Physics 4810 / 7810 Week 6 - Situated!

Day 11: Fa2008:
Situated Cognition
ZPD
and Play

Fieldwork

GO VOTE (Register and Vote!
and vote the whole ballot!)

Fieldwork

- How is it going?
- Apologies about fieldnotes… (#$#!!# WebCT)
- More this week
- Projects?

(yes this is the *authentic practice* we are reading about)

Clarifying Questions

- Do you have any questions of interpretation from the papers?
- E.g. what does *ersatz* mean?
- What is ZPD
- How does Vygotsky define Play?

Largely about CONTEXT

- What do we mean by *context* ?

Latin root of the term, "*contexere*, which means 'to weave together.'"(Cole 1996, p. 135)

Context

- Context is the collection of components and the relations among them – the connected whole which includes constituent elements *and* the relations among them.
- Birdwhistell uses the analogy of a rope to develop such a notion of context:

Context as Rope

The fibers that make up the rope are discontinuous; when you twist them together you don't make them continuous, you make the thread continuous .... even though it may look in a thread as though each of those particles[fibres] are going all through it, that isn't the case... Obviously, I am not talking about the environment. I am not talking about inside and outside. I am talking about the conditions of the system

(Birdwhistell as quoted in R. McDermott 1993, p. 274).

Situating Cognition

How can the following make sense?

1 is 3
3 is 5
5 is 4
4 is the perfect number.

What's a magic number?

How about?

One is 3
Three is 5
Five is 4
Four is the magic Number?

Cognitive Apprenticeships

The authors encourage teachers to engage students in authentic activities and immerse themselves in the culture of the subject they are studying. What are students' attitudes about such an enculturation? Will they want to dive into, say, the culture of physicists?

- The closest we have to cognitive apprenticeships right now is probably not in the classroom but in internships.
- Teaching using cognitive apprenticeship requires more effort and skill on the part of the teacher than traditional methods of teaching. How can we better prepare teachers for this

Cognitive Apprenticeships

- Does CA mean making more physicists?
- Is that our goal in the class?

Situating Physics / Context

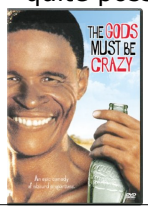
- I used to hate word problems. I spent so much time just trying to interpret …
- Sure, a golfer can use physics to predict where his ball will land if he hits it such that it makes a 37 degree angle to the ground - but why would s/he?
- I enjoy problems where I can use my physics knowledge in situations where one must use physics (for example, in astronomy). In In these situations, using physics *feels more natural*;

Context

- What role does context serve?
  - Establish prior knowledge
  - Send message that you know this
  - Create situation that is motivating
  - Physics becomes *a tool* to a natural end

Physics as a tool . . .

"It is quite possible to acquire a tool but to be unable to use it." In my opinion, this is far more than 'quite possible;' this is inevitable.



Authentic Practice

- Is "school" not an authentic activity?
- Do students not develop expertise at "school"

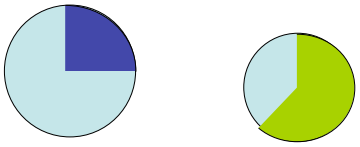
I think that often the students that excel are the ones that figure out what the teacher is looking for and provide it

JPFs

JPF, Practitioner, and Student Activity

	JPFs	Students	Practitioners
reasoning with:	causal stories	laws	causal models
acting on:	situations	symbols	conceptual situations
resolving:	emergent problems and dilemmas	well-defined problems	ill-defined problems
producing:	negotiable meaning & socially constructed understanding	fixed meaning & immutable concepts	negotiable meaning & socially constructed understanding

Really? Is this better



3/4 x 2/3 = 1/2 ???

Orwell was right?

1984

T/F: It is possible to have a complete language that conveys meaning precisely

T/F: He who controls the present controls the past. He who controls the past controls the future.

Collaborative Work

- We are social creatures, and what we do by ourselves is greatly outweighed by what we can do with others. This assumption once again seems to come out of the blue. How did nobody question this for decades? It seems so obvious.
- My experience is that group work is exceedingly rare in the workforce. Does anyone's personal experience (or other data) suggest otherwise?

Collaborative Work

Called for by:

- ABET
- National Academies
- National Standards
- Project 2061
- Governor's Council
- Industry…

Tracking

- If you are in favor of tracking, do you think that tracking should be changed to be based on students' current level of development AND their proximal zone?
- Students should be placed in a class with other students as close as possible to their ability level (or development level if you prefer). You are doing a disservice to honors students by putting them with students that will slow them down and a disservice to regular students by flying through material to benefit the honors students.

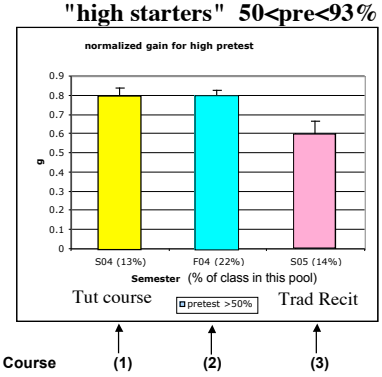
Tracking

- What do you think?
- What does the literature say?

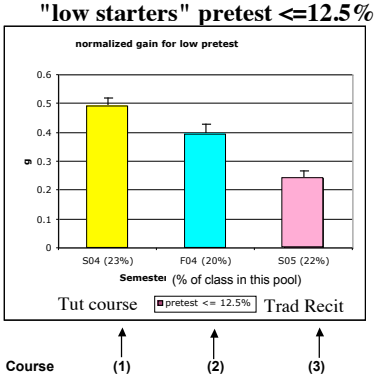
Mehan, H., Hubbard, L., Lintz, A., & Villanueva, I. (1994). *Tracking untracking: The consequences of placing low track students in high track classes* (Research Report No. 10). Washington, DC: National Center for Research on Cultural Diversity and Second Language Learning.

CU Collaborative Groups

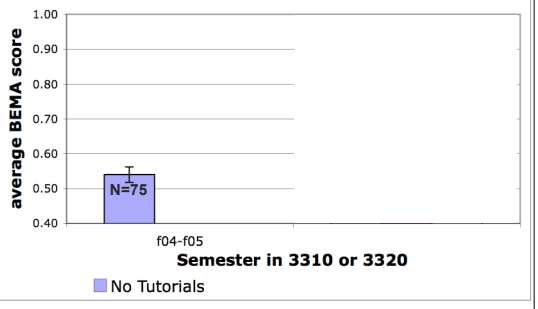
Impact on different pretest populations: "high starters" 50<pre<93%

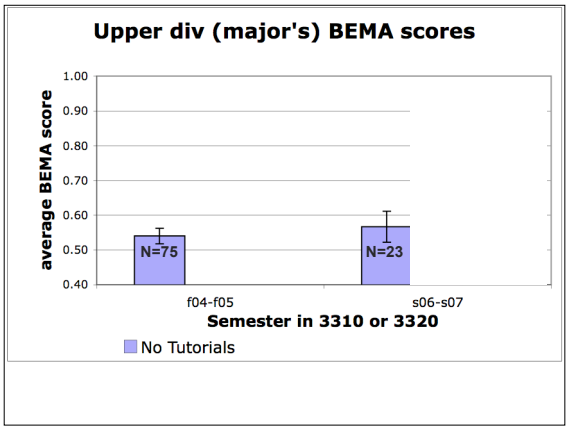


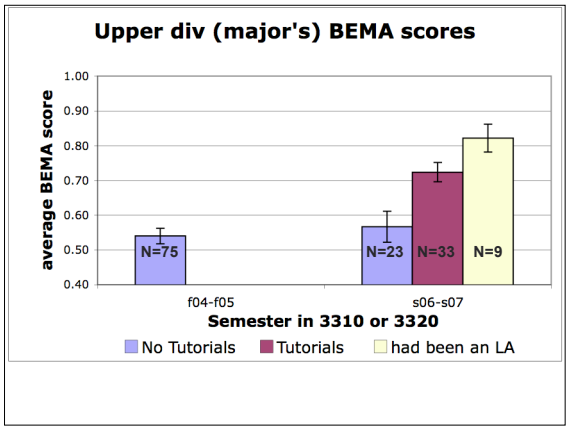
Impact on different pretest populations: "low starters" pretest <=12.5%

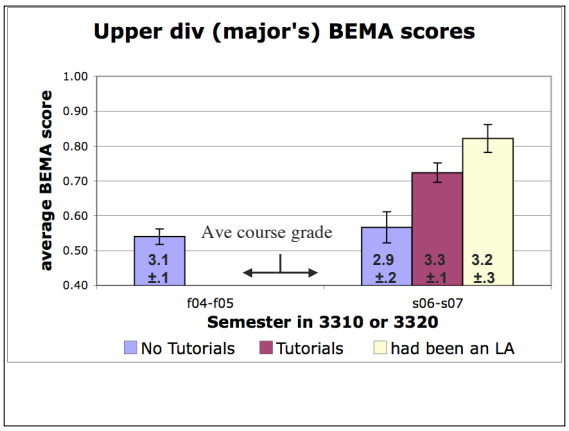


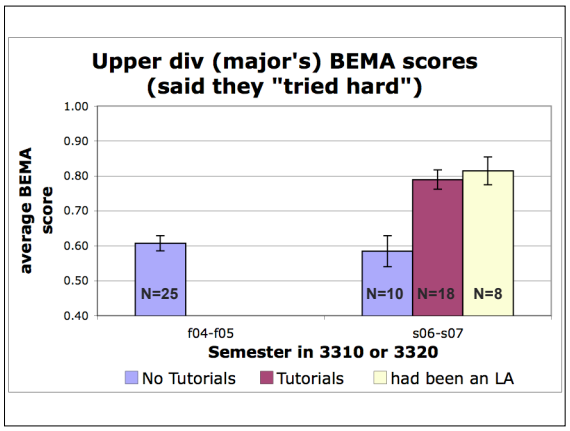
Upper div (major's) BEMA scores











Play

- 1) Does letting college students "play" compromise our academic structure? How do we get them to stay on task? (I guess this applies to younger students too.)
- What do we mean by rule based play?

Zone of Proximal Development

- Analogous to the difference between a:
  - Scalar •
  - Vector ↗
- What is this useful for:
  - Understanding cog processes / development
  - Designing educaiton