

Physics 4810 / 7810 Week 4 - Rockin!

Day 7: Fa2008:
Digging into Theory

Theory without practice is empty;
practice without theory is blind
- adapted from Kant



Can I have some up lifting
messages or examples of
students understanding and
prospering?



Admin

- Good Work / Discussions
- Fieldwork / Sites - it's okay to swap & adapts
- Always good to think about projects
 - But don't stress
 - Steady continual progress is what we seek
- Signup for Topic to lead!

Today

- Really about Theory
- More on practical implications Thurs
 - JITT
 - ILDs etc
- But I can't resist:
- "What's the deal? Is anyone using JiTT?"
- "Is it as good as it sounds? Why isn't anyone at this school using it?"
- Yes... this slide is JITT

More JITT

- "Why do we skip individuality principle and social learning principle?"
- We won't ...
- " I hear a lot about this Piaget character. Who is he, and does he have anything interesting to say? Why does he get cited so much?"
- Swiss Psychologist 1896-1980 often considered the father of modern educational theory
more at:
http://en.wikipedia.org/wiki/Schemata_theory

But my favorite JiTT

I thought Sagredo was a 'virtual colleague' (pg. 8). Now he's cropping up in more and more legitimate anecdotes. What's going on? Are the anecdotes made up by Redish to help him make a point? Or is Redish using the name Sagredo to protect real colleague's self esteems? Or is Redish going crazy?!

From: Edward Redish

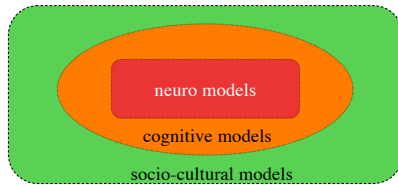
Date: September 16, 2008 11:45:25 AM MDT
All of the above, Noah. All of the above.

Model of student learning?

Individual $\xrightarrow[\text{no transmission}]{\text{Instruction}}$ Content (E/M)



Focus on models of cognition



Understanding Terms / ideas

comfortable with the following ideas?

- instructionism vs. constructivism
- prior knowledge
- assimilation
- accommodation
- constructionism
- coaching, scaffolding,

A puzzle

Place all the numbers in the square so all rows, columns, diagonals add up the same

1, 2, 3, 4, 5, 6, 7, 8, 9

Redish: Constructivism & General Principles

- What are his principles and what's missing?

The constructivism principle

Principle 1: Individuals build their knowledge by making connections to existing knowledge; they use this knowledge by productively creating a response to the information they receive.

Bootstrapping

Constructivism as a whole sounds like a profound thought, and it is...but it bugs me to say that we can't learn anything totally new and different. How does teaching of concepts begin? What's the ultimate First Concept (here I'm thinking of St. Thomas' First Mover argument)? For example, how does one teach about atoms?

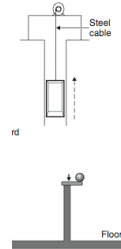
Context Principle

Principle 2: What people construct depends on the context – including their mental states.

Context

How can we get students realize this in practice (use in everyday life)?

Really? is this all there is to context?



Change Principle

Principle 3: It is reasonably easy to learn something that matches or extends an existing schema, but changing a well-established schema substantially is difficult.

Corollary 3.1 — It's hard to learn something we don't almost already know.

Corollary 3.2 — Much of our learning is done by analogy.

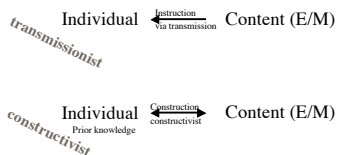
Corollary 3.3 — "Touchstone" problems and examples are very important.

Corollary: 3.4 — It is very difficult to change an established mental model.

Touchstone problems

1) I like the idea of "touchstone" problems. What would be the result if, on each CAPA, students were asked what they felt the most important or fundamental problem was? (i.e. pick a "touchstone" problem) Would it be more or less effective than an instructor saying "This is important, remember this"?

PER Theoretic Background



Deno's "Given-New" Principle

New information should always be presented in a context that is familiar to the reader and the context should be established first.

- From Redish from Clark 1975

Let's apply what we learned

- I want you to memorize the following number in order

3 7 3 2 3 7 1 9 4 5 5 3 0 1 7

G. Miller - magic number: 7 ± 2

7 +/- 2 is that it?

Now try the following:

1 7 7 6 1 8 6 5 1 9 4 5 2 0 0 8

Does chunking work for anything?

d l s	c a t	t h e
k e l	d o g	b i g
t y u	t a g	d o g
x b m	g y m	r a n
j o r	o a r	t o o
o h k	l u g	f a r

Posner: Theory of Accommodation

- Key: first instance of theoretical basis for learning COUPLE with mechanism
- What are conditions for accommodation?
- What is a conceptual ecology?
- What is Einstein's epistemology and why does this matter?

Utility of elicit-confront-resolve

Tutorials based on this approach (partly)

Example?

Consider 'Heavier Object Fall Faster than Light Objects'

What is a way to confront?

Come up with examples of utility (Tutorials) for Thurs [modify hw question]?

What's missing?

- Is there more than content & are these elements separable from content?
- What is the impact of elicit-confront-resolve epistemologically (belief about knowing)?
- Are concepts unitary?
- Does context matter and what is context?