

Turning lectures into learning



Turning Technologies User Conference
San Diego, CA, 10 October 2011



Turning Technologies, LLC
turning ideas into solutions

Introduction



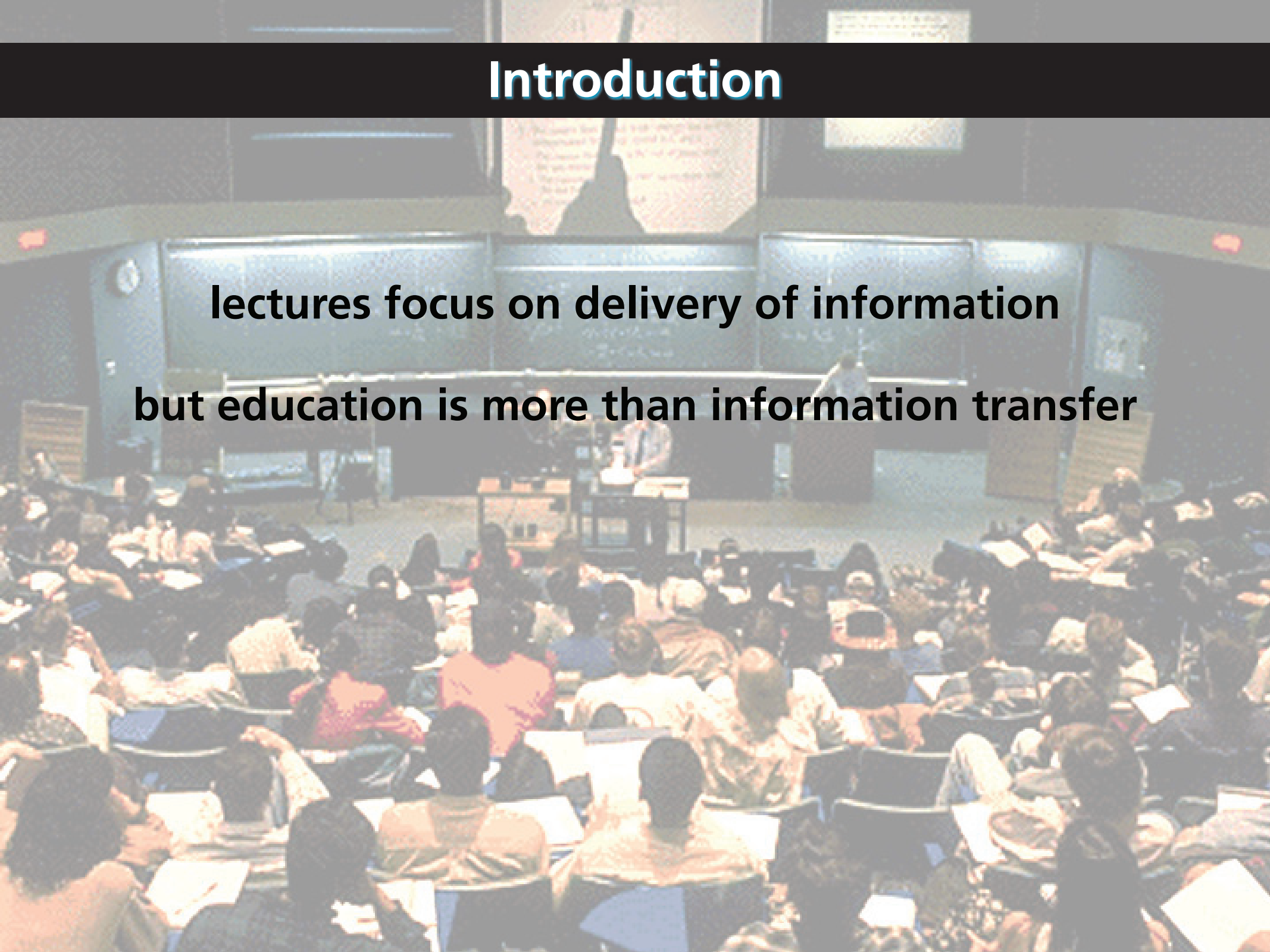
Introduction

lectures focus on delivery of information

A wide-angle photograph of a large lecture hall. In the foreground, rows of students are seated at desks, facing the front of the room. Many students have papers or laptops open. At the front of the hall, a lecturer stands behind a podium, addressing the audience. The room features a large screen at the front displaying text, and several blackboards are visible. The lighting is bright, and the overall atmosphere is that of a formal academic setting.

Introduction

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



Outline



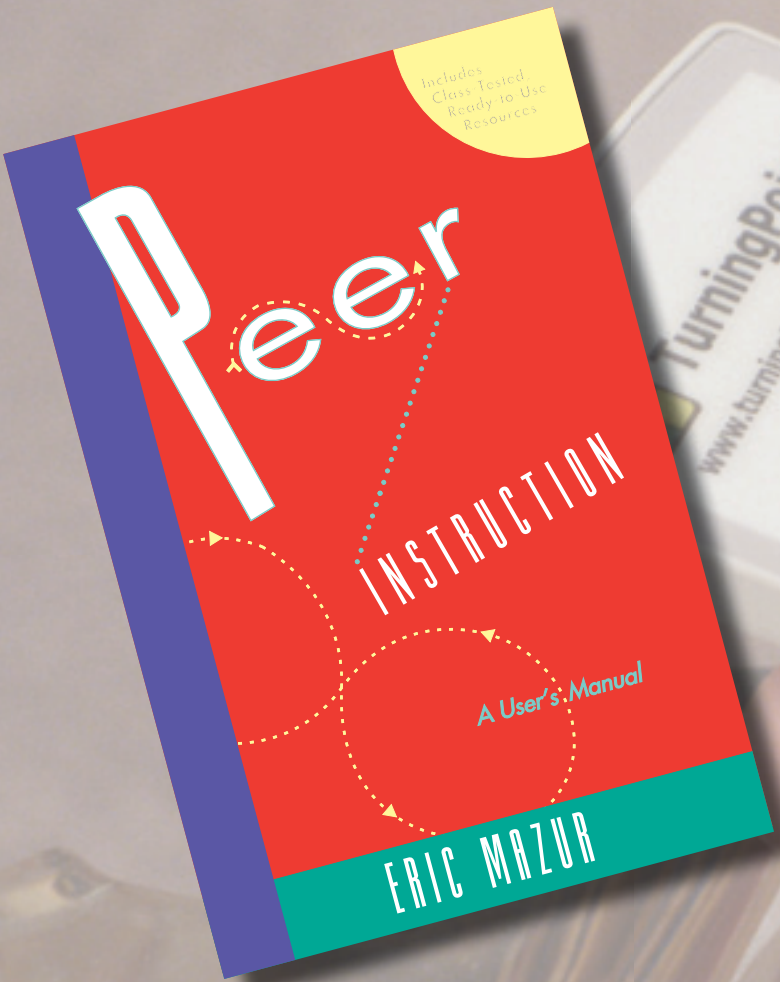
Outline

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

Peer Instruction

move information transfer
out of classroom

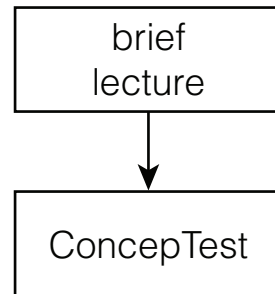
- assign reading
- teach by questioning



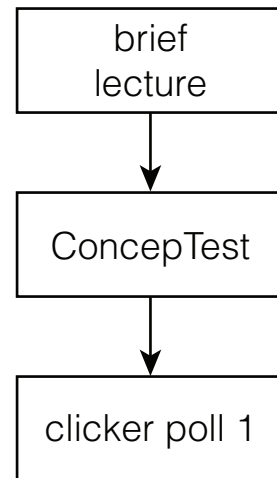
Peer Instruction

brief
lecture

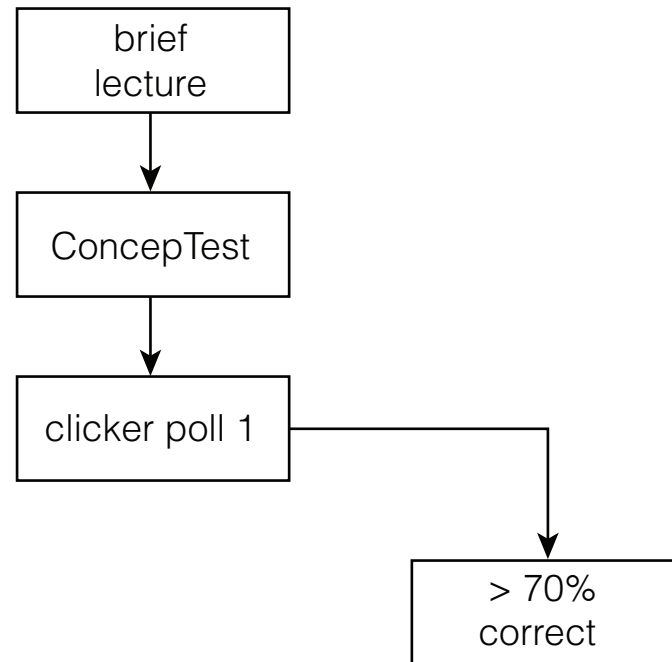
Peer Instruction



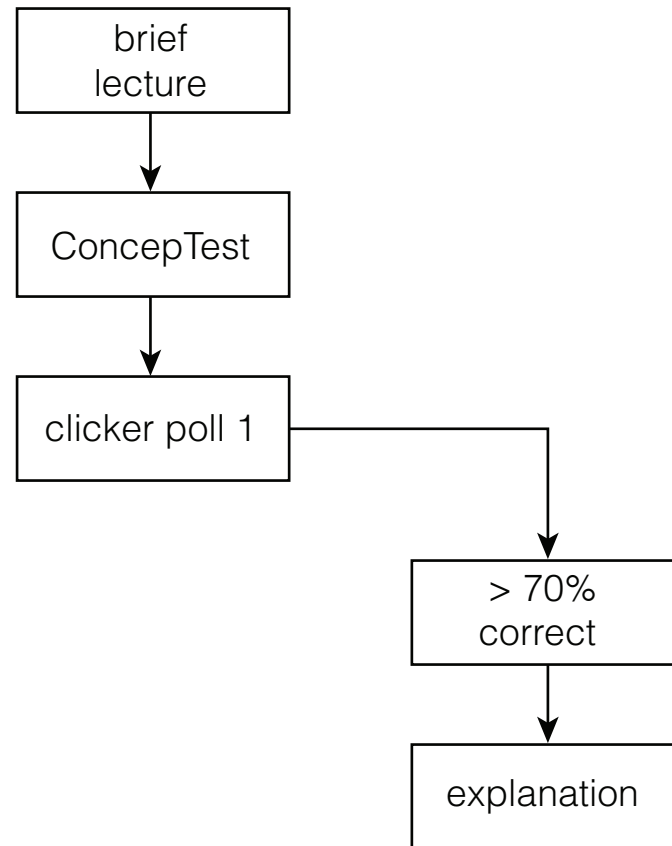
Peer Instruction



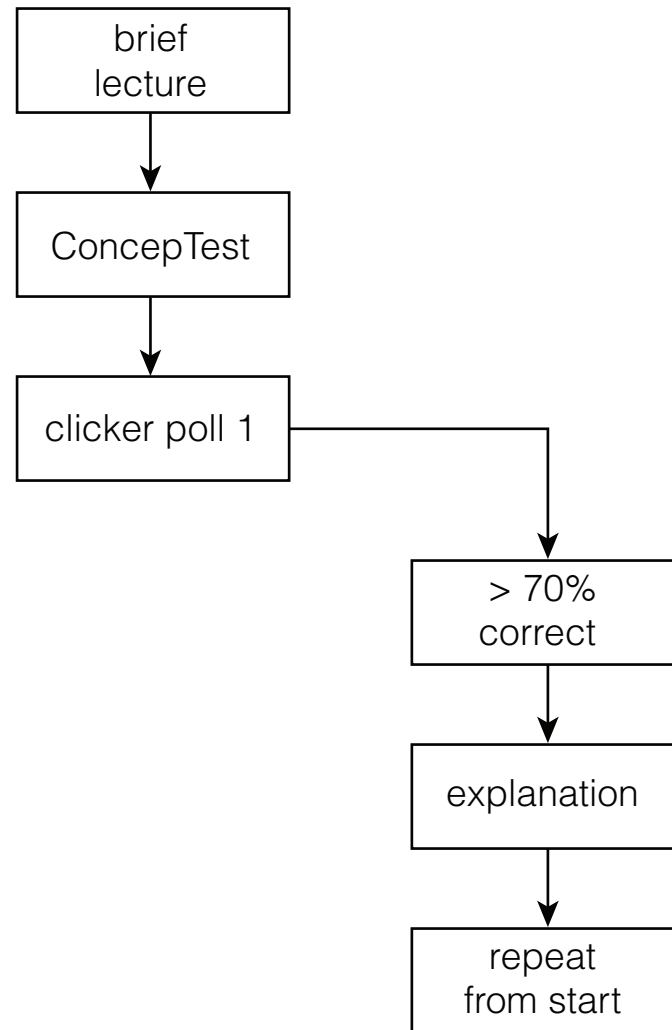
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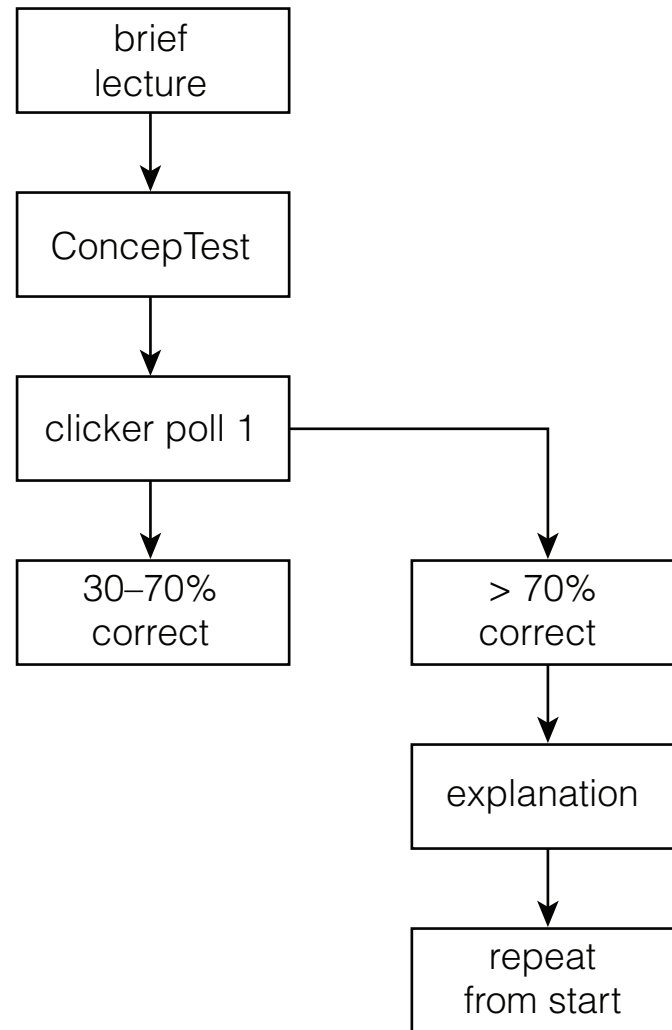
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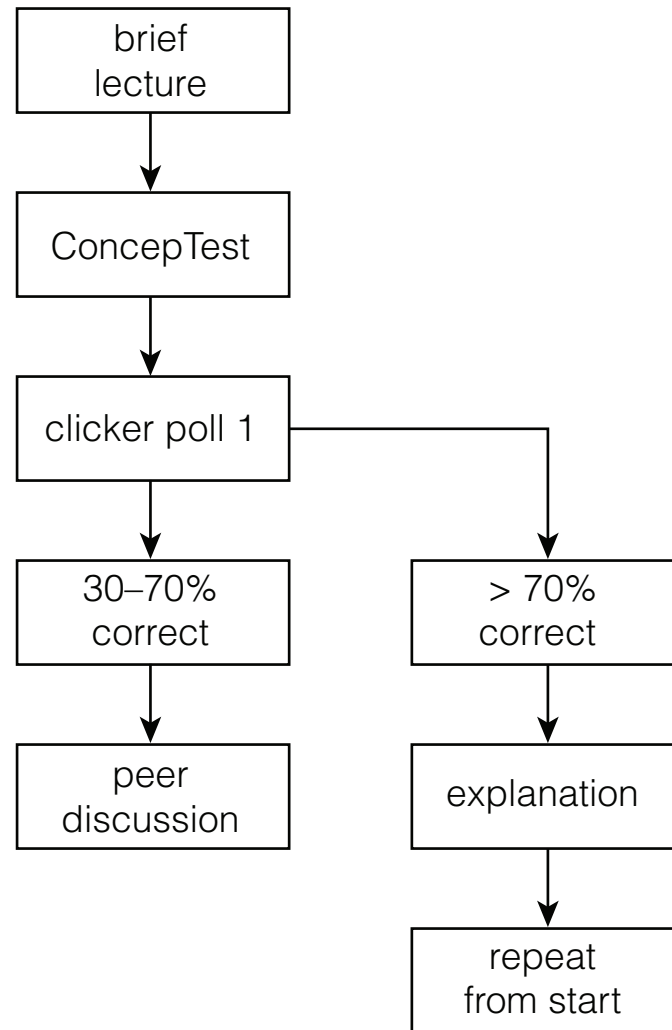
Peer Instruction



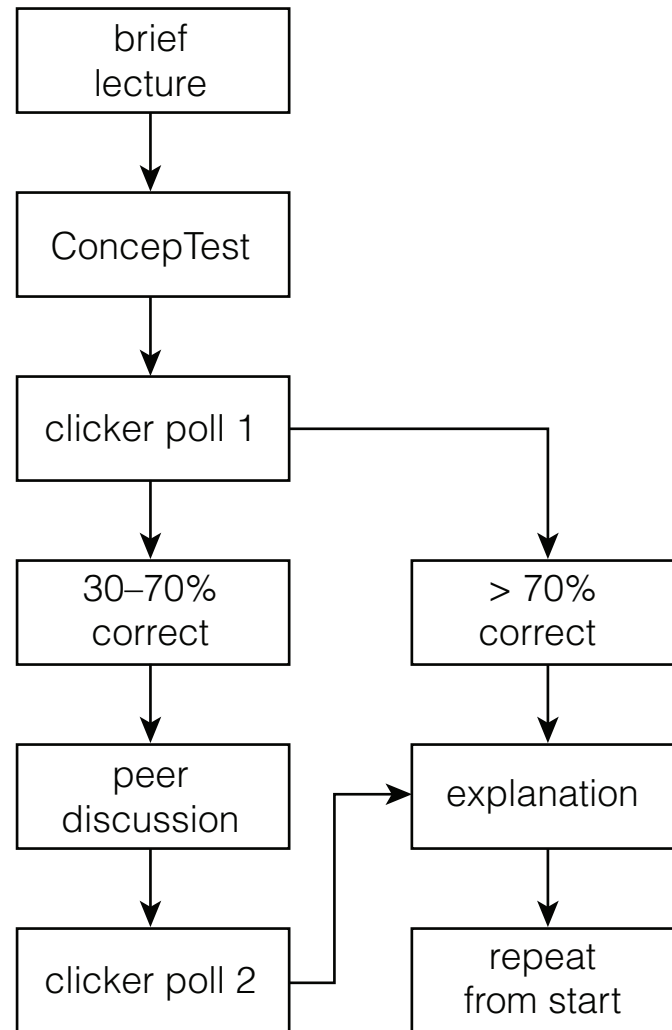
Peer Instruction



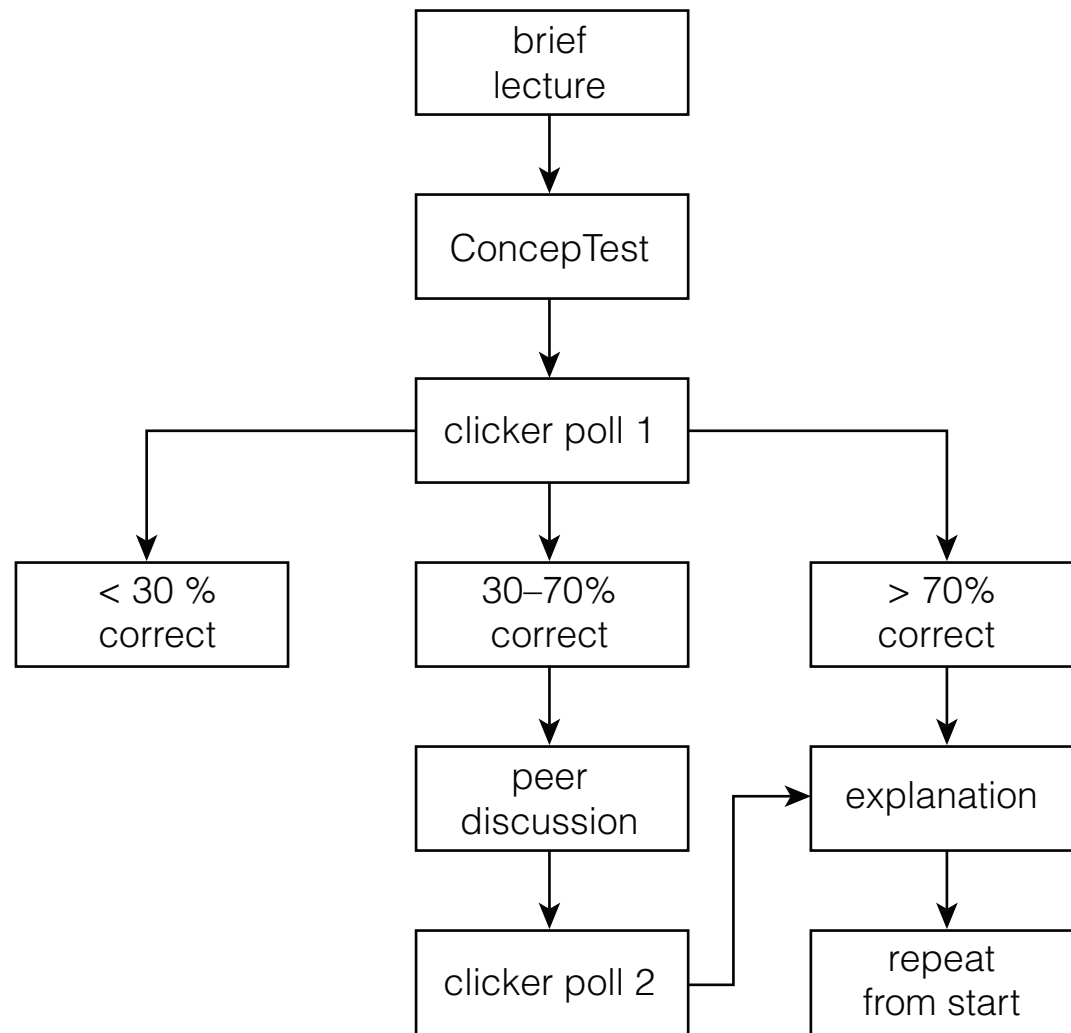
Peer Instruction



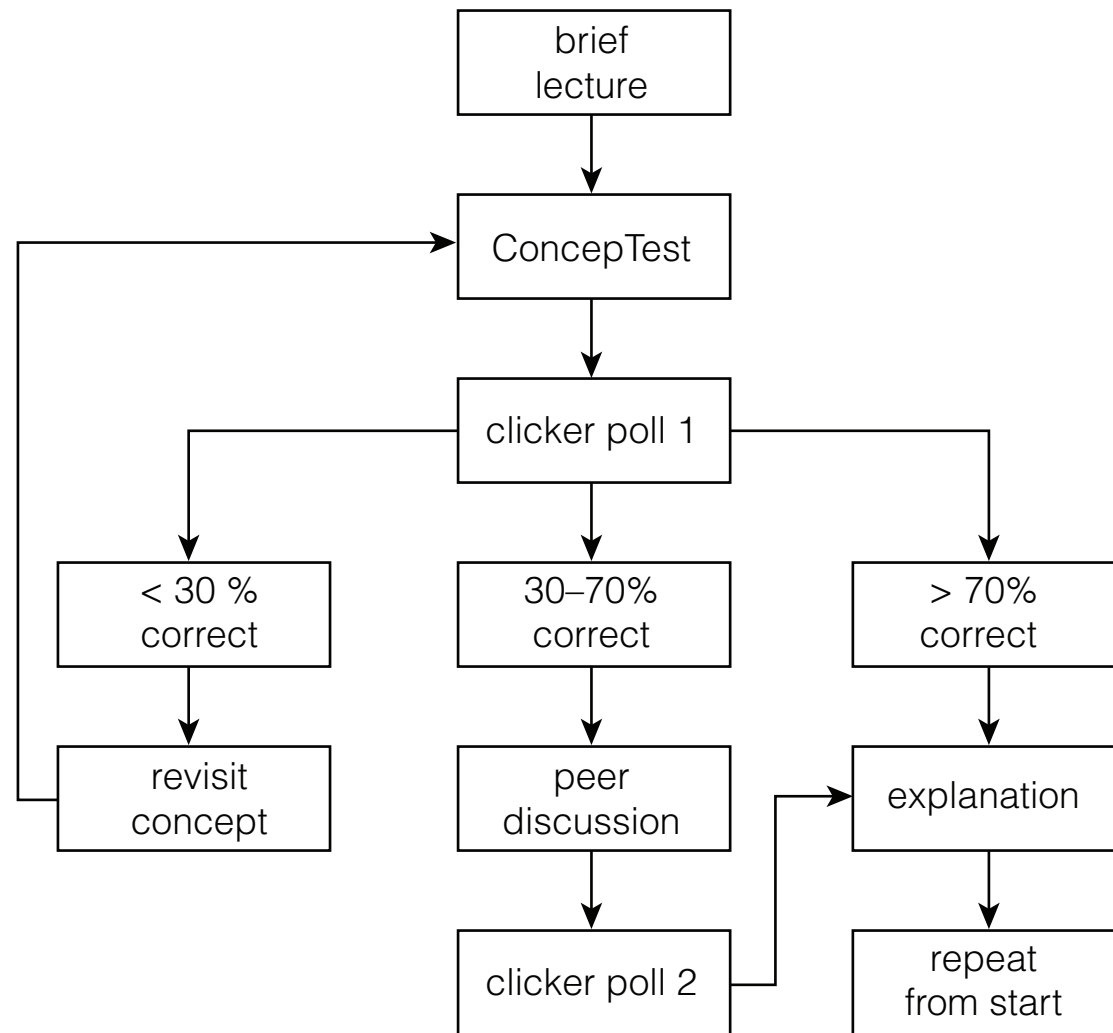
Peer Instruction



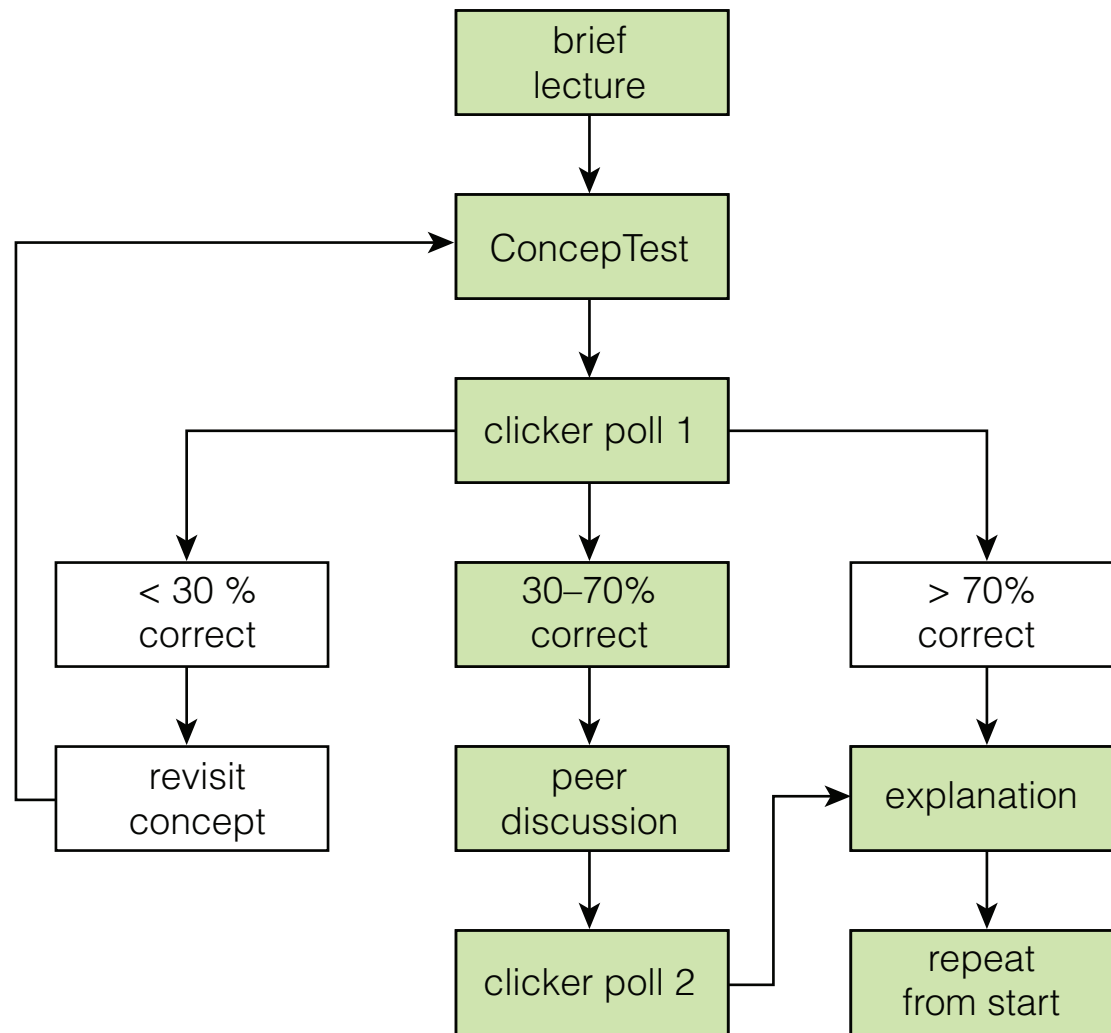
Peer Instruction



Peer Instruction



Peer Instruction



Outline

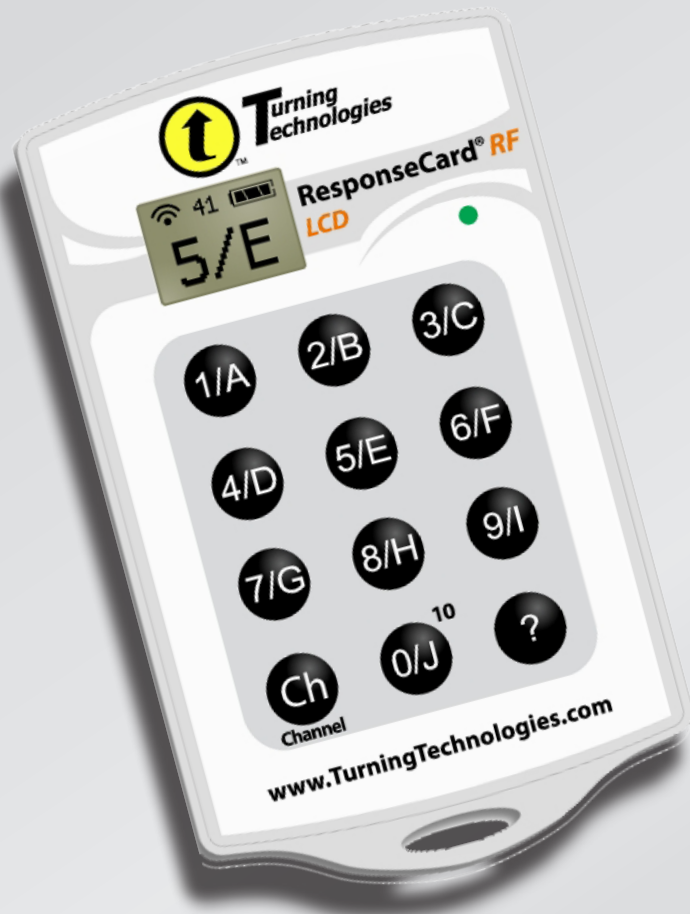
- Peer Instruction
- Let's try it!
- Results

Get your clickers ready!



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

Get your clickers ready!



Or use your web-enabled device!

- go to <http://rwpoll.com>
- enter session ID: **EMAZUR**

rwpoll.com

Get your clickers ready!



www.TurningTechnologies.com

Get your clickers ready!



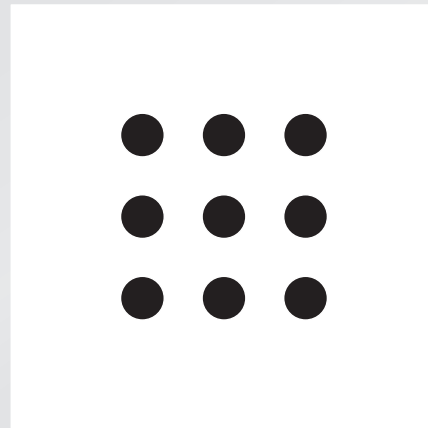
unique ID on back of clicker

Let's try it!

thermal expansion

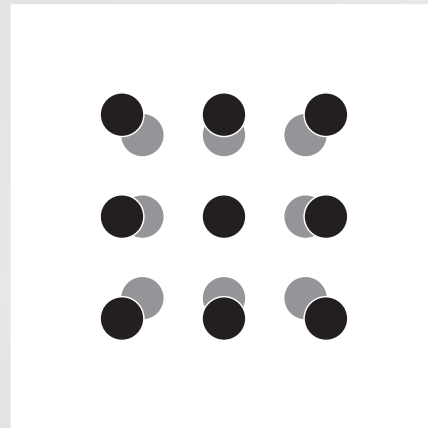
Let's try it!

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



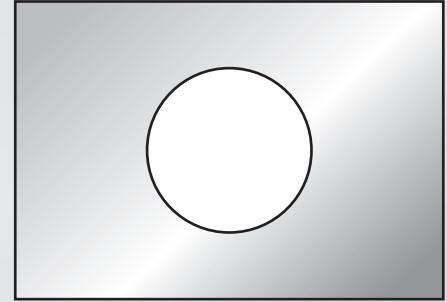
Let's try it!

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.

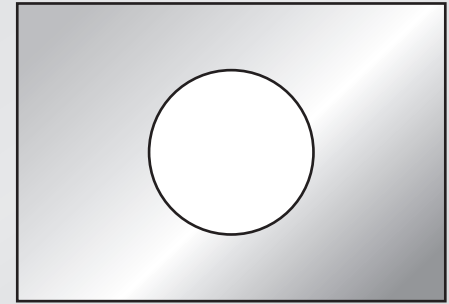


Let's try it!

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!

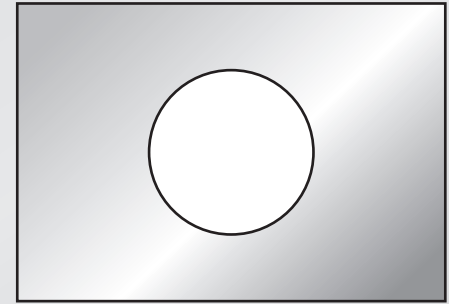
It's easy to fire up the audience!

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

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3. decreases.

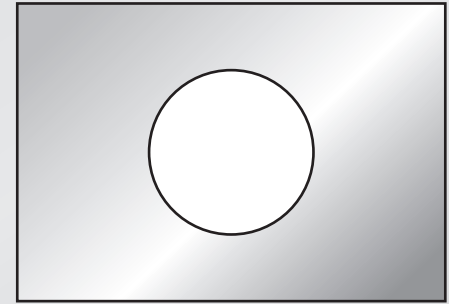


Let's try it!

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

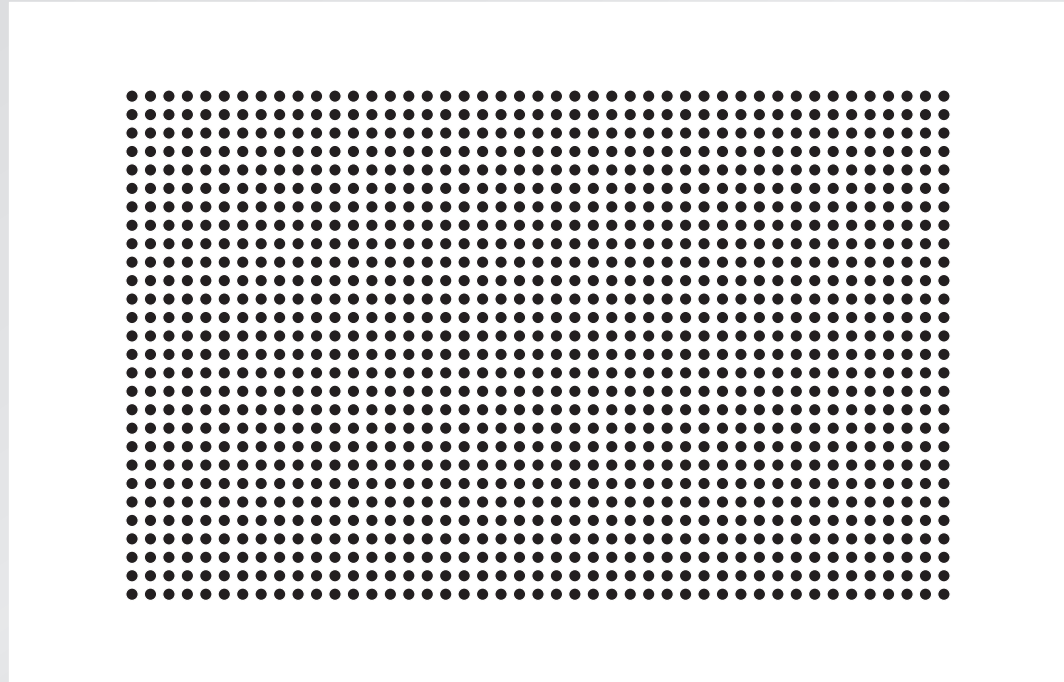
When the plate is uniformly heated, the diameter of the hole

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



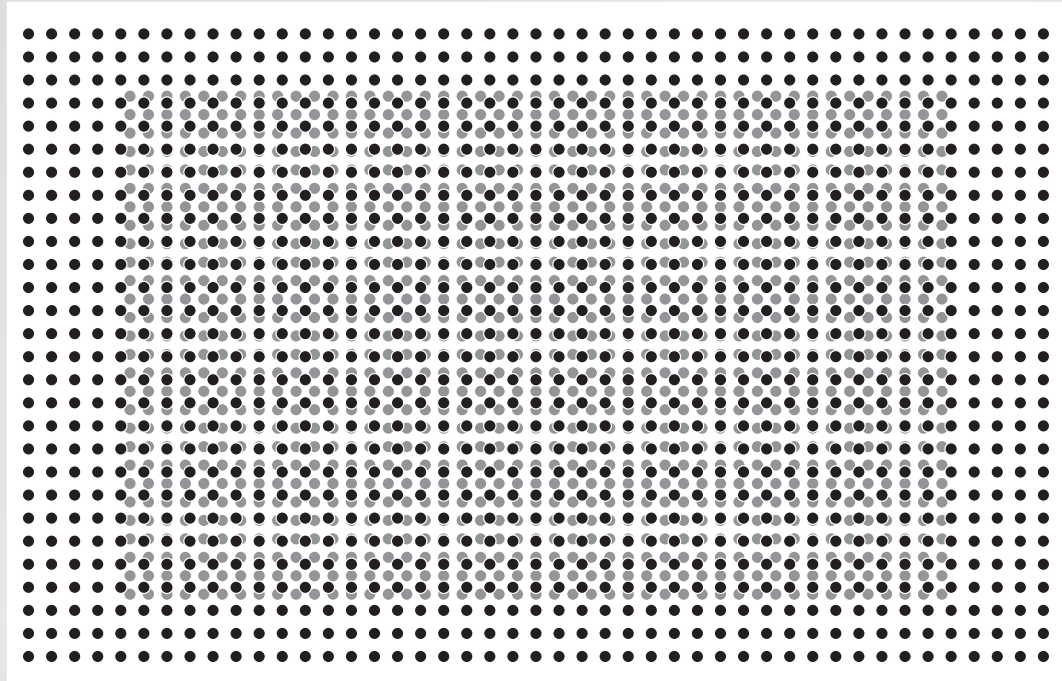
Let's try it!

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



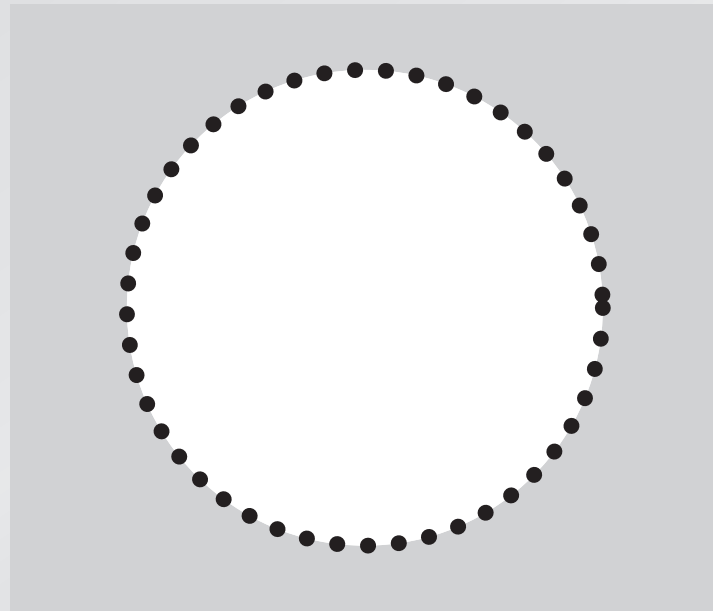
Let's try it!

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



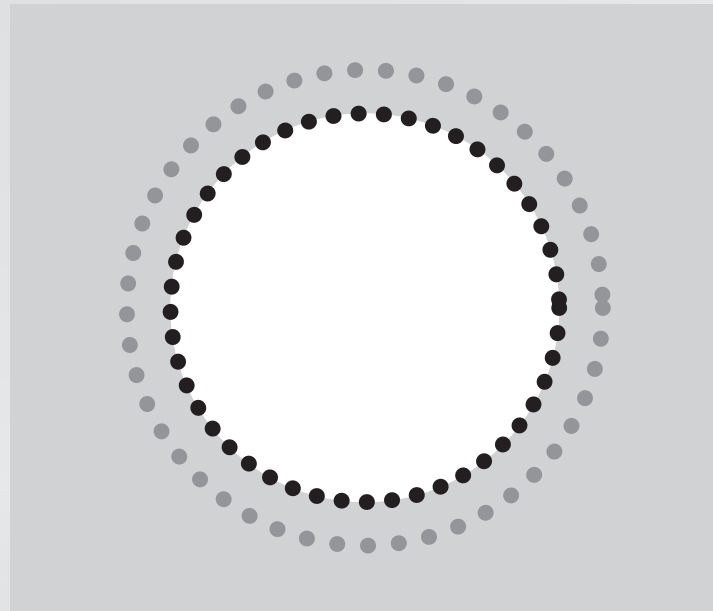
Let's try it!

consider the atoms at the rim of the hole



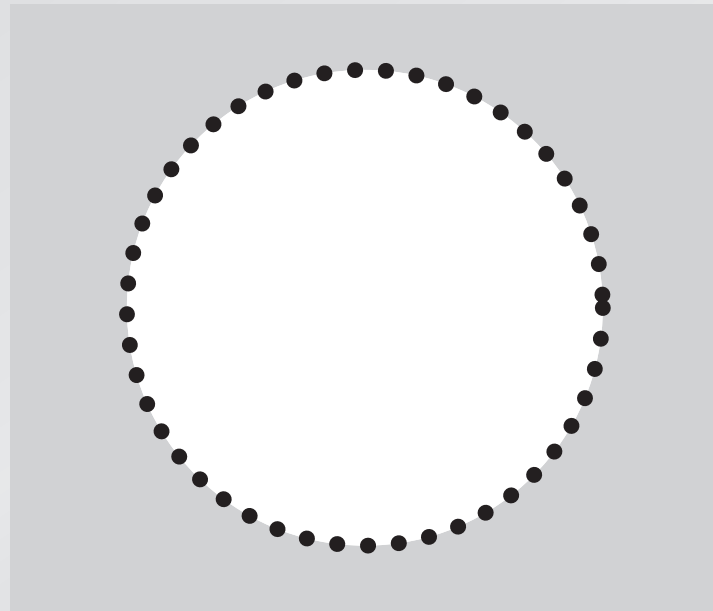
Let's try it!

consider the atoms at the rim of the hole



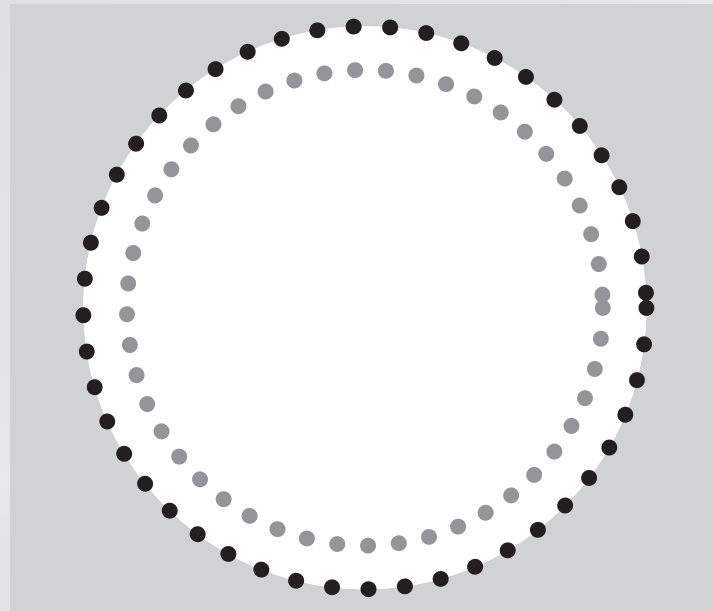
Let's try it!

consider the atoms at the rim of the hole



Let's try it!

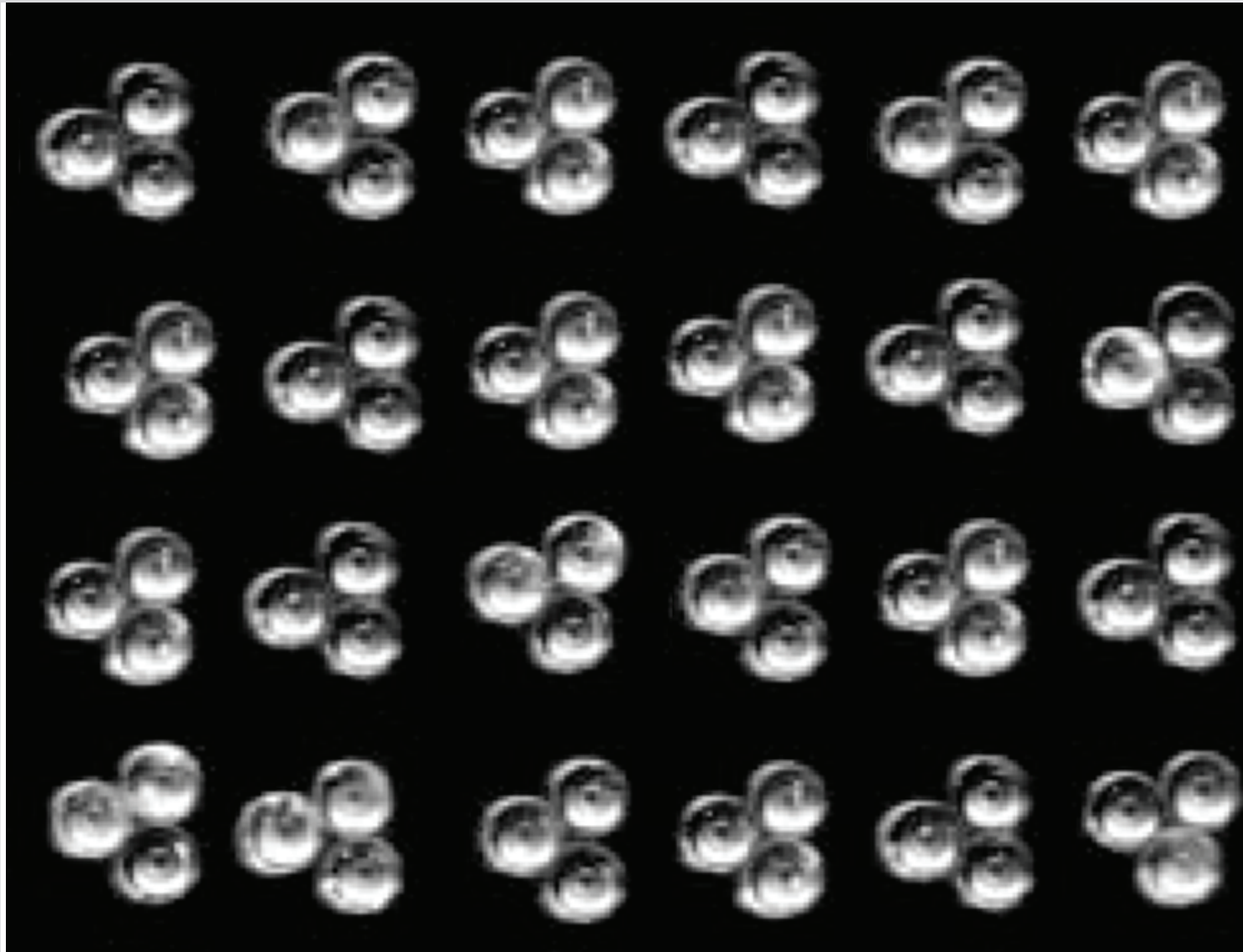
consider the atoms at the rim of the hole



Let's try it!

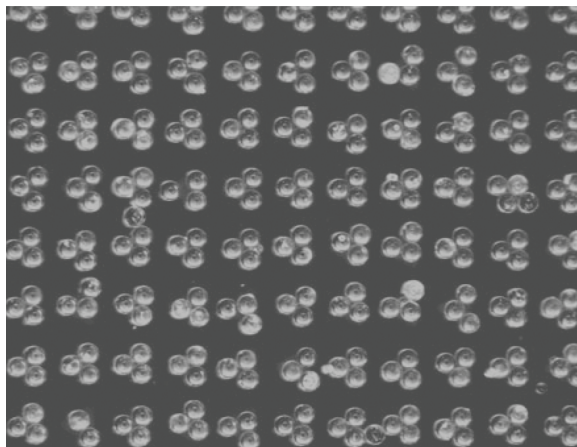
*“Does this method work only with questions
that have a correct answer?”*

Let's try it!

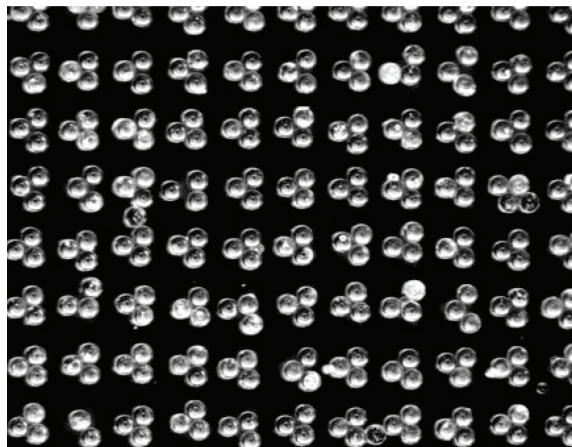


Let's try it!

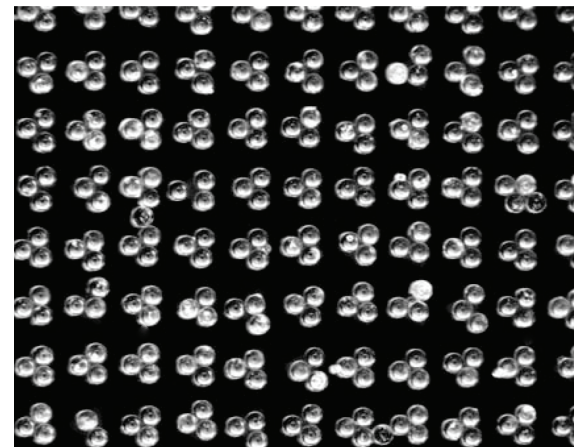
original



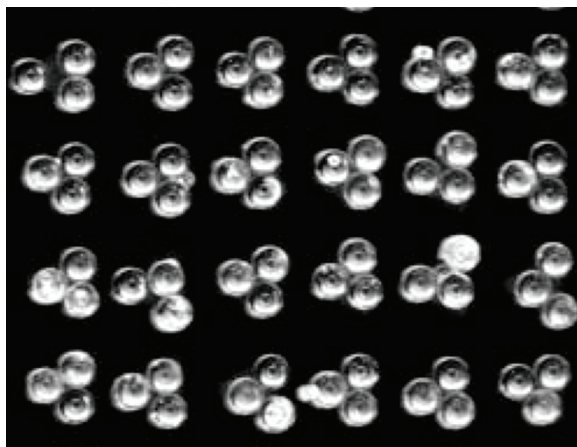
1. adjust contrast



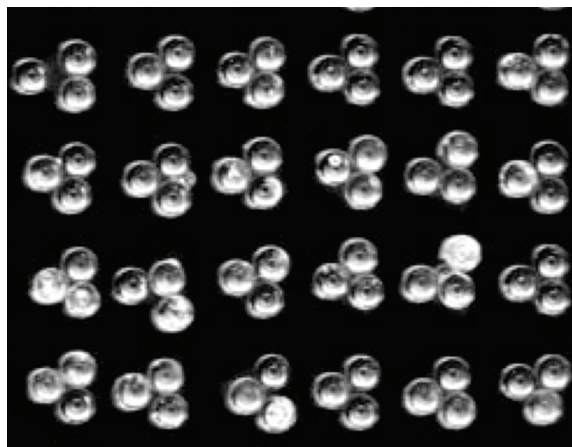
2. remove blemishes



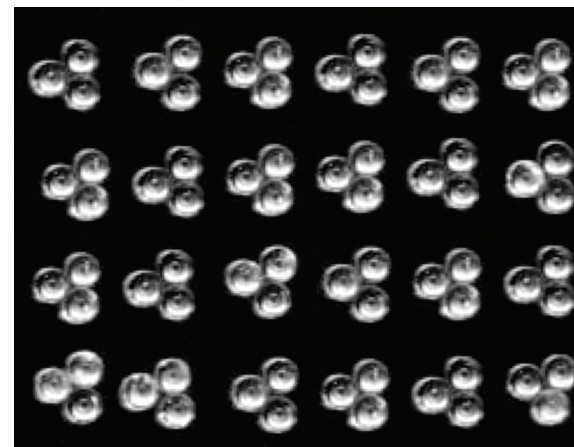
3. crop



4. remove outliers



5. reconstruct



Consider this

a couple of points worth noting:

Consider this

a couple of points worth noting:

- 1. you got engaged**

Consider this

a couple of points worth noting:

1. you got engaged
2. no "correct" answer

Consider this

a couple of points worth noting:

- 1. you got engaged**
- 2. no "correct" answer**
- 3. you got engaged**

Consider this

a couple of points worth noting:

1. you got engaged
2. no "correct" answer
3. you got engaged
4. you don't need a correct answer!

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?

1. Delta Airlines
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- 3. All Nippon Airways**
4. British Midland Airways
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8. Aeroflot
9. Are you kidding me? None of the above.

Let's try it!

hole in plate

model

microscopy image

discussion

airline

fact

Let's try it!

hole in plate

model

microscopy image

discussion

airline

fact

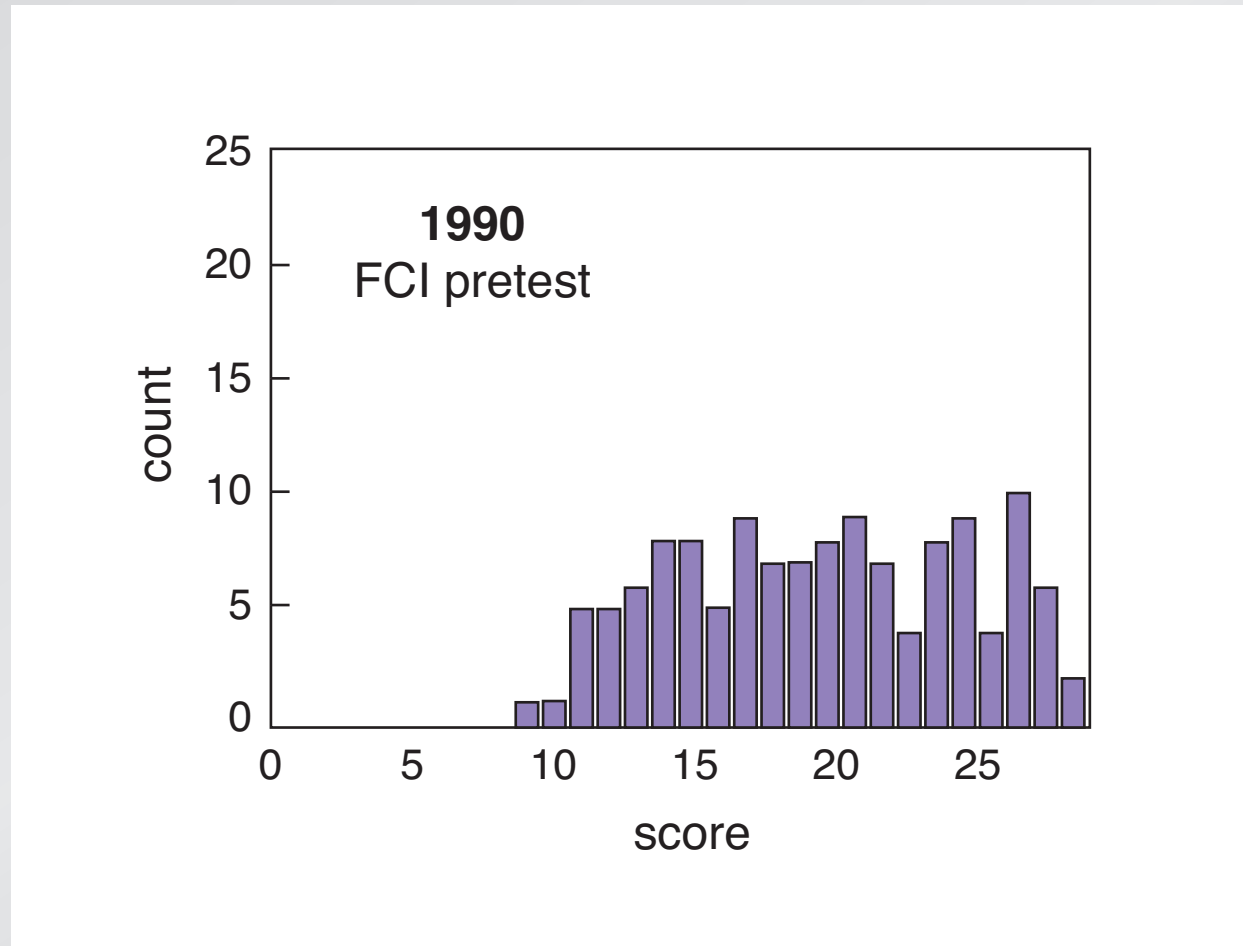
need to test mental model!

Outline

- Peer Instruction
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- Results

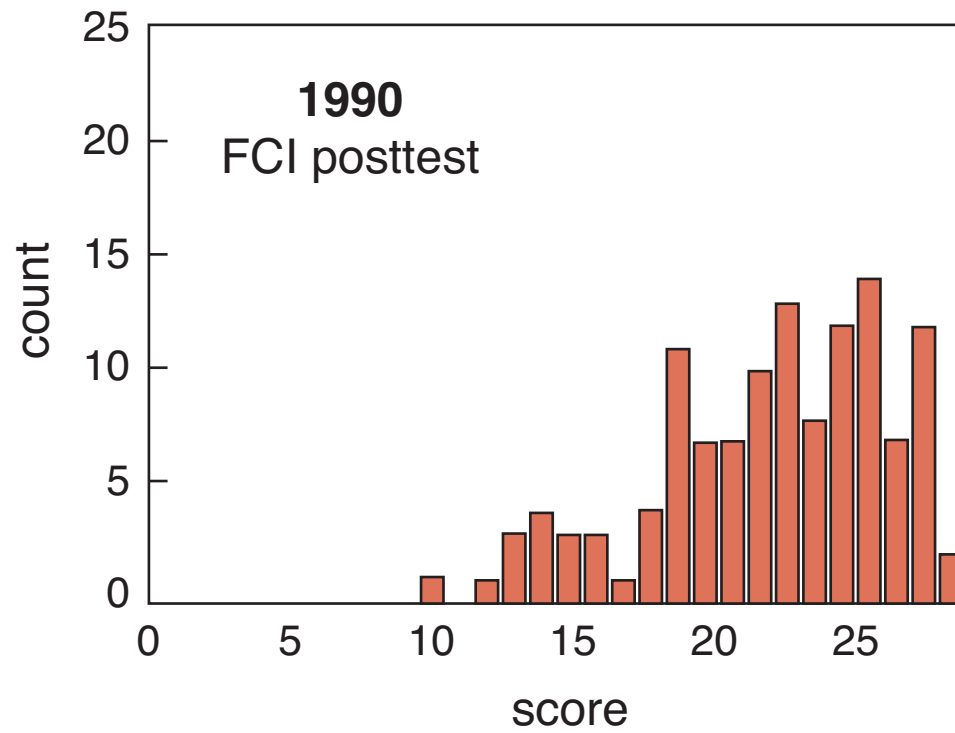
Results

traditional instruction



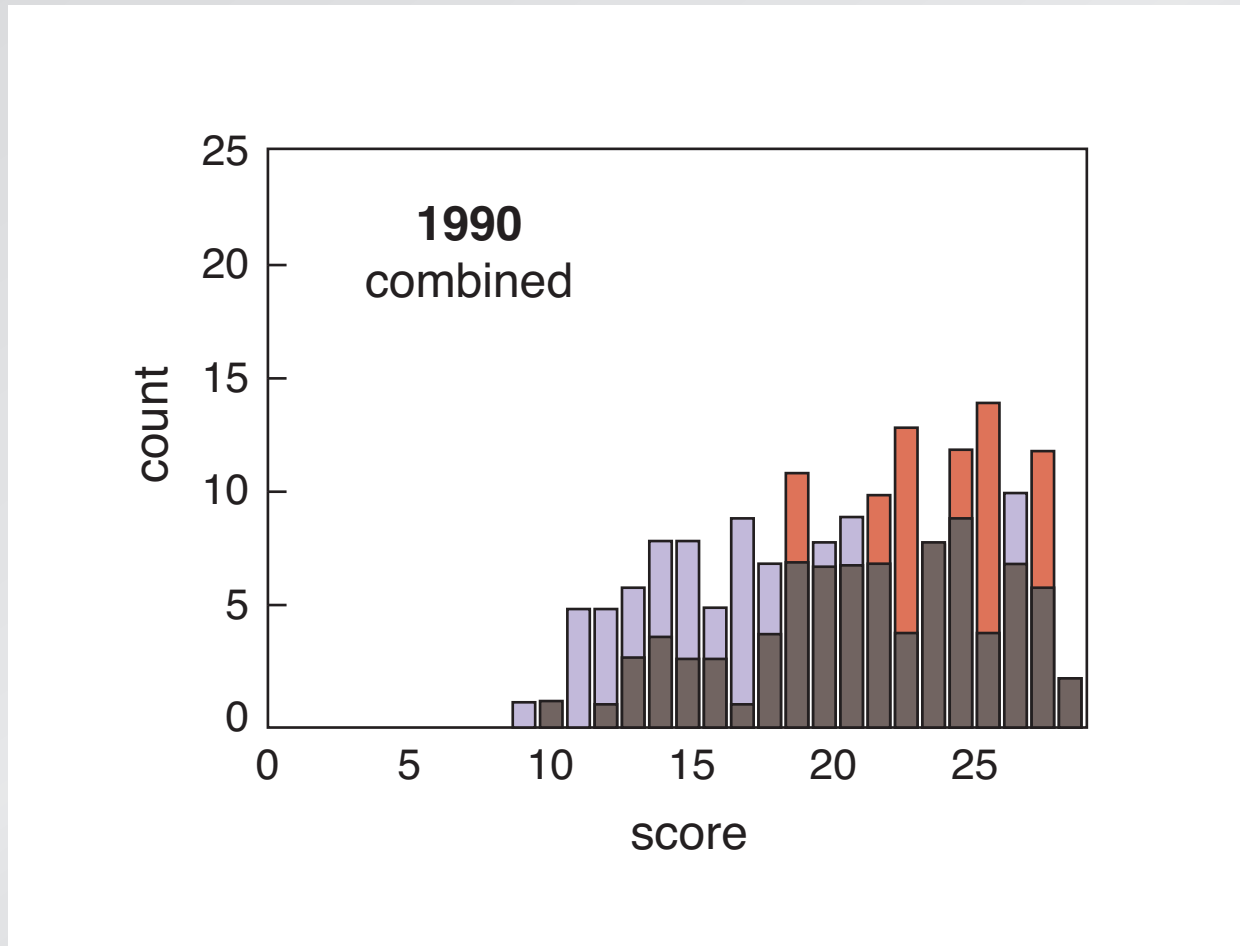
Results

traditional instruction



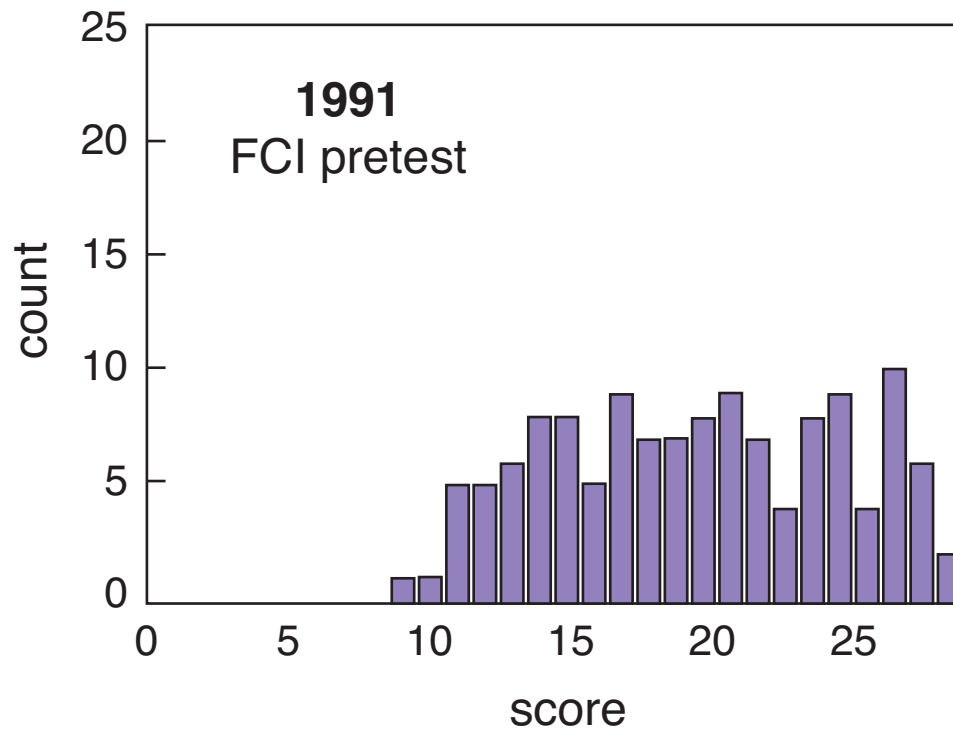
Results

traditional instruction



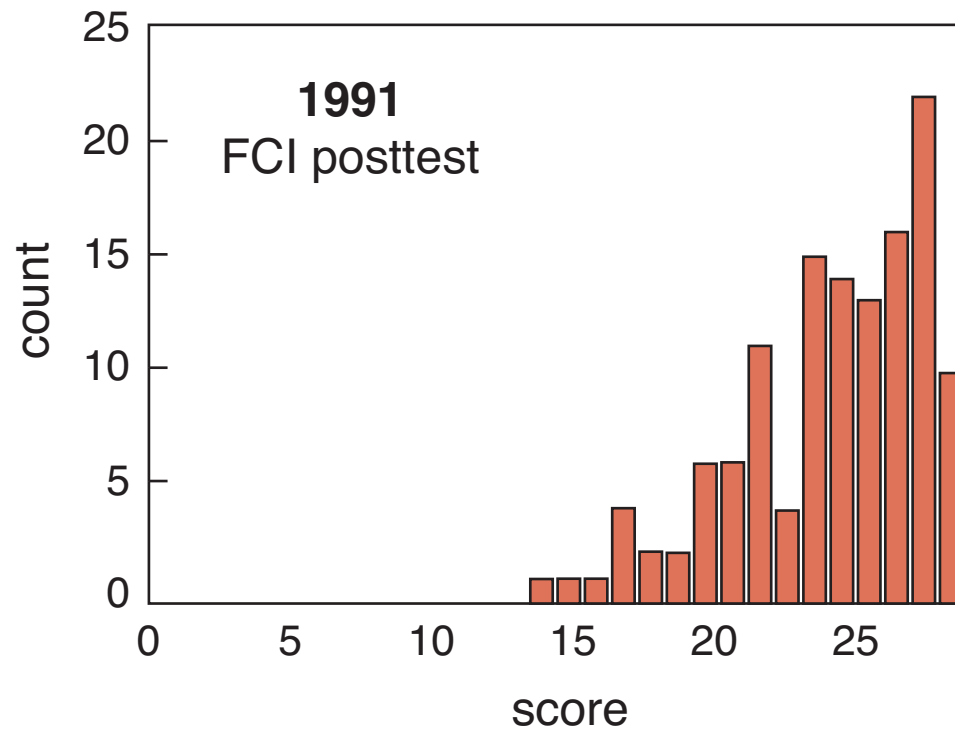
Results

first year of implementing PI



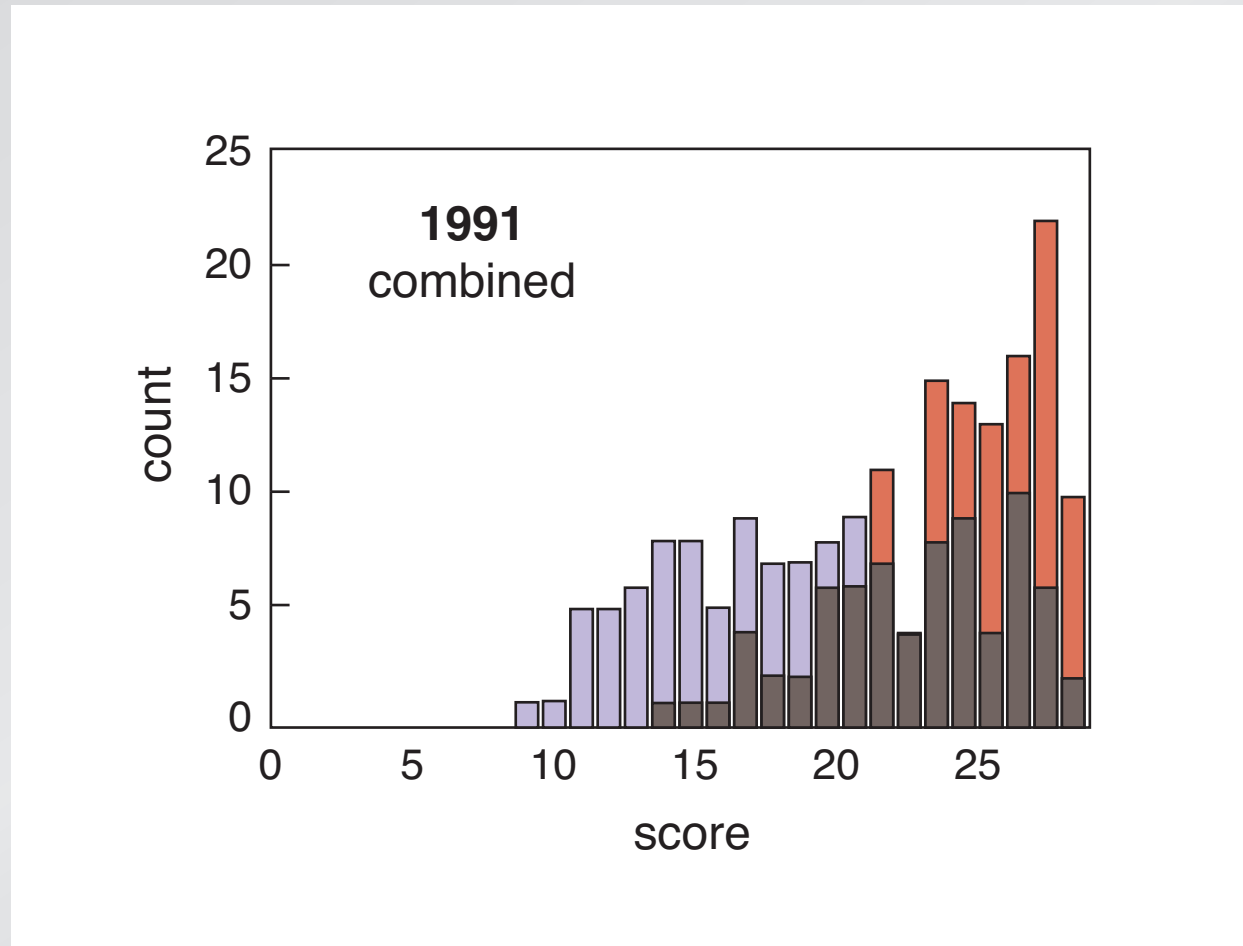
Results

first year of implementing PI



Results

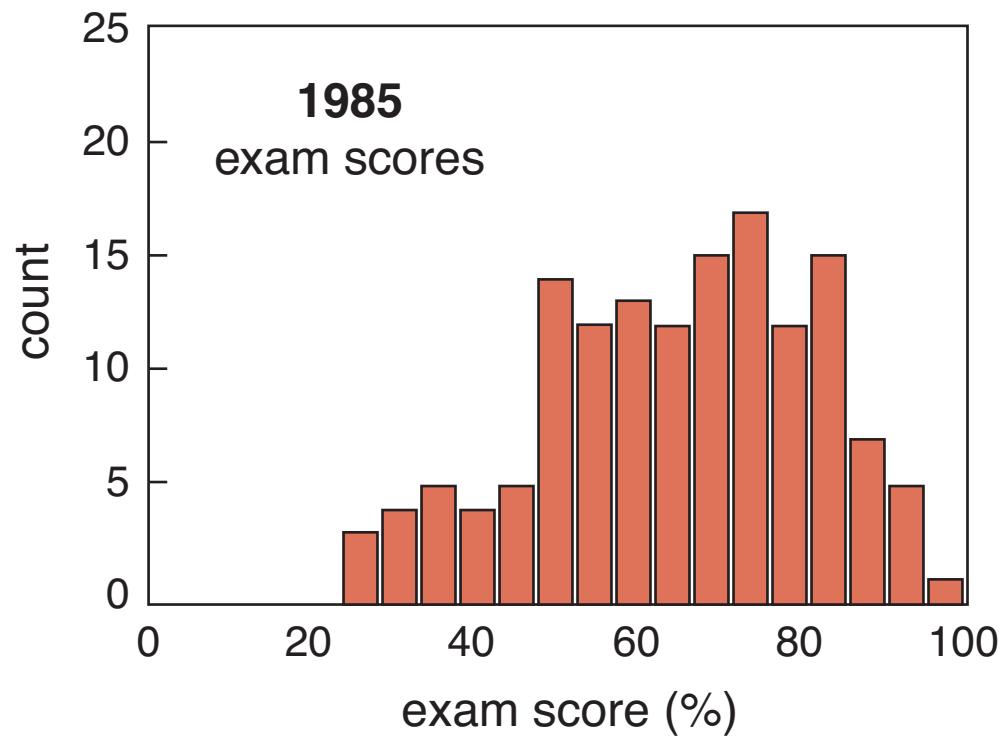
first year of implementing PI



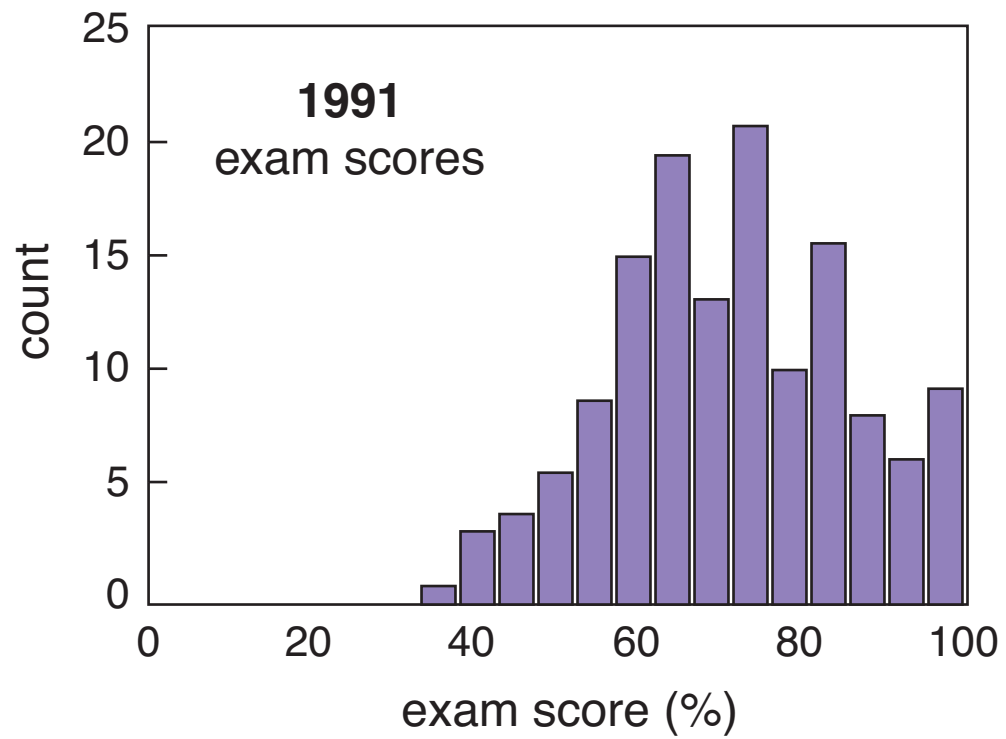
Results

what about problem solving?

Results

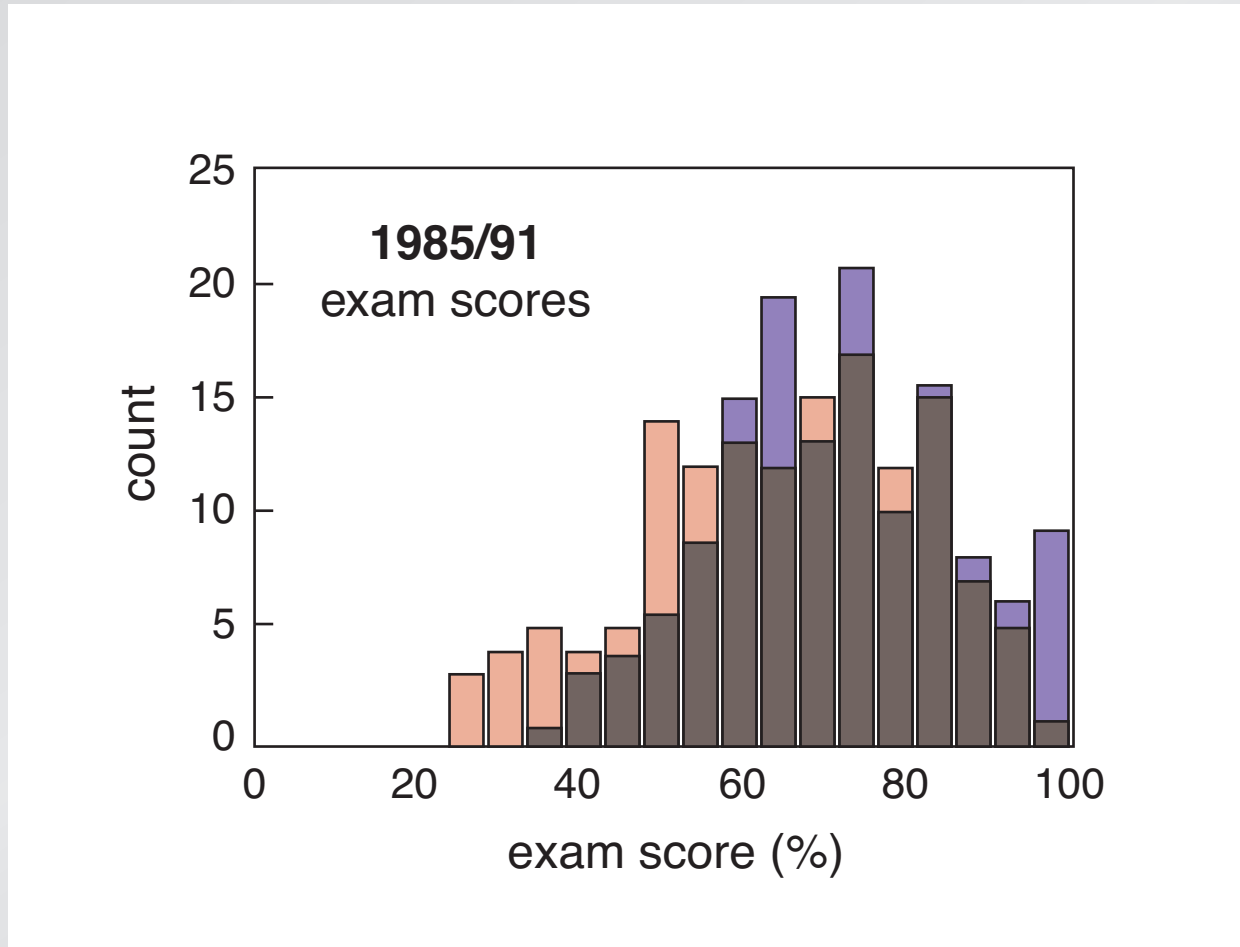


Results



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:

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