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EDUCACION

Using Learning Catalytics to Facilitate an Active Classroom



Mastering Leadership Conference
Tucson, AZ, 25 February 2017



Using Learning Catalytics to Facilitate an Active Classroom



@eric_mazur

EDUCATION

Mastering Leadership Conference
Tucson, AZ, 25 February 2017



feedback

1 lecture

2 PI

3 PI 2.0



1991



1 lecture

2 PI

3 PI 2.0



1993

A black handheld device, possibly a remote control or a small keypad, is shown at an angle. It features a numeric keypad with buttons labeled 1 through 9, 0, and a red button. A green logo with the letters 'FRS' is visible on the bottom right. The year '1998' is overlaid in large white text in the center.

1998



1 lecture

2 PI

3 PI 2.0



technology

1 lecture

2 PI

3 PI 2.0



How do I...

- design good questions?
- optimize the discussions?
- manage time?

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1 lecture

2 PI

3 PI 2.0

Use intelligent algorithms and data analytics to...

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- improve questioning
- manage discussions

- facilitate time management/flow

- lowest
- a. A 30-year fixed rate mortgage at 12%
 - b. A 15-year fixed rate mortgage at 12%
 - c. A 30-year fixed rate mortgage at 12%
 - d. A 15-year fixed rate mortgage at 12%
2. The biggest factor that leads American companies to manufacture their products overseas in India is:
- a. Higher quality of craftsmanship
 - b. Lower labor costs
 - c. Decreased transportation costs
 - d. Effective legal systems
3. Which of the following correctly summarizes the accounting equation for a sole proprietorship?
- a. $\text{Assets} = \text{Liabilities} + \text{Owners' equity}$
 - b. $\text{Liabilities} = \text{Assets} + \text{Owners' equity}$
 - c. $\text{Owner's equity} = \text{Assets} + \text{Liabilities}$
 - d. $\text{Revenue} = \text{Assets} - \text{Liabilities}$
4. In order to present a business plan to a group of potential investors, a businessperson would most likely use which of the following?
- a. Powerpoint
 - b. Quickbooks
 - c. Peoplesoft
 - d. Excel
5. In order to start an online business, an individual would need all but which of the following:
- a. business model
 - b. capital
 - c. a location
 - d. depreciation?

extensible plug-in architecture for question types

- lowest
- A 30-year fixed rate mortgage at 12%
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- Powerpoint
 - Quickbooks
 - Peoplesoft
 - Excel
5. In order to start an online business, an individual would need all but which of the following:
- Business model
 - Appreciation?

Sample question types:

- direction
- mathematical expression
- long answer, short answer, word cloud
- numerical, data collection
- ranking, priority
- region (select point on image)
- sketch, composite sketch
- highlight passage

Sample question types:

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4. direction of prevailing winds. The image provides several clues about the direction of prevailing winds in Oahu. Indicate this direction by drawing an arrow on your screen. [Deliver](#) [Show all results](#)



1 lecture

3 PI 2.0

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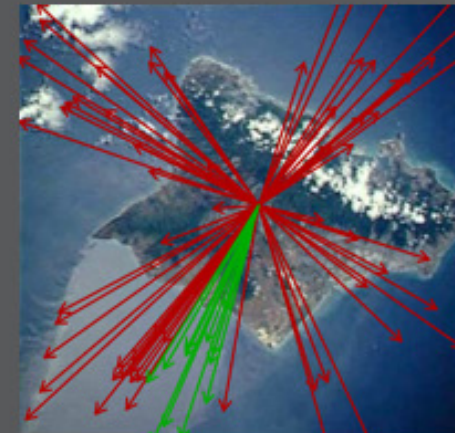
4. direction
prevailing

...le. The image provides several clues about the direction of
...on your screen.

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Round 1

77 responses, 16% correct



17 get it now
 3 still don't get it



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optics i

current session: **766079** | 69 students

[Back to all lectures](#) [Stop session](#) [Review results](#) [Seat map](#) [Show floating session ID](#) [Edit](#) [Delete](#)



Jump to ▾

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15



4. direction Light enters horizontally into the combination of two perpendicular mirrors as shown below.

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Indicate the direction of the incident light after it reflects off of both mirrors.

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current session: **766079** | 69 students

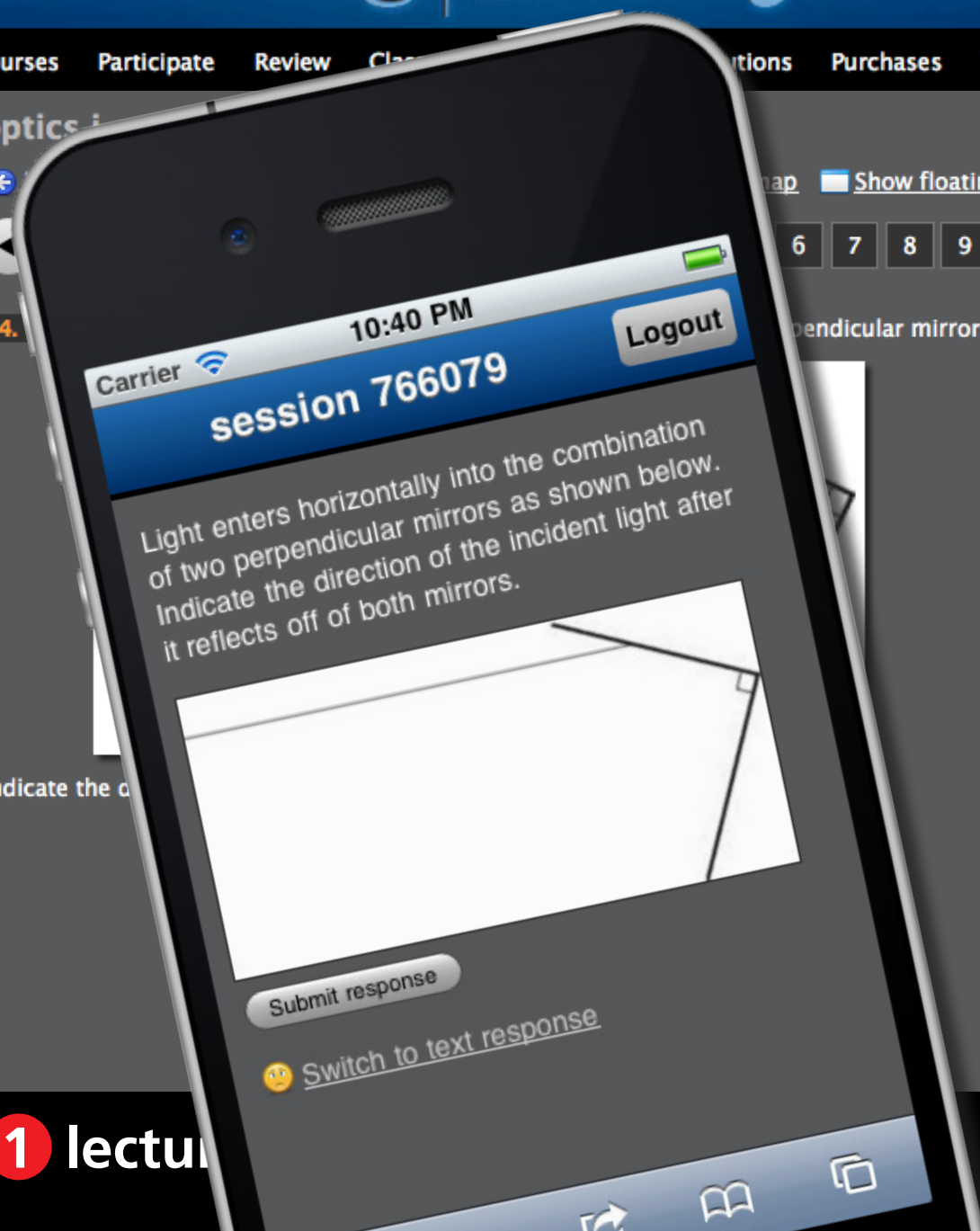
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6 7 8 9 10 11 12 13 14 15

perpendicular mirrors as shown below.

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6 7 8 9 10 11 12 13 14 15

perpendicular mirrors as shown below.

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current session: **766079** | 69 students

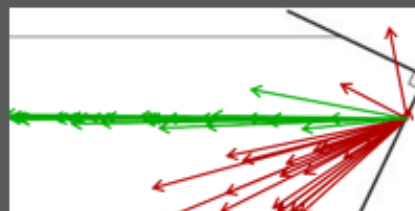
[Map](#) [Show floating session ID](#) [Edit](#) [Delete](#)

6 7 8 9 10 11 12 13 14 15

perpendicular mirrors as shown below.

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Round 1   
● 57 responses, 58% correct



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1 lectur

3 PI 2.0

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current session: **766079** | 69 students

Map Show floating session ID Edit Delete

6 7 8 9 10 11 12 13 14 15

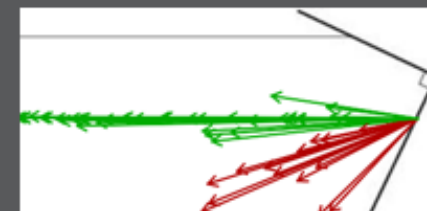
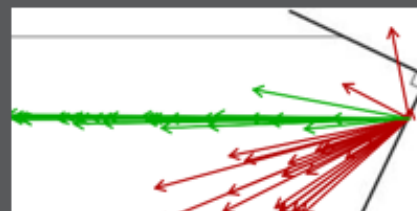


perpendicular mirrors as shown below.

Deliver 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



1 lecture

3 PI 2.0

Sample question types:

- direction

- mathematical expression

- long answer, short answer, word cloud

- numerical, data collection

- ranking, priority

- region (select point on image)

- sketch, composite sketch

- highlight passage

If $2x - y = 4$, then $x =$

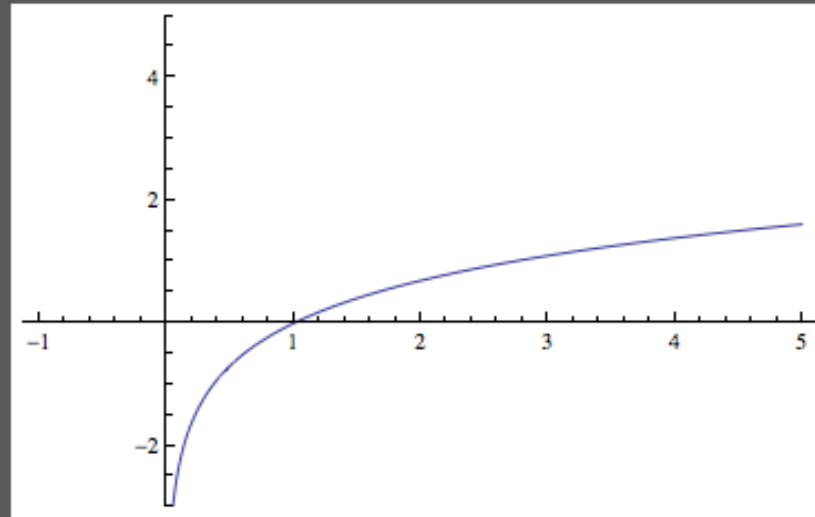
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This is a graph of $f(x) = \ln x$. Sketch a graph of the derivative $f'(x)$.



1 lecture

2 PI

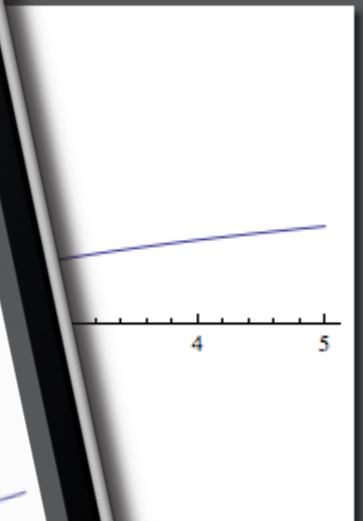
3 PI 2.0

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This is a graph of $f(x) =$



1 lecture

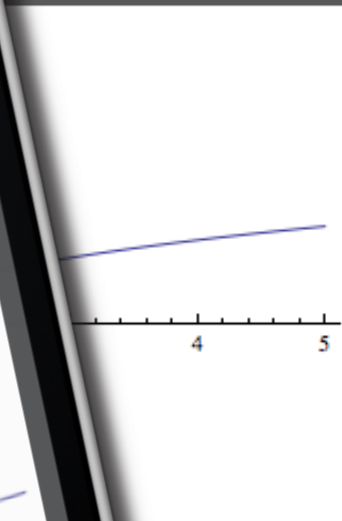
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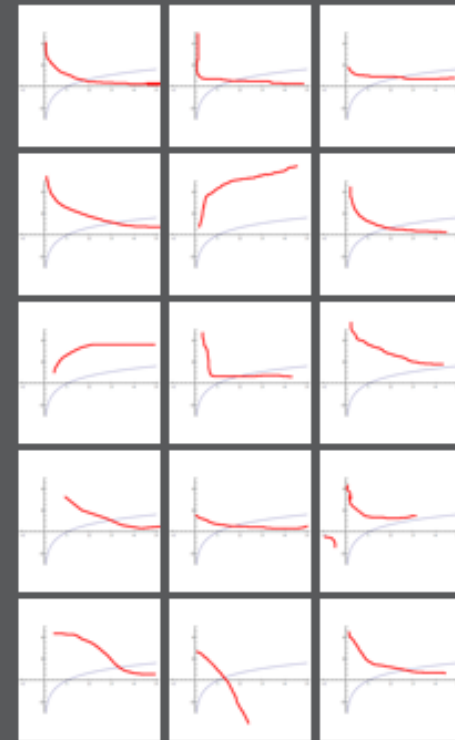
ases Users Tour Help

This is a graph of $f(x) =$



Round 1

15 responses



✓ 6 get it now
✗ 0 still don't get it

1 lecture

3 PI 2.0

Sample question types:

- direction
- mathematical expression
- long answer, short answer, word cloud
- numerical data collection
- ranking priority
- region (select point on image)
- sketch, composite sketch
- highlight passage

data analytics



1 lecture

2 PI

3 PI 2.0

A photograph of three people in a meeting, tilted and overlaid with the text 'human interaction'. The photo shows a woman on the left writing in a notebook, a woman in the middle looking up, and a man on the right with his hand to his chin. The text 'human interaction' is written in a large, red, stylized font across the center of the photo.

human interaction

1 lecture

2 PI

3 PI 2.0

Carrier 9:31 PM 100%

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skywalker.seas.harvard.edu/class_sessions/399757/review_results

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review results for session 399757 in electrostatic work and energy ii

Back to all lectures Download all results

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Round 1 74 responses, 61% correct

Round 2 75 responses, 83% correct

A. 61% B. 4% C. 35% D. 0% E. 0%

A. 83% B. 0% C. 17% D. 0% E. 0%

A positively charged rod is held near a neutral conducting sphere as illustrated below. A positively charged particle is moved from point A to point B

A. positive
B. zero
C. negative
D. depends on the path taken from A to B
E. cannot be determined without knowing more about the polarization induced in the sphere

Search:

1 lecture

2 PI

3 PI 2.0

Carrier 9:31 PM learning catalytics skywalker.seas.harvard.edu/class_sessions/399757/review_results Google Eric Mazur | Harvard University | Log out

learning catalytics

A positively charged rod is held near a neutral conducting sphere as illustrated below. A positively charged particle is moved from point A to point B as illustrated below. The potential difference from A to B is

A. positive
 B. zero
 C. negative
 D. depends on the path taken from A to B
 E. cannot be determined without knowing more about the polarization induced in the sphere

Round 1
 74 responses, 61% correct

A. 61%
B. 4%
C. 35%
D. 0%
E. 0%

Round 2
 75 responses, 83% correct

A. 83%
B. 0%
C. 17%
D. 0%
E. 0%

Search: _____

1 lecture

2 PI

3 PI 2.0

Carrier 9:31 PM 100%

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review results for session 399757 in electrostatic work and energy ii

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A. 83%
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E. 0%

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Search:

1 lecture

2 PI

3 PI 2.0

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learning catalytics





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 D. 0%
 E. 0%

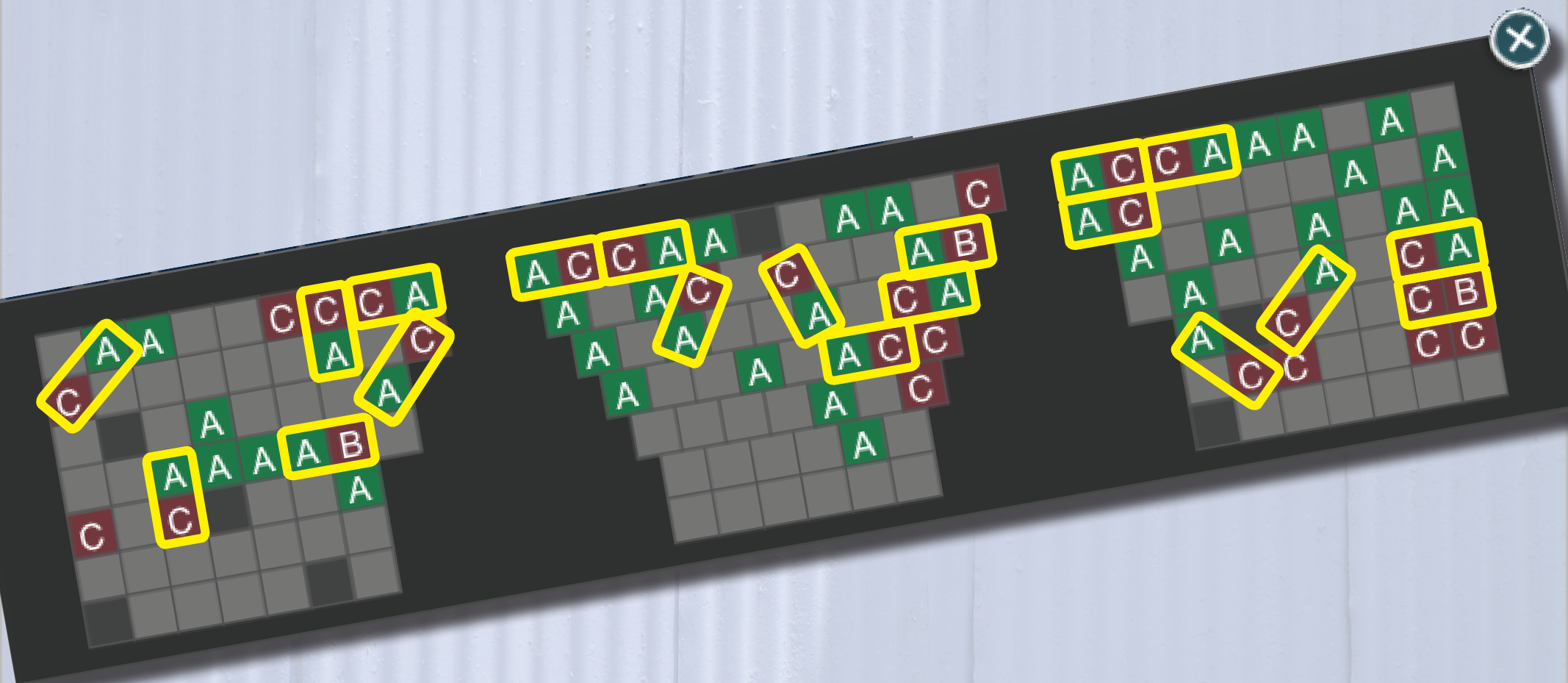
Search: _____

1 lecture

2 PI

3 PI 2.0

let system manage pairing



1 lecture

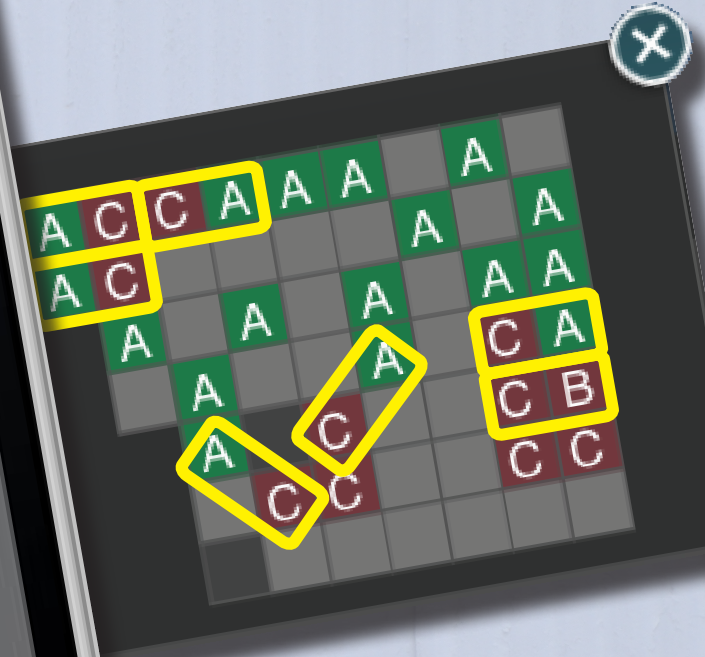
2 PI

3 PI 2.0

A positively charged rod is held near a neutral conducting sphere as illustrated below. A positively charged particle is moved from point A to point B at constant speed. The mechanical work required to cause this motion is

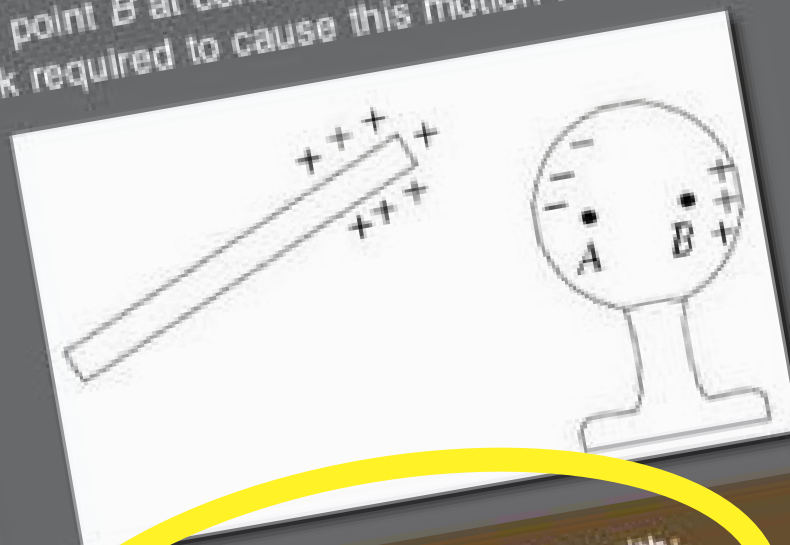


Please discuss your response with:
• Brian Lukoff (to your left)
✓ I am talking to this person/people



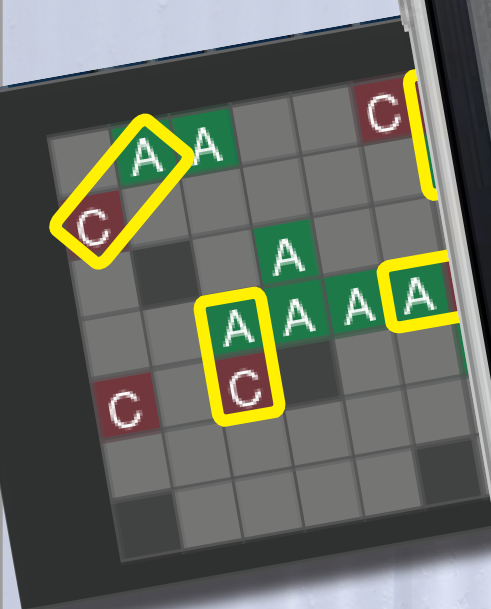
Leave

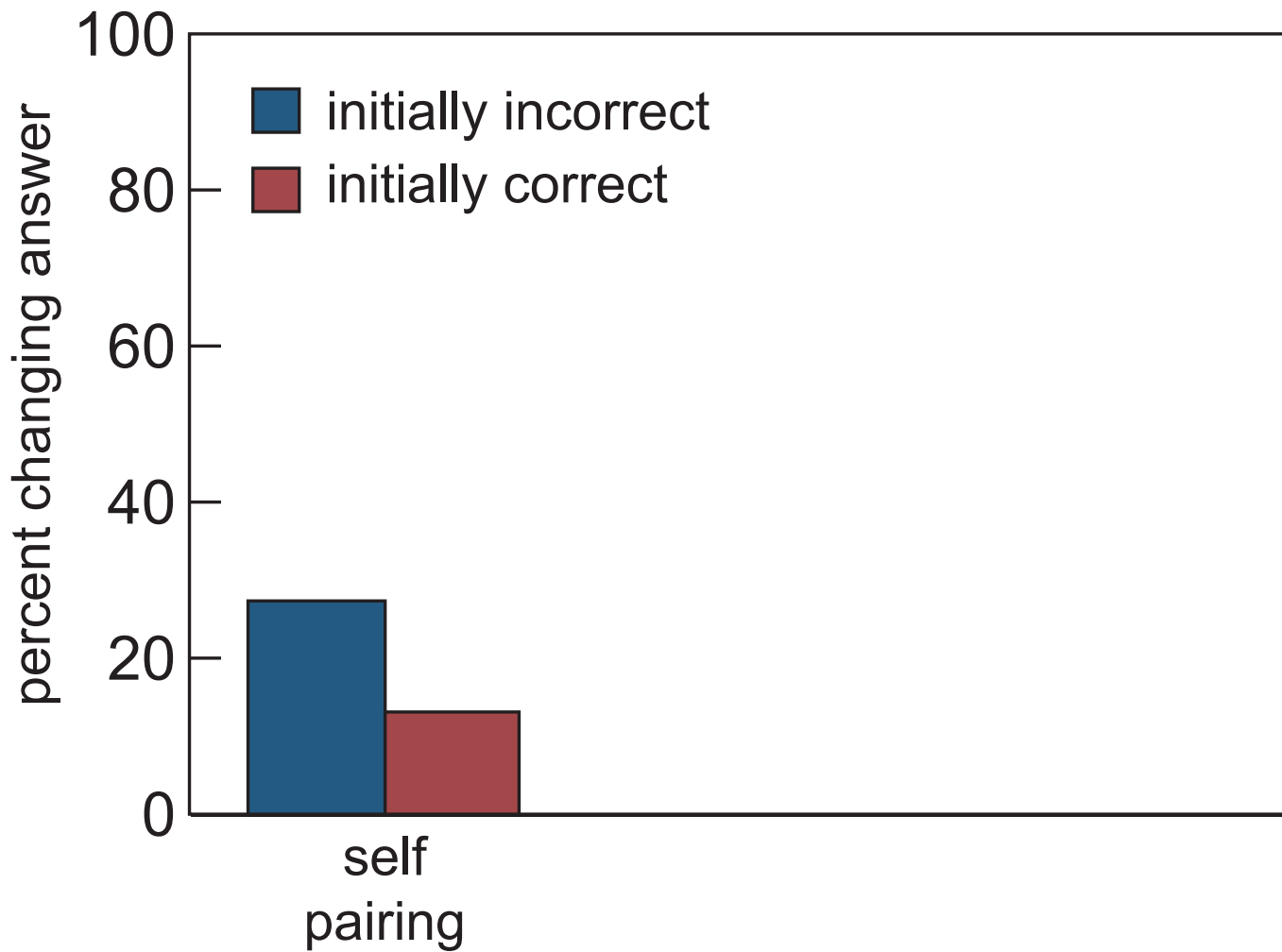
A positively charged rod is held near a neutral conducting sphere as illustrated below. A positively charged particle is moved from point A to point B at constant speed. The mechanical work required to cause this motion is

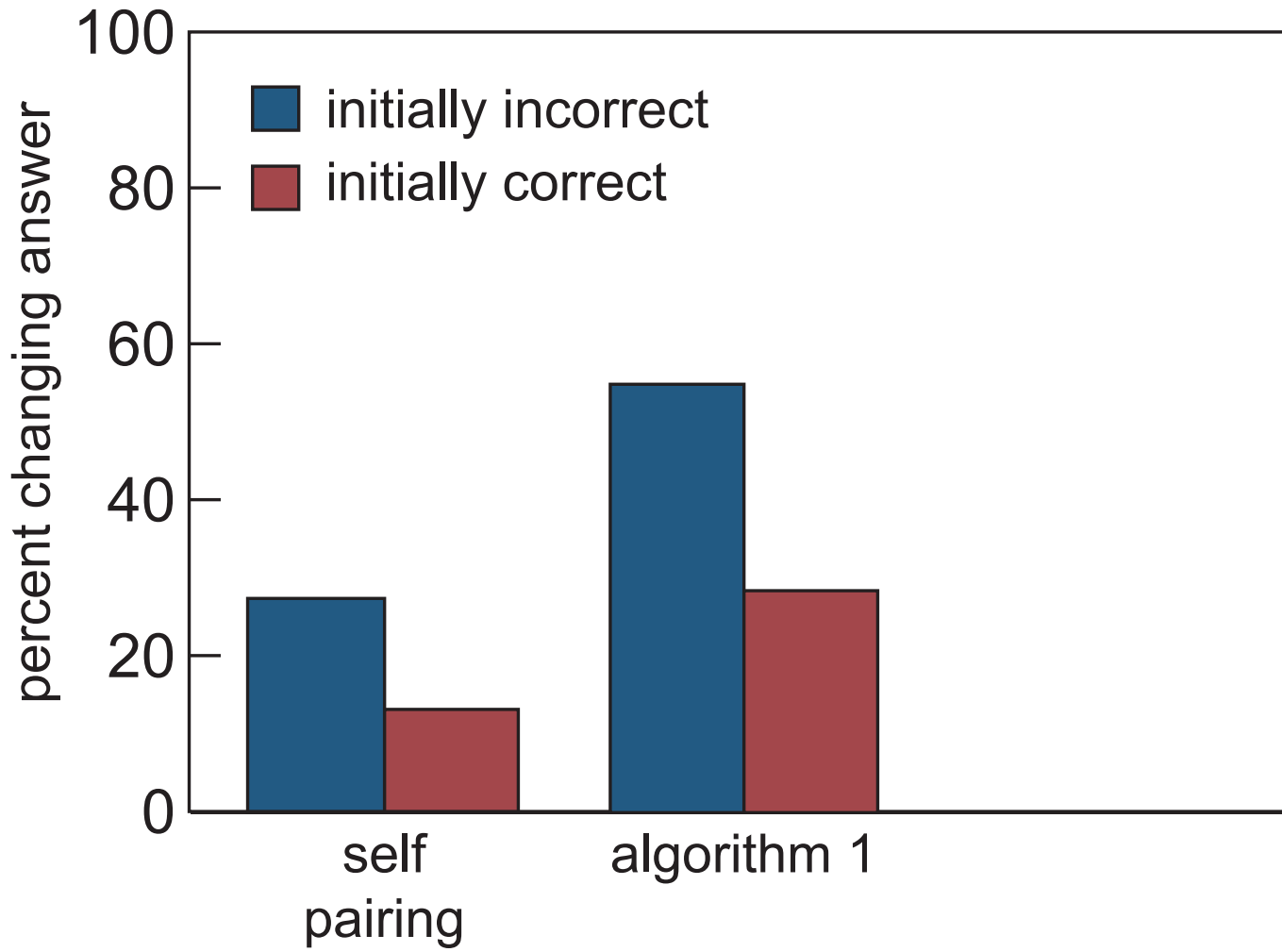


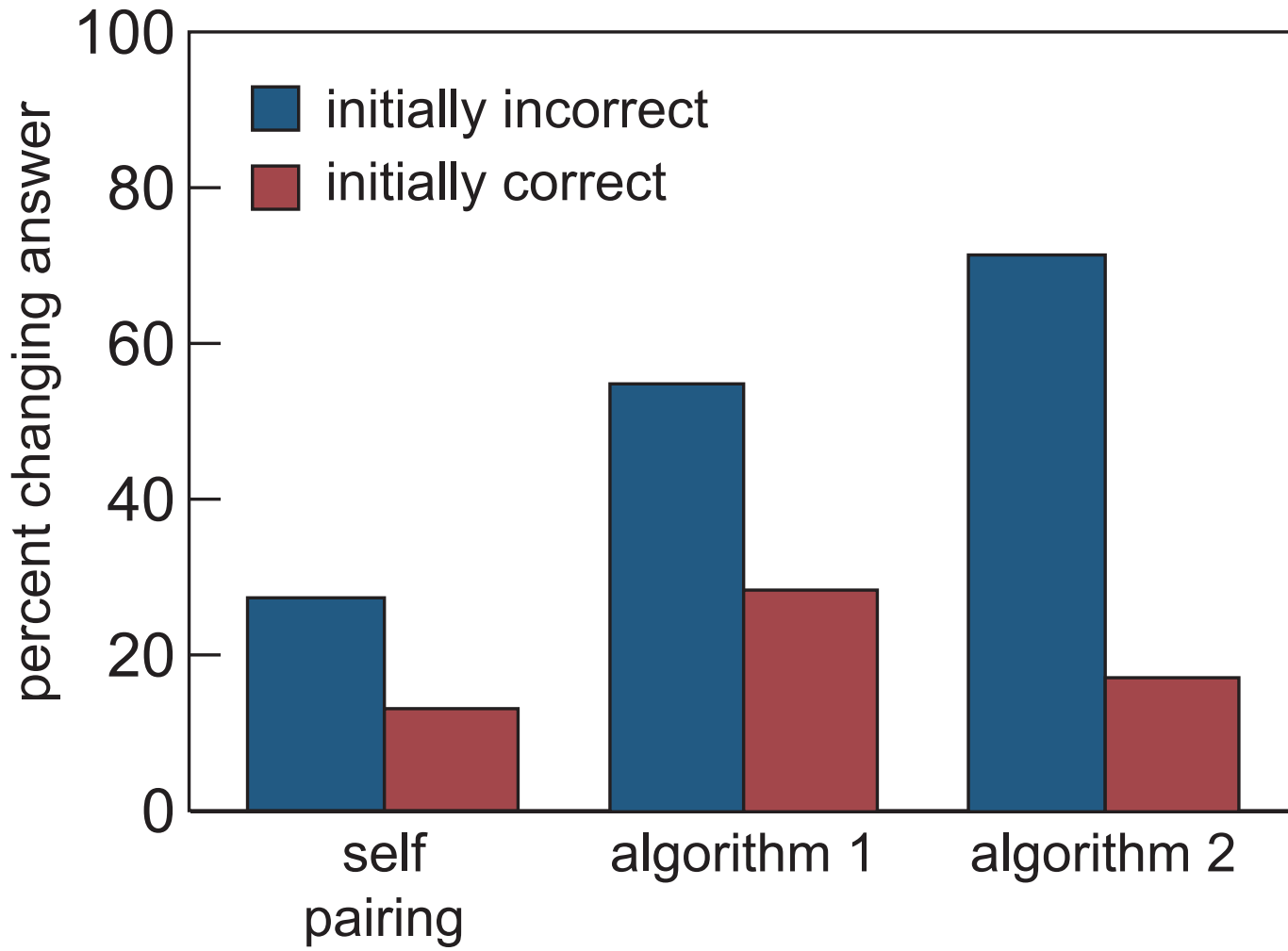
Please discuss your response with:

- Brian Lukoff (to your left)









IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF AT)

Name Team # 3

Test # 1

Subject _____

Total 23

SCRATCH OFF COVERING TO EXPOSE ANSWER

	A	B	C	D	Score
1.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>4</u>
2.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>2</u>
3.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>4</u>
4.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>1</u>
5.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>4</u>
6.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>4</u>
7.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>0</u>
8.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>4</u>
9.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
10.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____



1 lecture

2 PI

3 PI 2.0



Education is not just about:

- **transferring information**
- **getting students to do what we do**



Education is not just about:

- **transferring information**
- **getting students to do what we do**

discovery & exploration a must!



Learning Catalytics:

- implement proven, researched pedagogy



Learning Catalytics:

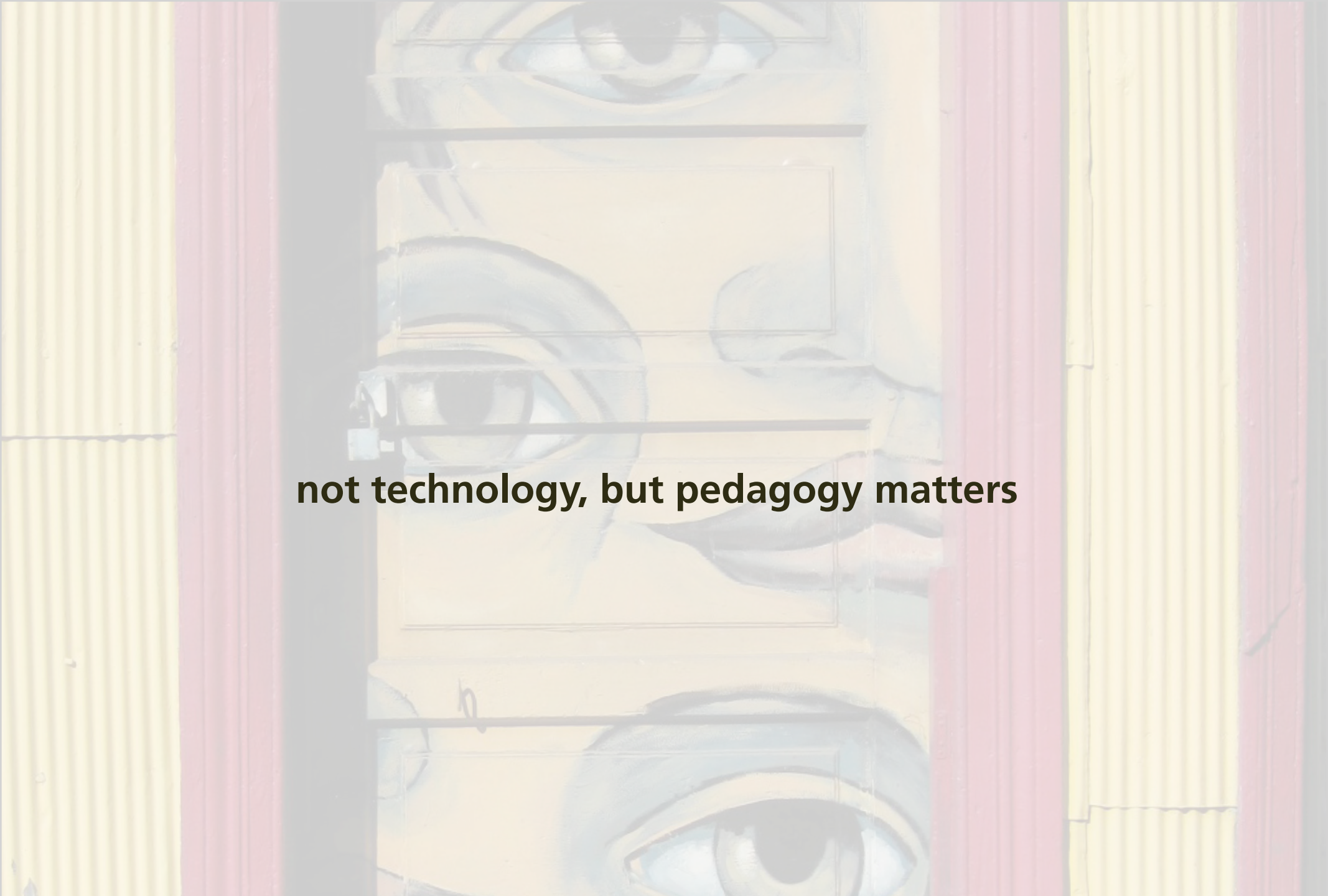
- implement proven, researched pedagogy
- use consumer devices

Learning Catalytics:

- **implement proven, researched pedagogy**
- **use consumer devices**
- **avoid pitfalls of MC assessment**

Learning Catalytics:

- implement proven, researched pedagogy
- use consumer devices
- avoid pitfalls of MC assessment
- create a smart classroom *anywhere*



not technology, but pedagogy matters

1 education

2 PI

3 PI 2.0

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