LEARNING:
Principles, Theories & Styles
Which penny is real?
Questions to consider

• How does learning take place?
• When does learning take place?
• Why does learning take place?
• How do we know that learning has taken place?
• What does the learner do?
• What does the teacher do?
• What type of learning ‘fits’ best for what I’m trying to teach?
• How will differences among students be handled?
Learning Process 1:

Learning must be. . .

6 factors that motivate student learning
(make learning meaningful)
1. Desire for Relevance to Career
2. Student’s Curiosity
3. Enthusiastic Instruction

Increased Learning

Improved Attitude

Extended Efforts

Worked beyond requirement
4. Social Interaction
5. Challenge
Levels of Processing & Meaningfulness of Material

- Levels-of-Processing Hypothesis (Craik & Lockhart, 1972):

<table>
<thead>
<tr>
<th>SLOW</th>
<th>Level of Processing</th>
<th>Example</th>
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<tbody>
<tr>
<td>1)</td>
<td>Visual Form</td>
<td>“DOG” comprises the letters D, O, and G</td>
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<td>2)</td>
<td>Phonology</td>
<td>Rhymes with FOG</td>
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<td>3)</td>
<td>Semantics (Meaning)</td>
<td>A four-legged pet that often chases cats and chews on bones</td>
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The depth of processing helps determine the durability in memory. Deeper Processing = more meaning = better learning!
6. Respect & Esteem
Learning Process 2:

Learning must be... ORGANIZED

a class without organization is like putting together a puzzle without the box
Learners must see the structure or the system in context in order to learn and retain it.

Students may need organizational help to better understand the new learning & to relate the parts to a whole.
Learning Process 3:

Learning must have **FEEDBACK**

Learning is enhanced when we know how well we are doing
Well, you've been a pretty good hoss, I guess. Hardworkin'. Not the fastest critter I ever come across, but...

No, stupid, not feedback. I said I wanted a feedbag.
Feedback is most helpful when it is an **immediate** positive reinforcement while the concepts and ideas are in sharp focus.
Learning Process 4:

Learning influences

Old learning nearly always influences new learning
French learned beforehand, interferes proactively with a Spanish exam

Spanish learned afterwards, interferes retroactively with French exam
The later learning interfered with what was learned early in the session.
Learning Process 5:

Trying to learn too much interferes with memory. It is not very good when large numbers of items are presented.
Unless real effort is made to avoid it, most of us will forget more than 75-85% of a 50-minute lecture after 24 hours.
How to avoid information overload

Learning should be sorted into major points & even further subdivided

The use of the whiteboards, visual aids, handouts, buzz groups, and questioning are often effective helps
Learning Process 6:

Learning can be improved by memory being good when large numbers of items are presented.
Rehearsal can be promoted a number of different ways:

- Having students repeat the material periodically (silently or aloud)
- Using handouts that require students to complete or “flesh out” concepts
- Students reviewing their notes periodically or soon after class.
- Questioning and providing silent periods after presenting key points
- Using visual aids

Immediately asking students to apply the information
Rehearsal can be improved to help learning by CHUNKING information:

**Chunking**
- 7855321234, easier if chunked as:
  - 785 532 1234

**Acronyms**
- HOMES =
  - Huron, Ontario, Michigan, Erie, Superior
- ROY G. BIV =
  - Red, Orange, Yellow, Green, Blue, Indigo, Violet
Other ways to chunk information to help rehearsal

Acrostics: **My very energetic mother just served us nine pizzas** (when Pluto was still a planet...)

Rhymes: “cooking rice? Water’s a twice”

Associations: “bad grammar will mar a good paper”

Students must be EXPLICITLY told to use such rehearsal techniques to help them aid learning. Even if they already know what they are and how to use them, it doesn’t mean they’ll apply it to your class.
Visual Imaging

Mental pictures (imagery) are a powerful aid to effortful processing, and rehearsal of important material.

Showing adverse effects of tanning and smoking in a picture may be more powerful than simply talking about it.
Imaging: thinking and doing in pictures
Learning Process 7

Learning can be enhanced by repeating focuses on those issues selected as important.
Learning Process 8:

We learn differently by using our various senses. Our memory is not very good when large numbers of items are presented.
Learning is more effective when multiple senses are used.

- 50% of what they hear and see
- 70% of what they say, as they talk
- 90% of what they say, as they do.

- 10% of what they read
- 20% of what they hear
- 30% of what they see
Learning Style Inventory

• What is your learning style?
• Take the **VARK** inventory to find out

• VARK = **Visual** Aural **Read/Write** Kinesthetic
Learning Process 9:

A critical part of learning is maintaining attention. Memory is not very good when large numbers of items are presented.
Typical 50 minute class

High attention

Low attention

Time in minutes

50
What we’d prefer...
Attention varies throughout the day, the week & the semester.

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**March 2012**

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Learning Process 9.5:

A critical part of learning is the learning environment (on-campus and online) play a role in learning.

Environment (on-campus and online) play a role in learning.
The size and shape of a classroom, the seating arrangement, the lighting, sound, color, temperature, and humidity all have some influence on the learner's attention level.

Students who come in from a cold winter trek across campus may easily become drowsy in a warm classroom.

A hot stuffy room can negate the best material and the finest teaching techniques.
Online environment is important to aid learning too!

- **13 Principles of Display Design** (Wickens et al., 2004)
  - Based on psychological limits on perception, memory, & attention
  - Important to think about when creating:
    - course website (i.e. KSOL)
    - class blog or wiki
    - anything pertaining to course that is located on a computer
Perceptual Principles

1. Make Displays legible (or audible)

2. Avoid absolute judgment limits

3. Top-down processing (we perceive what we expect)

4. Redundancy gain

5. Similarity causes confusion
Principles based on Mental Models

6. Principles of pictorial realism

7. Principle of the moving part
Attention Principles

8. Minimize information access cost

9. Proximity compatibility principle

10. Principle of multiple resources
11. Replace ‘memory’ with visual information: knowledge in the world

12. Principle of predictive aiding

13. Principle of consistency
Goals of the Learning Process
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