

Turning lectures into learning



Turning Technologies National User Conference 2009
University of Nevada Las Vegas
Las Vegas, NV, 12 October 2009



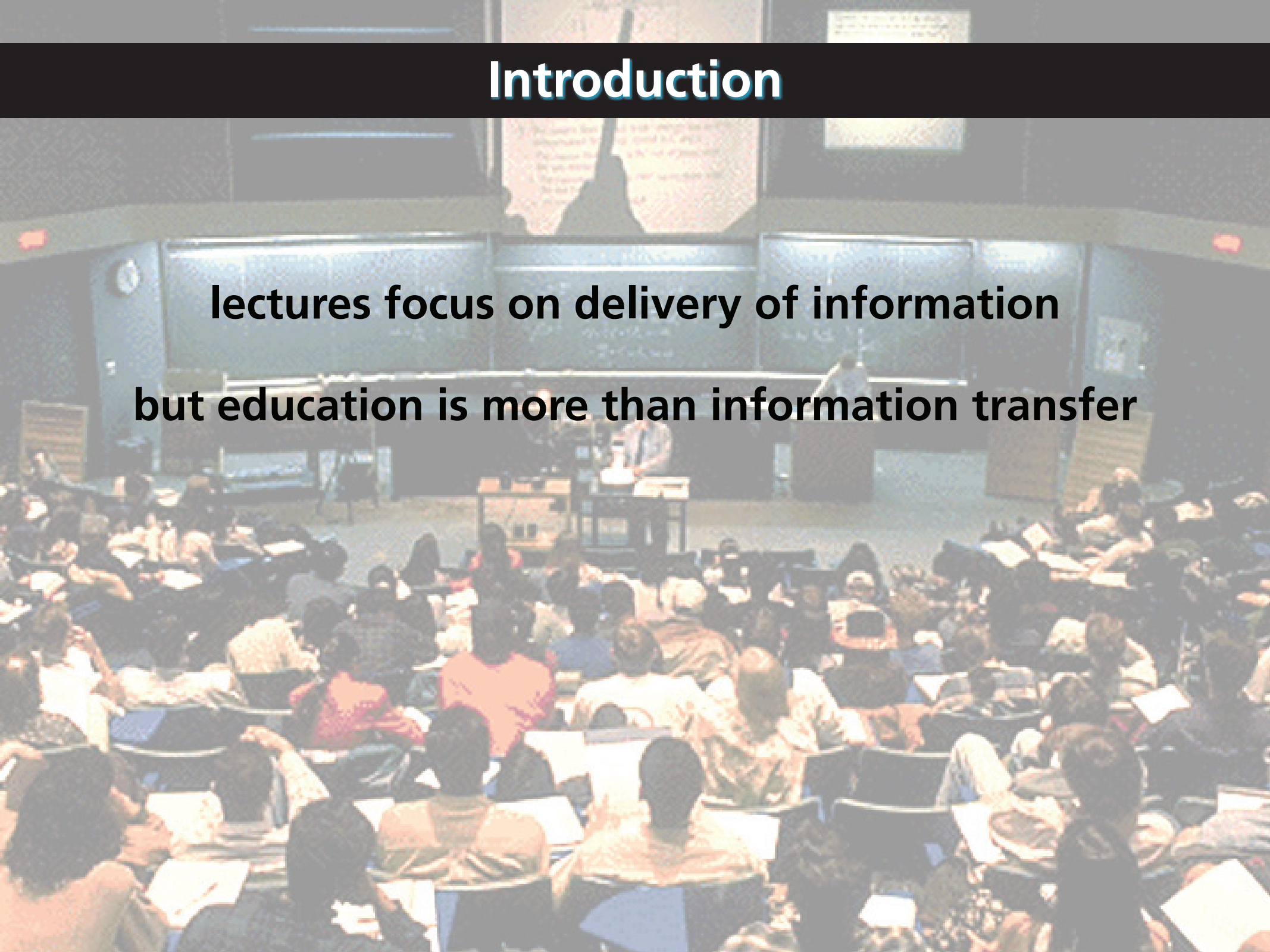
Introduction

lectures focus on delivery of information

A wide-angle photograph of a large lecture hall. In the foreground, the backs of many students are visible as they sit at rows of desks, facing the front of the room. Some students have papers or laptops open. At the front of the hall, a lecturer stands behind a podium, addressing the audience. Behind the lecturer is a large screen displaying a presentation slide with text and a graphic. The room has a curved wall and is well-lit.

Introduction

lectures focus on delivery of information
but education is more than information transfer



Outline



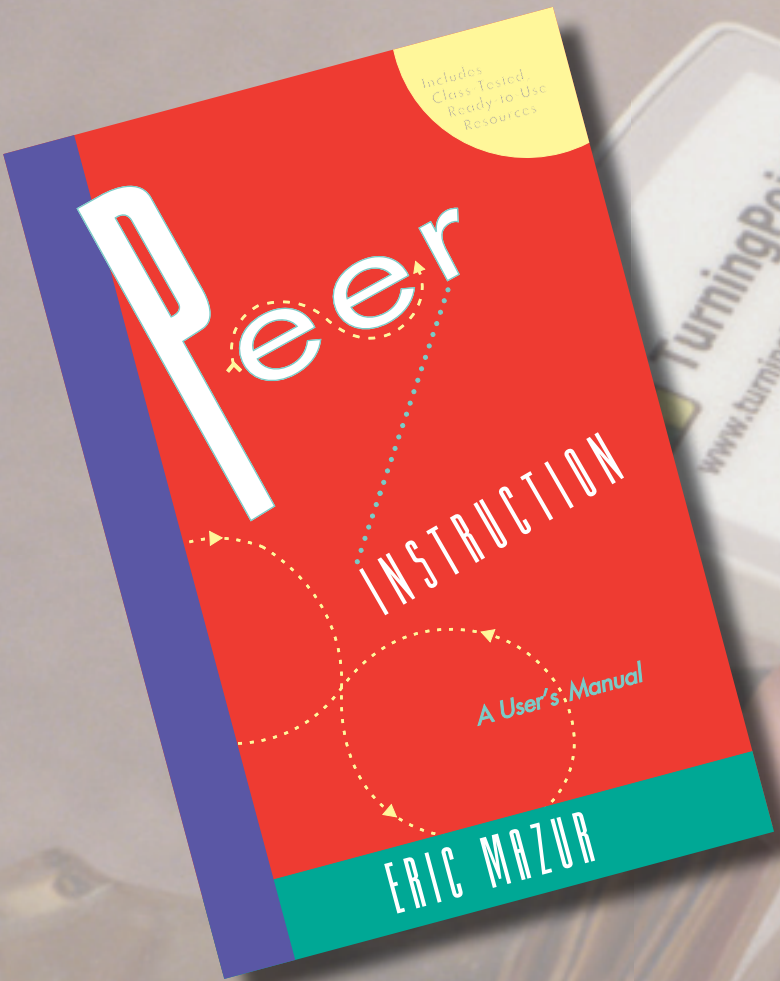
Outline

- Peer Instruction
- Let's try it!
- Results

Peer Instruction

move information transfer
out of classroom

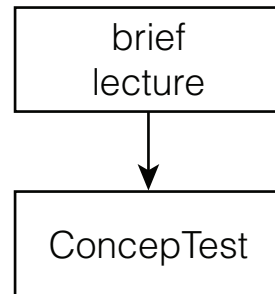
- assign reading
- teach by questioning



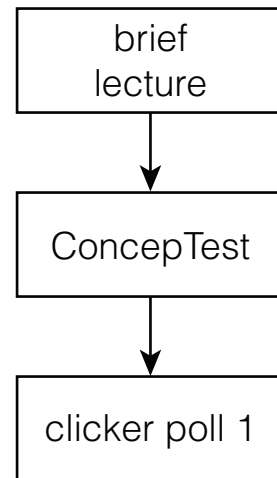
Peer Instruction

brief
lecture

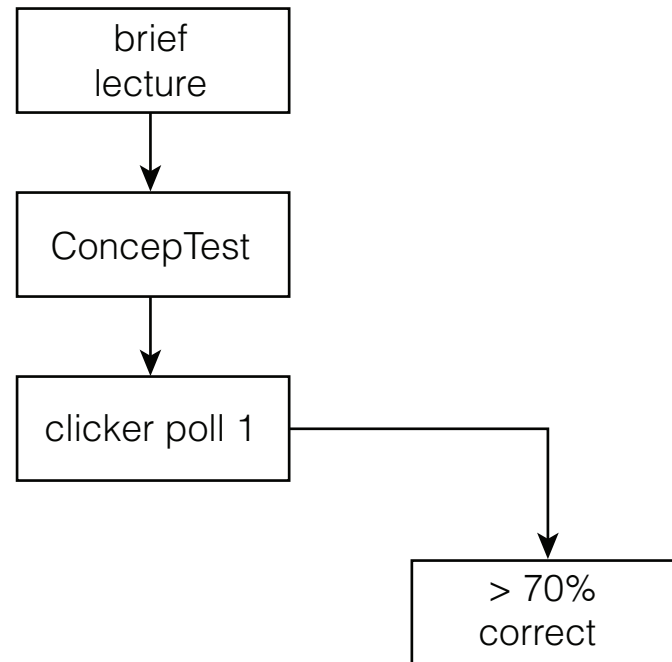
Peer Instruction



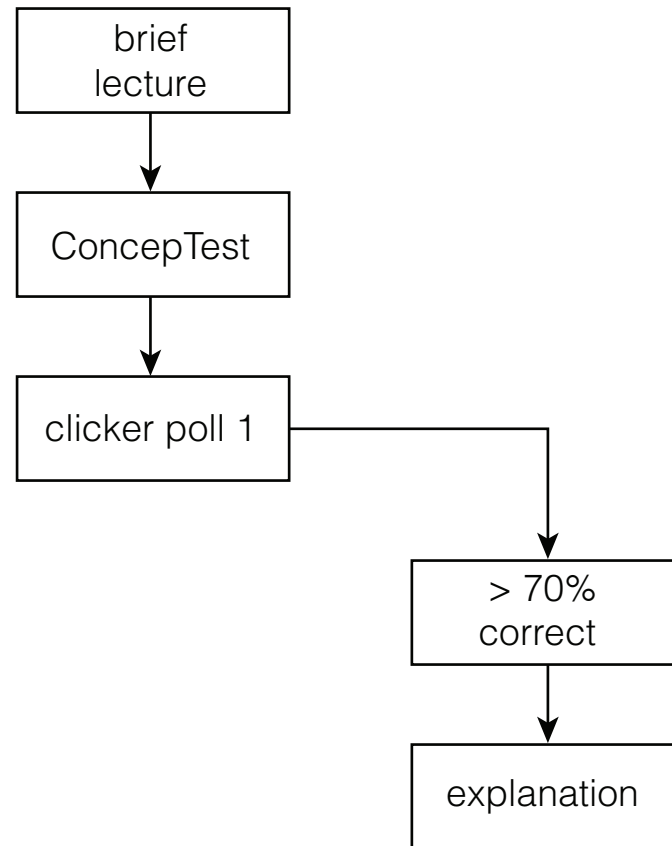
Peer Instruction



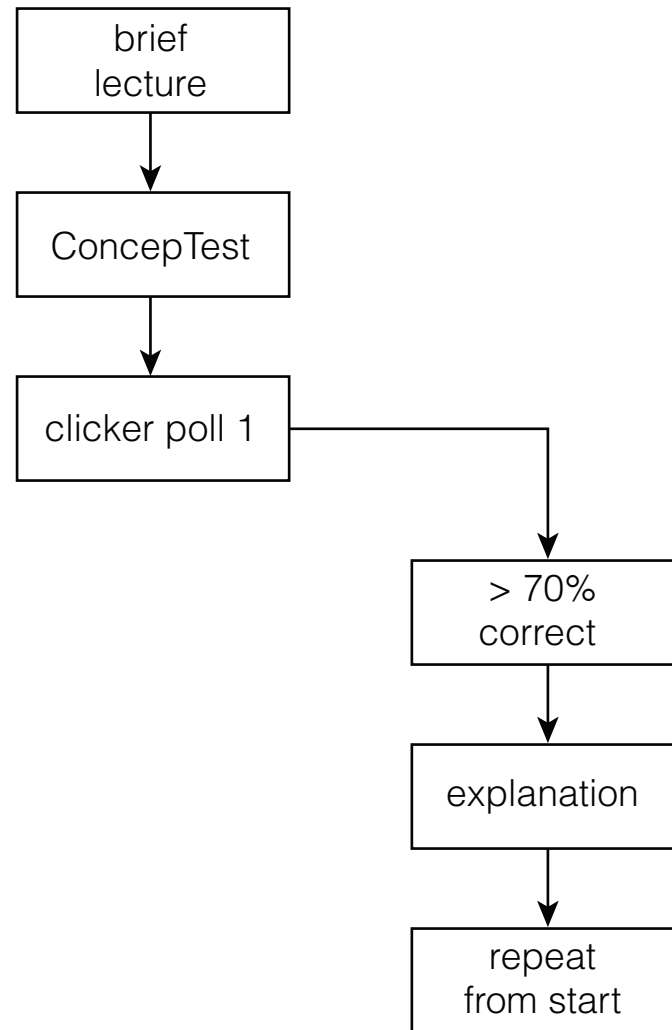
Peer Instruction



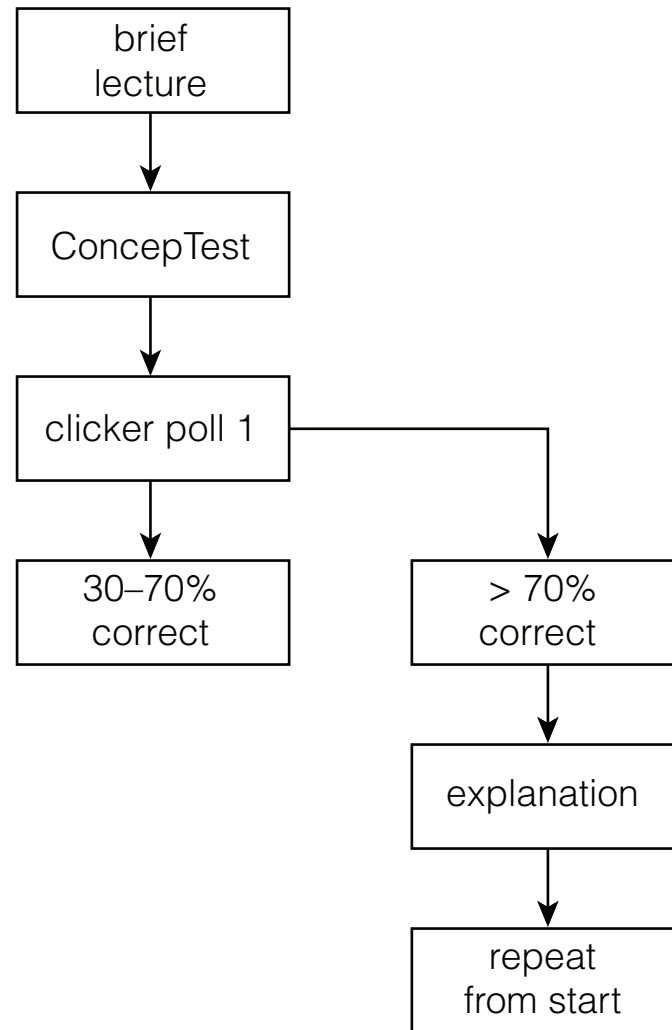
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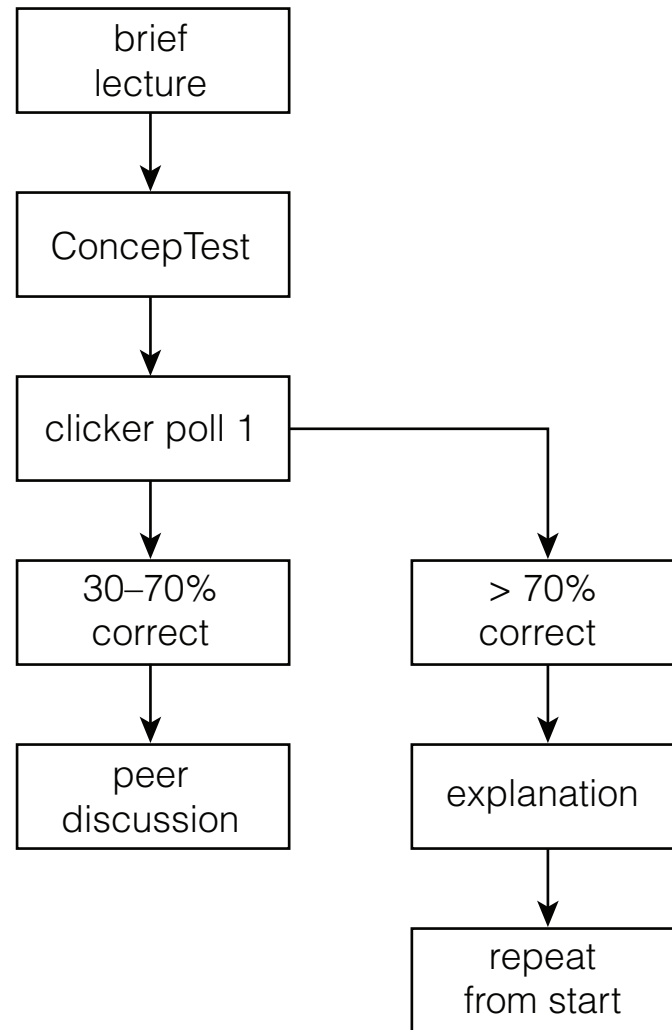
Peer Instruction



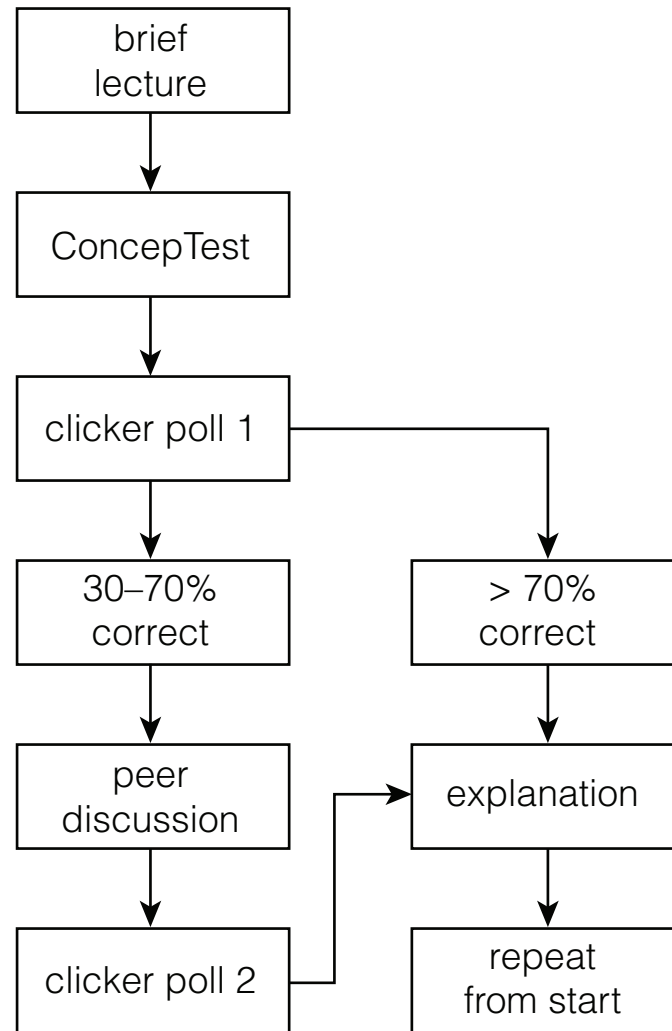
Peer Instruction



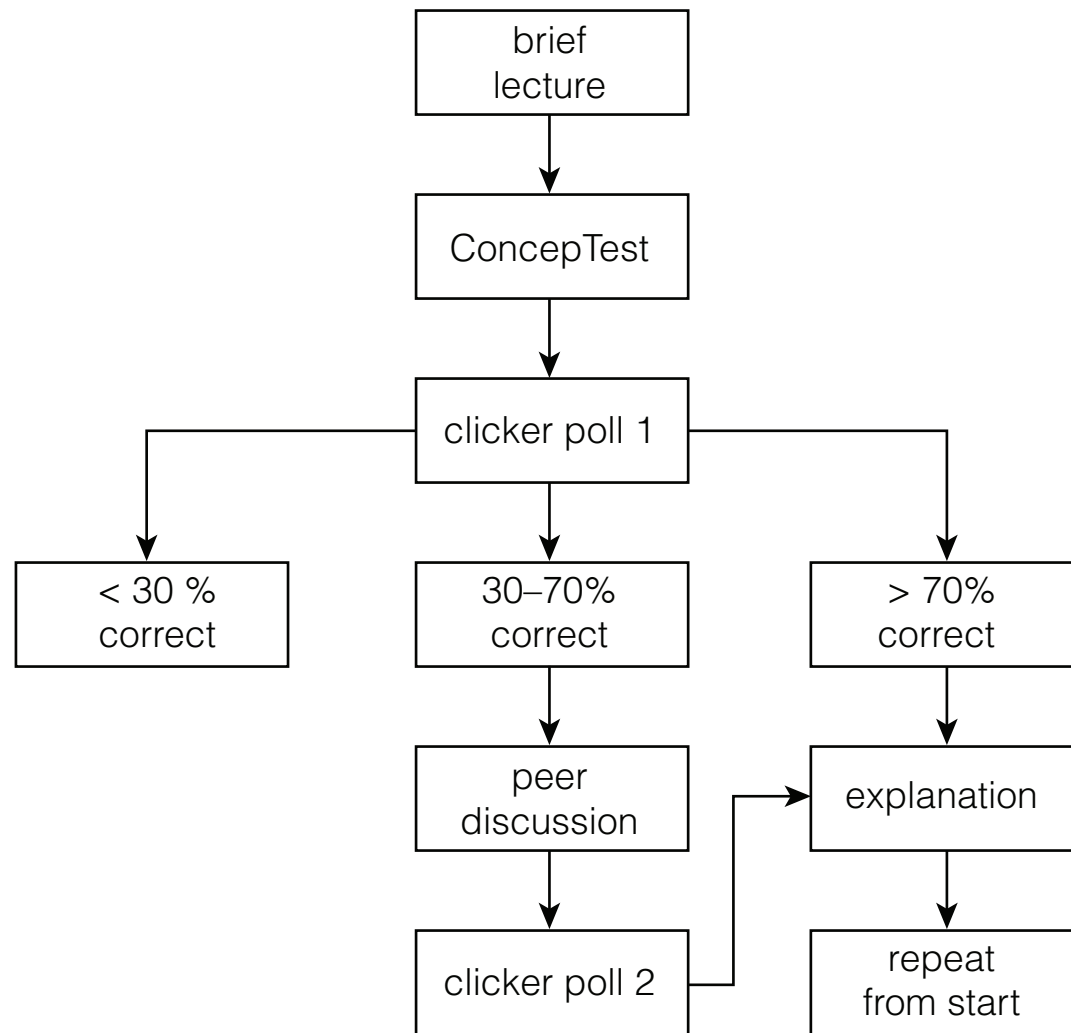
Peer Instruction



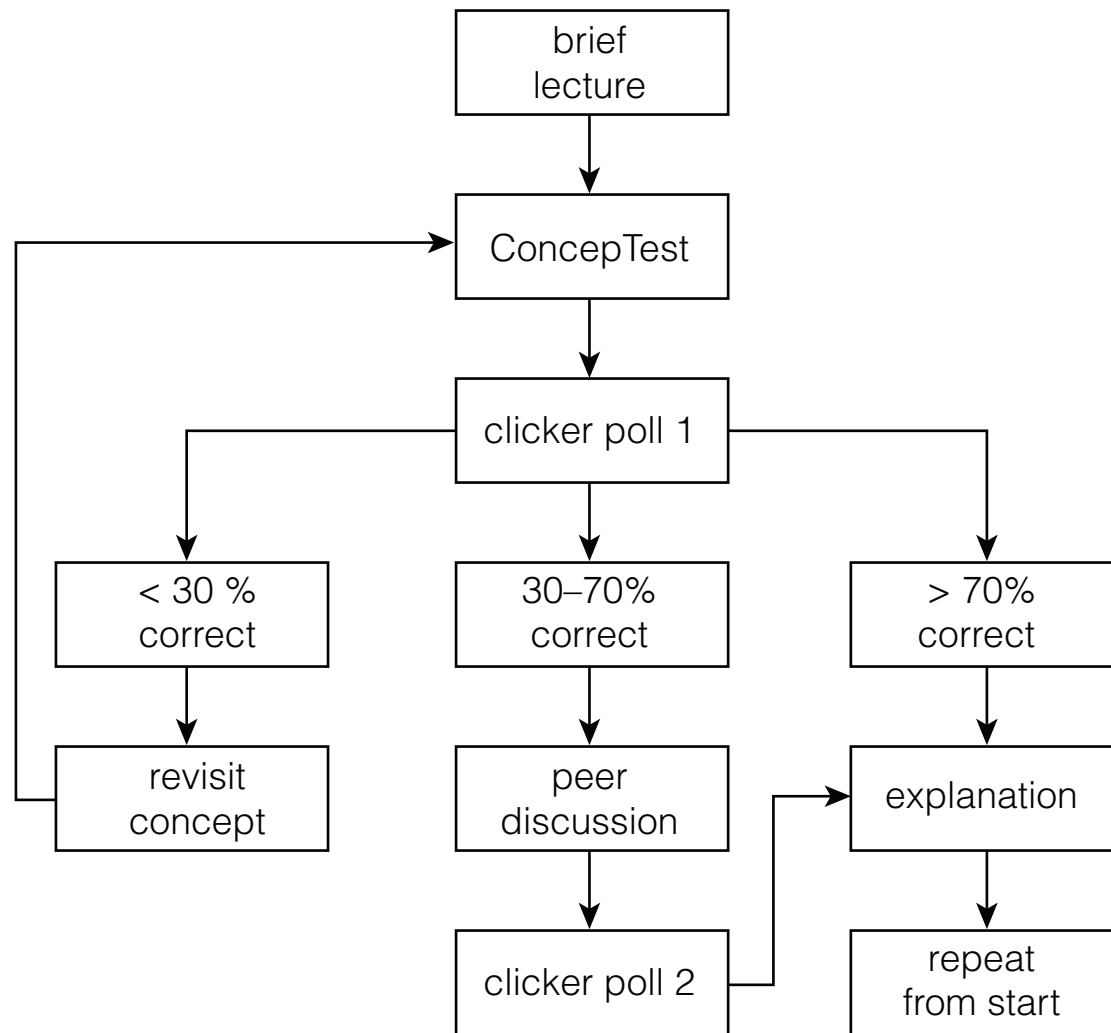
Peer Instruction



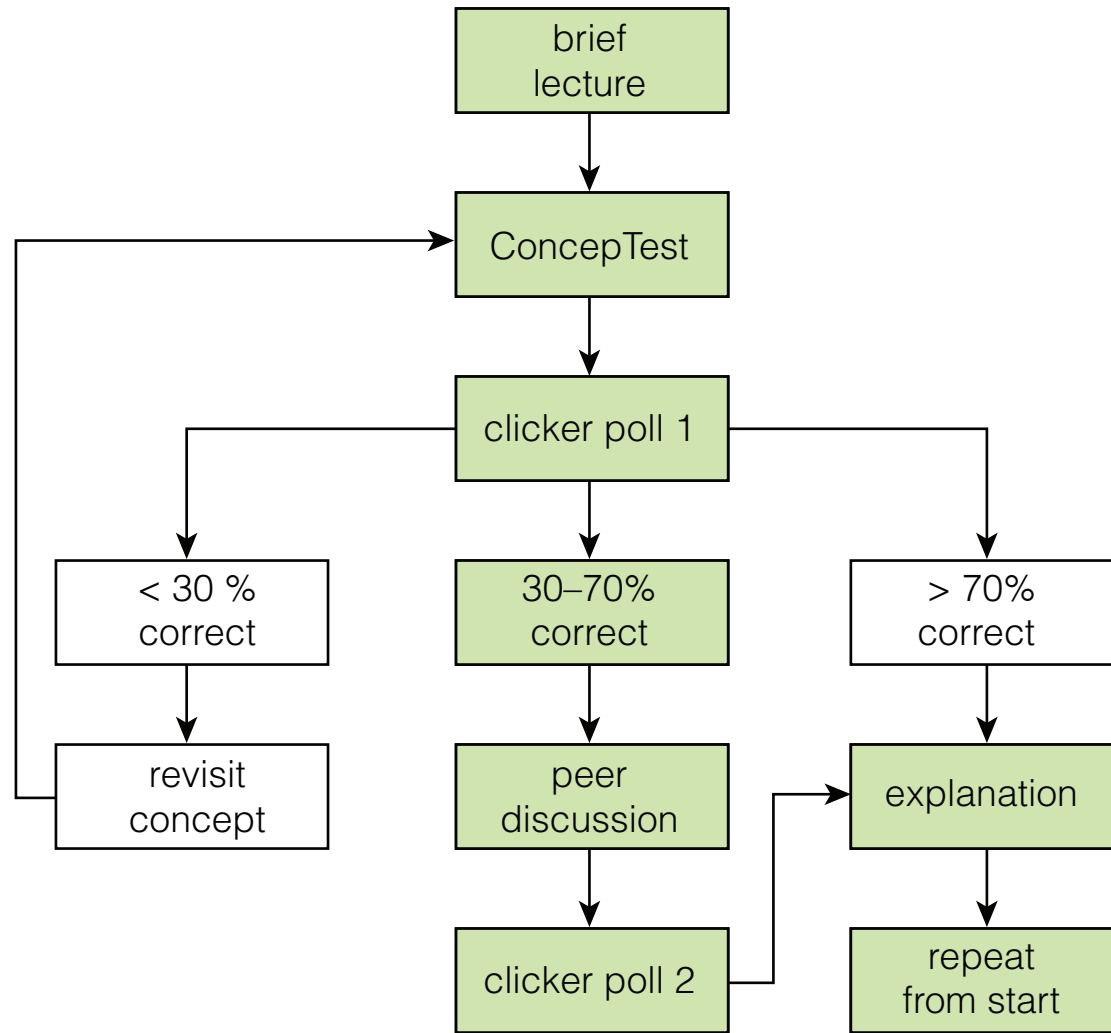
Peer Instruction



Peer Instruction



Peer Instruction

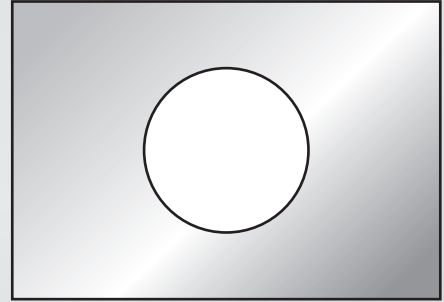


Outline

- Peer Instruction
- Let's try it!
- Results

Let's try it!

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

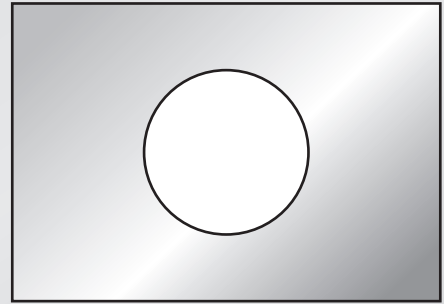


Let's try it!

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

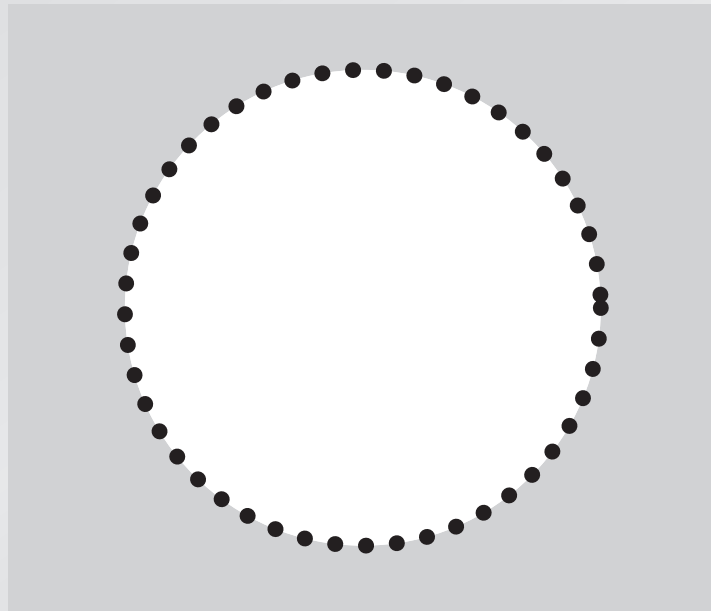
When the plate is uniformly heated, the diameter of the hole

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



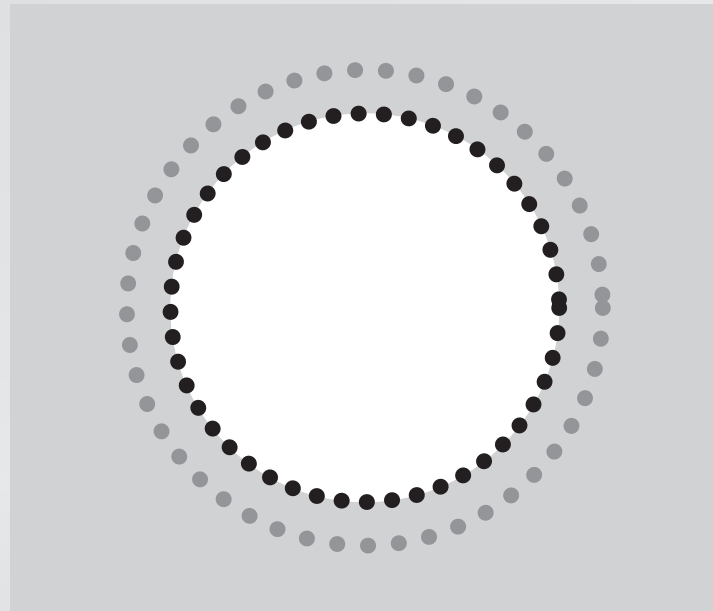
Let's try it!

consider the atoms at the rim of the hole



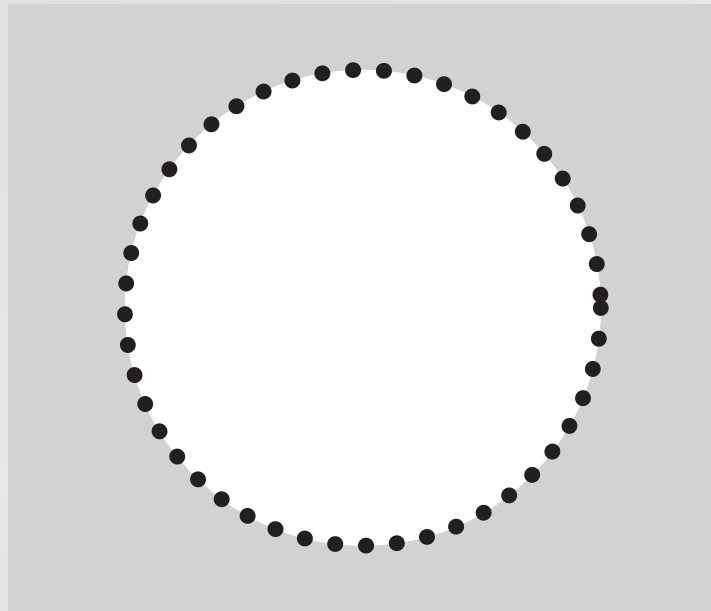
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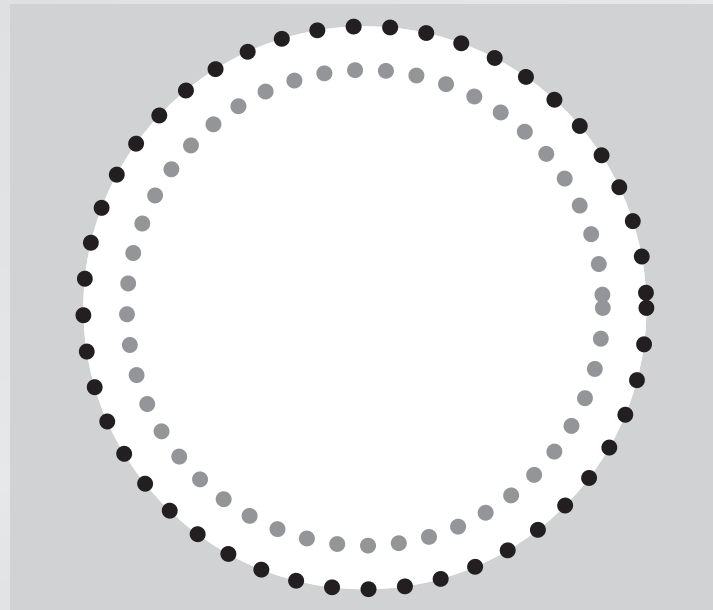
Let's try it!

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!

Imagine a rope that fits snugly along the equator.



Let's try it!

Imagine a rope that fits snugly along the equator.

Suppose the rope is cut and 1 m of rope is inserted between the cut ends. If the rope were to maintain a circular shape, how far off the surface of the Earth would it float?

1. the width of a few atoms
2. the width of a few hairs
3. the height of a curb
4. exactly 1 m
5. more than 1 m



Let's try it!

circumference at equator:

$$2\pi R_E$$

Let's try it!

circumference at equator:

$$2\pi R_E$$

new circumference:

$$2\pi R_E + 1 \text{ m}$$

Let's try it!

circumference at equator:

$$2\pi R_E$$

new circumference:

$$2\pi R_E + 1 \text{ m}$$

radius of circle with new circumference:

$$2\pi R = 2\pi R_E + 1 \text{ m}, \quad \text{and so} \quad R = R_E + \frac{1 \text{ m}}{2\pi}.$$

Let's try it!

It's easy to fire up the audience!

Let's try it!

Which of the following airlines tries to save fuel by suggesting that its passengers use the bathroom before boarding?

1. Delta Airlines
2. Lufthansa
3. All Nippon Airways
4. British Midland Airways
5. Air France
6. JAL
7. Aboriginal Air Services
8. Aeroflot
9. Are you kidding me? None of the above.

Let's try it!

Which of the following airlines tries to save fuel by suggesting that its passengers use the bathroom before boarding?

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Let's try it!

hole in plate

model

circumference

model

airline

fact

Let's try it!

hole in plate

model

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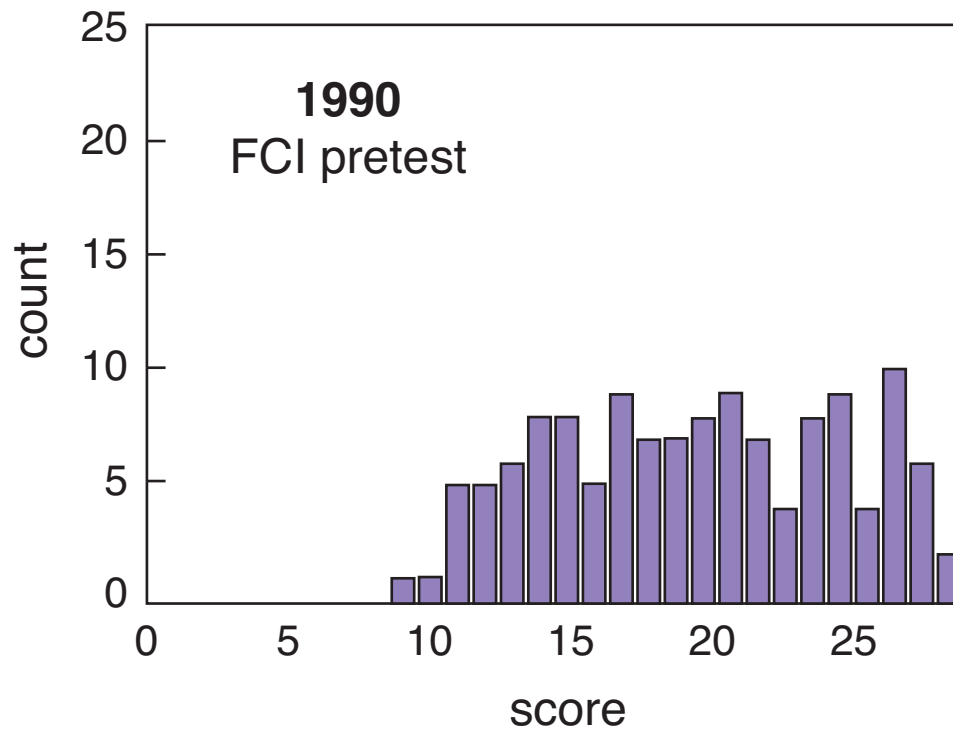
need to test mental model!

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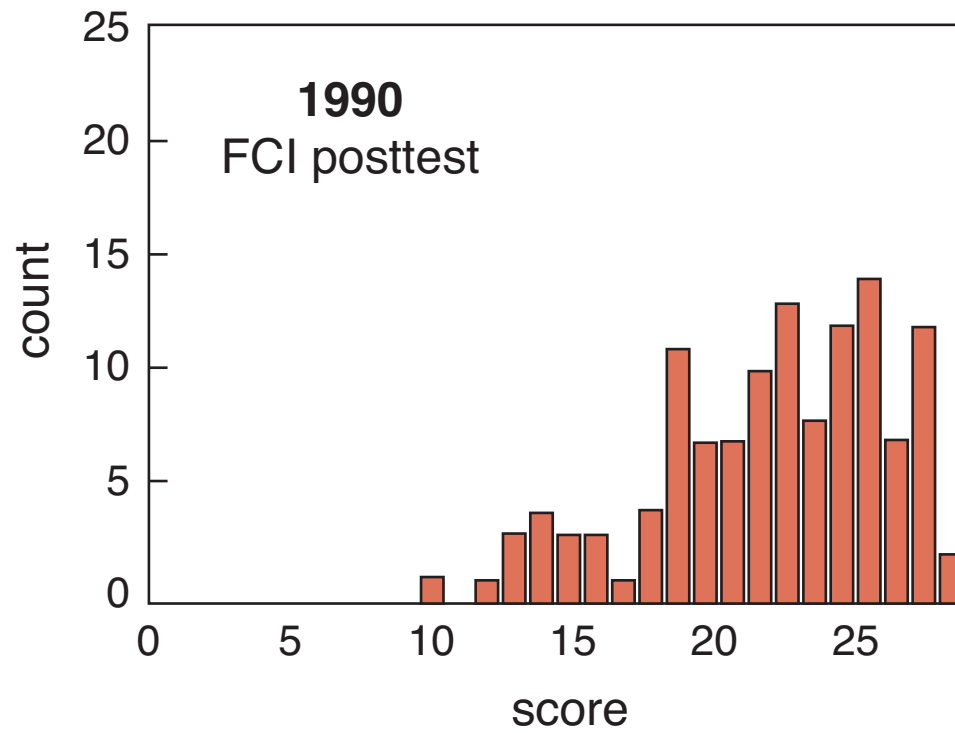
Results

traditional instruction



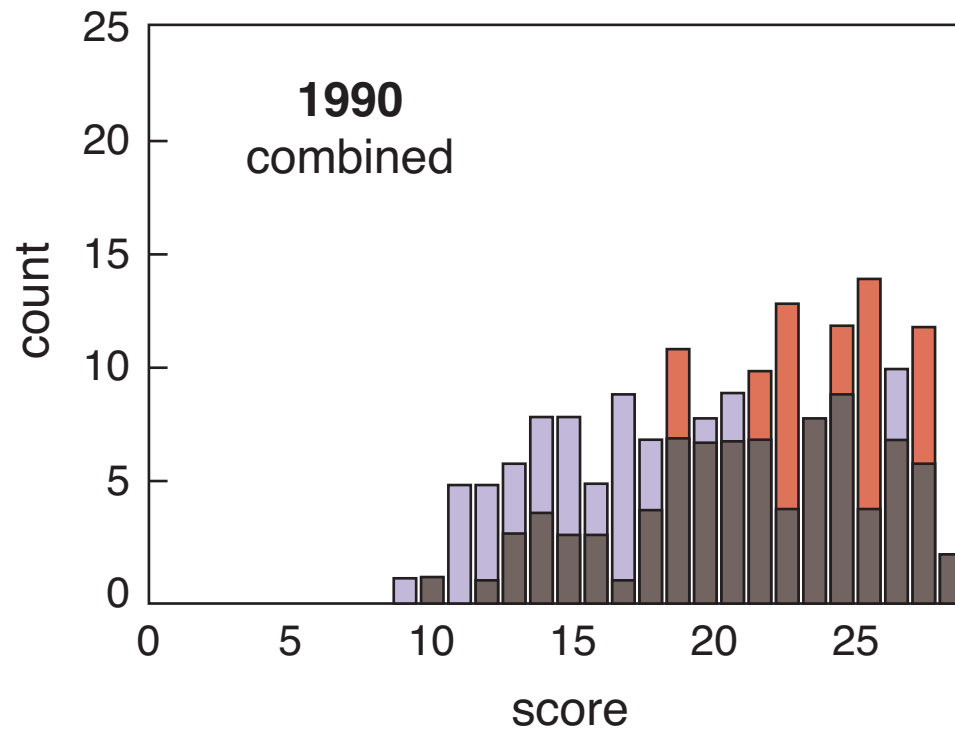
Results

traditional instruction



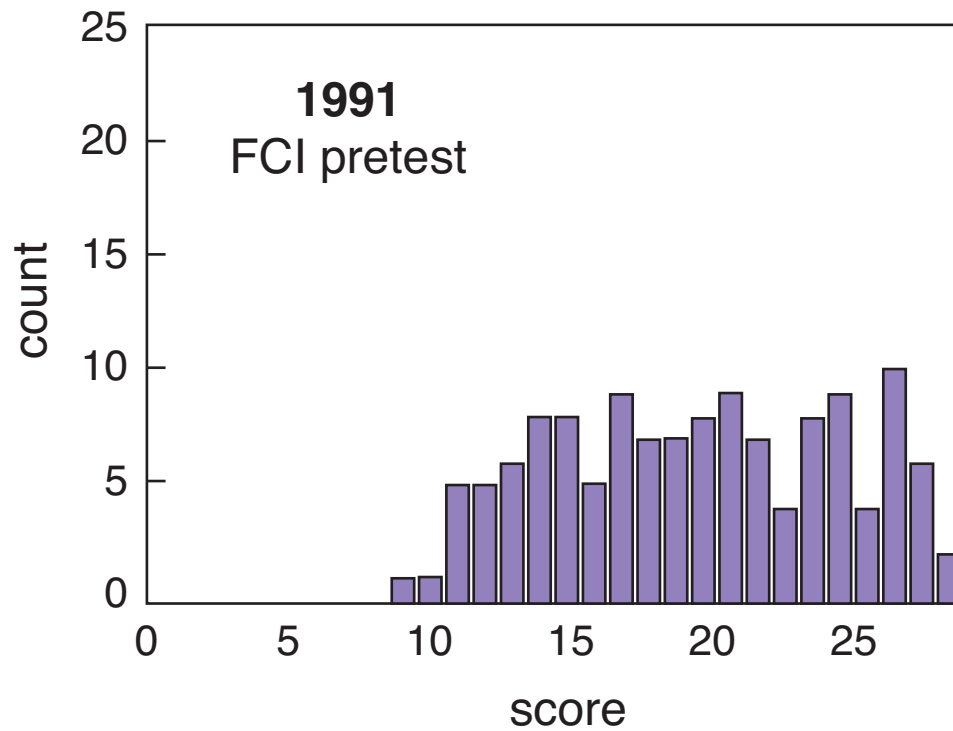
Results

traditional instruction



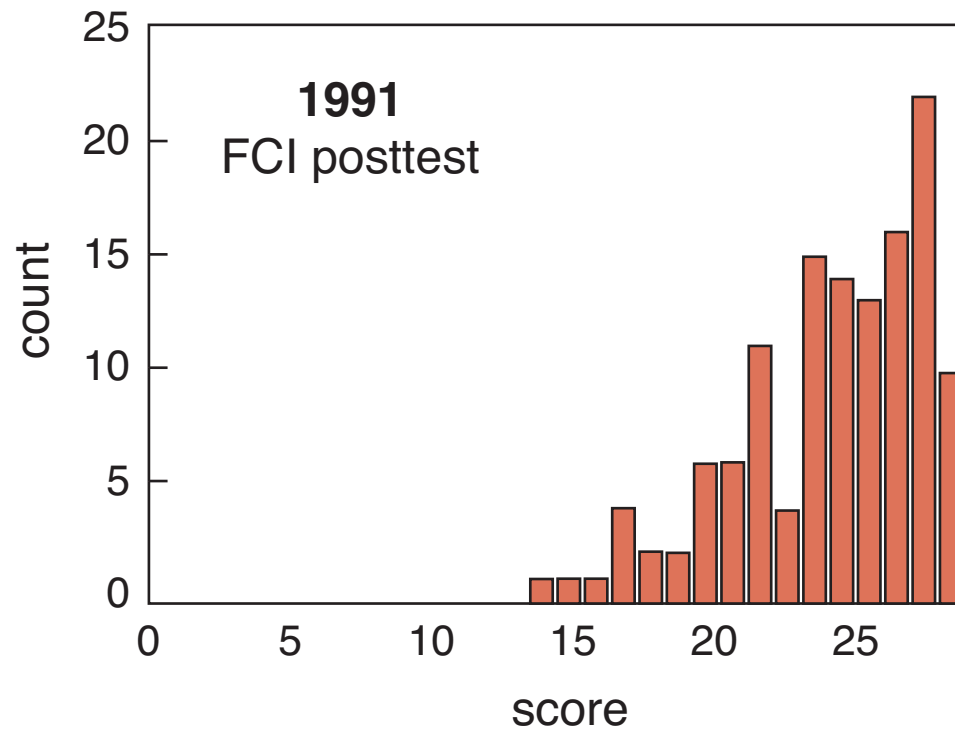
Results

first year of implementing PI



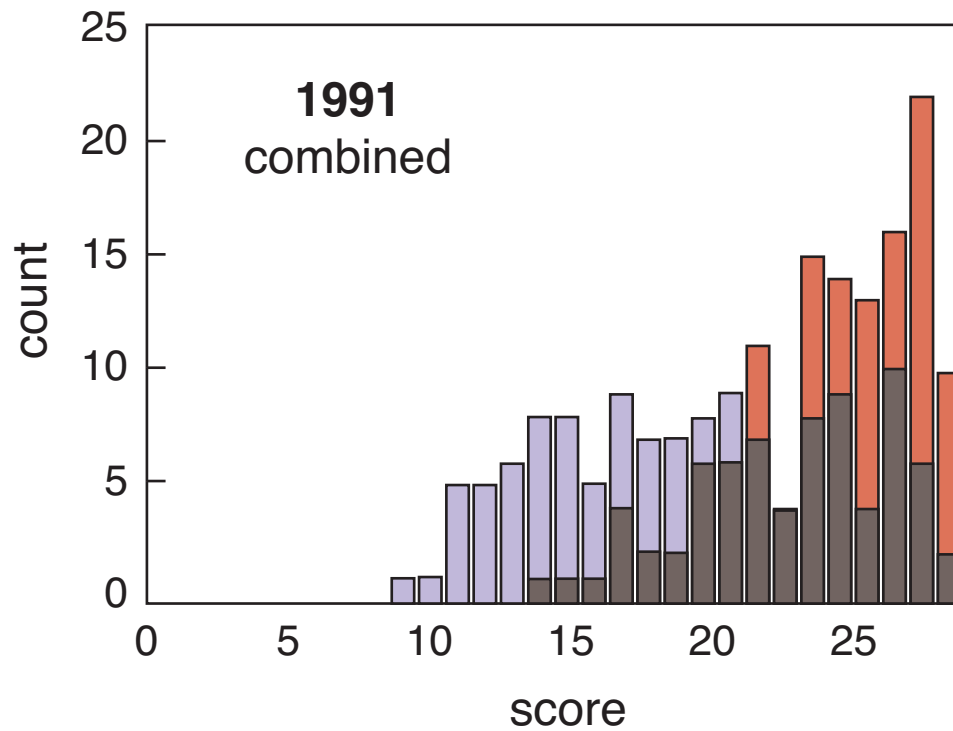
Results

first year of implementing PI



Results

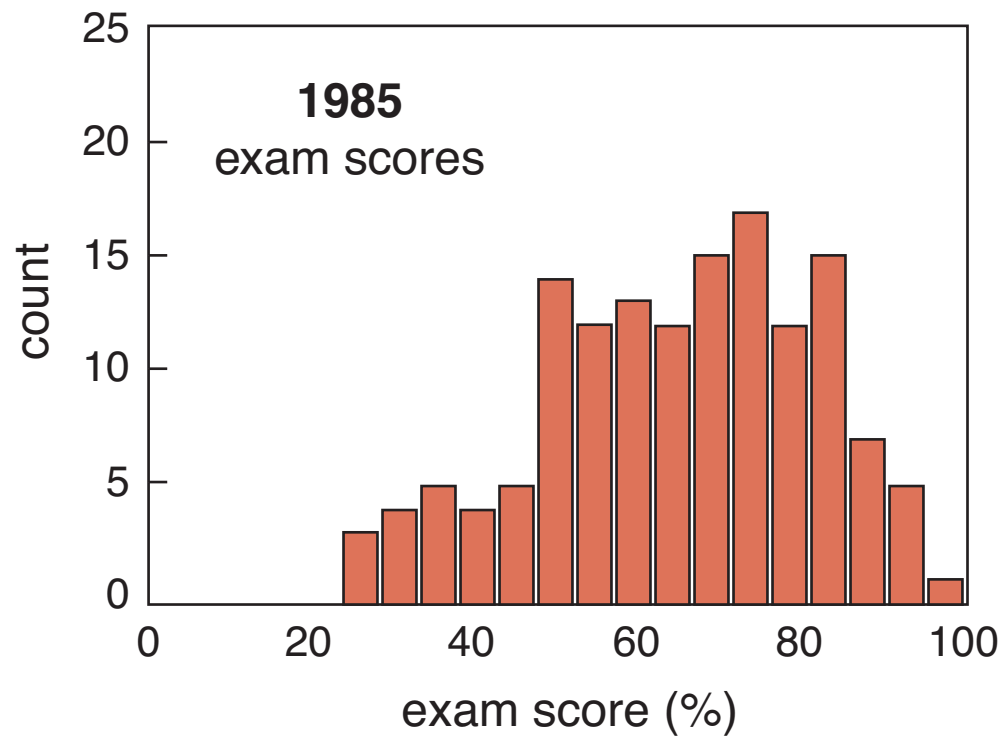
first year of implementing PI



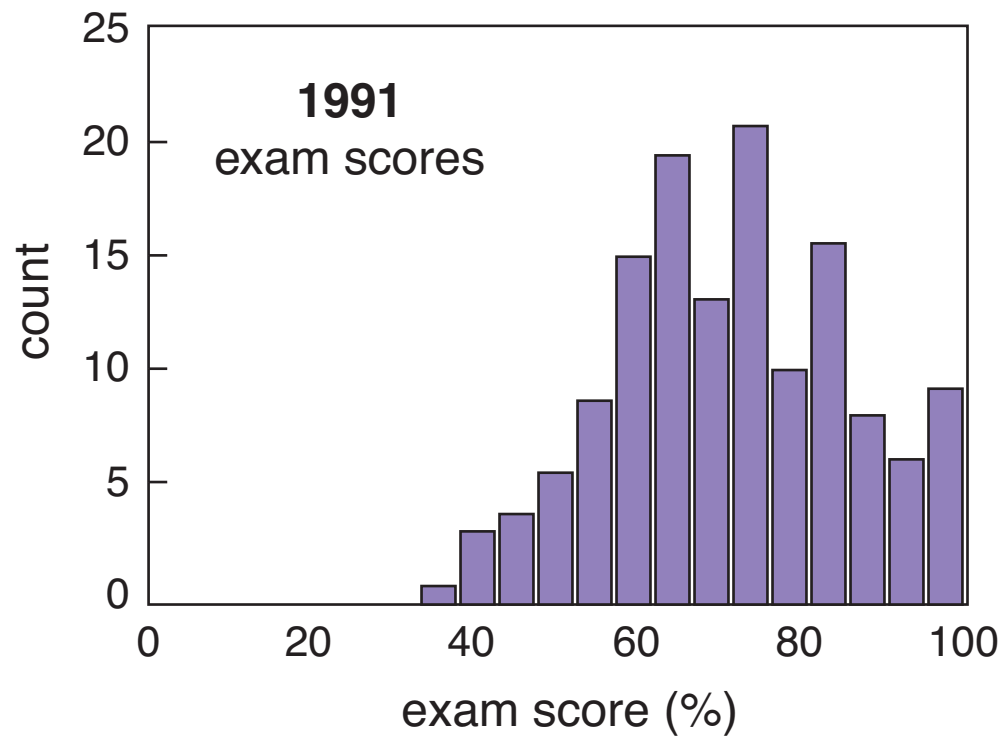
Results

what about problem solving?

Results

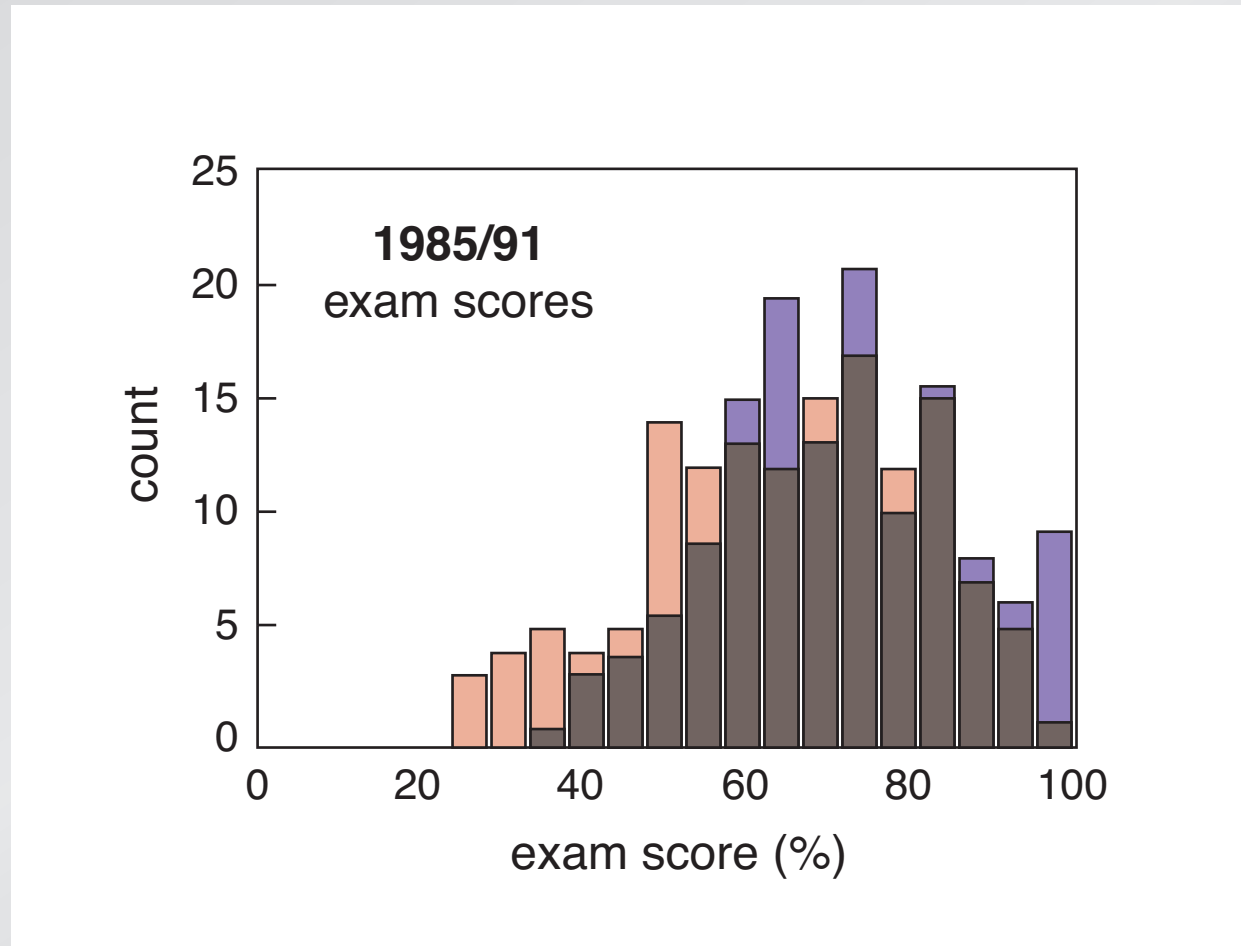


Results



Results

better understanding leads to better problem solving



Conclusion

active engagement greatly improves learning gains



Conclusion

active engagement greatly improves learning gains

technology facilitates active engagement



Conclusion

not just a polling tool, but an engagement tool!



Research Funding:

Pew Charitable Trust, Pearson/Prentice Hall, Davis Foundation, Engineering Information Foundation, Derek Bok Center for Teaching and Learning, National Science Foundation

for a copy of this presentation:

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