

A thought problem

Car #1 Leaves New York for Philadelphia, 90 miles away, traveling at 40 mph. 15 min later, Car #2 leaves Philadelphia traveling to NYC at 55mph. When they meet which car is closer to Philadelphia?



Physics 4810 / 7810 Week 11 (zoinks!)

Day 19: Fa2008:
Politics, Society and Physics

Mahajan, Fish, Bartlett
(Rosenberg & Weisz)



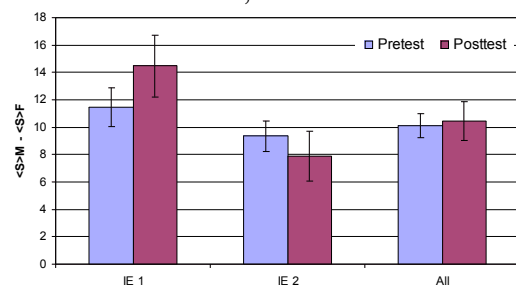
If you haven't voted yet, and this 1.5 hr block will make the difference, you're excused from class --- I encourage you to vote



Our Class Norms...

- Again, potentially charged topics
- Please focus on ideas, not people
- CONSTRUCTIVE critiques are the best
- It is okay & encouraged for you to differ with:
 - Authors
 - Professor
 - And maybe each other...
- Debate, Dissent, and Discussion are patriotic ;)

Gender Gap in 1110 Pre and Post Scores 7 semesters; 2100 students



Pollock, et. al. *Phys. Rev. ST PER*, 3, 010107 (2007)

Gender Gap

- On TEST performance!
- This is an indicator of:
 - TEST performance
 - Not necessarily a measure of understanding
 - And certainly not of ability (except on the test).

Course Grades

	Participation	Homework	Exams	Course GPA
$\langle S \rangle_M - \langle S \rangle_F$	-5.6 * (0.9)	-4.5 * (0.8)	4.5 * (0.6)	0.11 * (0.04)

- 7 semesters, $N \sim 3600$
- Average differences in % points, except GPA
- Differences offset one another

Politics, Political and Partisan

1. A treatise on the science or theory of politics; *spec.* the treatise written by Aristotle.
2. The theory or practice of government or administration.
- 3 **b.** The assumptions or principles relating to or underlying any activity, theory, or attitude, esp. when concerned with questions of power and status in a society.
4. **a.** Actions concerned with the acquisition or exercise of power, status, or authority

A Meta-message ... How we say things shapes what gets heard

- I see this paper as a rant.
 - I got so mad. . .
 - "Do this ... Don't do that!!!"
- Too easy to dismiss...

Your Professor's Bias

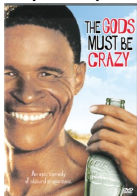
- All classes are political
- Education is inherently political
- Education is the key mechanism by which society replicates itself, and hence
- Education relates to assumptions and power of relations in social activities.

A word about Fish and Mahajan

- Fish is not being sarcastic (from the context of his other work)
- He is arguing about Partisanship rather than Politics, I suspect
- Mahajan... sort of sarcastic... sort of....

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.



From Mahajan (Nov 2004)

The ambiguity reflects my own conflicted views about science. Should we stop doing any research? I think so. Should we stop teaching physics to graduate students? Probably. Should we stop teaching physics to undergraduates? Not sure. Should we stop teaching physics as a liberal arts subject? Probably not. Should we teach it in schools? Depends how we teach it -- as a liberal art, maybe yes; as an exam/filtering subject, maybe not. At least those are my current thoughts on how to draw some lines, but it's a slippery slope and there are so many arguments on every side

3) In summary, the paper [Fish] argues that science should not enter politics, but I believe that it is at least equally as important that politics not enter science.

Who asks the questions?

- In science?

Who asks the questions

- In classes?

Good News? The New York Times

Professors' Liberalism Contagious? Maybe Not



Paul Fink Hess and Matthew Roseman found teachers do not change students' politics.

By PATRICIA COHEN
Published October 2, 2014

An article of faith among conservative critics of American universities has been that liberal professors politically indoctrinate their students. This conviction not only fueled the culture wars but has also led state lawmakers to consider requiring colleges to submit reports to the government detailing their progress in ensuring "intellectual diversity," prompted universities to establish faculty positions devoted to conservatism and spurred the creation of a network of volunteer watchdogs to monitor "political correctness" on campuses.

COMMENTS
GIFT
E-MAIL
PRINT
SHARE
SAVE
SHARE

Bad News

- Inclusion
- Stereotype threat
- Self-selection
- . . .

Who asks the questions

- In classes?
- “[Students] may believe they need to appease the instructor in order to receive their desired grades. From this perspective, many people may conclude that political discussions are ultimately unproductive . . .”
- “Professors encouraging political discourse is not only fine, but great in my opinion, but if they take a side one way or the other, I think it would discourage students with dissenting opinions from speaking up.”
- Is it possible not to have a reigning paradigm?
[see comment about making little Noah’s (which I found amusing and disturbing)]
- Do Away with grades?
- Value PARTICIPATION
- Students dictate what happens?

Bartlett Approach. . .

- the first law of sustainability:
"Population growth or growth in the rate of consumption of resources cannot be [indefinitely] sustained."
- What is a silent lie?

What about innovation?

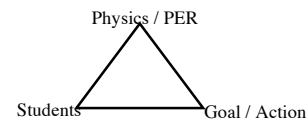
- Can't we find a new energy source?
- What do the Dismal Theorems say?

Silent Lie

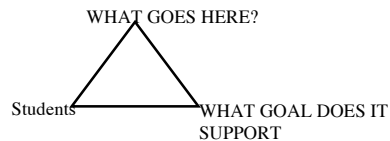
- What is the silent lie for:
 - Fish
 - Mahajan
 - Bartlett
- What are their stated goals?

Mediation

- Tools mediate (allow for thought) thought



How would BARTLETT/MAHAJAN/FISH change physics?



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).

Practice this



I leave my house lights on over night, how much money did I waste (hint: you pay approx. 10cents /kW*hr)

$$\text{Energy} = \text{power} \times \text{time} = 100\text{W} \times 8 \text{ hrs} = 800 \text{ W*hr} \\ = 0.8 \text{ kW*hr.}$$

Since you pay about \$0.10 for each kW*hr, that's about 8 cents. No big deal. Does this mean energy is cheap?

More Practice

- What if I have to produce this energy 0.8 kW*hrs?

Assume I am about 1/10th of a horse

0.1 horsepower running on a treadmill

1 hp = 750 Watts.

So I produce about 75 Watts.

For how long to get 800 Watt - hrs?
(more than the amount of time I left the bulb on!)

Is energy still cheap?

[I'm willing to pay you 8 cents to do this]

Estimation / Orders of Magnitude

- Useful if you don't have exact data
- Too complex a calculation -- simplify formula
- Gives **trends**

Exponential growth

- Al Bartlett contends, "The greatest shortcoming of the human race is our inability to understand the exponential function."

Orders of Magnitude / Exponential Growth

- How much will a hamburger cost in 2052?
- When will we run out of fossil fuels?
- How long does it take to charge a flash?
- How close do circuit components have to be to take advantage of / avoid quantum tunneling?