

Teaching For the Test You Won't Be Giving: Teaching for Long-Term Retention and Transfer

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Deep Thoughts

If I taught something and no one learned it, what happened?

I want you to remember that

- There are powerful learning strategies that can promote long-term retention and transfer
- It's what the learners do that determines what and how much is learned
- You need to look for evidence when evaluating claims about what works in education
- This is important

The Big Questions

Our future depends on the twin abilities of learning efficiently and thinking critically—the pillars of cognitive science.

Nora Newcombe asked:

Biology: Medicine ::
Cognitive Psychology: Education
True or False?

Rethinking the Purpose of Education

- The first and only goal: Teach for long-term retention and transfer

Principles in Cognitive Psychology that should be guiding the design of learning activities

- Acquisition (learning) and Retrieval (remembering) Have Different Operating Principles—Don't Confuse What Looks Like Good Learning with Good Remembering
- A Corollary—Don't confuse What Looks Like Good Teaching With Good Learning

Principles in Cognitive Psychology that should be guiding the design of learning activities

- Practice at retrieval strengthens memory traces (generation effect)



The Single Most Important Variable In Promoting Long-term Retention And Transfer Is Practice At Retrieval

- Have students make frequent summaries as a check on comprehension
- Present a brief problem to solve
- Use reciprocal peer-teaching
- Have students find relevant information and rate it for degree of relevancy
- Use different perspectives
- Post questions on list serves, etc.

Principles in Cognitive Psychology that should be guiding the design of learning activities

- Spaced practice enhances long-term retention (cramming only works for short retrieval intervals)



Principles in Cognitive Psychology that should be guiding the design of learning activities

- Variability during learning can make learning more effortful, but it is beneficial to long-term retention and transfer



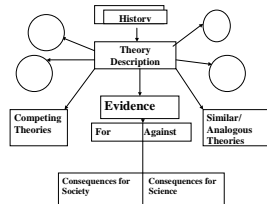
Guiding Thought-Provoking Questioning	What we want to know	Specific Thinking Skills Induced
Generic Questions		
What is a new example of...?	Application	
How could... be used to...?	Application	
What would happen if...?	Prediction/hypothesizing	
What are the implications of...?	Analysis/inference	
What are the strengths and weaknesses of...?	Analysis/inference	
What is... analogous to?	Identification and creation of analogies and metaphors	
What do we already know about...?	Activation of prior knowledge	
How does... affect...?	Activation of relationship (cause-effect)	
How does... tie in with what we learned before?	Activation of prior knowledge	
How does... apply to everyday life?	Application	
What is the counterargument for...?	Different perspectives	

Principles in Cognitive Psychology that should be guiding the design of learning activities

- Dual Coding of Information in Visuospatial and Verbal Formats Will Enhance Learning and Memory



Use elaboration to create interconnected knowledge structures (Dansereau)



Principles In Cognitive Psychology That Should Be Guiding The Design Of Learning Activities

- We use our mental models about the world to make sense out of experience. We may be more likely to change our memory for an event than to change a belief system that cannot account for the event.



Principles In Cognitive Psychology That Should Be Guiding The Design Of Learning Activities

- Feedback as Knowledge of Results
- How does the learner make sense from the feedback?



Principles In Cognitive Psychology That Should Be Guiding The Design Of Learning Activities

- Learning is influenced by our students' and our own epistemologies. Academic motivation is related to beliefs about learning.



Outcomes Assessment is not “one more thing—it’s the only thing.” It’s the only way of knowing if your students are learning what you think you’re teaching, and it tells you what to change if they’re not.

“What the teacher says in the classroom is not unimportant, but what the students think is a thousand times more important. The ideas should be born in the students’ mind and the teacher should act only as midwife.”

George Polya (1982, p. 104)

How will you transfer these principles of learning to your teaching practice?

- ◊ State clear learning objectives
- ◊ Actively engage students in learning
- ◊ Challenge student and teacher epistemologies
- ◊ Use effortful learning—create desirable difficulties
- ◊ Challenge existing cognitive models
- ◊ Teach for transfer—frequent uncued review with real-life examples
- ◊ Make careful choices because less can be more
- ◊ Check for long-term retention
- ◊ Use rerepresenting—visuospatial and verbal formats

“Had I been present at the creation, I would have given some useful hints for the better ordering of the universe.”

- Alfonso X, the Learned,
- King of Spain, 1252-1284

