Discussion About AAPT/PERC Summer 2007 Part II

Wednesday, September 12

2007

Dyan – AAPT & PERC - Relate to Research

- Content wise – not much; instead, "buried treasure"
- **Brian Ross**: we must not just look at *what* is or is not transferred, but ***why*** and ***how***.
  - Transfer depends on "declarative/procedural overlap"
  - Analogy vs. Categorization
- **Laura Shultz**: understanding causal relationships does not mean that you understand mechanistic relationships
  - Aberrometry – aberration changes grid. But why?

Mojgan- AAPT/Research

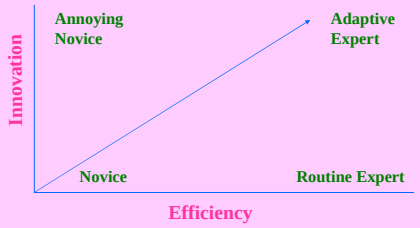
- *n-coding, elaboration on dual coding is a theoretical model of multiple internal mental representations. (Lasry, N.)*

This paper brings evidence for many characteristics of reformed teaching such as using variety of means in teaching and divergent thinking.

- *Ontology – the description of a system in terms of the kinds of objects relevant for its description, and their characteristics (Redish et. al)* relates to Pathway, and all questions concerning difficulties of visualizing process type quantities in physics.

Jackie

- Bruce Sherin
  - Mode
  - Dynamic Mental Construct
  - Use for interview analysis?
- Dan Schwartz
  - –Talked about group work



Spartak Kalita – AAPT 2007 II

Ruibal-Villasenor, Etkina, Karelina (Rutgers University) –

From Physics to Biology Helping Students Attain All-Terrain Knowledge

Transpiration is the evaporation of excess water from aerial parts and of plants

Two groups - **Design Labs** AND **Non-Design Labs** (also PER-based)

The students in the design groups
- spent more time in sense making
- able to identify and evaluate assumptions and uncertainties (+ minimize)
- better record, represent and analyze data and communicate scientific ideas

Frank, Scherr, Hammer (University of Maryland)

Beyond Confusion: Alternative Accounts of Students' Failure to Differentiate

Introductory physics students often confuse different (related) concepts **heat /temperature** (work, and internal energy) , **mass/volume**, **position/velocity**

Ambiguities may be driven by students' conceptual, perceptual, or mathematical ways of thinking

Case study: **Surface area / mass** confusion - is facilitated by her thinking about matter in terms of molecules; thinking in specific, context-dependent ways

K-State

Gender Differences in Introductory University Physics Performance: The Influence of High School Physics Preparation and Affective Factors by Zahra Hazari et. al.

Methodology: Nationwide , 66 item survey
Academic Controls: SAT, HS Math subjects scores, English ...
Demographic Controls: parental education, race, HS governance
Predictor Variables: Gender, HS physics curriculum, **affective factors** and interactions with gender on the latter two.
Outcome Measure: Letter Grade in University Physics

Hierarchical Linear Model: $p < .01$ or $.001$

GRDPRCNT --> not indicated by gender
--> with ACAD Controls gender is an indicator
--> with All Controls gender is not an indicator
--> math background is the best indicator
--> indicated by 21% Acad background, 5% Curriculum variables and 2% Affective variables
--> gender differences in affective, assessment and physics pedagogy

FRAN

'priority of specific' – correlate specifics of two situations rather than abstract generalization (Ross)

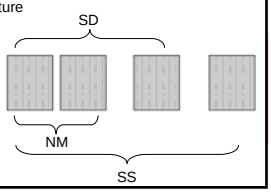
Students use specific resources guided by possibly unconscious cues
cues-some superficial, some structural (more with greater experience) (Ross)

How do we bring about these cues?

(Nokes)
Focus the learner on structural similarities
Vary problems incrementally, minimal changes each time:
Near-miss (NM): same content (sprites or objects used) and principle (equation(s) required) but with one critical surface change (interchange of given and found variables) that highlights some aspect of the principle structure

Surface-different (SD): have *different* objects used but the same principle and no interchange of given and found variables.

Structurally Similar (SS): Different objects, different principle (add new variance), changes given and found values automatically.



Upcoming Deadline!

Friday, October 12

AOK Meeting (Oct. 19-20) Abstract

Special PER Seminars Fall 2007

- 11:00AM, Thurs, Sept. 20 — Zdeslav Hrepic, Fort Hays State Univ.
- 11:00AM, Tues, Oct. 09 — Raj Chaudhary, Christopher Newport Univ.
- 11:00AM, Tues, Oct. 30/Nov. 5 — Rebecca Lindell, Southern Illinois Univ. Edwardsville