

Six Strategies of Learning and Teaching

(from evidence-based cognitive psychology research; gardening metaphor)

TJ Bocklage, 9/20



• SPACING Your Studying or Teaching



- Spread subject material and study activities over time
- Distributed practice (by **active** study) improves long term retention >>> cramming
- The longer you have to remember, the longer your spacing intervals should be



• Include **CONCRETE EXAMPLES**

- When studying abstract concepts, illustrate them with specific examples
- Adult learners want to know how the material will help them in practice



• **DUAL CODE** Facts or Concepts

- Combine words with visuals
- Stores the information in two neural pathways to retrieve information later
- Your own voice carries more retention power than an instructor's

"Zen Garden Gnome"

• **INTERLEAVE**



- Switch between topics, subtopics or types of problems while studying
- Builds connections across subject areas
- Boosts creativity
- Reduces boredom and fatigue

• **ELABORATE**



- Dig further into the subject to ask who, what, where, when, *why and how* = elaborative interrogation
- Connect what you are learning with what you already know
- Builds connections across subject areas → builds and strengthens neural networks

• **RETRIEVE**



- Harvest learned information from long-term memory
- Interrupts forgetting (the default)
- More effortful but proven far better than passive reading and re-reading
- More effortful but more effective than cramming: self-testing IS learning
- Improved retention occurs by spacing RP and formal review of answers

REFERENCES:

Make it Stick. The Science of Successful Learning. P Brown, H Roediger, M McDaniel. Belknap/Harvard: Cambridge, 2014.

The Adult Learner, 8th Ed. M Knowles, E Holton, R Swanson. Routledge (Taylor and Francis): London and New York, 2015.

EXAMPLES:

Spacing: Blood Banking example: Immerse yourself in blood bank boot camp, the interspersed blood bank lectures/unknowns throughout the year + blood bank rotation; space your reviews of the material throughout the year, linking them to the formal sessions, but do NOT space your reviews so far apart that you entirely forget the material in between.

Retrieval Practice: Use question books and try to answer before looking at the answer (called “generation”), make and use flashcards correctly meaning review periodically even the cards you easily answer (but less often than the ones you don’t always get right), prepare for and take PCC retrieval practices and attend the answer review sessions, ask yourself questions as you read, imagine teaching it to others and verbalize the teaching

Interleaving: Study different topics such as blood banking then molecular pathology (there will be overlap and differences). Study different aspects of coagulation together.

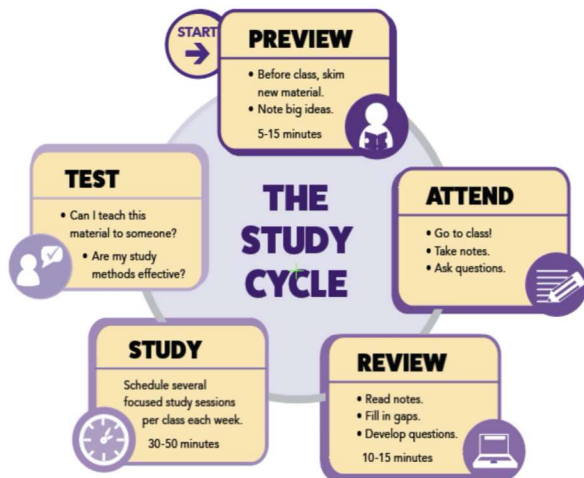
Elaboration: Connect what you are learning with what you already know from your reading, your rotations and notes from prior teaching sessions; ask why and how.

Concrete Examples: Examine multiple examples of a specific entity or reaction; note how they are alike and compare to specific examples of a related entity. It is more effective for learning specific features of an item to compare and contrast multiple examples and include examples that don’t fit the definitional criteria also.

Dual Coding: Evaluate visual and written descriptions together. Or visual and verbal together.

UKY Department of Pathology and Laboratory Medicine Pathology Core Curriculum (PCC)

The Study Cycle



Adapted from Frank Christ's PLRS system.
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- **PREVIEW:** Before the lecture, skim the reading assignment in Sternberg, Robbins or Expert Path -> note headings and boldface words and first sentences in paragraphs -> review summaries, examine visuals and then read descriptions-> think of questions you want to ask in the lecture
- **ATTEND:** GO TO THE LECTURE! Pay attention, ask questions, take meaningful, synoptic notes with an i-pen or hand write them
- **REVIEW:** Within 24 hours of the lecture, review your notes, fill in gaps (you can ask other residents) and develop any last questions (you can ask the lecturer)
- **STUDY:** Intense Study Session 1) Do Goals, 2) Engage in Active Learning Tasks, 3) Take a Break/Reward, 4) ReviewTakes 30-60 minutes – THE POWER HOUR --
- **TEST YOURSELF:** Ask yourself, “Am I using effective study methods?” and “Do I know the material well enough to teach others?”Later, actively review in another POWER HOUR
- **ACTIVELY PARTICIPATE IN PCC INTERACTIVE LEARNING SESSIONS!** Retrieval Practice, Jeopardy, Unknown Slide Conference, Texted Questions, Rapid Fire Reviews, Inter-Active Portions of Lectures AND DURING YOUR ROTATIONS

