

Confessions of a converted lecturer

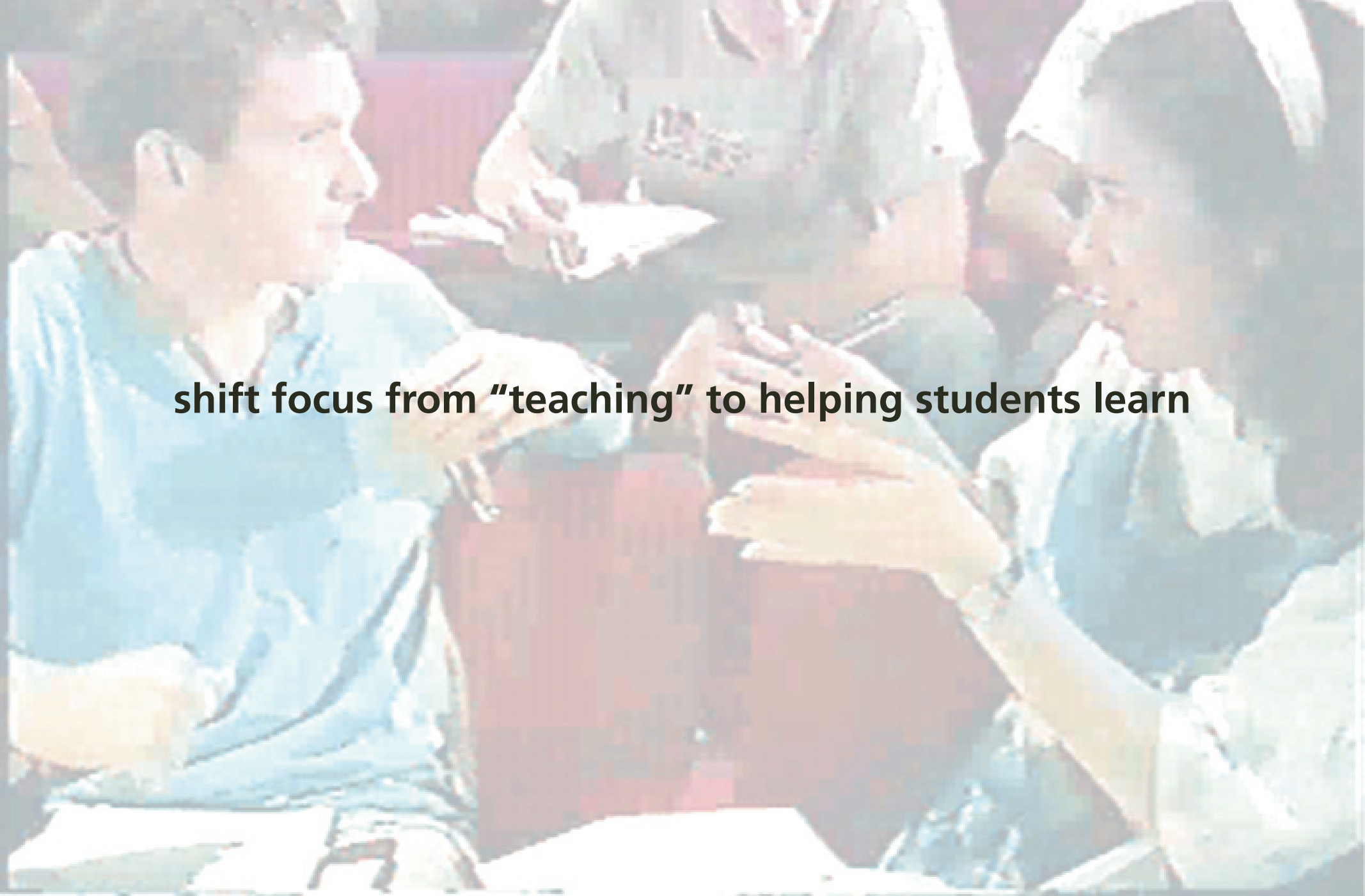


Provost's Series on University Teaching and Learning
Montclair State University
Montclair, NJ, April 6, 2011



My message

shift focus from "teaching" to helping students learn



Outline

- Education



Outline

- Education
- Peer Instruction



Outline

- Education
- Peer Instruction
- Results

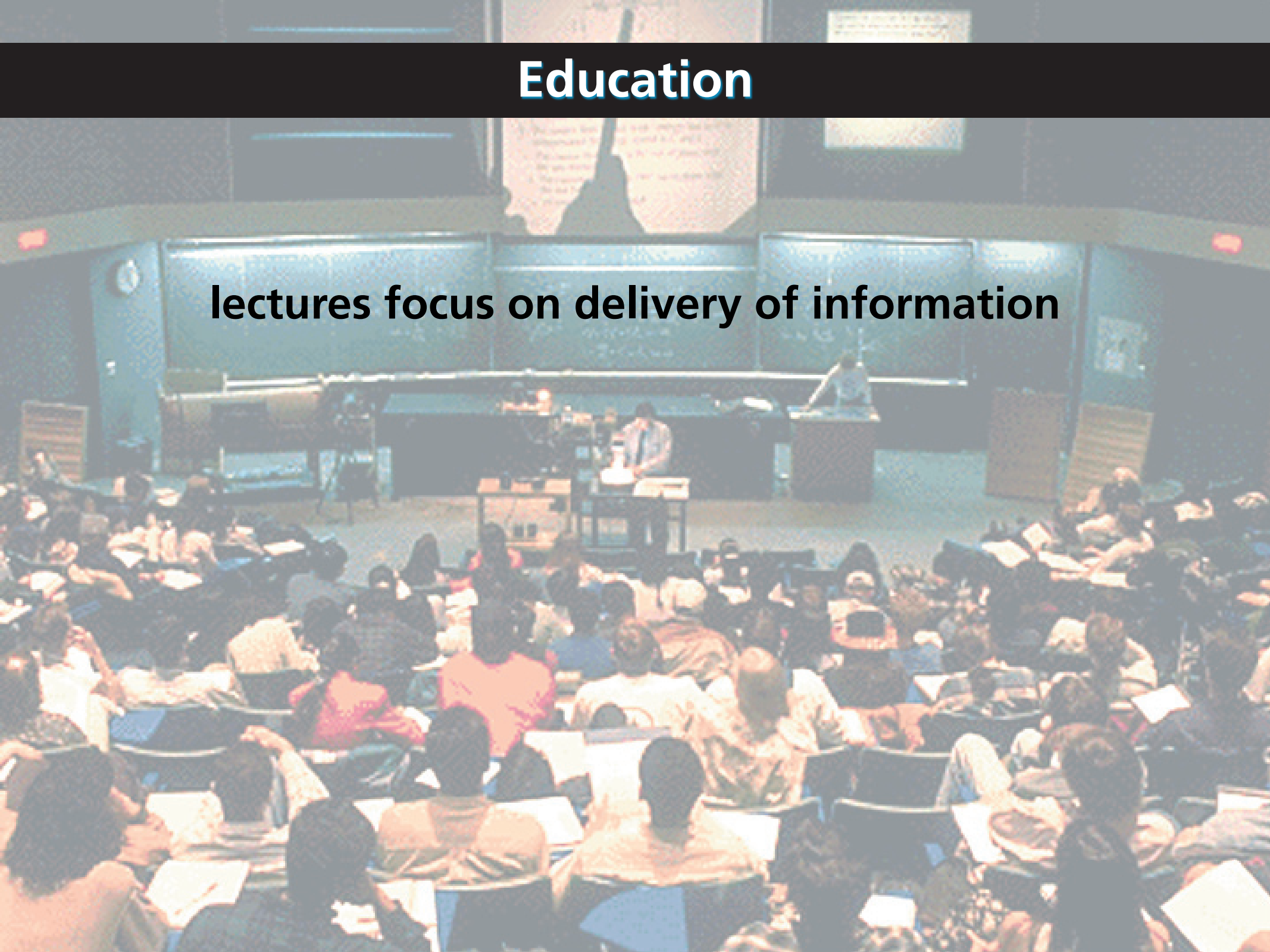


Education



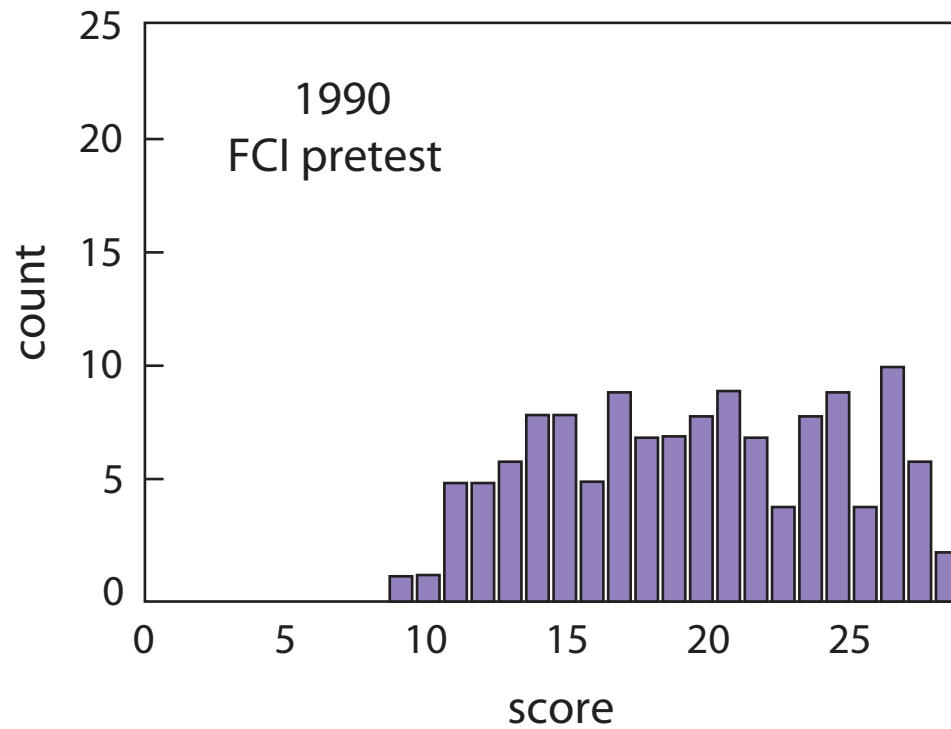
Education

lectures focus on delivery of information



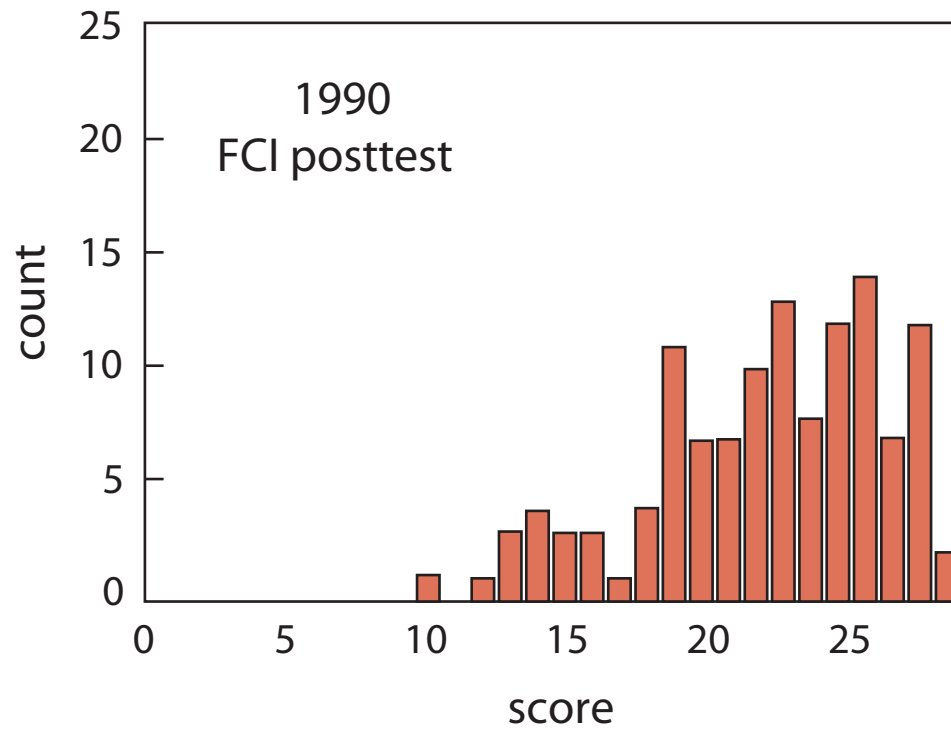
Education

education is not just information transfer



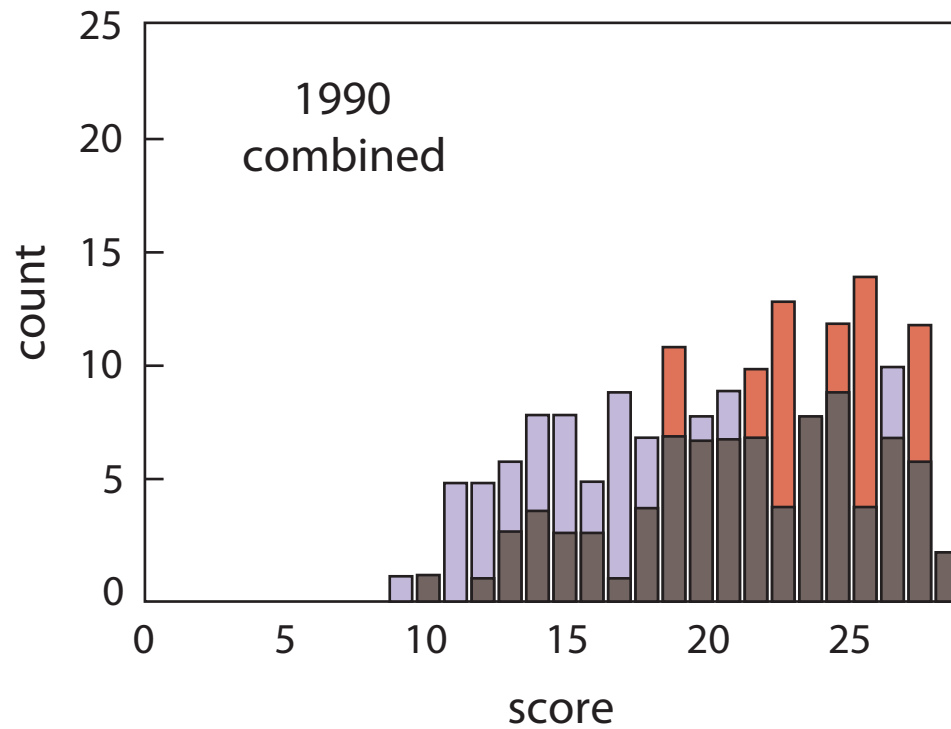
Education

education is not just information transfer

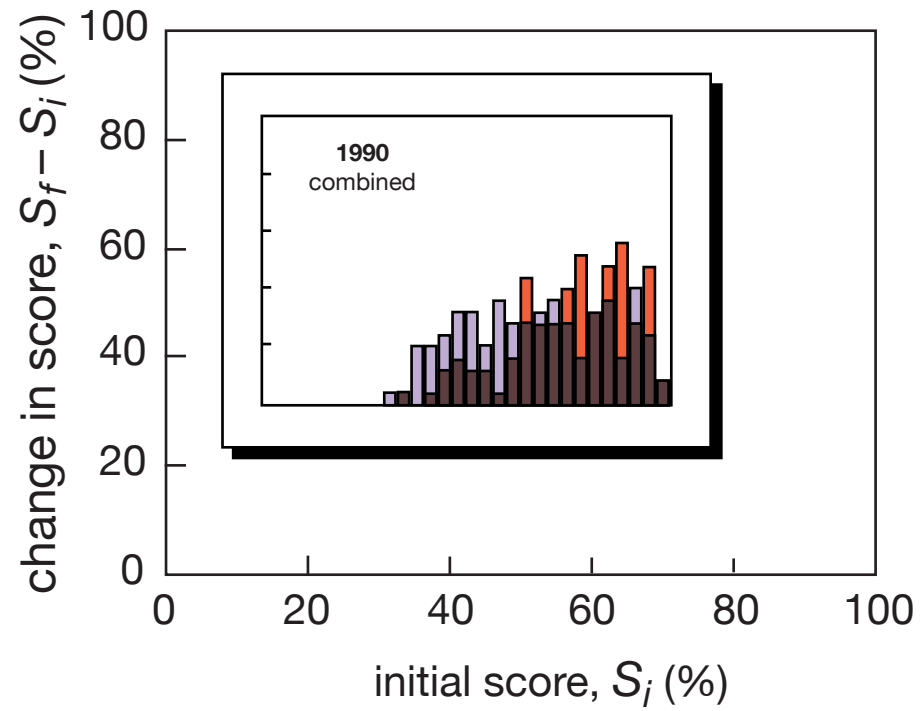


Education

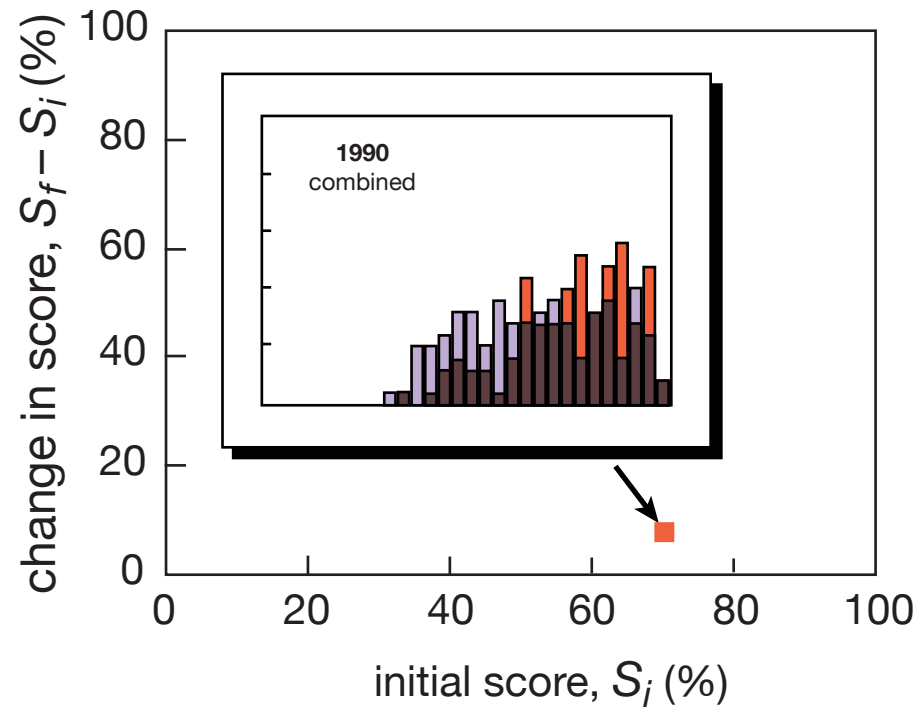
education is not just information transfer



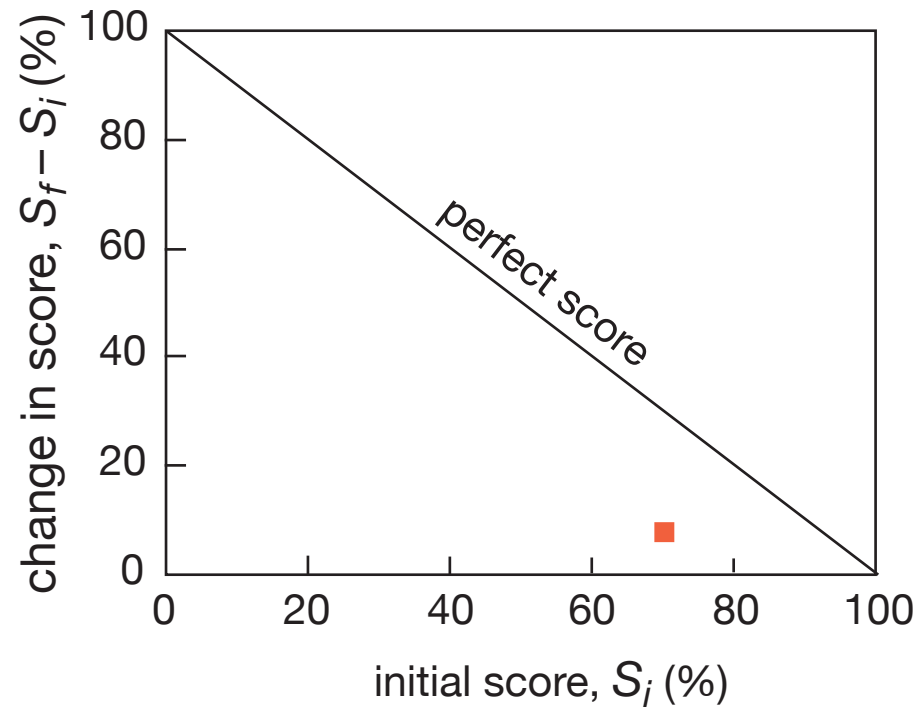
Education



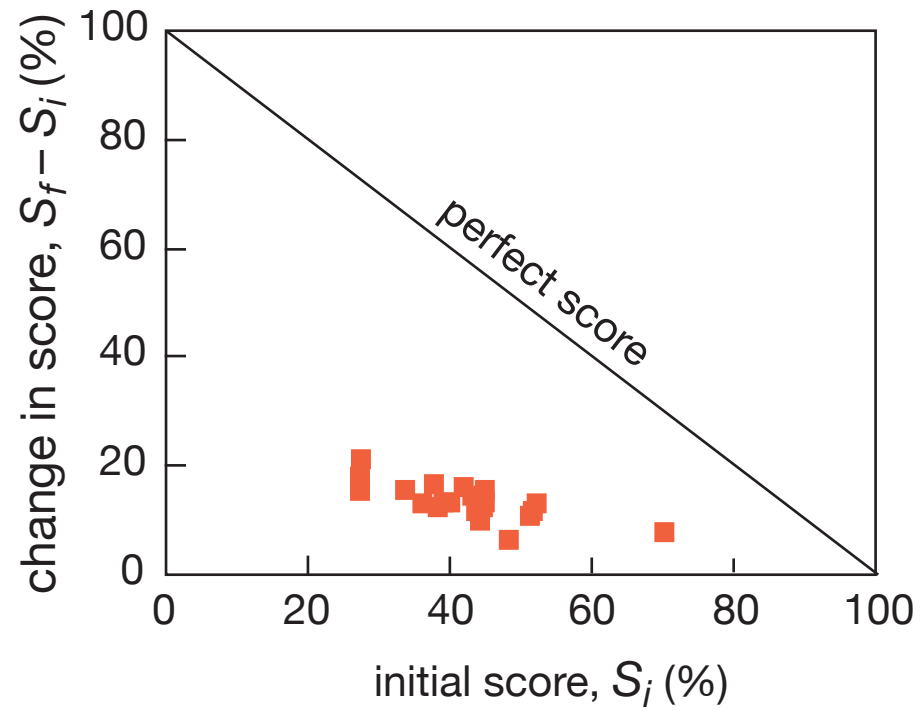
Education



Education

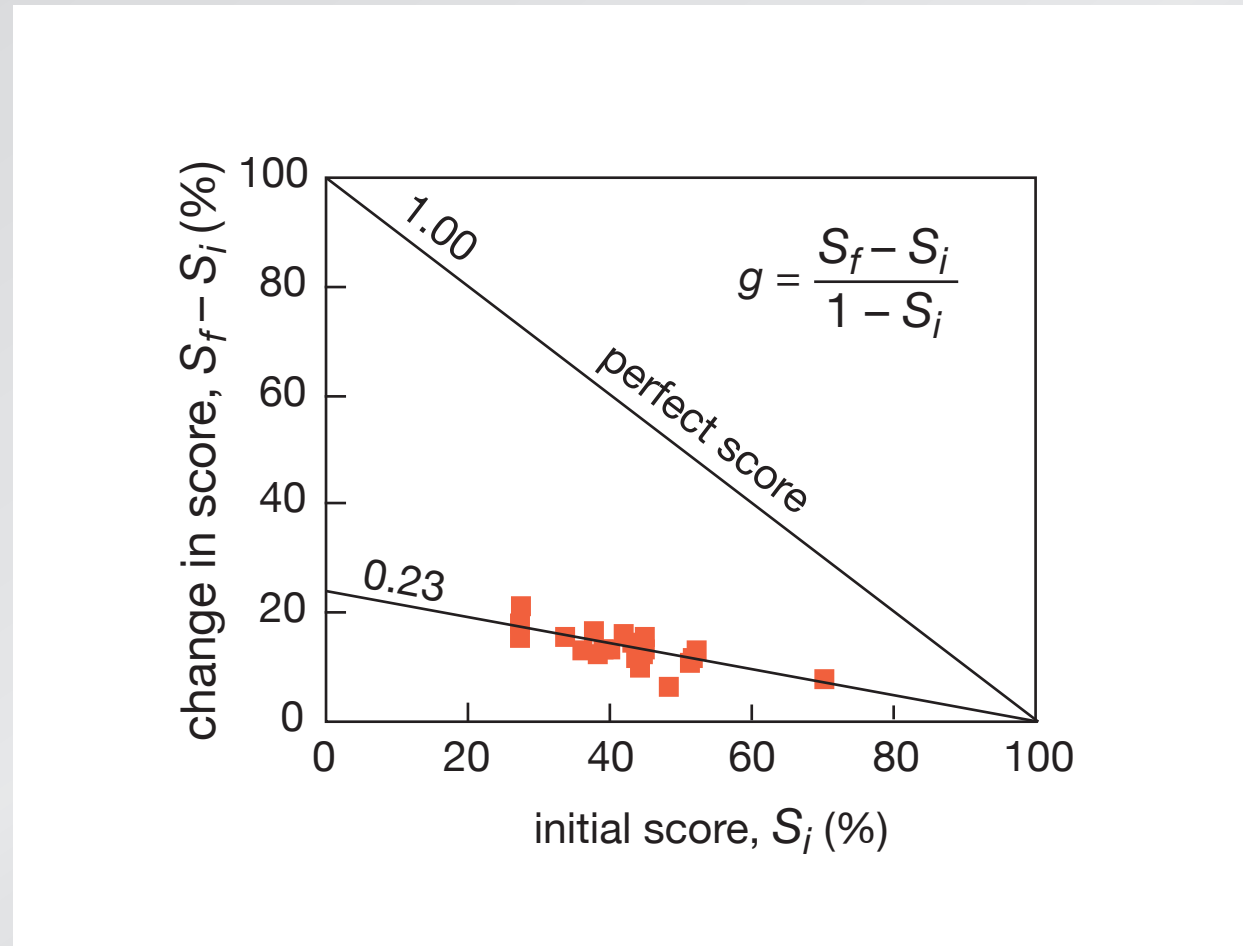


Education



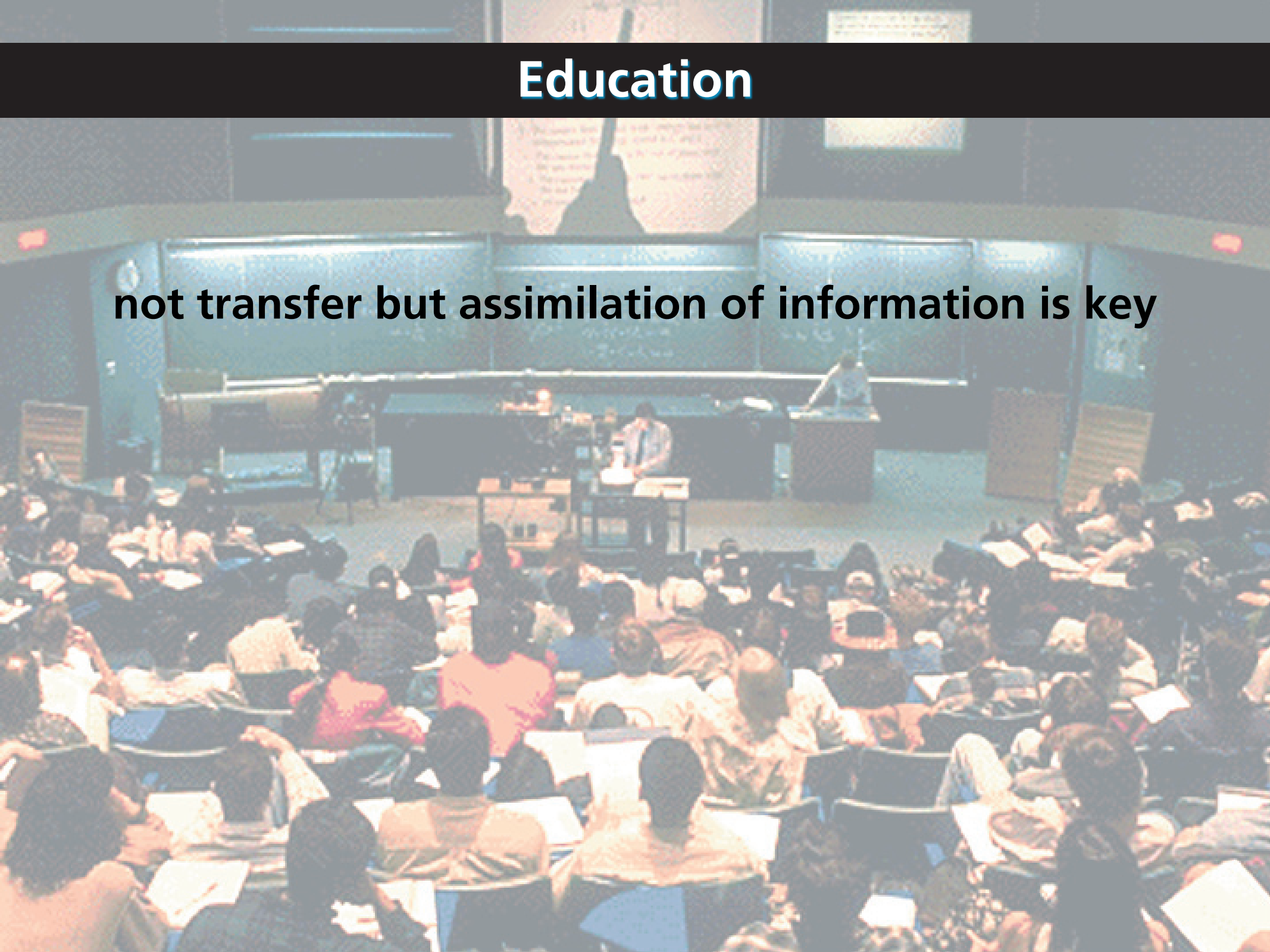
Education

only one quarter of maximum gain realized



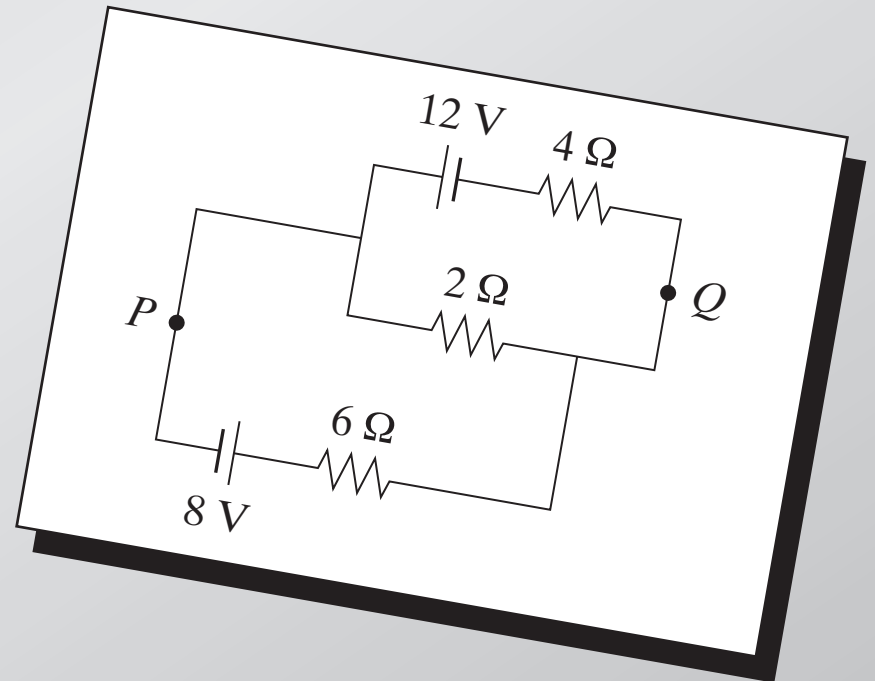
Education

not transfer but assimilation of information is key



Education

conventional problems misleading



Education

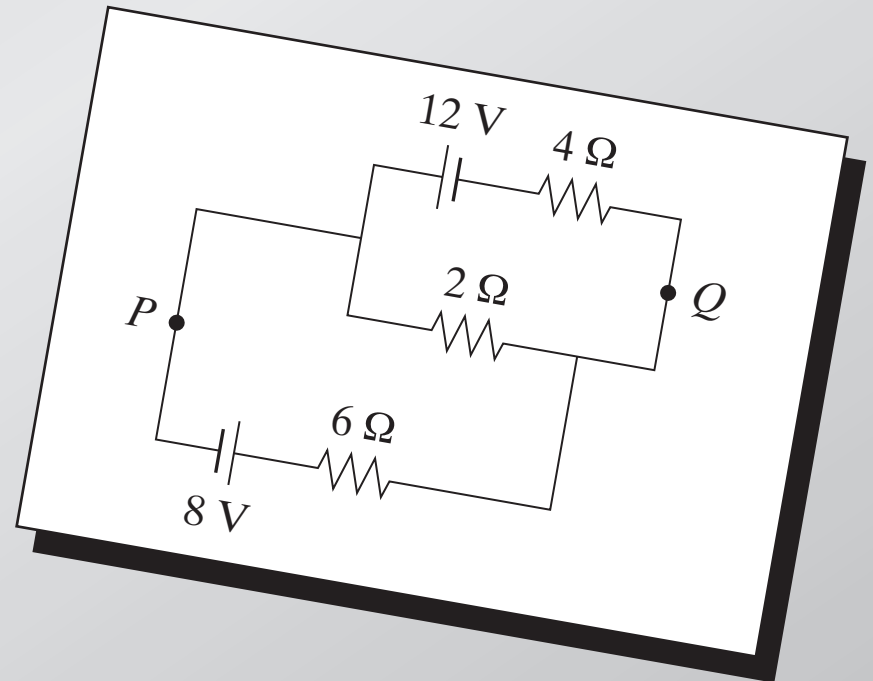
conventional problems misleading

Calculate:

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

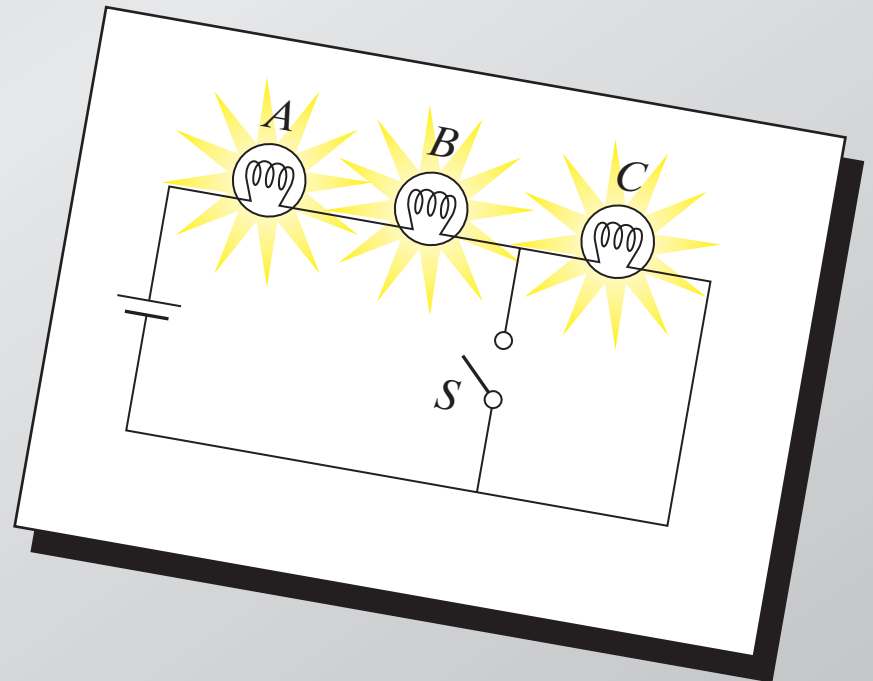
(b) potential difference

between P and Q



Education

are the basic principles understood?

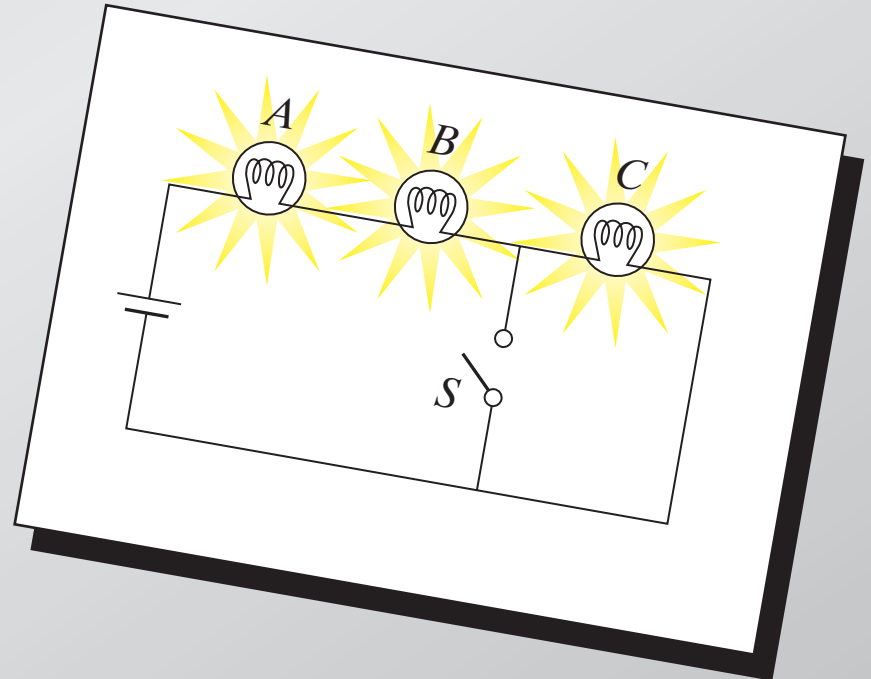


Education

are the basic principles understood?

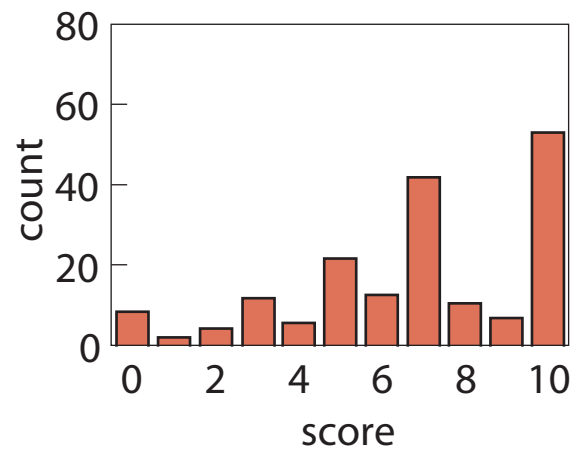
When S is closed, what happens to:

- (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?

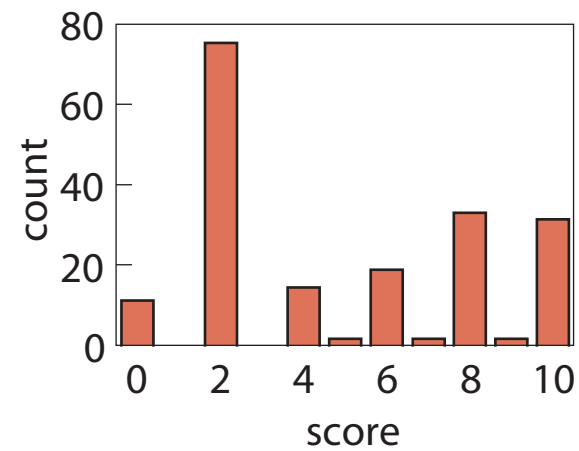


Education

conventional

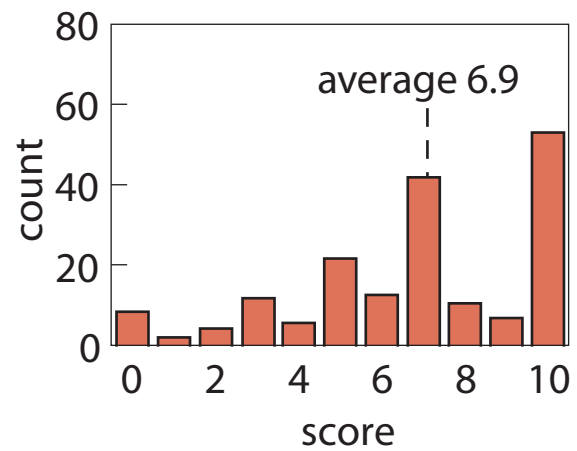


conceptual

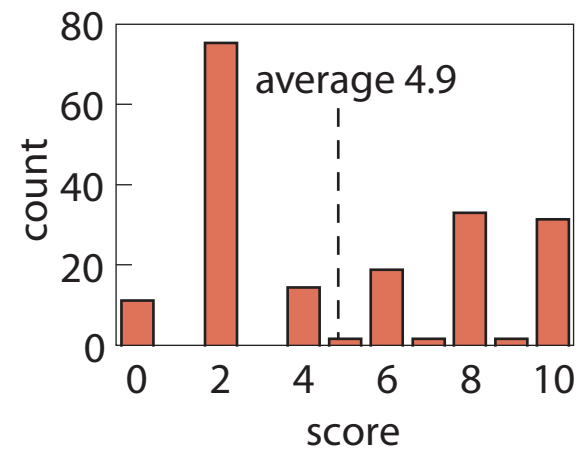


Education

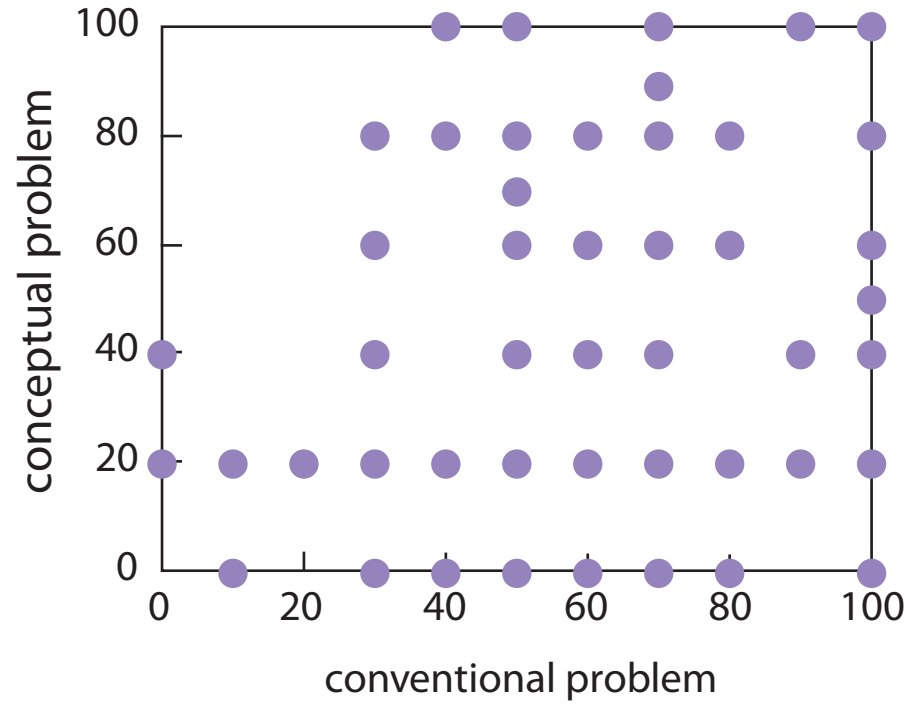
conventional



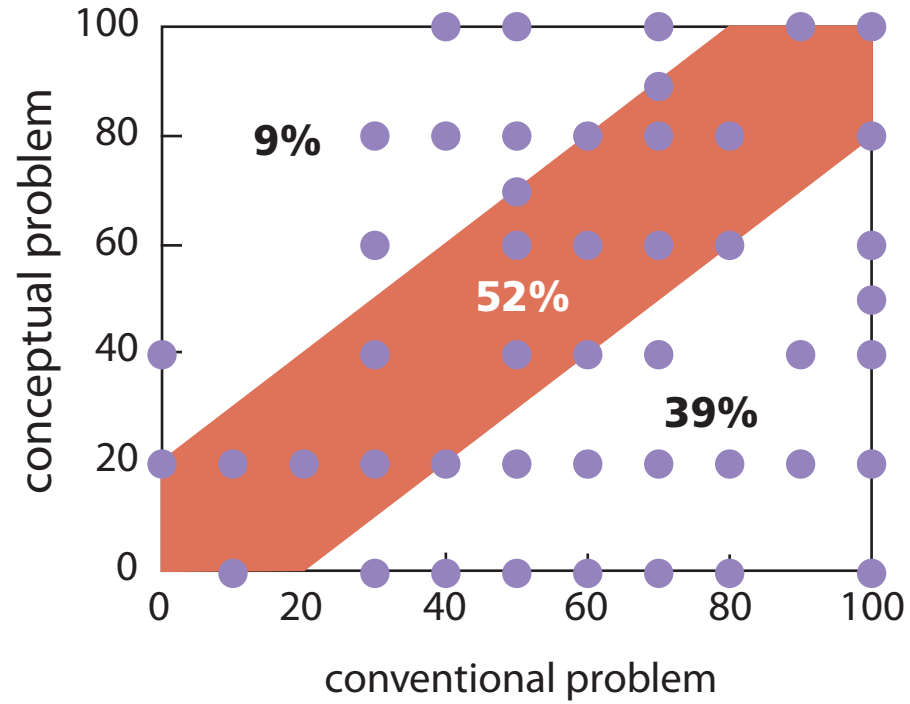
conceptual



Education



Education



A large lecture hall with students seated at desks, facing a stage with a lecturer and a large screen displaying text. The text on the screen is partially legible and appears to be a list of items or a document. The room is dimly lit, with the stage area being the primary light source. The students are mostly seen from behind, looking towards the front of the room. The lecturer is standing at a podium on the stage, facing the audience. The overall atmosphere is that of a formal academic setting.

So what should we do?

Peer Instruction

Give students more responsibility for gathering information...

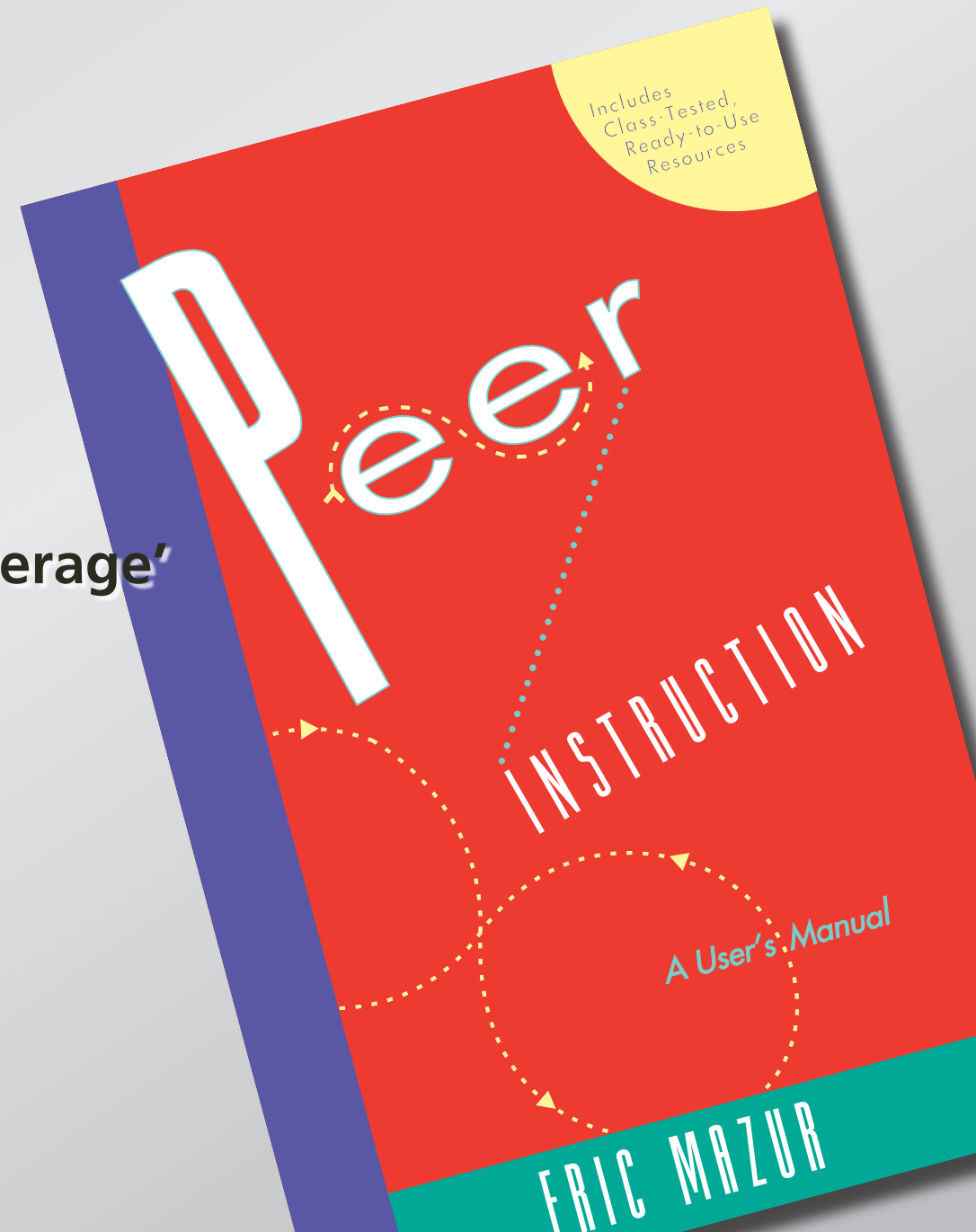
Peer Instruction

**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

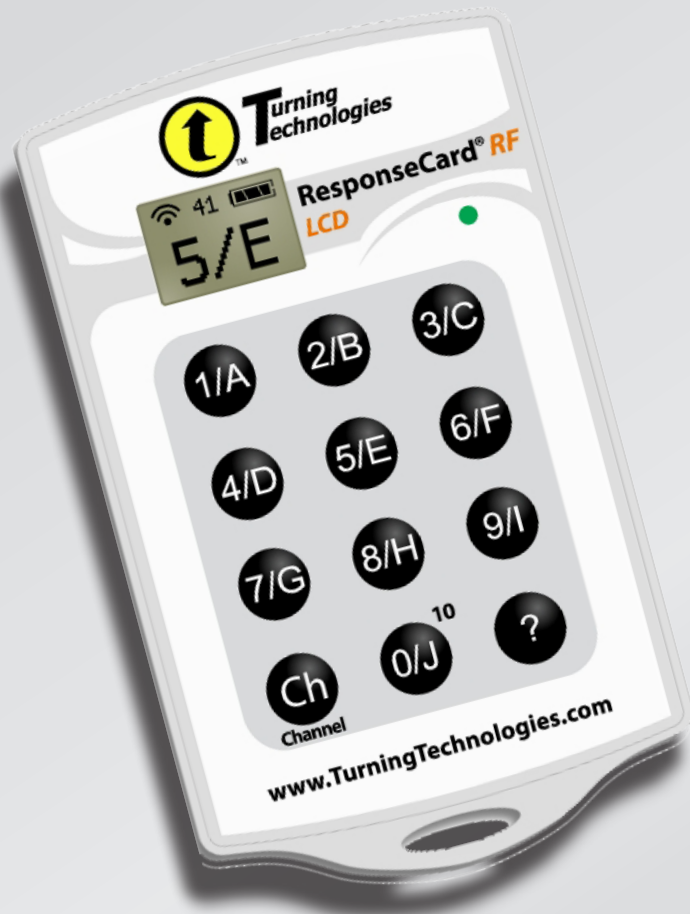


Peer Instruction

ConcepTest:

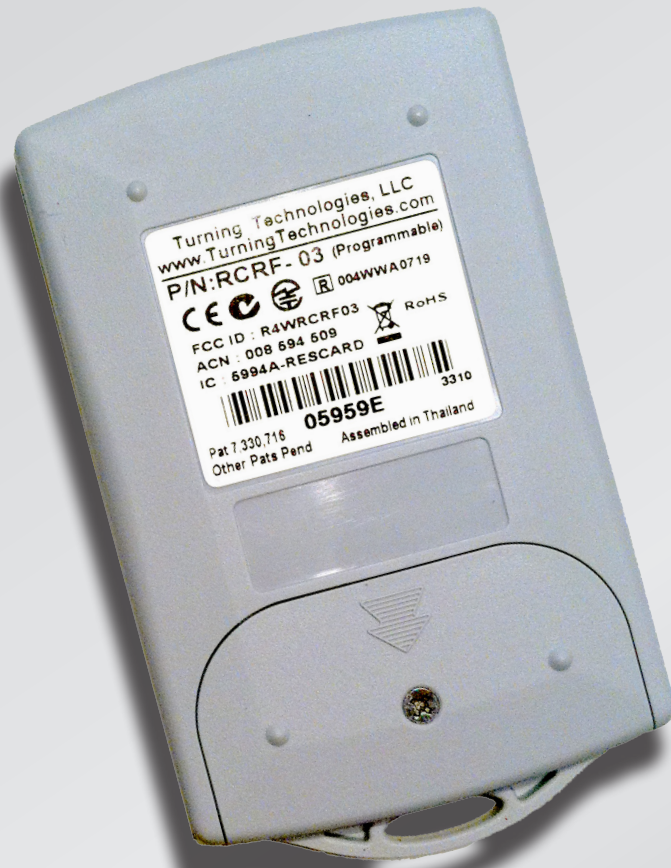
- 1. Question**
- 2. Thinking**
- 3. Individual answer**
- 4. Peer discussion**
- 5. Revised/Group answer**
- 6. Explanation**

Get your clickers ready!



- no ON/OFF button
- only last "click" counts
- display shows recorded answer

Get your clickers ready!



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Get your clickers ready!



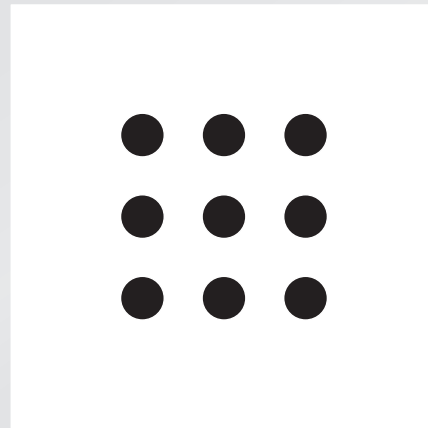
unique ID on back of clicker

Let's try it!

When metals heat up, they expand because all atoms get farther away from each other.

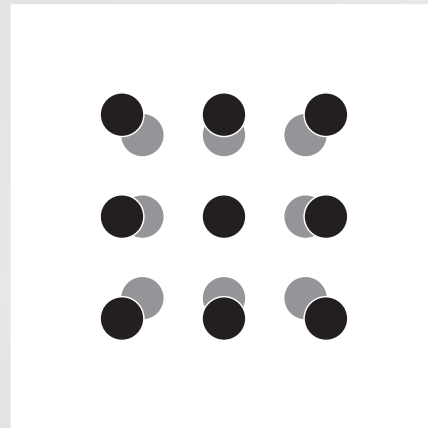
Let's try it!

When metals heat up, they expand because all atoms get farther away from each other.



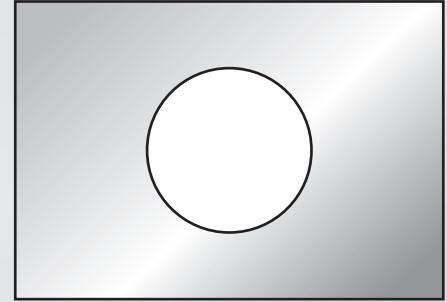
Let's try it!

When metals heat up, they expand because all atoms get farther away from each other.



Let's try it!

Consider a rectangular metal plate with a circular hole in it.

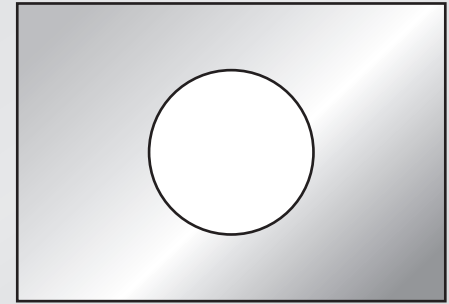


Let's try it!

Consider a rectangular metal plate with a circular hole in it.

When the plate is uniformly heated, the diameter of the hole

1. increases.
2. stays the same.
3. decreases.



Let's try it!

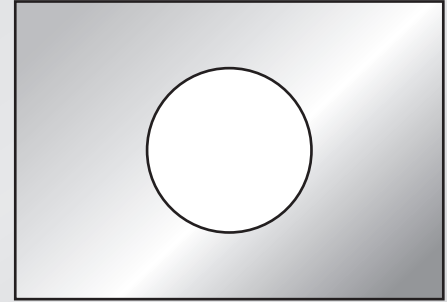
It's easy to fire up the audience!

Let's try it!

Consider a rectangular metal plate with a circular hole in it.

When the plate is uniformly heated, the diameter of the hole

1. increases. ✓
2. stays the same.
3. decreases.



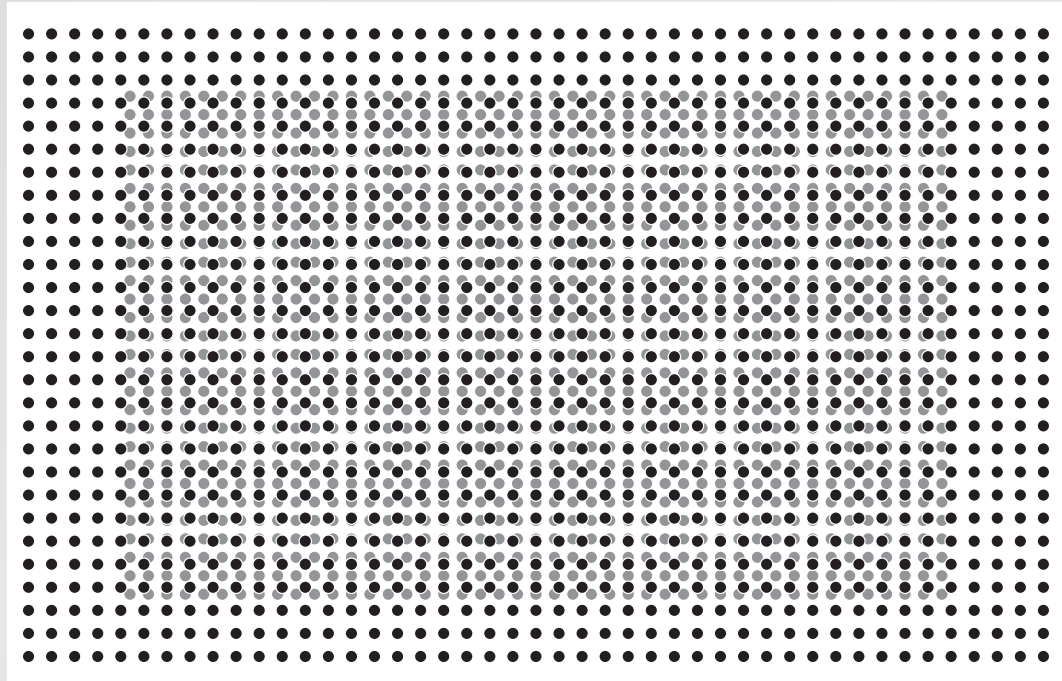
Let's try it!

remember: all atoms must get farther away from each other!



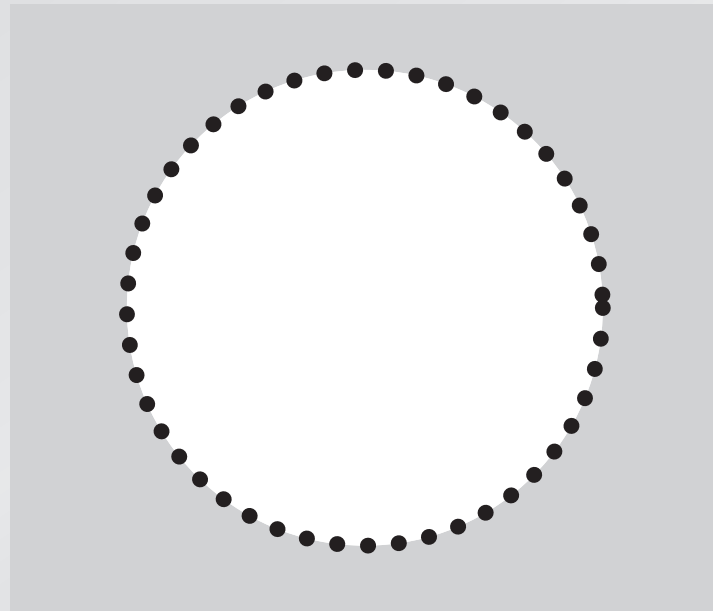
Let's try it!

remember: all atoms must get farther away from each other!



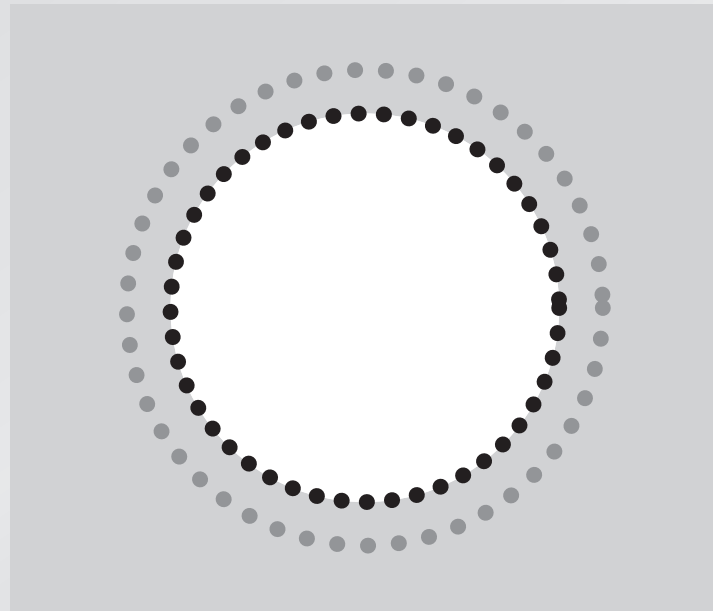
Let's try it!

consider the atoms at the rim of the hole



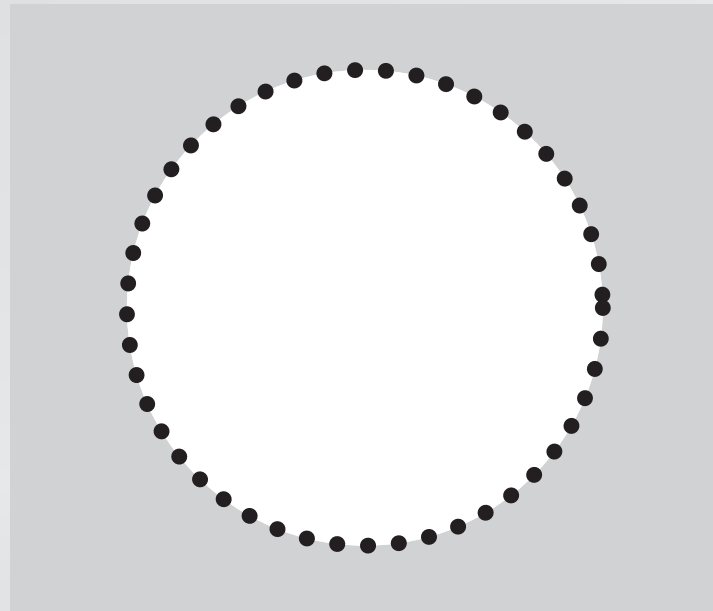
Let's try it!

consider the atoms at the rim of the hole



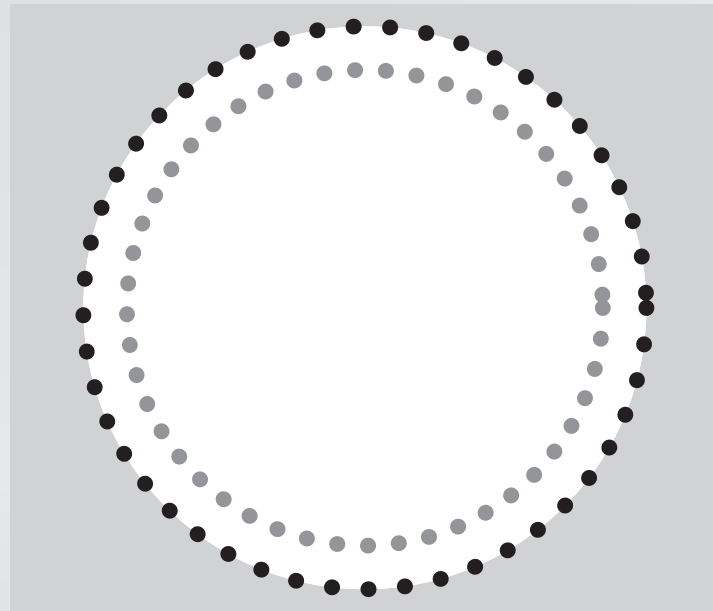
Let's try it!

consider the atoms at the rim of the hole



Let's try it!

consider the atoms at the rim of the hole



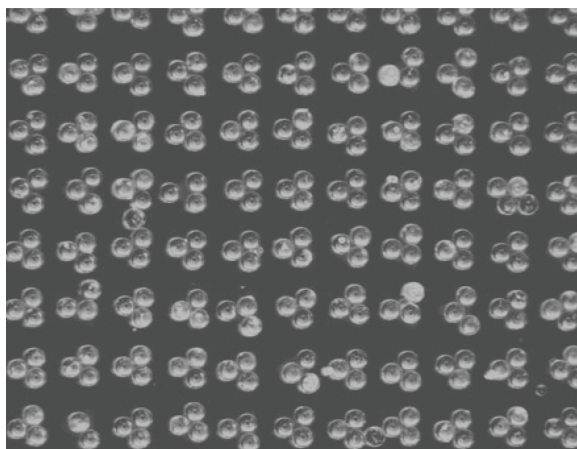
Let's try it!

Benefits:

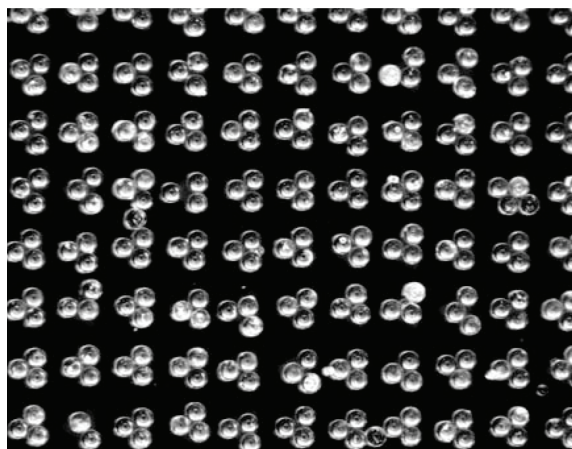
- **helps develop conceptual models**
- **solidifies understanding**
- **provides feedback**
- **empowers students**

Let's try it!

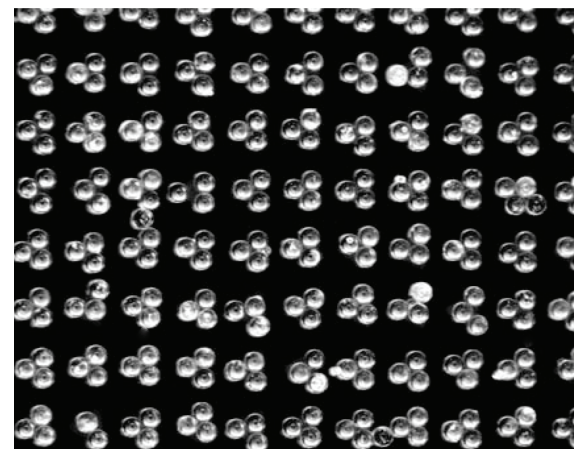
original



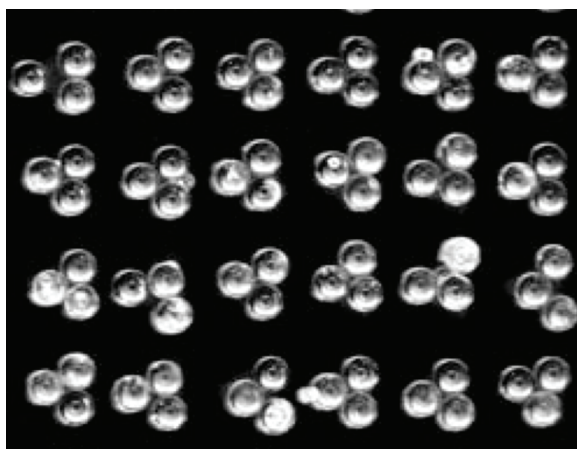
1. adjust contrast



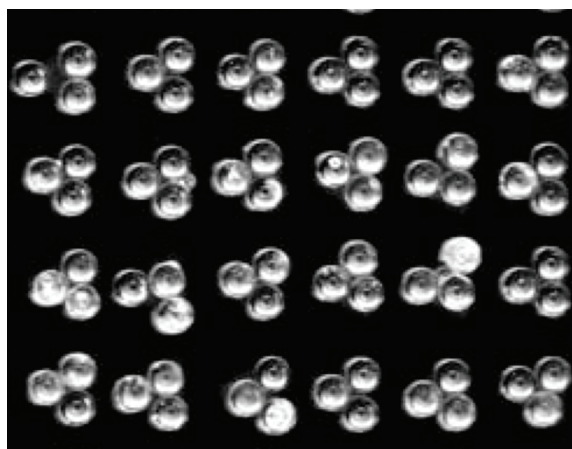
2. remove blemishes



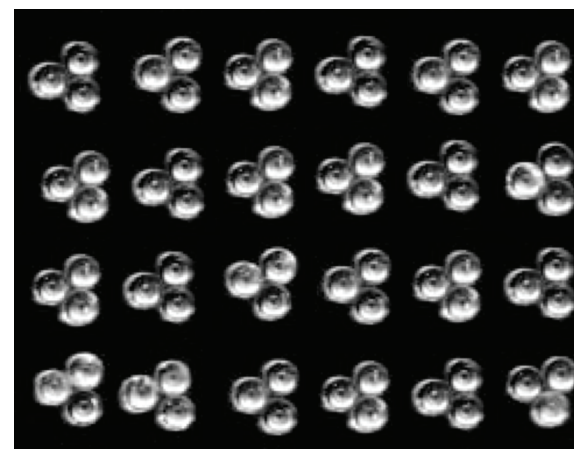
3. crop



4. remove outliers



5. reconstruct



Let's try it!

At which step were acceptable standards of ethics violated?

- 1. Optimize brightness/contrast**
- 2. Remove blemishes**
- 3. Crop on optimal area**
- 4. Remove outliers**
- 5. Reconstruct image with parts copied from other locations**



Let's try it!

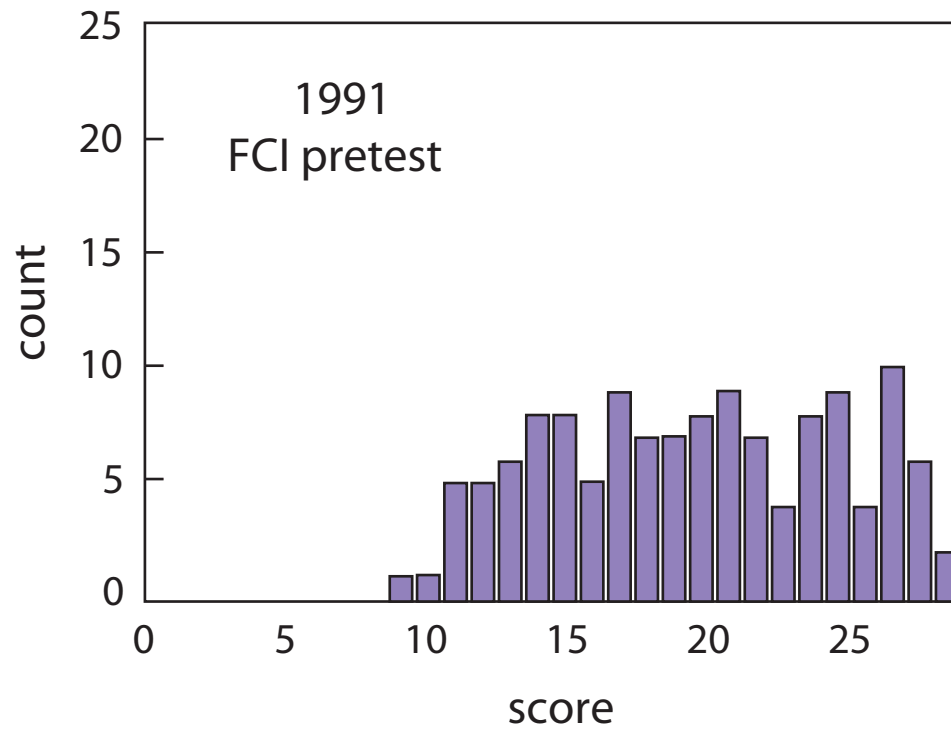
don't need a "correct" answer

Results

is it any good?

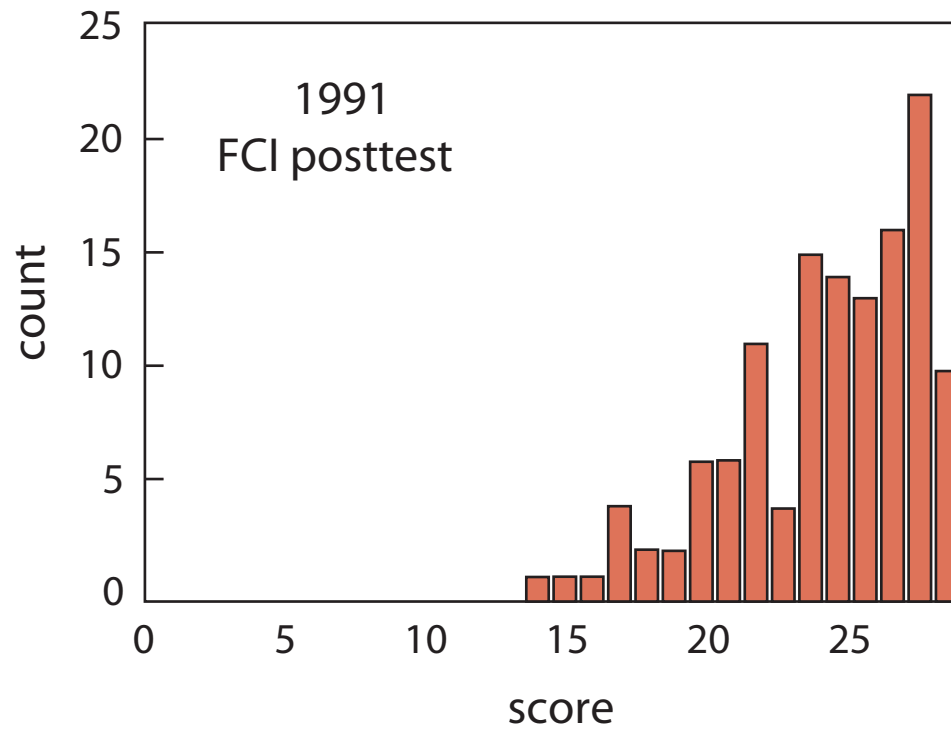
Results

first year of implementing PI



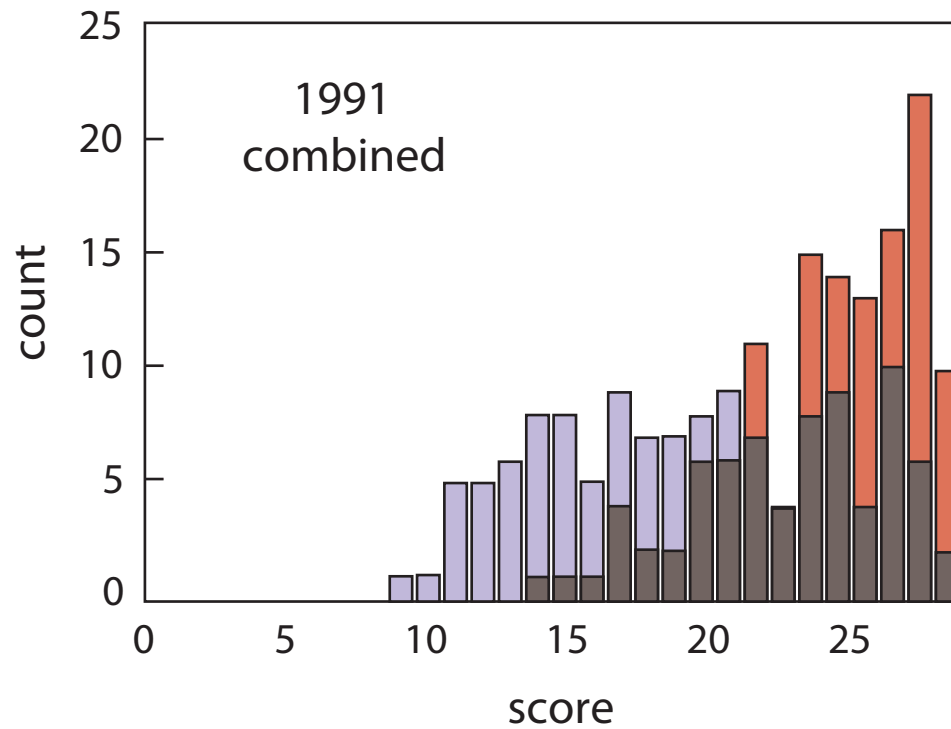
Results

first year of implementing PI

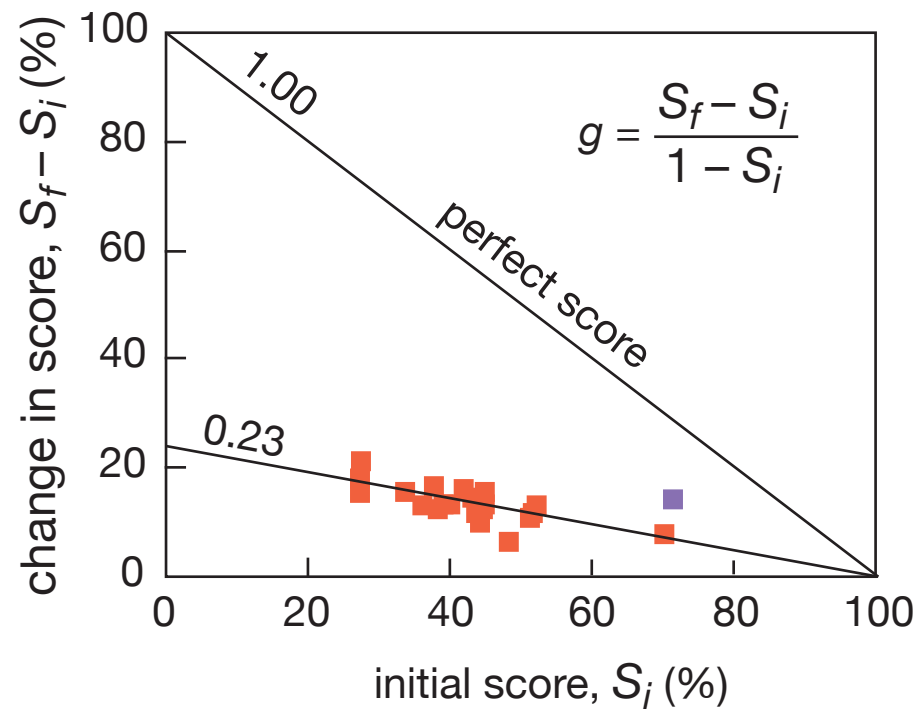


Results

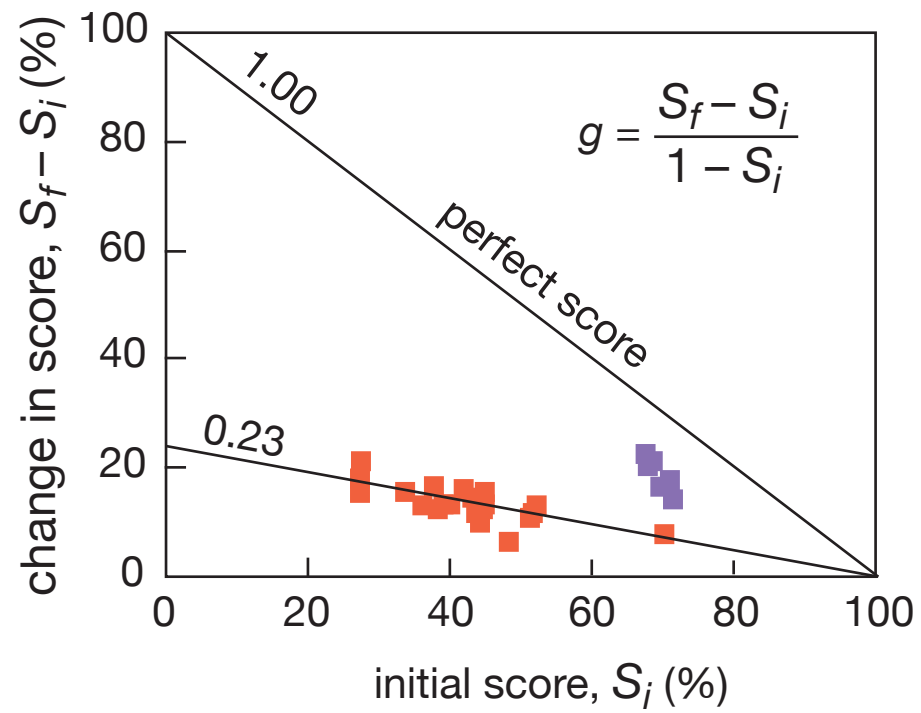
first year of implementing PI



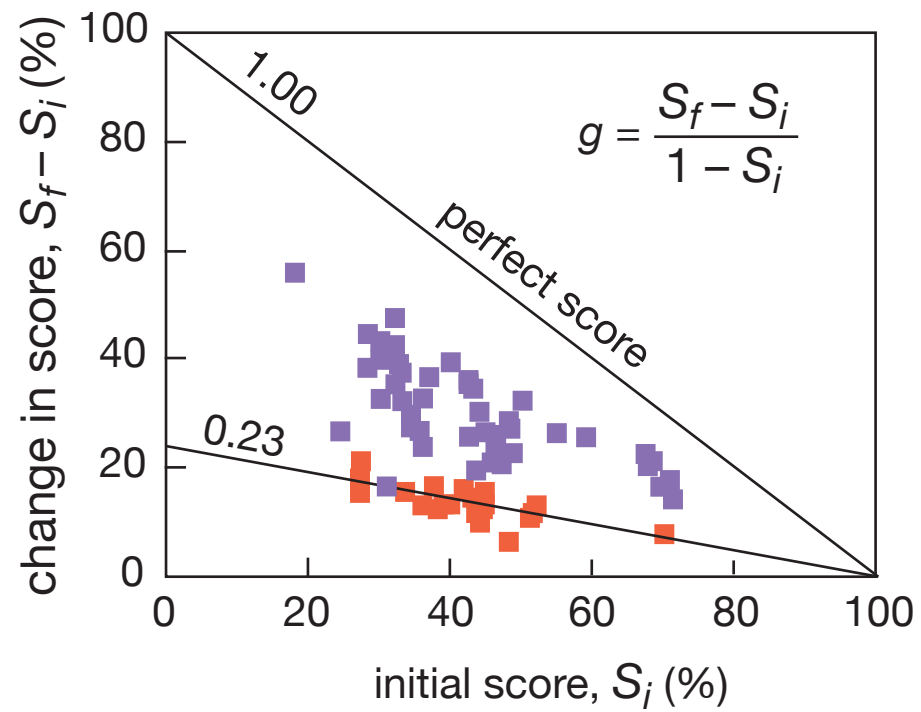
Results



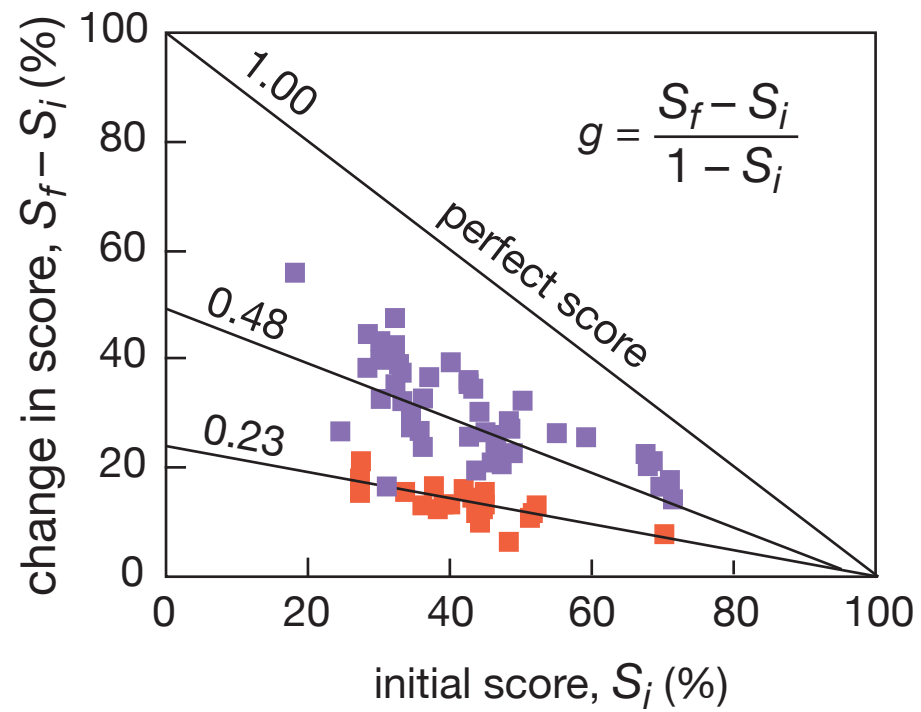
Results



Results



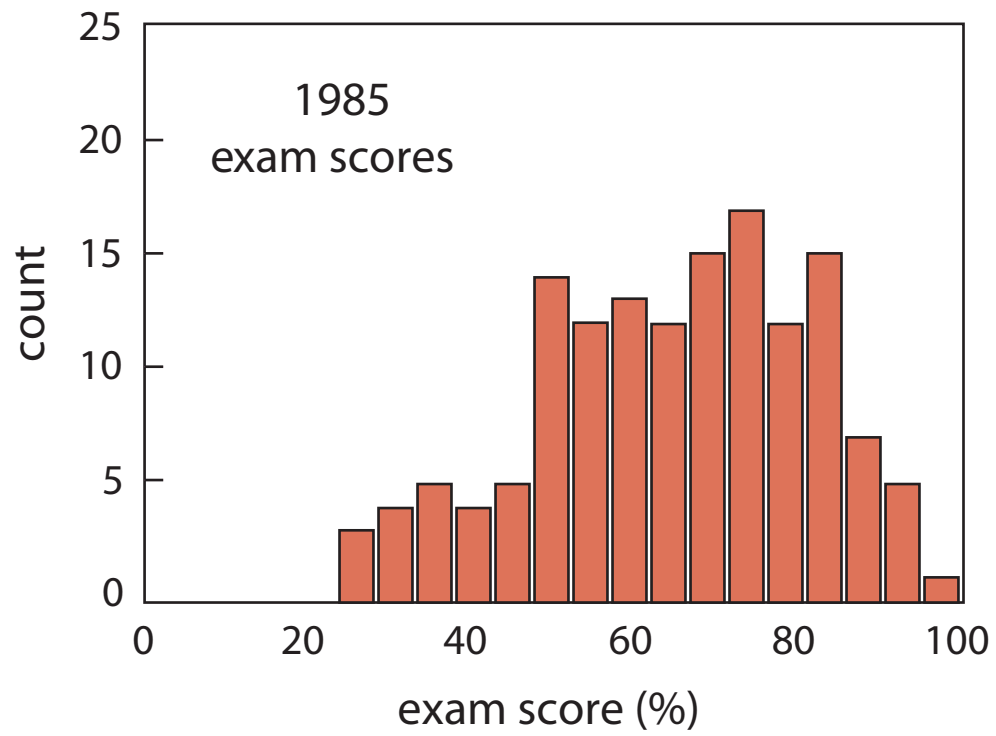
Results



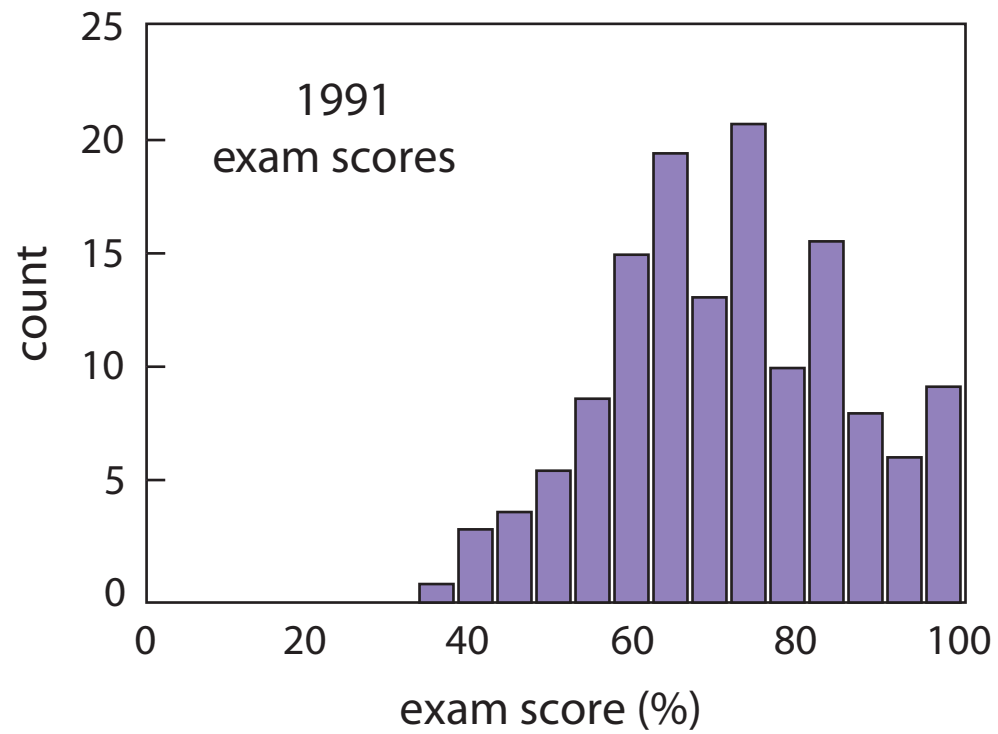
Results

what about problem solving?

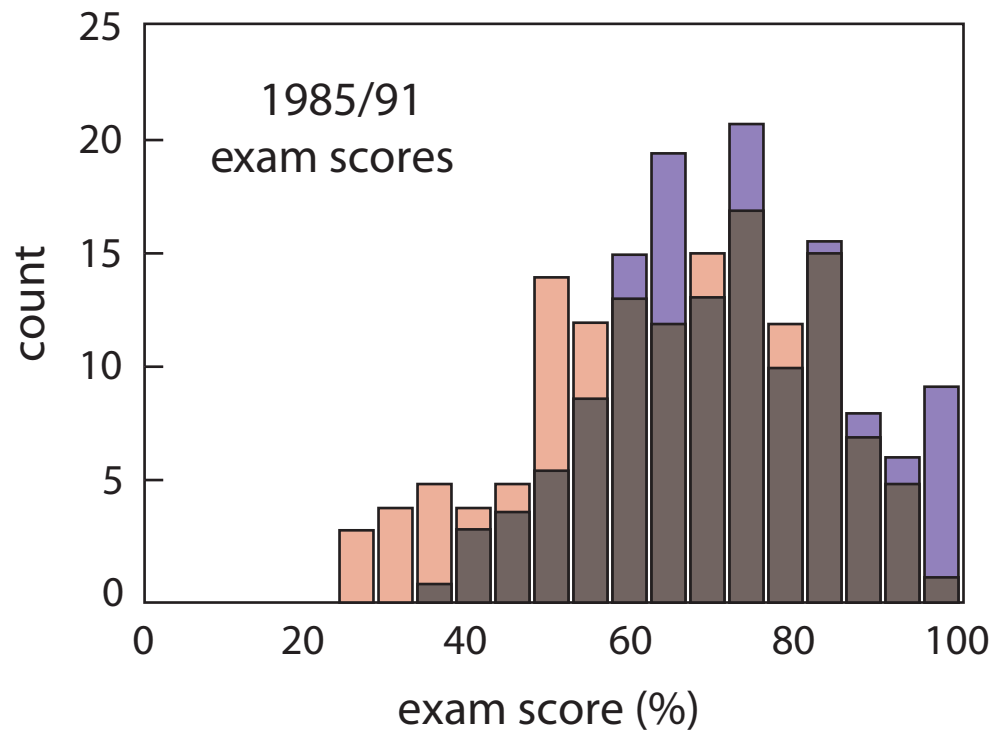
Results



Results



Results



Summary

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

Summary

So better understanding leads to better problem solving!

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

Summary

Traditional indicators of success misleading

Summary

Traditional indicators of success misleading

Education is no longer about information

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