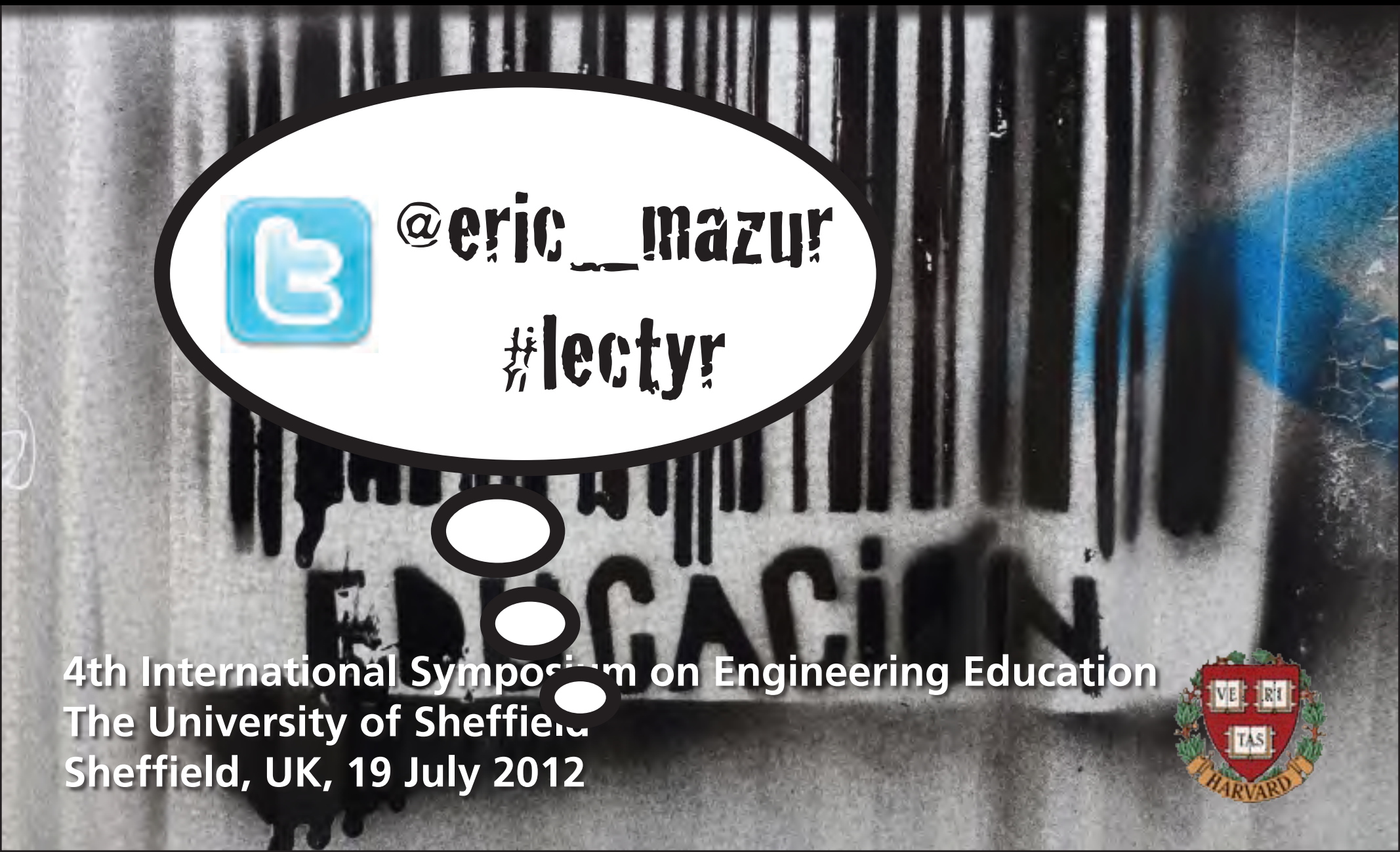
The Tyranny of the Lecture

4th International Symposium on Engineering Education
The University of Sheffield
Sheffield, UK, 19 July 2012

The Tyranny of the Lecture



4th International Symposium on Engineering Education
The University of Sheffield
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1 lecture

1 lecture

2 PI

1 lecture

2 PI

3 PI 2.0

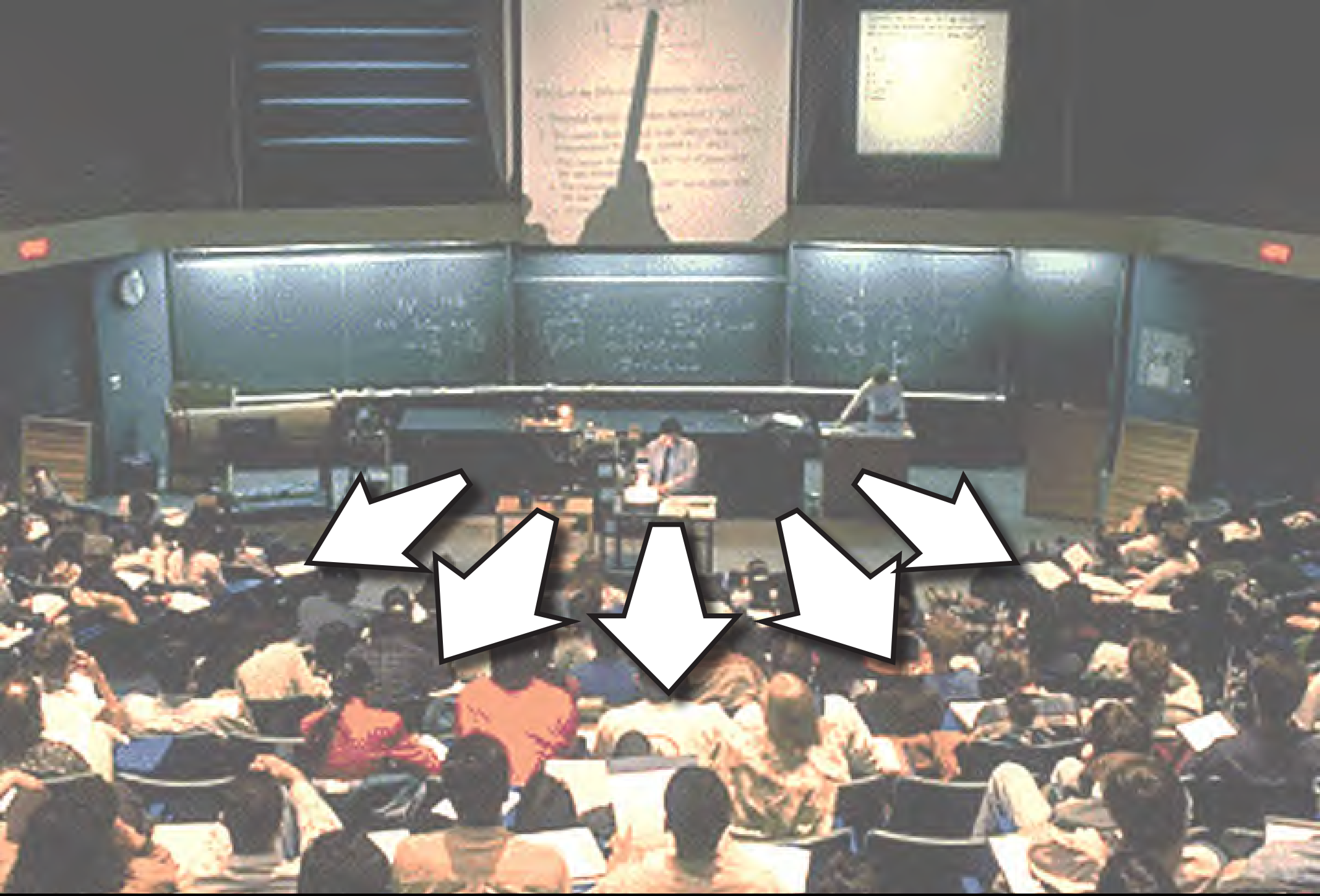
1 lecture

2 PI

3 PI 2.0


What happens
in a lecture?

1 lecture



1 lecture

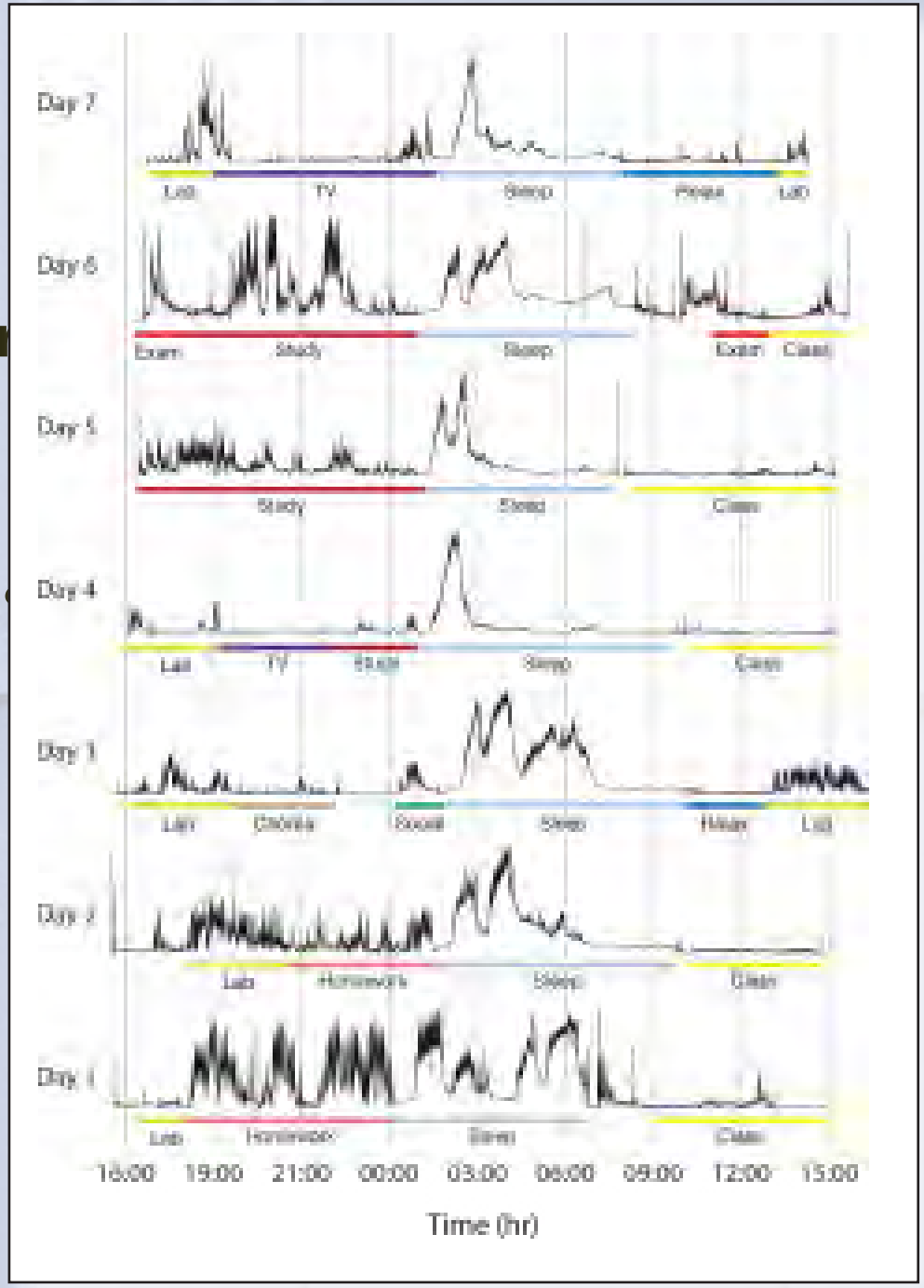
in a lecture, students…

in a lecture, students…

1. don’t pay utmost attention

in a lectu

1. don’t pay utmost

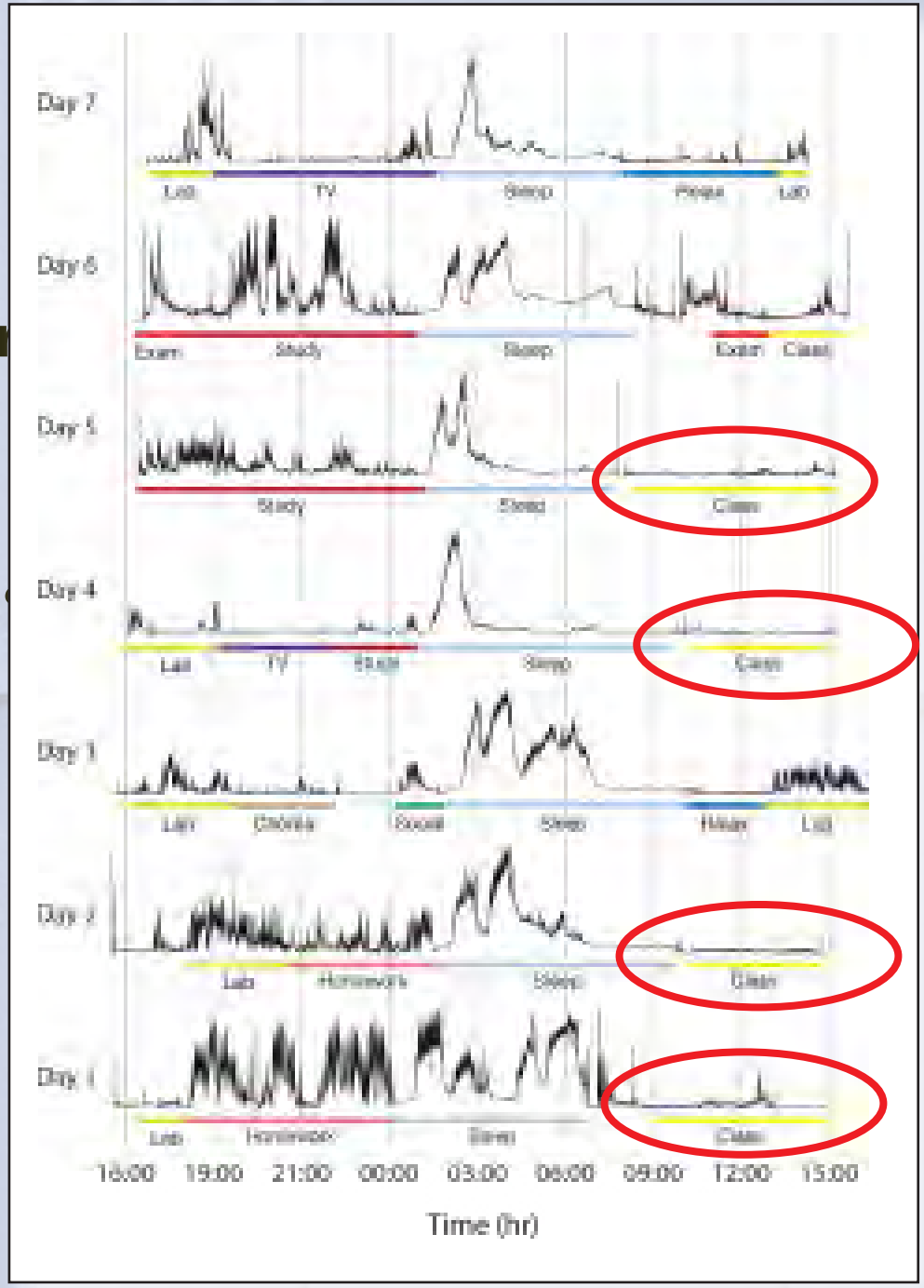


doi: 10.1109/TBME.2009.2038487

1 lecture

in a lectur

1. don’t pay utmost



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in a lectu

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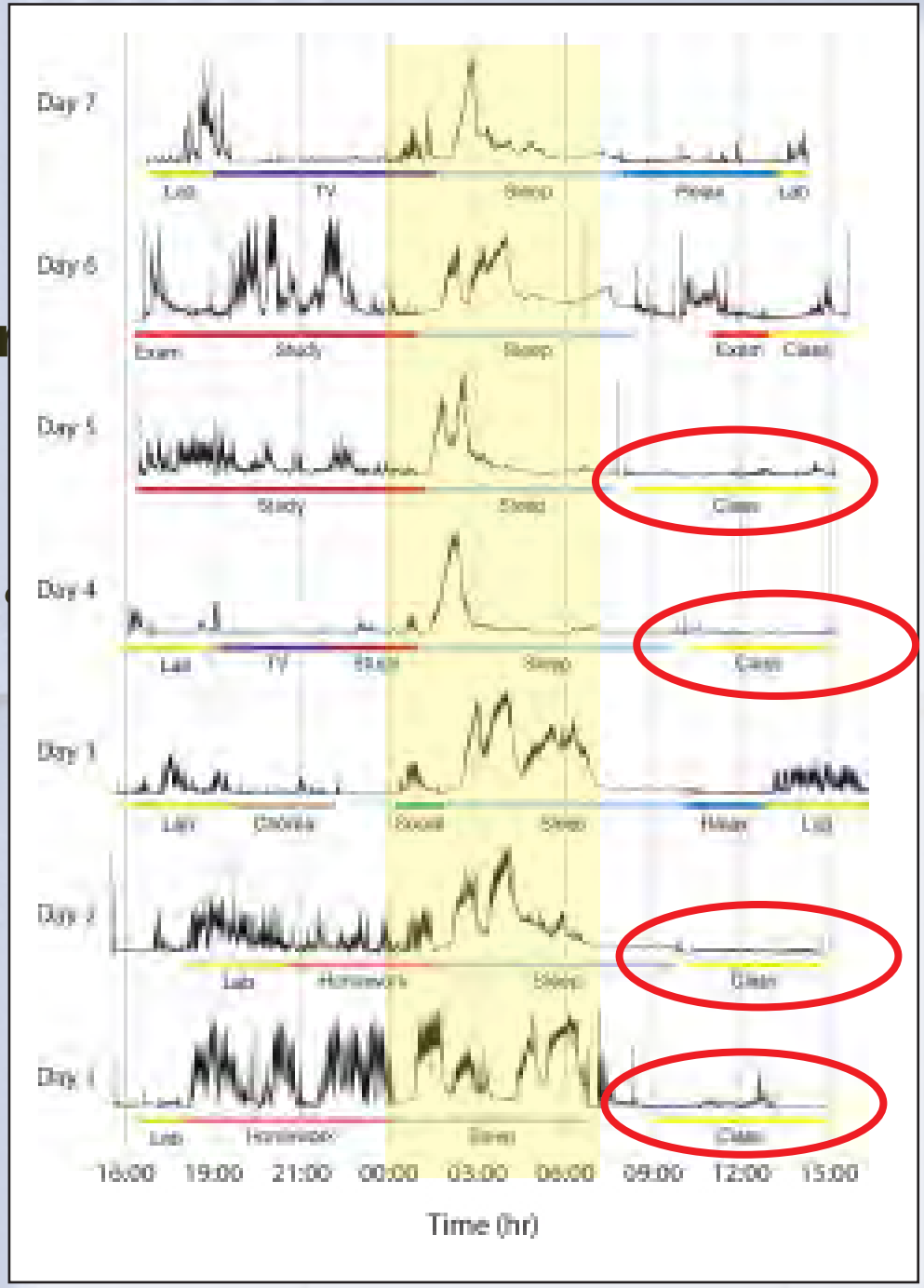

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1 lecture

in a lectur

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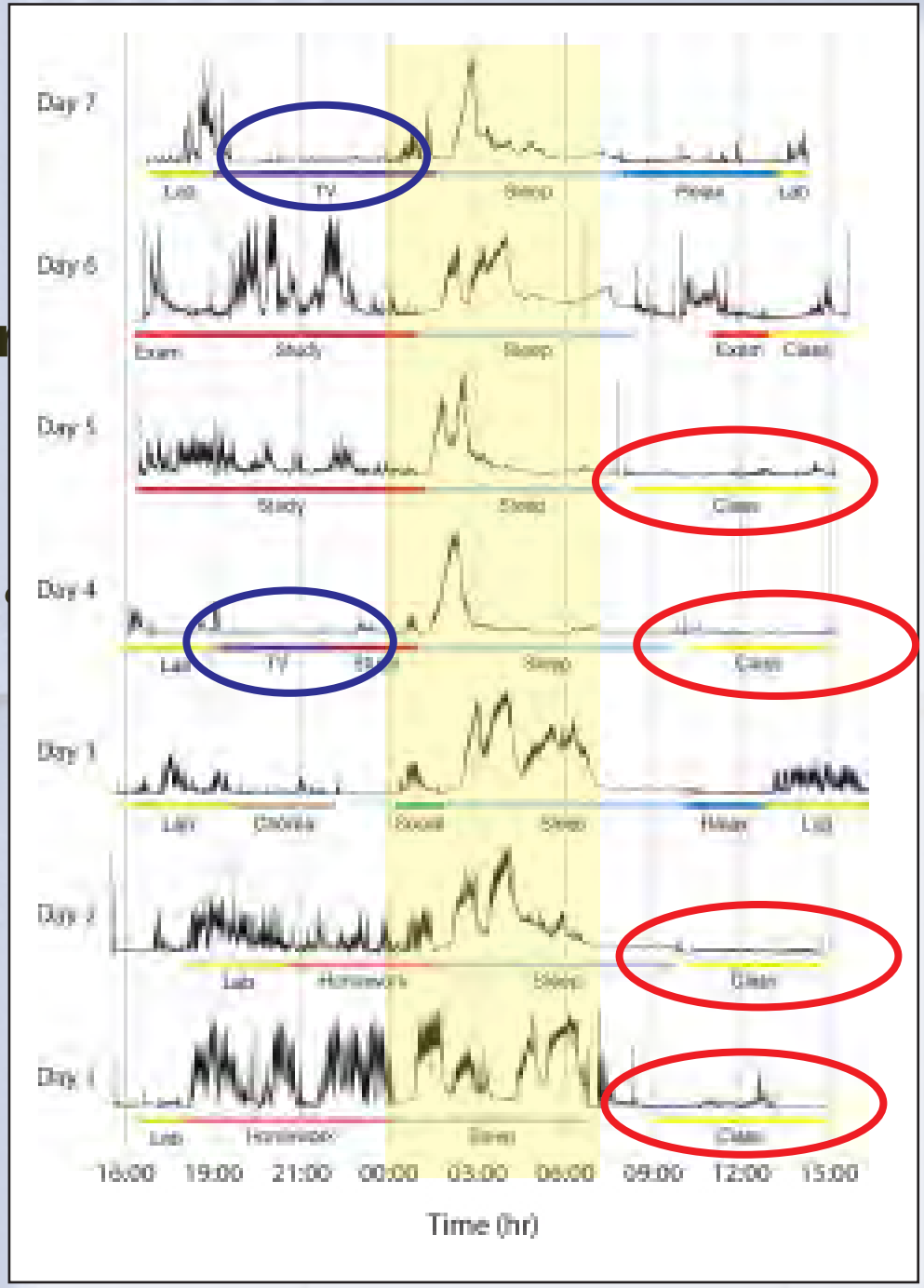

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1 lecture

in a lecture, students…

1. don’t pay utmost attention

2. think they know it

in a lecture, students…

1. don’t pay utmost attention

2. think they know it

3. are not confronted with misconceptions

in a lecture, students…

1. don't pay utmost attention

2. think they know it

3. are not confronted with misconceptions

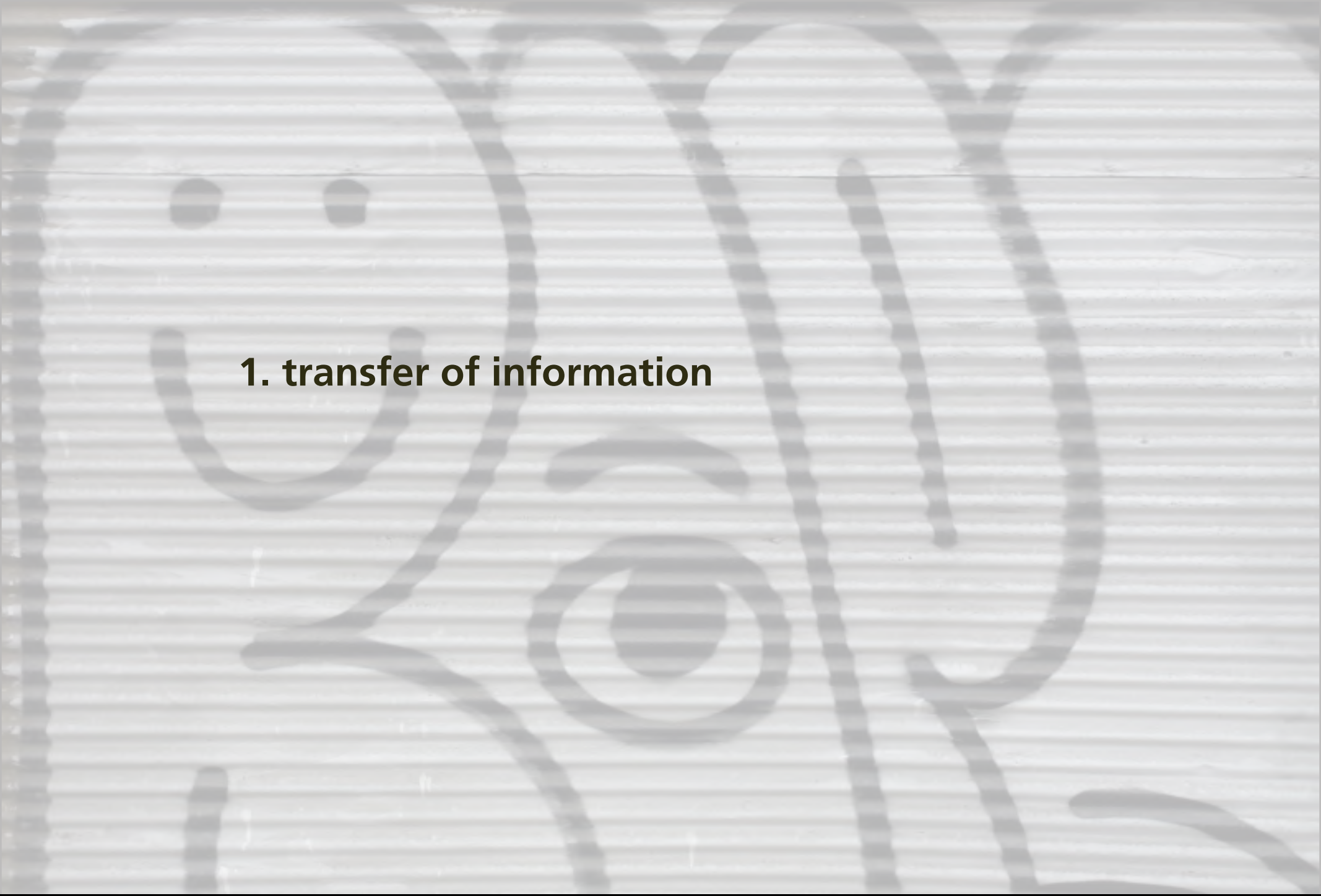
false sense of security

1 lecture

1 lecture

1 lecture

2 PI


1. transfer of information

1. transfer of information

2. assimilation of that information

1 lecture

2 PI

1. transfer of information (in class)

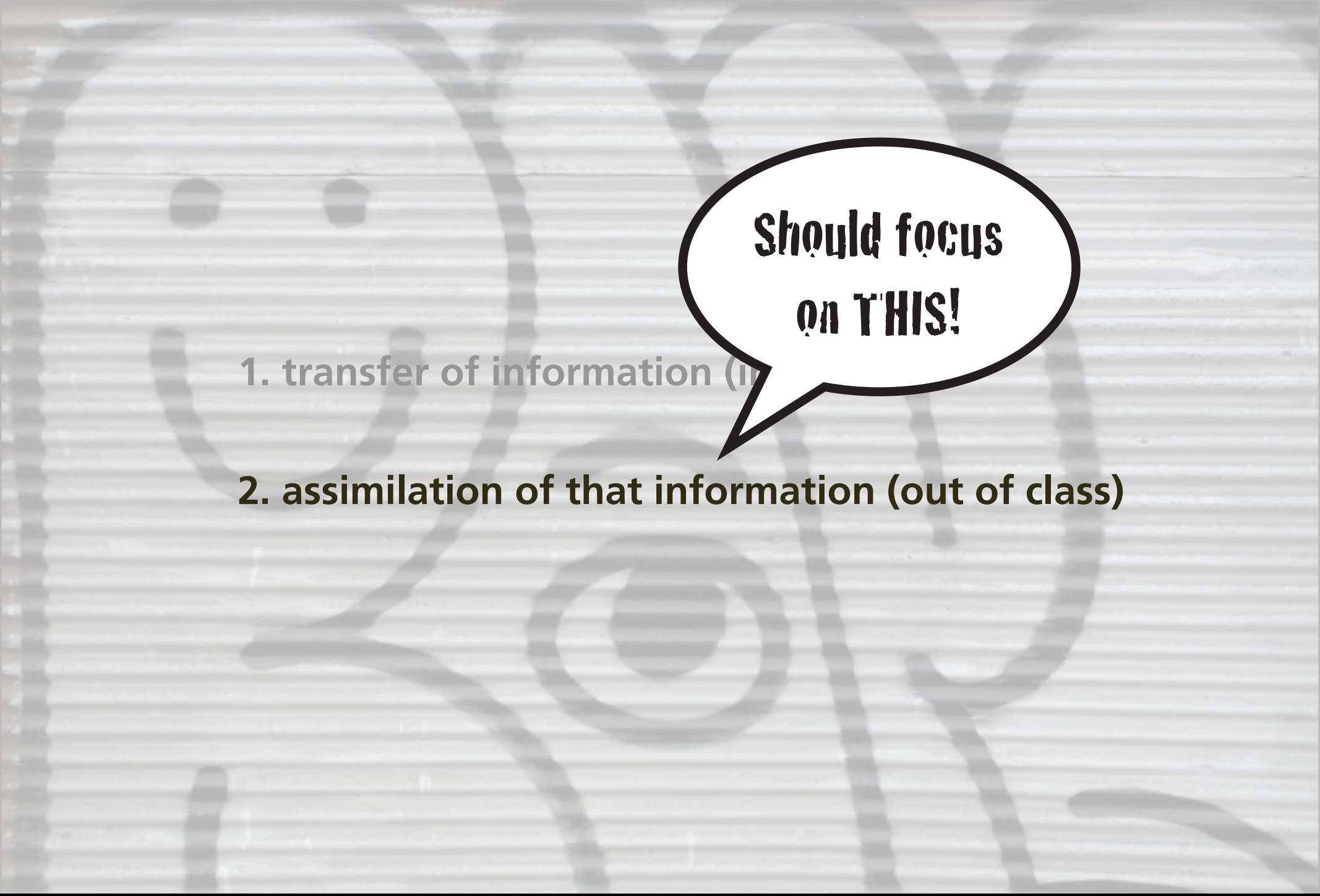
2. assimilation of that information

1 lecture

2 PI

1. transfer of information (in class)

2. assimilation of that information (out of class)


Should focus on THIS!
1. transfer of information (i
2. assimilation of that information (out of class)
1 lecture
2 PI

1. transfer of information (in class)

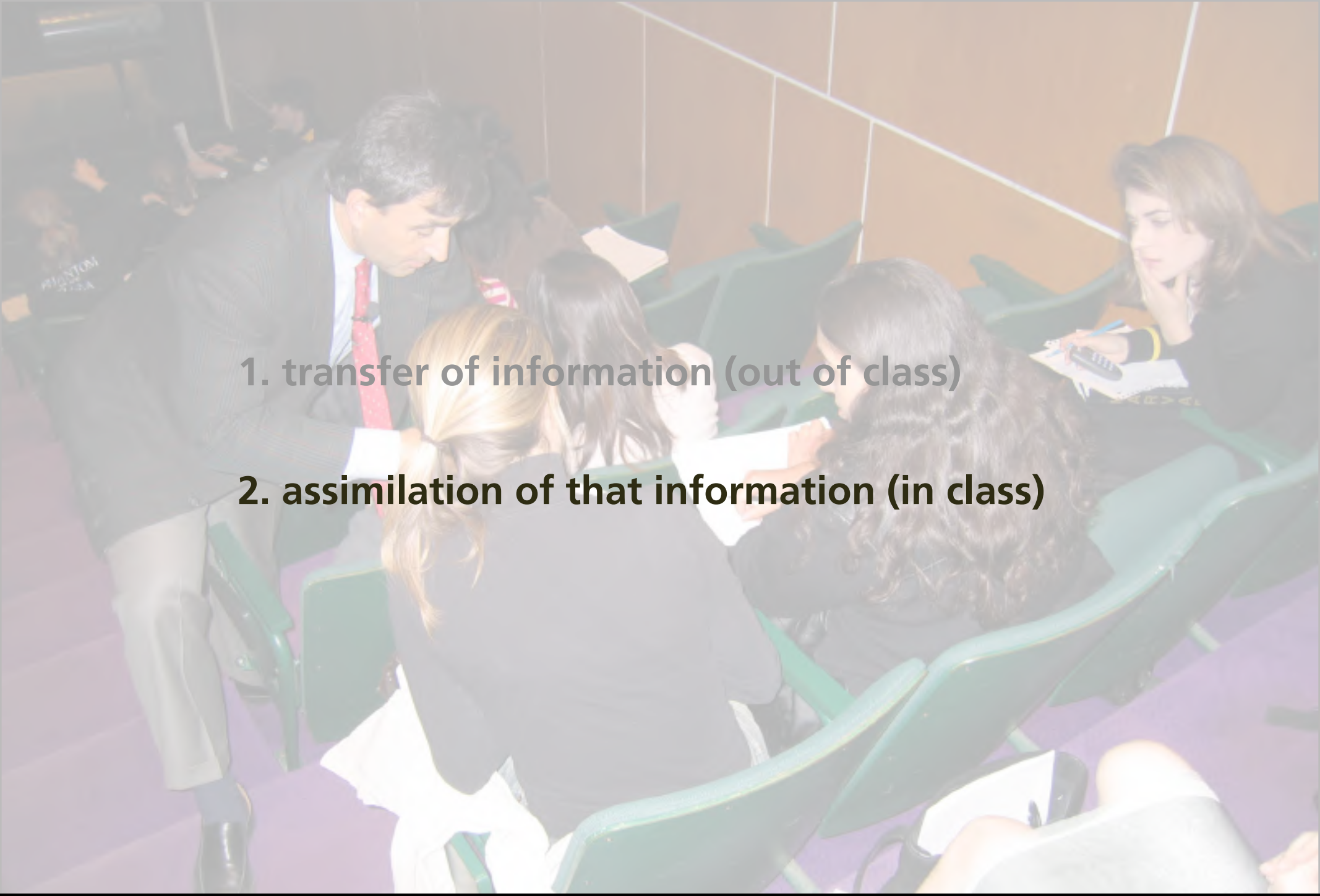
2. assimilation of that information (out of class)

1. transfer of information (out of class)

2. assimilation of that information (in class)

1 lecture

2 PI

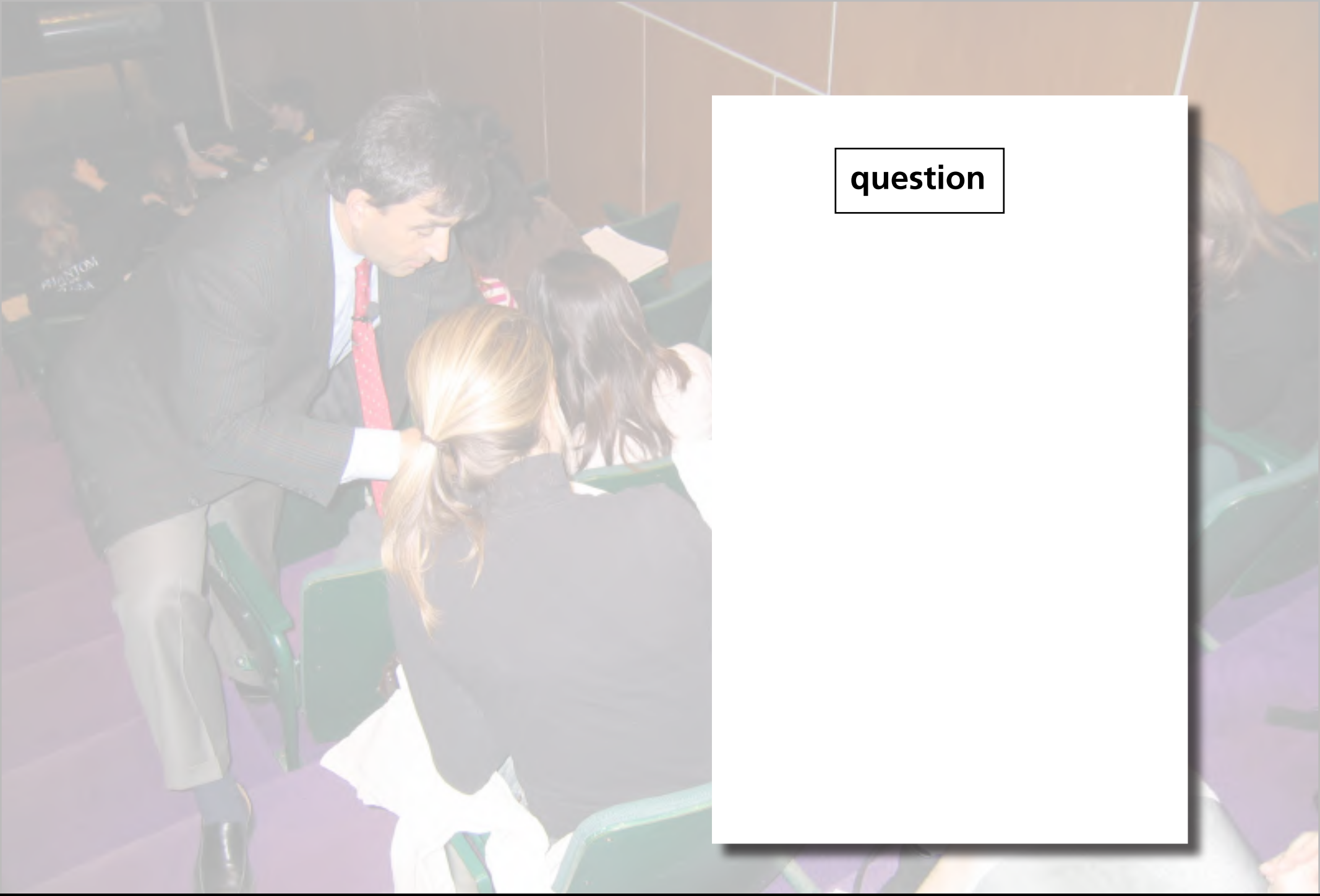


1. transfer of information (out of class)

2. assimilation of that information (in class)

1 lecture

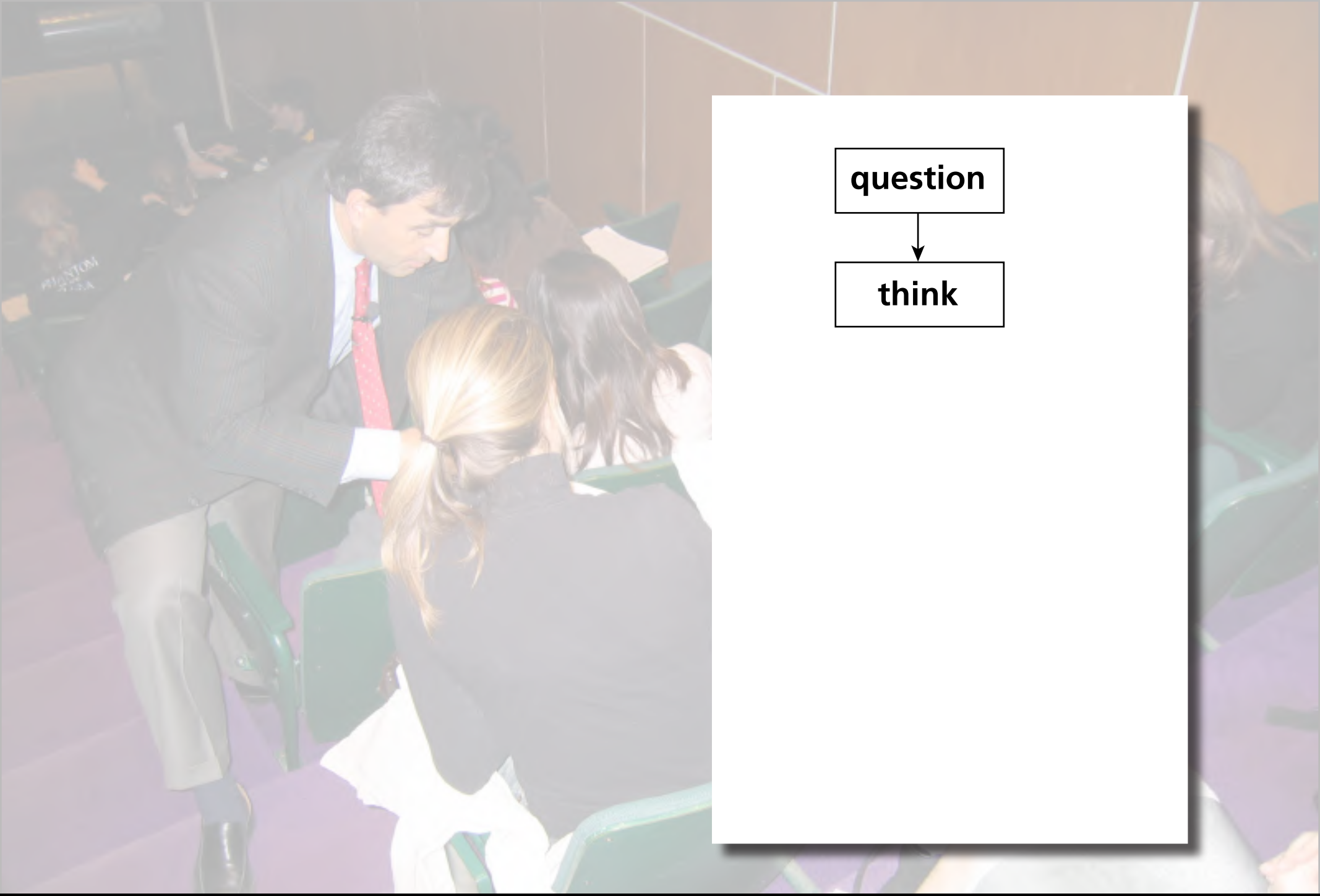
2 PI



question

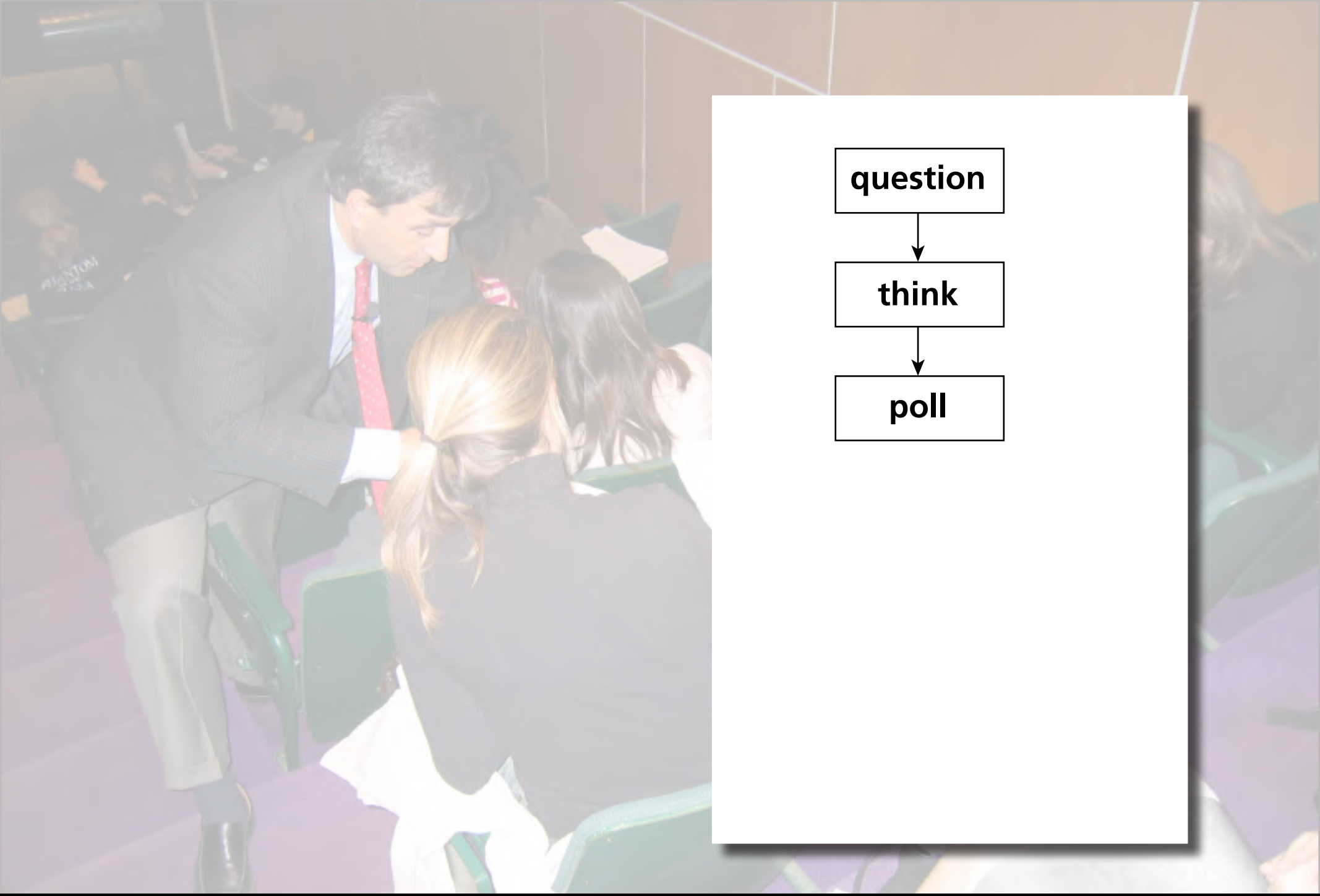
1 lecture

2 PI



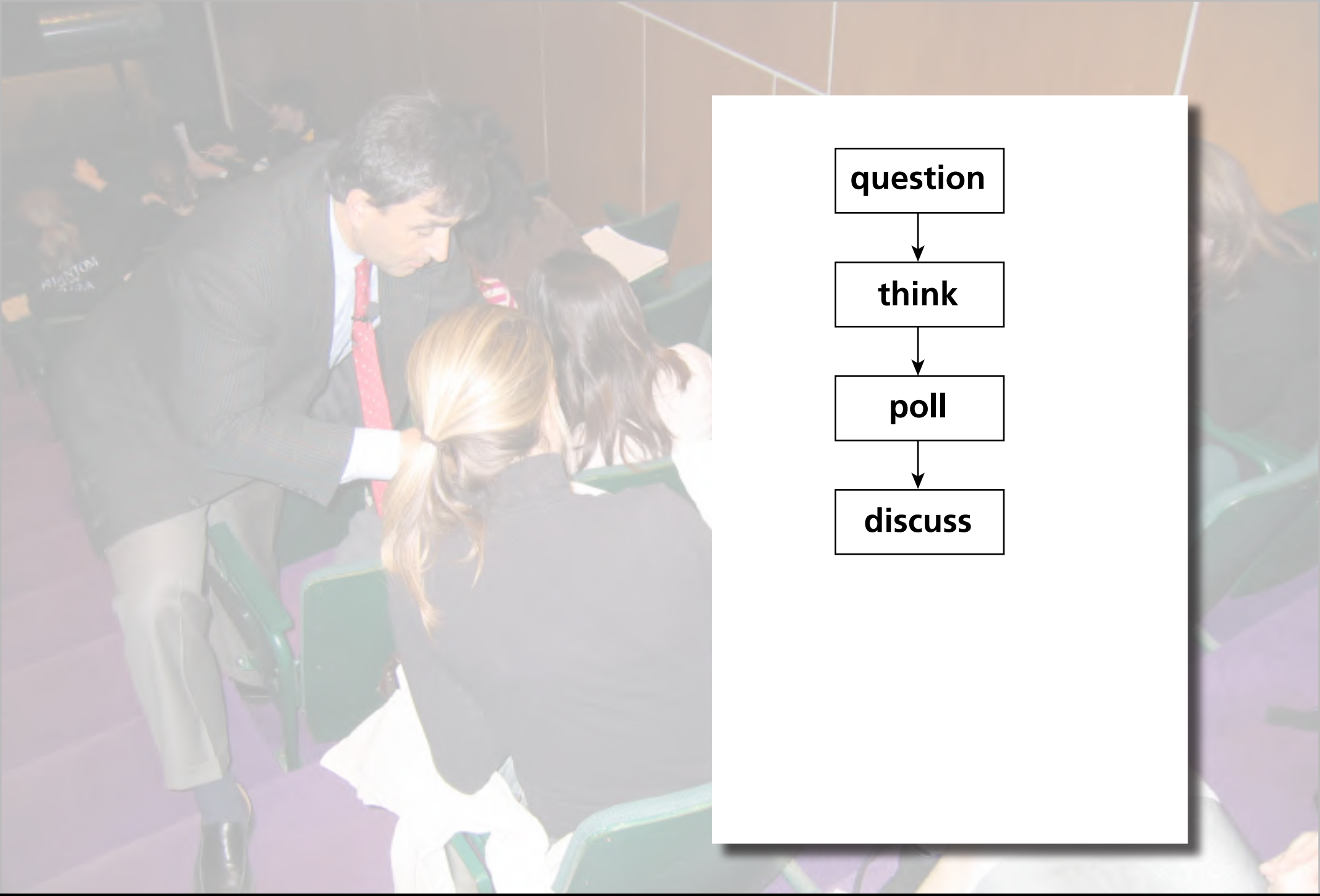
1 lecture

2 PI



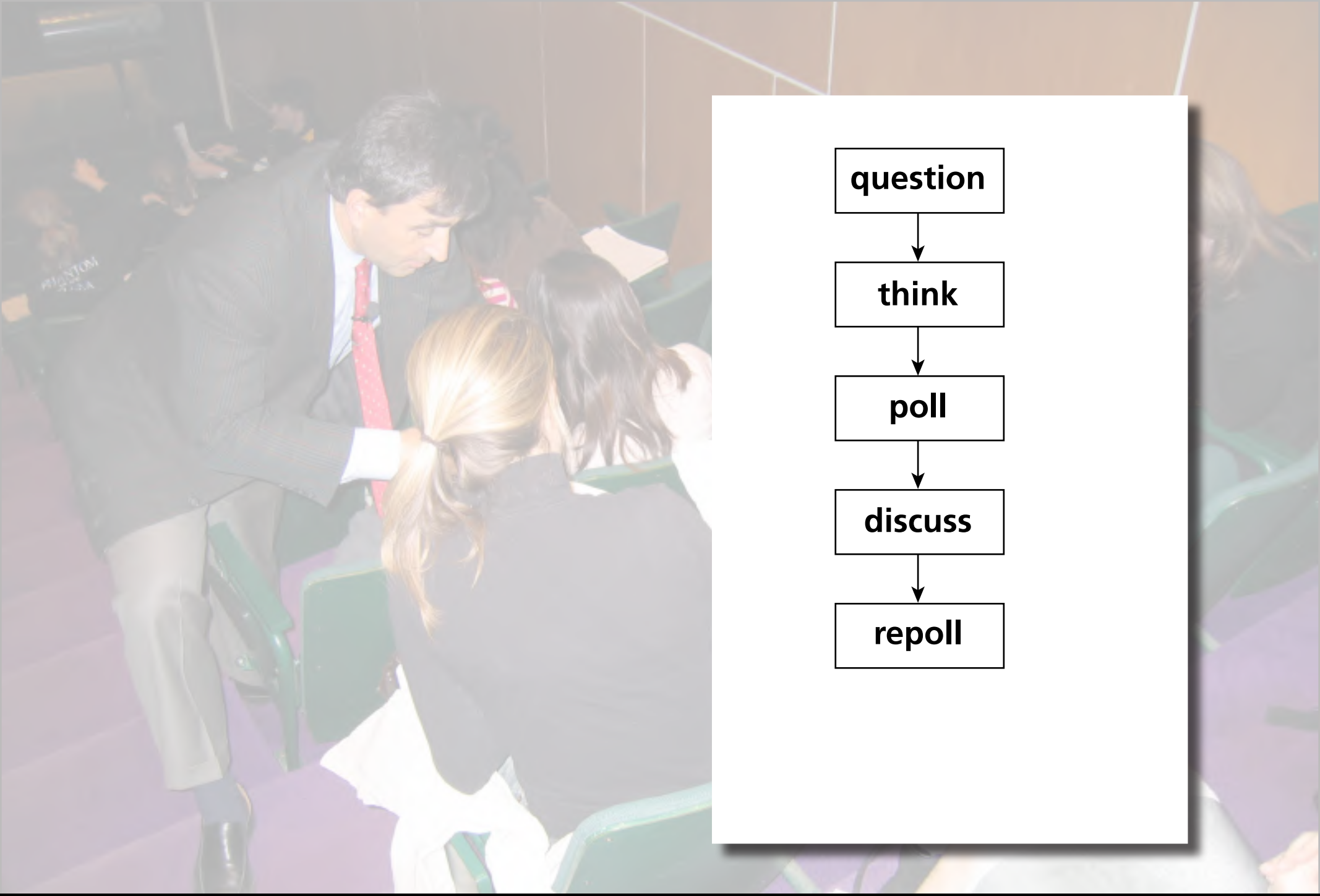
1 lecture

2 PI



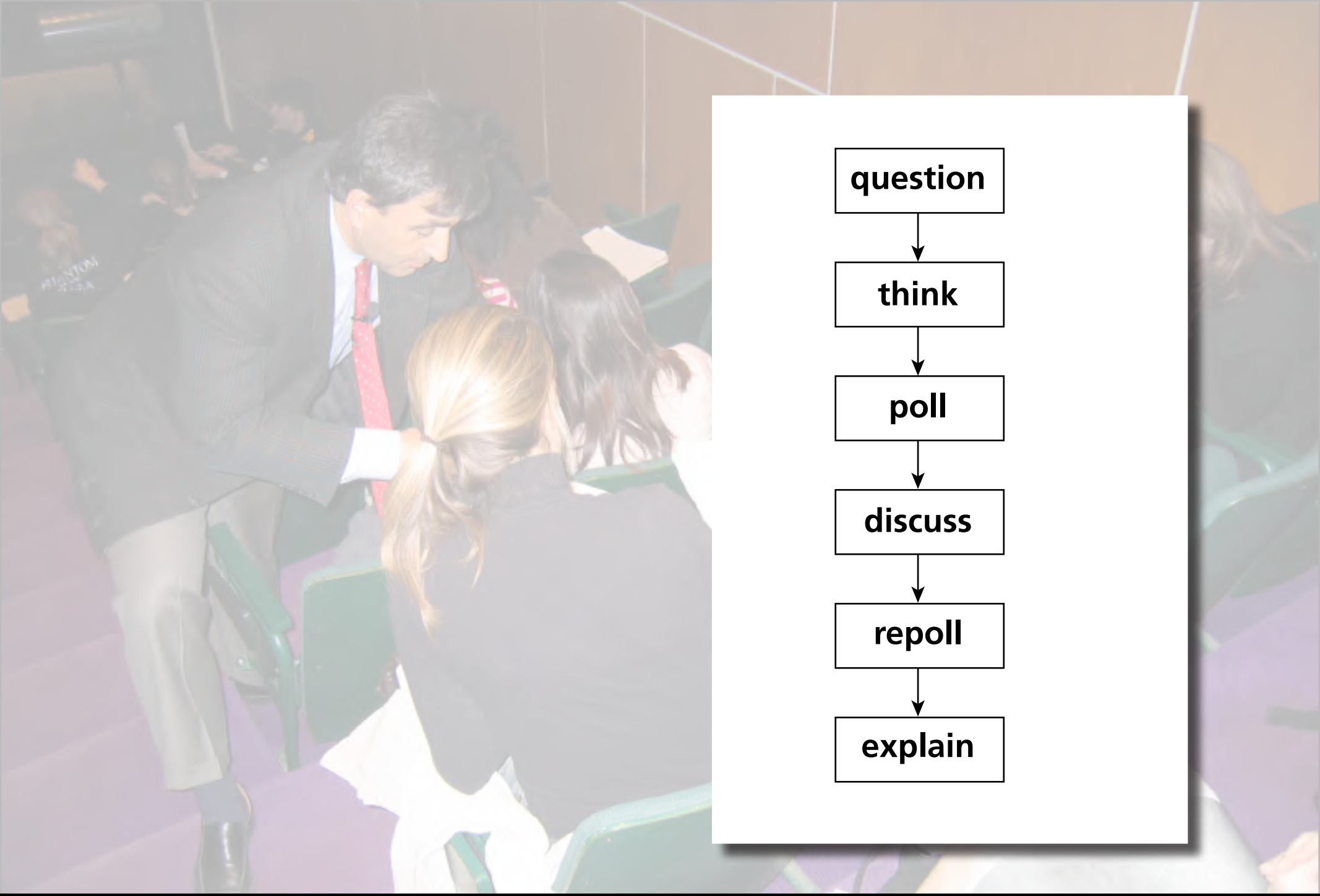
1 lecture

2 PI



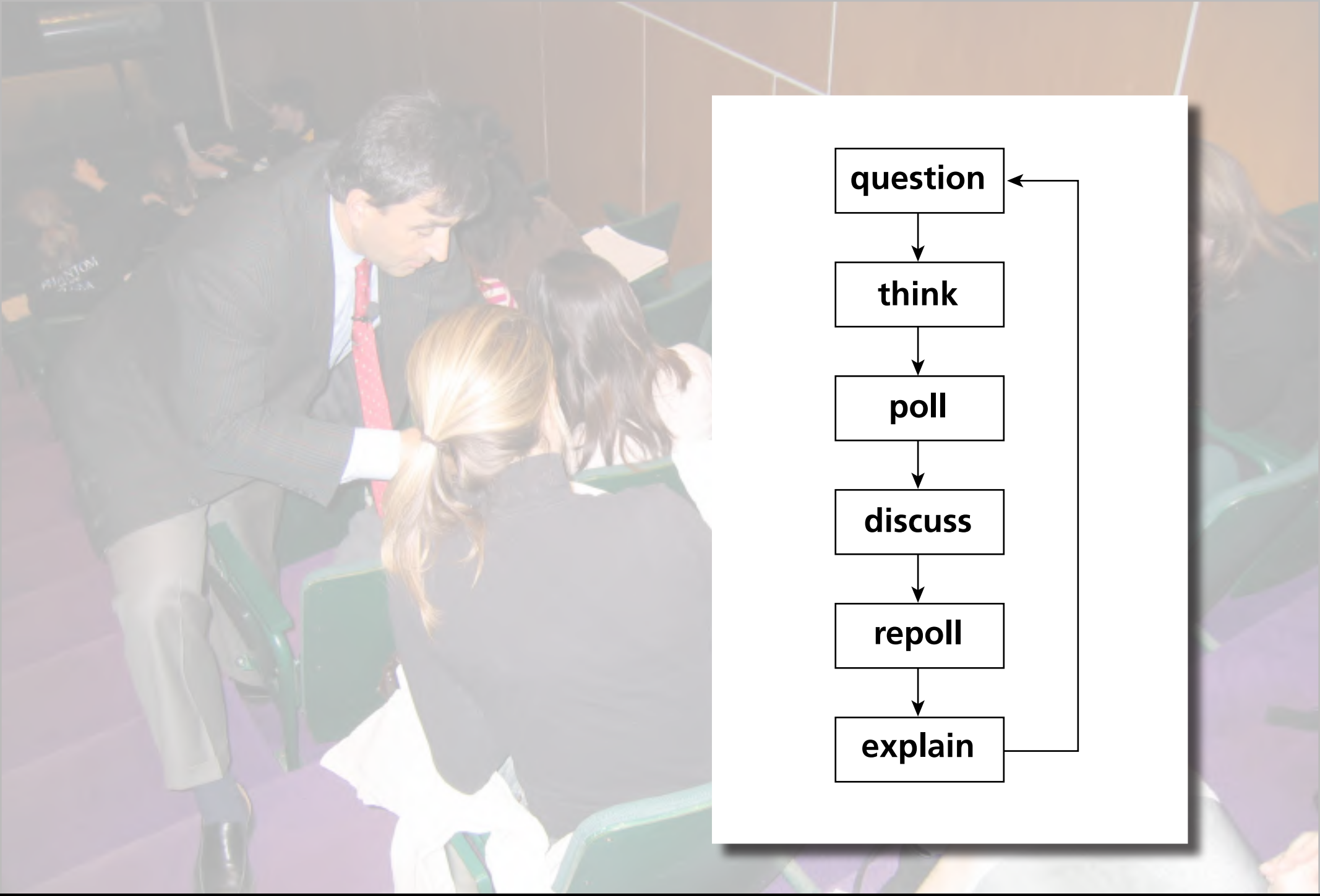
1 lecture

2 PI



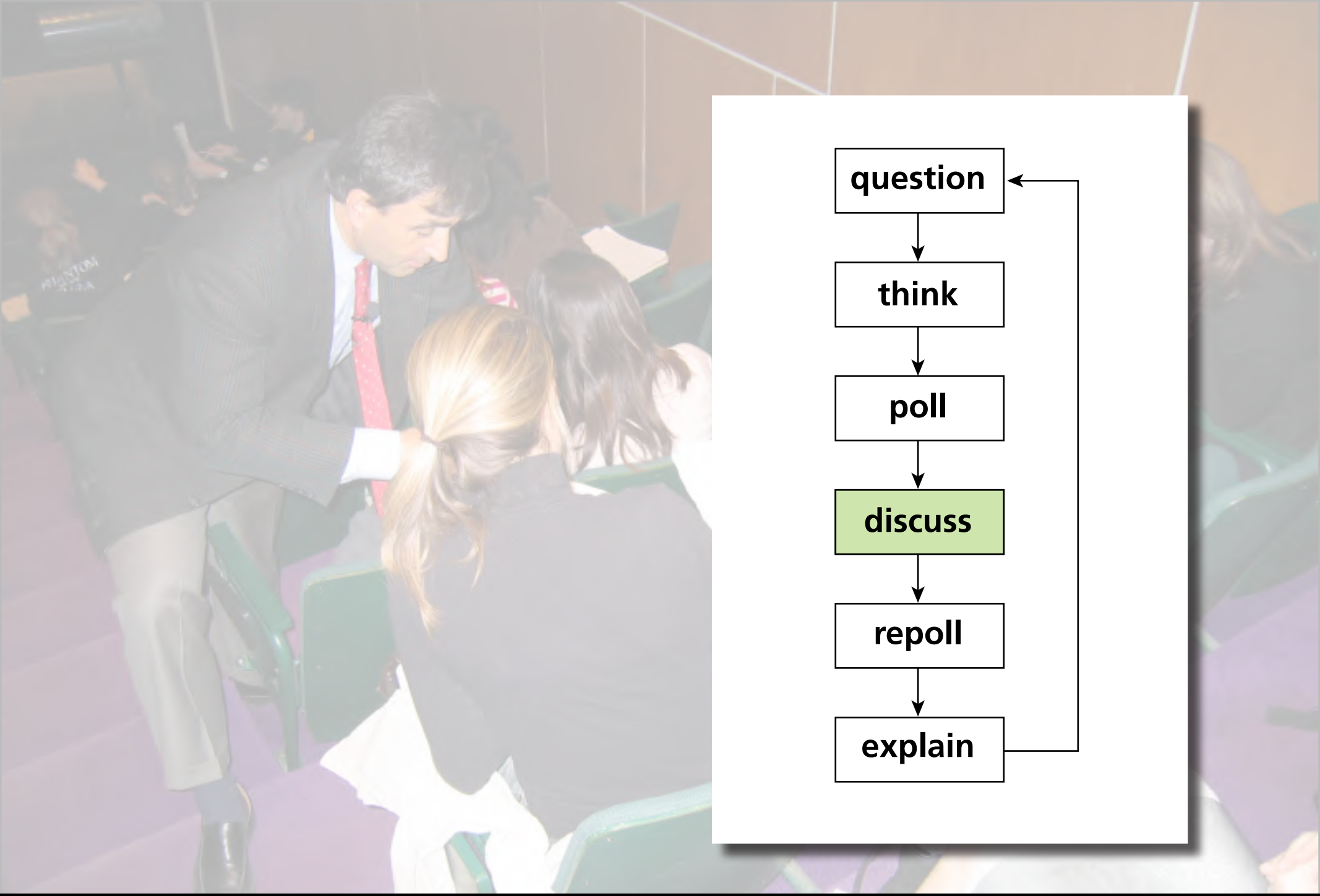
1 lecture

2 PI



1 lecture

2 PI



1 lecture

2 PI

1 lecture

2 PI


Peer
Higher learning gains
INSTRUCTION
1 lecture
2 PI


Peer
Higher learning gains
Better retention
INSTRUCTION
1 lecture
2 PI


First International Asia-Pacific Conference
on Peer Instruction
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mazur@harvard.edu


Join now!
PeerInstruction.net

1 lecture

2 PI

3 PI 2.0

feedback

1 lecture

2 PI

3 PI 2.0

1 lecture

2 PI

3 PI 2.0

1. lecture
2. PI
3. PI 2.0

1 lecture 2 PI 3 PI 2.0

1 lecture

2 PI

3 PI 2.0

1 lecture 2 PI 3 PI 2.0

How do I…

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

learning | catalytics

1 lecture

2 PI

3 PI 2.0

learning | catalytics

Gary King

Brian Lukoff

Eric Mazur

1 lecture

2 PI

3 PI 2.0

Use intelligent algorithms and data analytics to…

- improve questioning
- manage discussions
- facilitate time management/flow

a. A 30-year fixed rate
b. A 15-year fixed rate mortgage at
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 ov
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. Assets = Liabilities + Owners' equity
b. Liabilities = Assets + Owners' equity
c. Owner's equity = Assets + Liabilities
d. Revenue = Assets – Liabilities

4. In order to present a business plan to a group of potential investors, a businessperson would most likely use which

a. Powerpoint
b. Quickbooks
c. Peoplesoft
d. Excel

5. In order to start an online business, and individual would need all but which of the following:

business model

preciation?

extensible plug-in architecture for question types

1 lecture 2 PI 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

Sample question types:

- **direction**
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optics i

current session: 766079 | 69 students

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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.

Deliver | Show all results

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

feedback & support

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current session: 766079 | 69 students

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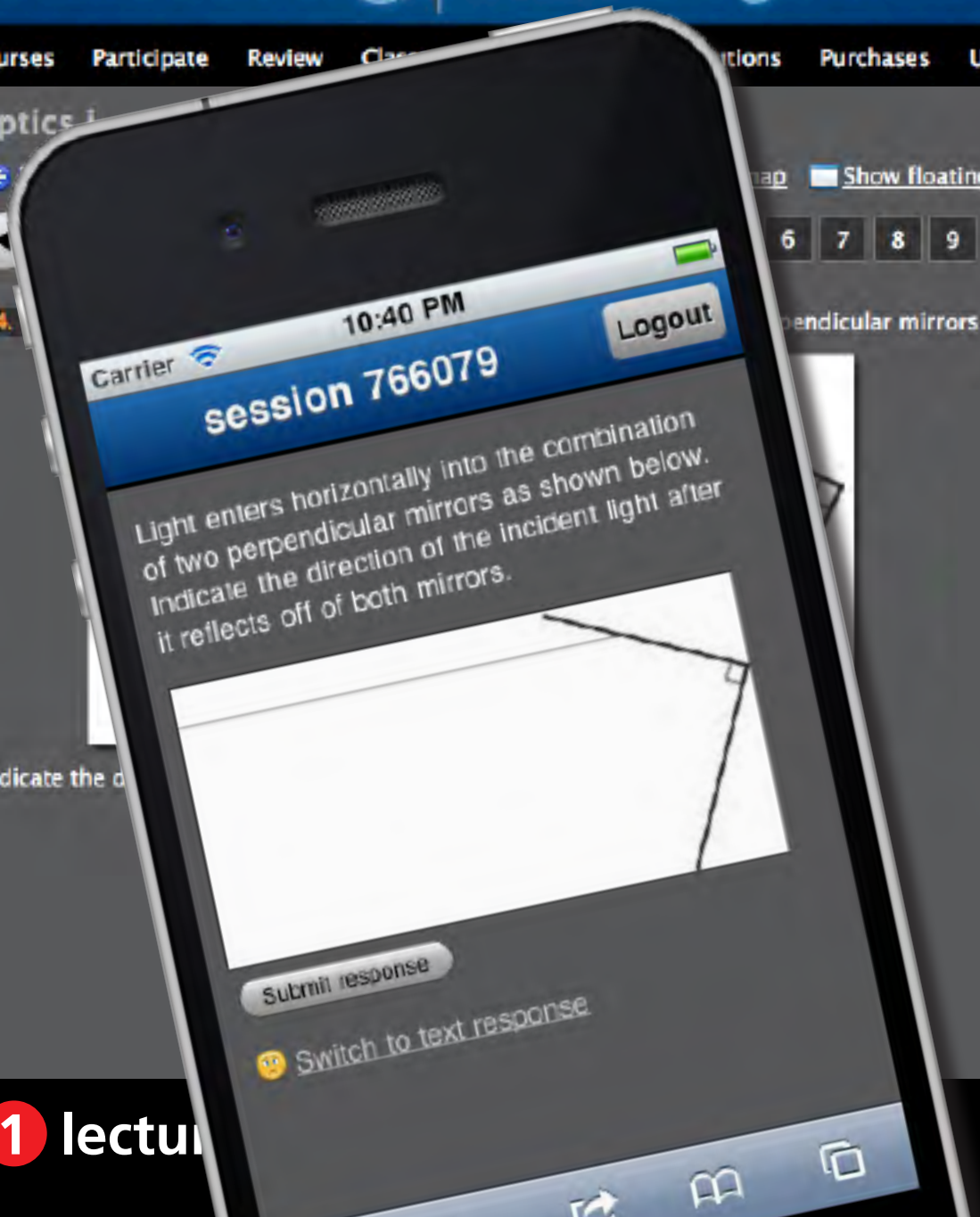
6 7 8 9 10 11 12 13 14 15

endicular mirrors as shown below.

Deliver Show all results

Indicate the d

feedback & support



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3 PI 2.0

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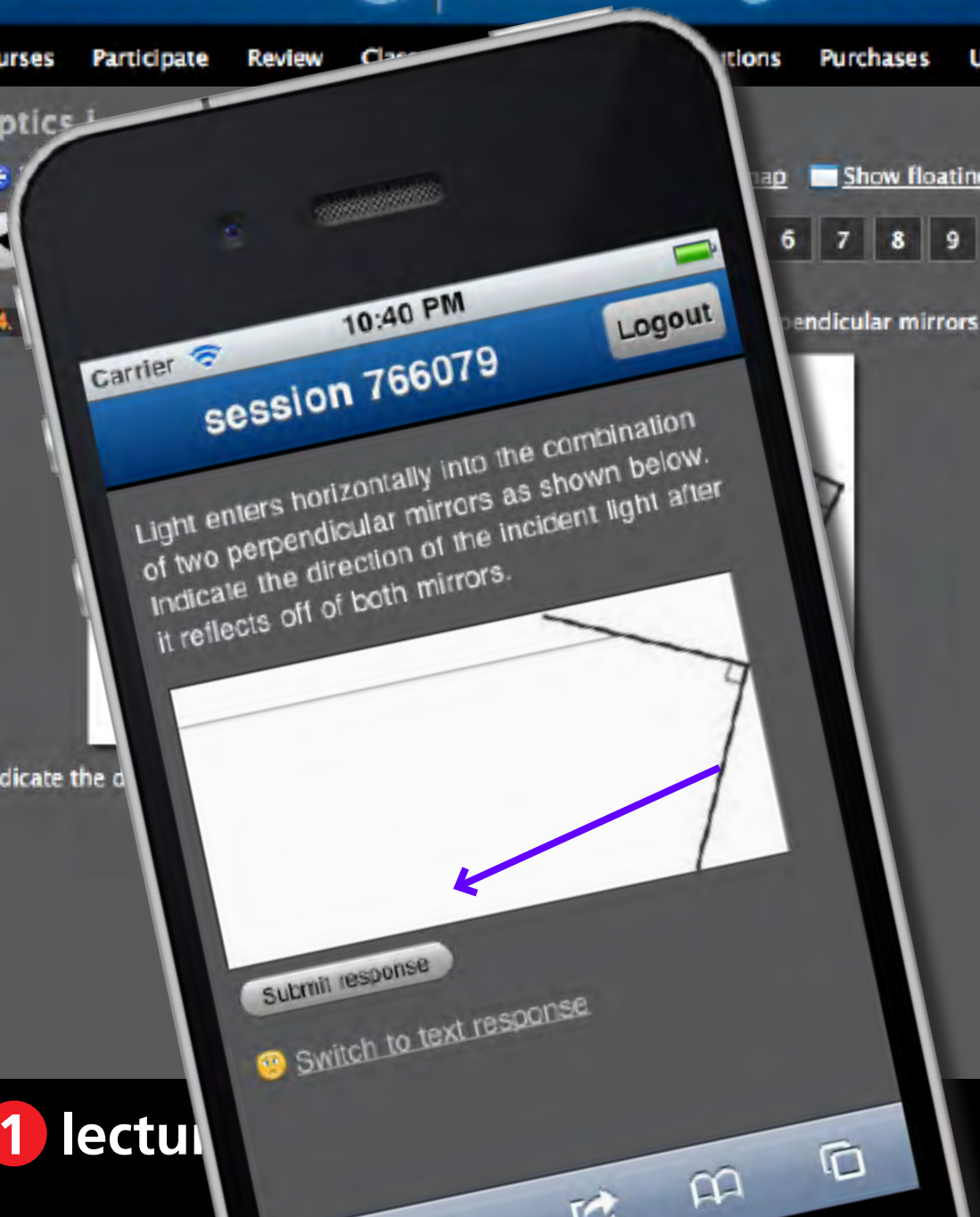

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3 PI 2.0

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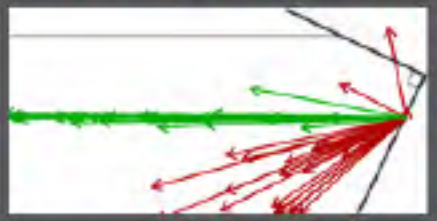
6 7 8 9 10 11 12 13 14 15

endicular mirrors as shown below.

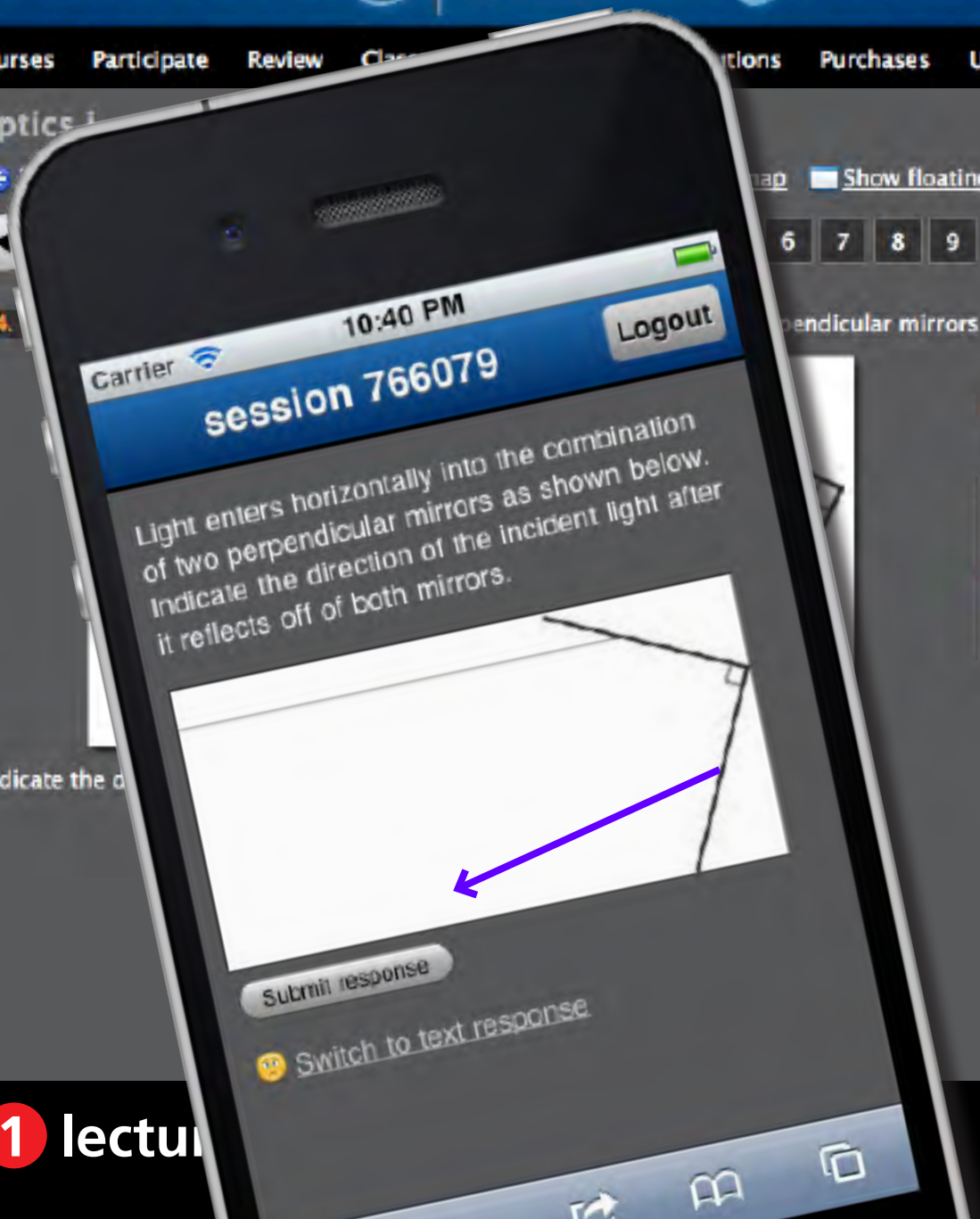
Deliver Show all results

Round 1

57 responses, 58% correct



feedback & support



1 lectu

3 PI 2.0

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current session: 766079 | 69 students

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6 7 8 9 10 11 12 13 14 15

endicular 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

Indicate the d

Carrier 10:40 PM Logout

session 766079

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

1 lectu

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 $x =$

1 lecture 2 PI 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

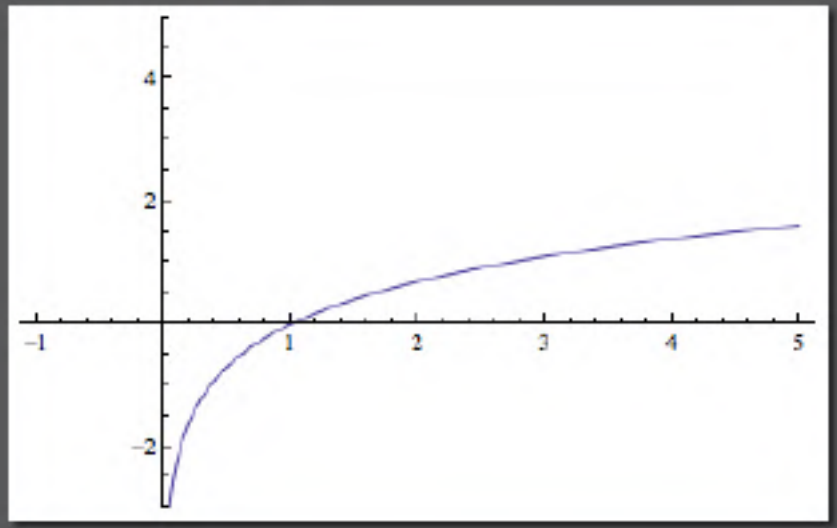
Where is Tanzania?

1 lecture 2 PI 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

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



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

1 lecture

3 PI 2.0


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Users
Tour
Help
This is a graph of $f(x)$ =
Round 1
15 responses
6 get it now
0 still don't get it
Carrier
10:30 PM
Logout
Refresh
session 333281
This is a graph of $f(x) = \ln x$. Sketch a graph of the derivative $f'(x)$.
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

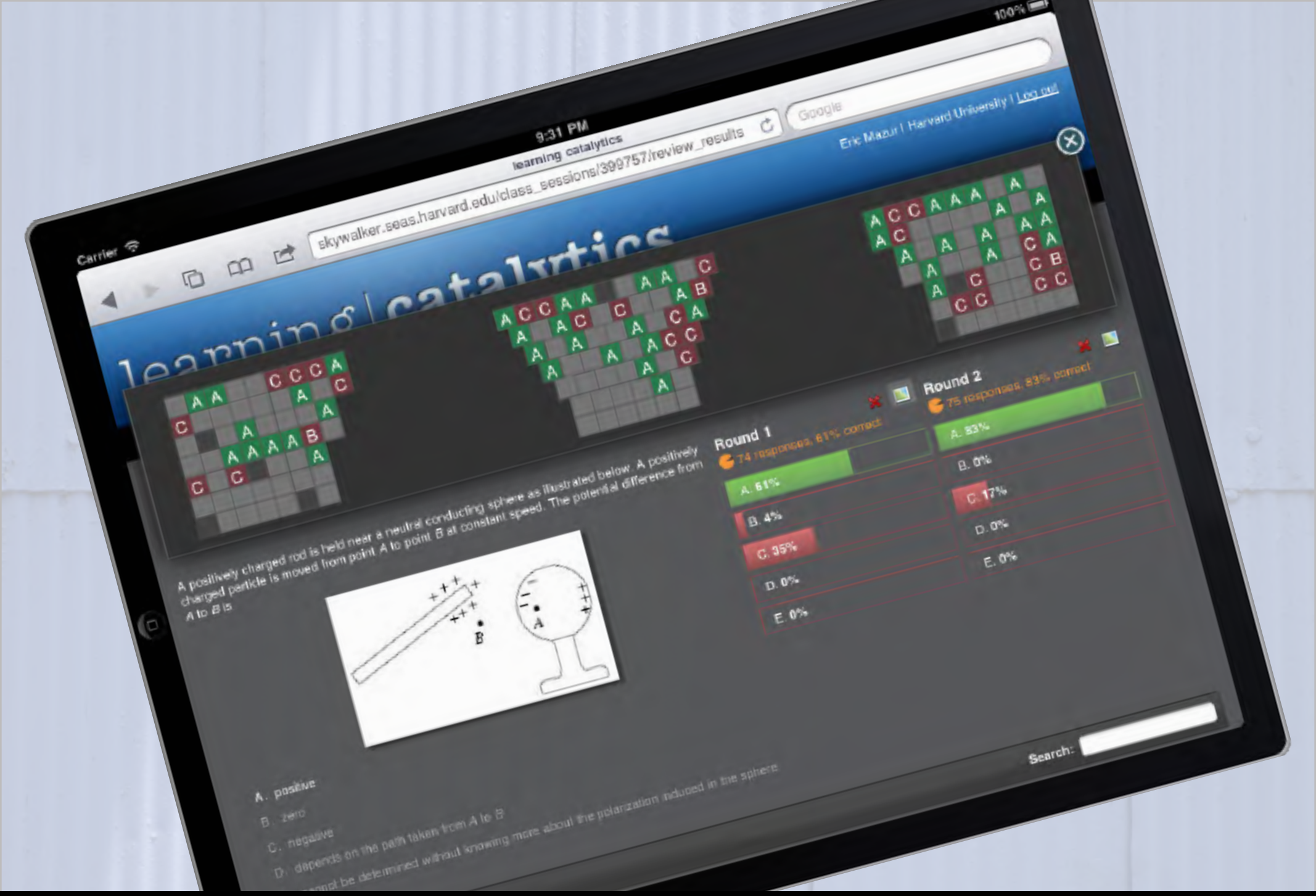
human interaction

1 lecture

2 PI

3 PI 2.0

1 lecture **2** PI **3** PI 2.0

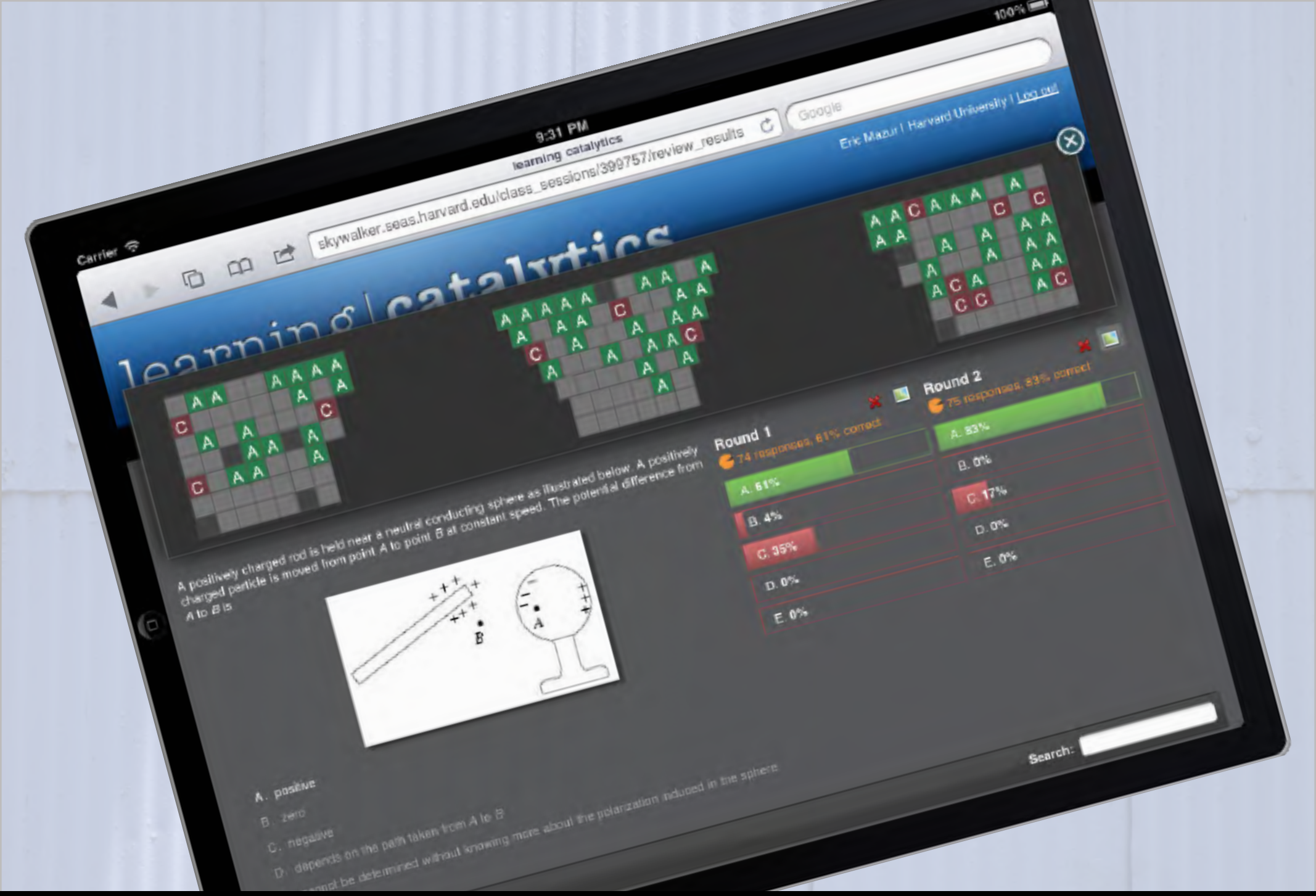


1 lecture

2 PI

3 PI 2.0

1 lecture 2 PI 3 PI 2.0



1 lecture

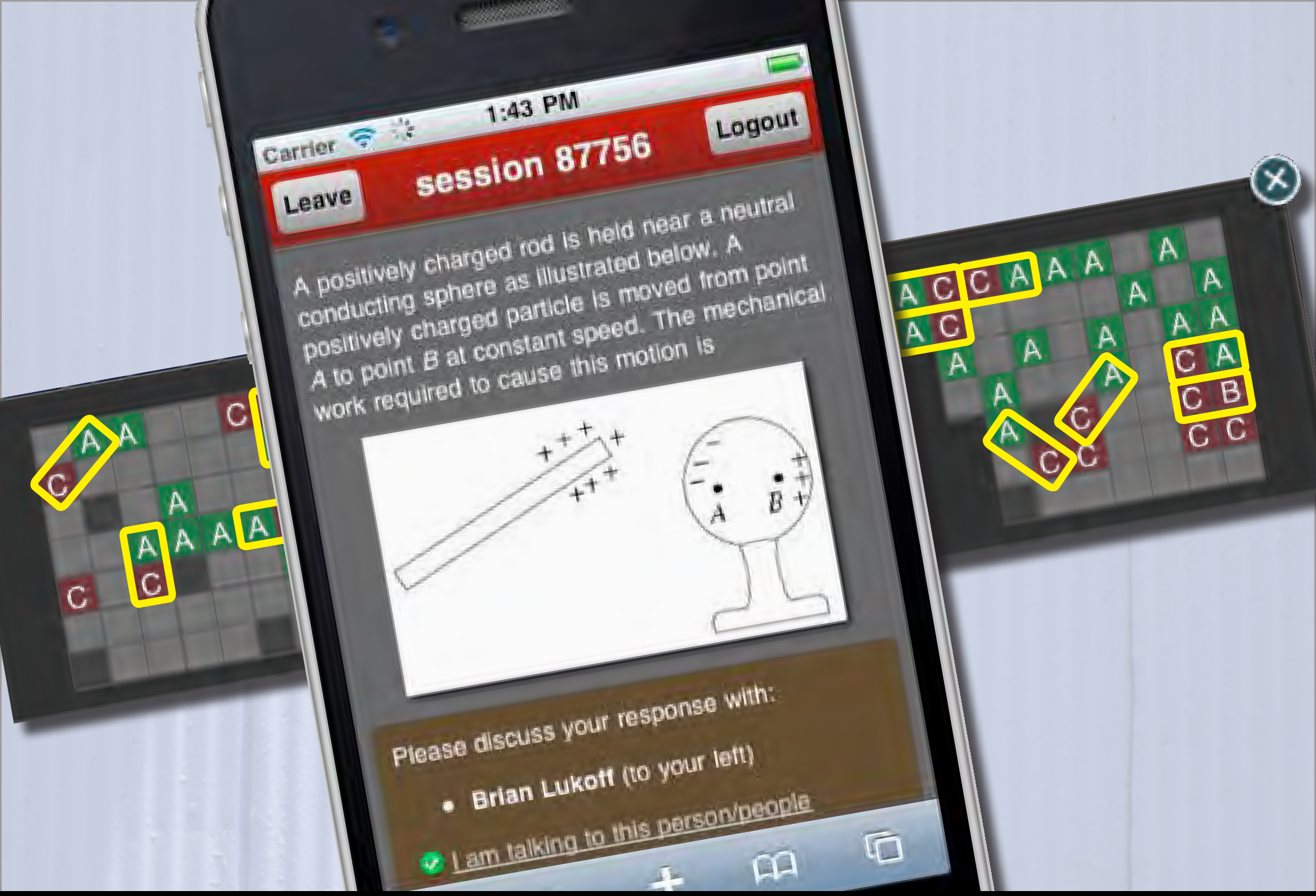
2 PI

3 PI 2.0

let system manage pairing

1 lecture 2 PI 3 PI 2.0

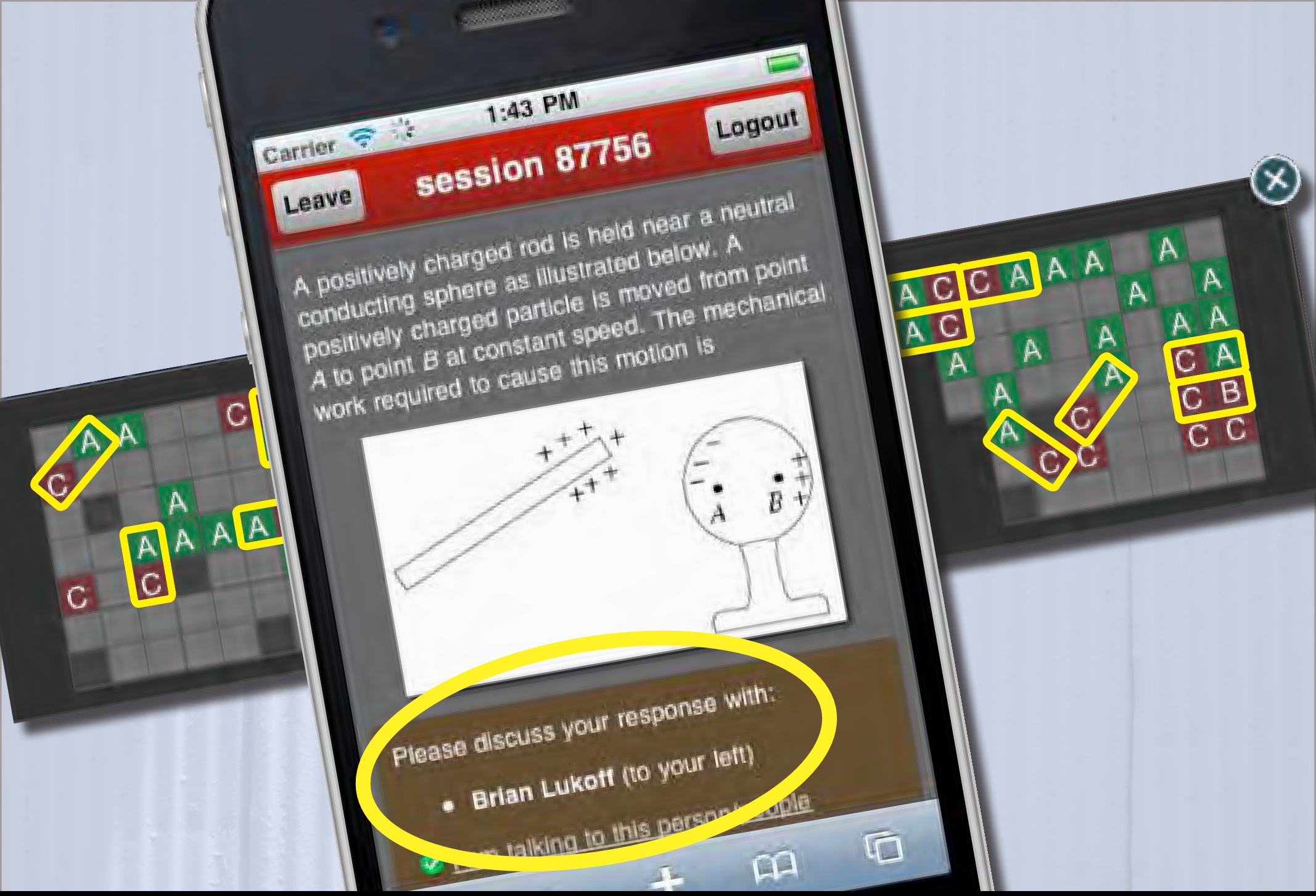
1 lecture 2 PI 3 PI 2.0



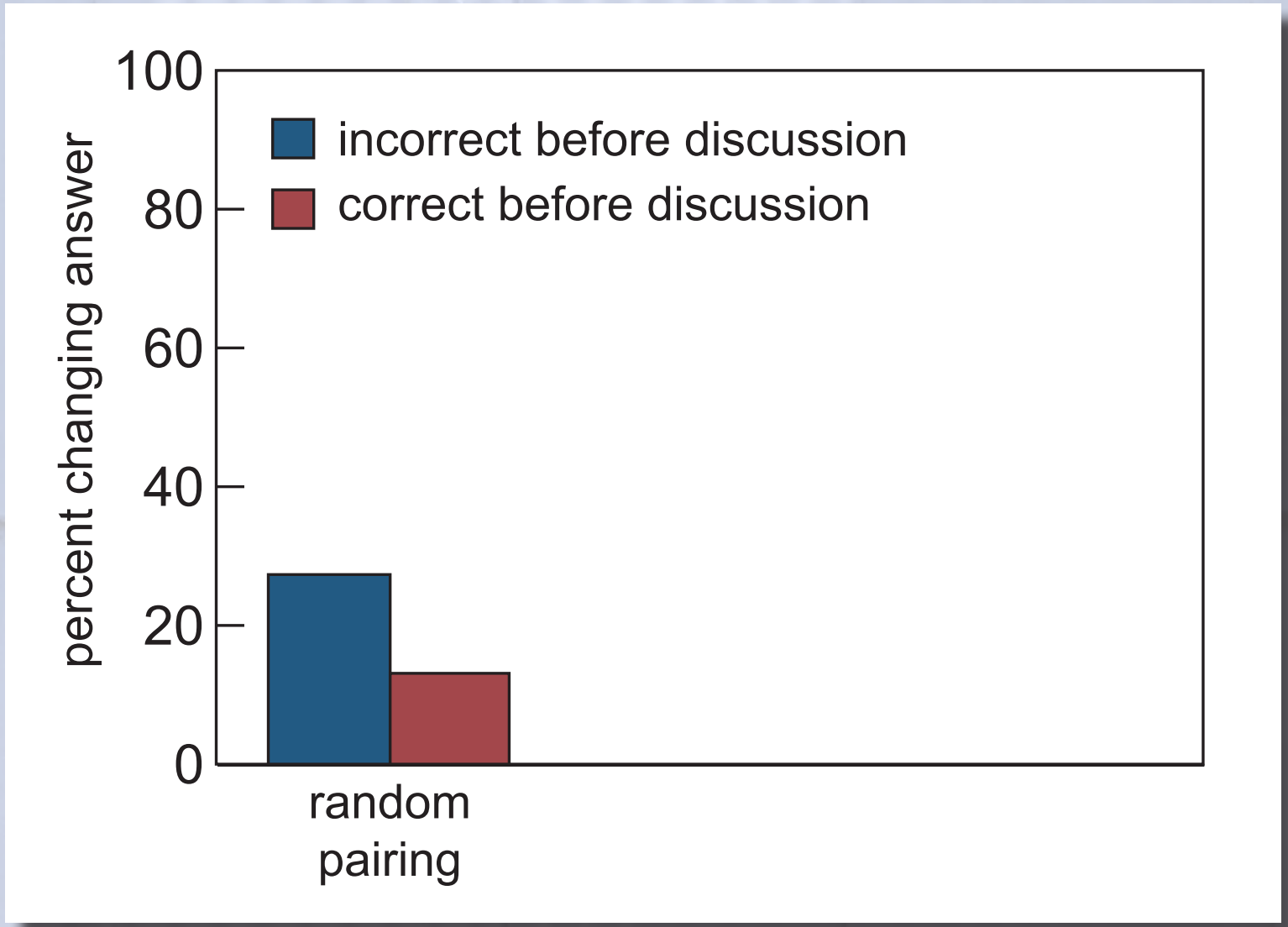
1 lecture

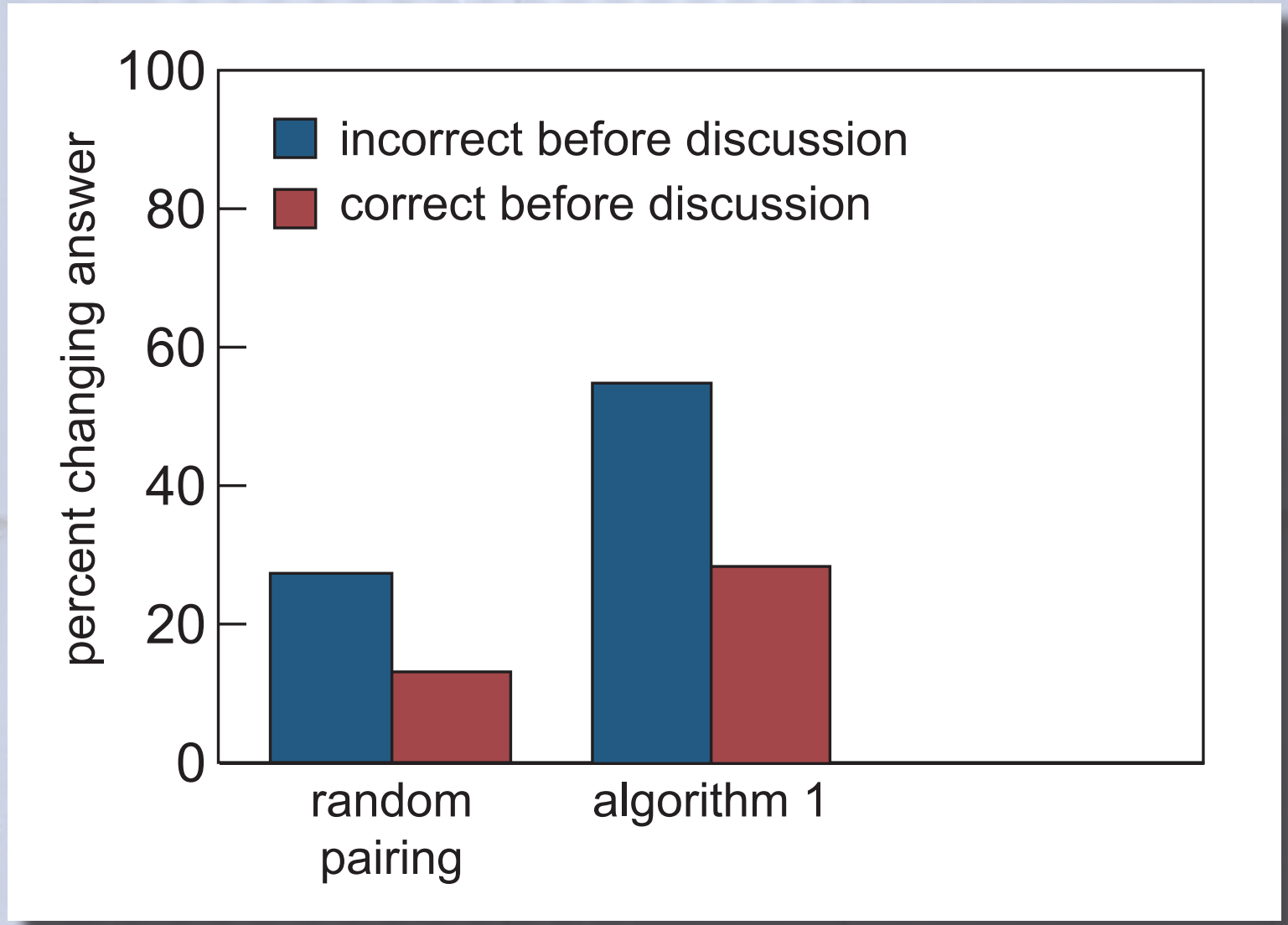
2 PI

3 PI 2.0

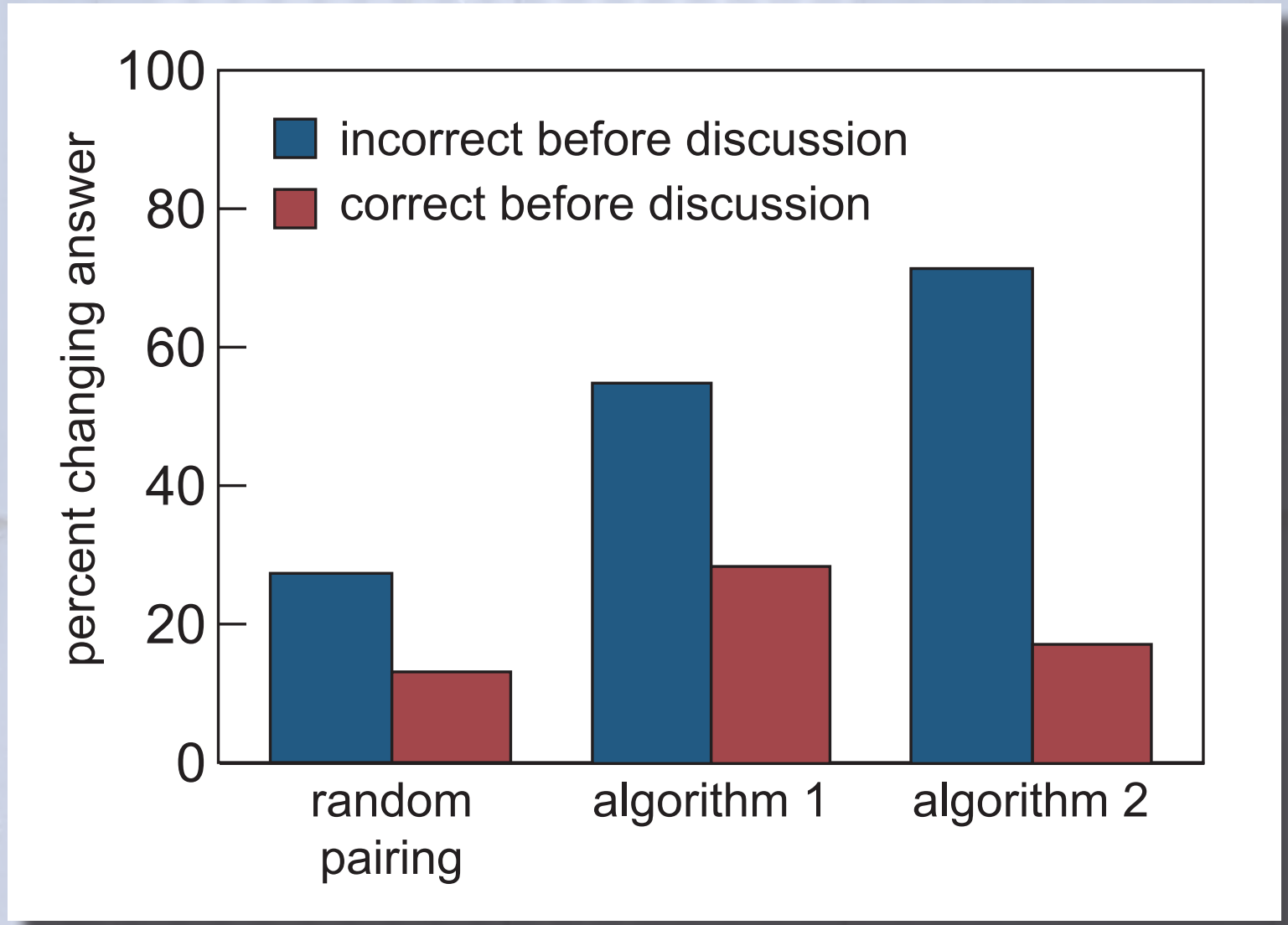


1 lecture 2 PI 3 PI 2.0


100
80
60
40
20
0
percent changing answer
incorrect before discussion
correct before discussion
random
pairing



1 lecture 2 PI 3 PI 2.0



1 lecture 2 PI 3 PI 2.0

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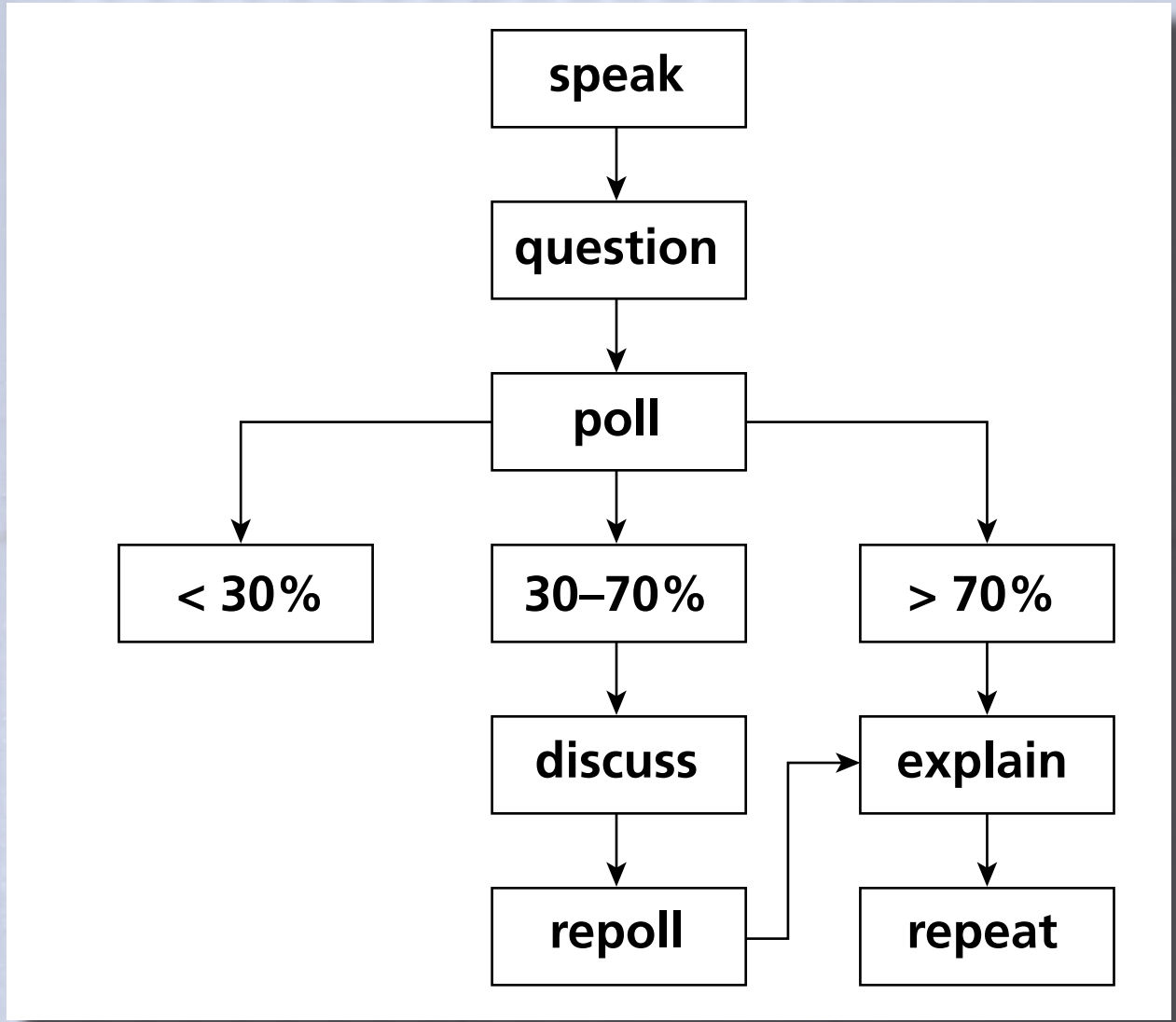
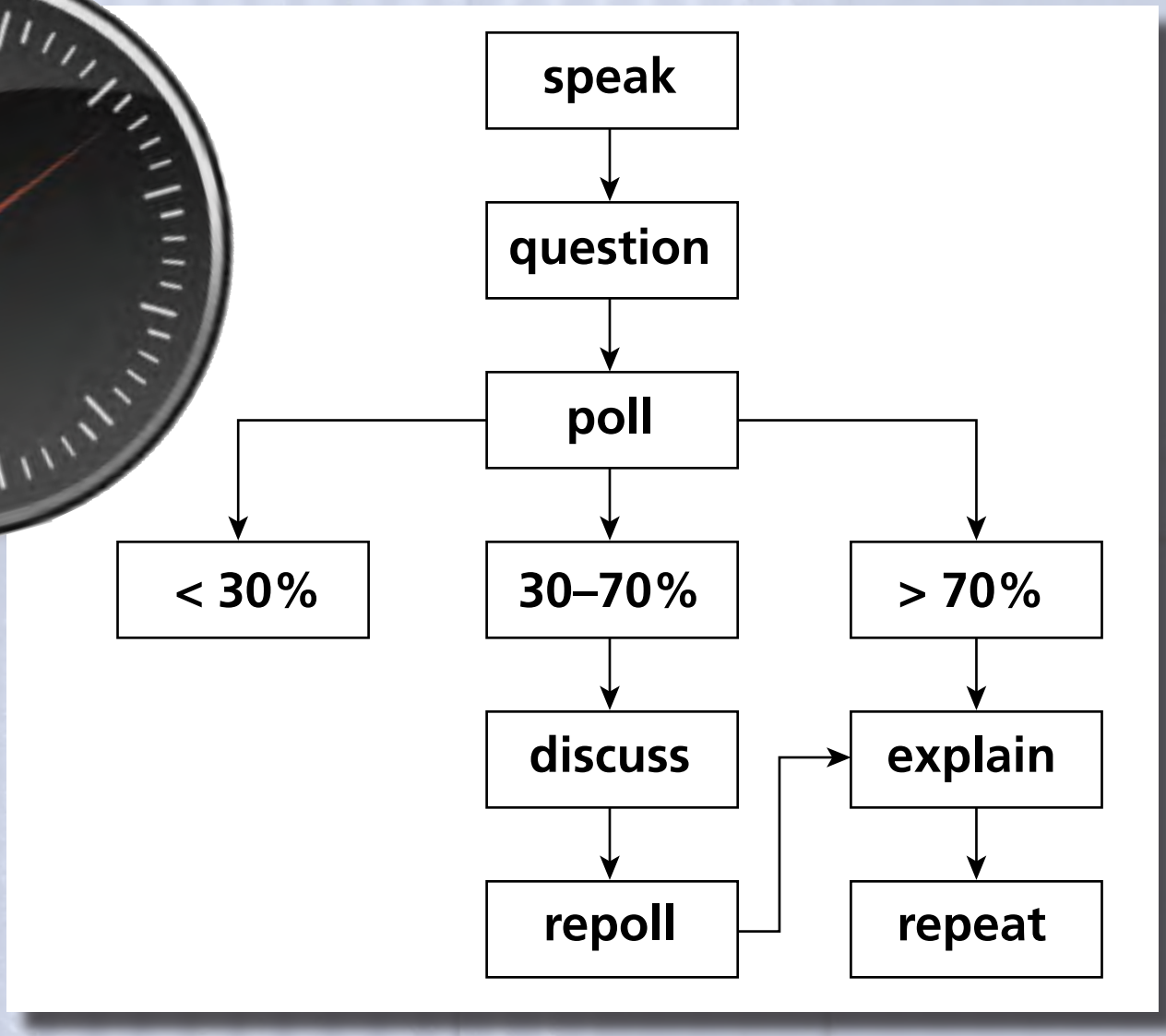


1 lecture 2 PI 3 PI 2.0



1 lecture 2 PI 3 PI 2.0

1 lecture

2 PI

3 PI 2.0

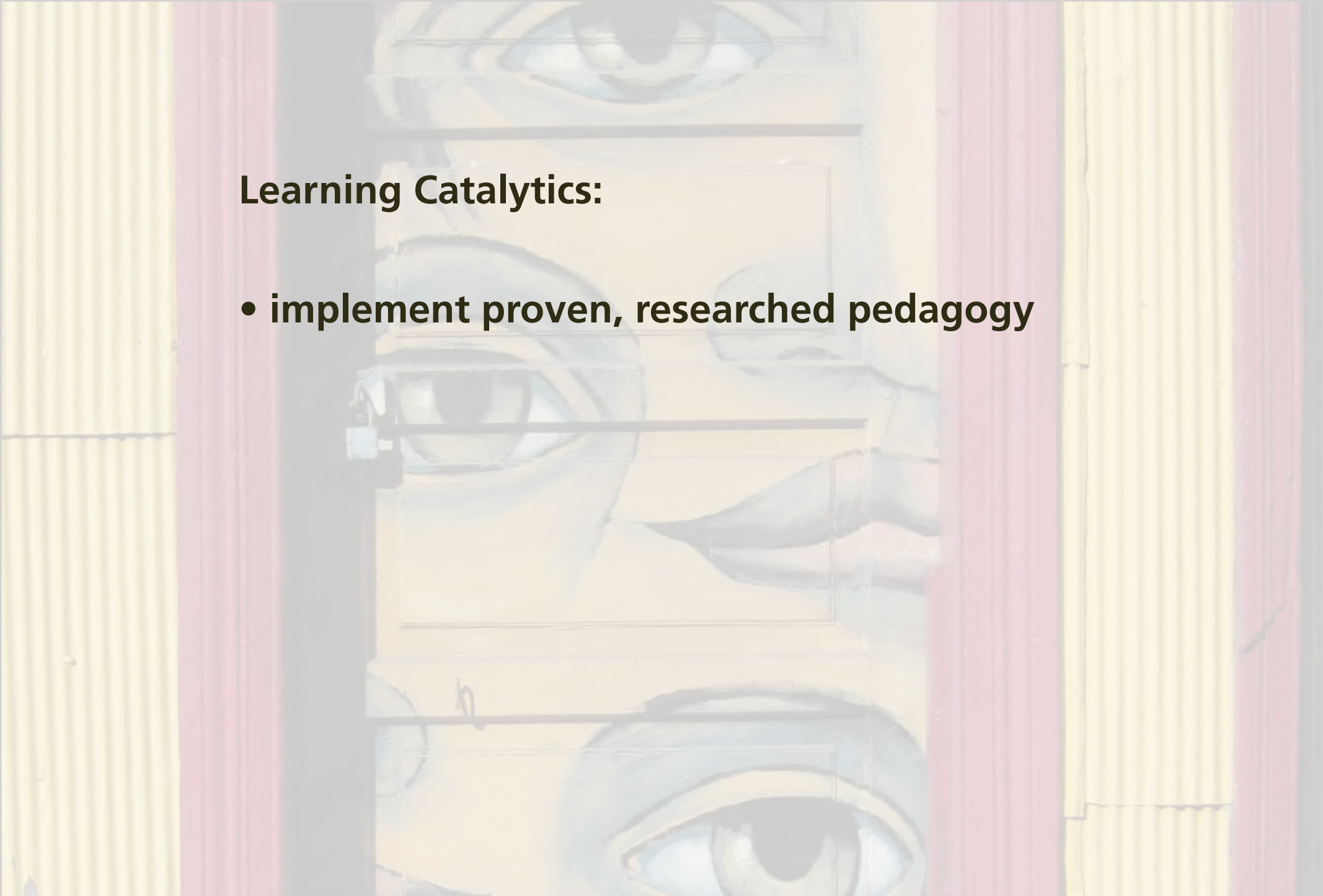
Education is not just about:

- 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*

Many thanks to:

Education Research

Prof. Alvaro Neves
Prof. James Fraser
Dr. Julie Schell
Kelly Miller
Jason Dowd

Learning Catalytics

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Dr. Brian Lukoff

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Dr. Laura Tucker
Dr. Ruonan Li
Ely Spears
Parker Porfolio

Gesture Analysis

Prof. Rachel Scherr
Ryan Smith
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