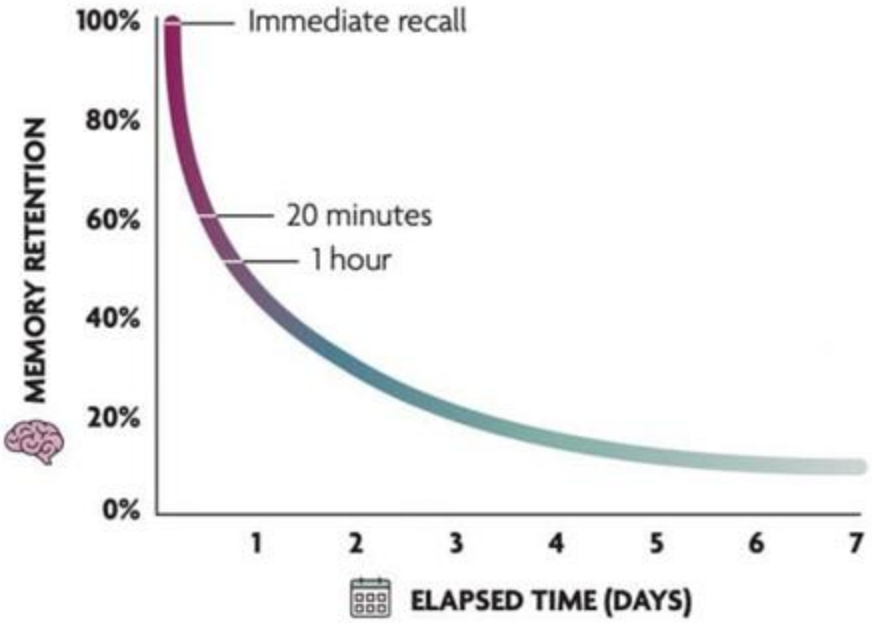


Rock, D. (2008) SCARF: A brain-based model for collaborating with and influencing others. *NeuroLeadership Journal.*

Other Factors at Play: The Forgetting Curve

Ebbinghaus Forgetting Curve

- Deficits in student outcome data does not necessarily mean students didn't learn it the first time.
- *Evaluation Paradox* - What teachers teach vs. what students remember



This curve demonstrates how information students learn is lost over time when there is no attempt to consciously review & remember the learned material

Processing & Reflection

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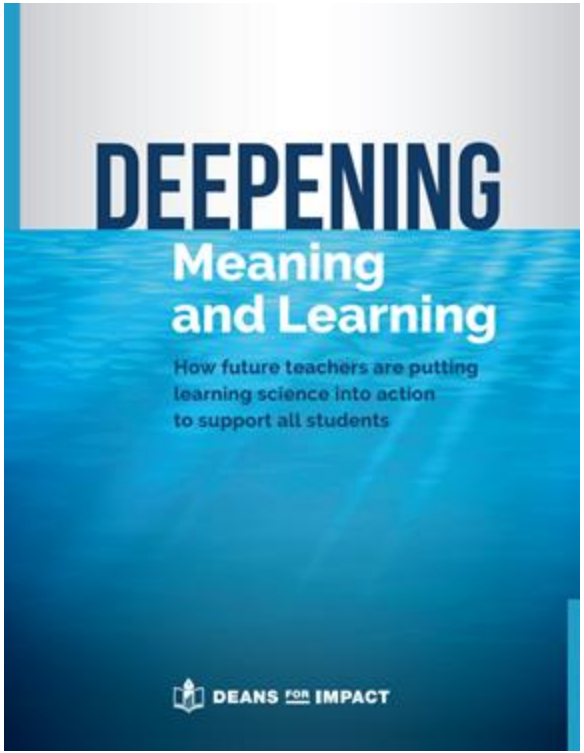
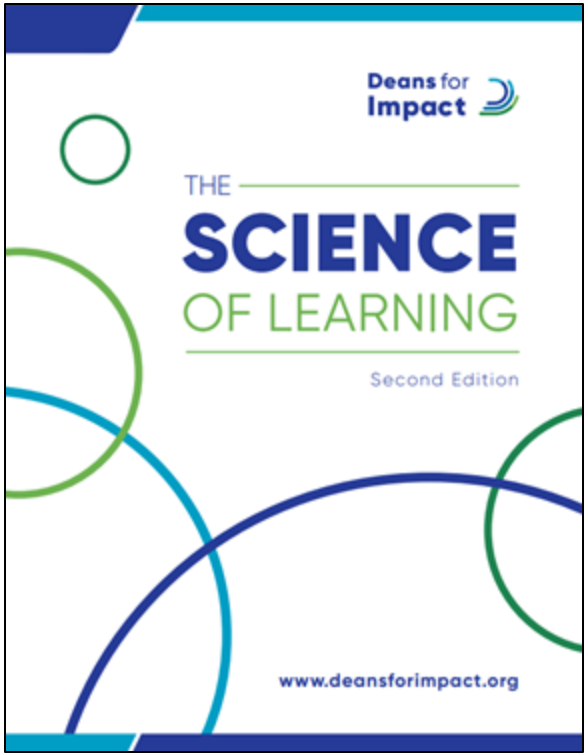
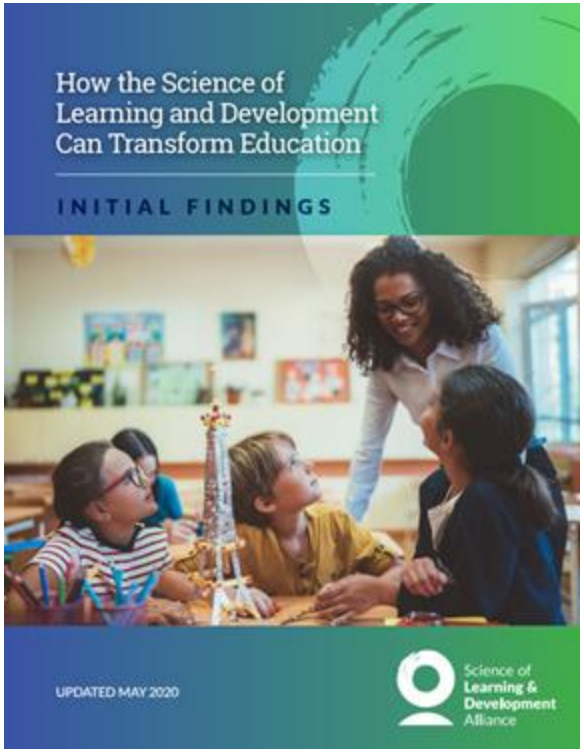
What was confirmed?

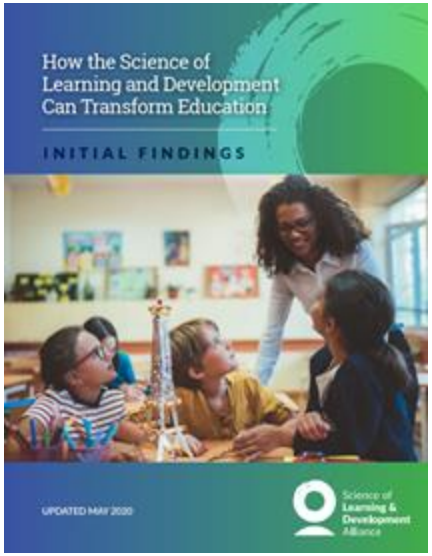
Science of Learning Principles



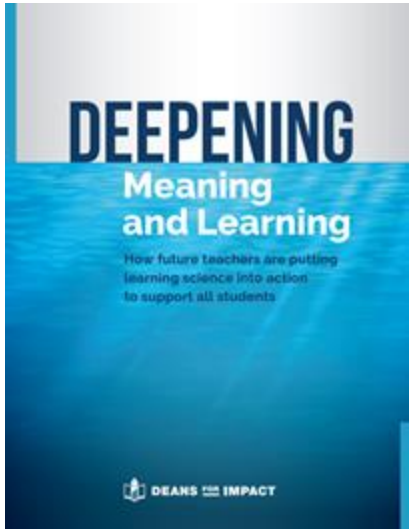




Science of Learning Principles



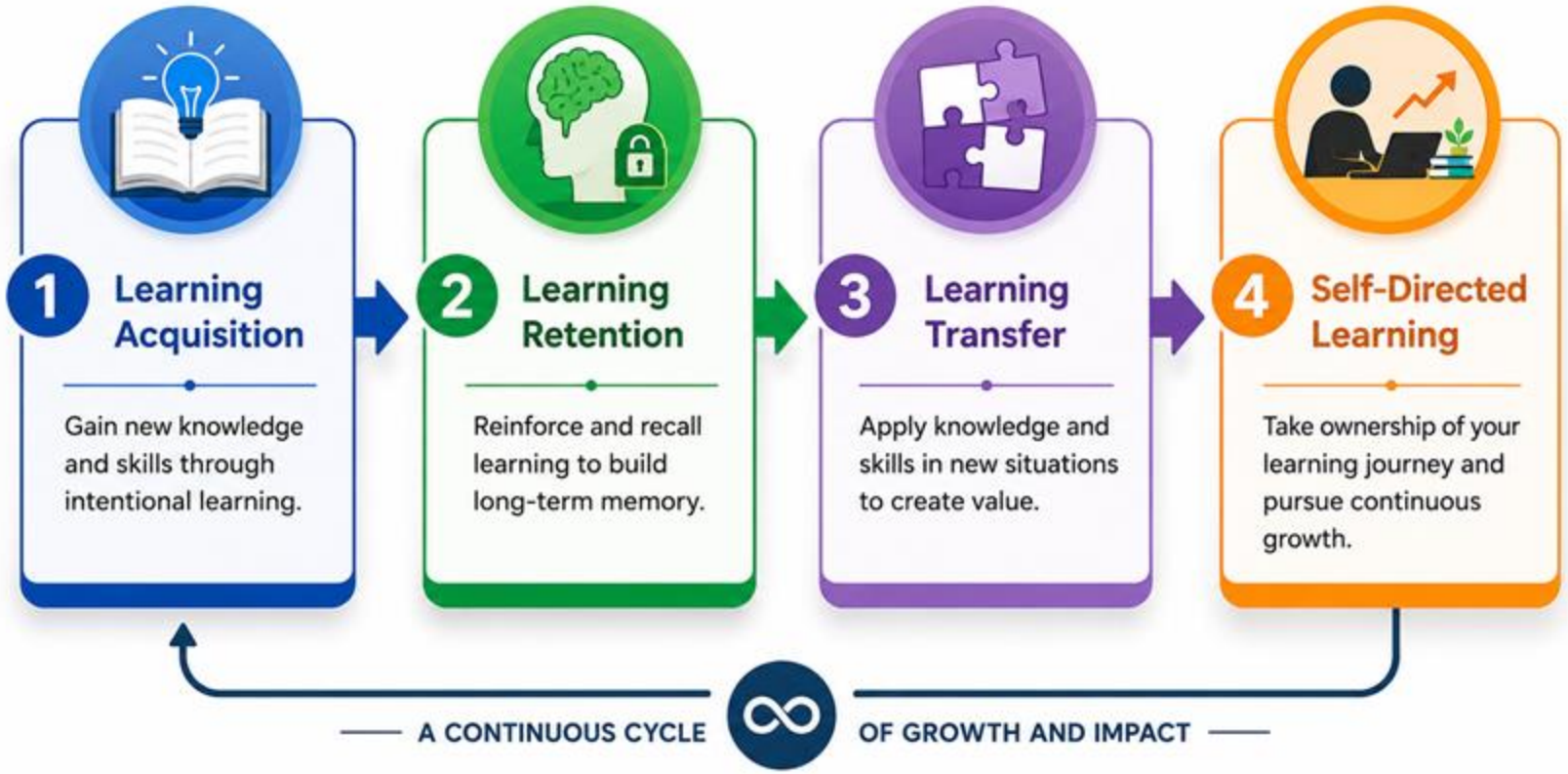
Science of Learning Principles



Learning Science Principles and Teacher Actions

Connecting the Dots	Managing the Learning Load	Deepening Meaning and Learning	Practicing with Purpose	Building Feedback Loops	Creating a Motivating Environment
Students learn new ideas by reference to ideas they already know.	Learning can be impeded if students are confronted with too much information at once.	Students should think about meaning when they encounter to-be-remembered material.	Practice is essential to learning, but not all practice is equivalent.	Effective feedback is essential to acquiring new knowledge and skills.	Students will be motivated to learn in environments where they feel safe and valued.
Teachers prompt students to call up important prior knowledge and explicitly connect it to new ideas	Teachers intentionally sequence tasks to include opportunities to build foundational concepts before moving on to more advanced tasks Teachers scaffold student understanding through carefully designed instruction that includes modeling, explanation, thinking aloud, and worked examples	Teachers' questions and tasks require students to focus their attention on the meaning of content Teachers' questions and tasks require students to engage in effortful thinking Teachers prompt students to connect (and distinguish) varied examples and contrasting non-examples	Teachers space and interleave practice opportunities to assist students in building automaticity	Teachers provide students targeted practice opportunities with specific feedback on their work Teachers foster an orientation toward improvement, not performance	Teachers surface the voices, ideas, and opinions of all their students and show that these are valued

Science of Learning Principles



Practical Implications: Learning Acquisition

Considerations

- Sensory inputs
- Environmental factors
- Explicit Instruction
- Timely, accurate feedback
- Cognitive load and functioning working memory
- Prior knowledge
- Vocabulary
- Student interests
- Analogies
- Text sets
- Visuals

Practical Implications: Learning Retention

Considerations

- Working memory to long-term memory
- Connections!
- Examples & non-examples
- Mnemonics
- Practice (3x)
- Spaced interval (SLOT)
- Interleaved
- Writing
- Academic discourse
- Manage emotions

Practical Implications: Learning Transfer

Considerations

- Assess in instructional and novel settings
- Cross-curricular collaboration
- Varied ways for application
- Extended learning opportunities
- Concrete→abstract
- Highlight sequences or steps in the process
- Provide a strategy arsenal for students

Practical Implications: Self-Directed Learning

Considerations

- Student autonomy
- Strategic thinking
- Teacher language
- Metacognition
- Productive struggle
- Failing forward
- Student goal setting
- Self-monitoring
- Self-assessing
- Teacher modeling

Processing & Reflection

Please turn to an "elbow" partner and have this conversation…

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What was confirmed?

Resources

DEEPENING
Meaning and Learning
How future teachers are putting learning science into action to support all students
Deans for Impact
THE SCIENCE OF LEARNING
Second Edition
How the Science of Learning and Development Can Transform Education
INITIAL FINDINGS
make it stick
The Science of Successful Learning
Peter C. Brown
Henry L. Roediger III
Mark A. McDaniel
HOW TO USE RETRIEVAL PRACTICE TO IMPROVE LEARNING
HOW TO USE SPACED RETRIEVAL PRACTICE TO BOOST LEARNING
METACOGNITION: HOW TO IMPROVE STUDENTS' REFLECTIONS ON LEARNING
RETRIEVAL
SPACING
INTERLEAVING
METACOGNITION
RETRIEVAL PRACTICE AND TRANSFER OF LEARNING: FOSTERING STUDENTS' APPLICATION OF KNOWLEDGE
HOW TO IMPLEMENT RETRIEVAL-BASED LEARNING IN EARLY CHILDHOOD EDUCATION
EFFECT SIZES AND META-ANALYSES: HOW TO INTERPRET THE "EVIDENCE" IN EVIDENCE-BASED
TRANSFER
EARLY CHILD
EFFECT SIZES
TRANSLATIONS
Edited by Jared Cooney Horvath, Jason M. Lodge, and John Hattie
FROM THE LABORATORY TO THE CLASSROOM
TRANSLATING SCIENCE OF LEARNING FOR TEACHERS

Next Move?

Who is your person/people?

What passions/efforts do you share with this work?

How can you support each other?

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