SMART PRACTICE: BRAIN-BASED ESOL INSTRUCTIONAL TECHNIQUES

SESSION 1
FIRST LITERACY
FEBRUARY 26, 2016
FRAMING OUR DISCUSSION

• What is learning?
• What does memory have to do with learning?
• How do we know when our students have gained mastery of what they have learned?
TODAY’S AGENDA

1. Learning at the Neural Level
2. Connections
3. Repetition
4. Desirable Difficulty
5. Planning Your Implementation
THE HUMAN BRAIN

100, 000, 000, 000

The number of neurons we have at birth.
One neuron can make up to 10,000 connections through its dendrites.
The postnatal development of the human cerebral cortex.

WHAT MAKES LEARNING CONNECTIONS DURABLE?

“Neurons that fire together wire together.”

~ Hebb’s Rule, 1949

• repetition
• multiple modalities
• effortful learning
RECAP: THE HUMAN BRAIN

True or False?

Each neuron carries one memory.
True or False

Our brains change over our lifetimes.
True or False?

Learning happens when neurons make new connections.
True or False?

Neural connections never atrophy and disappear.
CONSOLIDATE YOUR LEARNING

1. What happens in the brain when a person learns something new?

2. How can the person make the learning durable and strong?
Learning is about making connections.
LIMITS OF LEARNING
Fill in the blank.

“There is virtually no limit to how much learning we can remember, as long as we relate it to what we already know.”

~Brown, Roediger, McDaniel (2014) Make It Stick
SCHEMA

Recap and Reflection

“If a schema is triggered near the moment of learning, that learning is more permanent.”

~ John Medina, Brain Rules, 2014

Think-Pair-Share:

What is the neural reason for this?
SMART PRACTICE . . .

MAKE CONNECTIONS

1. Show a picture to activate schema.
2. Ask an opening question.
4. Pretest.
ACTIVATE SCHEMA: SHOW A PICTURE

What do you see?
What do you know about [the topic]?
First, she **separates** the clothes into color piles. Then, she **puts** a load into the washer. She **sets** the water temperature according to the color of the load.
Students who are given a pre-test improve their learning by __________.

a. 11%

b. 22%

c. 33%

d. 44%

Richland, Kornell, Kao (2009)
COUNTER-INTUITIVE RESULTS OF PRE-TESTS

On pre-tests “particularly multiple-choice, we benefit from answering incorrectly by, in effect, priming our brain for what’s coming later.”

~ Benedict Carey, NYT, 2014
ACTIVATE SCHEMA: PRE-TEST

At the start of a lesson, give a short test.

- True/False.
- Multiple choice.
- Open questions: who, what, where, when, why, how.
CONSOLIDATE YOUR LEARNING

1. “Neurons that fire together, wire together.” What does this quote mean?

2. Why is pretesting an effective learning tool?

3. Is the purpose of pretesting to get students to memorize their learning?
SMART PRACTICE . . .
MAKE CONNECTIONS

What are ways to activate students' schema and prime their learning?

1. . . .
2. . . .
3. . . .
4. . . .
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A SCHEMA BUILDING EXERCISE

“Practice makes perfect.”
LEARNING & RETRIEVING
THE FORGETTING CURVE

In 1885, Hermann Ebbinghaus determined:

Information is lost very quickly after it is learned.
REPETITION & THE FORGETTING CURVE

% Retention

Time

5min 1 day 2 days 1 week 1 mth 3 mth 6 mth 1 yr 2 yr

http://www.lincolnguitar tuition.com/Guitar_Lessons_Lincoln_10.htm
HOW OFTEN SHOULD YOU REPEAT?

Increase the interval length over time.

Spaced Repetition
CONSOLIDATE YOUR KNOWLEDGE

1. Why do we forget our learning so easily?
2. Why is repetition important?
SMART PRACTICE . . .

Repetition

Brainstorm:

How can you build more repetition and practice into your classes?
TODAY’S AGENDA

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PRE-TEST

1. Is a closed book test a more effective learning tool than reviewing class notes?

2. What is the difference between massed practice and interleaved practice? Which one is more effective for long term learning?
Learning requires effort.
IN OTHER WORDS . . .

. . . Fast learning leads to fast forgetting.
“When we work hard to understand information, we recall it better; the extra effort signals to the brain that this knowledge is worth keeping.”

~ Anne Murphy Paul, *Time Magazine*, 2011
A STUDY: REVIEW VS. RECALL

Group A was asked to recall their learning without notes or prompts.

Group B spent the same amount of time studying the material and reviewing notes.

Two days later: Which group performed better?

A week later:

Which group remembered 48% of the material?

Which group remembered 90%?

Roediger and Karpicke (2006)
REVIEW VS. RECALL

When you review material, you are recognizing material that looks familiar.

When you recall material, you are remembering it. Recall strengthens your memory.
Remember your learning!

1. Read.

2. Read again.


4. Write what you remember.

5. Open the book.

6. Check your work.
TEACHING TO MASTERY?

Group 1: Massed Practice
Instruction on a topic and then practice the topic.
Instruction on A. Then practice A.
Instruction on B. Then practice B. . . . . etc.

Group 2: Interleaved Practice
Rotating instruction and practice.
Instruction on A, B, C, D. Then practice A, C, D, B.

Dunloskey (2013)
Strengthening the Student Toolbox: Study Strategies to Boost Learning

Accuracy at solving problems during practice session and on the delayed criterion test.
JUST MEMORY OR REAL LEARNING?

As a LEARNING strategy, retrieval practice improves:

• complex thinking and application skills
• organization of knowledge
• transfer of knowledge to new concepts
INTERLEAVE MATERIAL

• Mix in previous flashcards.
• Mix in other verb tenses.
• Mix in previous vocabulary.
• Mix in new settings for conversational speech.
• Mix in previous audio-scripts or readings.
CONSOLIDATE YOUR KNOWLEDGE

1. As a study technique, why is self-testing a more effective learning tool than reviewing your notes?

2. What is the difference between massed practice and interleaved practice? Which one is more effective for long term learning?
RECAP:

True or False?

If you practice one concept single-mindedly you will burn it into your memory.
True or False?

Varying the way you practice material confuses your memory.
True or False?

The bigger the effort you make to understand something the better you remember it.

“Memory is the residue of thought.”

~ Daniel Willingham
TODAY’S AGENDA

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PLANNING YOUR IMPLEMENTATION

Pre-tests:

1. What is a useful pretest?
   • Timely feedback.
   • Matches your objectives for student learning.
   • Use the technique multiple times.

2. How can you do one in class?
PLANNING YOUR IMPLEMENTATION

Total Recall:

1. When will you use it?
2. How do you have students do it?
NEXT SESSION:  
MARCH 18

1. Share your learning.
2. Multimodal learning at the neural level and in the classroom.
3. Student speak at the neural level and in the classroom.