Master Teacher Program - Values

- Continuous improvement and quality
- Positive and respectful attitude
- Open participation and exchange
- Confidentiality for participants
- Discovery and Innovation
- The value of mentoring
- Student Bashing
- Colleague Bashing
- Administration Bashing
- Self Bashing
First, consider this...
...or this?

![Tennessee license plate](image)
Or this?
What is Learning?
What is Learning?

- Behavioral models
- Mental “muscle” models
What is Learning?

- Behavioral models
- Cognitive Psychological models
- Neuroscientific models
Why do we care?
What the Best Teachers Do

• No. 6. Effective teaching reflects an understanding of human learning
Now take out a piece of paper...
What do we know about learning?

• Must acknowledge prior knowledge and preconceptions
• Must develop deep foundational knowledge
• Must fit into conceptual framework
• Must be organized within framework
  - Retrieval
  - Transfer
Prior knowledge

• Consider pretests or quizzes
• Draw out misunderstandings
• Use questions, assessments that reveal student understanding
Deep Foundations

• Teach fewer things in depth
• Emphasize key concepts
Cognitive Load Theory

New Information

• Limited ability to hold more than 5-9 elements
• Limited ability to process more than 2-4 elements at a time
• New information is lost rapidly
Go Deep?

Fox Trot

Go deep.

How can free will coexist with divine preordination?

Too deep.

If Batman died, would the Joker be happy?
Building a Conceptual Framework

- Give the “Big Picture”
- Teach discipline-specific thought processes
- Model the thinking
- Use lots of examples, ideally in different contexts
Ex: Legal Precedent

History of Higher Education

Higher Ed Law

Educational Policy

Read Chronicle article

Faced with actual cases

Ok, maybe now I get it!
Remember this?
Cognitive Load Theory
Long term capacity

- No known limitations to long term memory
- Simple ideas are added to form more complex schema
- Expertise comes from organized knowledge that become automated, one element “items” in working memory
What’s the right “load”?

- Intrinsic load

Adapted from Danielson and Bender, 2010
What’s the right “load”?

- Intrinsic load
- Germane (relevant) load
Overload

• Examples of extraneous load
Overload

• Reduce extraneous load
  - Show complete or partial examples with solutions
  - Avoid split attention
  - Minimize confusing redundancy

• Optimize germane load
  - Vary learning tasks
Review: What do we know about learning?

- Must acknowledge prior knowledge and preconceptions
- Must develop deep foundational knowledge
- Must fit into conceptual framework
- Must be organized within framework
  - Retrieval
  - Transfer
How People Learn

• What makes it STICK?
Learning for Long-term Retention or Transfer

- Solid initial learning
- Deep understanding
- Meaningful chunks or patterns
- Incorporating new elements into existing schema
- Time on task
- Practice
  - Retrieval
  - In context
  - Different applications
Additional Strategies

• Weaving concepts
  - Integrate course concepts
  - Creates “desirable difficulties” (Bjork)

• Spacing
  - Revisit concepts multiple times
  - Provide “multiple windows of entry” (Daniel)
The Importance of Reflection
Metacognition

- Thinking about thinking
- Thinking about learning

- How did I finally get it?
Metacognition

• Thinking about thinking
• Thinking about learning
• How did I finally get it?

Tell me what you're thinking..
Formative Assessments

- Test understanding
- Provide feedback
- Allow practice
Formative Assessments

• Test understanding
• Provide feedback
• Allow practice

Show me what you’re thinking
What the Best Teachers Do

• No. 6. Effective teaching reflects an understanding of human learning
• No. 7. Effective teaching is designed to give prompt feedback
One more key element to retention, retrieval and transfer...
• Did you Ask “Why?”
Motivation!!

• You’ve presented the “what”...
• So what?
• Now what?
• Who cares?
Brain Rule #6

• “We don’t pay attention to boring things”
Provide Motivation

• “Nothing taught by force stays in the soul.”

- Plato, The Republic
• Enthusiasm?
• Relevance?
Motivation!!

- Enthusiasm*
- Relevance*
Brain Rule # 12
• We are powerful and natural explorers.
Motivation!!

- Enthusiasm*
- Relevance*
- Clear and challenging expectations
- Confidence that students can succeed
- Safe environment
Emotion, Stress and Learning

- At minimum, erodes joy of learning
- Clearly impairs brain’s ability to put information into storage regions
- Impairs performance
- Impairs ability to generate possible reasons (e.g. differential diagnoses; see Pottier, 2013)
Summary Circle of Learning

Motivating Environment

Metacognition

Learning with Understanding

Preexisting knowledge

Richter and Timm, 2005
Summary Circle - Teaching

Motivating Environment for students

Reflection, Assessment, Feedback

Assessment of preexisting knowledge, context

Develop Teaching Goals and Content for expected outcomes; create conceptual framework
How Does It all Start to Make Sense?

• Exercise 2
Experts vs. Novices

• Recognize patterns of information
• Highly organized knowledge base
• Conditionalized to context
• Rapid retrieval of relevant knowledge
• May NOT be the best teachers...
What about Learning “Styles”?

• Styles are probably better characterized as preferences

• Learners can utilize strengths and work on weaknesses

• Teachers can use multiple ways to present material

• Best “style” really depends on content to be learned, not person
Brain Rules 5 and 11

• Every brain is wired differently
• Male and female brains are wired differently
That said...

- Multisensory input enhances learning
- Vision trumps other senses

- More brain rules!
Deliberate Practice

- Well defined task
- Immediate feedback
- Repeat
Brain Rules Number 7

• “Repeat to Remember”
Where More is More

• More ways something is learned
• More linkages and connections
• More opportunities for spaced retrieval
• More opportunities for deliberate practice
• More personal meaning

More Memory Pathways
Summary

• Must acknowledge prior knowledge and preconceptions
• Must develop deep foundational knowledge
  – Within reasonable cognitive load
• Must fit into conceptual framework
• Must be organized within framework
  – Add simple elements
• Practice and Feedback develop expertise
  and Requires Collaborative Motivation!!