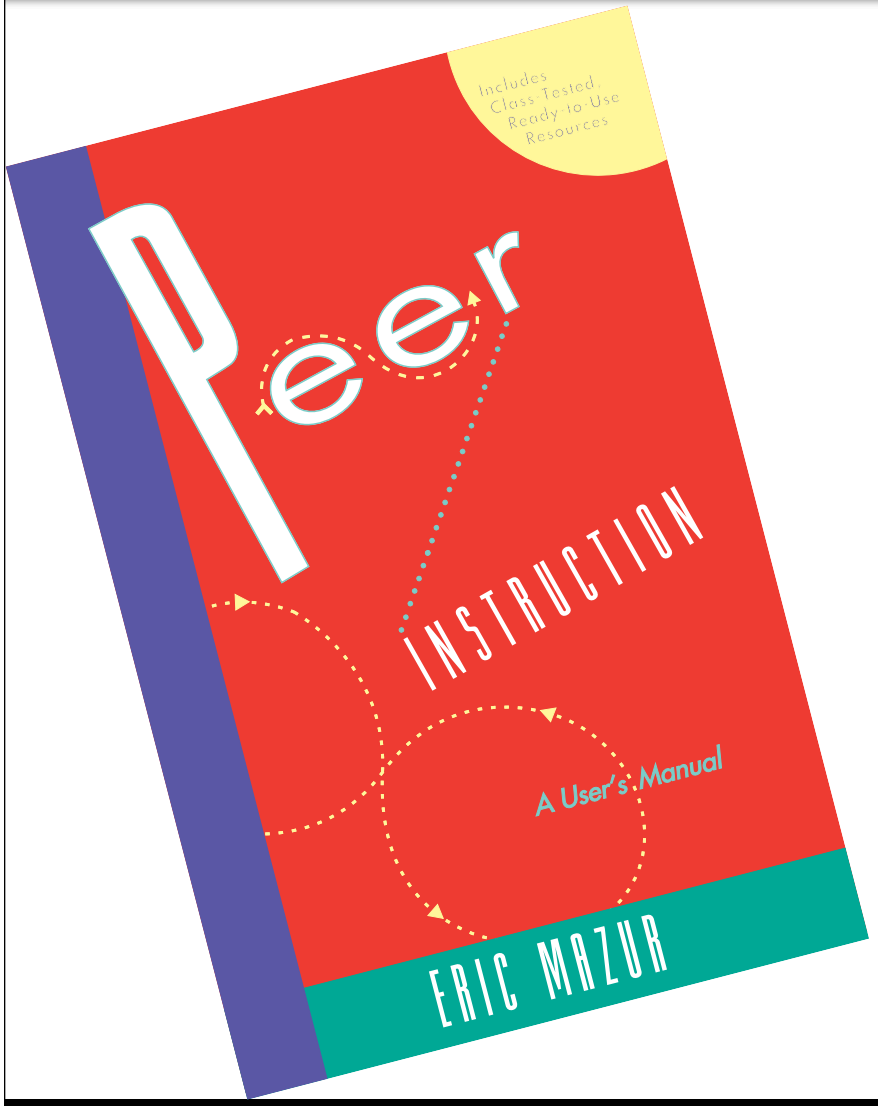
Peer Instruction Workshop



Julie Schell

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University of Texas at Austin, Instructional Designer
Center for Teaching and Learning

WHA Junior Faculty Institute
Jan 30, 2012
Austin, TX

INTERNATIONAL OFFICE
THE UNIVERSITY OF TEXAS AT AUSTIN

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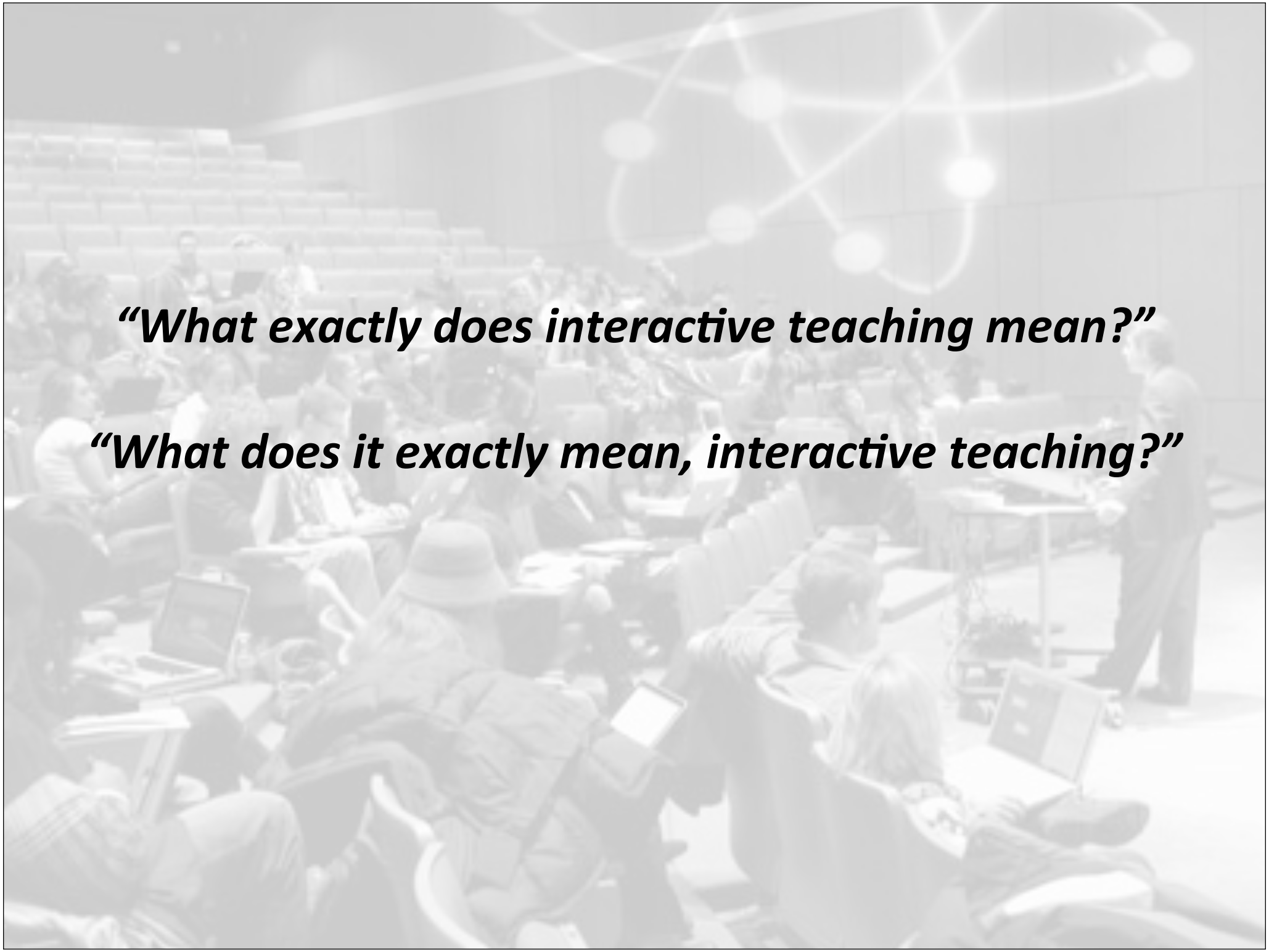
CENTER FOR TEACHING + LEARNING
THE UNIVERSITY OF TEXAS AT AUSTIN

MAZUR GROUP

Get your clickers ready!

Peer Instruction (Eric Mazur)

1. Never heard of it
2. Heard of it, but don't really know what it is
3. Quite familiar with it
4. I use it in my classes


“What exactly does interactive teaching mean?”
“What does it exactly mean, interactive teaching?”

Problem: traditional teaching focuses on
on information delivery

but learning requires much more than information delivery, it requires information assimilation

Traditional teaching

1. Information delivery (coverage, easy) - job of the teacher

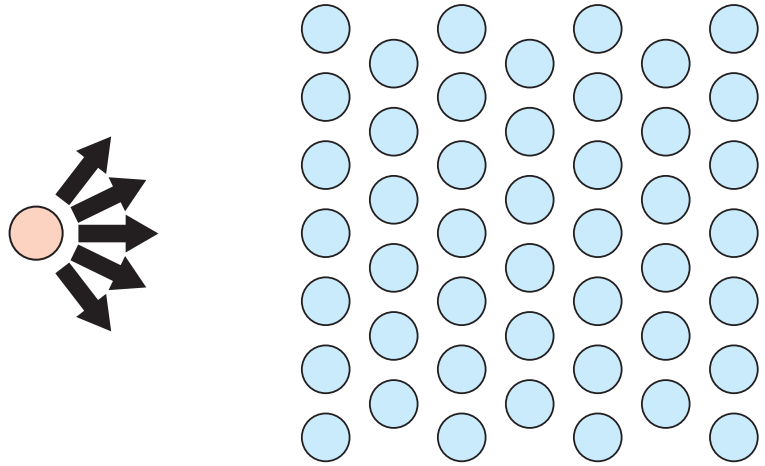
2. Information assimilation (understanding, hard) - left to the student

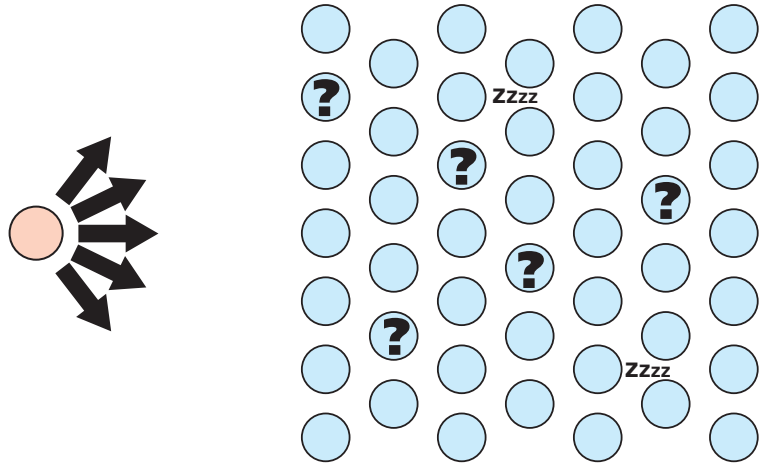
Interactive teaching:

1. Information delivery (coverage, easy) - left to the student

2. Information assimilation (understanding, hard) - guided by the instructor


“What is interactive teaching most effective for?”

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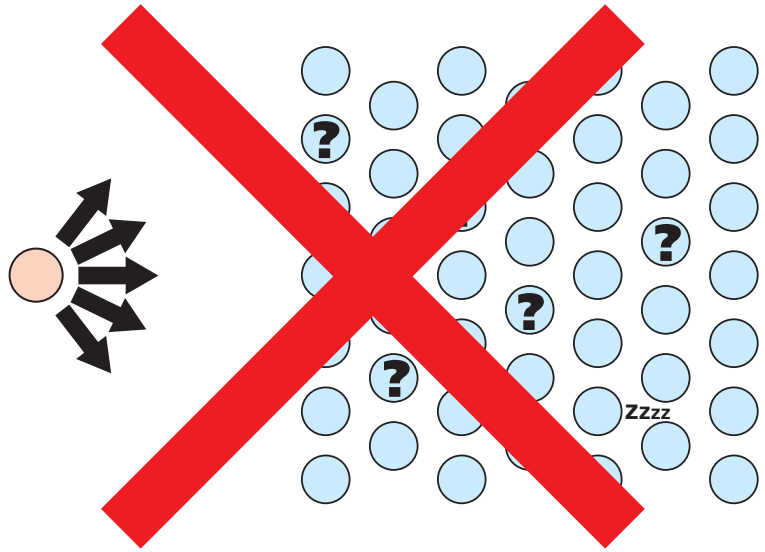
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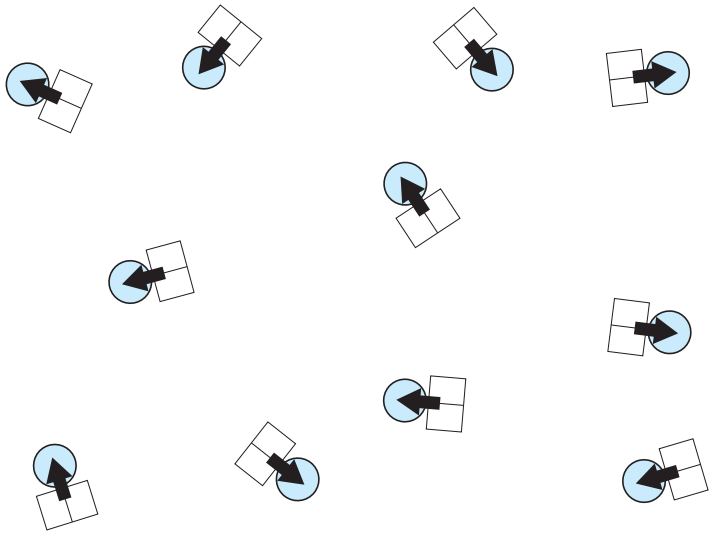
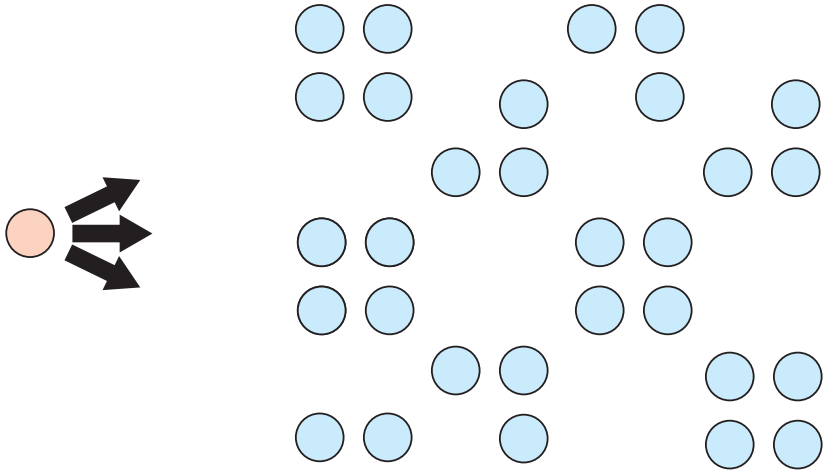
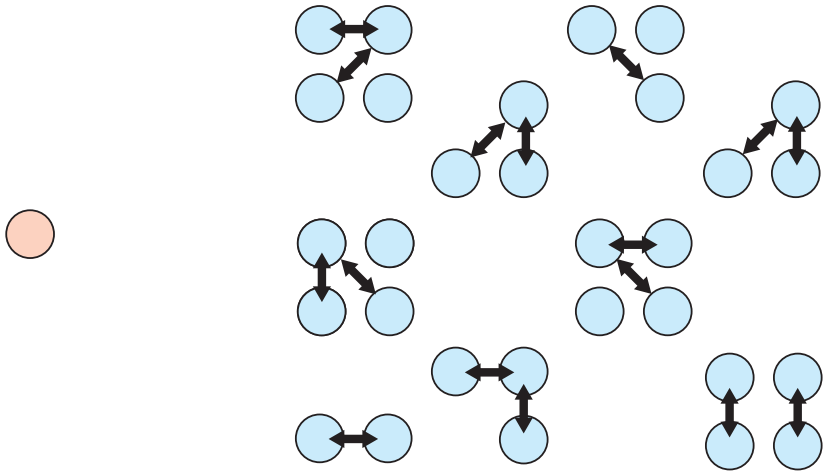
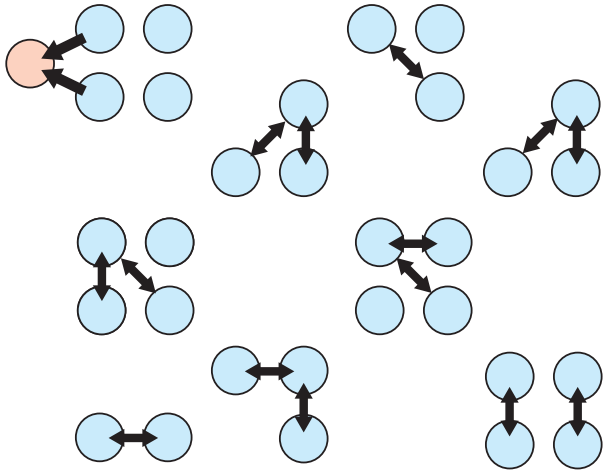
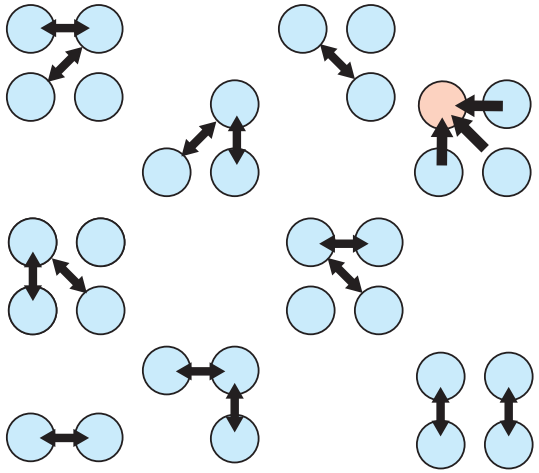






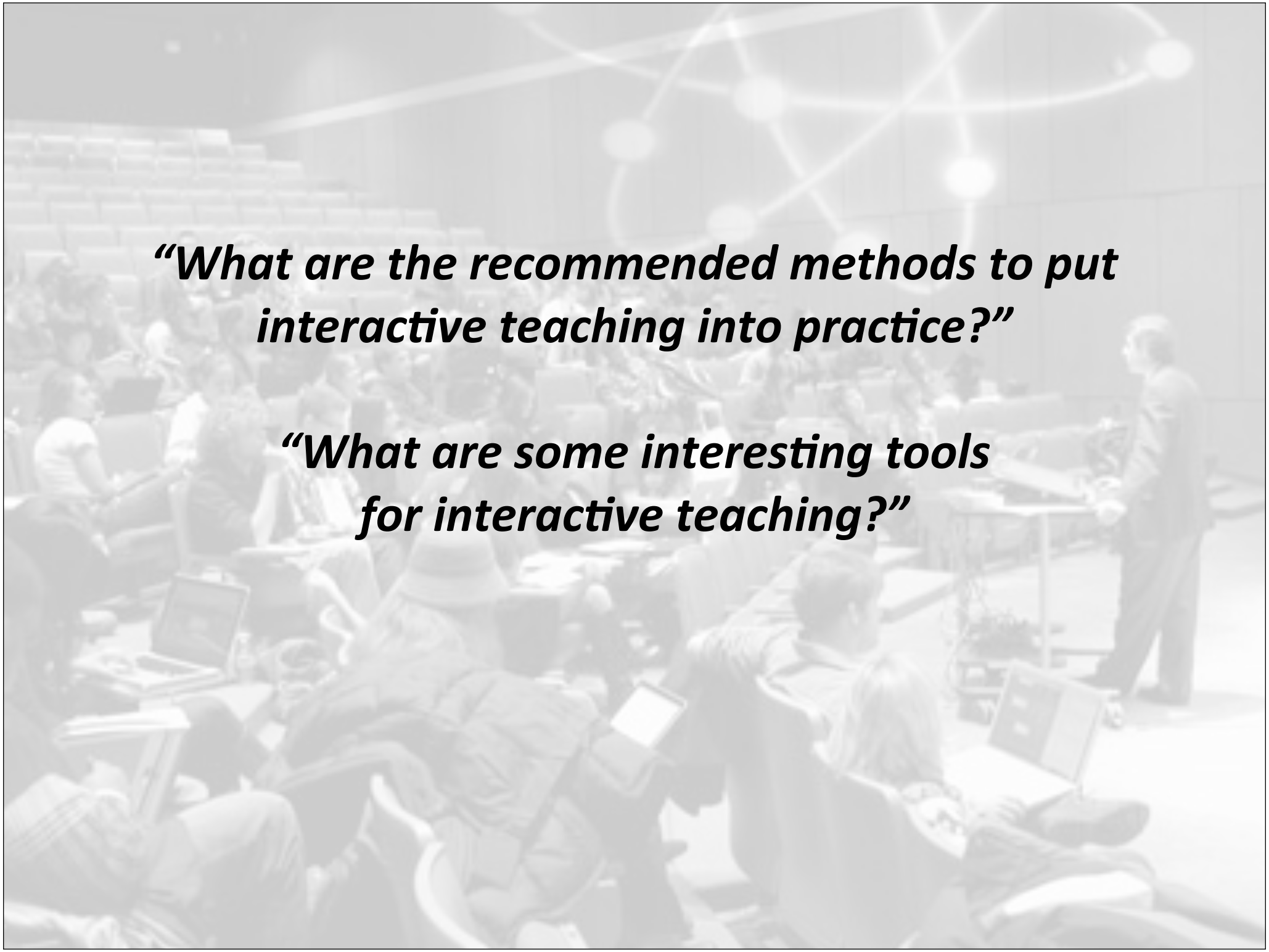




Interactive teaching moves coverage out of and assimilation into the classroom.

1. Information delivery (coverage, easy) - left to the student

2. Information assimilation (understanding, hard) - guided by the instructor


“What are the recommended methods to put interactive teaching into practice?”
“What are some interesting tools for interactive teaching?”

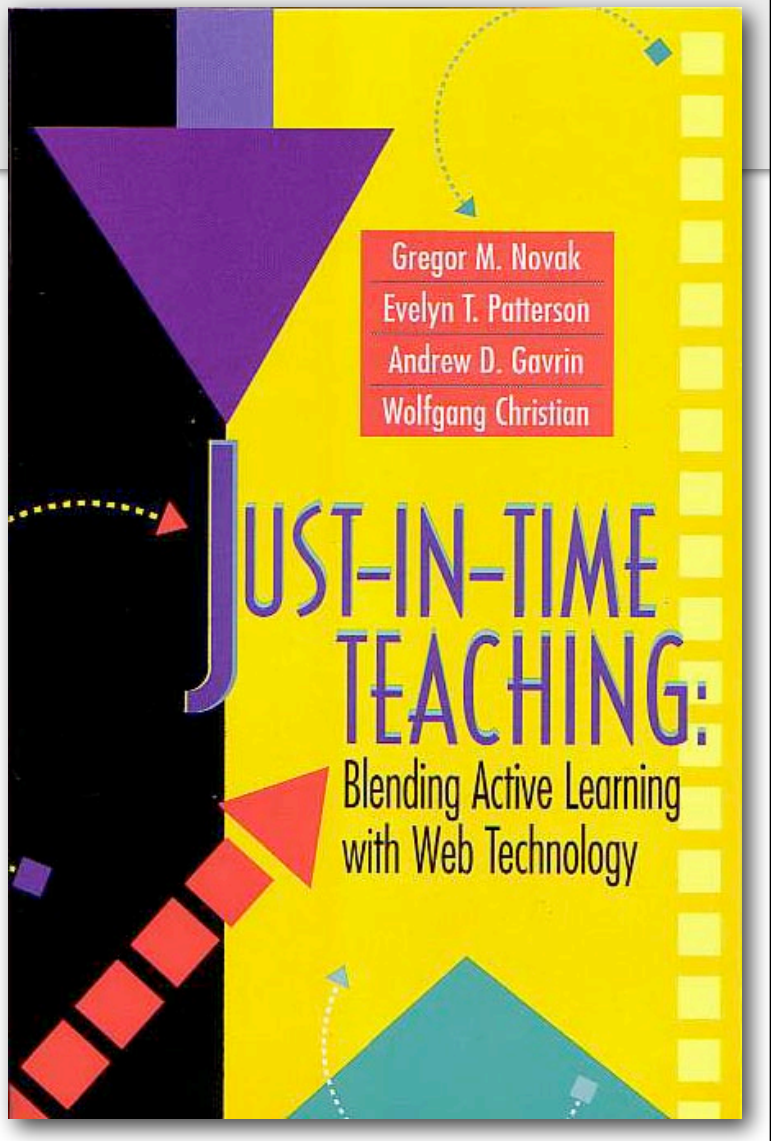
2 Research-based Interactive Teaching Tools

- *Just-in-Time Teaching (JiTT): pre-class reading covers content*
- *Peer Instruction: in class time involves content assimilation*

JiTT

Just-in-time-teaching

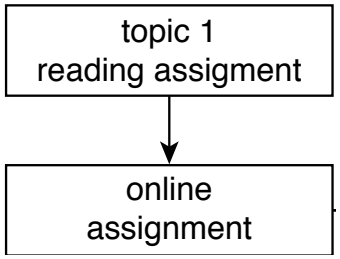
Motivates students to cover material outside of class



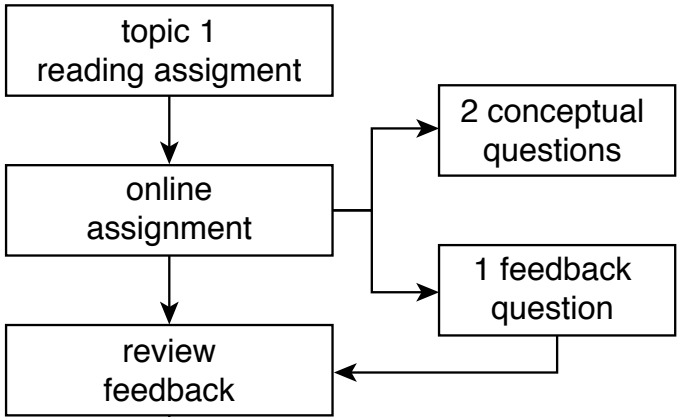
JiTT

topic 1
reading assigment

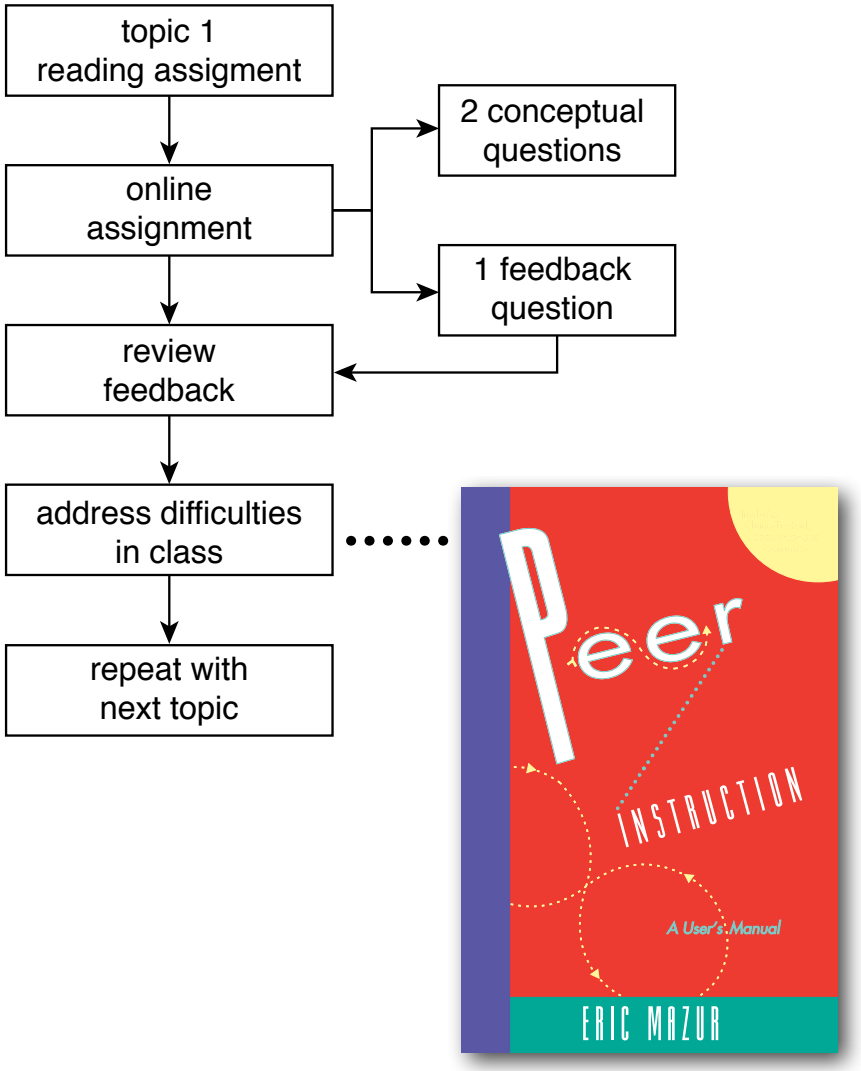
JiTT



JiTT


topic 1
reading assigment
online
assignment
review
feedback
2 conceptual
questions
1 feedback
question

JiTT


topic 1
reading assigment
online
assignment
2 conceptual
questions
1 feedback
question
review
feedback
address difficulties
in class
repeat with
next topic
Peer
INSTRUCTION
A User's Manual
ERIC MAZUR

JiTT

1. What characteristic determines whether organisms belong to the same species? Why are, for instance, are Rottweilers, bulldogs, and poodles - phenotypically (ie physical appearance) very different - considered to be members of the same species - dogs? Why are all humans, despite our numerous phenotypic differences, considered to be one species?

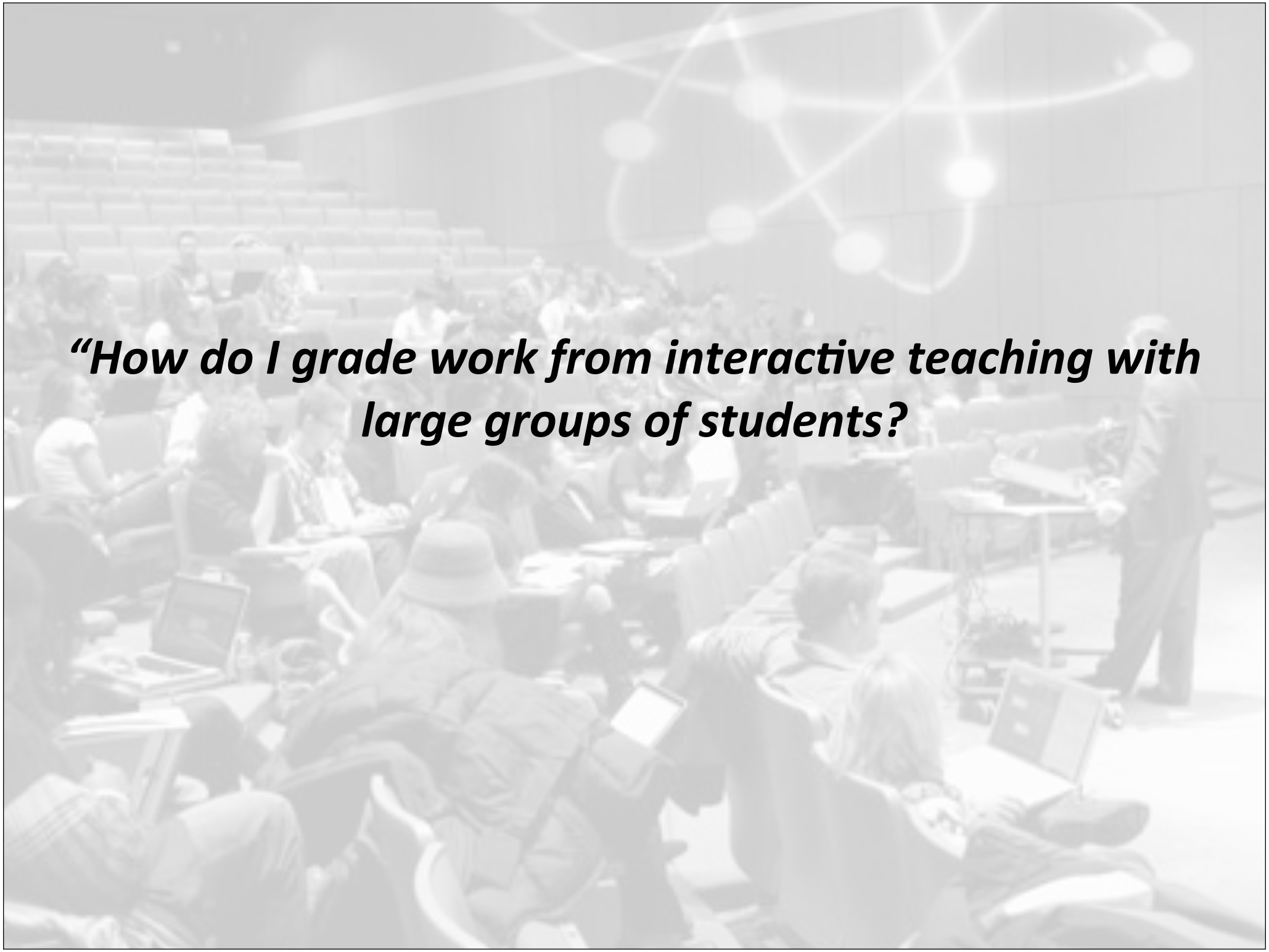
From Debi = I think the characteristic is their proteins. Each species has different proteins and can distinguish them from other similiar species. The closer the relation between the two species, the more the proteins resemble each other. That is why all dogs and all humans, despite physical differences, are considered to be a part of their same species.

From Erika = A has to do with the common characteristics carried by each. Each Rottweiler, Bulldog, and Poodle have four legs, tail, covered in hair, they bark, and even have wet noses. These are some of the similar features looked for by species.

2. What did you find most confusing about the reading on species? If you found nothing confusing, what do you think is most important for us to spend time discussing in class?

From Altman: I was very confused about the concept of interbreeding. Is it right that if offspring also interbreed then they are considered the same species? If their offspring does not breed, than it is a different species, as in the case of horses and donkeys. The general rule applies that if two organisms interbreed and have fertile offspring, than the two organisms are of the same species, I think but I am not sure.

From Walker = I think it is important to focus on the concept of interbreeding. What is the difference between intrabreeding and interbreeding and does inbreeding mean the same thing?

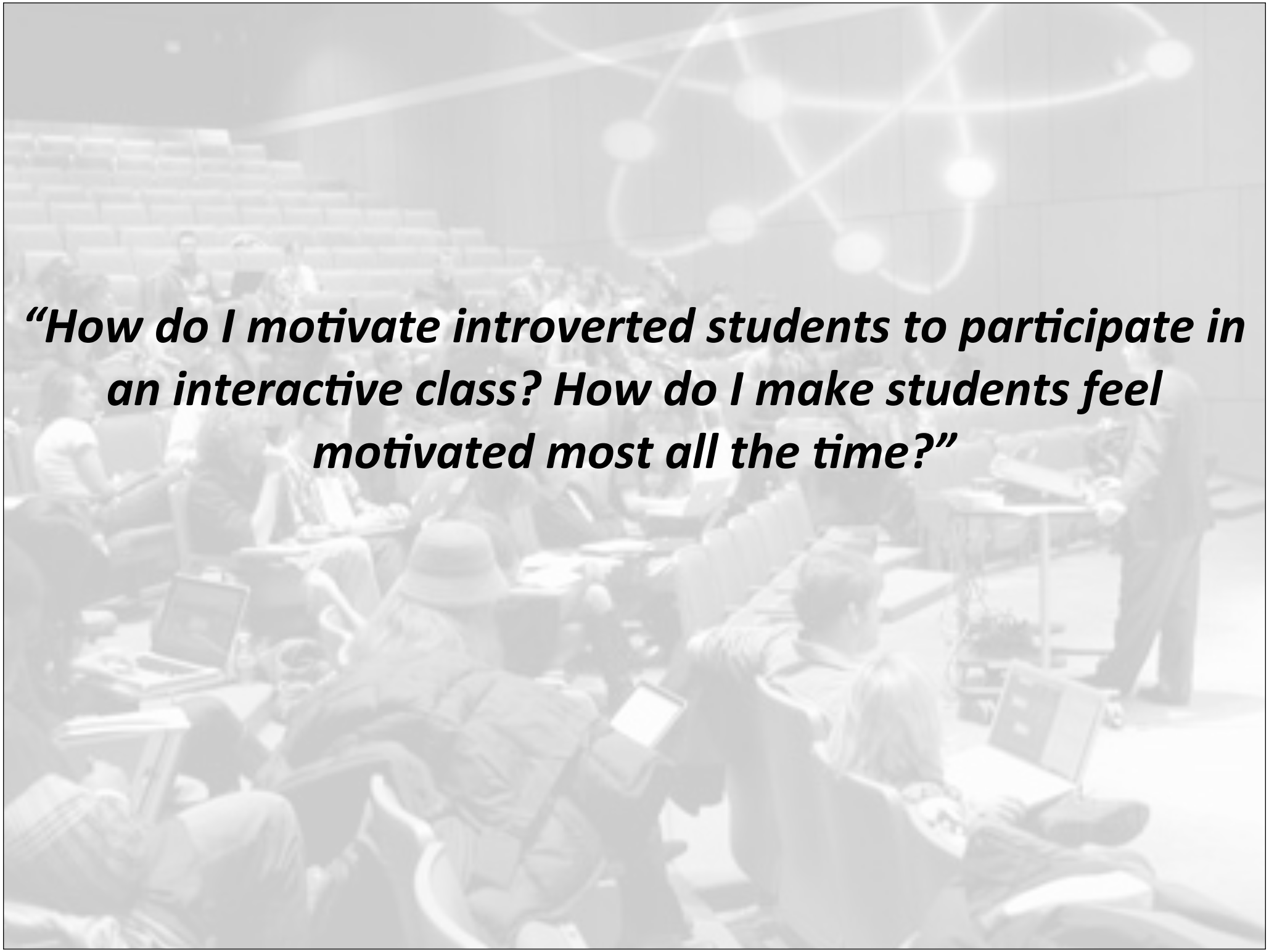

“How do I grade work from interactive teaching with large groups of students?

JiTT

Ideas for Managing JiTT Grading in Large Classes

If you have very large classes, it may be difficult for you to grade all of your students' responses for every JiTT exercise. There are several ways to decrease the amount of grading you do, while maintaining the number of JiTT exercises you use:

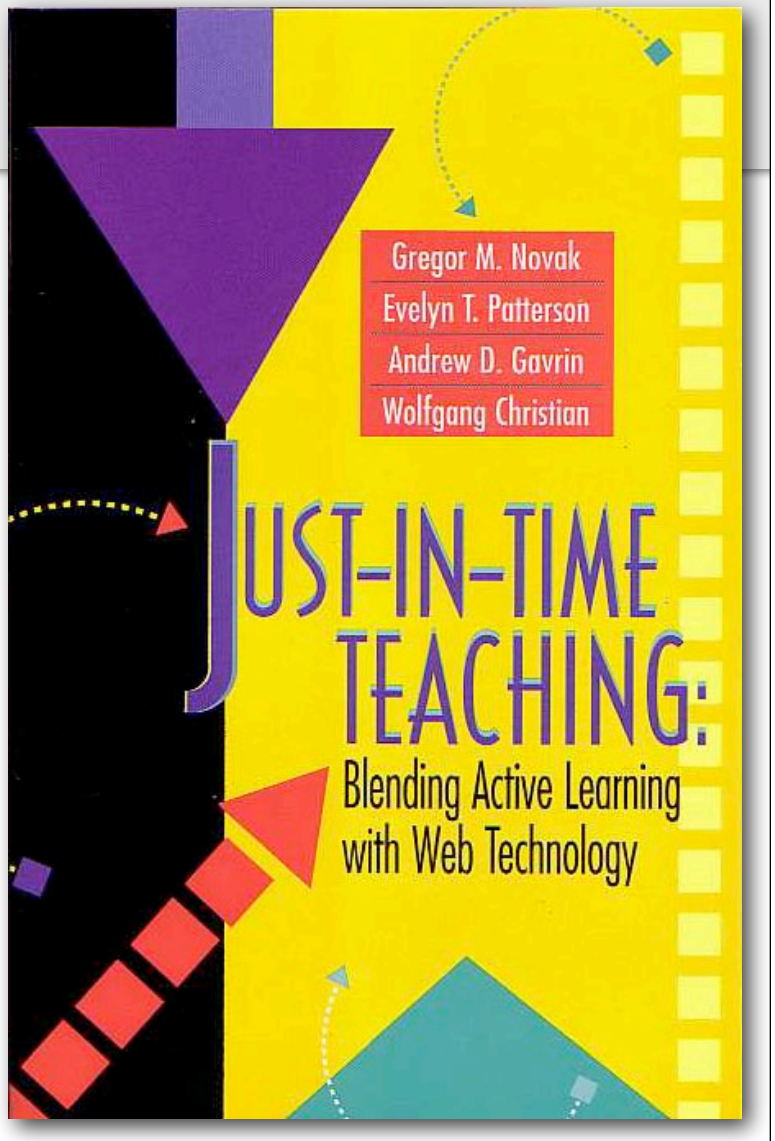
- You can grade only a random selection of the JiTT exercises you assign during the course.
- You can grade responses from a random selection of students for each exercise.
- You can award grades for completion, rather than accuracy of answers.


“How do I motivate introverted students to participate in an interactive class? How do I make students feel motivated most all the time?”

JiTT

Just-in-time-teaching

Motivates students to cover material outside of class
Graded on effort, not correctness
Allows less active students to ask questions
Students spend class time addressing most difficult topics



Get your clickers ready!

The best way to motivate students to cover the material before they come to class is to...

1. tell them completing the readings will help them perform better on exams
2. tell them completing the readings will earn them points toward final grades
3. tell them completing the readings is optional but highly recommended
4. tell them completing the readings is required

2 Research-based Interactive Teaching Tools

- *Just-in-Time Teaching (JiTT): pre-class reading covers content*

- *Peer Instruction: in class time involves content assimilation*

Peer Instruction

Traditional teaching: http://youtu.be/dxPVyieptwA

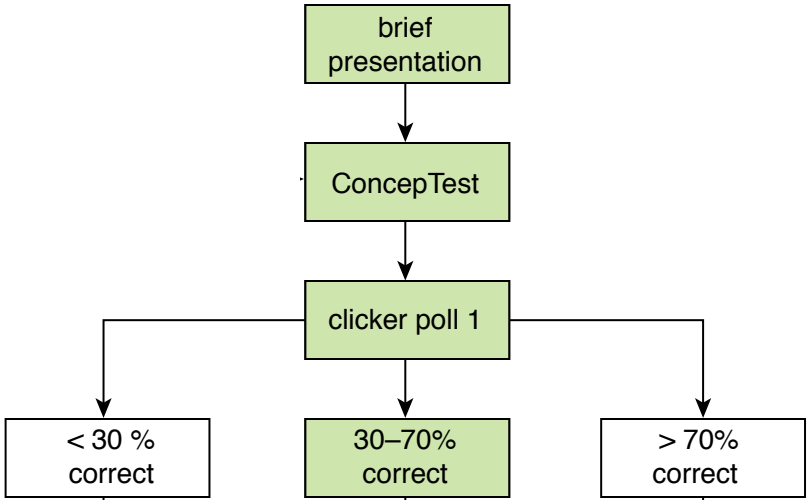
Peer Instruction

Peer Instruction: http://www.youtube.com/watch?v=

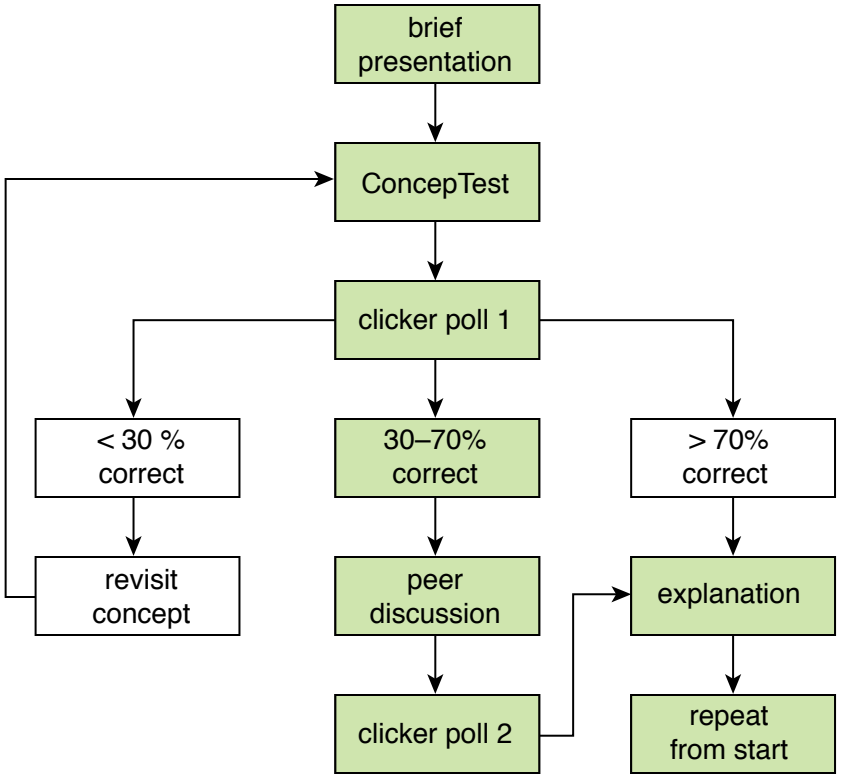
Peer Instruction

brief
presentation

Peer Instruction



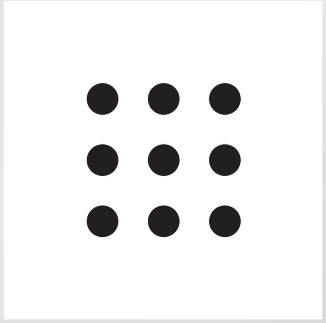
Peer Instruction



Peer Instruction

Let's try it!

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



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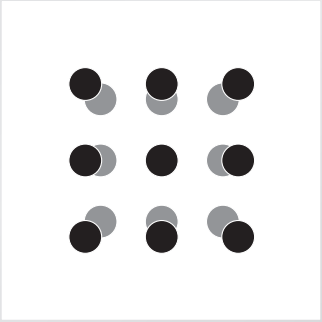
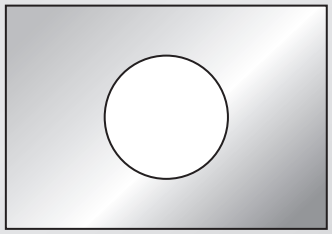


Peer Instruction

Let's try it!

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



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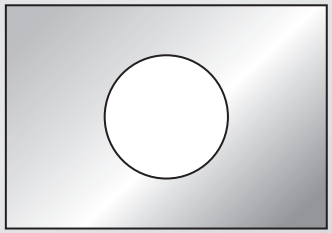

When the plate is uniformly heated, the diameter of the hole

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

Peer Instruction

Let's try it!

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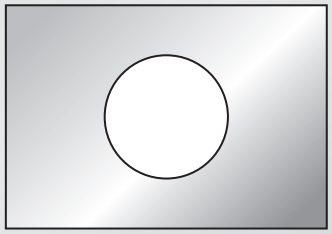


When the plate is uniformly heated, the diameter of the hole

1. increases. ✔

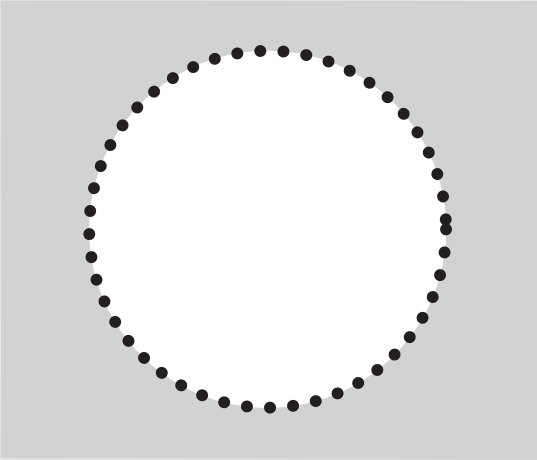
2. stays the same.

3. decreases.

Peer Instruction

Let's try it!

consider the atoms at the rim of the hole



Peer Instruction

Let's try it!

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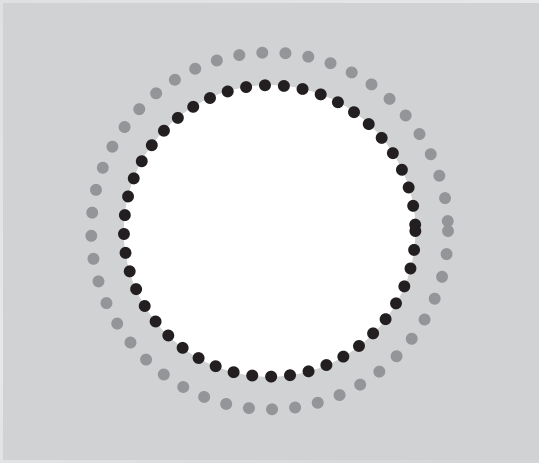
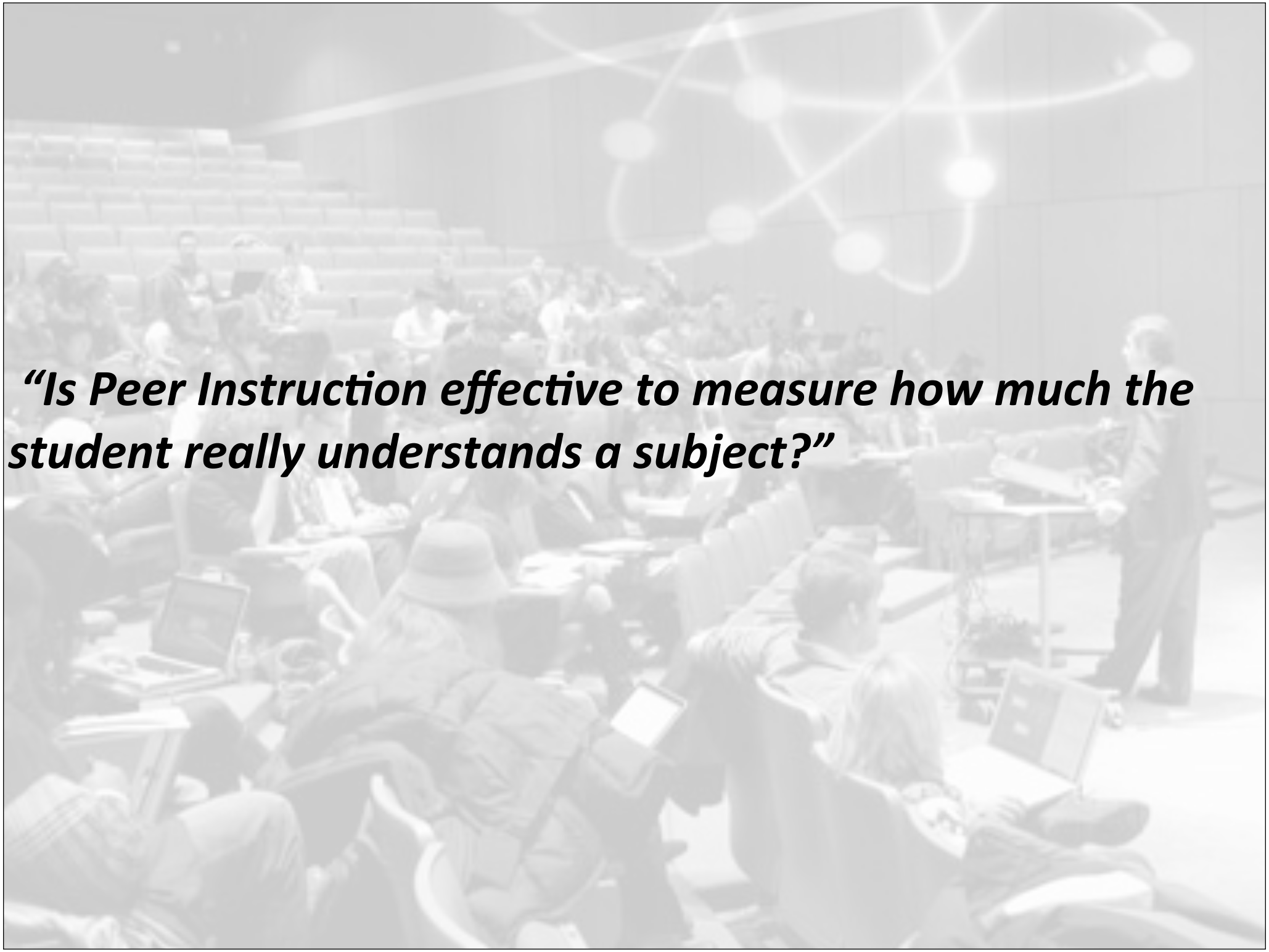
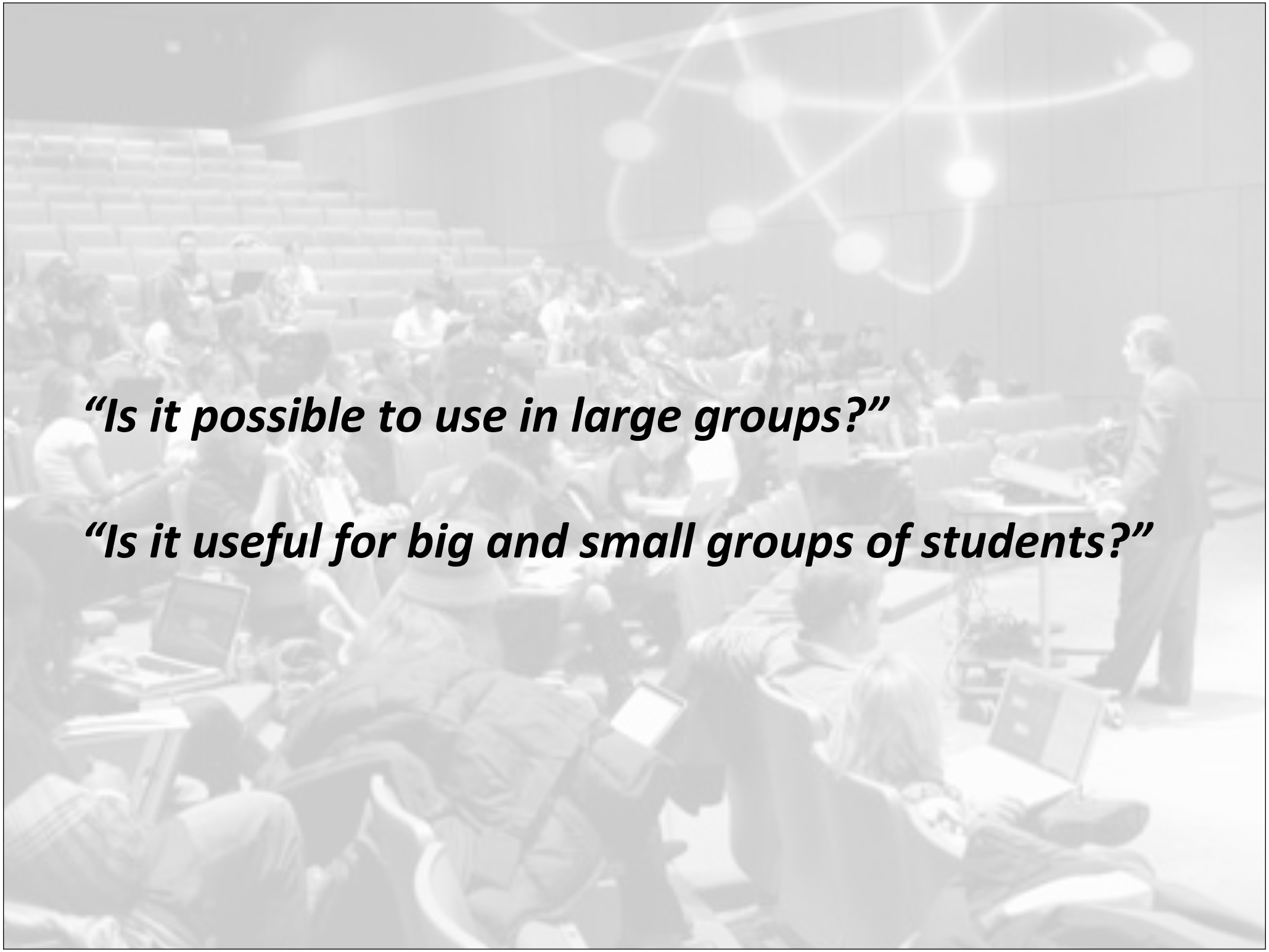
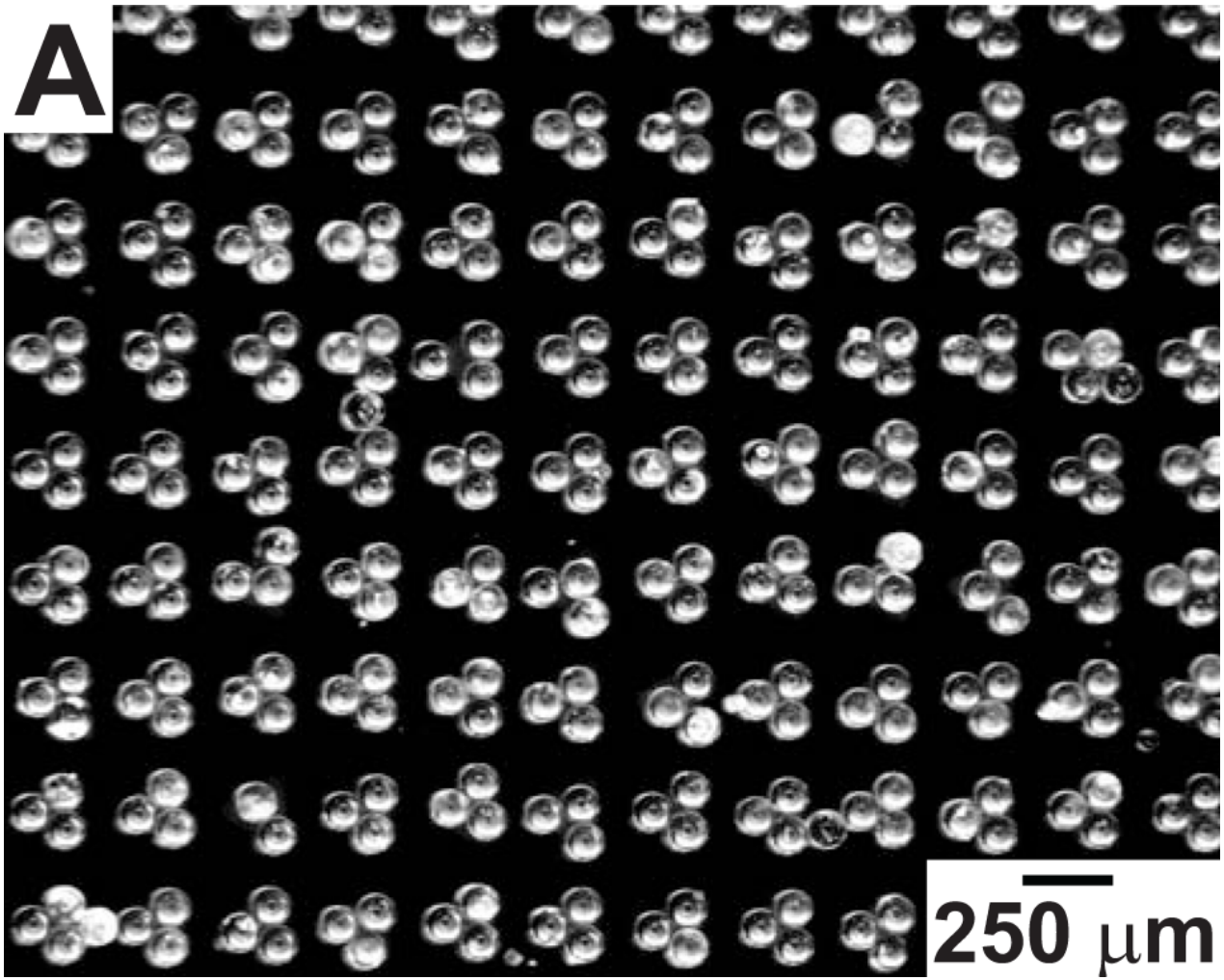



“Is Peer Instruction effective to measure how much the student really understands a subject?”


“Is it possible to use in large groups?”
“Is it useful for big and small groups of students?”

Peer Instruction



Peer Instruction

Case Study B

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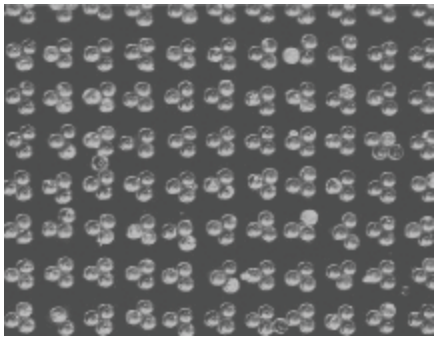

Peer Instruction

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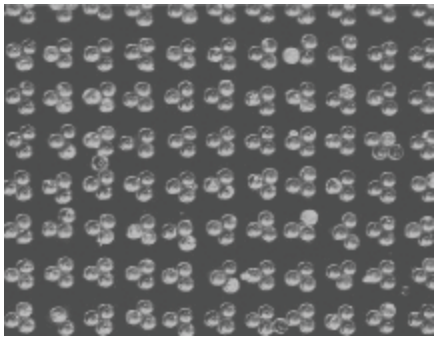

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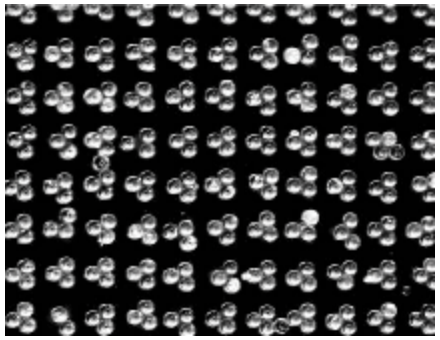

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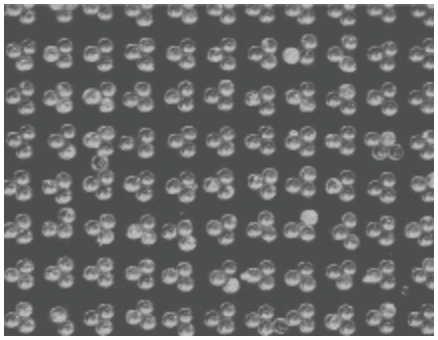

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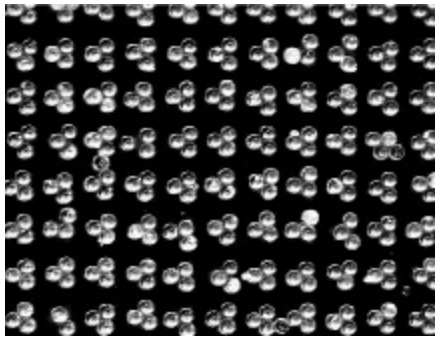
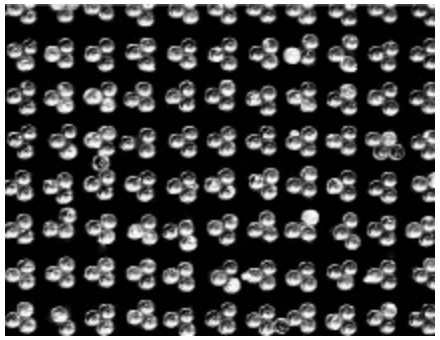


2. remove blemishes



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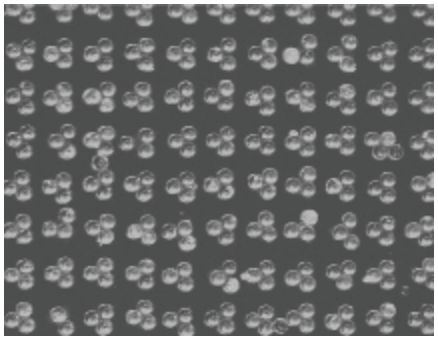

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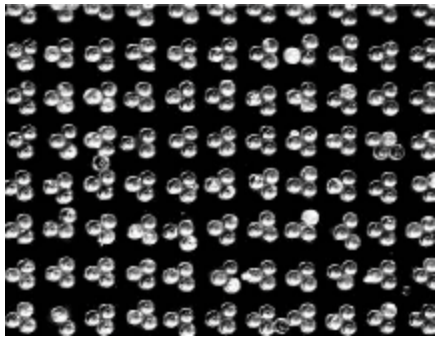

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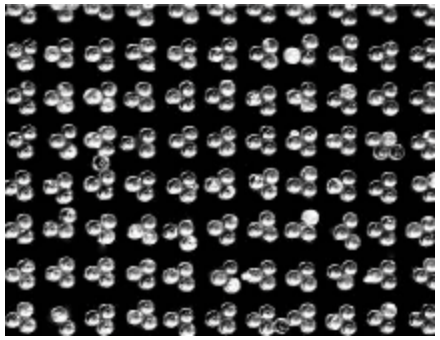
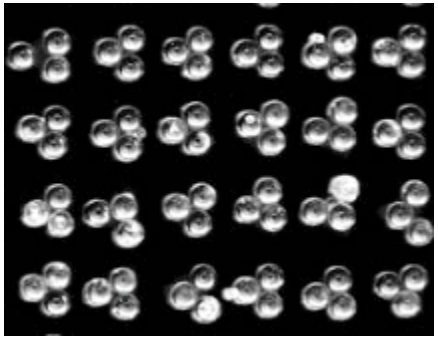


3. crop



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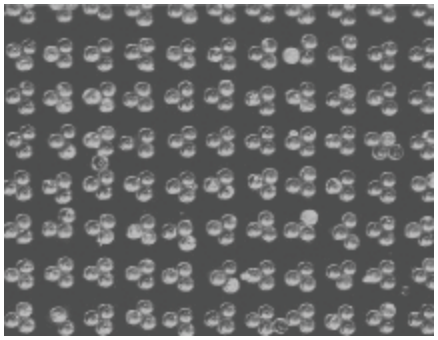

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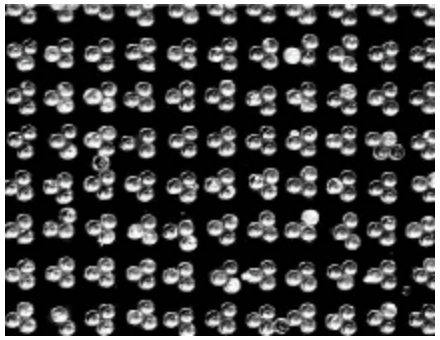

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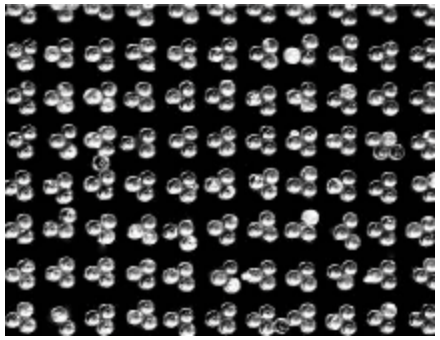

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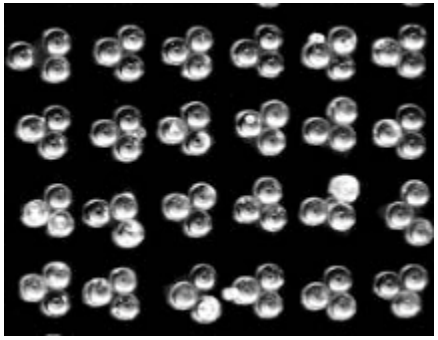
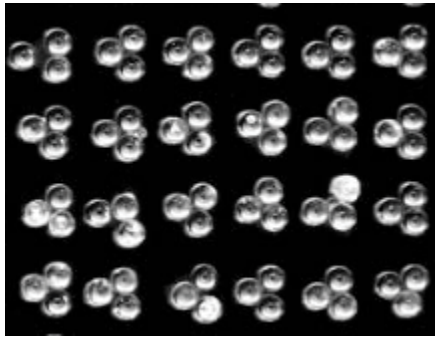


4. remove outliers



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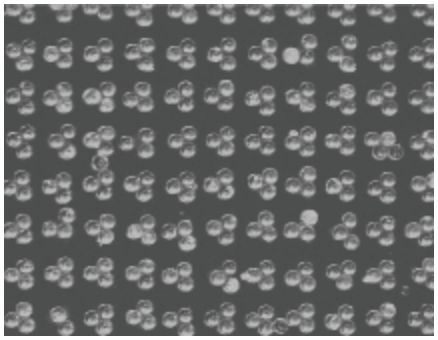

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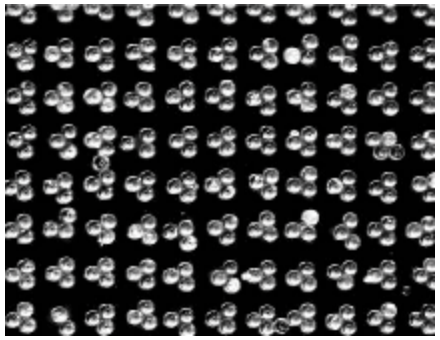

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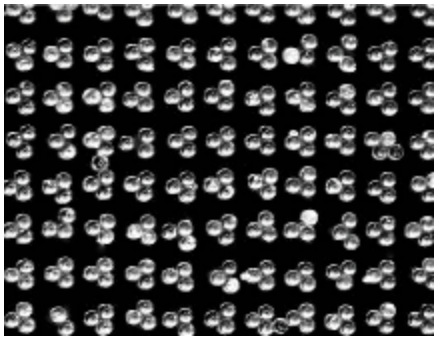
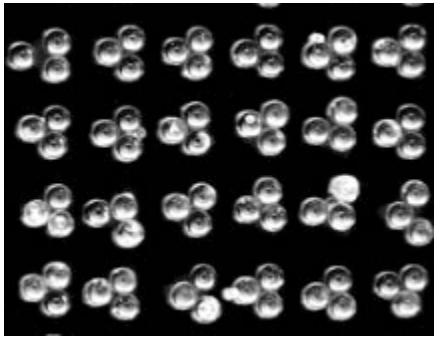
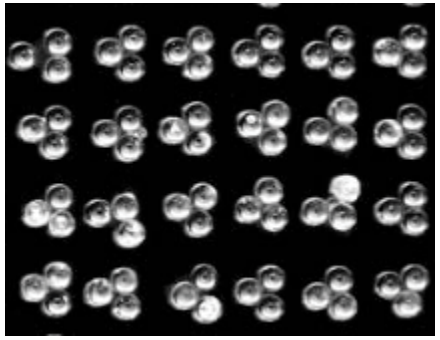


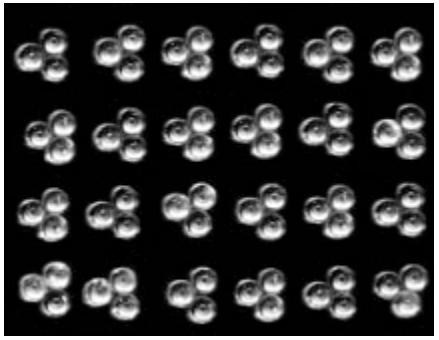
3. crop



4. remove outliers



5. reconstruct

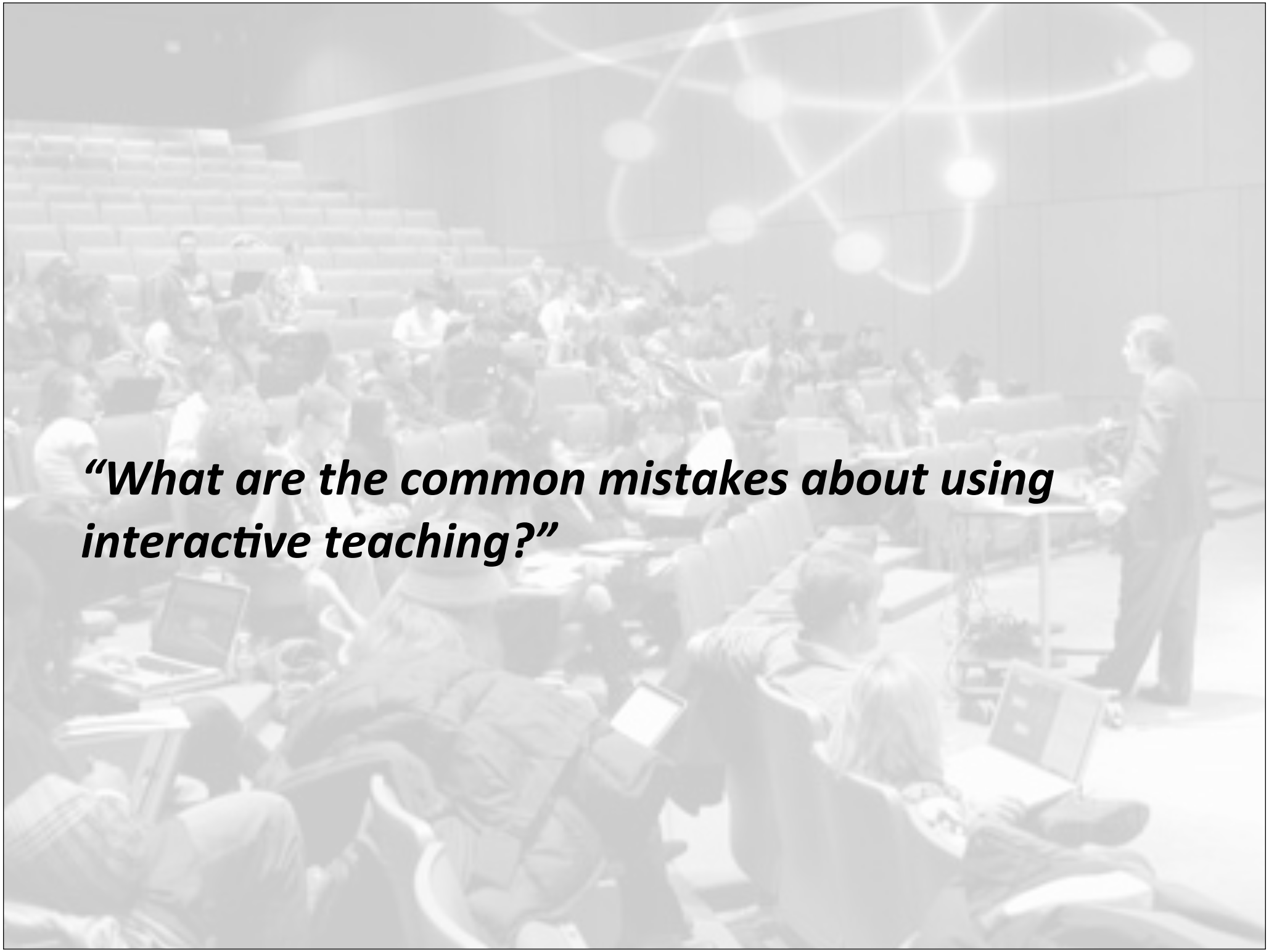


Peer Instruction

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**


“What are the common mistakes about using interactive teaching?”

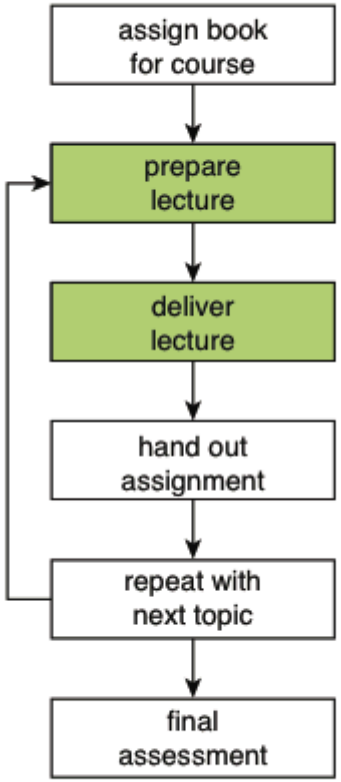
Peer Instruction

Common Mistakes

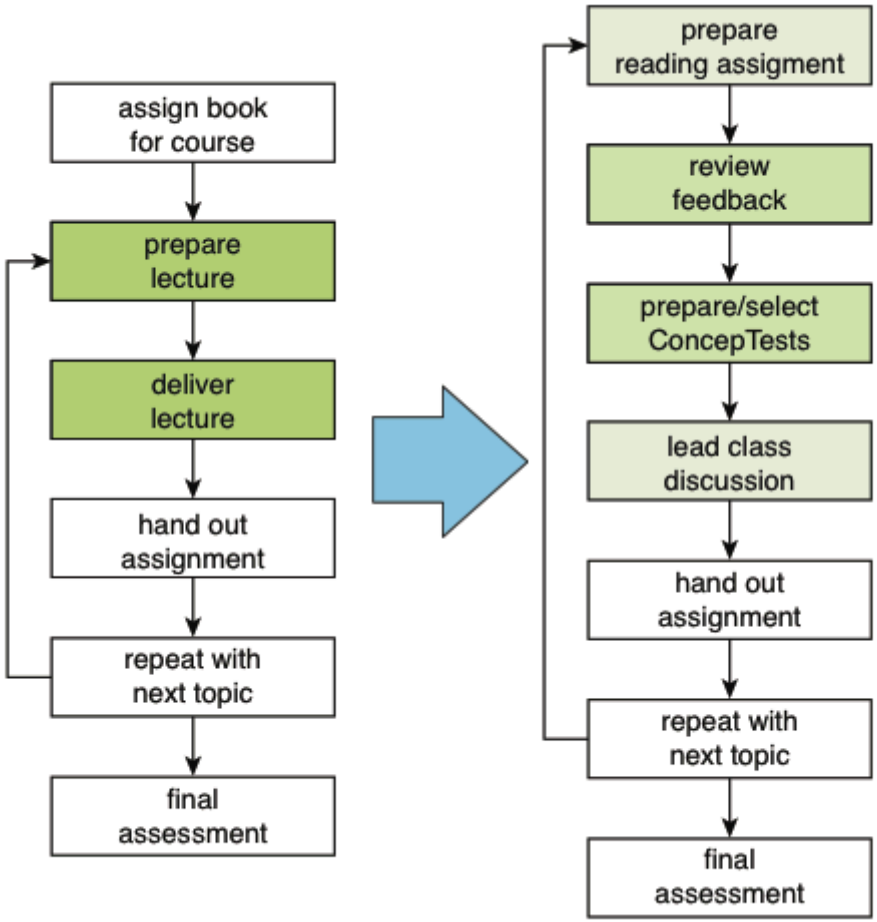
Interactive teaching takes too much time compared to lecture.

Peer Instruction

Where does the effort go?



Peer Instruction



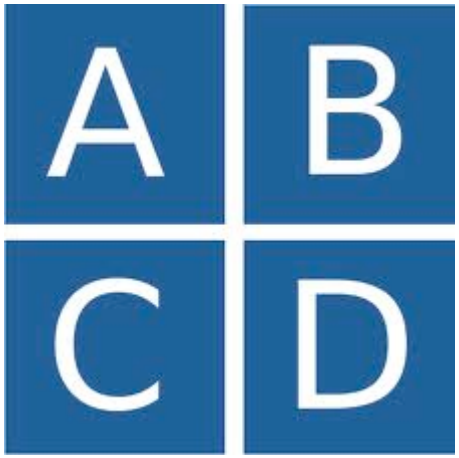
Peer Instruction

Common Mistakes

I can't do Peer Instruction because I don't have clickers.

Peer Instruction

Use Flashcards



Peer Instruction

Setting the stage

Imagine a rope that fits snugly along the equator.

Peer Instruction

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

Peer Instruction

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

Peer Instruction

Setting the stage

circumference at equator:

$$2\pi R_{\mathrm{E}}$$

new circumference:

$$2\pi R_{\mathrm{E}} + 1\ \mathrm{m}$$

radius of circle with new circumference:

$$2\pi R = 2\pi R_{\mathrm{E}} + 1\ \mathrm{m}, \quad \textbf{and so} \quad R = R_{\mathrm{E}} + \frac{1\ \mathrm{m}}{2\pi}.$$


“What kinds of fields or subjects is interactive teaching good for?”

Peer Instruction

Physics
Chemistry
Computer Science
Astronomy
Math
Biology
Philosophy

Peer Instruction

Types of Questions

Polling
Conceptual Understanding
Opinion or Discussion
Problem-solving

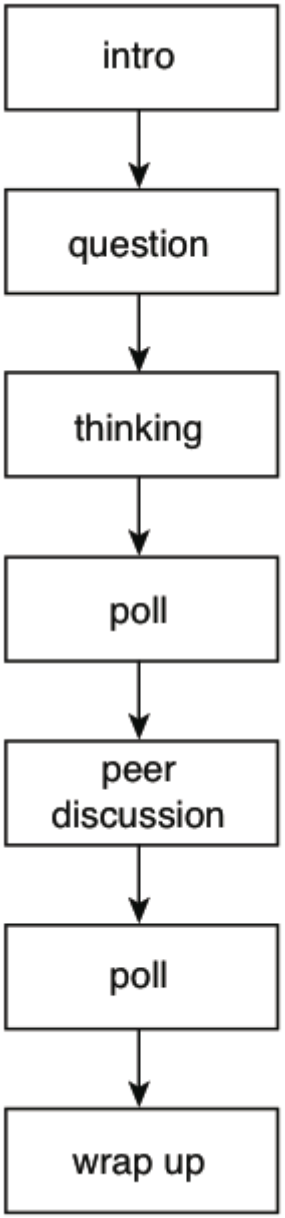
Peer Instruction

Good questions:

-are based on common student misconceptions
-focus on a single concept
-require more than plug and chug
-are clear and concise
-are of manageable difficulty

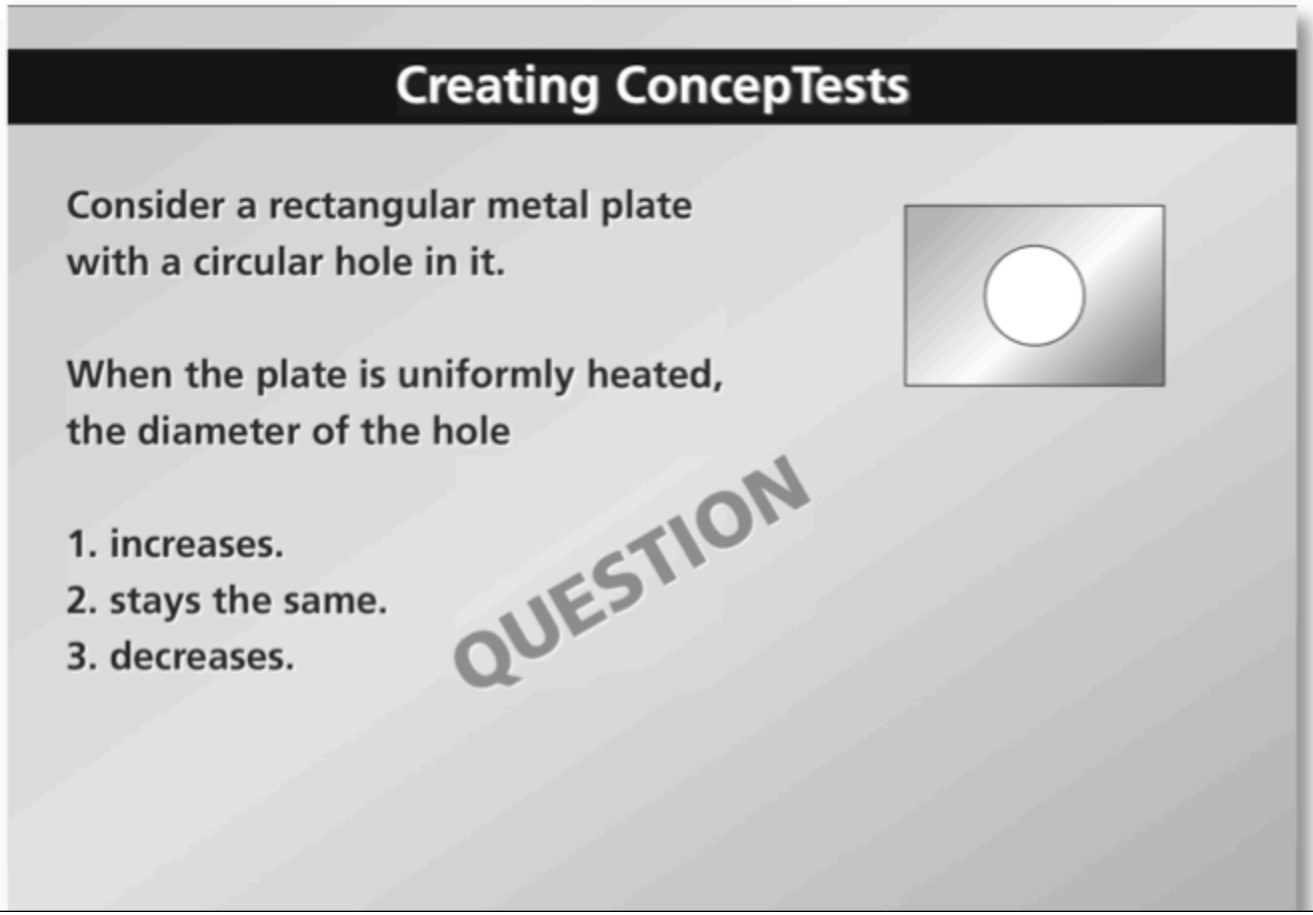
Peer Instruction

Parts of a ConcepTest:



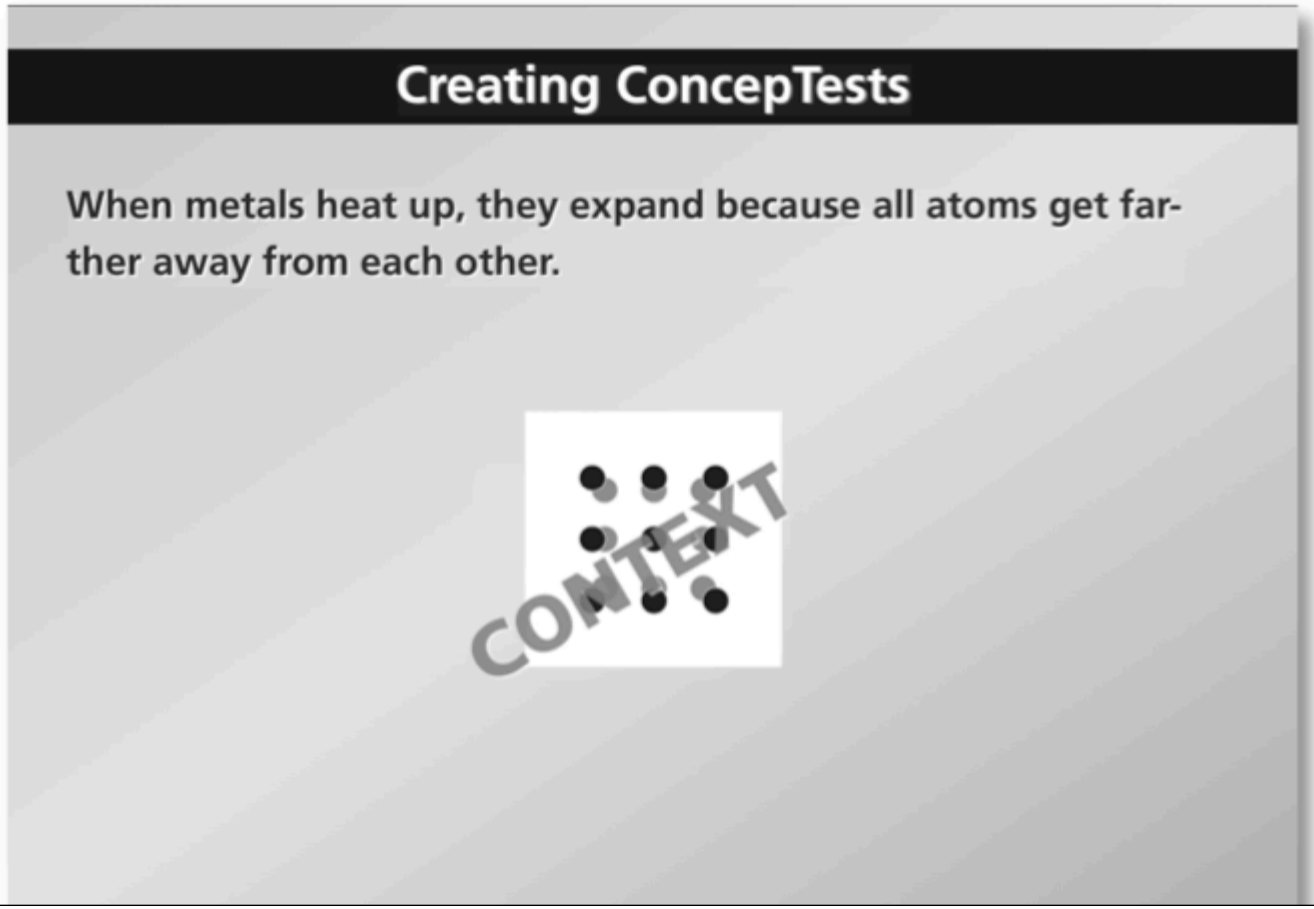
Peer Instruction

Parts of a ConcepTest:



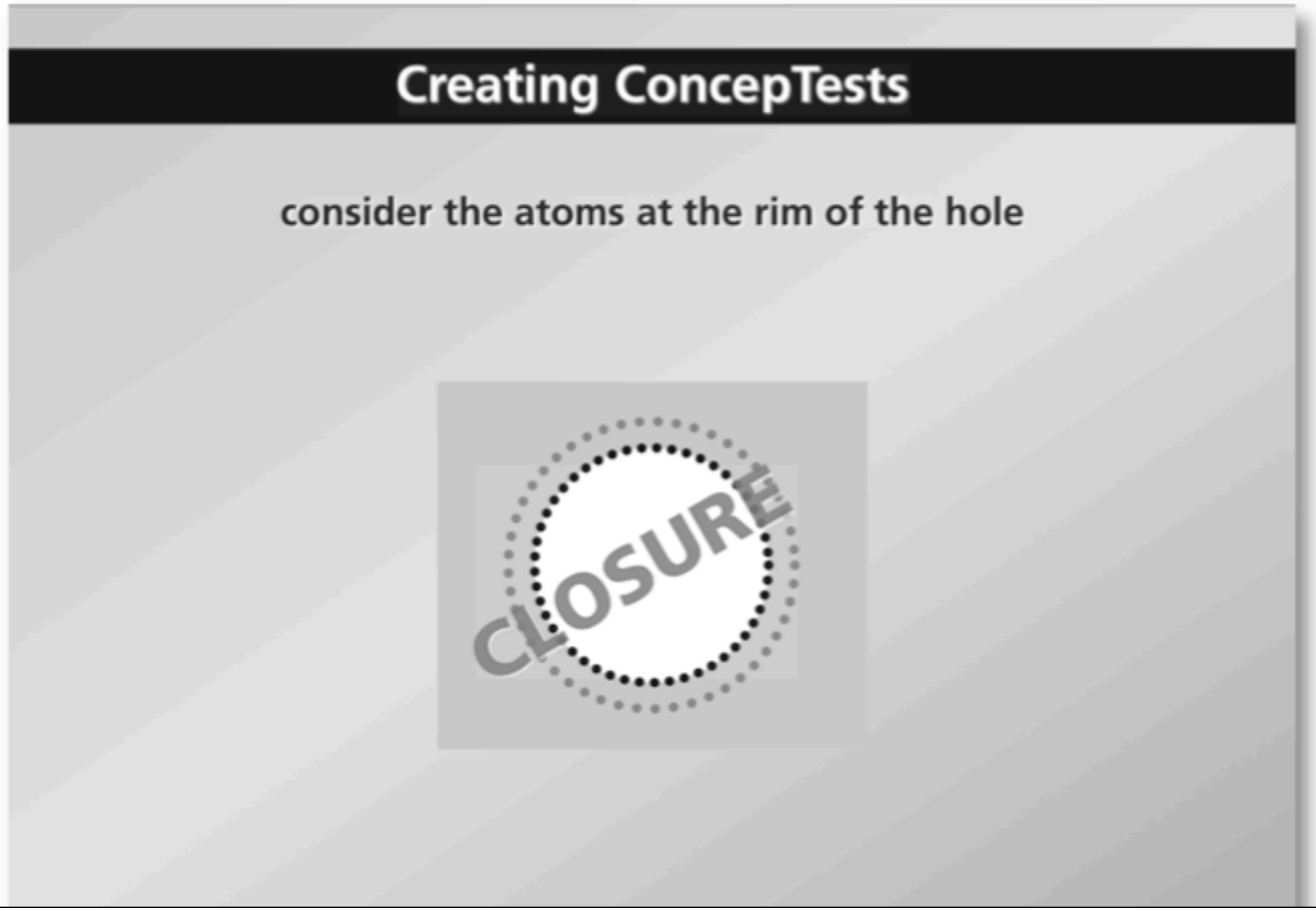
Peer Instruction

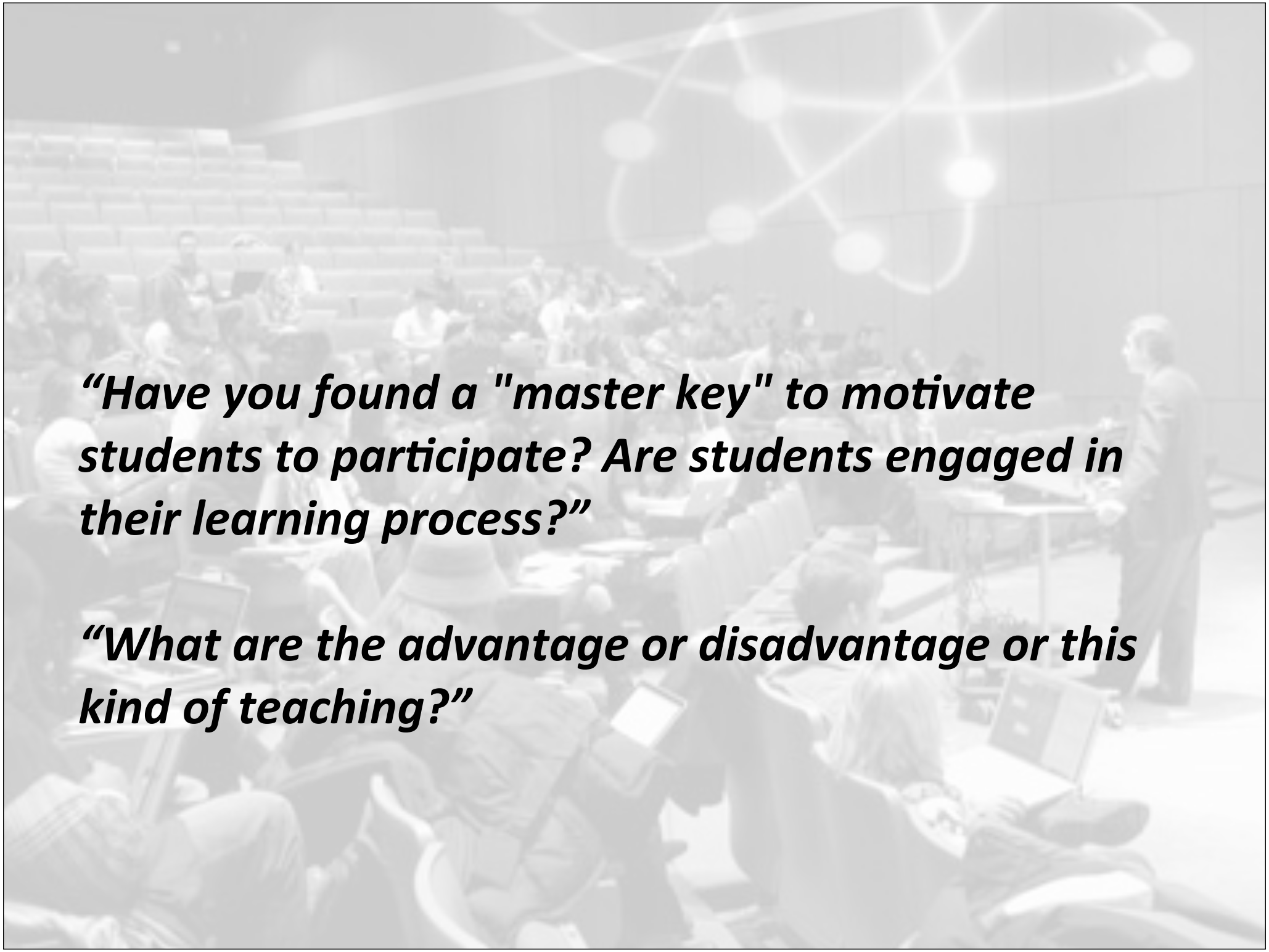
Parts of a ConcepTest:



Peer Instruction

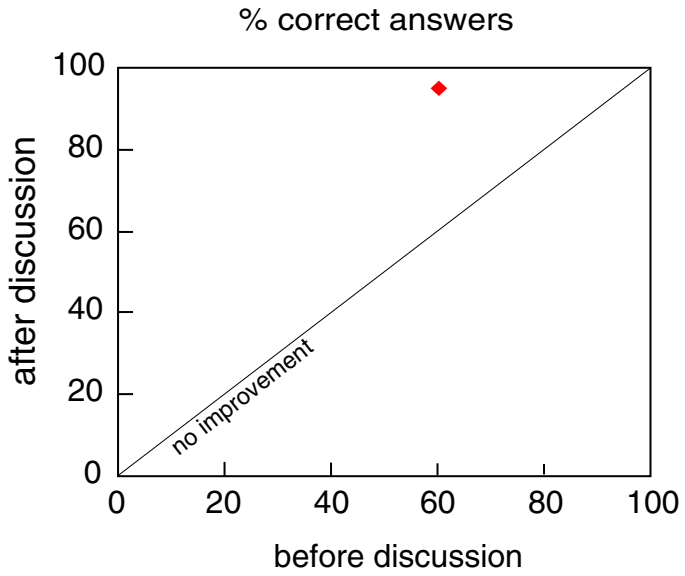
Parts of a ConcepTest:




“Have you found a "master key" to motivate students to participate? Are students engaged in their learning process?”
“What are the advantage or disadvantage or this kind of teaching?”

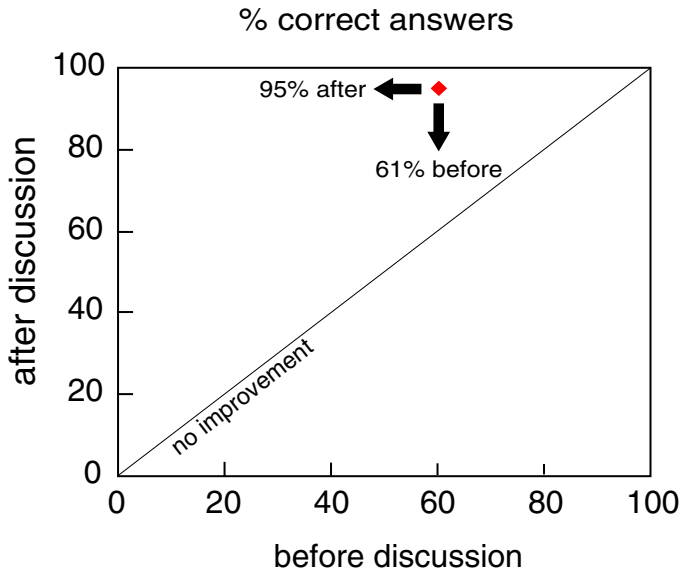
Peer Instruction

Does it work?



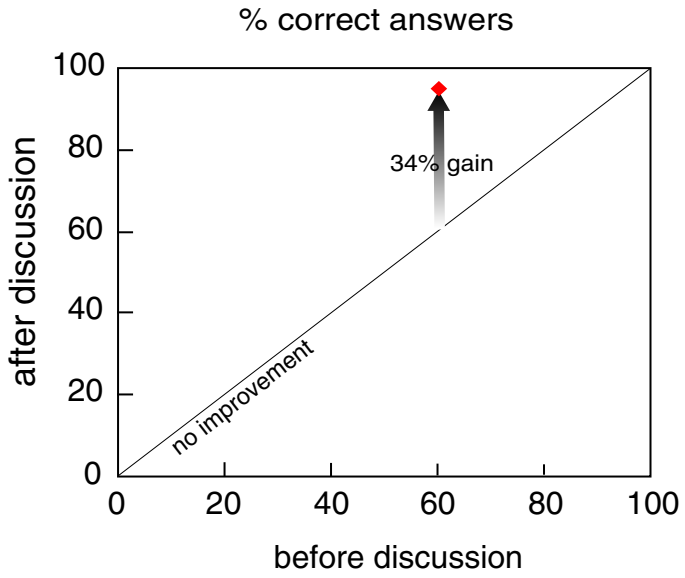
Peer Instruction

Does it work?



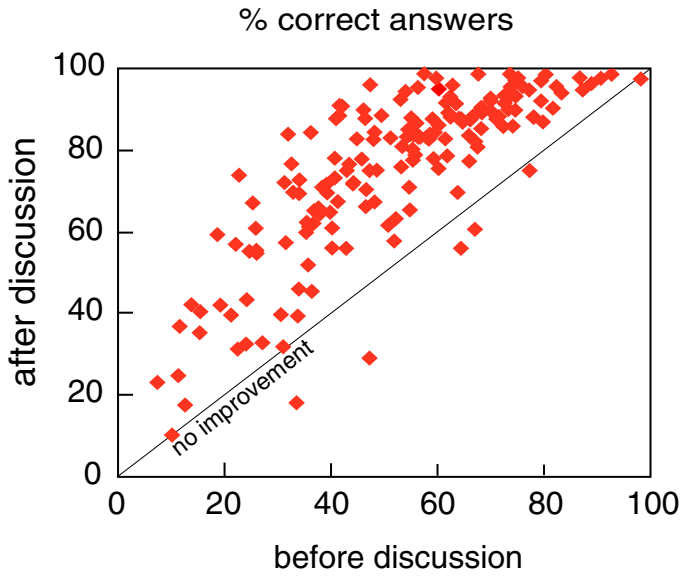
Peer Instruction

Does it work?



Peer Instruction

Does it work?



Acknowledgements

Eric Mazur either designed our inspired all content and each slide in this presentation.

Download this presentation at

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