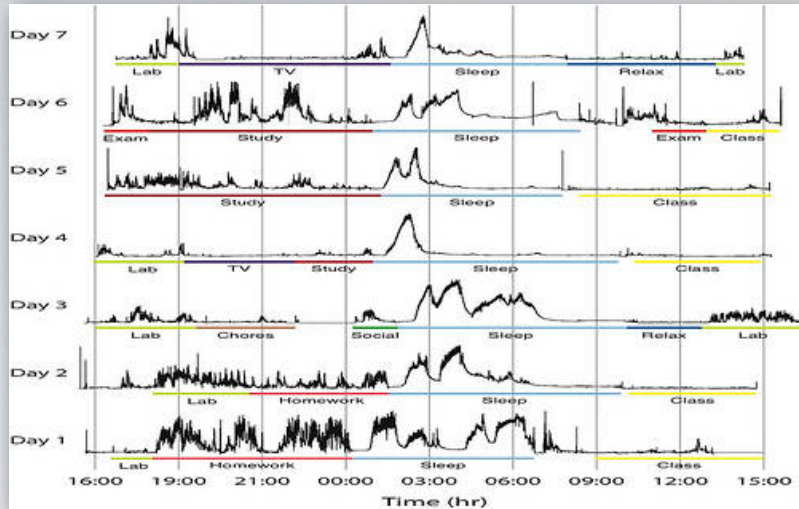


# REAL STRATEGIES FOR YOUR CLASSROOM: PEER INSTRUCTION WORKSHOP



Thiel College  
May 17, 2012  
Institute for Teaching and  
Learning

**Julie Schell**  
Senior Postdoctoral Fellow  
Harvard University



[mazur.harvard.edu](http://mazur.harvard.edu)



## WORKSHOP GOALS

### **after this workshop you will be able to:**

- identify motivations for moving from coverage- to an *uncoverage*-based teaching philosophy
- select real, research-based strategies for motivating students to prepare before, and engage deeply during, your class
- begin using research-based technologies in your classroom
- locate resources for learning more about Peer Instruction

*“What is a clicker?”*

- No on off button
- Only last click counts
- Answer displays on screen



Think of something you are good at, something that you know you do very well.

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How did you learn this deeply?

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How did you learn this deeply?

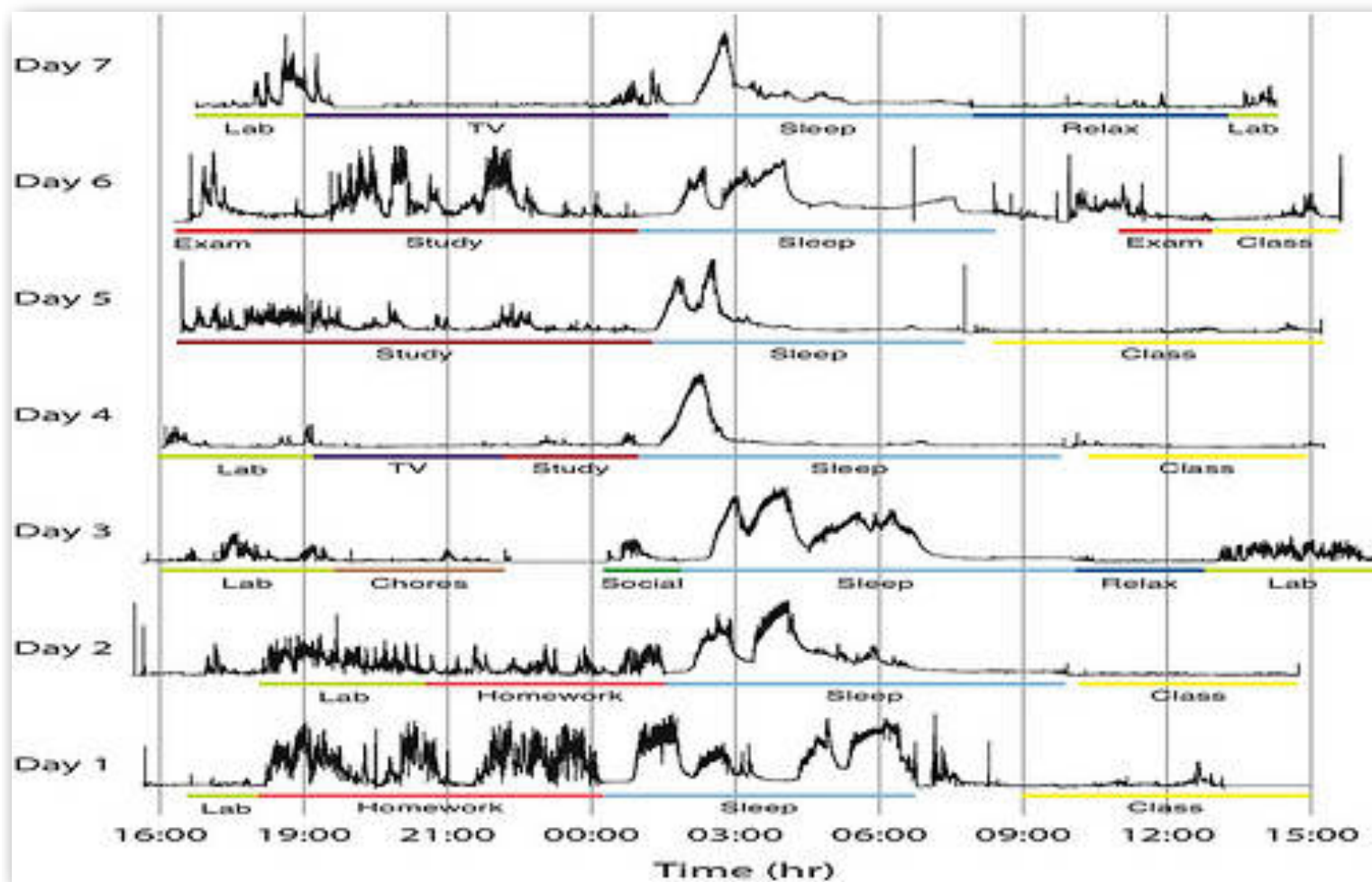
**I learned it by:**

A. Listening in lecture

B. Taking exams

C. Practicing or experimenting (trial and error)

D. Observing or apprenticeship





**Problem:** Students are not learning effectively in college classrooms, which are primarily lecture-based.

**Solution:** Students learn more effectively in interactive teaching environments.

“[Science] should be taught in a rational way, objects and instruments in hand—not from books merely, not from memory chiefly, but by the seeing eye and the informing fingers...to develop and discipline those powers of the mind by which science has been created and is daily nourished—the powers of observation, the inductive faculty, the sober imagination, the sincere and proportionate judgment. A student in the elements gets no such training by studying even a good text-book, though he really master it, nor yet by not sitting at the feet of the most admirable professor.”

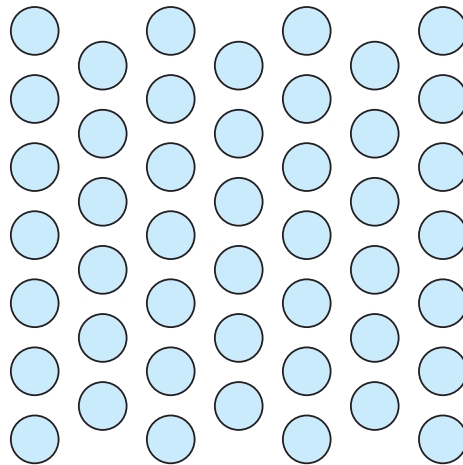
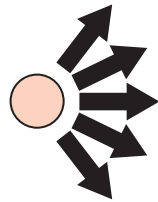
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Charles Eliot, Harvard University 1869

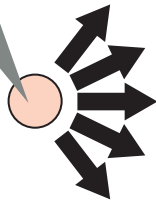
*“How can I do it [teach] more effectively?”*

*“A number of students have not learned well, and some appear dissatisfied with the process. What have I done wrong?”*

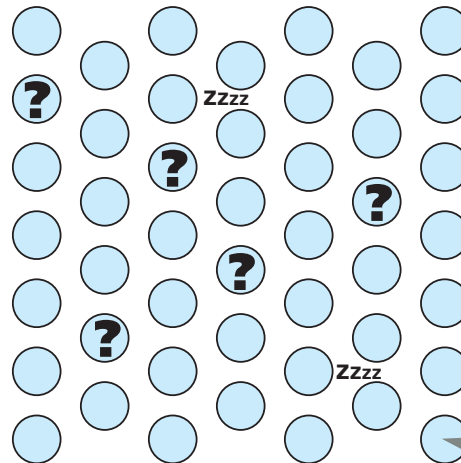
lectures focus on knowledge coverage



I think they understand



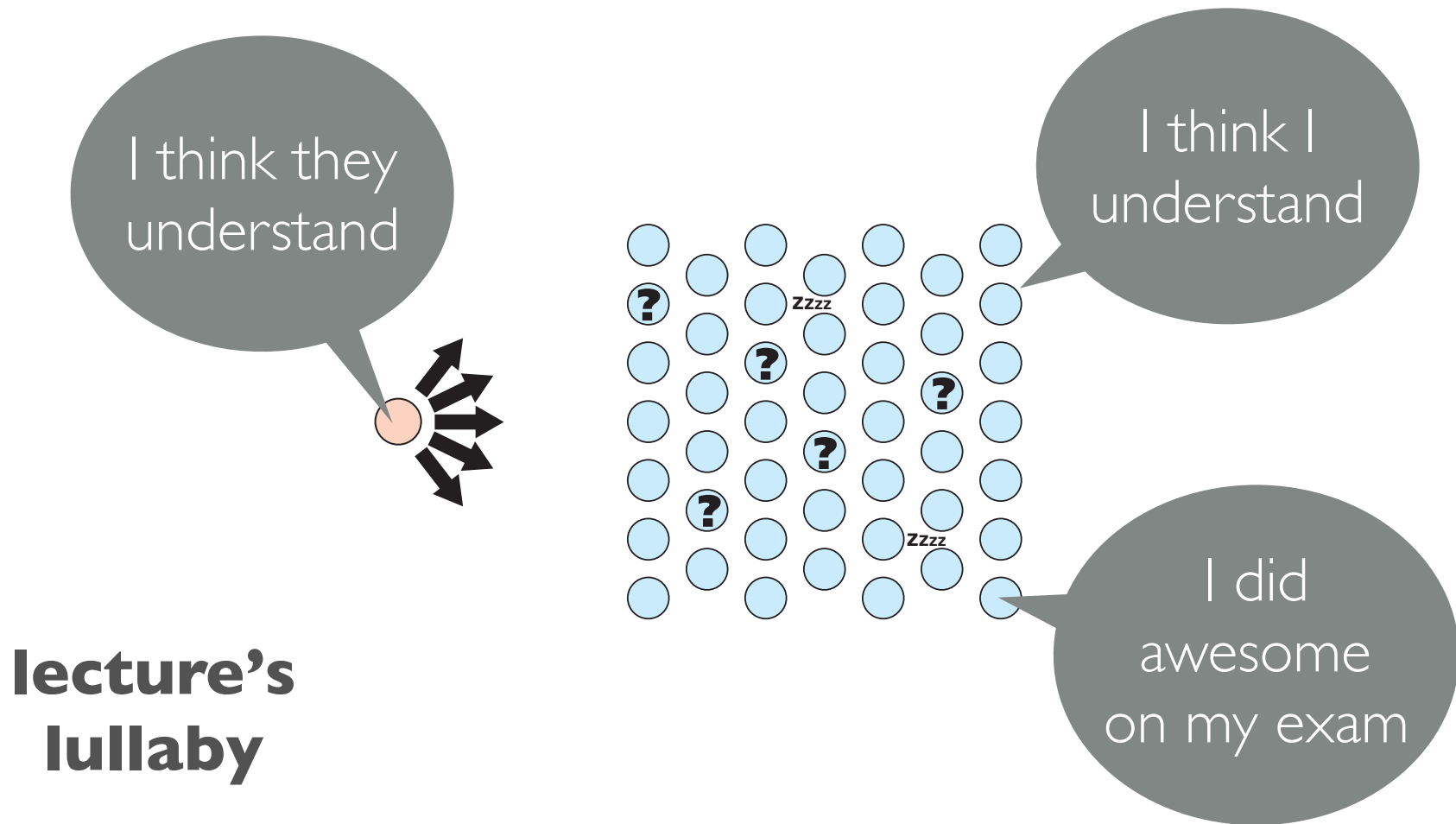
**lecture's  
lullaby**



I think I understand

I did  
awesome  
on my exam

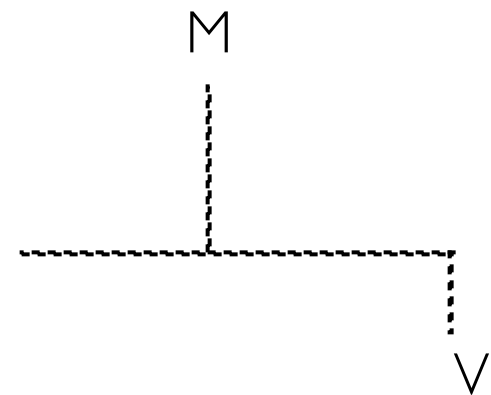
lecture lulls both faculty and students into a false sense of security



To get from his high school to his home, Martin travels 5.0 miles east and then 4.0 miles north. When Veronica goes to her home from that same high school, she travels 8.0 miles east and 2.0 miles south.

**What is the approximate measure of the shortest distances, between Martin's home and Veronica's home?**

- 1. ~3 miles
- 2. ~6 miles
- 3. ~9 miles
- 4. ~17 miles

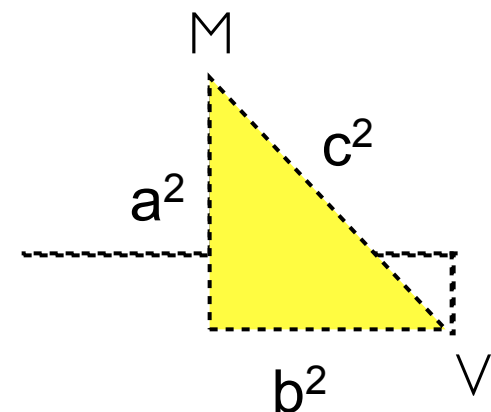




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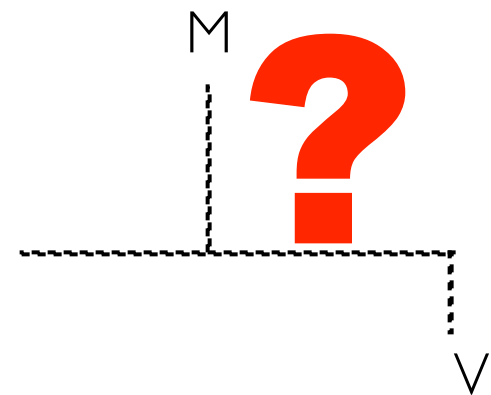
$$a^2 + b^2 = c^2$$



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What they see= *Foreign context*

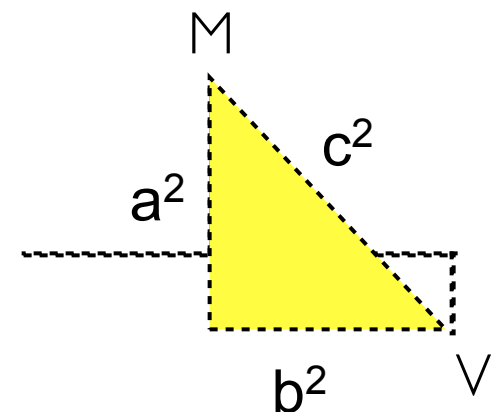


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$$a^2 + b^2 = c^2$$

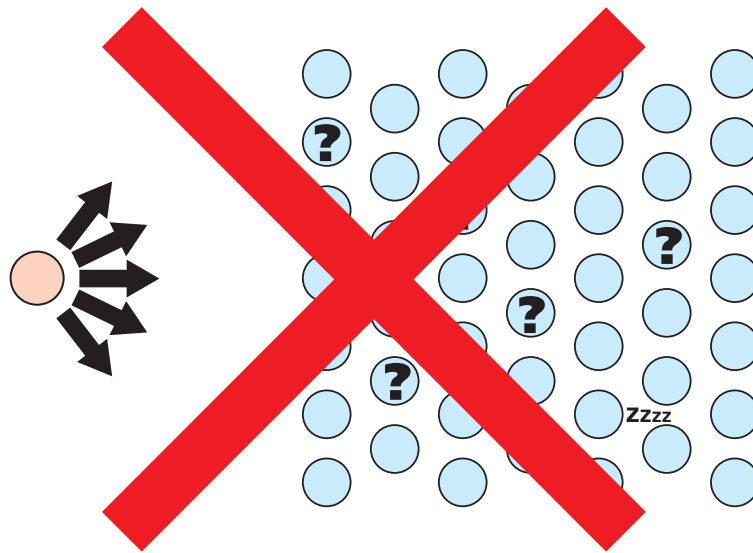
What they see = *Foreign context*  
What we see = *Pythagorean theorem*



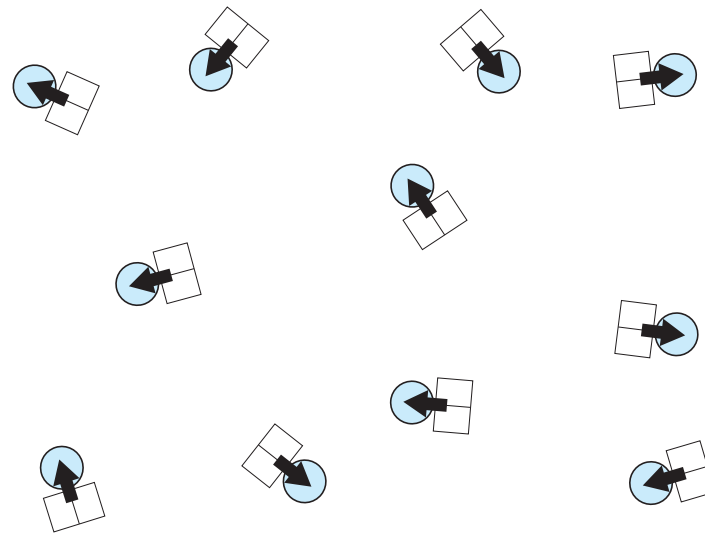
*“Effectively covering all required content for my course.  
There is not enough time to fit it all in. I don't just want to  
cover content I want there to be solid student  
understanding.”*

knowledge transfer the signpost of understanding  
it is the most important skill for today's students

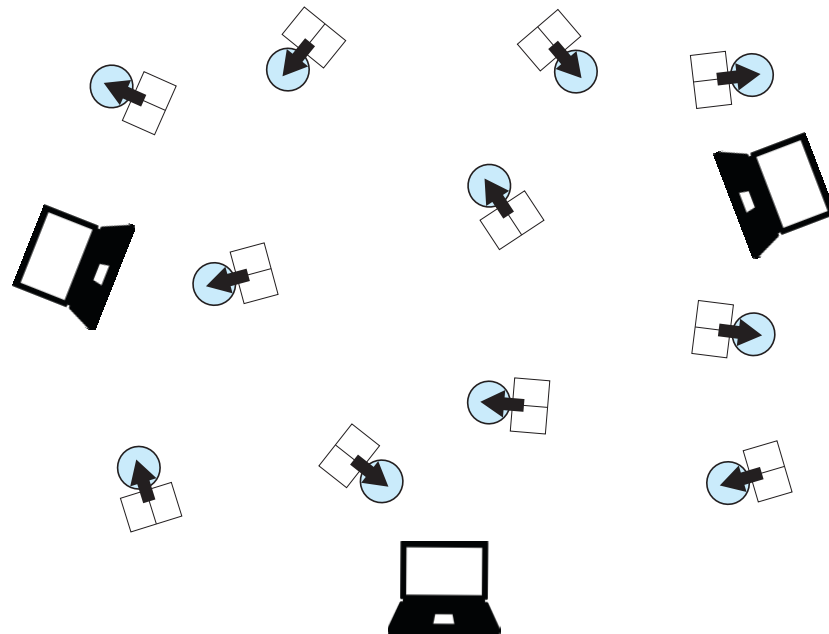
move coverage out, *uncoverage* in



flip your class - students do coverage at home

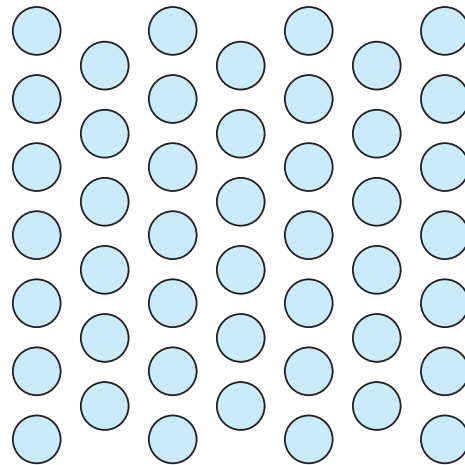
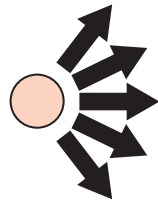


flip your class - students do coverage at home

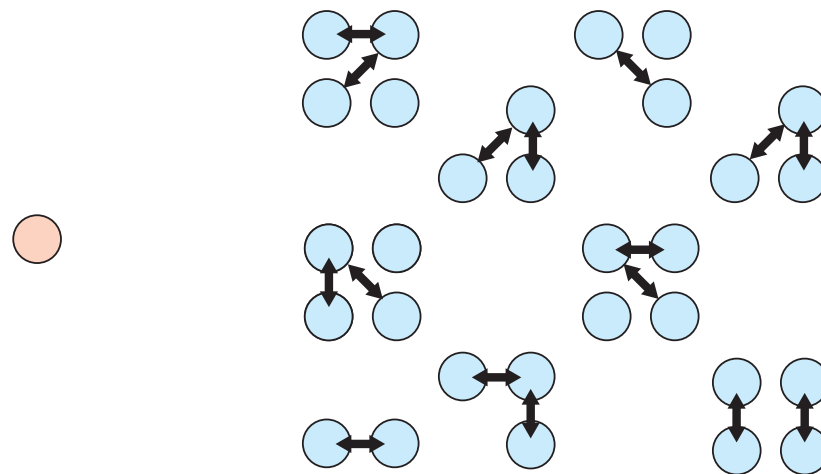




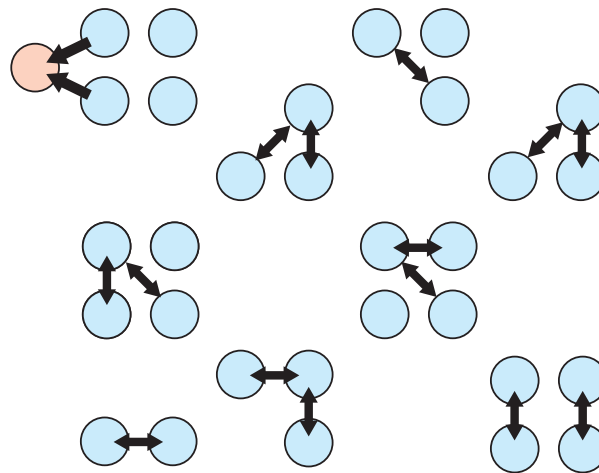
# lecture a little



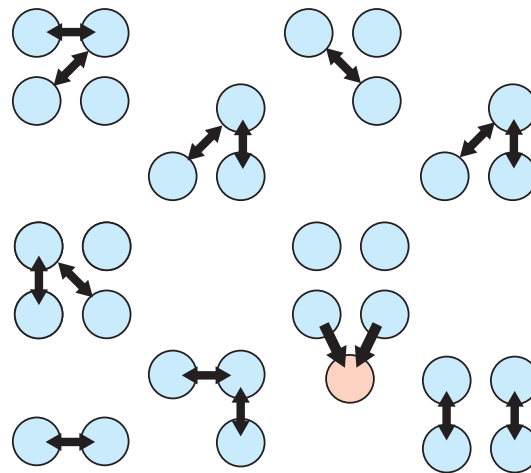
help students uncover meaning in class



help students uncover meaning in class



help students uncover meaning in class



# MESSAGE

We cannot possibly teach our students all knowledge in our disciplines.

But we can teach them Big Ideas that allow them to transfer knowledge across contexts.

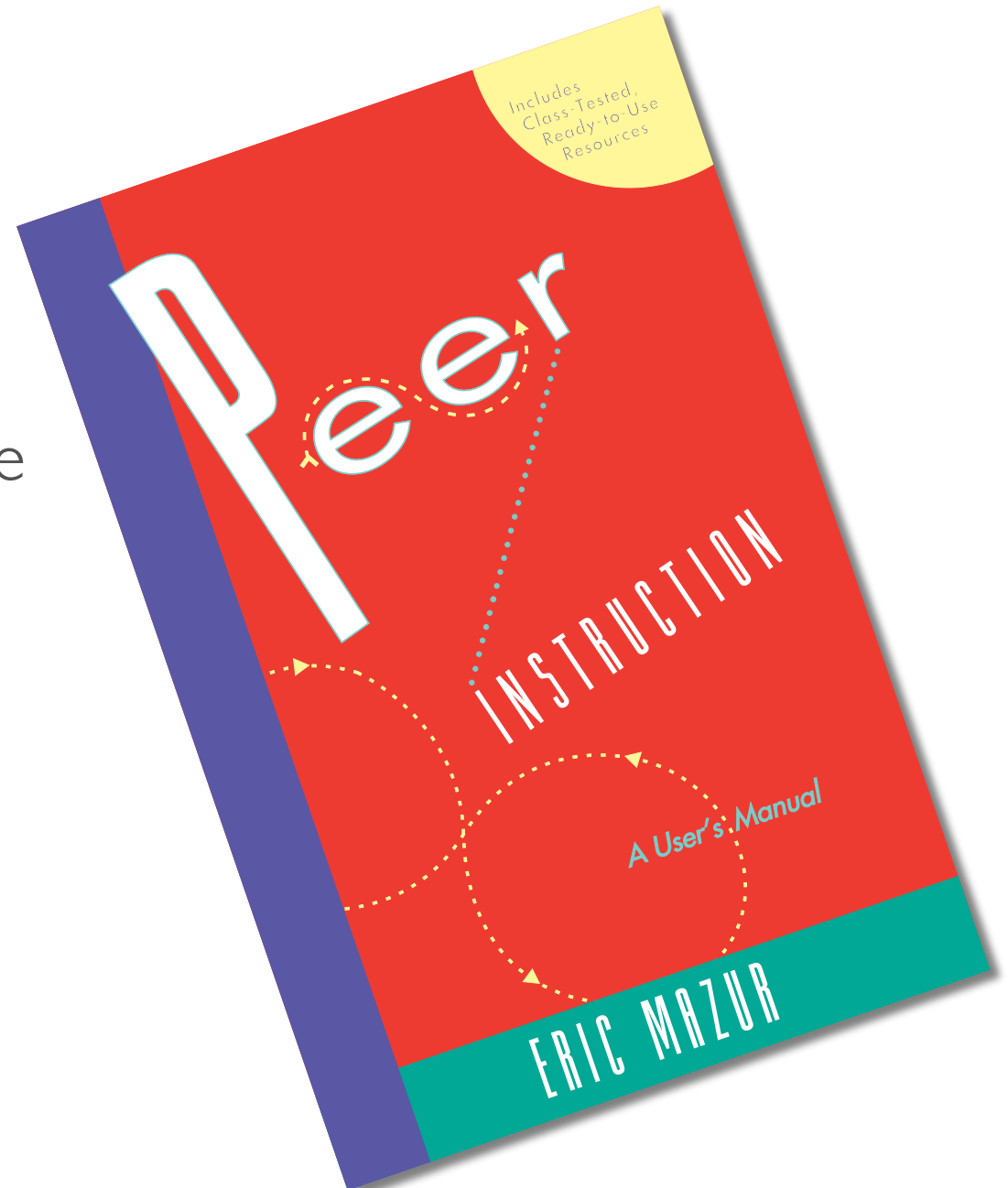
You can forget knowledge, but you cannot forget true understanding.

# Outline

- JiTT and Peer Instruction Overview
- Peer Instruction Demonstration
- Peer Instruction 2.0

# PEER INSTRUCTION

- pre-class reading
- in-class: depth, not coverage
- use questions to elicit, confront, resolve



*“How can I motivate them?”*

*“What are the best ways to motivate students?”*

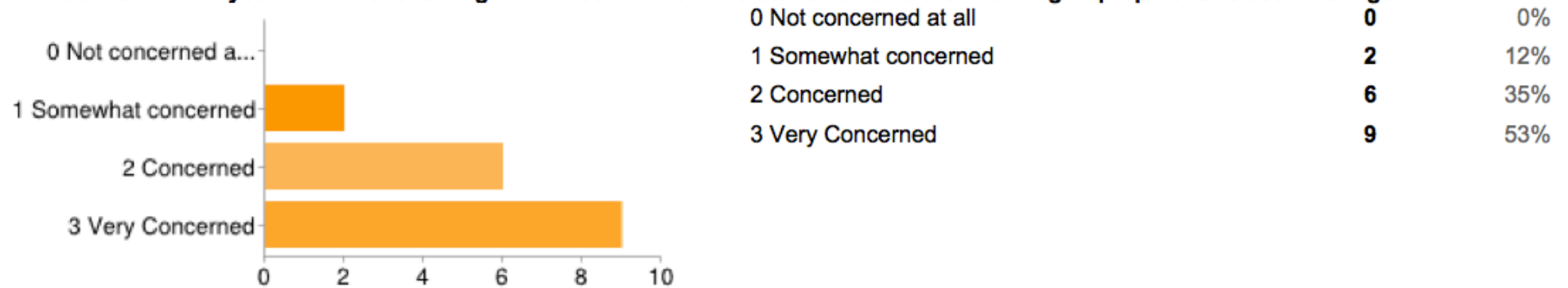
*“How can you inspire the students to take more pride in their learning?”*

*“Effective ways to motivate student learning.”*



# PEER INSTRUCTION

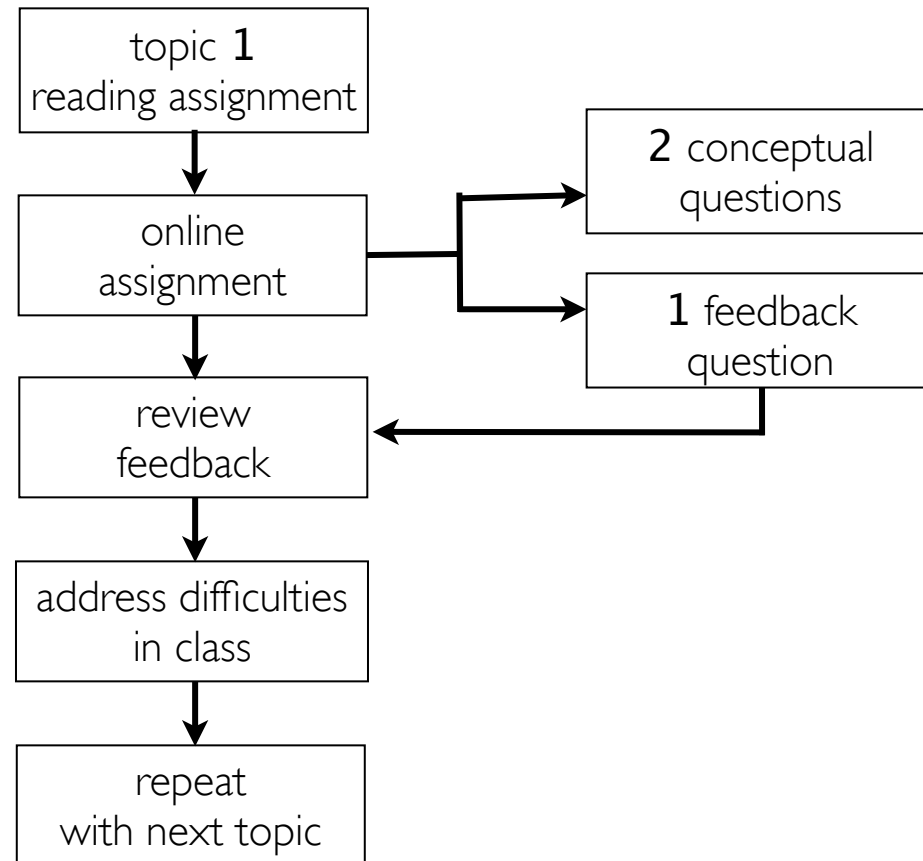
**How concerned are you about the following: - The need to motivate students to do their reading or prepare for class meetings**



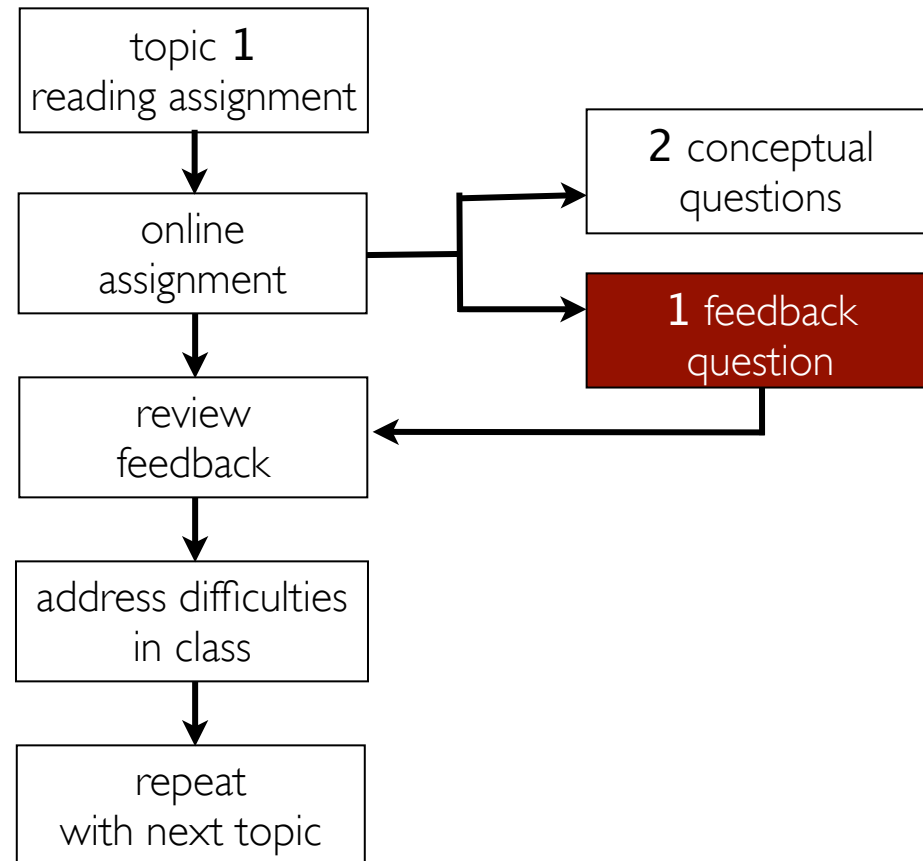
*What is your greatest challenge?*

*“Motivating students to come prepared for class.”*

# Just-in-Time Teaching



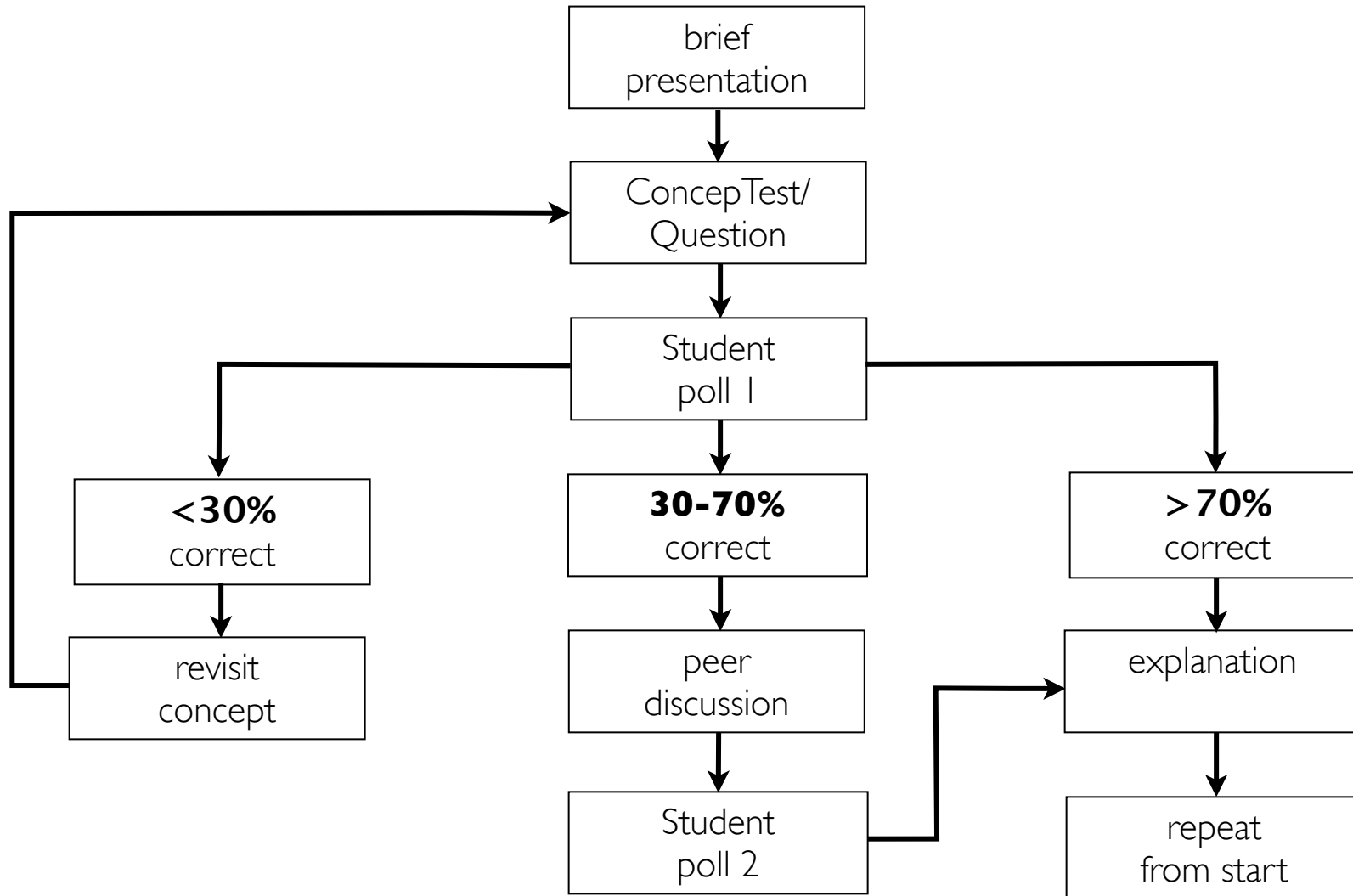
# Just-in-Time Teaching



*“How does one develop high participation of students in a large class (50 to 100 students)?”*

*“How does one deal with students of variable abilities in a class (some excellent, some average, some struggling)?”*

# PEER INSTRUCTION



# Outline

- JiTT and Peer Instruction Overview
- Peer Instruction Demonstration
- Peer Instruction 2.0

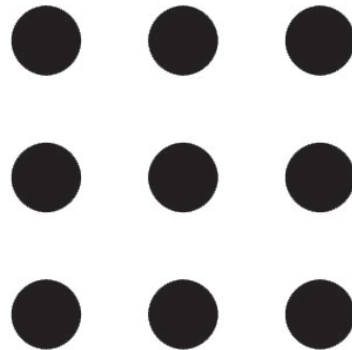
# PEER INSTRUCTION: DEMO

LET'S TRY IT!

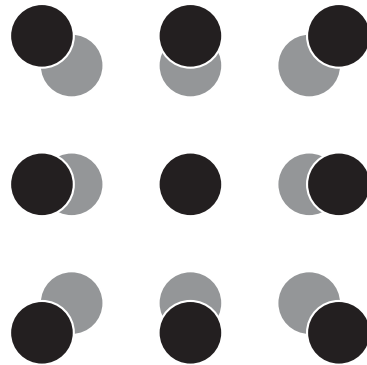


## PEER INSTRUCTION: DEMO

When metals heat up, they expand

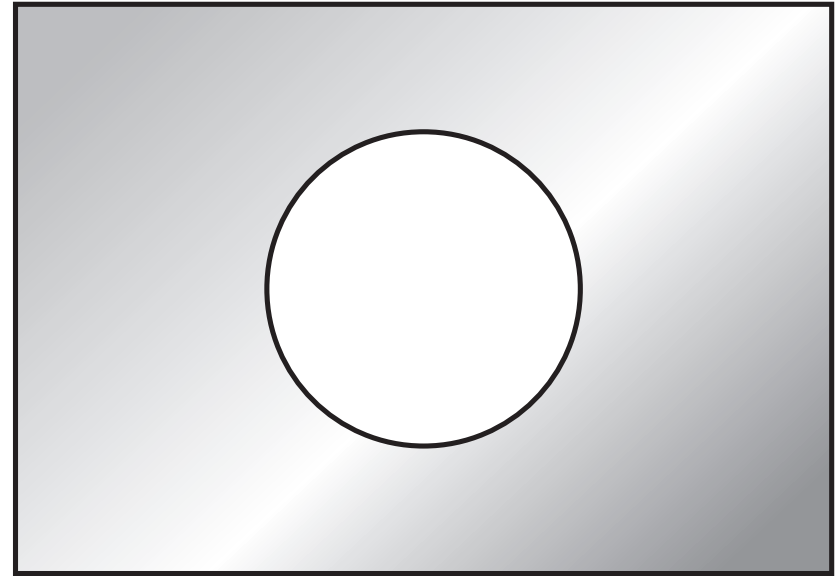


# PEER INSTRUCTION: DEMO



## PEER INSTRUCTION: DEMO

Consider a metal plate with a circular hole in it.

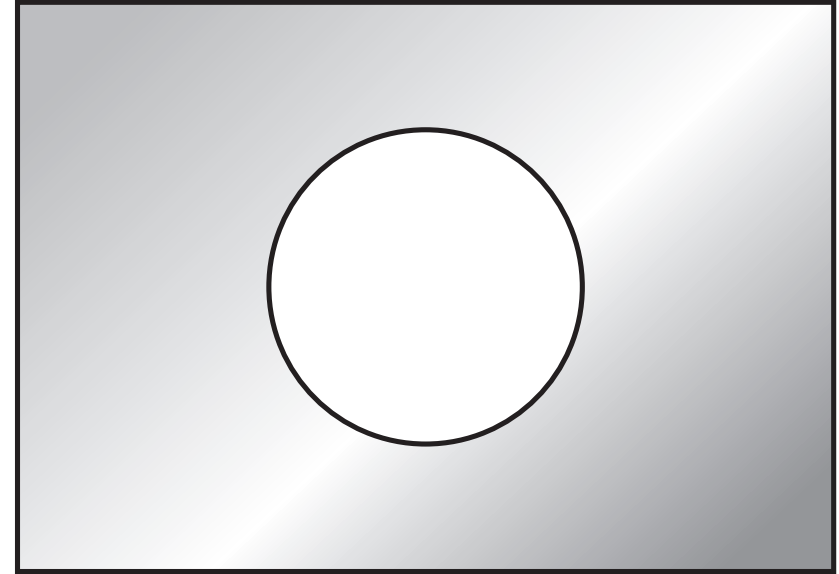


## PEER INSTRUCTION: DEMO

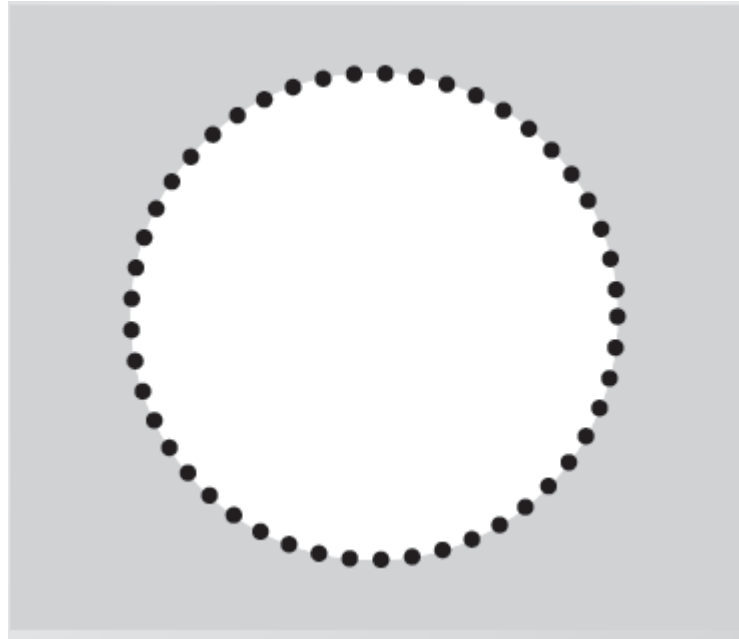
Consider a metal plate with a circular hole in it.

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

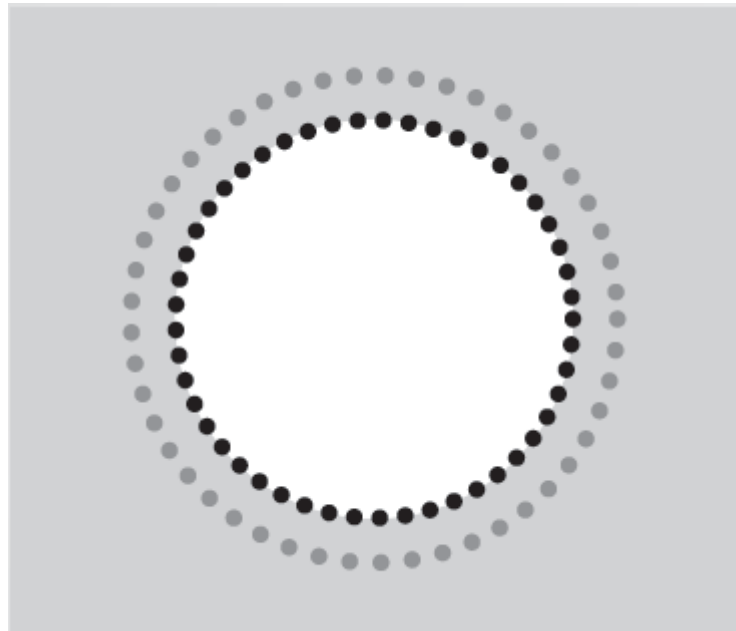
1. increases.
2. stays the same.
3. decreases.



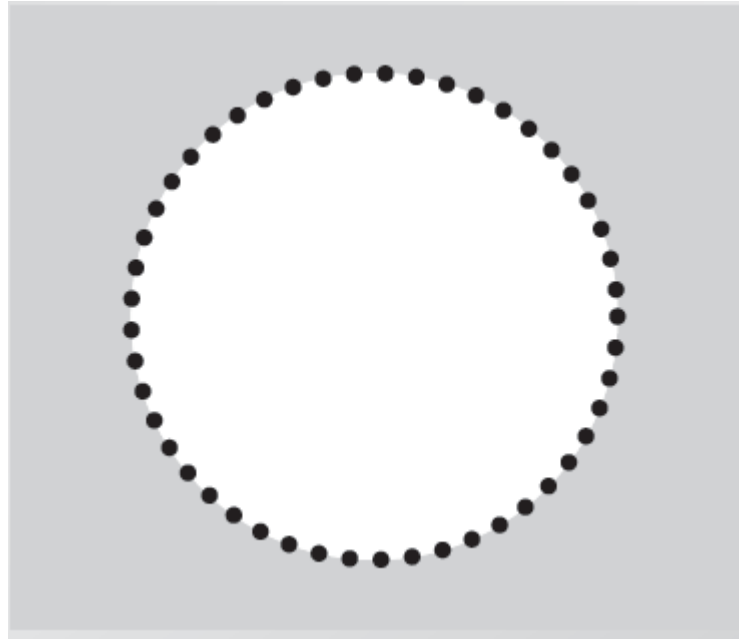
# PEER INSTRUCTION: DEMO



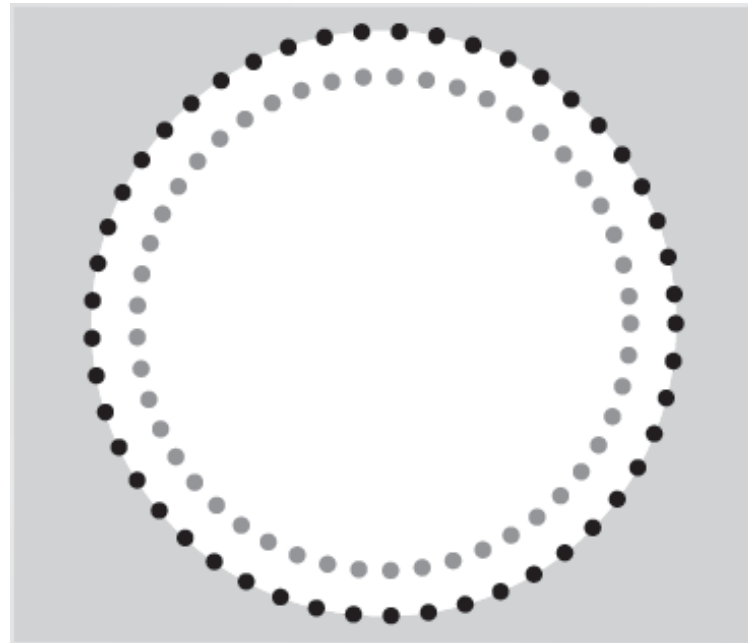
# PEER INSTRUCTION: DEMO



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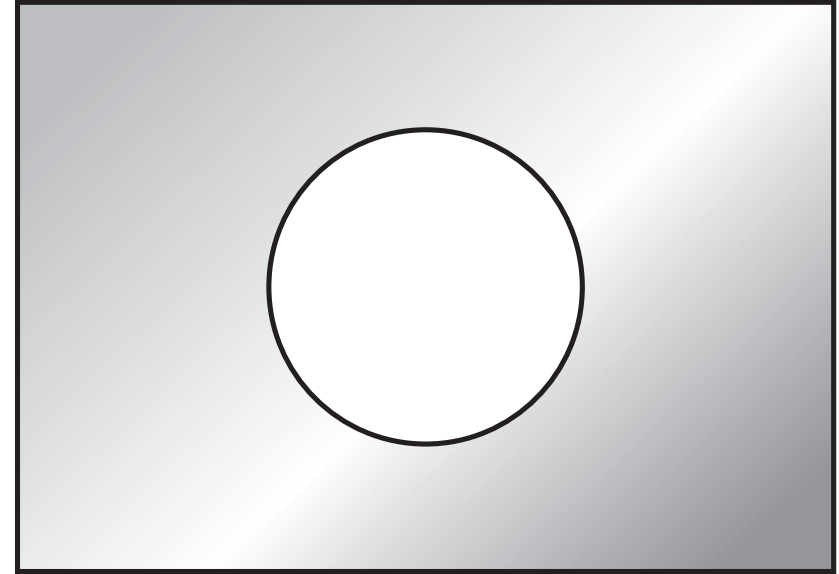


## PEER INSTRUCTION: DEMO

Consider a 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.



*“Getting students to participate in the large group after they've been in small groups.”*

## PEER INSTRUCTION: DEMO

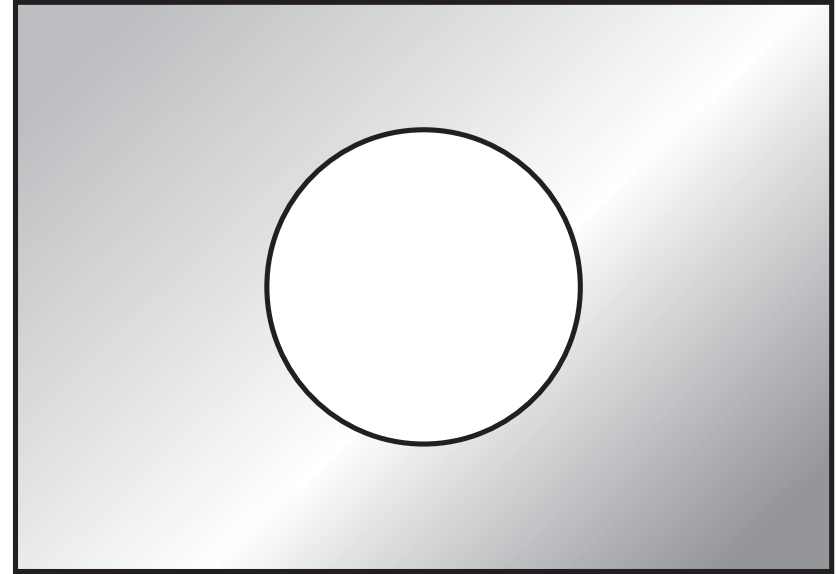
Consider a metal plate with a circular hole in it.

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

**1. increases.**

2. stays the same.

3. decreases.

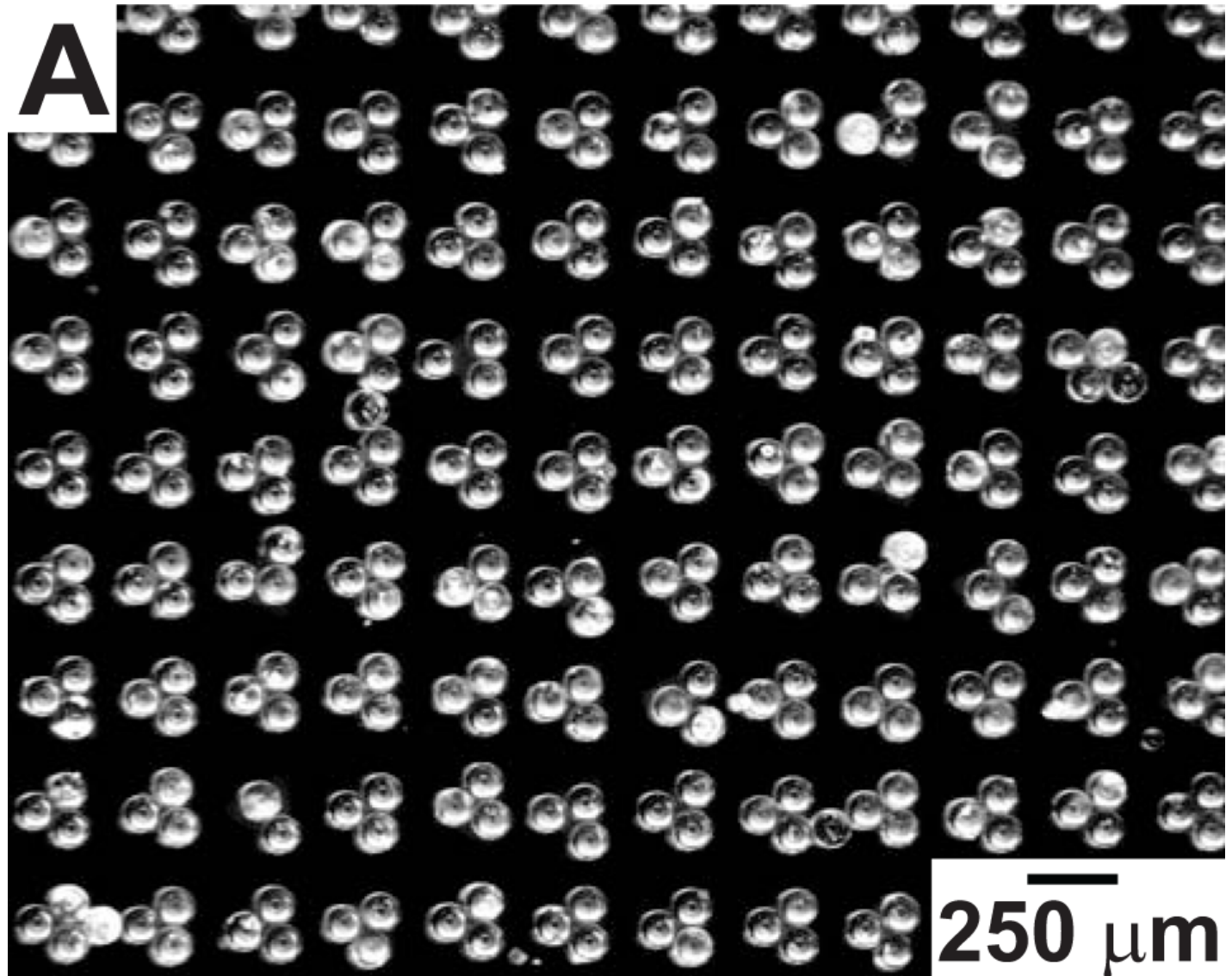


# PEER INSTRUCTION: DEMO

## Benefits

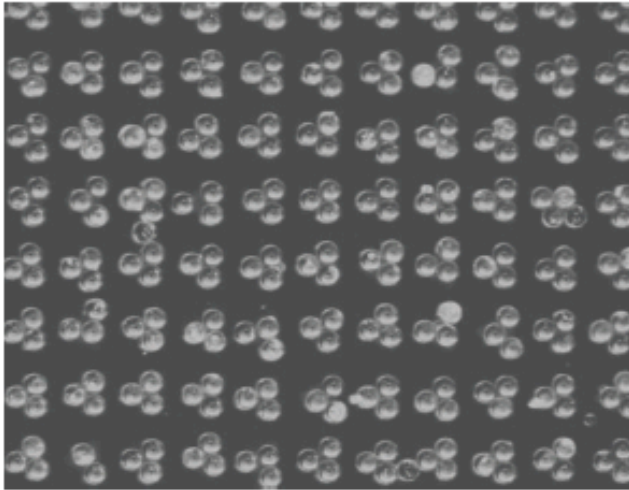
- turns classroom into higher order thinking sandbox
- engages all students, not just the most courageous
- brings greater awareness to students and teachers
- encourages deep versus surface learning

*“How to engage and motivate students and keep them interested.”*

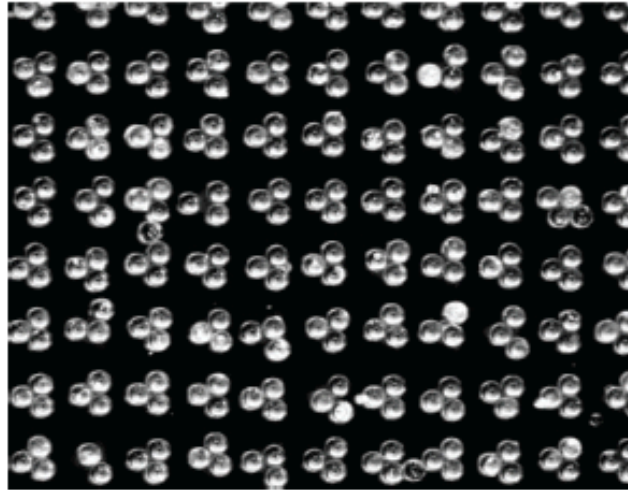


# PEER INSTRUCTION: DEMO

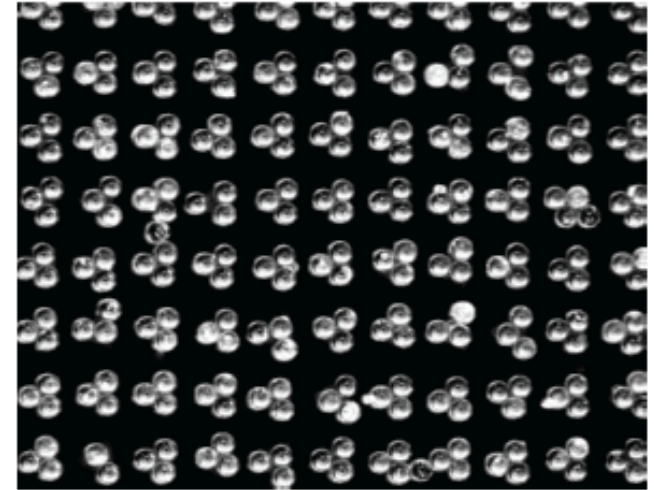
original



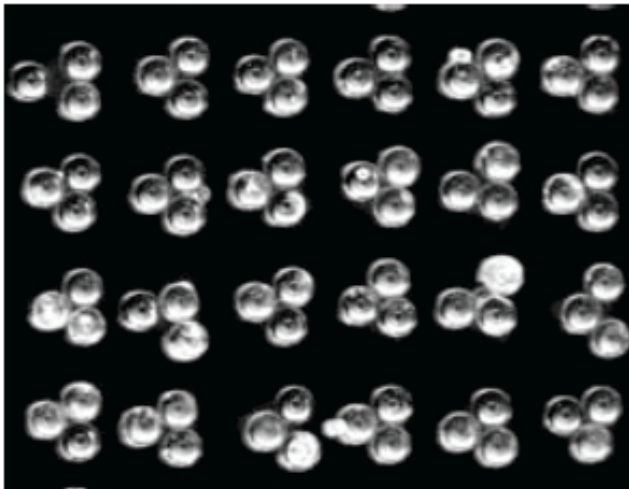
1. adjust contrast



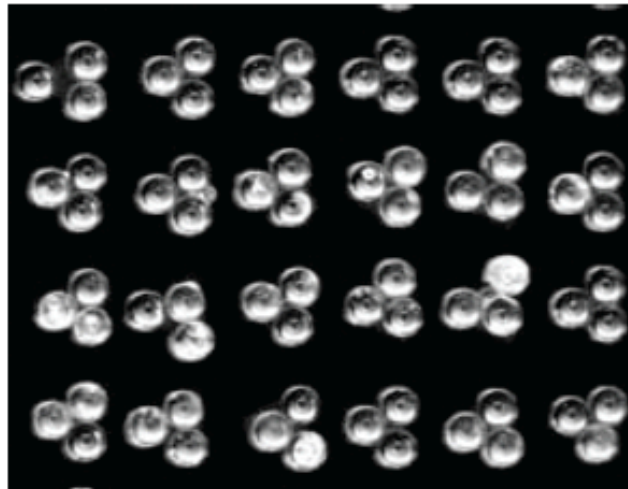
2. remove blemishes



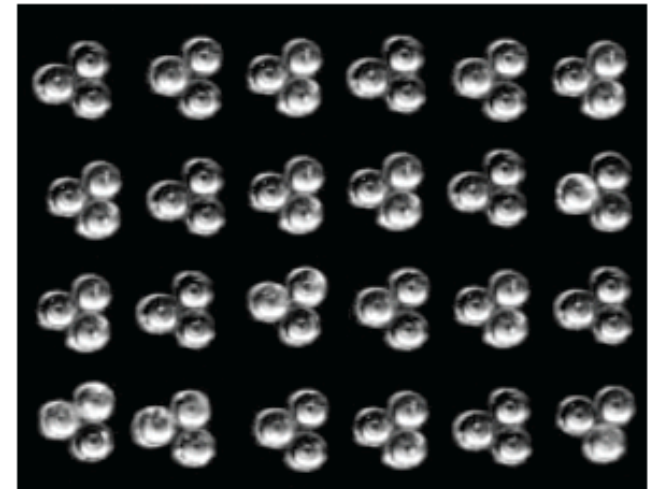
3. crop



4. remove outliers



5. reconstruct



**At which step were acceptable standards of ethics violated?**

1. optimize brightness/contrast
2. Remove blemishes
3. Crop optimal area
4. Remove outliers
5. Reconstruct image



# PEER INSTRUCTION: DEMO

## Benefits

- don't need a right answer
- everyone was engaged

# Outline

- JiTT and Peer Instruction Overview
- Peer Instruction Demonstration
- Peer Instruction 2.0

*“How to do such things as simply get information about a text, pictures, etc... up on the screen in an efficient way.”*

# PEER INSTRUCTION 2.0

The image shows a desktop browser window and a mobile phone displaying the 'learning catalytics' interface. The desktop browser window has a title bar 'learning catalytics' and a URL bar with 'https://learningcatalytics.com/courses/11/lectures/203'. The page header includes 'Brian Lukoff | Harvard University | Log out' and the 'learning|catalytics' logo. A navigation bar contains 'Courses', 'Participate', 'Review', 'Classrooms', 'Account', and 'About'. The main content area shows 'current session: 766079 | 69 students' and a toolbar with 'Stop session', 'Review results', 'Seat map', 'Show floating session ID', 'Edit', 'PDF', and 'Delete'. Below this is a 'Jump to' dropdown and a sequence of buttons numbered 1 to 15, with button 4 highlighted. The main text reads 'Light enters horizontally into the combination of two perpendicular mirrors' and 'Indicate the direction of the incident light after it reflects off of both mirrors.' A diagram shows two perpendicular mirrors with an incident light ray. To the right, 'Round 1' shows '57 responses, 58% correct' and 'Round 2' shows '51 responses, 73% correct'. Below the rounds, a diagram shows the incident light ray reflecting off both mirrors. At the bottom right, a 'feedback & support' button is visible. The mobile phone screen shows the same interface, with a 'Leave' button, 'session 766079', and 'Logout' button at the top. The text on the phone screen is 'Light enters horizontally into the combination of two perpendicular mirrors as shown below. Indicate the direction of the incident light after it reflects off of both mirrors.' The diagram on the phone shows a blue arrow pointing left towards the mirrors. Below the diagram is a 'Submit response' button and a 'Switch to text response' option. At the bottom of the phone screen, it says 'Current seat: A2' and 'Change seats'.

learning catalytics

https://learningcatalytics.com/courses/11/lectures/203

Brian Lukoff | Harvard University | Log out

learning|catalytics

Courses Participate Review Classrooms Account About

current session: 766079 | 69 students

Stop session Review results Seat map Show floating session ID Edit PDF Delete

Jump to 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Light enters horizontally into the combination of two perpendicular mirrors as shown below. Indicate the direction of the incident light after it reflects off of both mirrors.

Stop delivery Deliver again Assign groups Show all results

Round 1 57 responses, 58% correct

Round 2 51 responses, 73% correct

8 get it now  
0 still don't get it

feedback & support

Carrier 1:50 PM

Leave session 766079 Logout

Light enters horizontally into the combination of two perpendicular mirrors as shown below. Indicate the direction of the incident light after it reflects off of both mirrors.

Submit response

Switch to text response

Current seat: A2 Change seats

# PEER INSTRUCTION 2.0

**2. word cloud** Now describe in a couple of words how you became good at whatever it is you entered in the previous question.

[Deliver](#) [Show all results](#)

**Round 1**

**123 responses**

experiences

learning observing

reading people being

experience time

**practice**

work others school

working good through family

watching many

listening

✓ **61** get it now

✗ **4** still don't get it

Carrier 10:12 PM

[Refresh](#) **session 123456** [Logout](#)

Now describe in a couple of words how you became good at whatever it is you entered in the previous question.

[Submit response](#)

✉ IM the instructor

**I must cover the material**

I must cover the material

Debunked

I must UNcover the material



# Peer Instruction Network

CONNECT.SHARE.LEARN

**[www.peerinstruction.net](http://www.peerinstruction.net)**



**website: [scholar.harvard.edu/julieschell](https://scholar.harvard.edu/julieschell)**

**Blog: [blog.peerinstruction.net](https://blog.peerinstruction.net)**