

Making it Stick: Improving Instruction with Spacing and Retrieval Practice



Megan Sumeracki, Ph.D.
Virginia Tech Carilion School of Medicine
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OVERVIEW



Cognitive Psychology Applied to Education

Spaced Practice

- What it is
- Evidence supporting effectiveness
- Application examples

Retrieval Practice

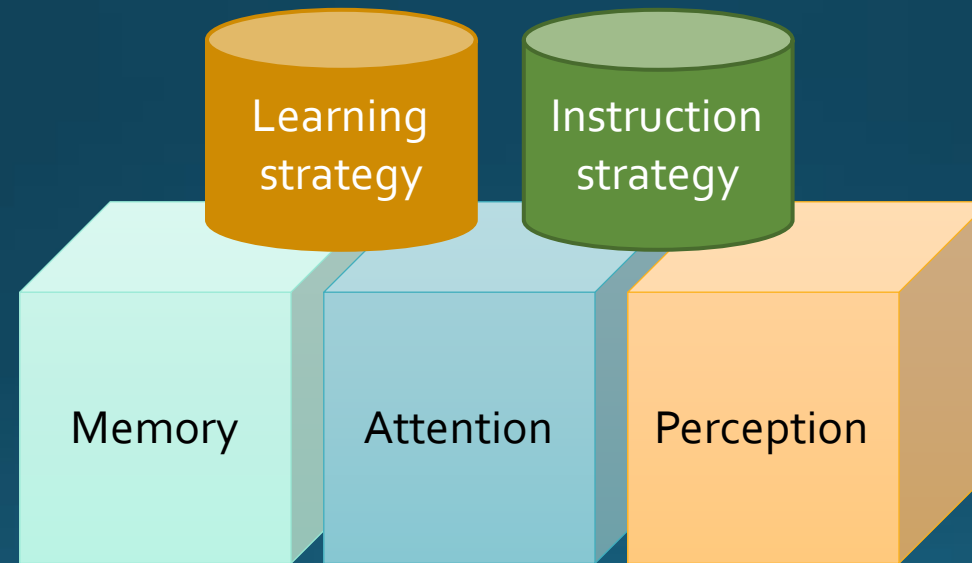
- What it is
- Evidence supporting effectiveness
- Application examples

Putting them together

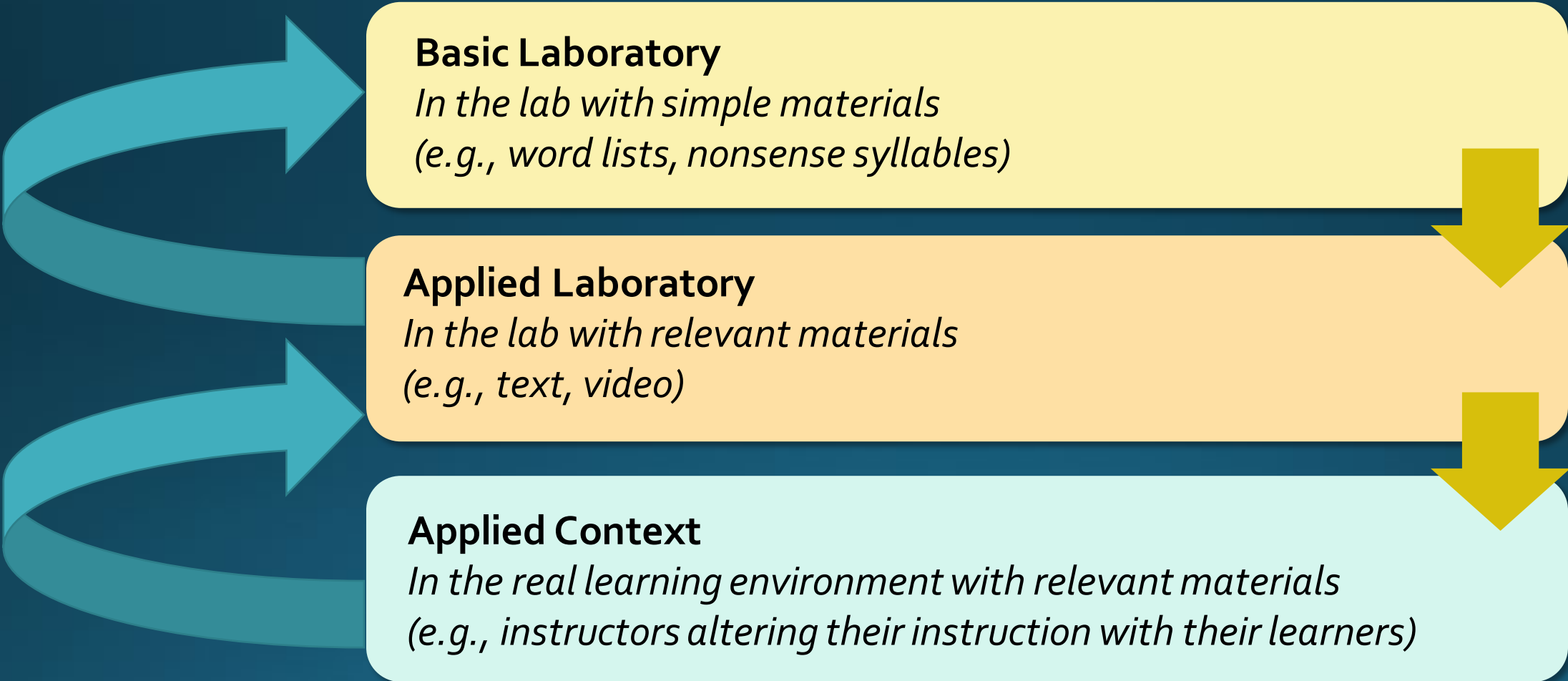
- Application examples
- Think and write, discuss, share

Resources

Cognitive psychology applied to instruction



Testing the strategies



Basic Laboratory

*In the lab with simple materials
(e.g., word lists, nonsense syllables)*

Applied Laboratory

*In the lab with relevant materials
(e.g., text, video)*

Applied Context

*In the real learning environment with relevant materials
(e.g., instructors altering their instruction with their learners)*

The two most applicable strategies:

SPACE OUT YOUR STUDYING OVER TIME



SPACED PRACTICE

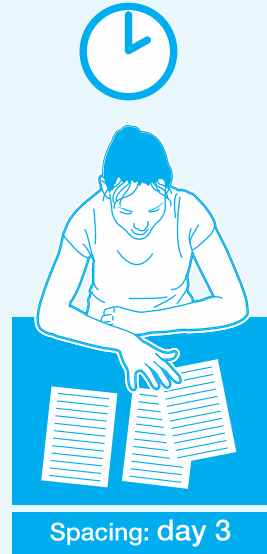
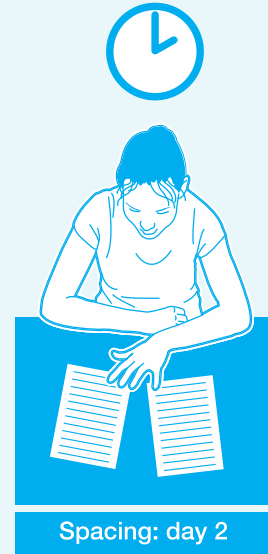
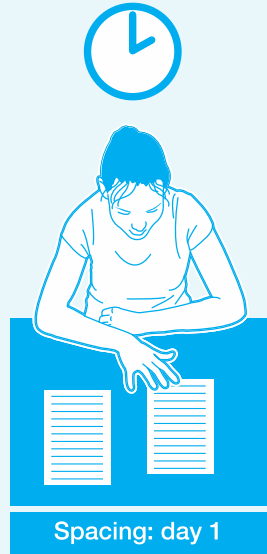
PRACTICE BRINGING INFORMATION TO MIND



RETRIEVAL PRACTICE

Spaced Practice

Spacing



DEMO:

Solve these two math problems in your head

$$37 + 15 + 12$$

$$37 + 15 + 12$$

Spacing – An All-rounder

Vocabulary learning

(e.g., Bahrick et al., 1993; Kornell, 2009; Bloom & Shuell, 1981)

Medical & Health CPD

(e.g., Van Hoof et al., 2021)

Surgical skills

(e.g., Moulton et al., 2006; Nakata et al., 2017)

Fact learning

(e.g., DeRemer & D'Agostino, 1974)

Works in many domains

Motor skills

(e.g., Baddeley & Longman, 1978; Shea et al., 2000; Goedert & Miller, 2008)

Text passages

(e.g., Gordon, 1925; Rawson & Kintsch, 2005; Verhoeijen et al., 2008)

Problem solving

(e.g., Cook, 1934; Grote, 1995)

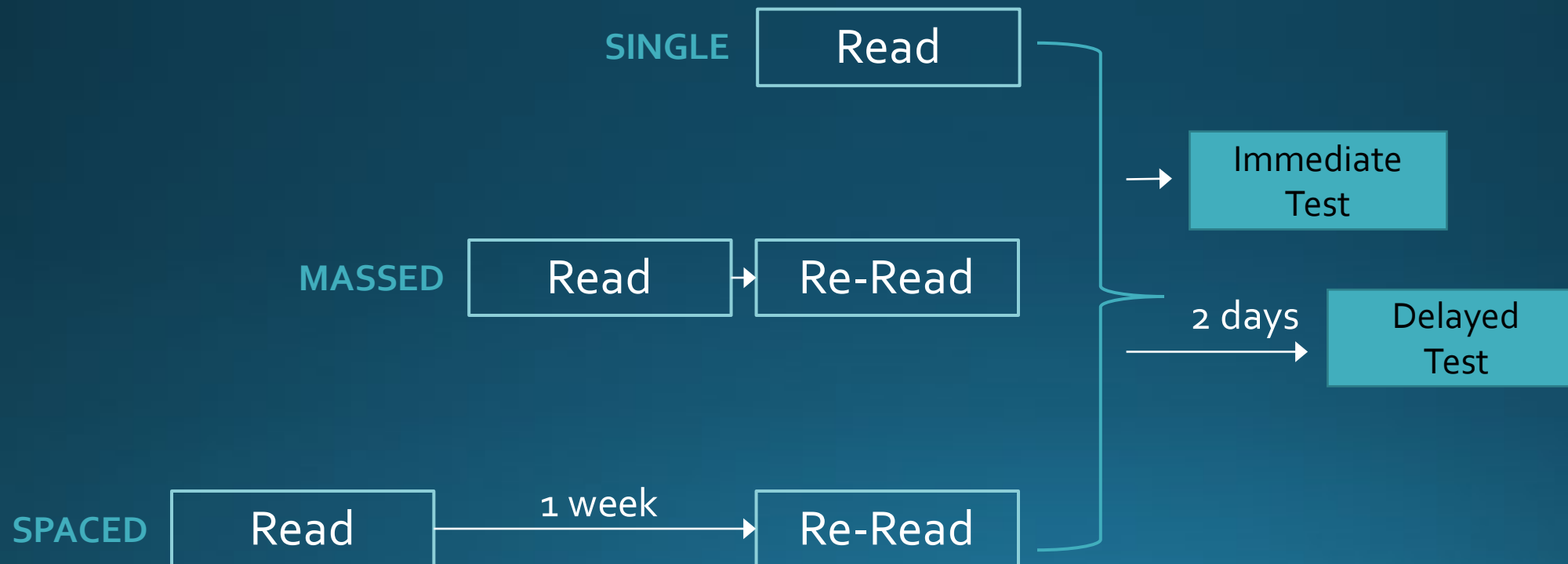
Musical instrument learning

(e.g., Simmons, 2007)

Evidence from the Laboratory

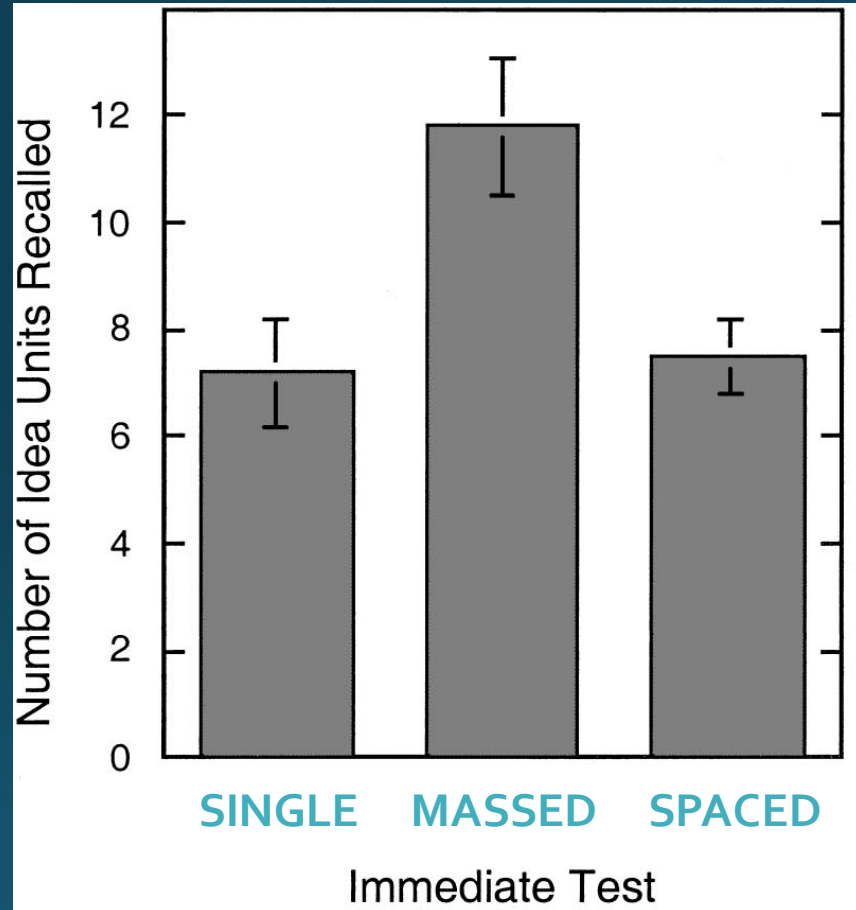
Rawson & Kintsch (2005)

- Adult learners studied a lengthy science text



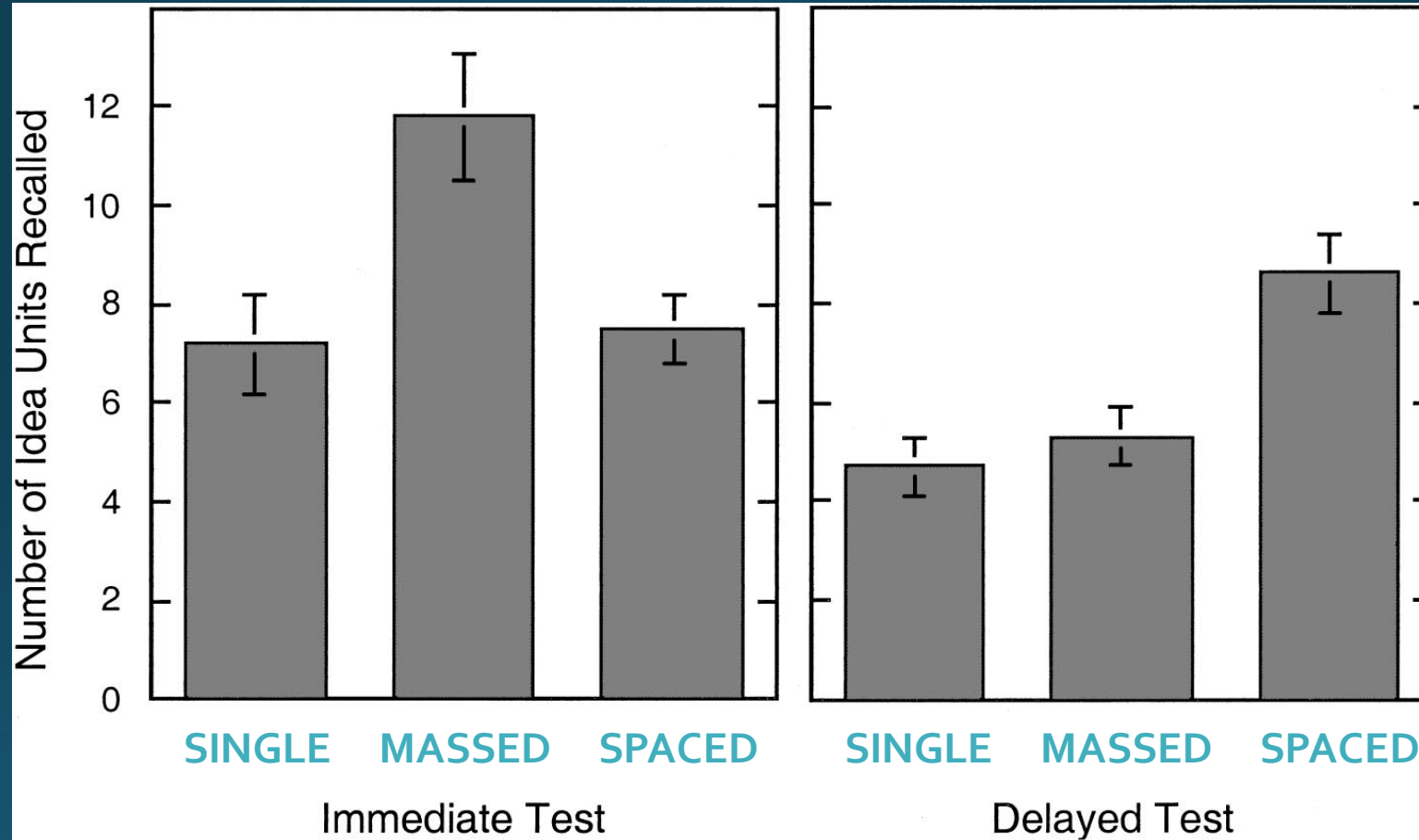
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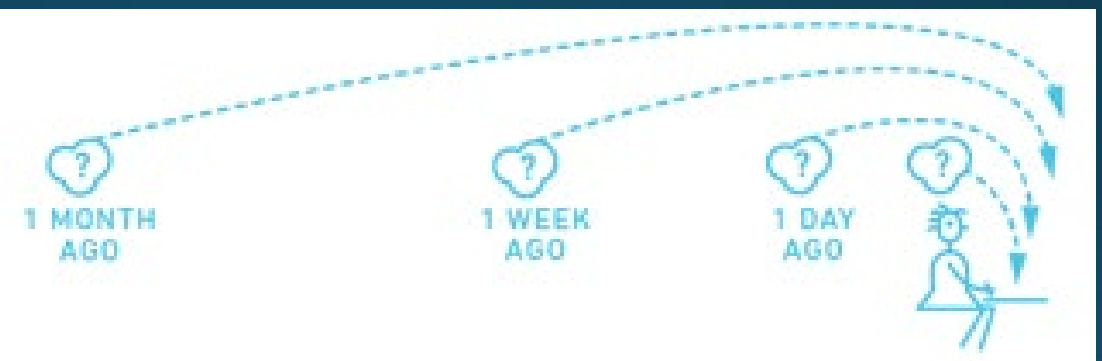
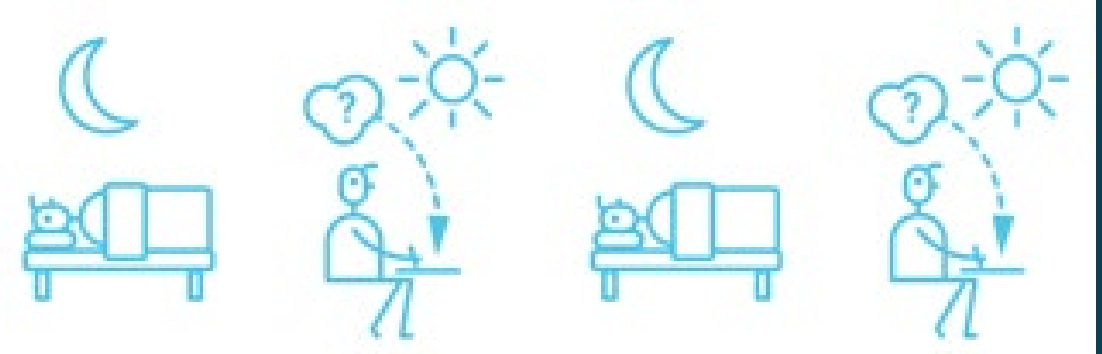
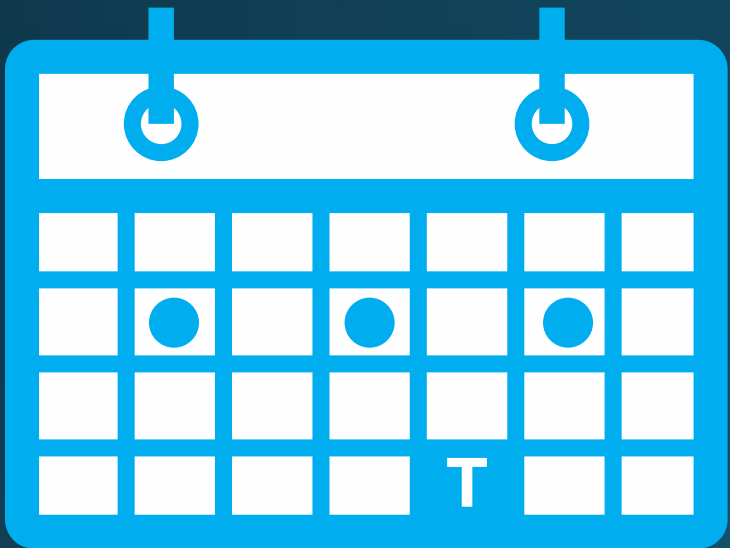


Evidence from the Laboratory

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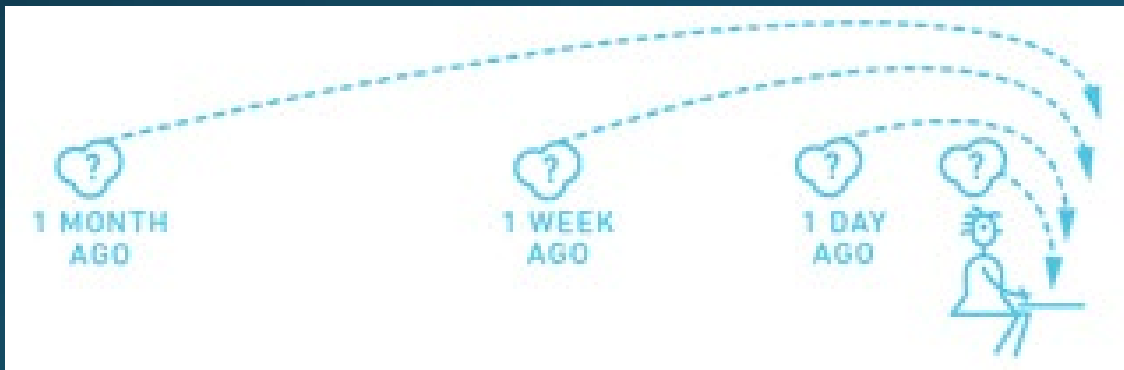


Application



Application by Learners

- Commit to __ min every day.
- Review different lags
 - 1 day
 - 1 week
 - 1 month
 - And older



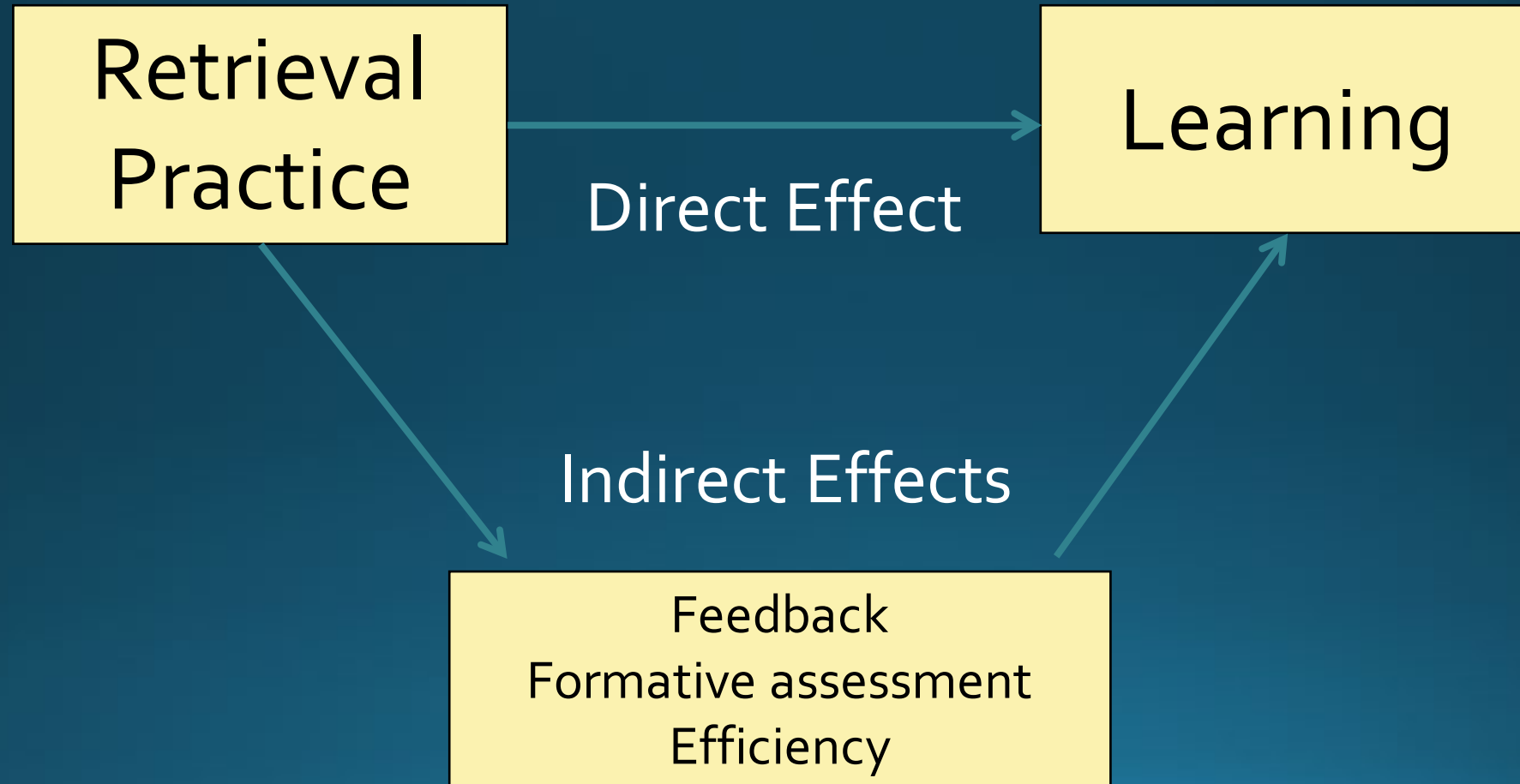
Spaced Practice Plan

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	...
1	Taught	Practice		SL 1				SL 2			
2		Taught	Practice		SL 1			SL 2			
3			Taught		Practice	SL 1			SL 2		
4				Taught		Practice		SL 1			
5					Taught	Practice			SL 2		
6						Taught	Practice		SL 2		
7							Taught		Practice		
8									Taught		

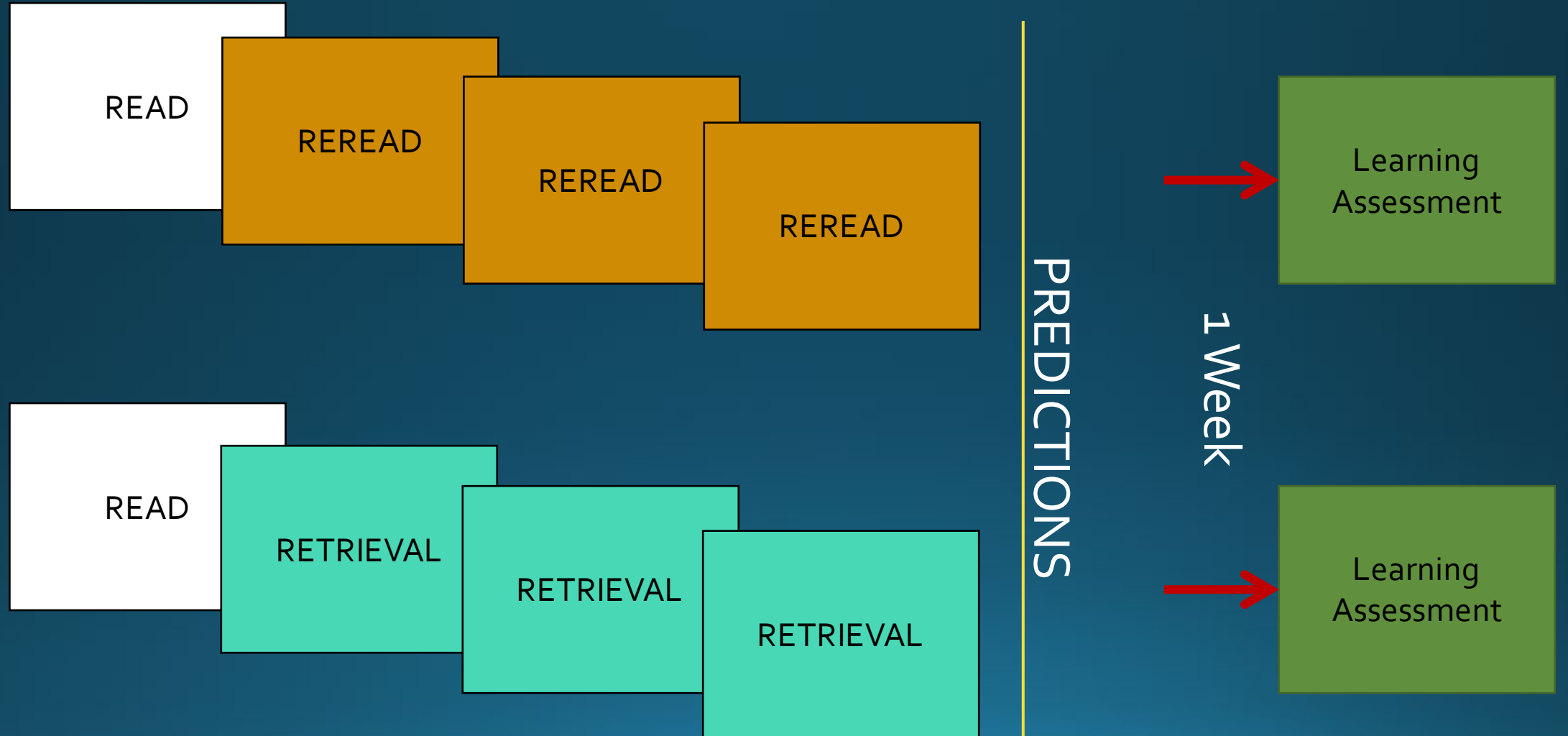
TOPIC

Retrieval Practice

Effects on Learning

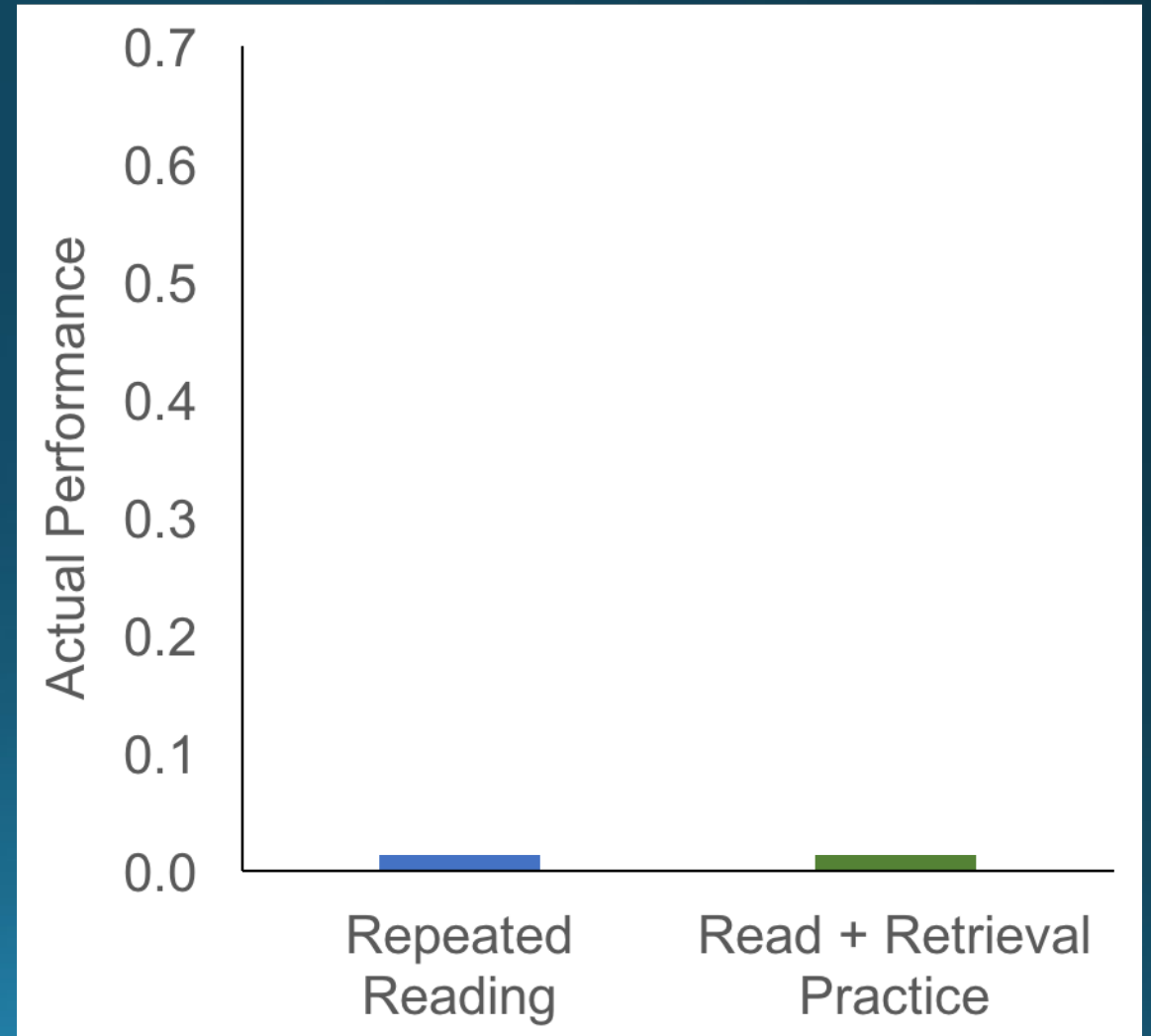
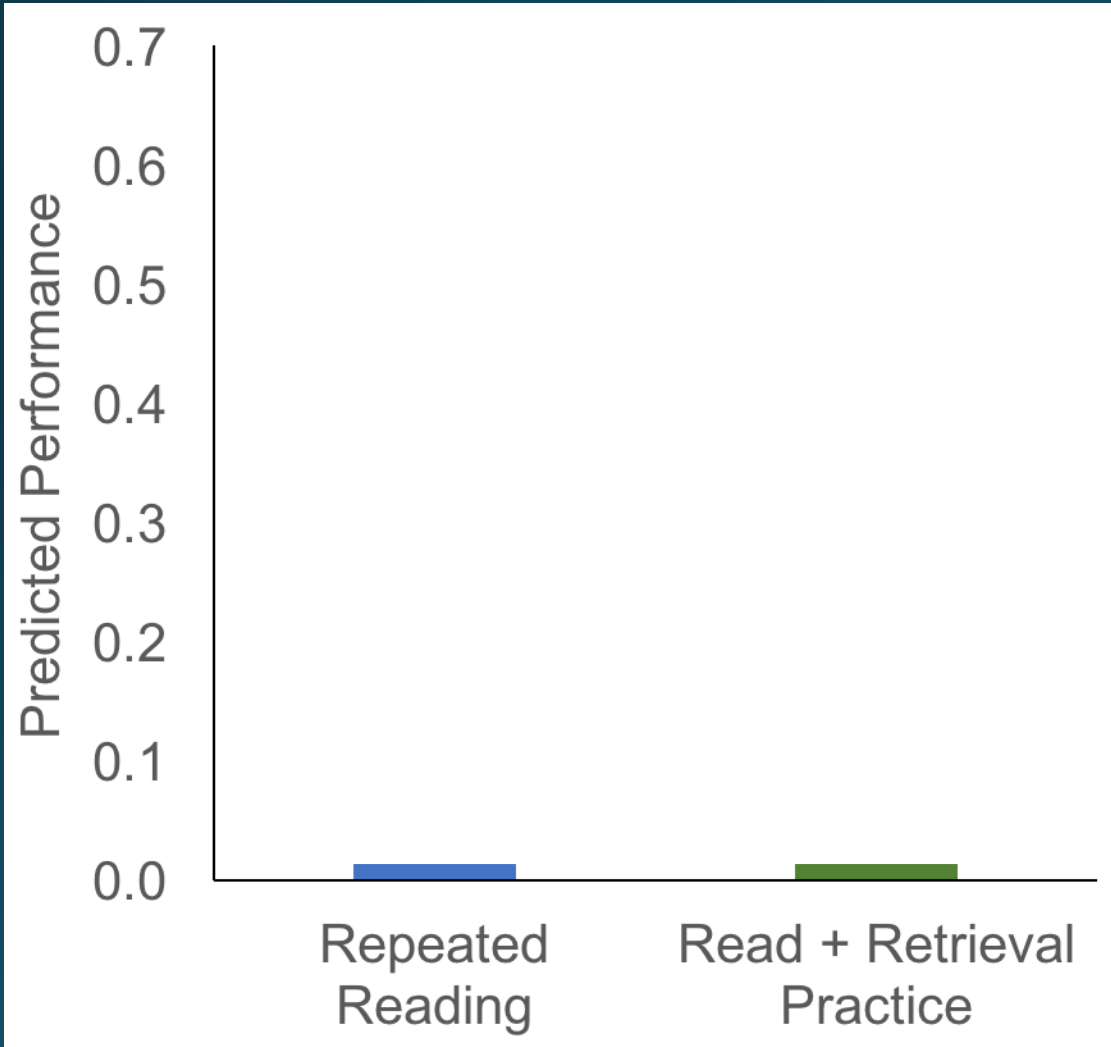


Direct effects of retrieval practice



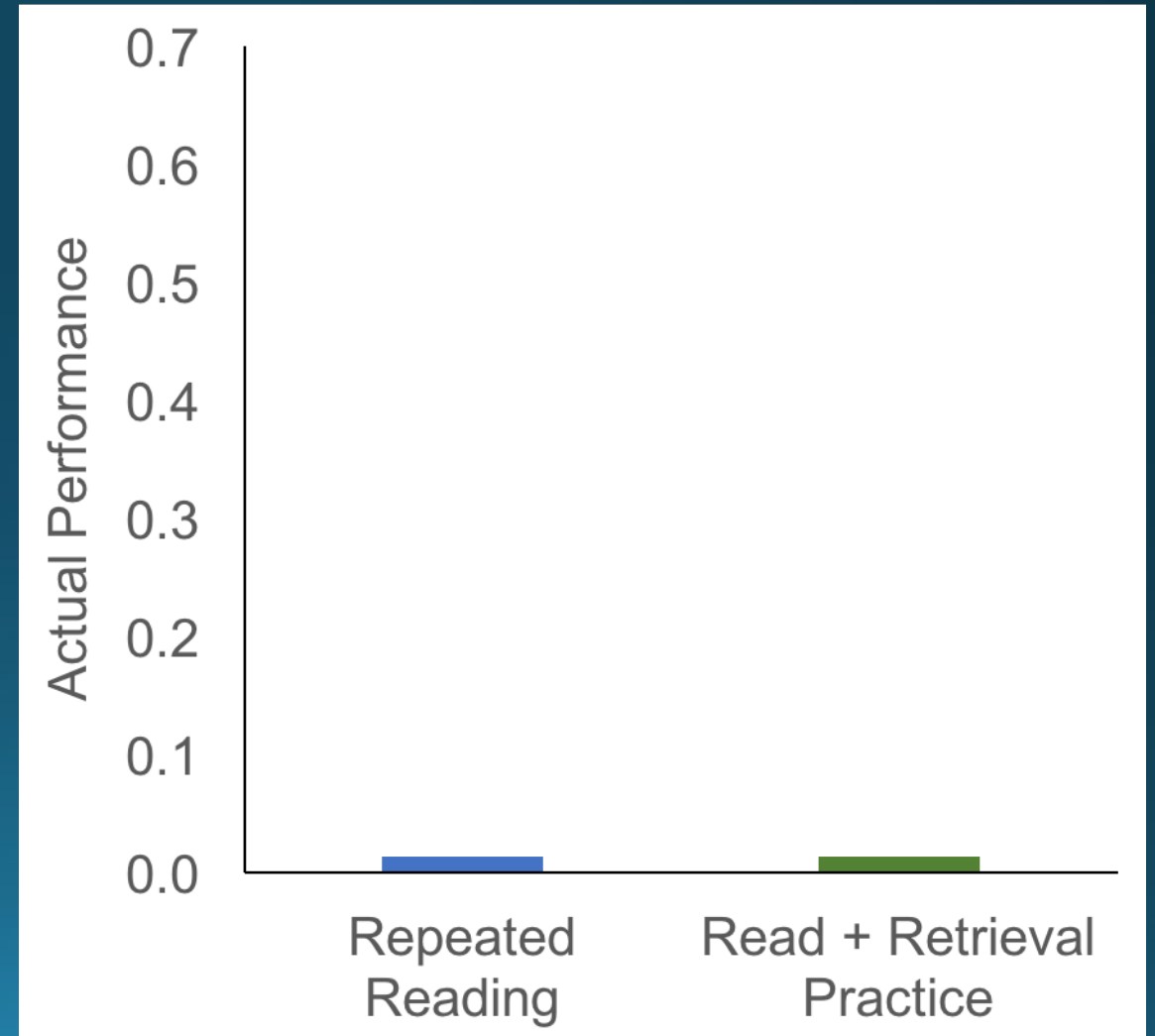
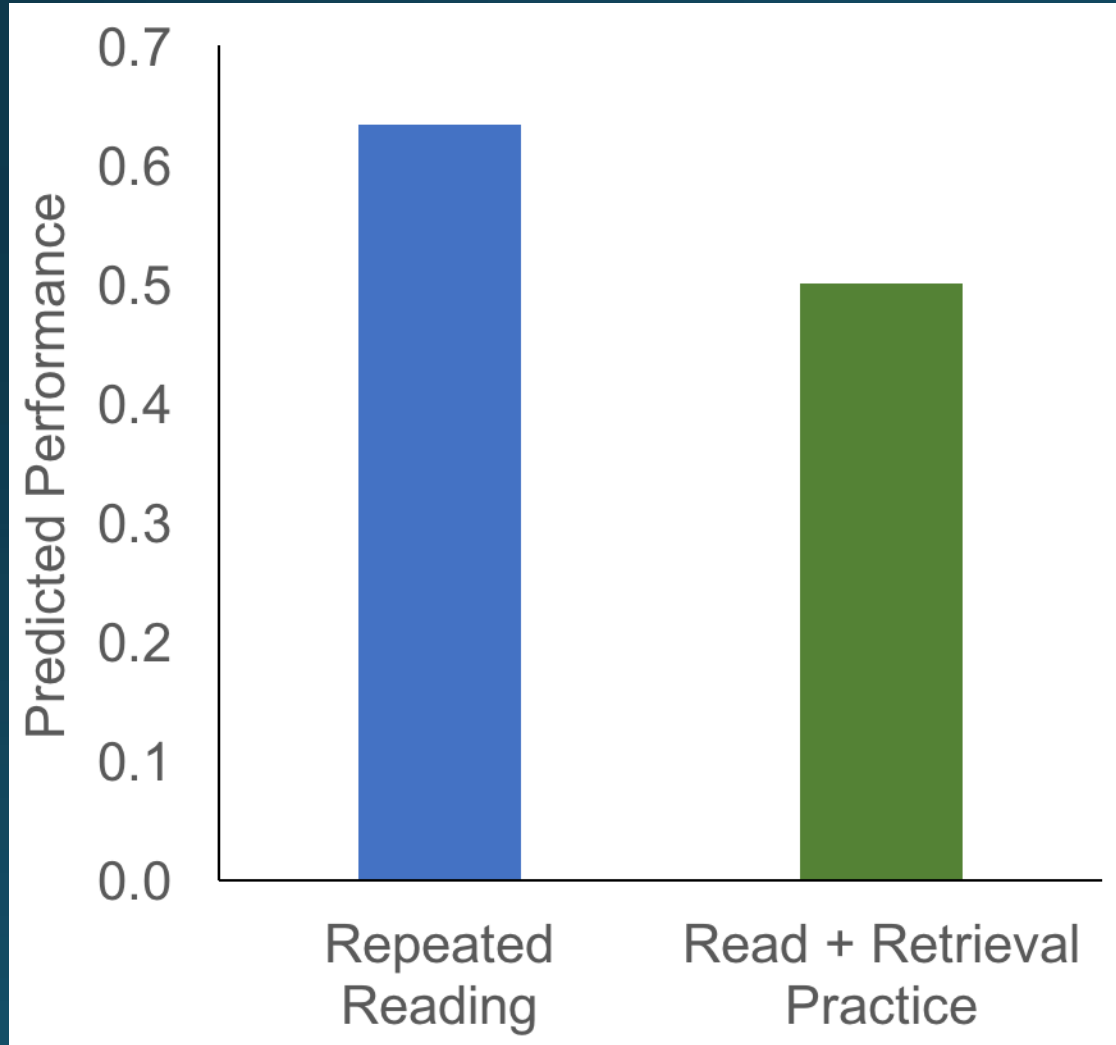
Do learners realize retrieval helps?

(Roediger & Karpicke, 2006, Exp 2)



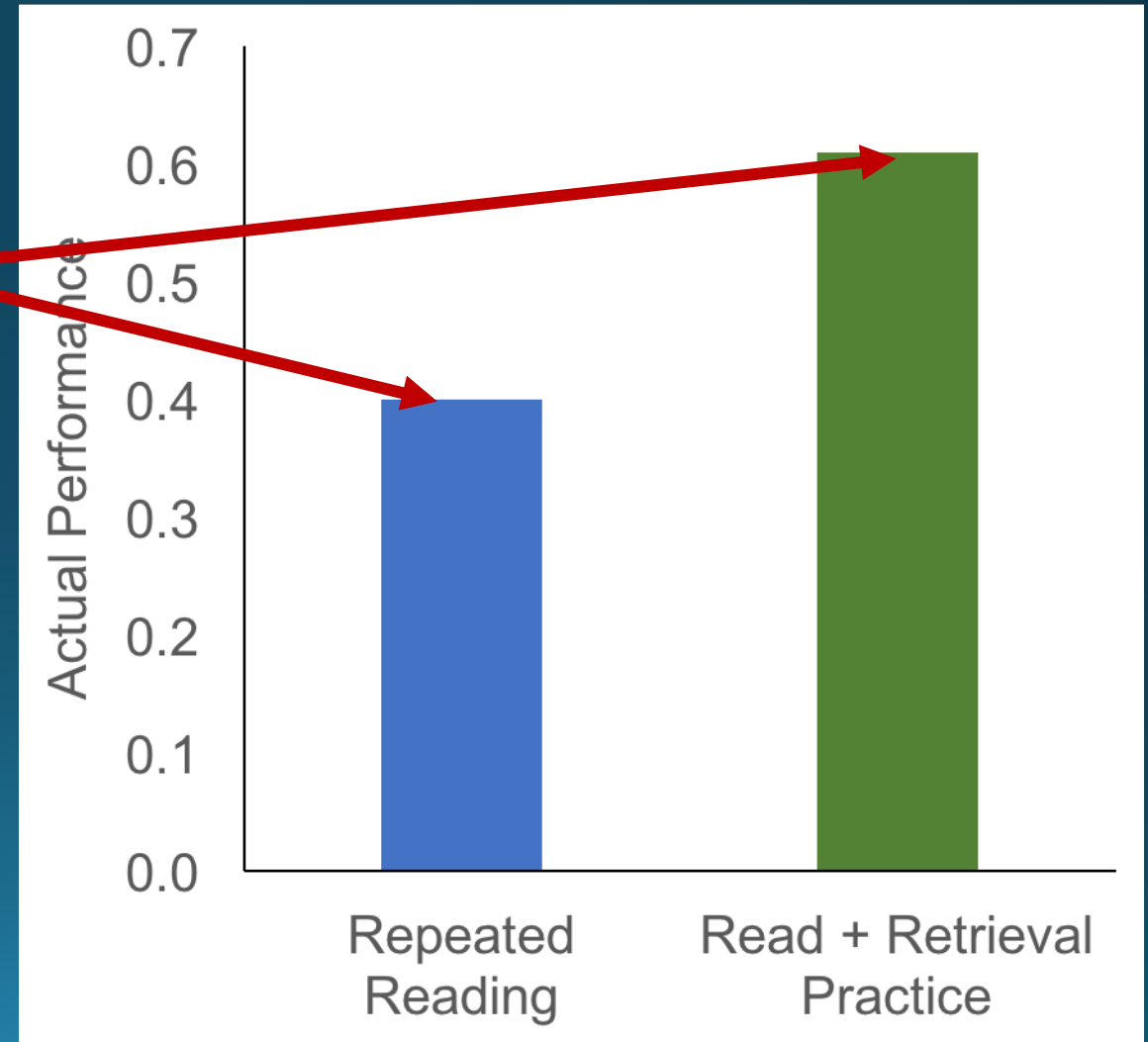
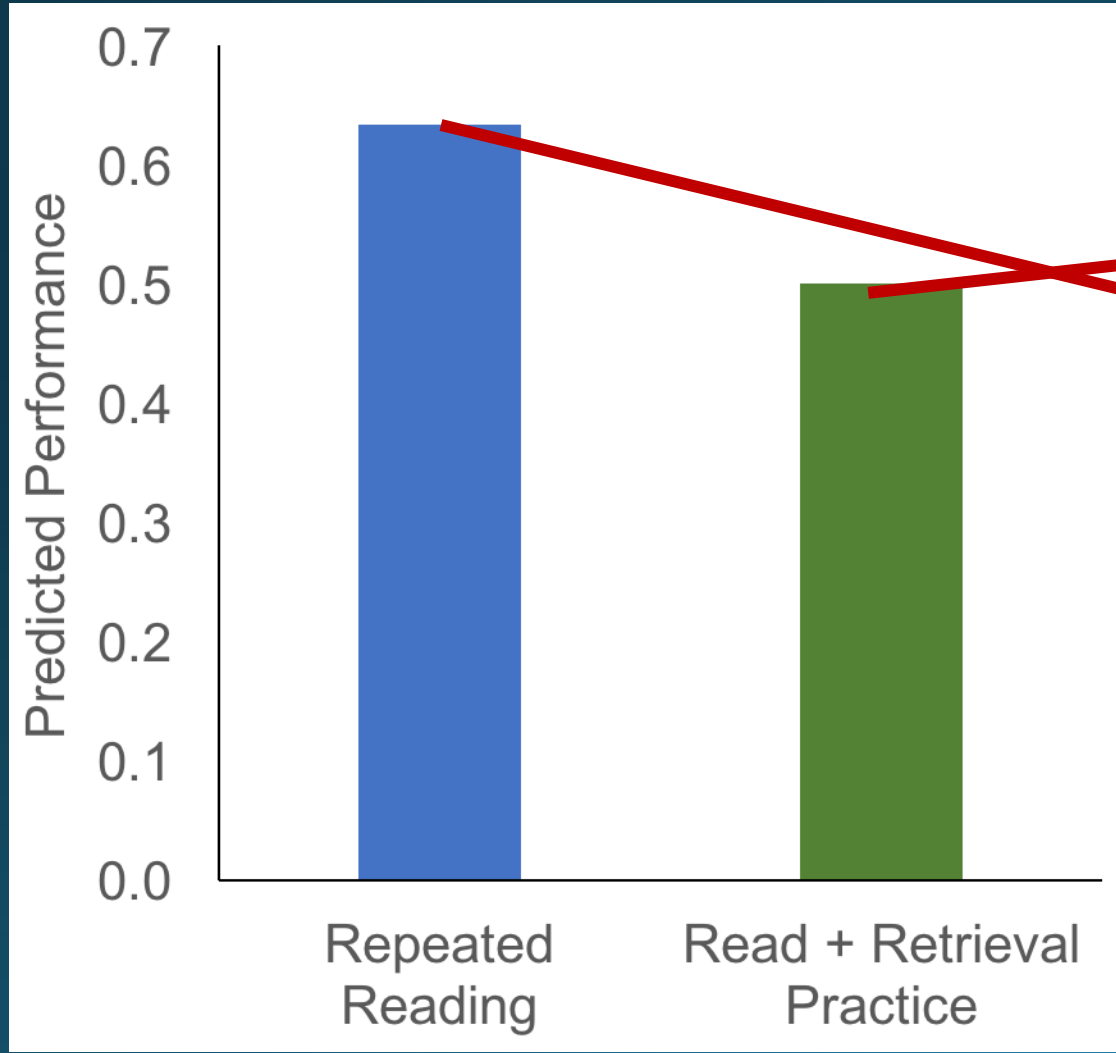
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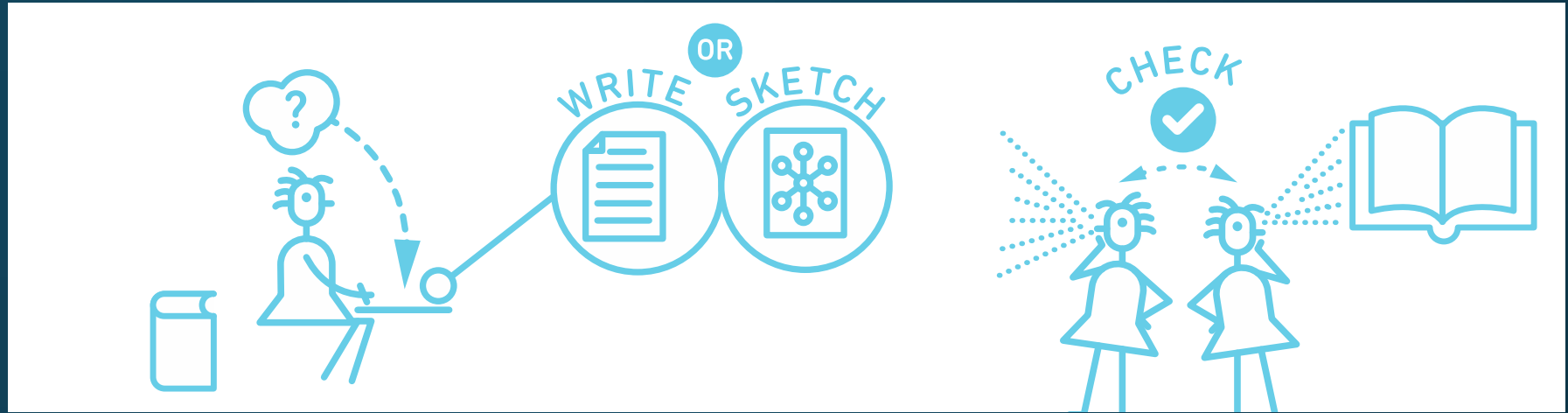
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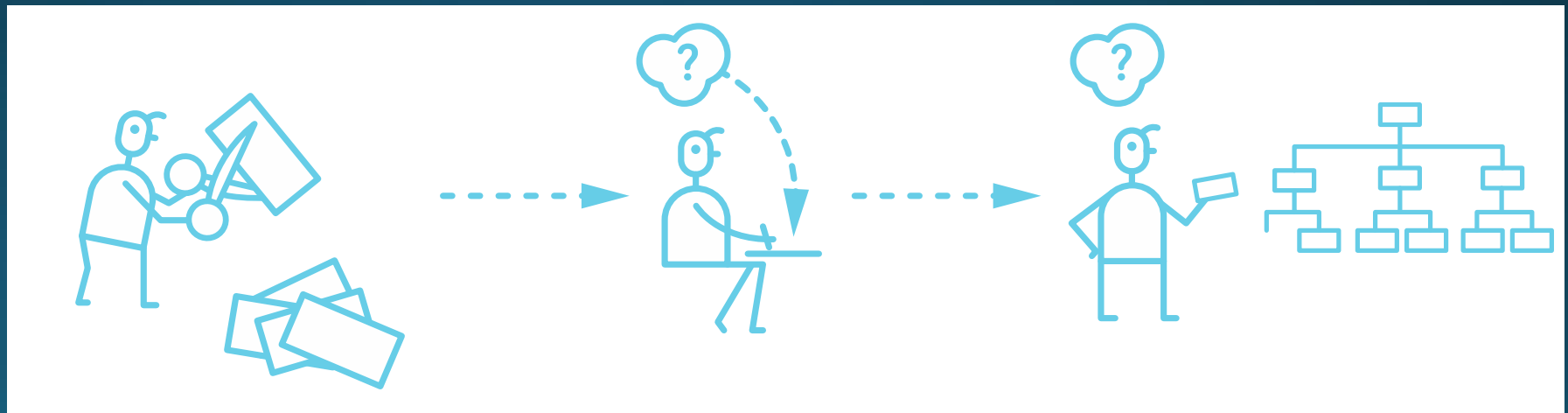


Application:

Retrieval can be verbal or visual

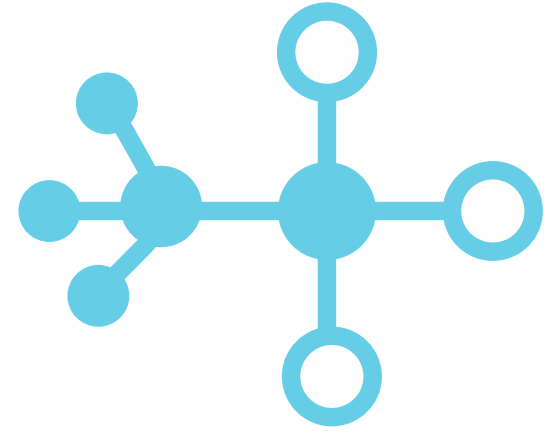
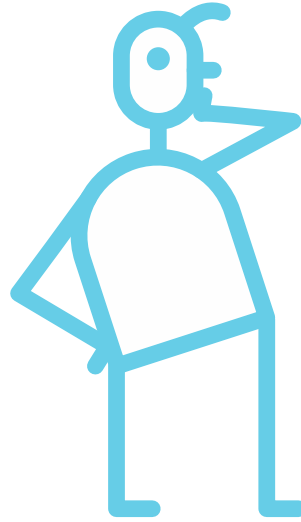


Make sure learners don't just flip flashcards

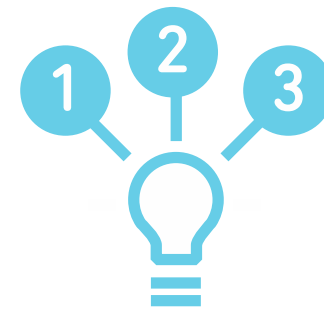


Application:

Retrieval practice can be used for complex materials

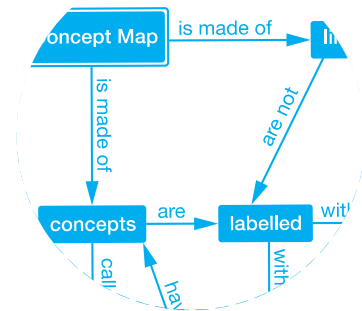


Retrieval practice is hard - but that's good!



Retrieval Practice

THOUGHT
FLOW



Putting Spacing and Retrieval Together

Answering Questions:

Q₁ – Q₃ – retrieval of information from last session

Q₄ – retrieval of information from last week

Q₅ – retrieval of information from last month

Q₆ – make link between information from last session & previously learned information

Spaced Retrieval in Medical School



Alyssa B. Shaffer, M.D.

Think & Write

*Current examples of
spacing and retrieval
practice in my
program.*



Discuss

Discuss:

- Ideas for implementation
 - *Short term vs long term?*
 - *Potential challenges?*
 - *Resources you may need?*

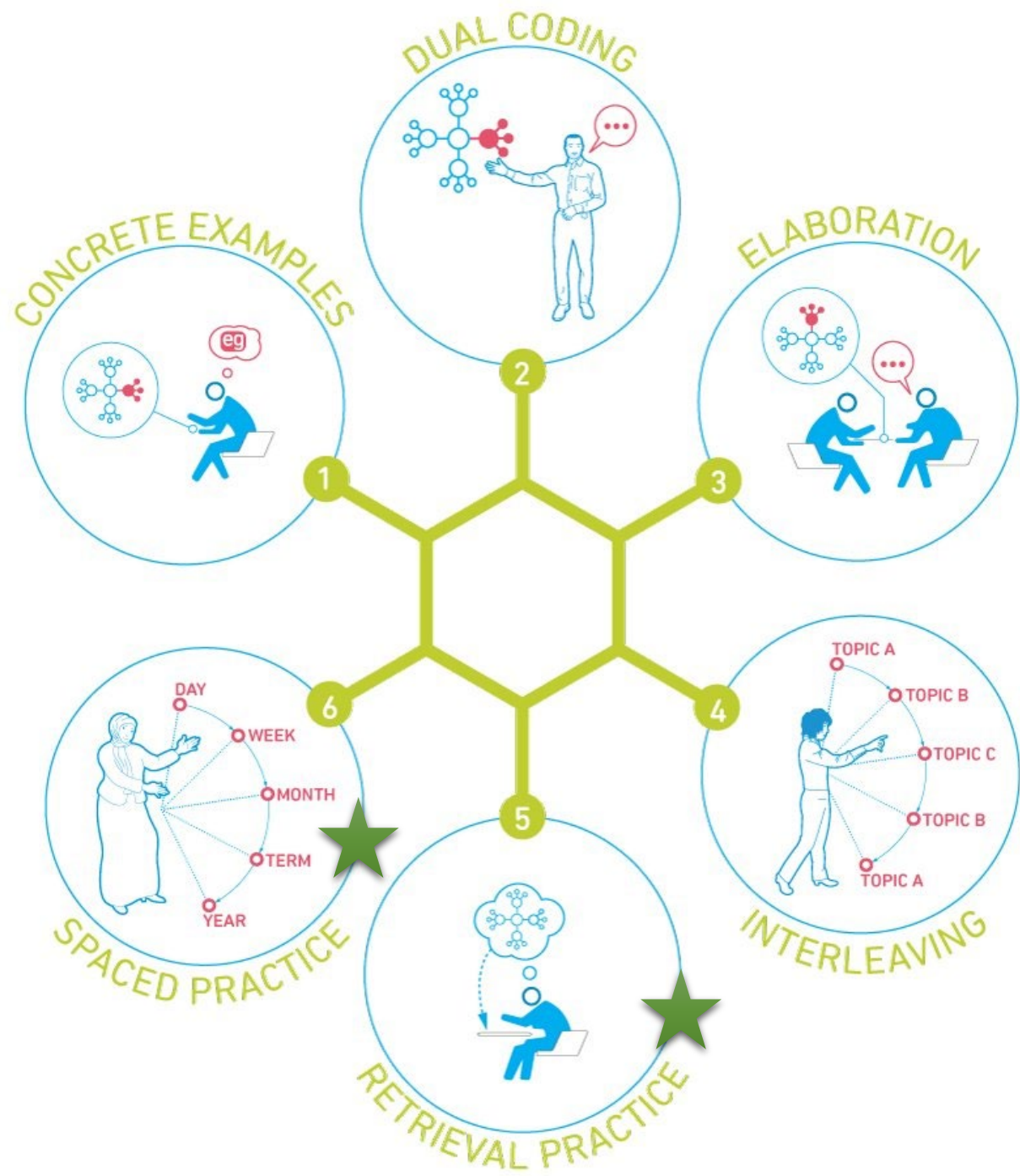


Share

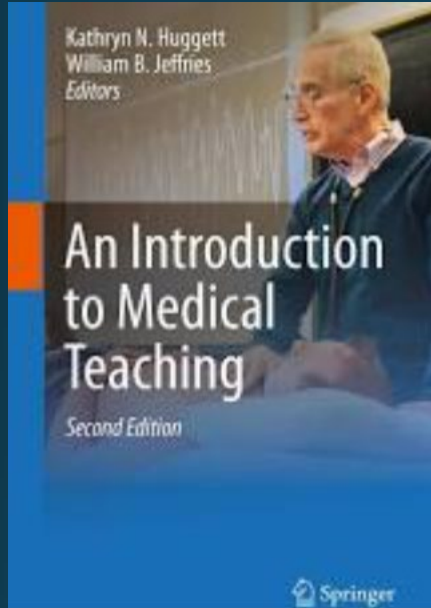
Share:

- Ideas for implementation
 - *Short term vs long term?*
 - *Potential challenges?*
 - *Resources you may need?*





Chapters and Articles



Nebel & Sumeracki

Chapter 1: The Science of Learning

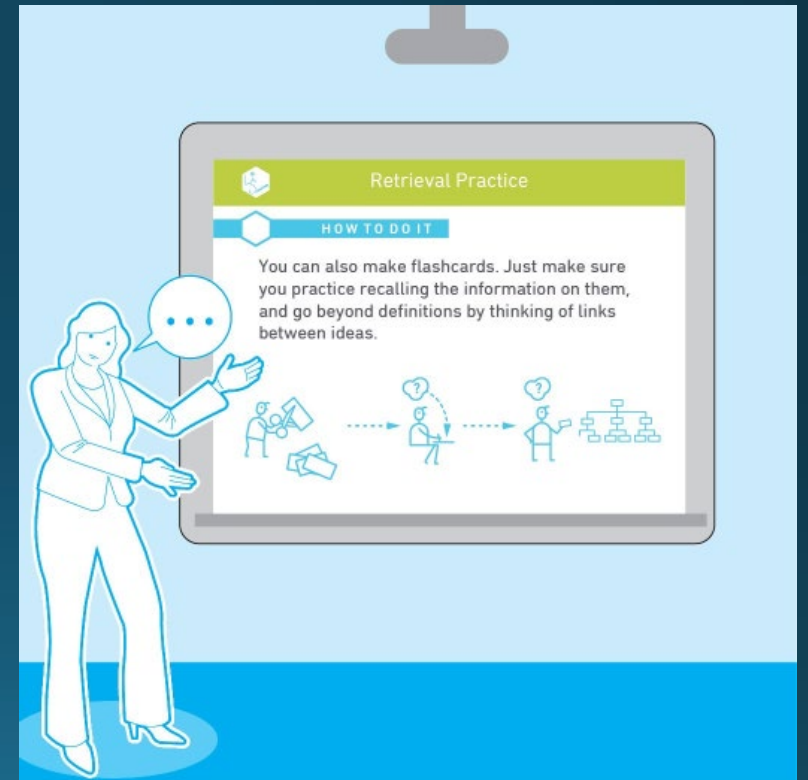
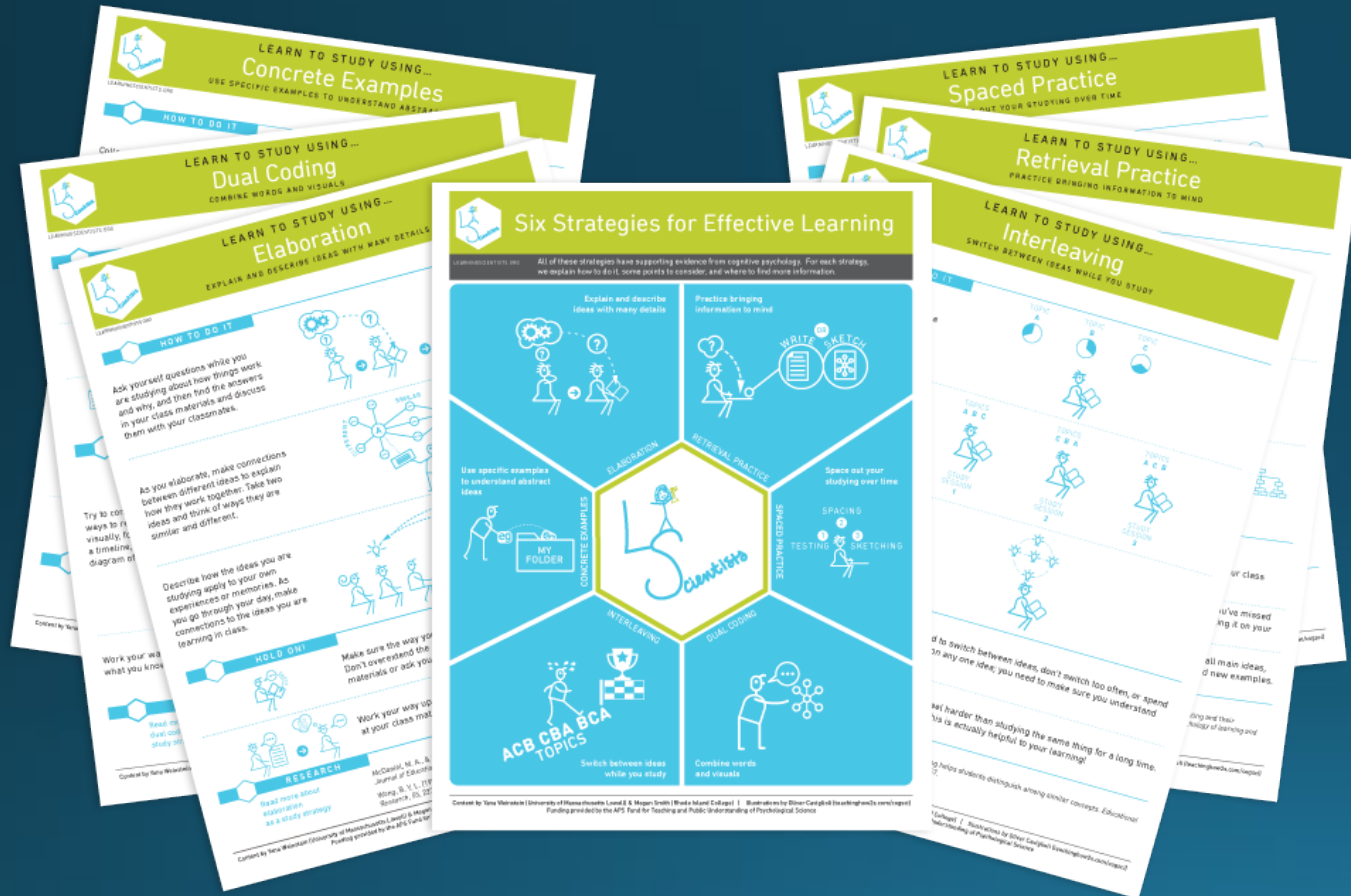
- Van Hoof, T. J., **Sumeracki, M. A.**, & Madan, C. R. (2021). Science of learning strategy series: Article 1, distributed practice. *The Journal of Continuing Education in the Health Professions*, 41(1), 59-62.
- Van Hoof, T. J., Madan, C. R., & **Sumeracki, M. A.** (2021). Science of learning strategy series: Article 2, retrieval practice. *The Journal of Continuing Education in the Health Professions*, 41(2), 119-123.

Free Resources



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Six strategy posters & Slides

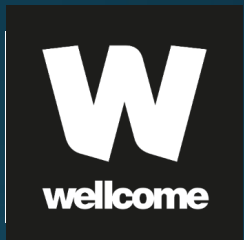
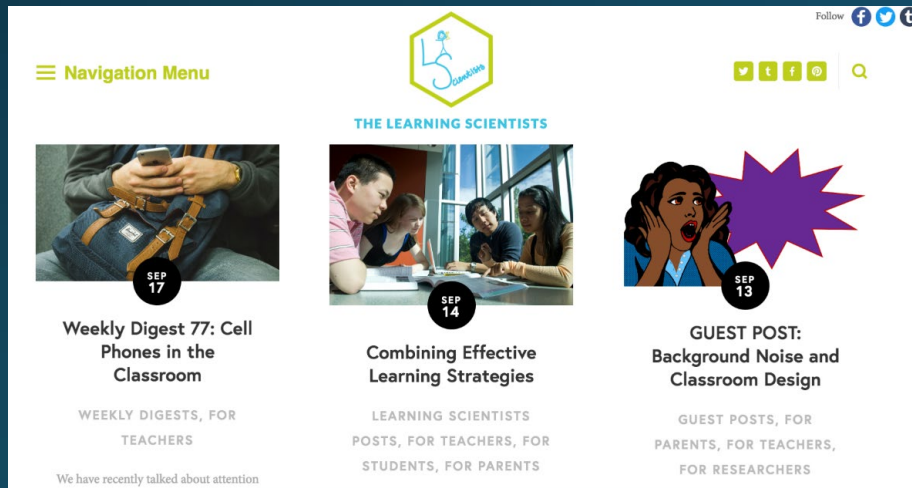


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Resource digests

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Guest posts



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