Learning → Performance

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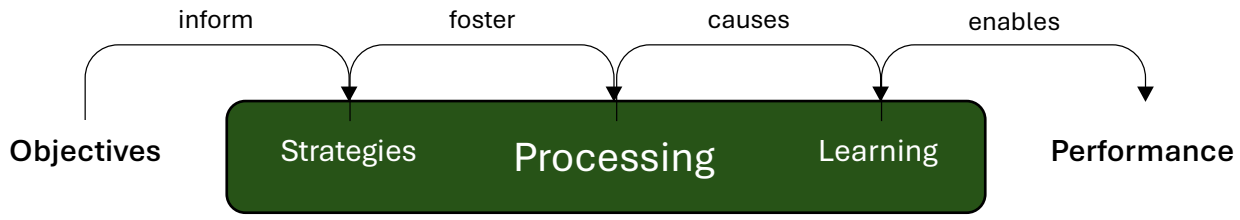
I. What's the difference between learning and performance?

II. A Model of Learning



Learning is Effortful.

III. Attention

a. What is attention?

An Activity

Color	Group 1	Group 2
Orange		
Purple		
Red		
Green		
Blue		

Group 1 Group 2

b. Focus and Suppression

c. Capture and Selection

The Science of Attention

1. Attention is limited: The capacity of attention drops quickly and dividing or repeatedly switching attentional focus impairs learning.

2. Attention is selective and competitive: Focusing on some information suppresses processing of competing information.

3. Attention is guided by goals, prior knowledge, expectations, and salience: Internal knowledge and motivations, and external conditions determine what wins the attention competition.

4. Sustained attention is effortful and fluctuates: Mind wandering and attentional lapses are normal, so instruction must periodically reorient attention.

5. Attention is state- and context-dependent: Sleep, fatigue, anxiety, motivation, and environmental conditions affect attentional control.

The Application of Attention

Principle 1: Protect limited attention by reducing avoidable competition.
Remove decorative images, background music, tangential anecdotes, and "interesting but irrelevant" stories from instructional materials.

Principle 2: Guide attention toward the features and relationships that matter.
Use signaling and cueing: arrows, highlighting, color coding, and verbal direction to relevant actions, objects, or ideas. Be sure to explain the signals and cues, and be consistent.

Principle 3: Segment instruction and manage the pace of demand.
Address vocabulary and component concepts before integrated tasks, and separate the cognitive demand of *understanding* a procedure from the motor demand of *performing* it, rather than imposing both simultaneously on first exposure.

Principle 4: Build in recurring reorientation.
Provide a retrieval question, small meaning-based task, or brief discussion focused on recent content or skills at intervals throughout the instruction.

Principle 5: Convert attention into learning-relevant processing.
Once attention has been established, ask students to predict, compare, explain, apply, or perform—any task focused on meaningful processing.

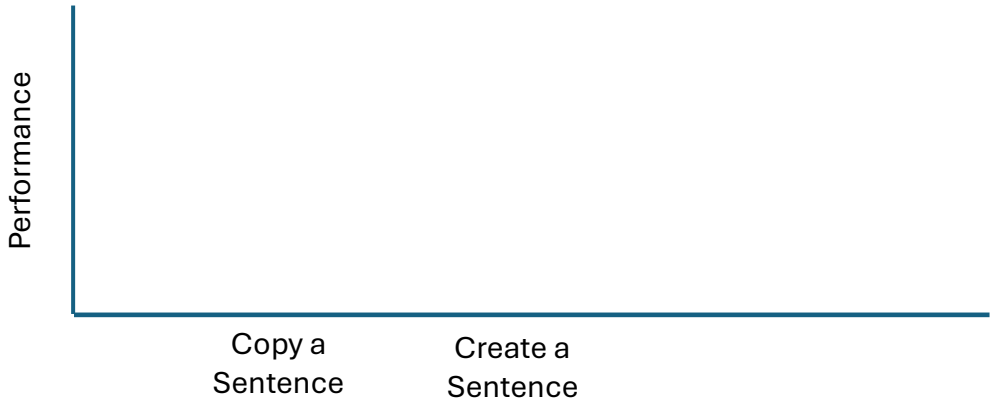
IV. Processing: Making Meaning

a. What is meaning?

An Activity

Copy a Sentence	Create a Sentence
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.
9.	9.
10.	10.

Copy a Sentence	Create a Sentence
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.
9.	9.
10.	10.



The Science of Cognitive Processing

Principle 1: The deeper the processing, the deeper the learning.

Principle 2: Activating prior knowledge is essential for new learning.

Principle 3: Revisit, integrate, and reorganize what you know into greater coherence.

Principle 4: Directly compare and differentiate ideas/skills that you often confuse.

Principle 5: Learning deeply is effortful; what feels easy, isn't learning.

The Application of Cognitive Processing

Principle 1: Activate relevant prior knowledge before new learning.
Begin with a question, prediction, brief case, diagram, or retrieval prompt that brings relevant knowledge into active use and reveals gaps.

Principle 2: Guide learners to generate meaning, not merely receive information.
Ask learners to predict, explain, classify, summarize from memory, draw a representation, or propose a next step before providing the complete answer. These activities require learners to select, organize, and integrate information rather than simply listen, reread, highlight, or copy.

Principle 3: Teach relationships, mechanisms, and causal connections, not only isolated facts.
Ask learners to explain mechanisms, trace causal sequences, connect evidence to conclusions, and describe how changing one condition would affect another.

Principle 4: Explicitly connect new information to what learners already know.
After introducing something new, ask learners to identify what it resembles, how it extends their existing knowledge, and where the comparison no longer applies.

Principle 5: Revisit important knowledge through spaced and cumulative retrieval.
Return to essential ideas across a class session, unit, and course, requiring learners to retrieve and use them without immediately seeing the answer.

Principle 6: Use direct comparison to help learners distinguish easily confused ideas. Place similar concepts, conditions, findings, mechanisms, or procedures side by side and ask learners to identify both their shared features and their critical differences.

Principle 7: Use feedback to produce explanation, correction, and revision. Require learners to use that feedback to revise an explanation, decision, representation, or performance so that feedback leads to cognitive reorganization rather than merely acknowledgment of the correct answer.

Principle 8: Evaluate learning through delayed, independent, and varied application. After supported instruction and practice, determine whether learners can retrieve and apply their knowledge later, without prompts, and in a somewhat different case or context.

VIII. A Synthesis

List three ideas, concepts, or conclusions that you think are worth remembering.