Keeping Play Cognitive

Hands-on, Minds-on

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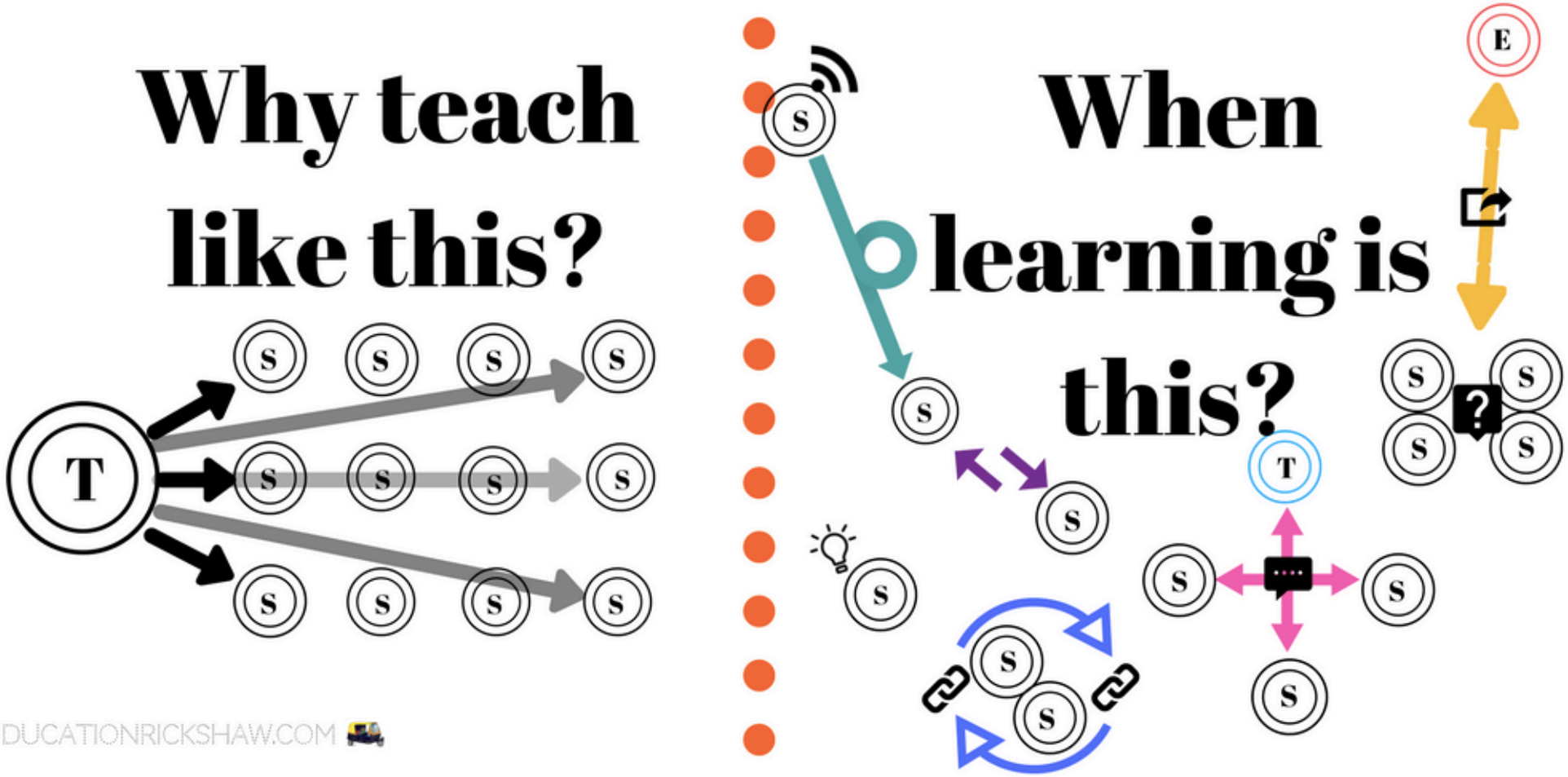
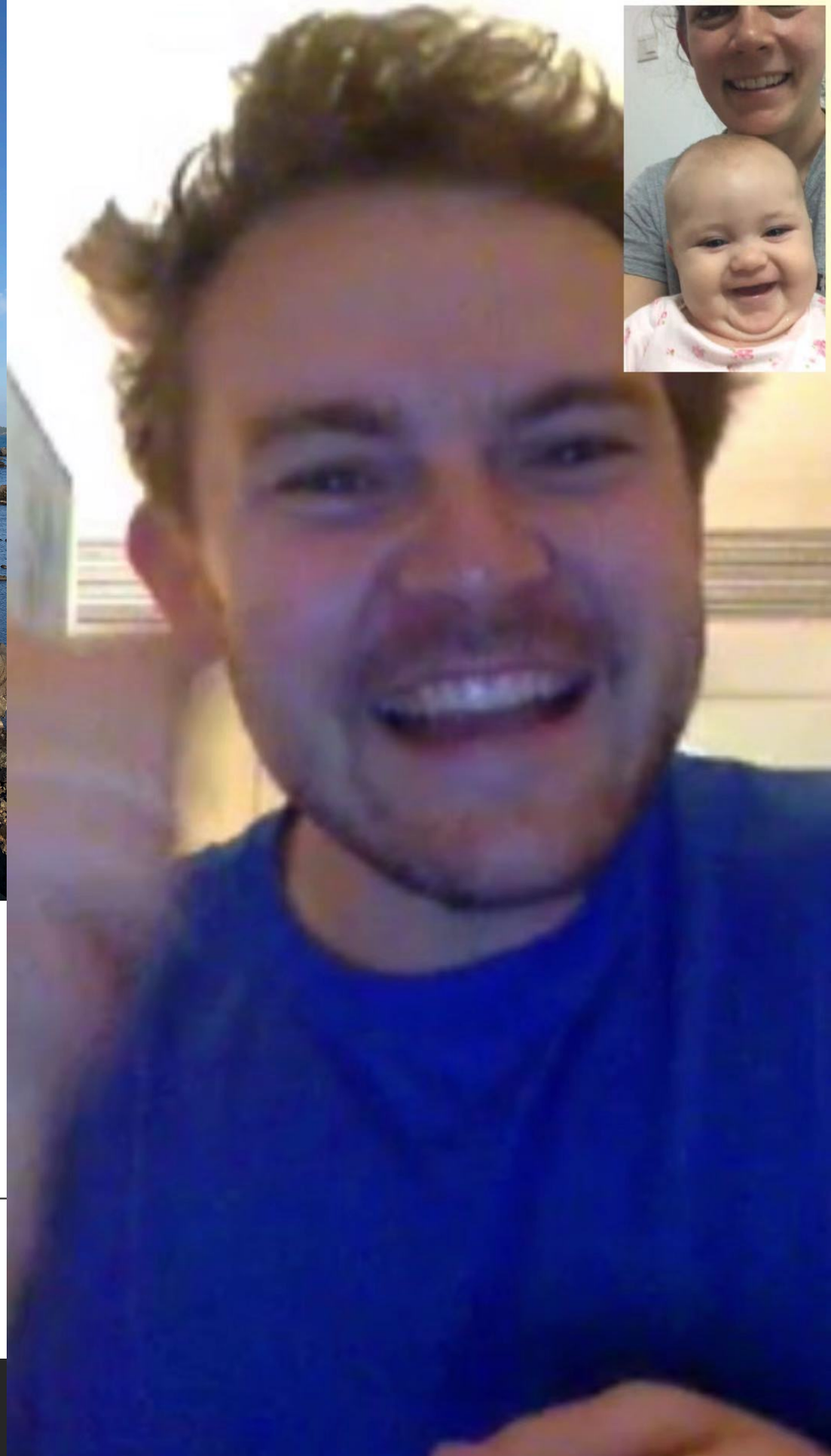
educationrickshaw.com

My classroom



After 100 Years of the Same Teaching Model It's Time to Throw Out the Playbook



My daughter

Cognitively Active

Low → High

Behaviorally Active

Low → High

Hands-off + Minds-off	**Hands-off + Minds-on**
Hands-on + Minds-off	**Hands-on + Minds-on**

Adapted from Mayer (2004)

In the future of learning now, play-based learning is best implemented when/if/by…

Menu Choices

Should we train kids to multi-task?

Does play = learning?

Does making something yourself mean you'll end up liking it more?

Serial Players

Thoughts on improving hands-on learning

The voice and choice conundrum

"Why minimally guided instruction doesn't work"

Okay, now you have me aroused!

Overloaded!

Genius hour schemes

Pockets of play

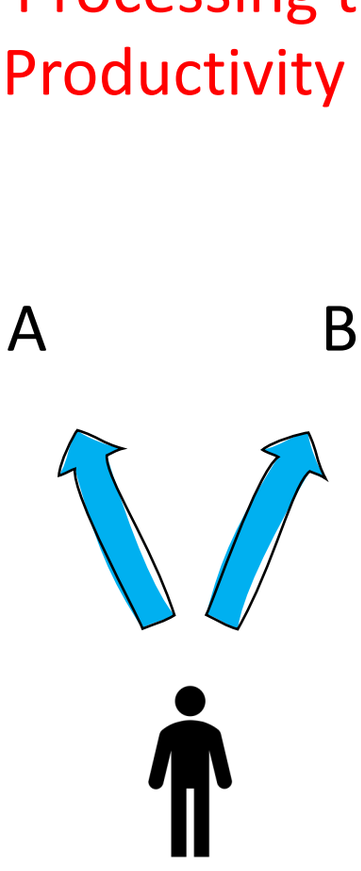
Learning should come naturally. But does it?

Multitasking

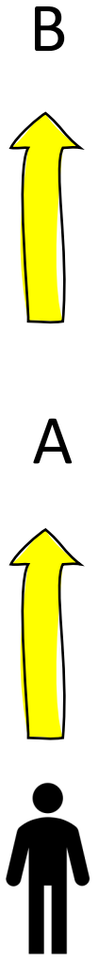
(Pashler, 1994; Fischer & Plessow, 2015)

+ Errors
+ Processing time
- Productivity

Parallel Task Processing



Serial Task Processing



“Dual task interference”

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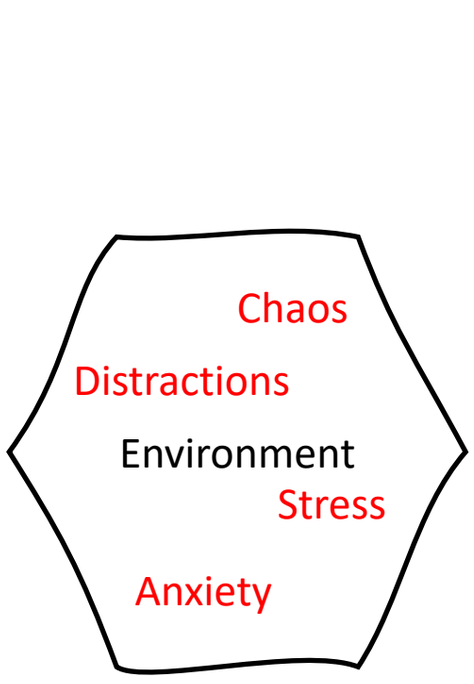
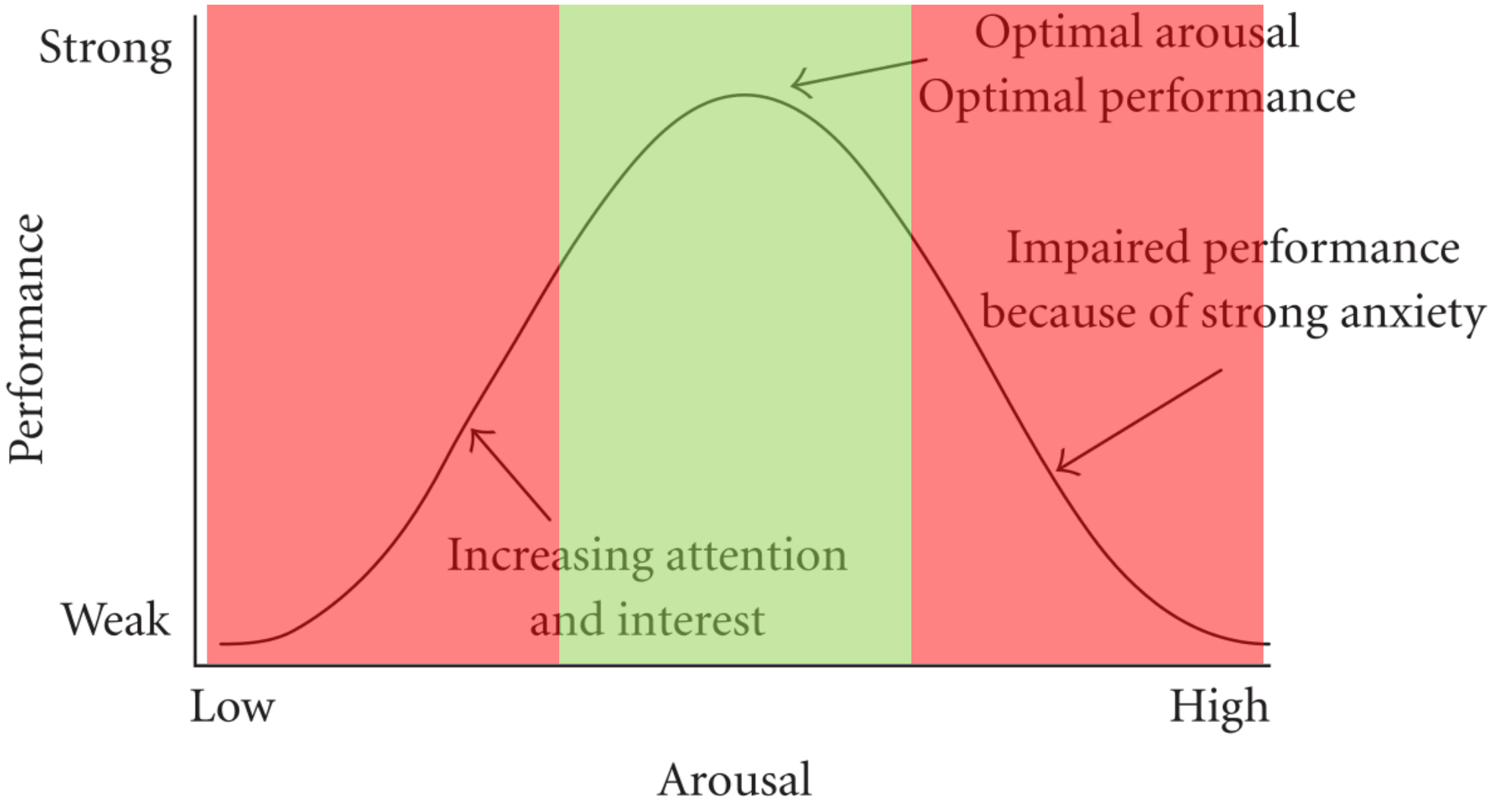
Yerkes-Dodson Law

(Diamond, Campbell, Park, Halonen, & Zoladz, 2007)





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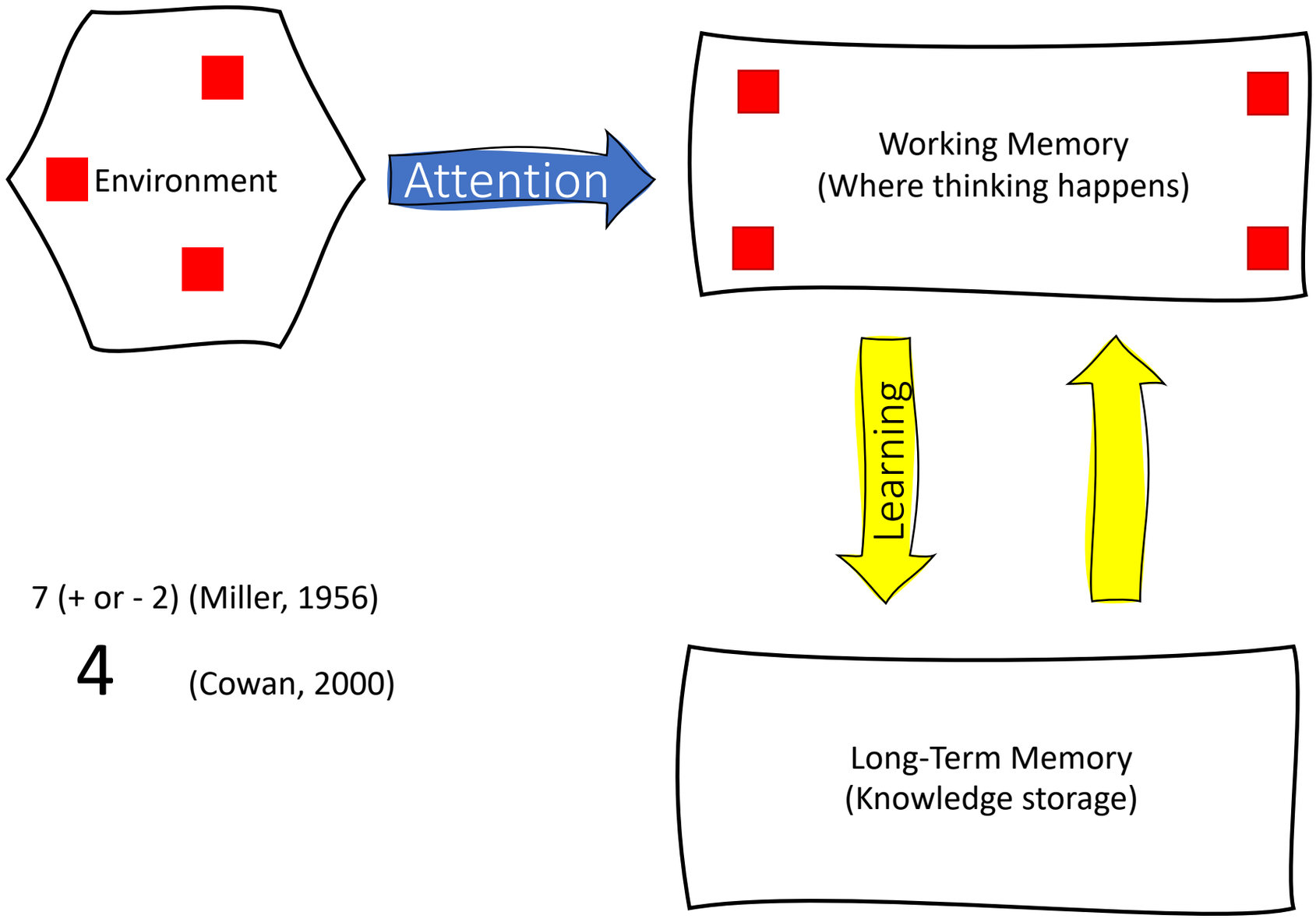
Decay



7 (+ or - 2) (Miller, 1956)

4 (Cowan, 2000)

Adapted from: Willingham, 2009

D5O9C4X1B9O0A1X2

ABCD 1945 XOXO 2019

Is it fair to say that play-based learning results in high cognitive load, and therefore leads to less learning?

YES (AND WHY)

NO (AND WHY)

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Learning should come naturally. But does it?

Evolved to do these

Didn’t evolve to do these

Biologically primary	Biologically secondary
Speaking	Reading
Social Cues	Writing
Walking	Arithmetic

(Geary, 2008)

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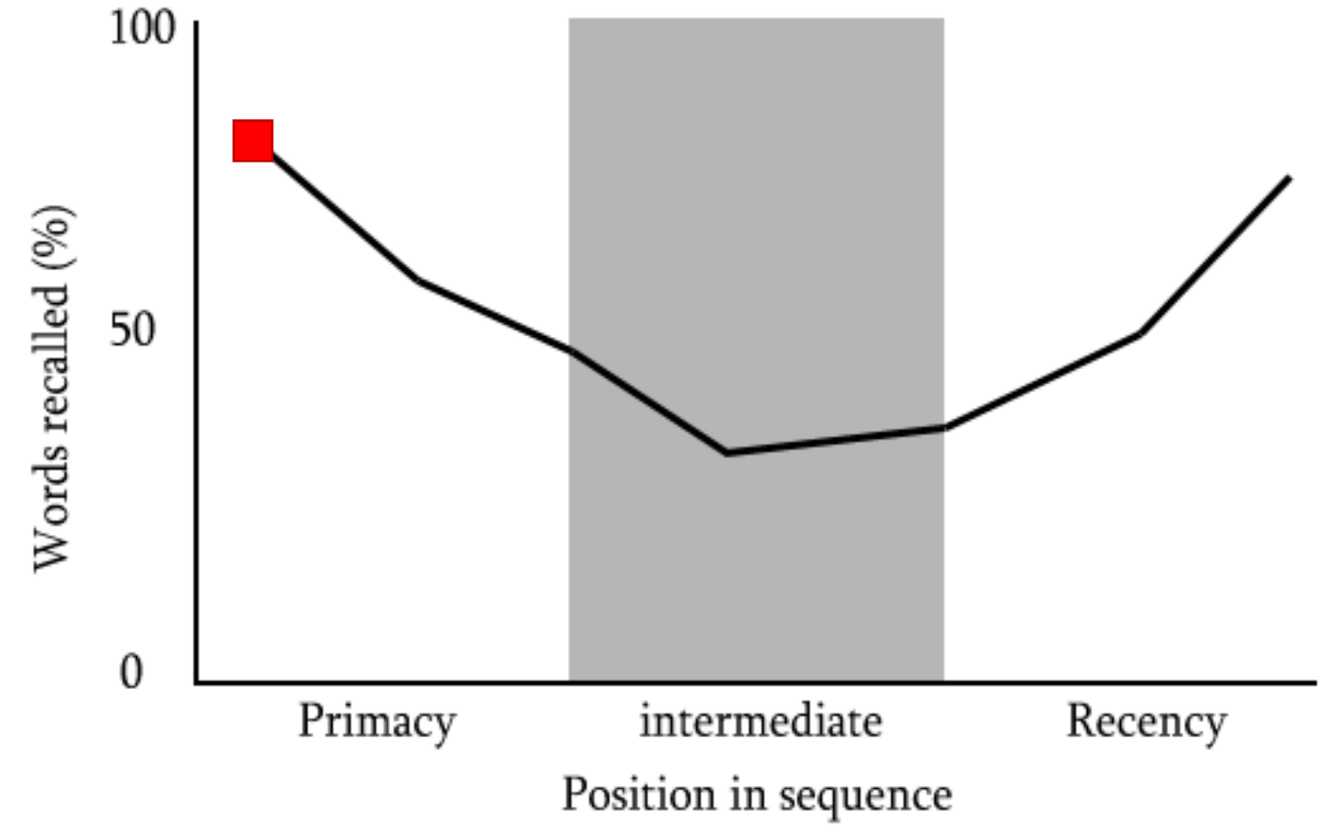
Serial Position Effect



(Martinez, 2010)

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Genius hour schemes

Pockets of play

Learning should come naturally. But does it?

More Play!

Play	Play	Play	Play	Play
Play	Play	Play	Play	Play
Play	Play	Play	Play	Play
Childhood-killing academics	Childhood-killing academics	Childhood-killing academics	Childhood-killing academics	Childhood-killing academics
Childhood-killing academics	Childhood-killing academics	Childhood-killing academics	Childhood-killing academics	Childhood-killing academics
Childhood-killing academics	Childhood-killing academics	Childhood-killing academics	Childhood-killing academics	Childhood-killing academics
Childhood-killing academics	Childhood-killing academics	Childhood-killing academics	Childhood-killing academics	Childhood-killing academics
Childhood-killing academics	Childhood-killing academics	Childhood-killing academics	Childhood-killing academics	Childhood-killing academics

Pockets of Play

Play	Play	Play	Play	Play
Play	Play	Play	Play	Play
Play		Play		Play
	Play		Play	
Play		Play	Play	
Play	Play	Play	Play	Play

Pockets of Play

Morning play	Morning play	Morning play	Morning play	Morning play
Math	Math	Math	Math	Math
Recess	Recess	Recess	Recess	Recess
Swimming	Writing	PE	Reading	Drama
Reading	Design	Reading	Art	Writing
PE	Reading	Drama	Design	Reading
UOI	UOI	UOI	UOI	UOI
ASA	ASA	ASA	ASA	ASA

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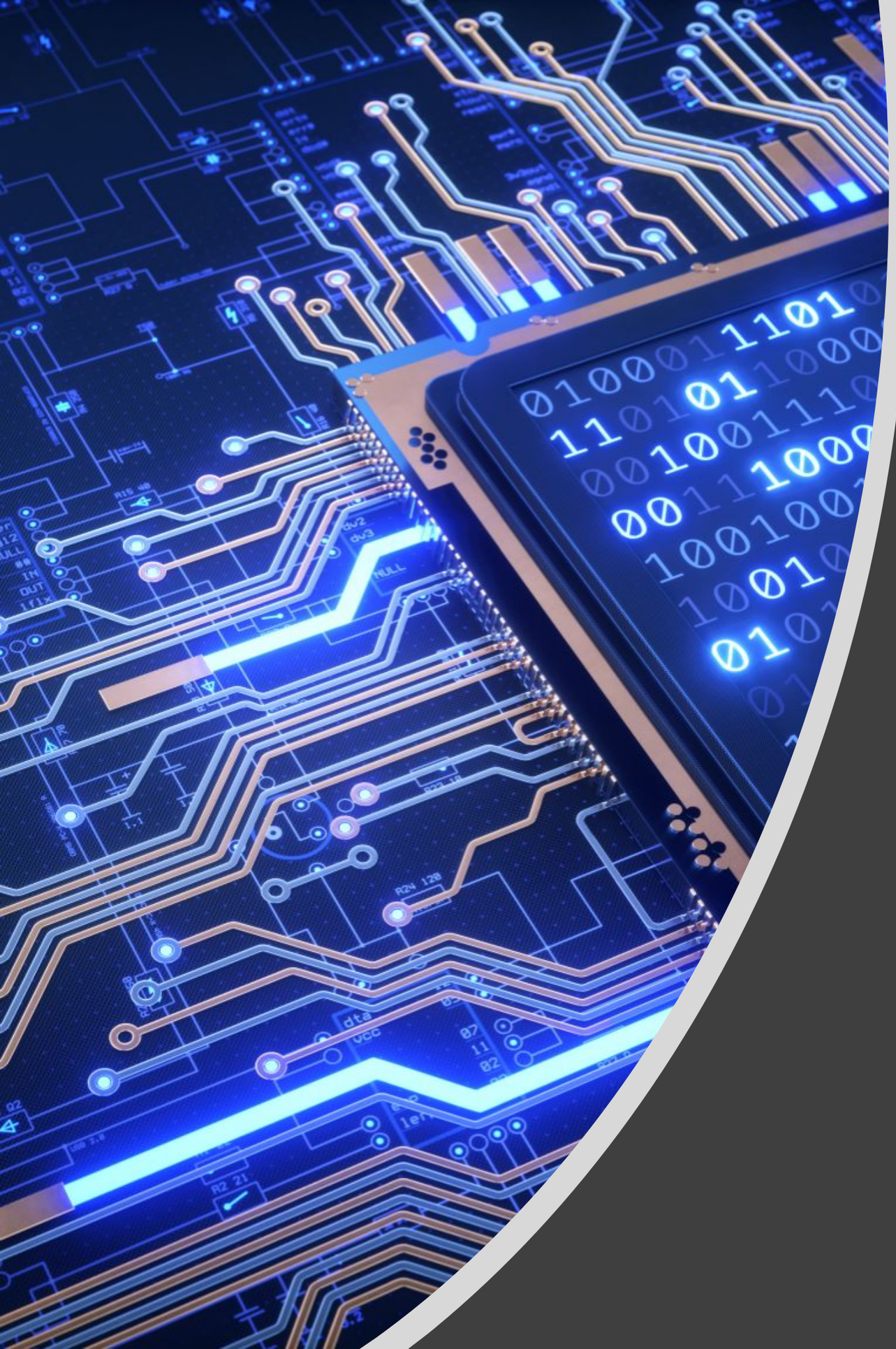

X Block and CNU

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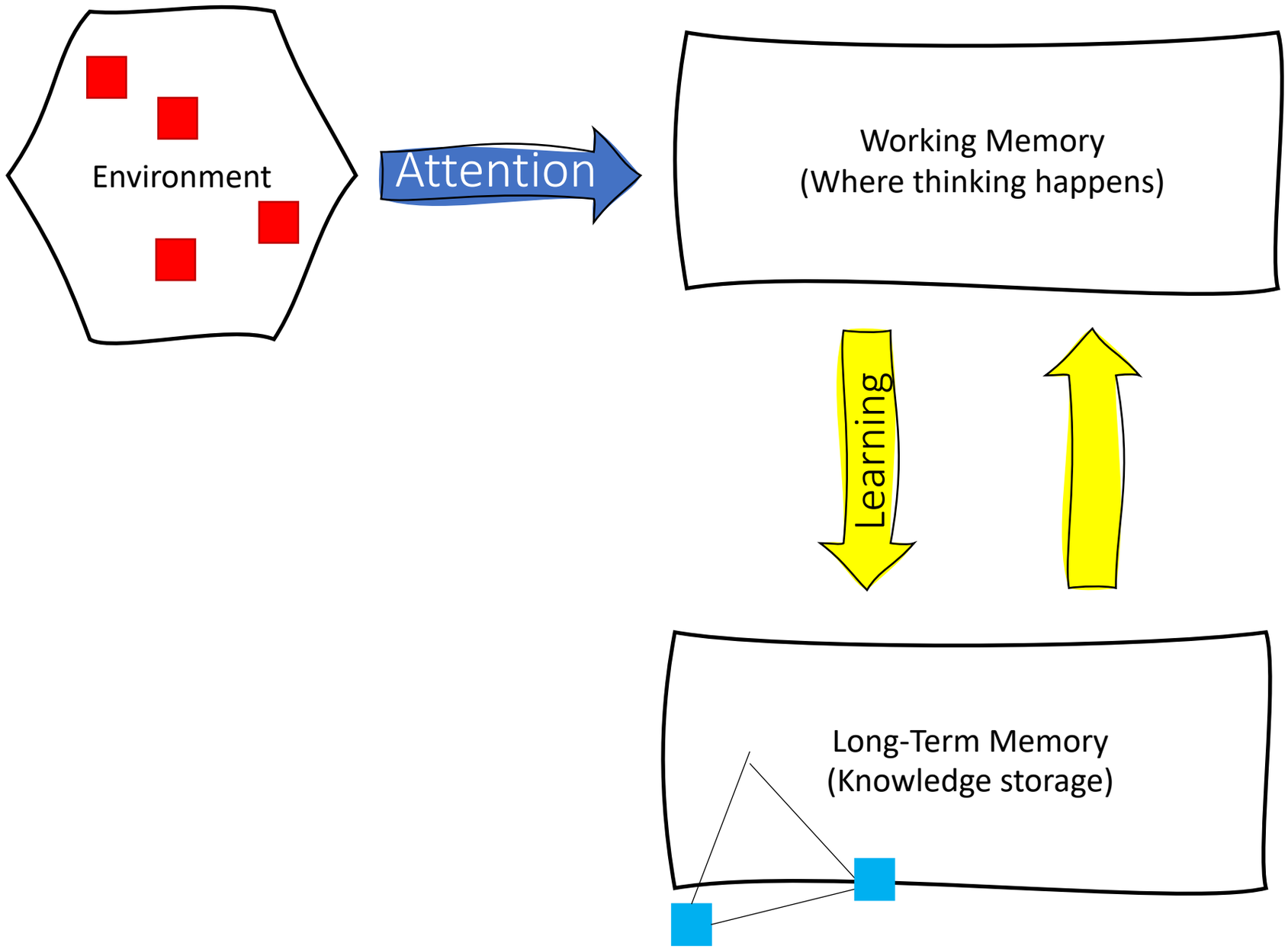

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Learning should come naturally. But does it?

Have a read.
Thoughts?

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Learning should come naturally. But does it?

“Students tend to enjoy and choose the activities from which they learn the least”

In a review of 70 studies, lower aptitude students who chose unguided instructional treatments received significantly lower scores on posttests than on pretest measures.

Less able learners who chose less guided approaches tended to like the experience even though they learned less from it.

More able students often select *more guided* versions of courses, even though they learned less from it, probably because they believe that they will achieve the required learning with a minimum of effort (Clark, 1982).

Voice and choice

- Examples of when voice and/or choice is not appropriate.

- Examples when voice and/or choice is appropriate.

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Educational Psychologist

Routledge
Taylor & Francis Group

ISSN: 0046-1520 (Print) 1532-6985 (Online) Journal homepage: https://www.tandfonline.com/loi/hedp20

Why Minimal Guidance During Instruction Does Not Work: An Analysis of the Failure of Constructivist, Discovery, Problem-Based, Experiential, and Inquiry-Based Teaching

Paul A. Kirschner , John Sweller & Richard E. Clark

"The goal of this article is to suggest that based on our current knowledge of human cognitive architecture, minimally guided instruction is likely to be ineffective. The past half-century of empirical research on this issue has provided overwhelming and unambiguous evidence that minimal guidance during instruction is significantly less effective and efficient than guidance specifically designed to support the cognitive processing necessary for learning" (Kirshner, Sweller, & Clark, 2009, p. 76)

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FINAL VERSION

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References and Further Reading

Mayer, R. E. (2004). Should There Be a Three-Strikes Rule Against Pure Discovery Learning? *American Psychologist*, *59*(1), 14–19. https://doi.org/10.1037/0003-066x.59.1.14

Geary, D. C. (2008). An evolutionarily informed education science. *Educational Psychologist*, *43*(4), 179–195. https://doi.org/10.1080/00461520802392133

Blog post used in the presentation (Doug Lemov):

https://teachlikeachampion.com/blog/the-paper-rocket-thoughts-on-improving-hands-on-learning/

Multitasking:

Adler, R. F., & Benbunan-Fich, R. (2012). Juggling on a high wire: Multitasking effects on performance. International Journal of Human Computer Studies, 70(2), 156–168. https://doi.org/10.1016/j.ijhcs.2011.10.003

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Yerkes-Dodson Law (Optimal Arousal):

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Expertise Reversal Effect:

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Clark, R. E. (1982). Antagonism between achievement and enjoyment in ATI studies. Educational Psychologist, 17, 92–101

Priming effects:

Vohs, K. D., Mead, N. L., & Goode, M. R. (2008). Merely activating the concept of money changes personal and interpersonal behavior. Current Directions in Psychological Science, 17(3), 208–212. https://doi.org/10.1111/j.1467-8721.2008.00576.x

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Domain Knowledge and Brainstorming:

Rietzschel, E. F., Nijstad, B. A., & Stroebe, W. (2007). Relative accessibility of domain knowledge and creativity: The effects of knowledge activation on the quantity and originality of generated ideas. Journal of Experimental Social Psychology, 43(6), 933–946. https://doi.org/10.1016/j.jesp.2006.10.014

Worked examples and process sheets:

Ward, M., & Sweller, J. (1990). Structuring effective worked examples. Cognition and Instruction, 7, 1–39.

Nadolski, R. J., Kirschner, P. A., & Van Merriënboer, J. J. G. (2005). Optimizing the number of steps in learning tasks for complex skills. British Journal of Educational Psychology, 75(2), 223–237. https://doi.org/10.1348/000709904X22403

Scaffolding:

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Working Memory Capacity:

Cowan, N. (2000). The magical number 4 in short-term memory: A reconsideration of mental storage capacity. Behavioral and Brain Sciences, 24, 87–185.

Miller, G. A. (1956). The magical number seven, plus or minus two: some limits on our capacity for processing information. Psychological Review, 63(2), 81–97. https://doi.org/10.1037/h0043158

The Research Question (Podcast)

http://bit.ly/mrzachgpodcast

Testing Effect:

Roediger, H. L., & Karpicke, J. D. (2006). Test-enhanced learning: Taking memory tests improves long-term retention. Psychological Science, 17(3), 249–255. https://doi.org/10.1111/j.1467-9280.2006.01693.x

Serial Position Curve:

Martinez, M. E. (2010). *Learning and cognition: The Design of the Mind*. Upper Saddle River, NJ [u.a.]: Merrill.

Cognitively Active

Low ⟷ **High**

Behaviorally Active

Low ↓ **High**

Hands-off + Minds-off i.e. Passive uni-directional lecture Passive watching of a video	**Hands-off + Minds-on** i.e. Interactive lecture, Teacher-led discussions, Read-Aloud, Seat-based practice, Testing, Silent reading
Hands-on + Minds-off i.e. Just for fun, some forms of unguided exploration, discovery, unstructured play.	**Hands-on + Minds-on** i.e. Guided practice, Independent practice, Gradual release of responsibility, Student-led discussions