Do I Have Your Attention? by Blake Harvard

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Chapter	Do this/Learn this
Part 1: Understanding Memory Constraints: Intro/preface: how should we teach so students learn? no silver bullet, what works in one place may not work elsewhere	• 'Learning is a change to long-term memory' • 'Without knowledge of human cognitive processes, instruction is blind'

1 Memory Processing: Learning material → Senses → Sensory memory (mainly forgotten) → Attention (limited) → Working memory (WM) (limited in extent, lasts 15 – 30 seconds → *Elaborative interrogation* →Long-term memory (LTM) (Infinite) Memories not stored like files on a computer – more like a spider's web – more content = web with more silk threads – easier to catch more content	• Show students the limits of their WM with 4/5/6… etc digit numbers to remember.
	• Try with phone numbers – shows WM holds more meaningful info
	• Moving info to LTM requires effort
	• Retrieving easier:
	  ○ the more you retrieve and apply info
	  ○ the more contexts you retrieve info from

2 The SAR Method: Sense → Attend → Rehearse Need to select information to attend to (from all the sensory input), attend to info, use it to remember it	• Attention is finite – if you attend to one thing you can't attend to another • Putting in LTM requires elaboration/interaction
3 Chock Points: Attention: Choke point (CP) = constraint in the human cognitive system, **CP1: mental effort/concentration is limited**: need Cognitive Load Theory (CLT) – there is intrinsic load (necessary) and extraneous load (optional) **CP2 narrow focus of attentions limits WM** – 11 million bits of info/sec come in, we can process 40 million, there is attention contagion, both paying attention/not paying attention are contagious and attention/success/motivation reinforce each other, enhance learning	• Reduce extraneous load to make sure intrinsic load does not produce cognitive overload • Reduce effect of technology as attention distractor • Make paying attention the norm so that it is contagious • Limit use of ICT • Look at seating at displays in terms of attention • Reduce 'seductive details' that are extraneous load • Make sure they don't have to split their attention between e.g. between text and images • Don't make info redundant e.g. talking over slides
4 Pitfall: Multitasking: Pitfall (PF) = common trap students fall into that undermine their learning **PF1: multitasking** and **distractions** greatly **reduce learning**, multitasking is actually task switching	• Get students to do the task switching (time A/B/C etc, then A/1/B/2 etc) • Walking and talking is NOT multitasking as one has become automated
5 Choke points and pitfalls: Working Memory: **CP3: WM can hold about 4 chunks of info**, prior knowledge impacts their ability to chunk **PF2**: students **like** the **least effective study methods** because they feel like they are working but aren't	• Organize information into large chunks • Make the chunks explicit – tell students about it • Use mnemonics • Teach them effective study methods: retrieval practice, spaced practice
6 Choke points and pitfalls: Long-Term Memory: **PF3: overconfidence** about what they understand, **CP4: forgetting** happens in WM and LTM	• Use low stakes formative assessment to inform them • Teach them how to inform themselves • Don't assume they'll know it after recalling it once
Part 2: Maximizing Learning: Intro/preface: you may not have seen all this in teacher ed, what's 'best' has not always been clear, research supports retrieval practice and spaced practice	• Simple is best for novices so as not to overload WM • Simple does not mean easy • Retrieval practice and spaced practice are the cream of the crop

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7 Introduction to Retrieval Practice (RP): Assessment is not a bad word, NOT the same as standardized testing, not all questions are RP – need planning and structure, but ALL RP is better than restudying, when answering try Brain/Book/ Buddy. RP exposes Unknown Unknowns, and highlights Known Unknowns	• RP to try:
	  ○ Standard RP – questions you need them to answer
	  ○ Diminishing cues – tons of research that it works better than standard
	• Answer RP with Brain one color/Book 2nd color/Buddy 3rd
	• Ask 'did you guess'?
	• Get them to identify the Unknown Unknowns from RP

8 Anxiety, Stress-Resistant Memories, and Collaboration: Assessment does NOT always increases stress; RP reduces stress, AND stress can affect memory retrieval; RP inoculates against stress-resistant memories by providing routes that are not disrupted by cortisol.	• Do RP often enough for it to become the norm • Point out the stress reducing impact • Remember the person doing the thinking is doing the learning • Get students to do RP with each other • Get everyone to write the answer to questions

9 Improving on Multiple-Choice (MC) Questioning: MC does NOT have to just be recognition, they can provide rich opportunities for RP by interacting with the wrong answers, reverse engineering	• Use the stem first on its own (for recall)
	• Then introduce the answers, with discussion
	• Interact with all answer choices by:
	  ○ Get them to write questions for which the wrong answers would be correct
	  ○ Identify why someone might choose each incorrect answer
	  ○ Identify the best wrong answer
	  ○ Identify where this wrong answer comes from
	• Reverse engineering the MC question by:
	  ○ Provide them with the answers only and get them to write a question for which A is the correct answer + the rest incorrect
	  ○ Repeat for all the answers

10 Brain Dump, Color Coding, and What to Retrieve? Complexity does NOT always lead to more cognition. Simple strategies, like a Brain Dump, work well due to the Goal-Free Effect from CLT, important to choose material to retrieve that is: critical for seeing the big picture, commonly confused.	• Use a brain dump/goal free problem to get them to show recall and connectedness • Have a cheat sheet ready for those who have no recall • Use colour coding of like material in topics with lots of facts • Follow up with something to do with the groups
11 Introduction to Spaced Practice (SP): is the opposite of cramming/massed practice, spend the same amount of time but spread out – difference of 74% to 49% in tests, particularly benefits low attaining students,	• Teach them to use spaced practice (it rarely comes naturally), and why it works • Experiment with the 'space'… • Any spacing is better than nothing
12 The Exit Ticket, Last Lesson, Last Week, Last Month: an exit ticket at the end of a lesson measures performance, not learning,	• Use an exit ticket on material from a previous lesson • Do an entrance ticket instead based on last lesson • Ask them what they think tomorrow's lesson will be about • Group RP questions according to last week/lesson/month • Use that to show themes/big picture ideas across topics
13 Student Intuition, Modelling, and Framing Forgetting Students have not been taught to view assessments as positive/useful – we need to teach them, forgetting is part of learning and not 'failure', opportunities to show what you have forgotten help you learn	• Use learning their names at the start of the year (diminishing cues, spaced practice, forgetting) • Also helps to normalize failure • Explain forgetting and its role in learning