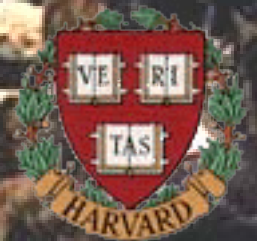


Memorization or understanding: are we teaching the right thing?



6th International CDIO Conference 2010
École Polytechnique de Montréal
Montréal, Canada 16 June 2010



My message



shift focus from "teaching" to helping students learn

Outline

- Education



Outline

- Education

- Peer Instruction



Outline

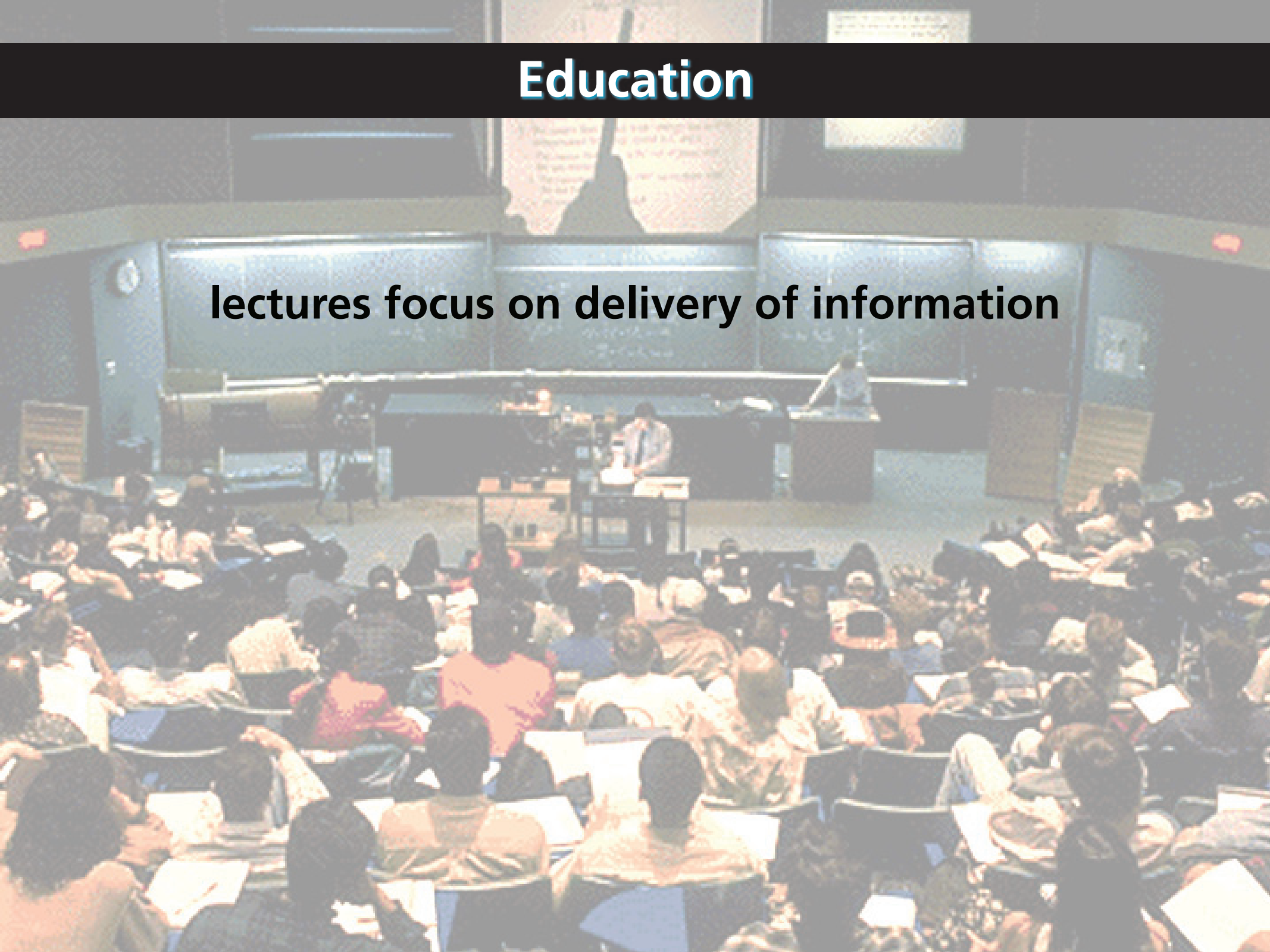
- Education
- Peer Instruction
- Results

Education



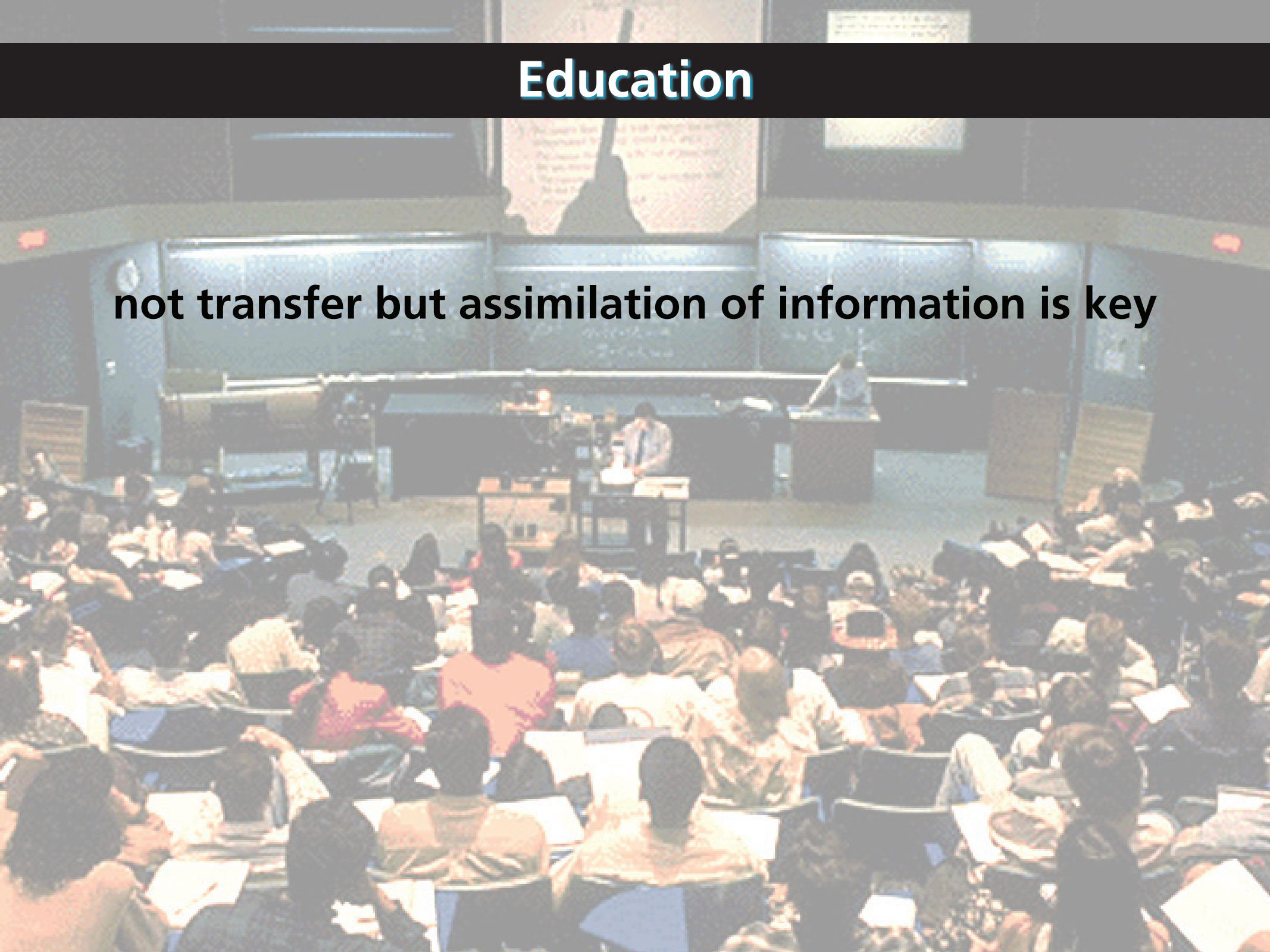
Education

lectures focus on delivery of information



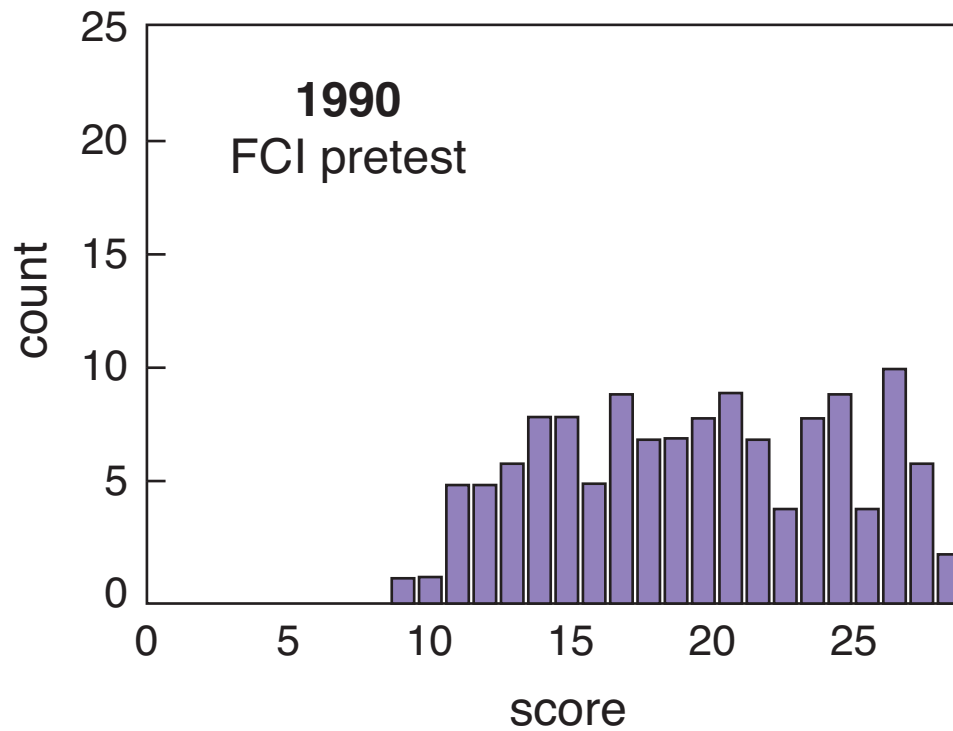
Education

not transfer but assimilation of information is key



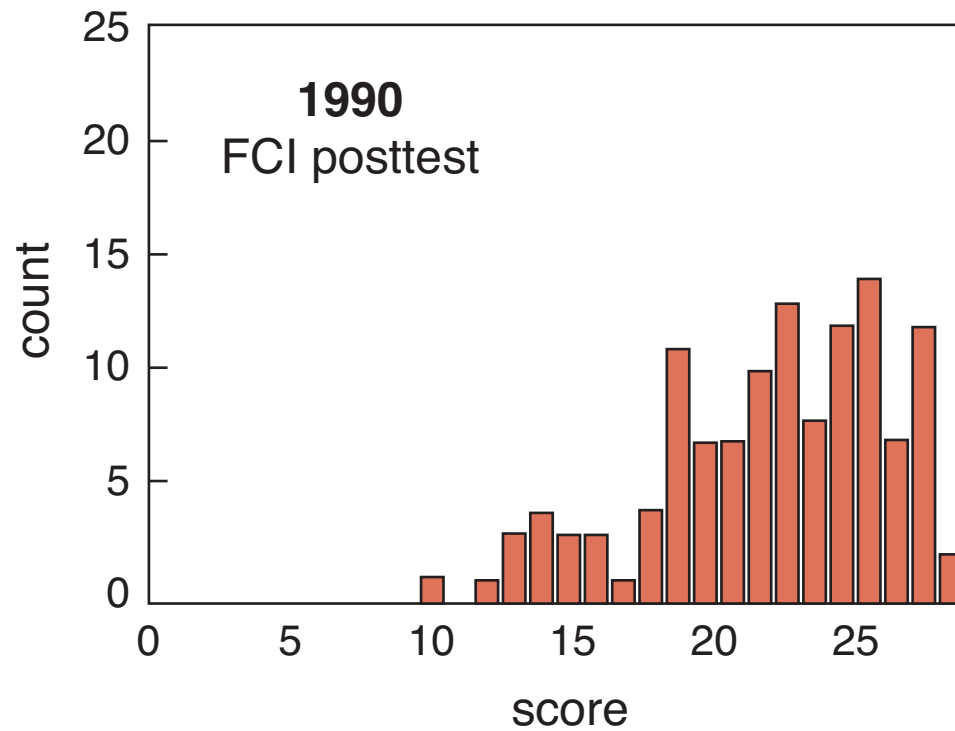
Education

education is not just information transfer



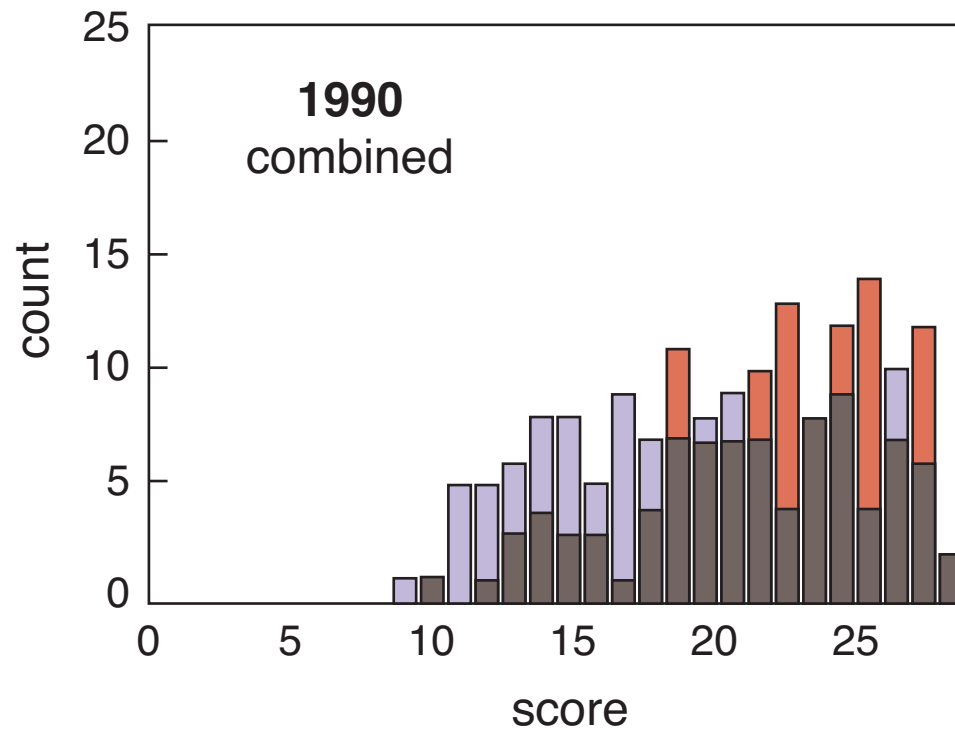
Education

education is not just information transfer



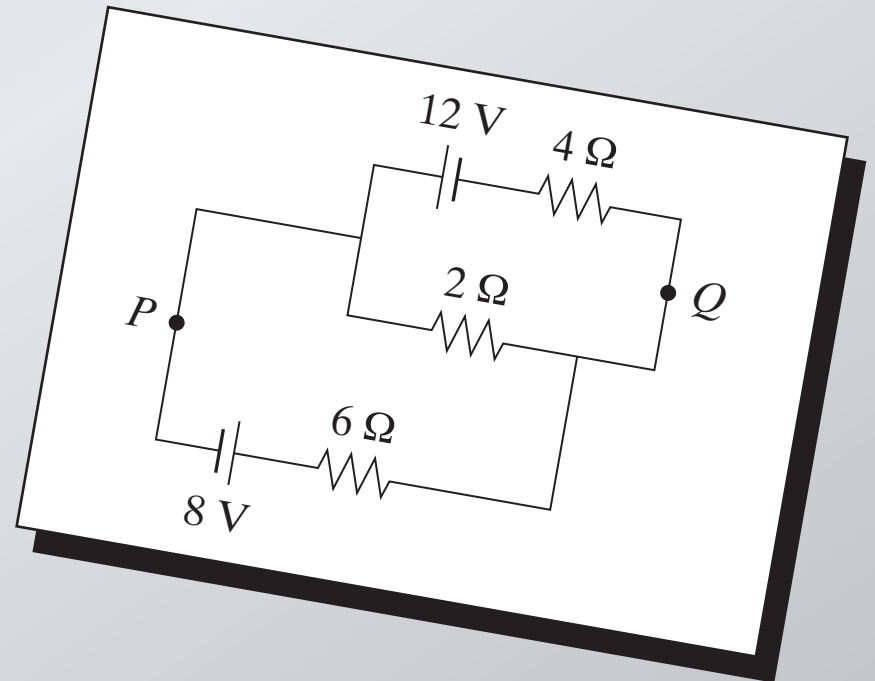
Education

education is not just information transfer



Education

conventional problems misleading



Education

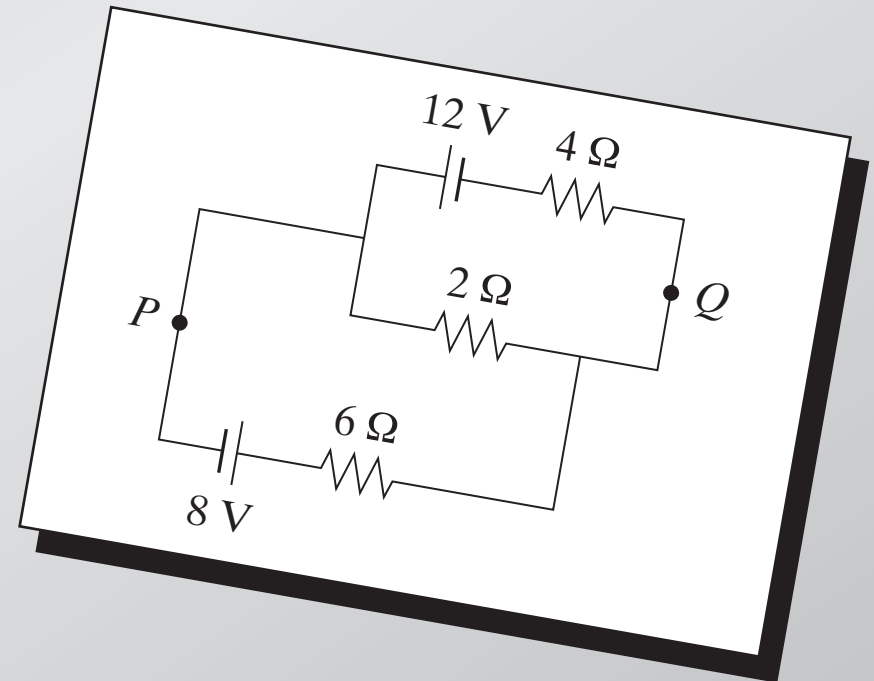
conventional problems misleading

Calculate:

(a) current in $2\text{-}\Omega$ resistor

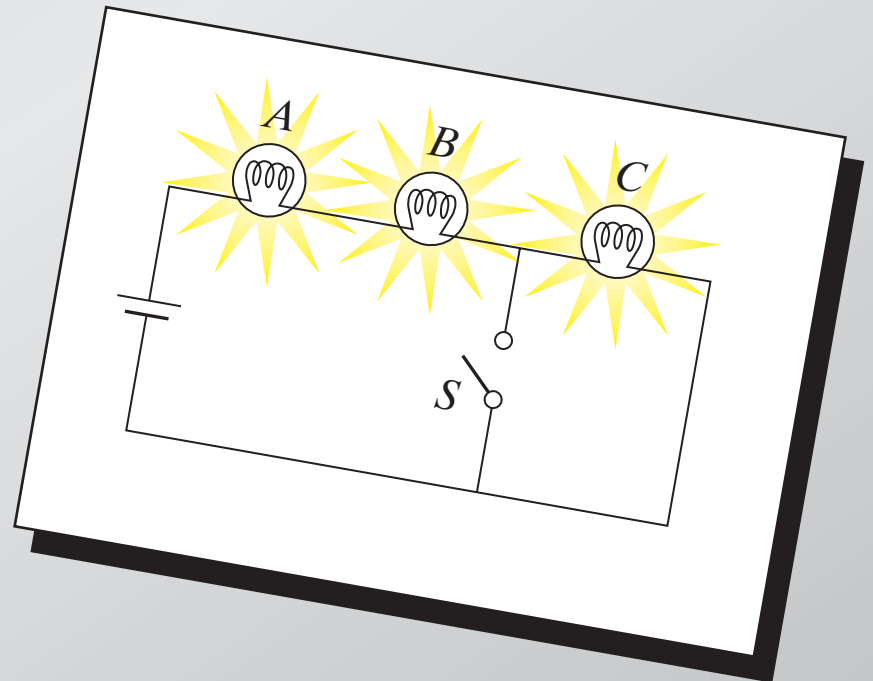
(b) potential difference

between P and Q



Education

are the basic principles understood?

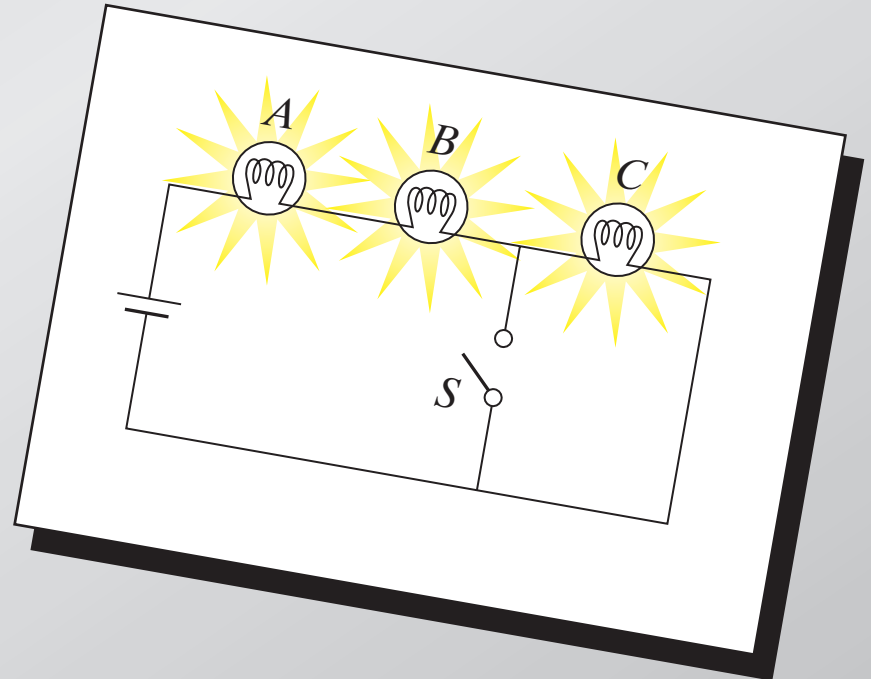


Education

are the basic principles understood?

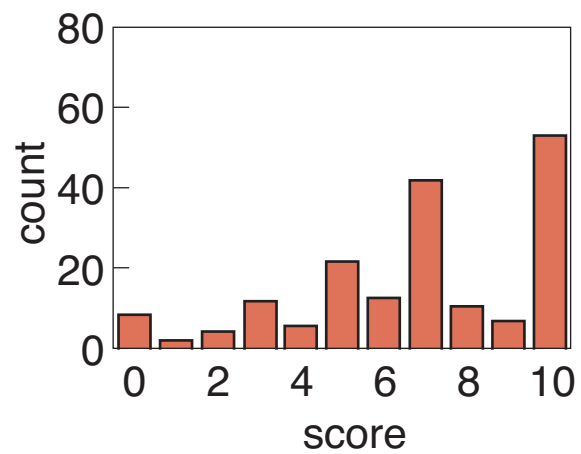
When S is closed, what happens to:

- (a) intensities of A and B ?
- (b) intensity of C ?
- (c) current through battery?
- (d) potential difference across
 A , B , and C ?
- (e) the total power dissipated?

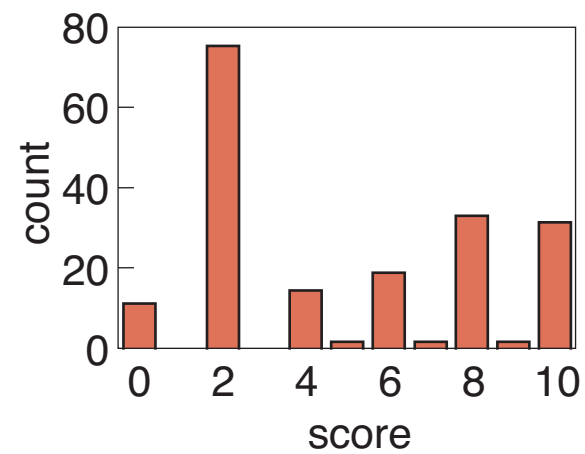


Education

conventional

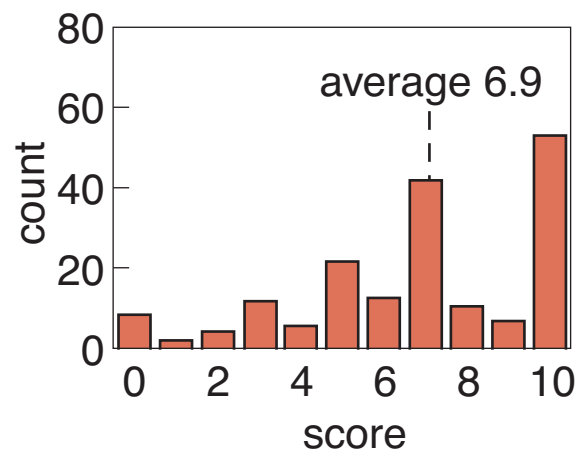


conceptual

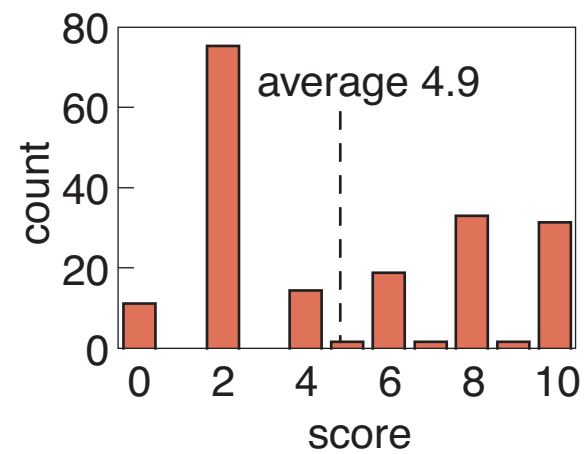


Education

conventional



conceptual



So what should we do?



Peer Instruction

Give students more responsibility for gathering information...

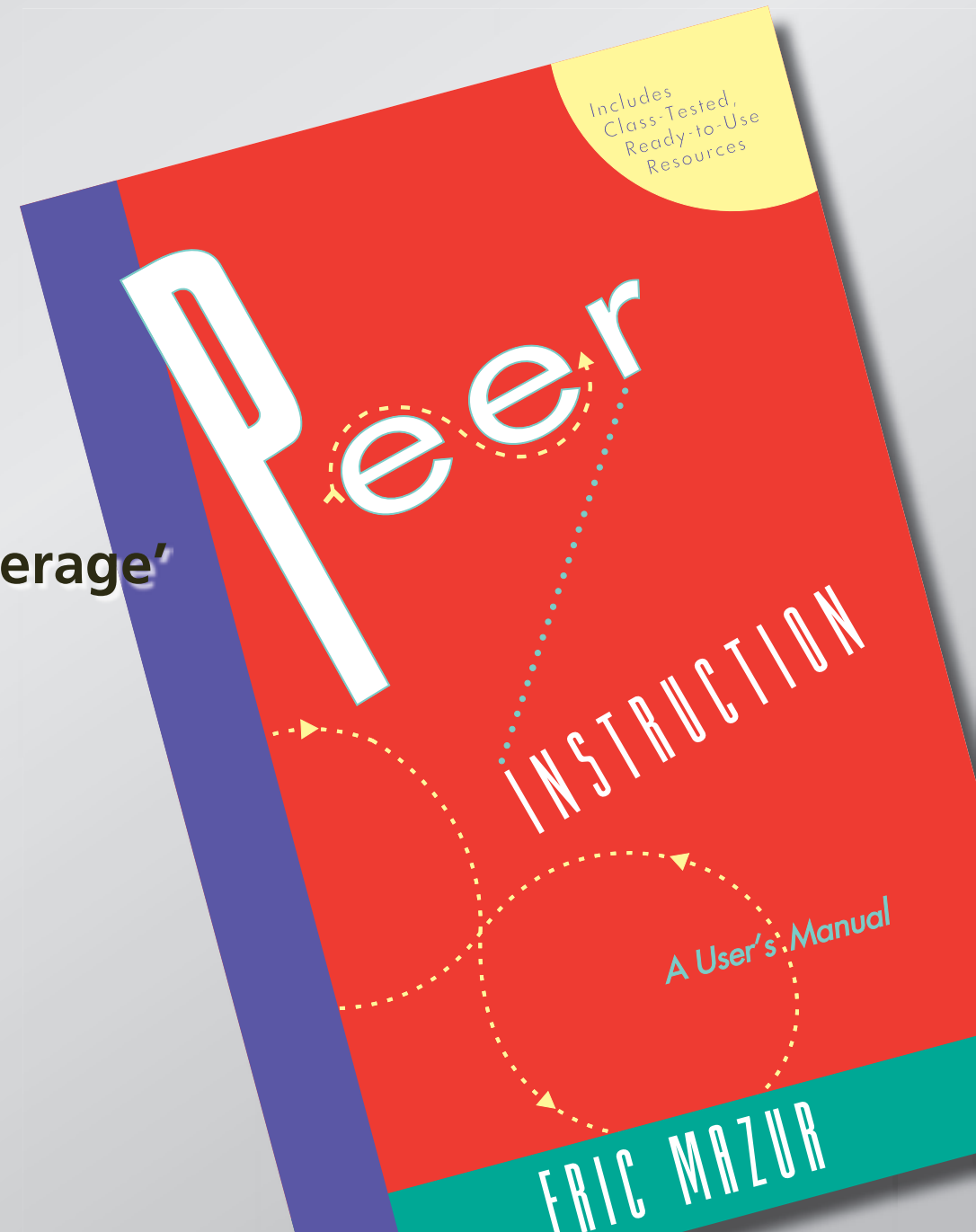
Peer Instruction

**Give students more responsibility for gathering information...
so we can better help them assimilate it.**

Peer Instruction

Main features:

- pre-class reading
- in-class: depth, not 'coverage'
- ConcepTests



Peer Instruction

ConcepTest:

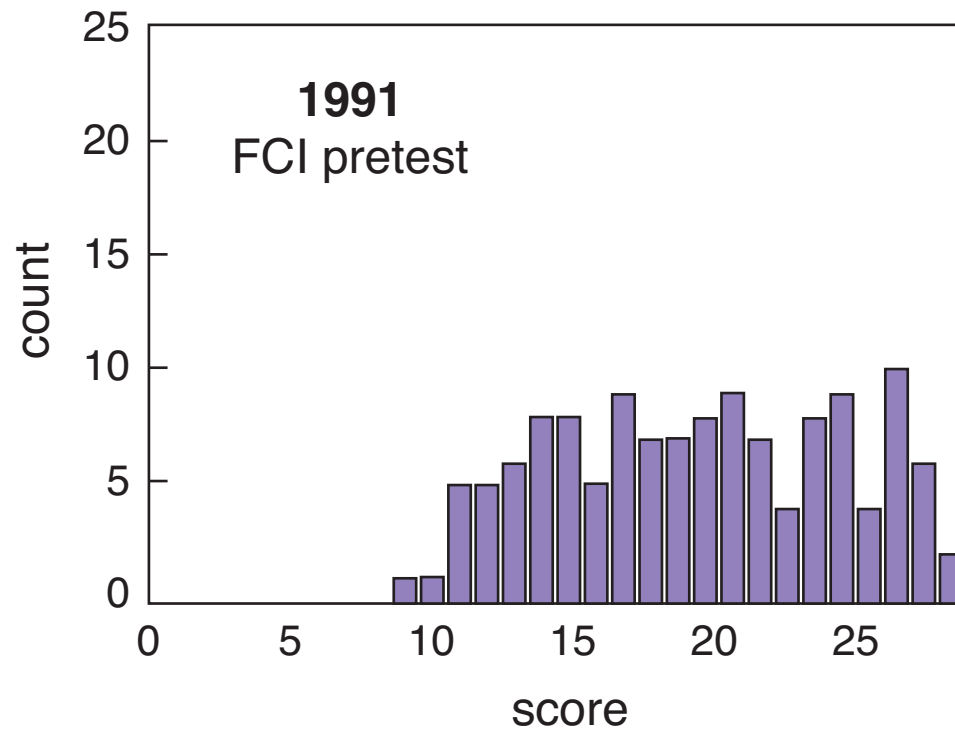
- 1. Question**
- 2. Thinking**
- 3. Individual answer**
- 4. Peer discussion**
- 5. Revised/Group answer**
- 6. Explanation**

Results

is it any good?

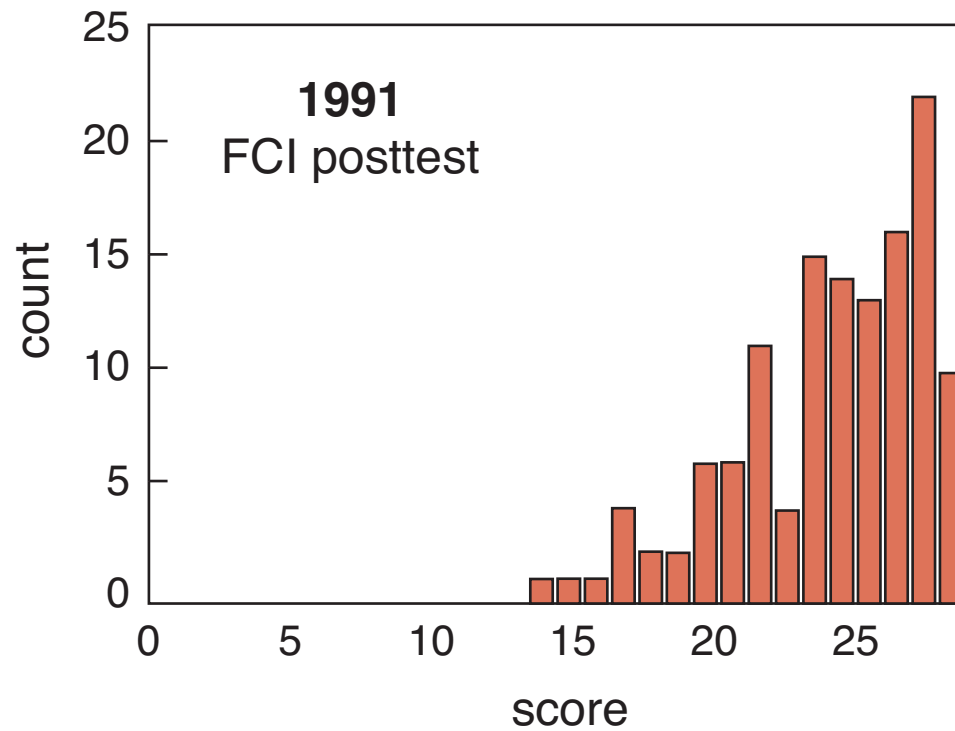
Results

first year of implementing PI



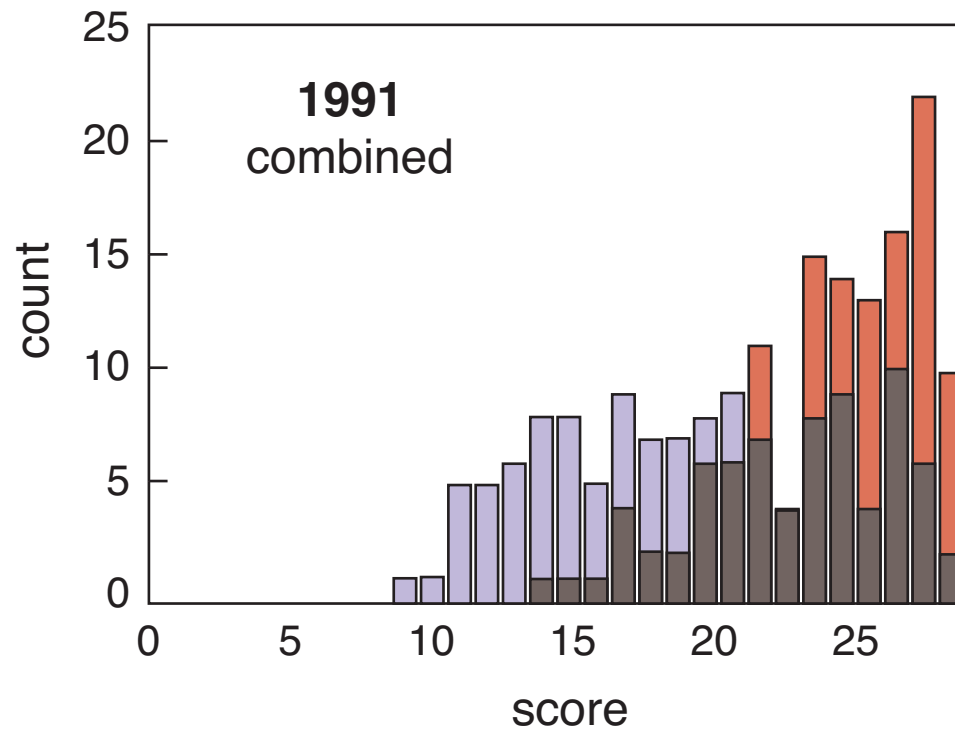
Results

first year of implementing PI



Results

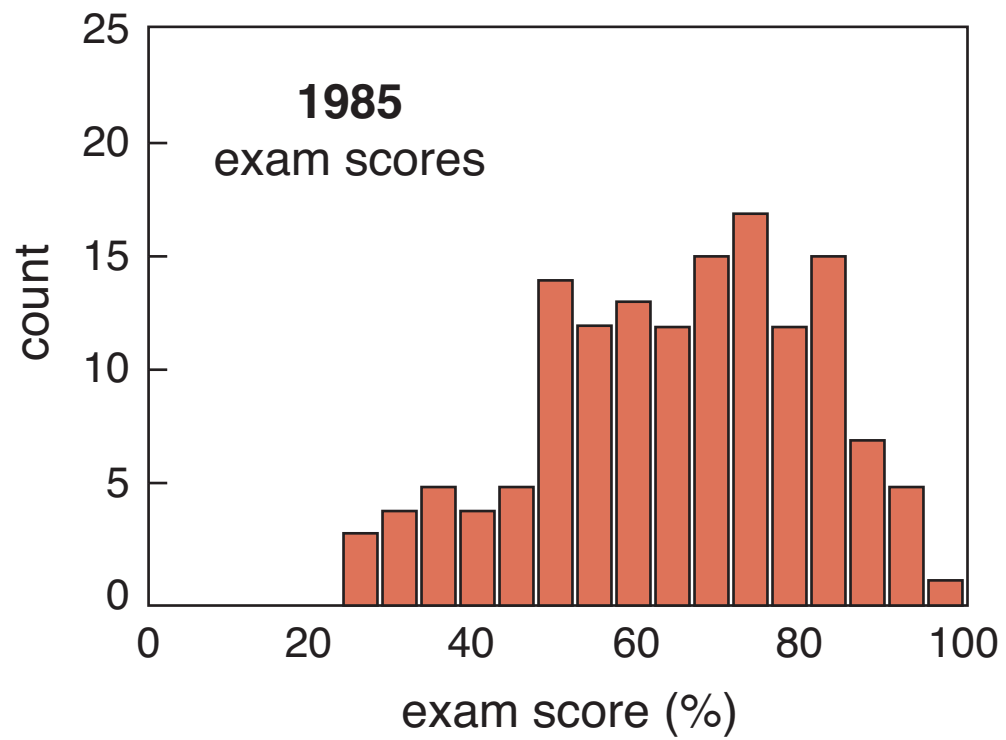
first year of implementing PI



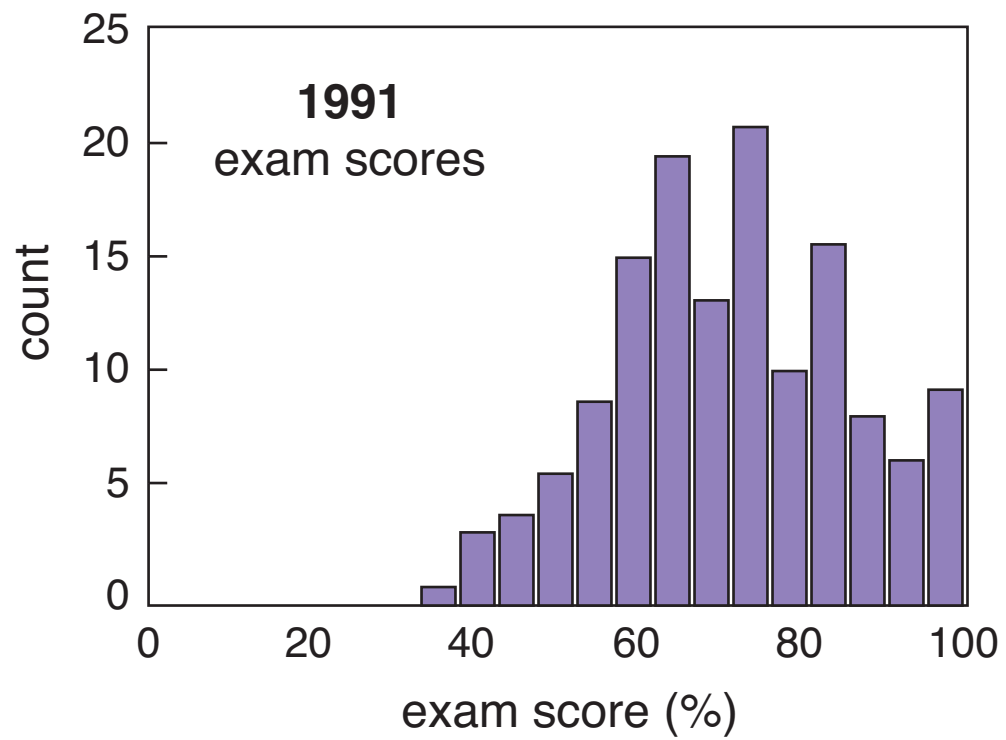
Results

what about problem solving?

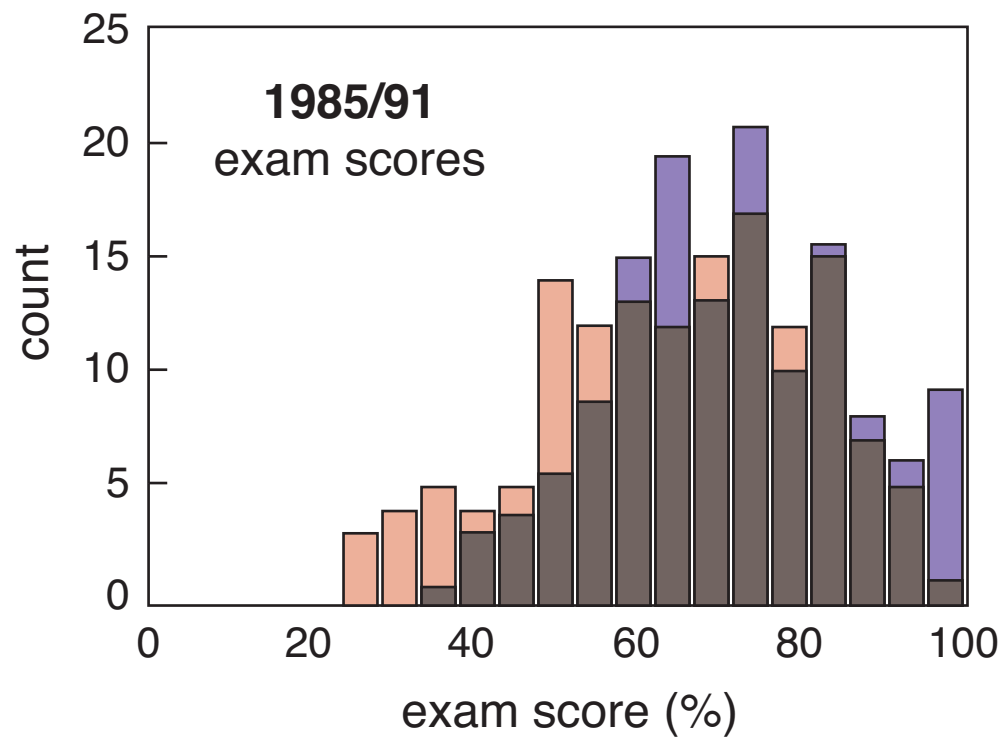
Results



Results



Results



Conclusion

**So better understanding leads to better
problem solving!**

Conclusion

So better understanding leads to better problem solving!

(but “good” problem solving doesn’t always indicate understanding!)

Funding:

National Science Foundation

for a copy of this presentation:

<http://mazur-www.harvard.edu>

Follow me!



eric_mazur

Google™

Google Search

I'm Feeling Lucky

Google™

[Google Search](#)[I'm Feeling Lucky](#)



mazur

Google Search

I'm Feeling Lucky

Google™

mazur

Google Search

I'm Feeling Lucky

Funding:

National Science Foundation

for a copy of this presentation:

<http://mazor-www.harvard.edu>

Follow me!



eric_mazor