# Teaching and Learning Physics Week X

Day 21:

- the Physics of Everyday Thinking Curriculum
- the Physics By Inquiry
- Knight: a PER influenced curriculum

Learning Goals:

- describe differences between PET, PBI, trad'l
- tie these curricula to earlier work on MC, theory, goals, etc.
- act on these in design of class : )



- Hi Everybody –
- I have a quick favor to ask if you don't mind. As part of my role in Student Success I am looking at what success actually means to students. So I would like to see if students in your classes wouldn't mind helping me out with a really quick task. What I would like them to do is write their **definition of success in 10 words or less. It can be anything – no limits. I just want to know what is the first thing they think of when they are asked how to define success. I am good with either having them write it down anonymously on a piece of paper and giving it to you, or they can send it to me in an e-mail directly, or anything in between.**
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- If you would like to participate, thanks. If not, that is fine too. I am trying to collect everything by next Friday, November 6th.
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- Thanks so much for the help!!
- Paul
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- Paul S. Chinowsky
- Associate Vice-Provost for Student Success
- Professor, Civil Engineeirng
- UCB 37, University of Colorado Boulder

# Class Updates

- Next Subjects for class
  - Inclusion (race, gender) in physics
  - Labs / Expt
  - International perspectives
  - Project workshp
  - Sustaining Educ Transforms
- Fieldwork … discussion
- Keep on Projects: Projects …

# Schoenfeld Approach

- What are you doing?
- Why are you doing it?
- How does it help?

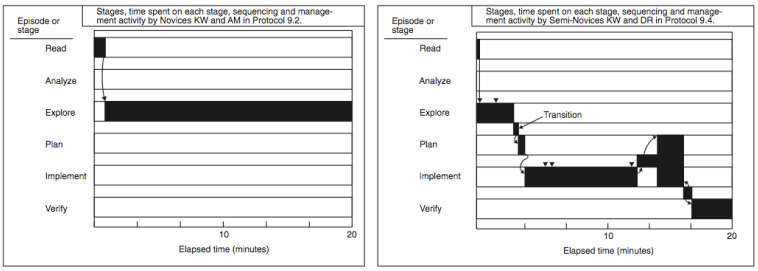
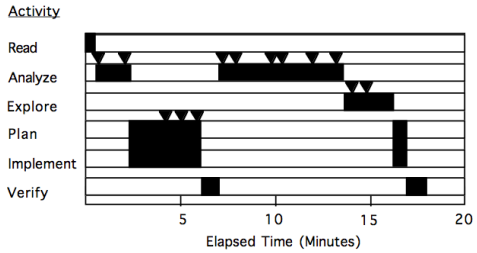



**Figure 3.4** Sample plots of student activities in solving math problems in Alan Schoenfeld's metacognitive math class. Small triangles mark metacognitive statements [Schoenfeld 1985].

# Proto-PER researchers

- Define – Observable ACTIONS for coding:

READ
ANALYZE
EXPLORE
PLAN
IMPLEMENT
VERIFY




# Physics of Everyday Thinking (formerly physics for elementary teaching)

- The Physics and Everyday Thinking (PET) curriculum is a one semester (60 – 70 hours),
- inquiry-based physics course
- suitable either as a general education course or as a course for prospective or practicing elementary teachers.
- PET employs a learning-centered pedagogy
  - consists of elicitation of initial student ideas,
  - development of new or modified ideas (based on experimental or simulator evidence),
  - building student consensus on final ideas,
  - and the application of ideas to new situations.

# Physics of Everyday Thinking
# 3 major Goals:

- **Content**
  - **construct a set of physics ideas that they can**
  - **apply to explain interesting phenomena from everyday life.**

  **The learning goals for the course have been taken directly from the AAAS Project 2061 benchmark ideas and NRC National Science Education Standards**

- **Nature of Science:**
  - **Process of science**
  - **Discourse of science …**
- **Learning about Learning (LAL):**

  **To help students develop an understanding of how scientists develop knowledge, how they learn science themselves, and how others, for example, younger students, learn science. There are three sub-goals for the LAL goal:**
  - **Nature of science: AAAS / expectations**
  - **My Own Learning: To help students enhance their metacognitive skills**
  - **Children's Ideas: To help college students realize that all learners (including themselves, other peers, and younger students) have ideas about science that should be recognized, and that can serve as both resources**

  **In addition to these three sub-goals, the curriculum is written to help students develop a more positive attitude about science and to help them develop more confidence in discussing (and perhaps teaching) science.**

# Physics By Inquiry (PBI)

- If Tutorials are the 'band-aid', PBI is the preventative medicine
- Discovery-based
- Putting UW framing (recall early McDermott?) into practice
- Process of Science

# In Groups

- Identify which aspects of Goals, Hidden Curriculum, Theory, Pedagogical Approaches… these addresses –
  - Be specific
  - PET and PBI
- Compare to traditional HW

http://www.colorado.edu/physics/phys4460/phys4460_fa13/capa/hw2.pdf

How do these two different framings address:

- the hidden curriculum?
- The other items from above , Theory, Pedagogical Approaches…
- the different metaphors of leaning: acquisition and participation (a la Sfard and discussion day)?

# Feedback

- Google the videos of:
- Real world problems from my physics text

# You're in charge…

- You have the opportunity to implement a class for general education credit (non-majors).
- What curricula/ approaches do you select and why?