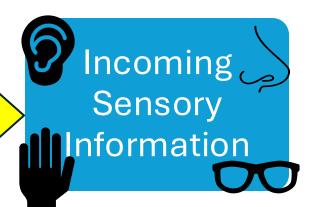
### **OPTIMIZING COGNITIVE LOAD, FOR OURSELVES AND OUR LEARNERS**

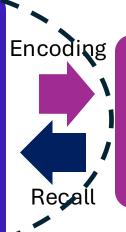
INFORMATION PROCESSING MODEL<sup>1</sup>





#### Working Memory<sup>2</sup>

"The ability to temporarily hold information in the mind and manipulate it for brief periods of time during complex cognitive tasks.



## Long-term Memory/Learning

"Information stored in "Schemas" or patterns based on how we use it"

INTRINSIC LOAD

COMPLEXITY OF NEW INFORMATION

EXTRANEOUS LOAD

UNNECESSARY AND
DISTRACTING INFORMATION
(EXTERNAL V. INTERAL)

GERMANE LOAD LINKING NEW INFORMATION WITH CURRENT/PREVIOUSLY STORED INFORMATION SCHEMAS

#### **COGNITIVE LOAD**

"The amount of information our working memory can process at any given time"

Cognitive Overload impairs working memory and ability to encode or recall information

nitive

Continuous exposure to high cognitive loads may be a contributor for burnout<sup>3</sup>

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# OPTIMIZING COGNITIVE LOAD FOR LEARNING AND EFFICIENCY

- 1. **DECREASE INTRINSIC LOAD** "COMPLEXITY OF NEW INFORMATION"
  - Use a spiral curriculum where learners are introduced and re-introduced to increasingly complex topics and encounters
  - Encourage continuity with patients over time (allowing familiarization with complexity)
  - "Chunk" or "Sort" encounter into smaller pieces (e.g. Sort information by system)
- 2. **DECREASE EXTRANEOUS LOAD** "UNNECESSARY AND DISTRACTING INFORMATION"
  - EXTERNAL EXTRANEOUS LOADS
    - Optimize learning environment: Decrease interruptions (pages, message alerts, voice interruptions) during a tasks. Ensure all equipment is available and ready including technology and charting equipment. Clearly mark/hold times for tasks that can be seen and respected by others
  - INTERNAL EXTRANEOUS LOADS
    - Manage fatigue Micro-breaks between tasks to allow re-focus, allow time for nutrition and "bio-breaks", ensure adequate time held in the day for the tasks needed (so that can be present and not focused on "what comes next/feeling rushed"), wear clothing that is comfortable and adjustable to temperature throughout the day
- 3. INCREASE GERMANE LOAD "LINKING NEW INFORMATION WITH CURRENT/PREVIOUSLY STORED INFORMATION SCHEMAS"
  - Introduce learning aids (e.g. Mnemonics, rhymes, common links, pattern recognition)
  - Link to similar previous presentations or patients seen in the past (also increases spiral learning)
  - Use low-fidelity simulation to high fidelity (patient encounters) when possible (e.g. Practice first)

#### References:

- 1. Atkinson, R.C and Shiffrin, R.M. (1968). Human memory: A proposed system and its control processes. *The psychology of learning and motivation* Vol. 2 (89-195)
- 2. Baddeley, A.D. Working Memory. *Phil. Trans.R.Soc.Lond.B.* Vol 302,311-324(1983)
- 3. Steven E Roskos, Laurie Fitzpatrick, Bengt Arnetz, Judy Arnetz, Shiva Shrotriya, Elizabeth Hengstebeck, Complex patients' effect on family physicians: high cognitive load and negative emotional impact, *Family Practice*, Volume 38, Issue 4, August 2021, Pages 454–459, https://doi.org/10.1093/fampra/cmaa137