

The Tyranny of the Lecture



BLC11

Boston, MA, July 27, 2011



The Tyranny of the Lecture



**Want to help
liberate the world?**



The Tyranny of the Lecture



**Want to help
liberate the world?**



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**The classroom of
the future is HERE!**



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The Tyranny of the Lecture



@eric_mazur
#lectyr



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EDUCACION

Think of something you are really good at

EDUCACION

Think of something you are really good at



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Now think how you became good at it



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1 lecture

2 PI



1 lecture

2 PI

3 PI 2.0



1 lecture


2 PI

3 PI 2.0



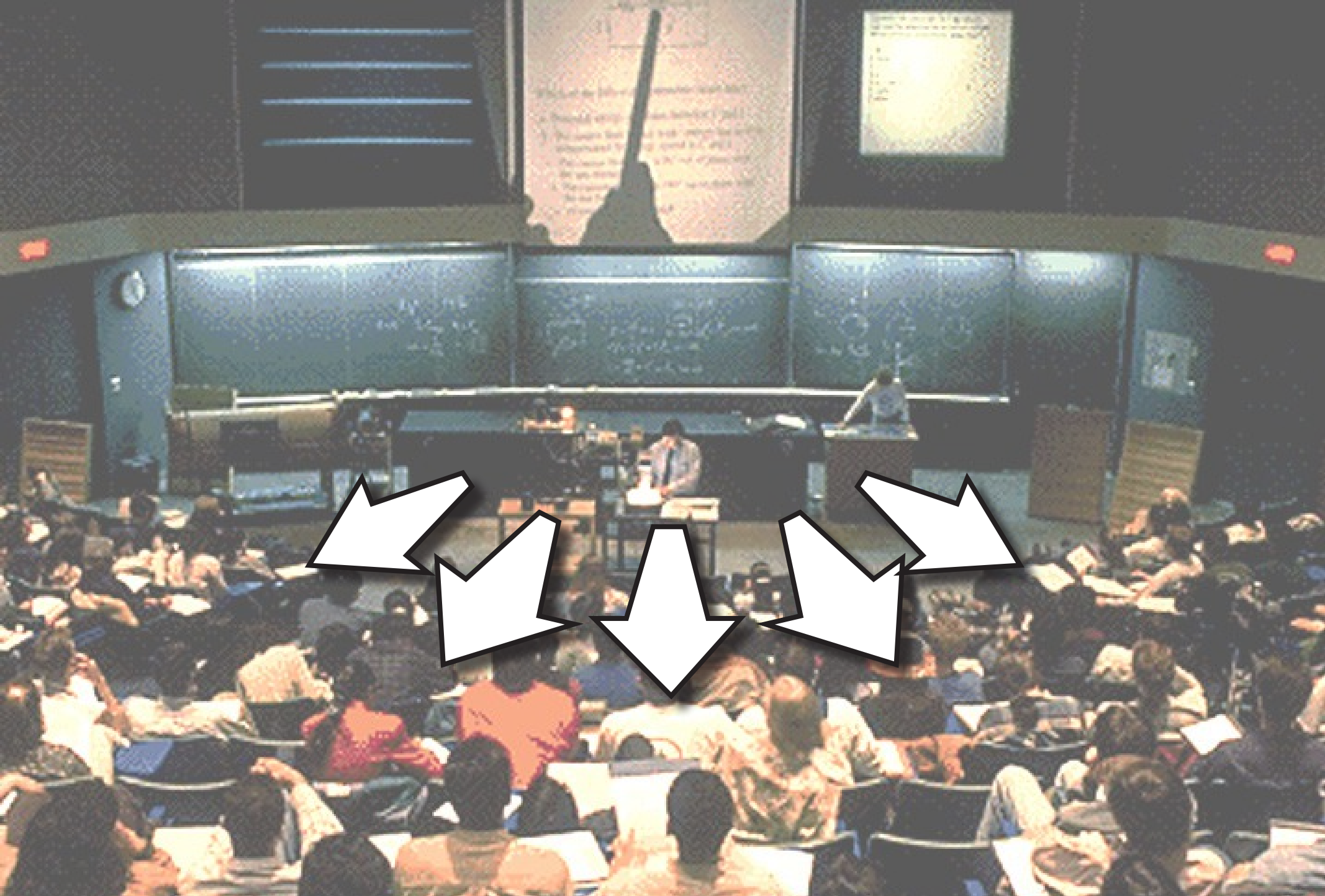






**What happens
in a lecture?**





The result?

EDUCACION

Lack of learning

EDUCACION

Lack of learning

Lack of retention



1 lecture

2 PI



1. transfer of information



1. transfer of information

2. assimilation of that information



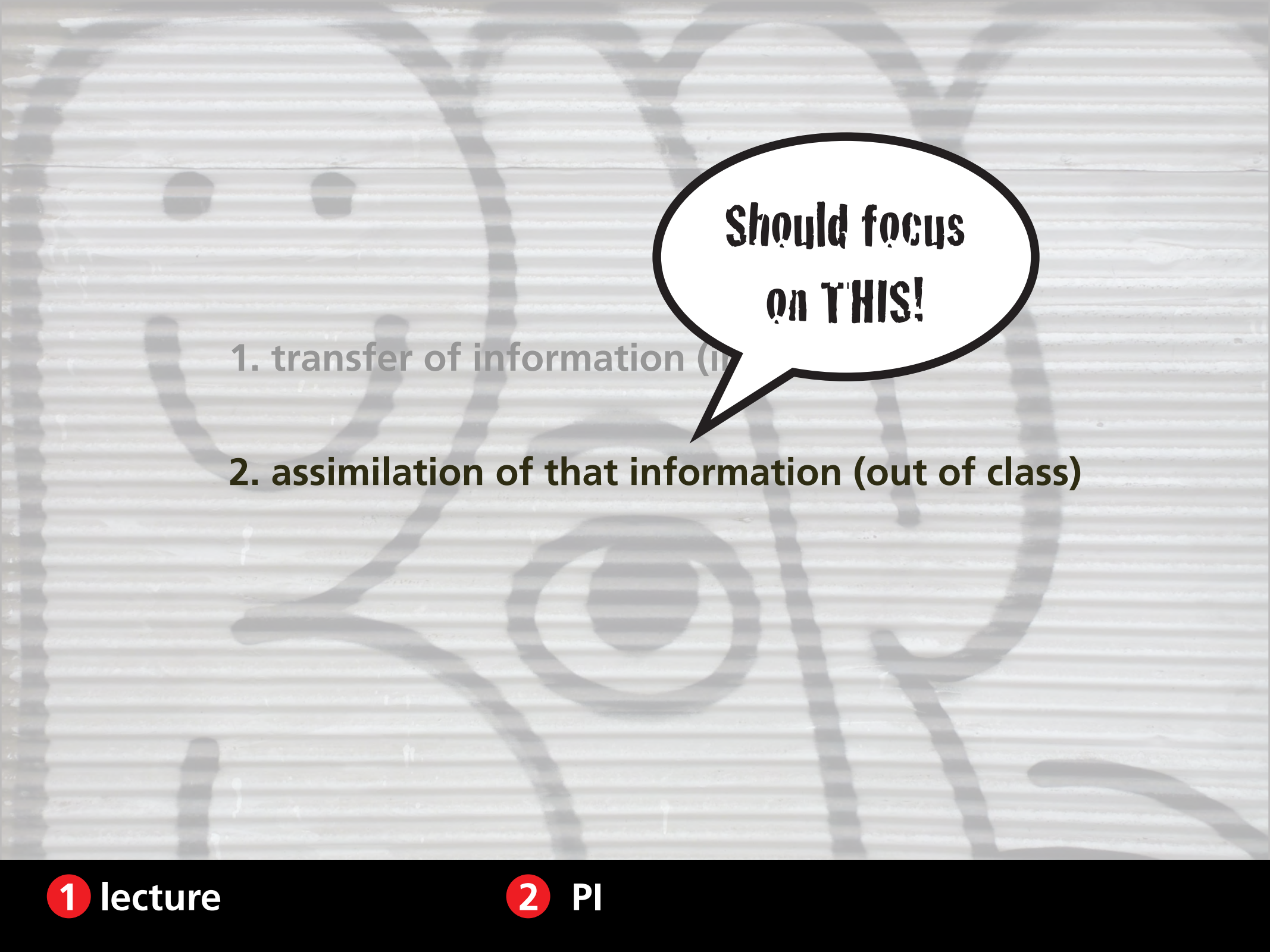
1. transfer of information (in class)

2. assimilation of that information



1. transfer of information (in class)

2. assimilation of that information (out of class)



**Should focus
on THIS!**

1. transfer of information (in)

2. assimilation of that information (out of class)

- 
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. transfer of information (out of class)

2. assimilation of that information (in class)

A photograph of a man in a grey checkered suit and red tie leaning over a green lecture hall chair to assist a woman with blonde hair in a black jacket. The woman is seated, and the man is looking down at something in her hands. Other people are visible in the background, some seated and some standing. The setting appears to be a lecture hall or a similar educational environment.

question



question



think



question



think



poll



question



think



poll



discuss



question



think



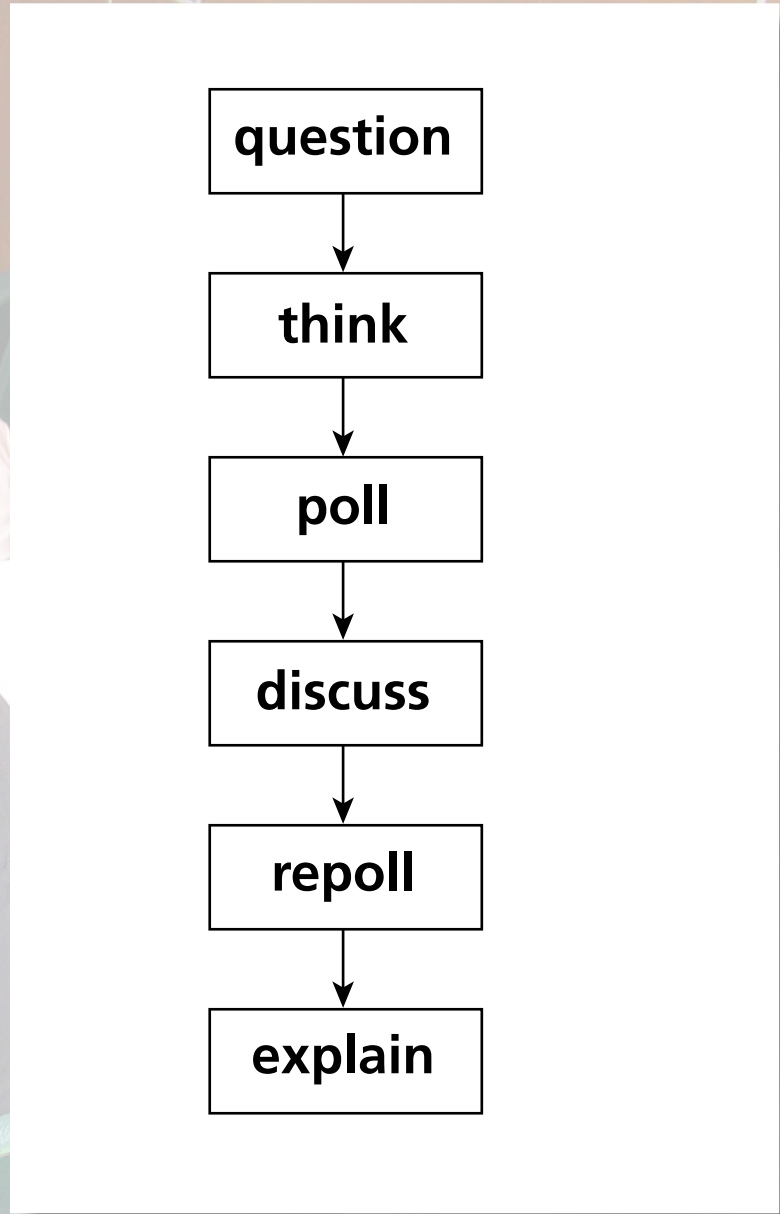
poll

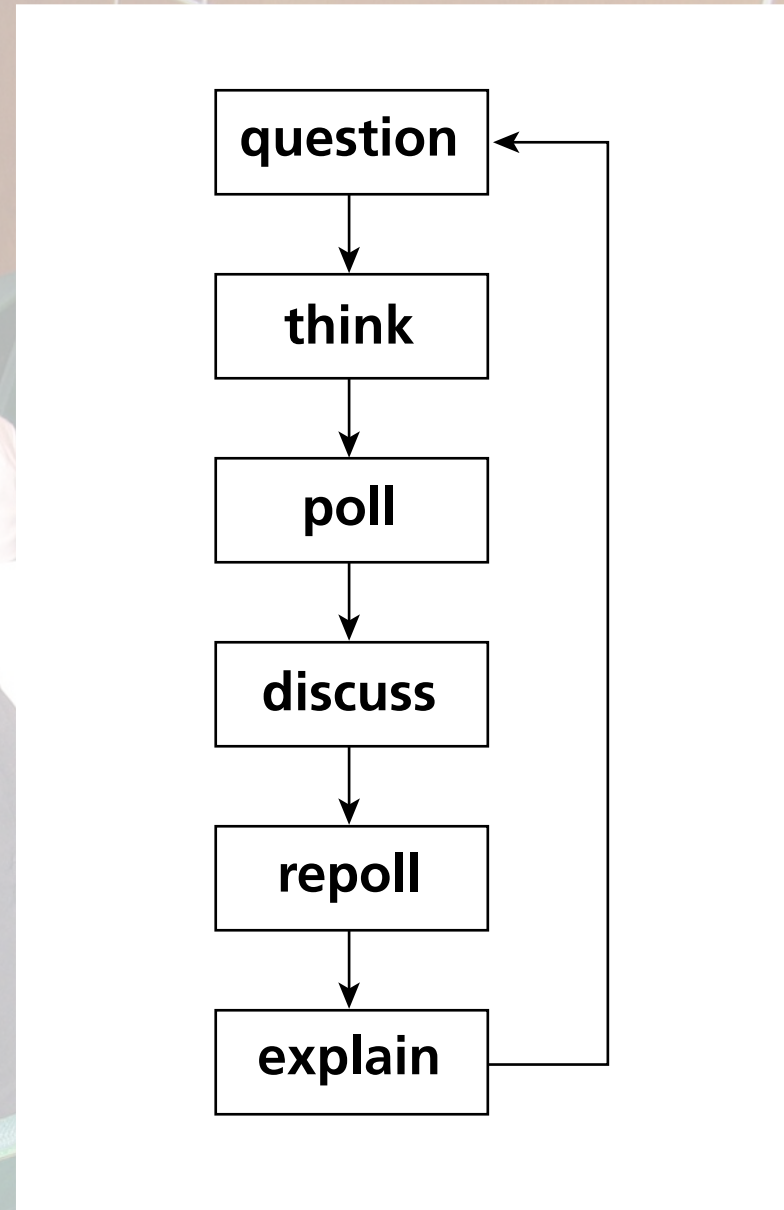


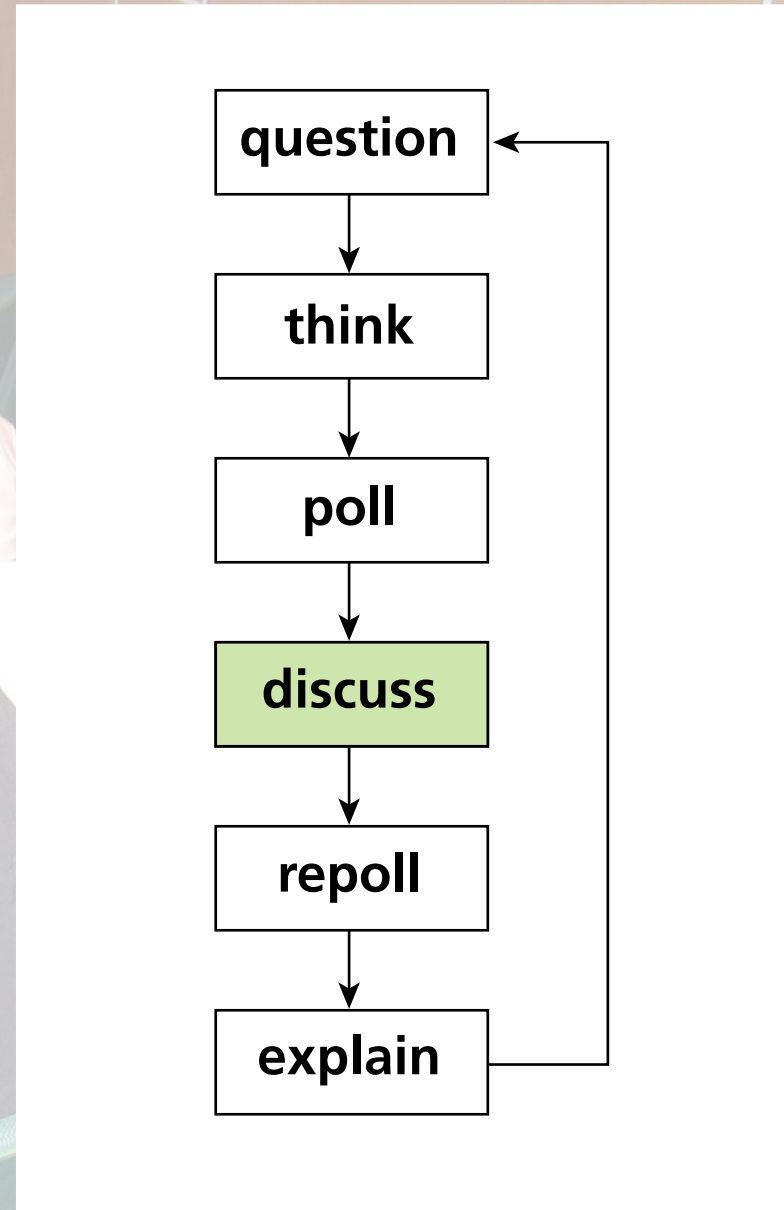
discuss



repoll







1 lecture

2 PI



Peer

INSTRUCTION

1 lecture

2 PI

Speak

speak



question

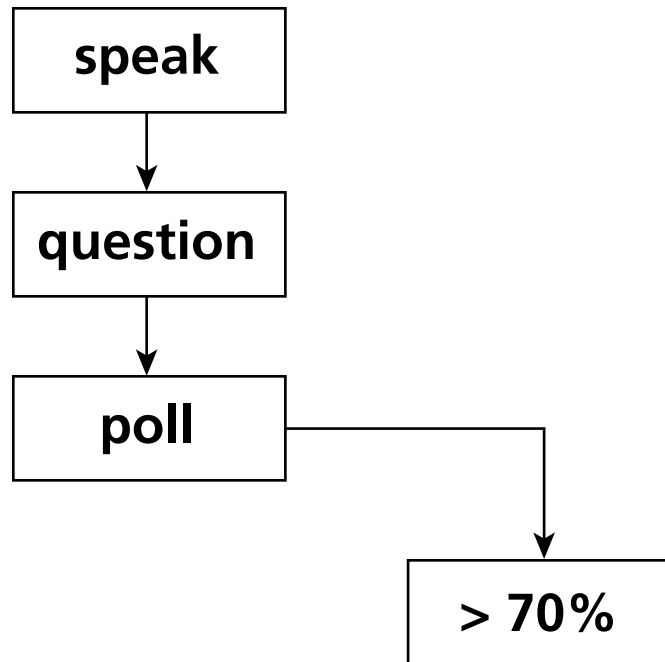
speak

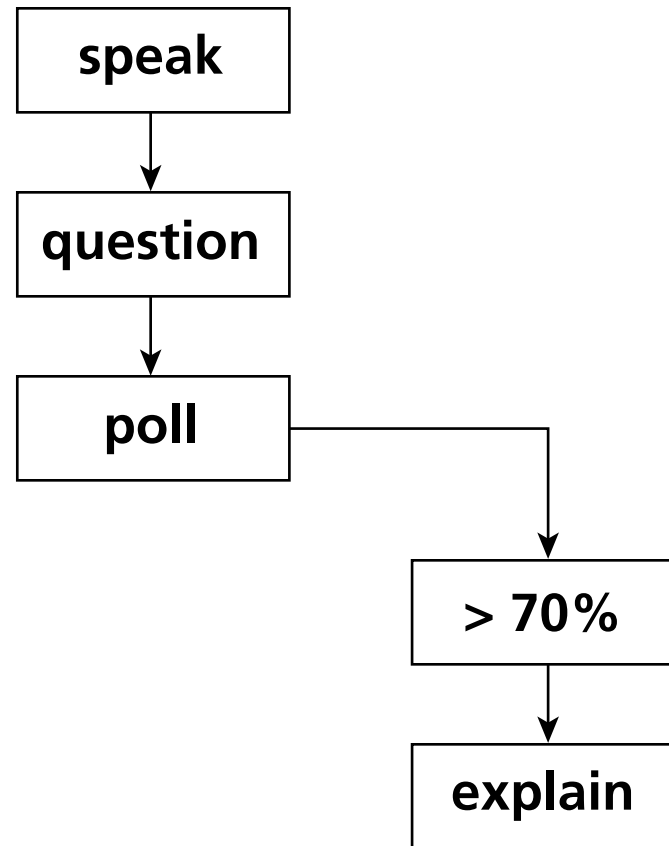


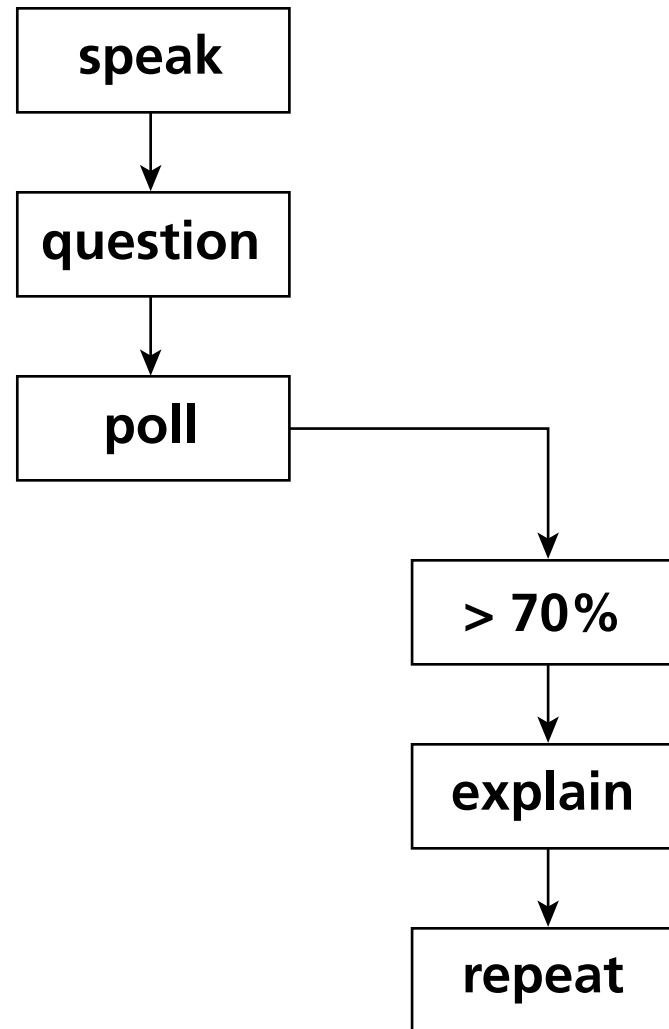
question

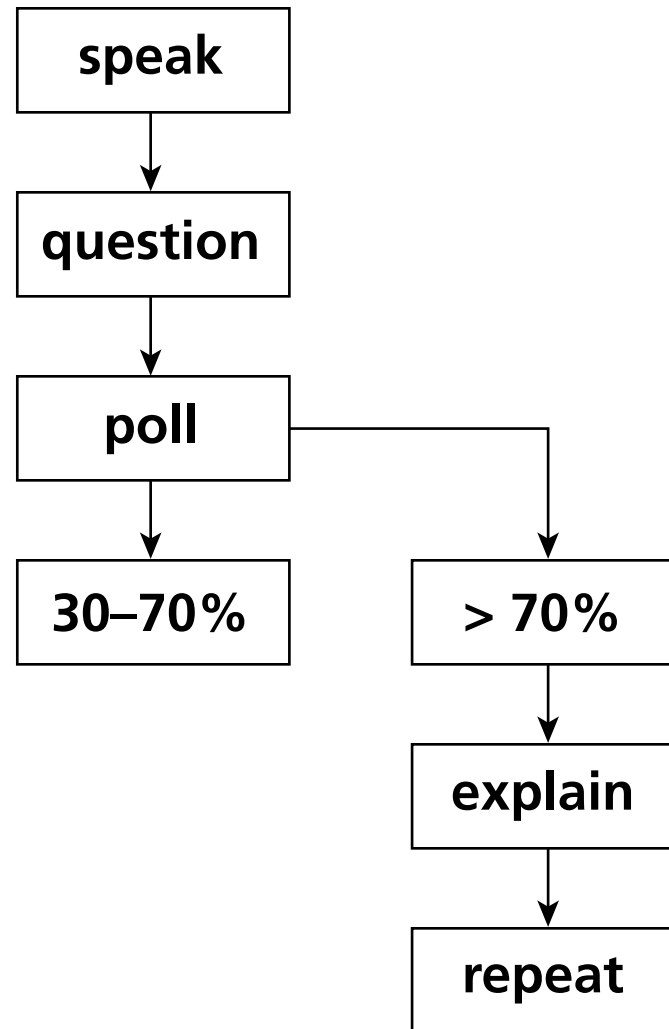


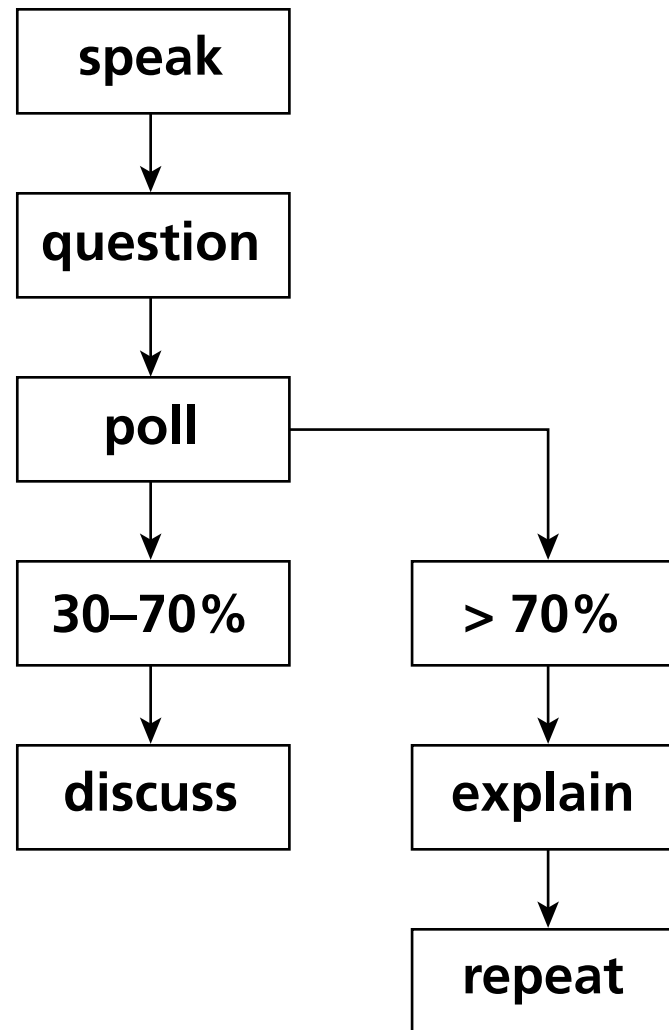
poll

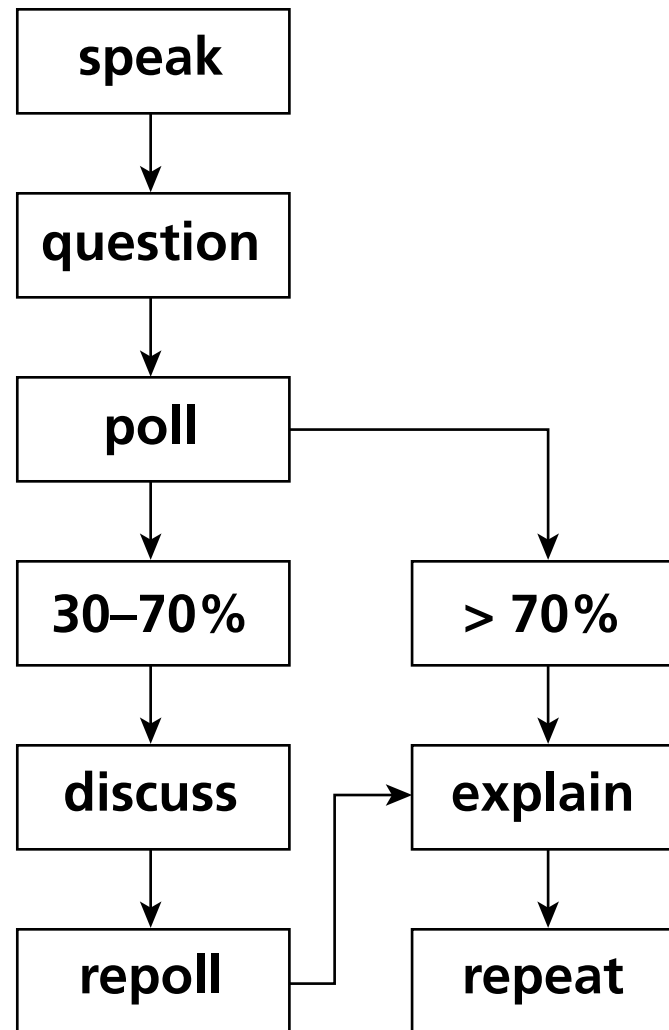


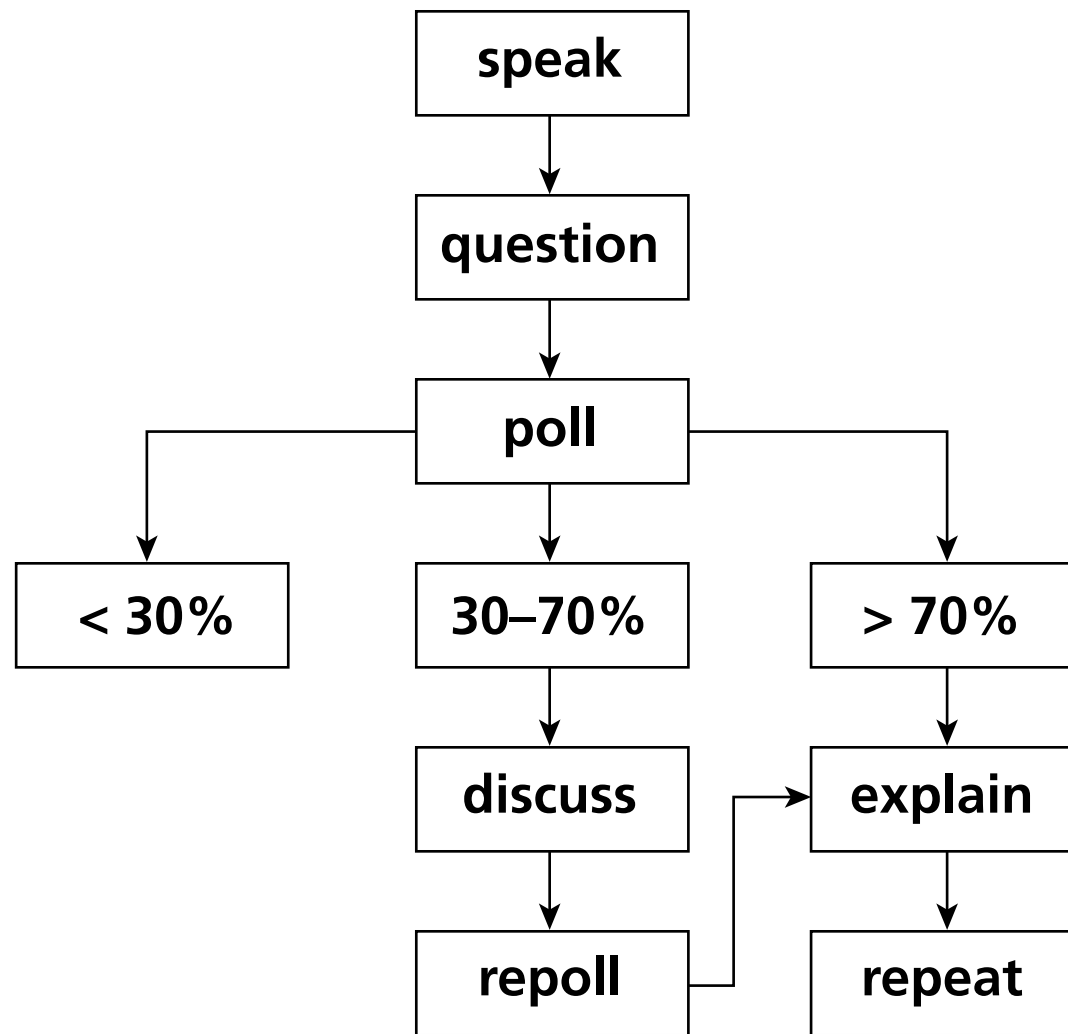


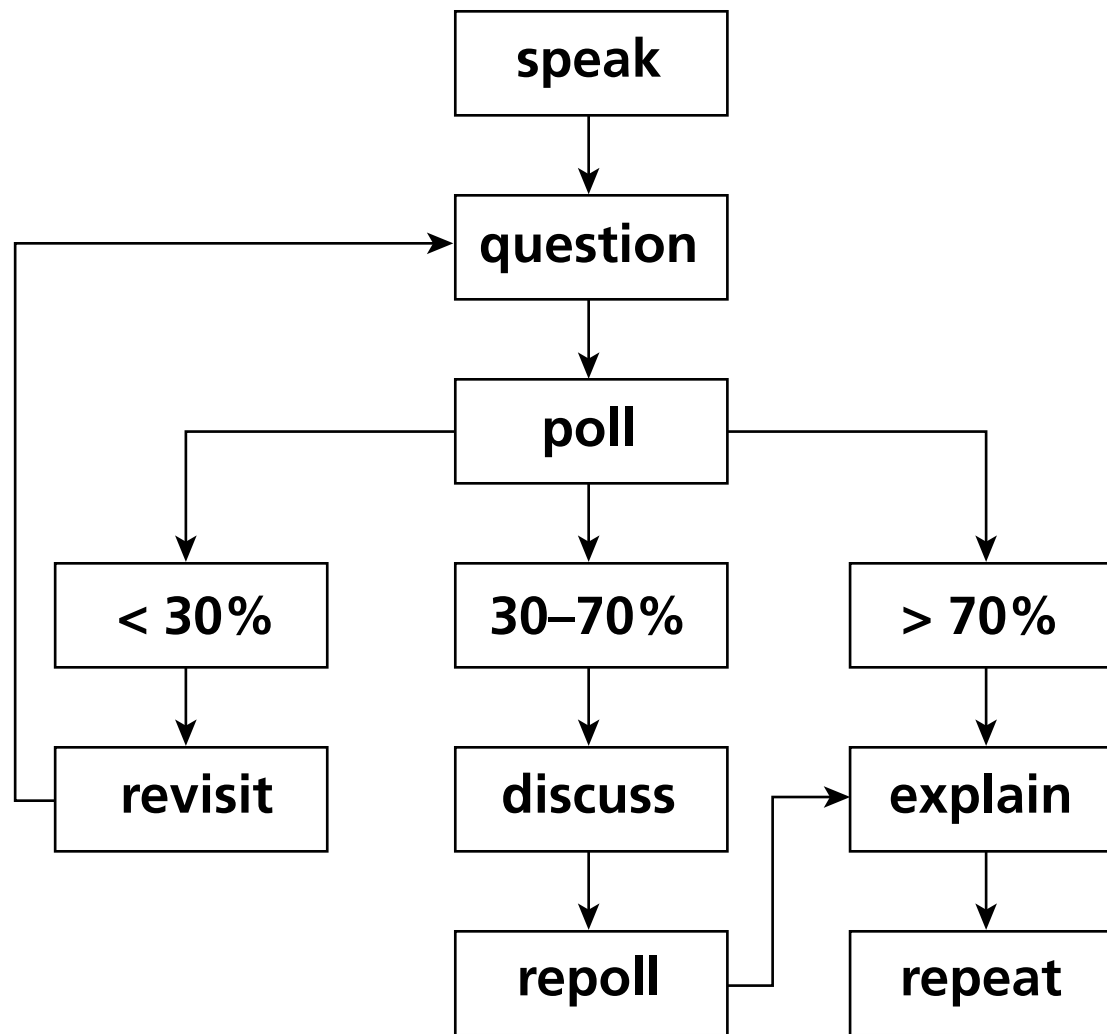


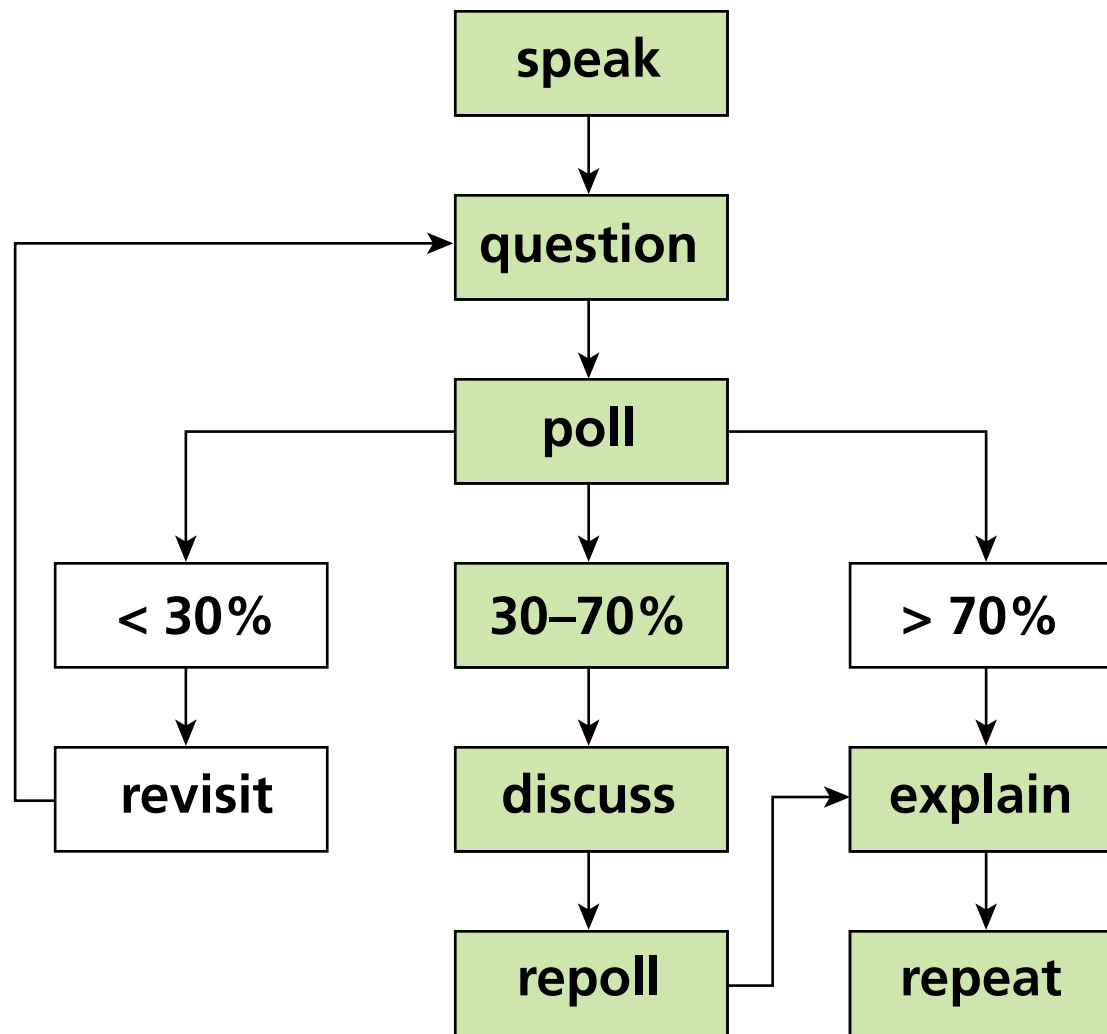








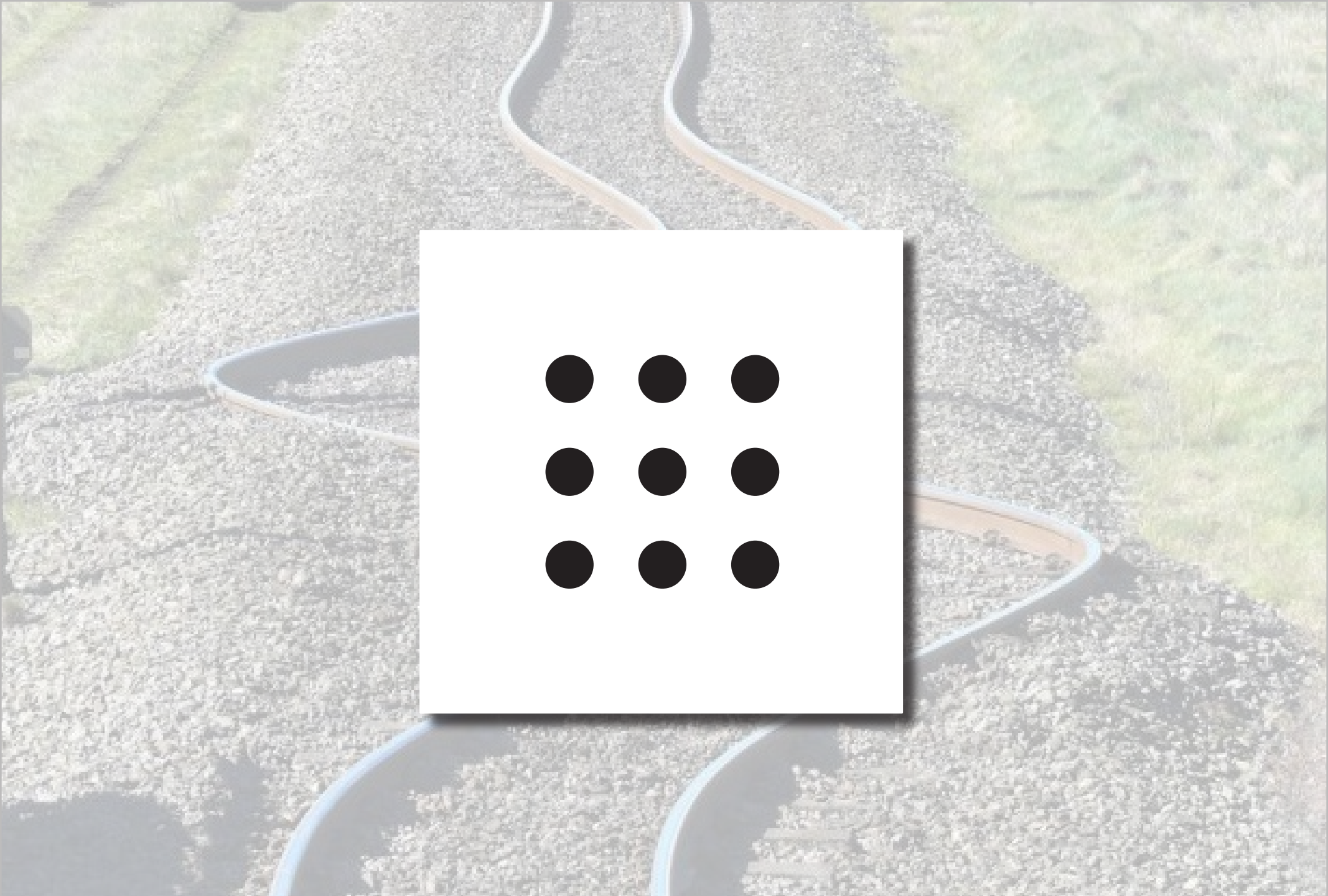


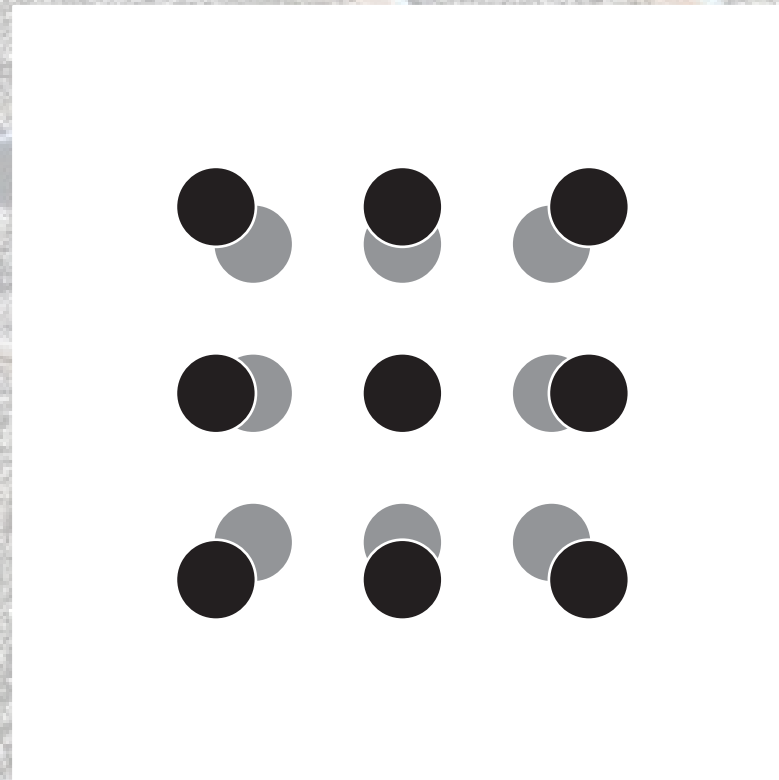




An aerial photograph of a railway track that has been laid out in a series of sharp, wavy curves. The track is composed of wooden sleepers and metal rails, resting on a bed of dark gravel. The surrounding area is covered in green grass. The text "thermal expansion" is written in a bold, black, sans-serif font across the middle of the track, illustrating the concept of thermal expansion in engineering.

thermal expansion





all of them



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



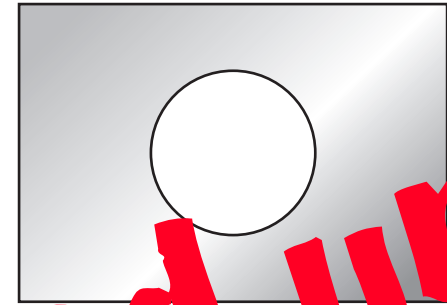
Consider a rectangular metal plate with a circular hole in it.



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

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

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.

you got all fired up!

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.**

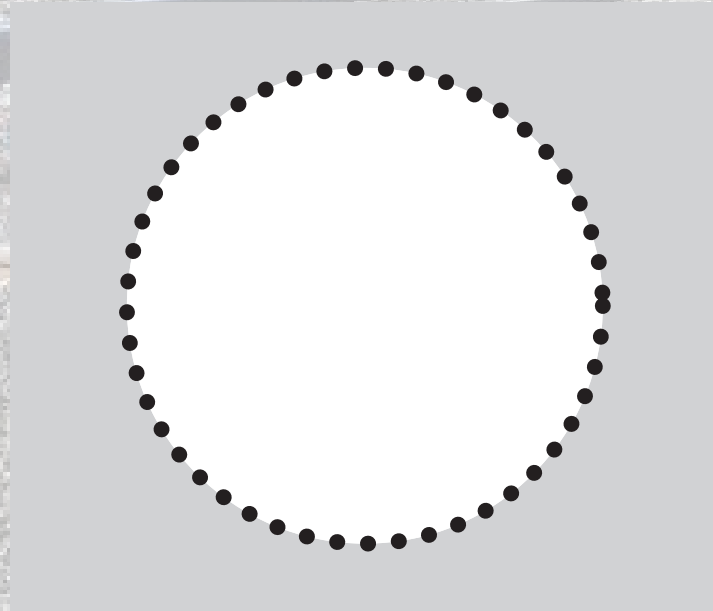
Consider a rectangular metal plate with a circular hole in it.



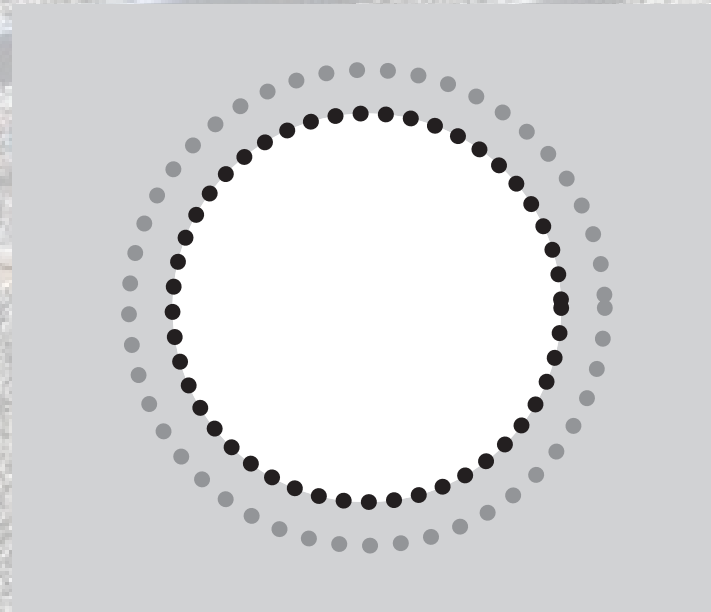
When the plate is uniformly heated, the diameter of the hole

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

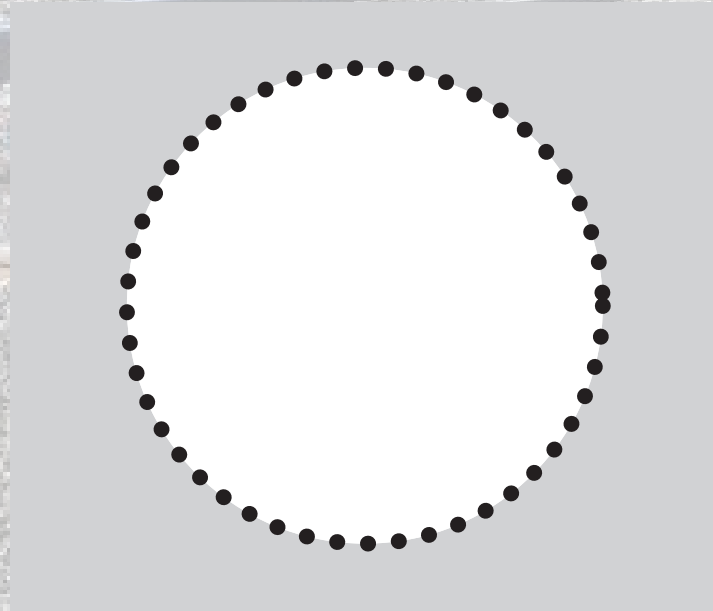
consider atoms at rim of hole



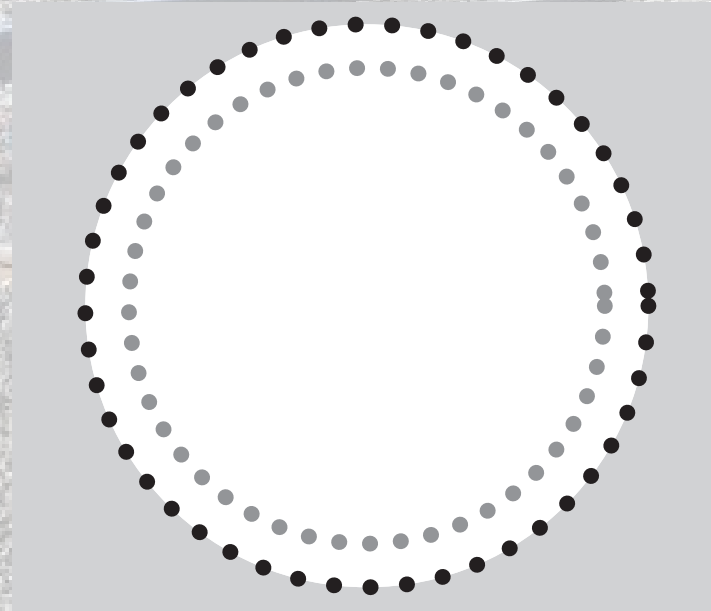
consider atoms at rim of hole



consider atoms at rim of hole



consider atoms at rim of hole



consider atoms at rim of hole

you won't forget this


Peer



back to PI



INSTRUCTION





Peer

INSTRUCTION

1 lecture

2 PI



Peer

Higher learning gains

INSTRUCTION

1 lecture

2 PI

The background features a large, light blue word 'Peer' with a dashed yellow line forming a circle around the 'ee'. Below it, the word 'INSTRUCTION' is written in a light blue, sans-serif font. Two red, bold, italicized phrases are overlaid: 'Higher learning gains' and 'Better retention'. A dashed yellow line with arrows connects the 'ee' in 'Peer' to the 'B' in 'Better', and another dashed yellow line with arrows connects the 'IN' in 'INSTRUCTION' to the 'H' in 'Higher'.

Higher learning gains

Better retention

INSTRUCTION



1 lecture

2 PI

3 PI 2.0

feedback

1 lecture

2 PI

3 PI 2.0



1991

1 lecture

2 PI

3 PI 2.0



1993



1998





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

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**

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- 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, and individual would need all but which of the following:
- a. business model
 - b. depreciation?

extensible plug-in architecture for question types

Sample question types:

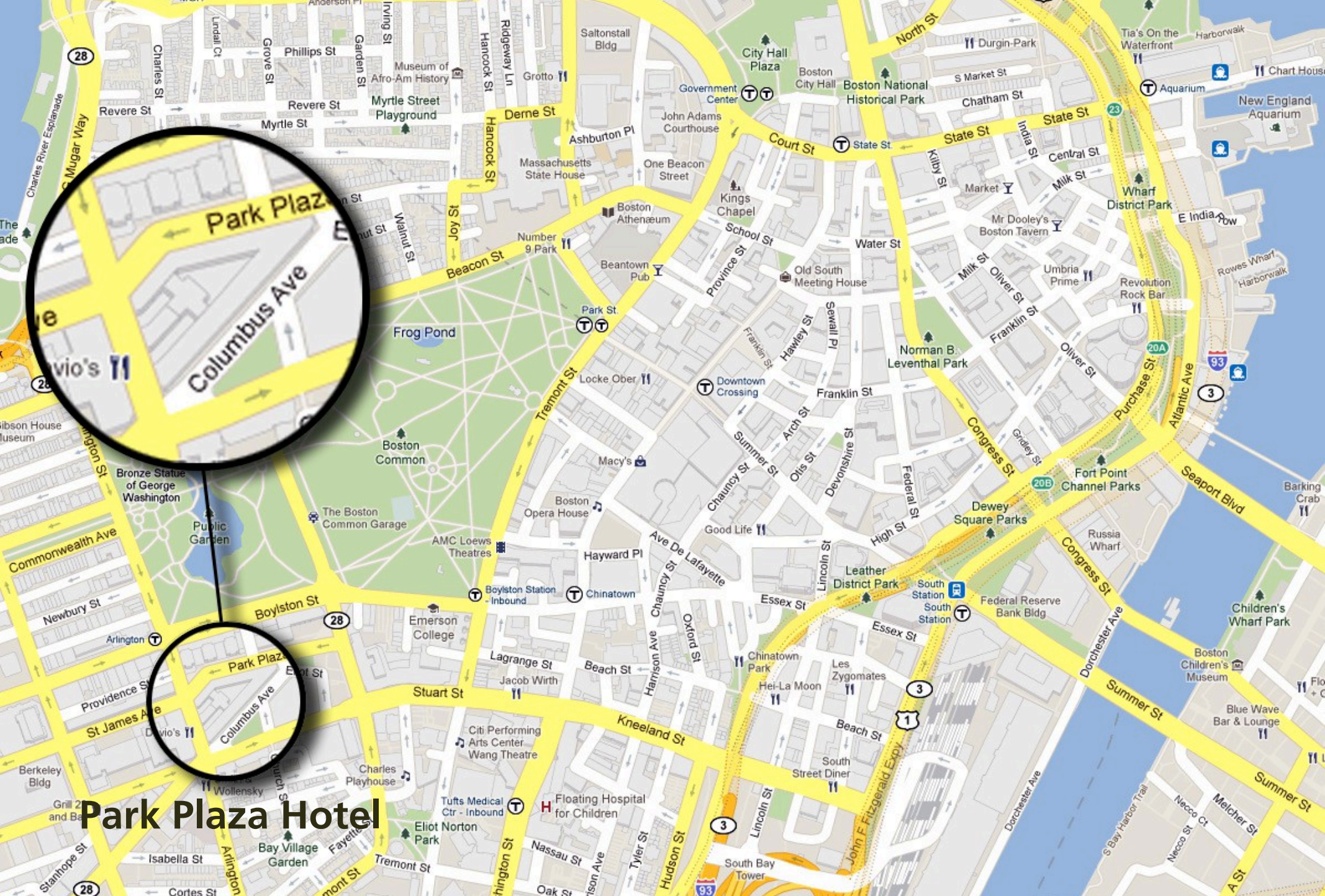
- direction
- expression
- long answer, short answer, word cloud (fill in text)
- multiple-choice, many-choice
- numerical (enter a number)
- ranking
- region (select point on image)
- sketch

Sample question types:

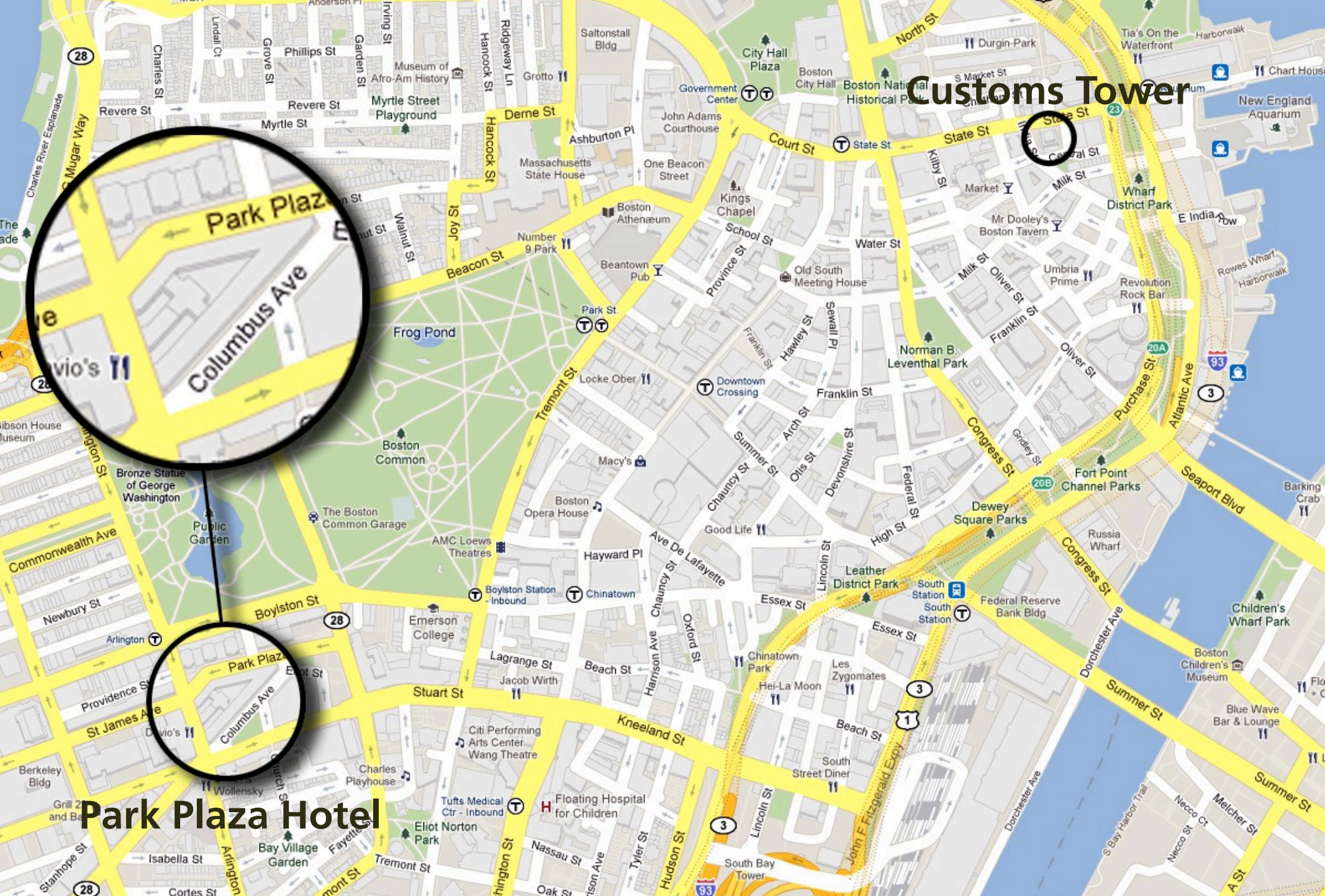
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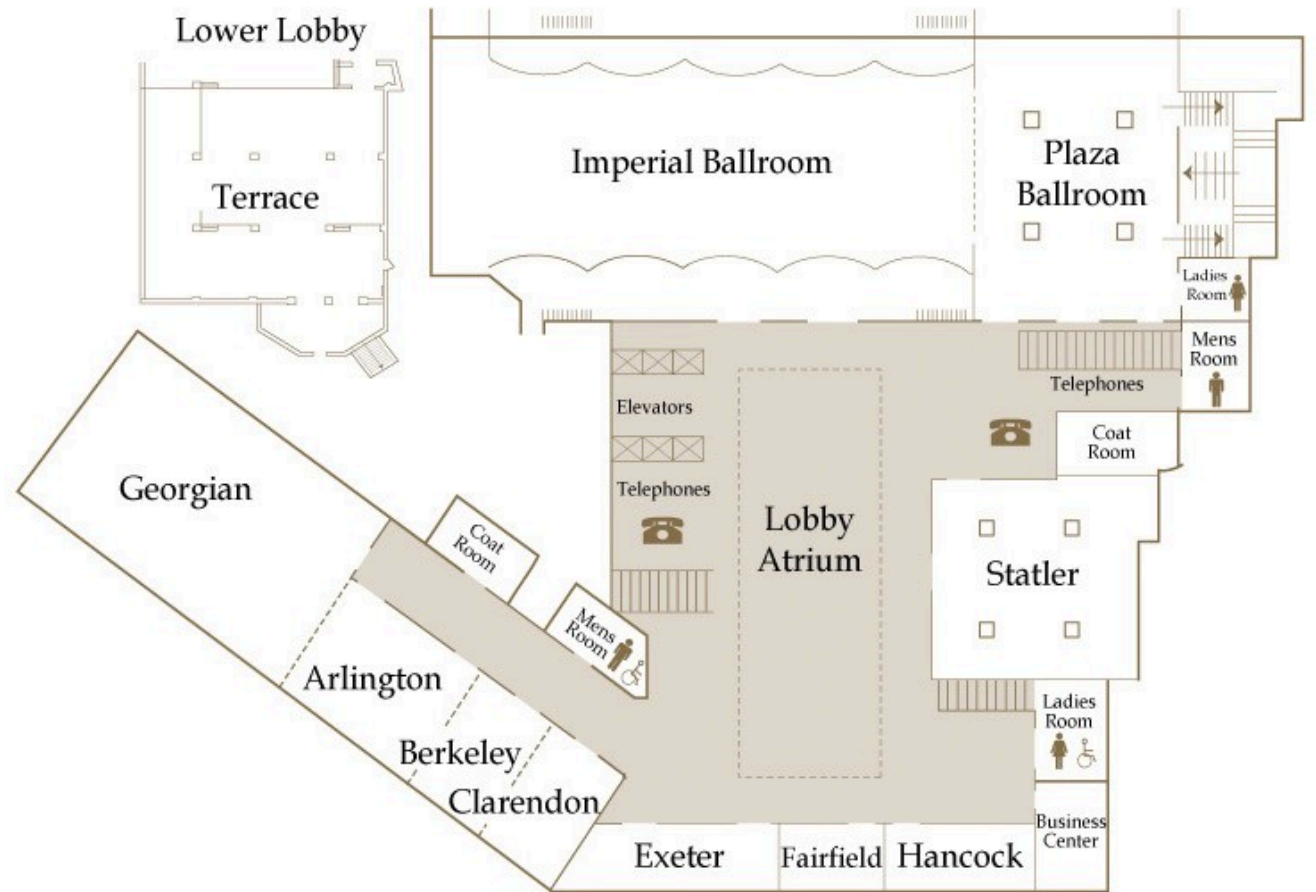


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Customs Tower



Park Plaza Hotel



Sample question types:

- direction
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- sketch

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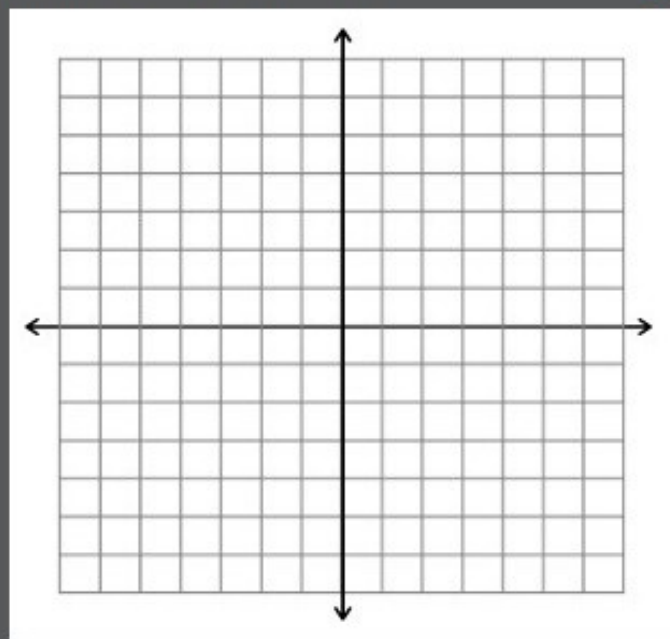
Jump to ▼

1

2

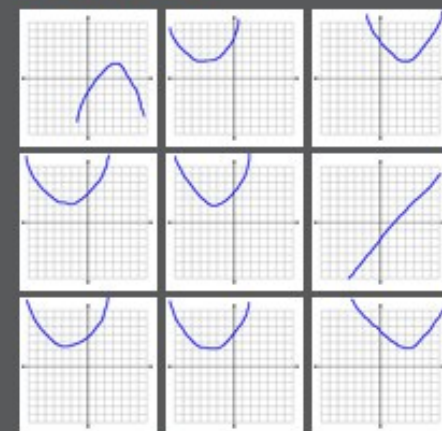
3

4

4. sketch Sketch a graph of the function $f(x) = (x - 3)^2 + 2$.[Stop delivery](#) [Deliver again](#) [Assign groups](#) [Show all results](#)

Round 1

9 responses

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

Sample question types:

- direction
- expression
- long answer, short answer, word cloud (fill in text)
- multiple choice, many choice
- number (enter a number)
- ranking
- region (select point on image)
- sketch



1 lecture

2 PI

3 PI 2.0



human interaction

1 lecture

2 PI

3 PI 2.0

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Jump to 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

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.



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%

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 100%

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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 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

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Search:

1 lecture

2 PI

3 PI 2.0

Carrier 9:31 PM 100%

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Search:

1 lecture

2 PI

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Carrier 100%

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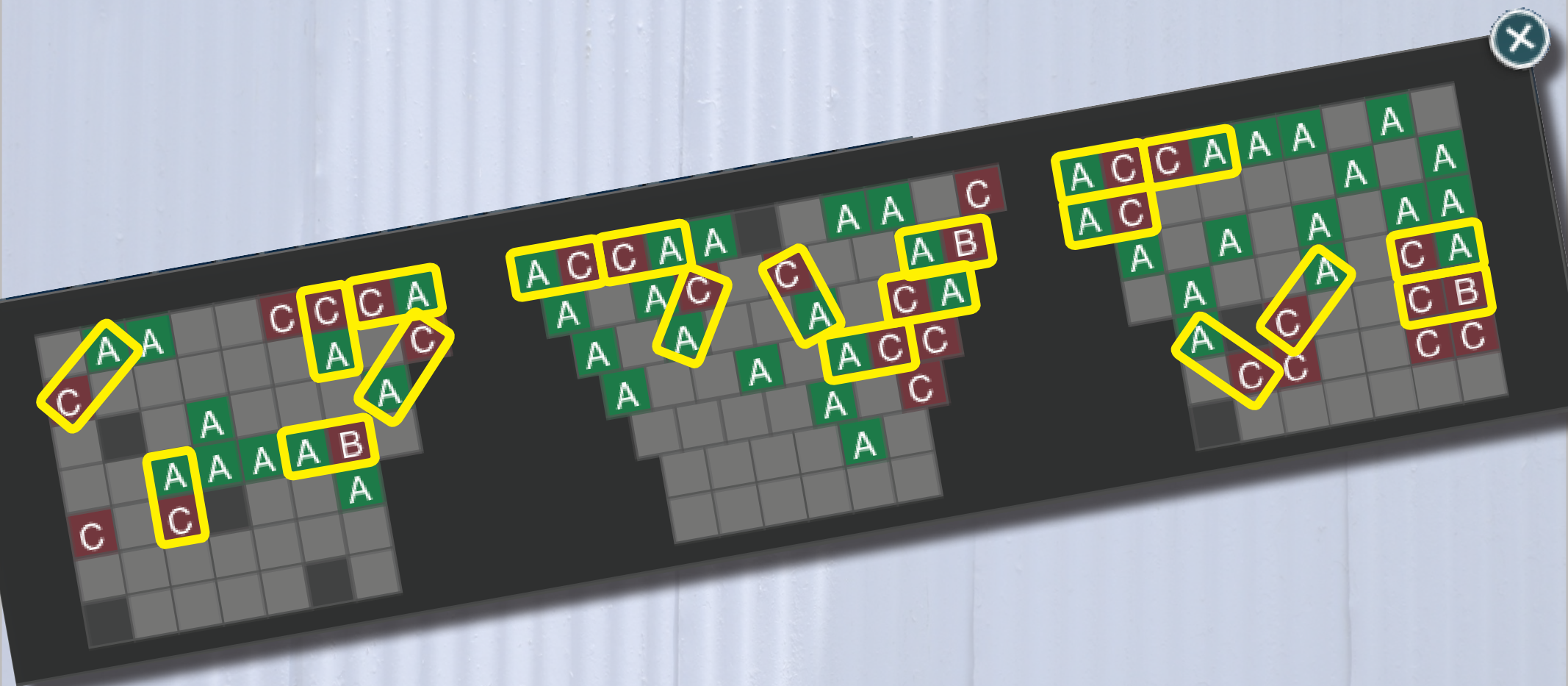
Search: _____

1 lecture

2 PI

3 PI 2.0

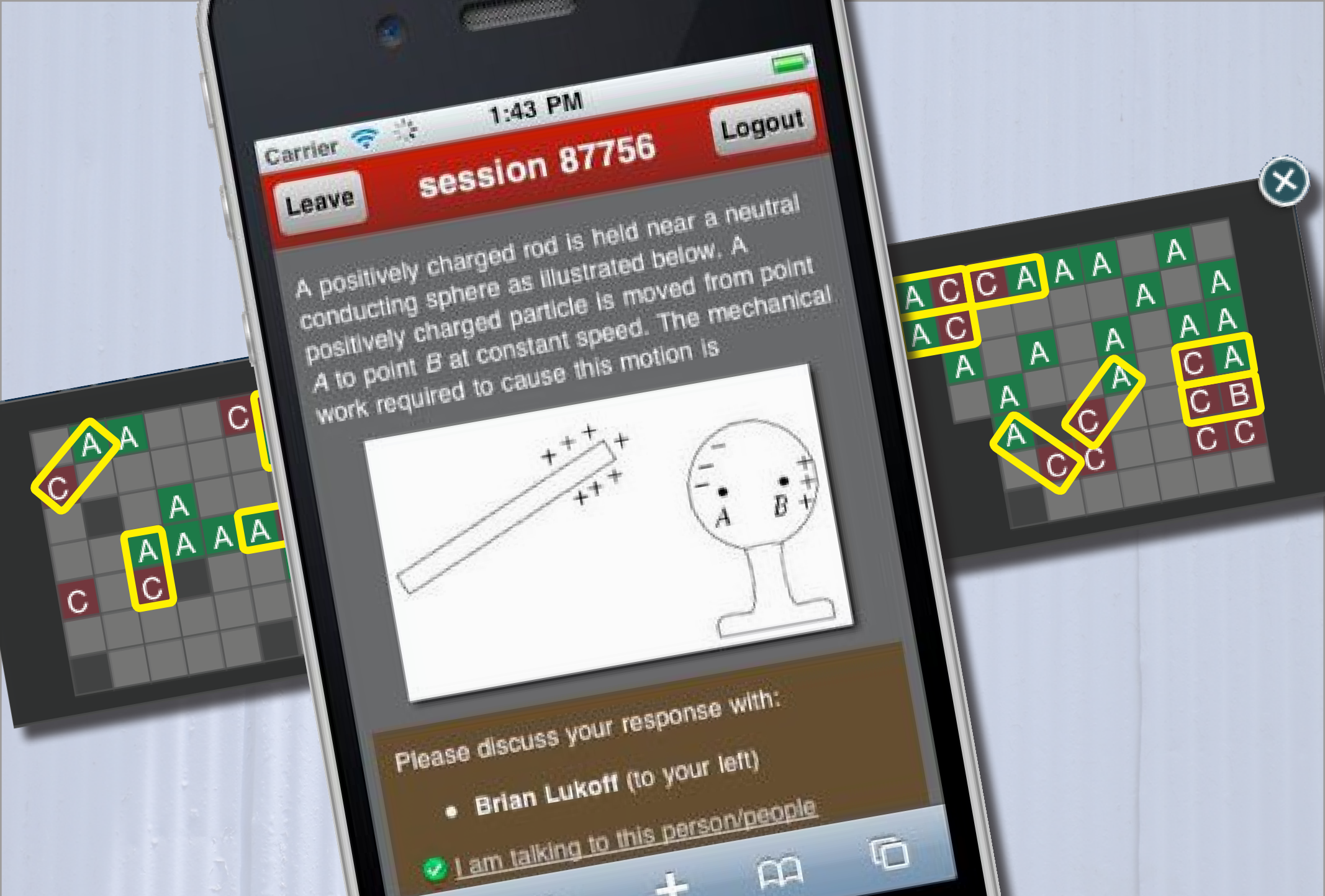
let system manage pairing



1 lecture

2 PI

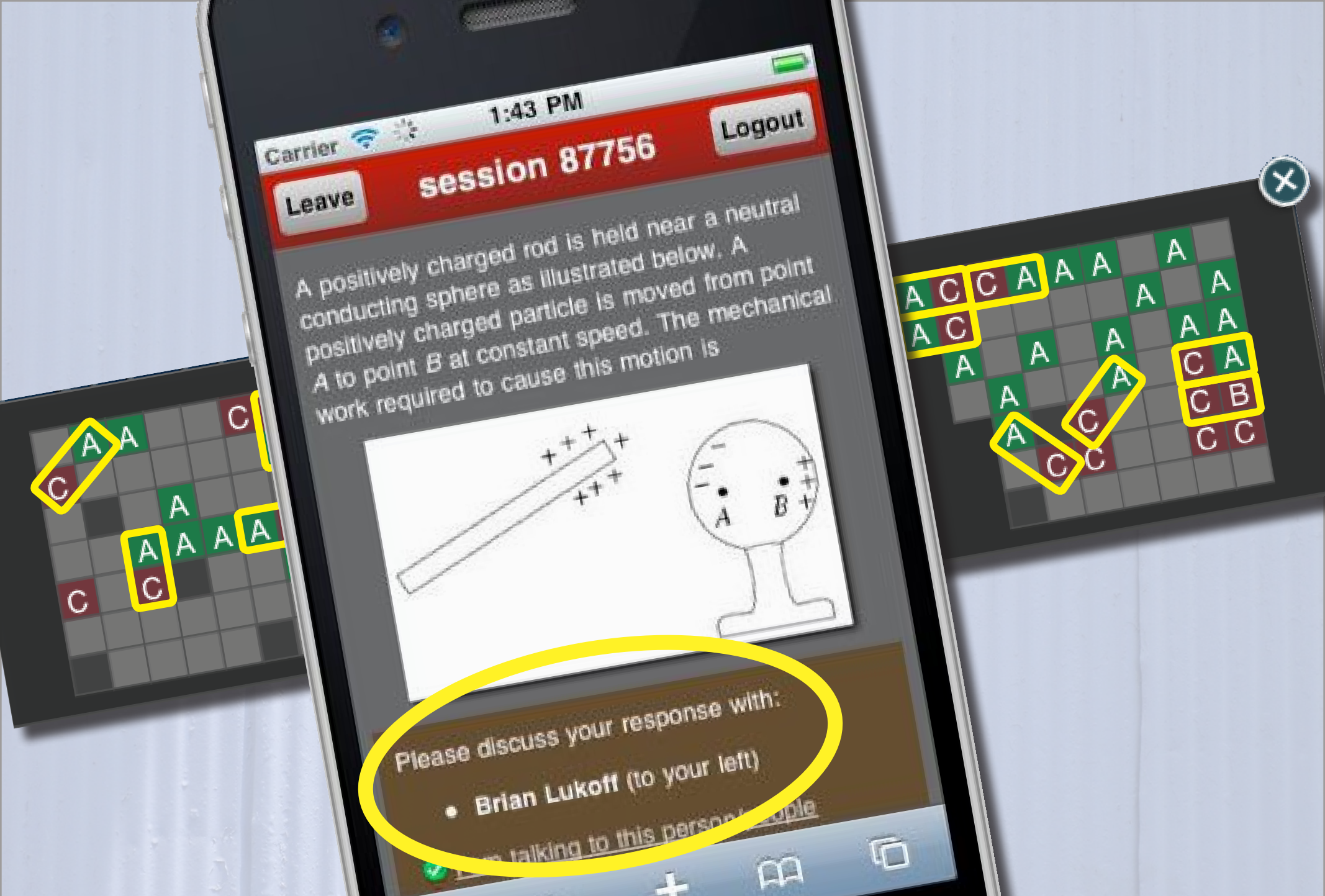
3 PI 2.0



1 lecture

2 PI

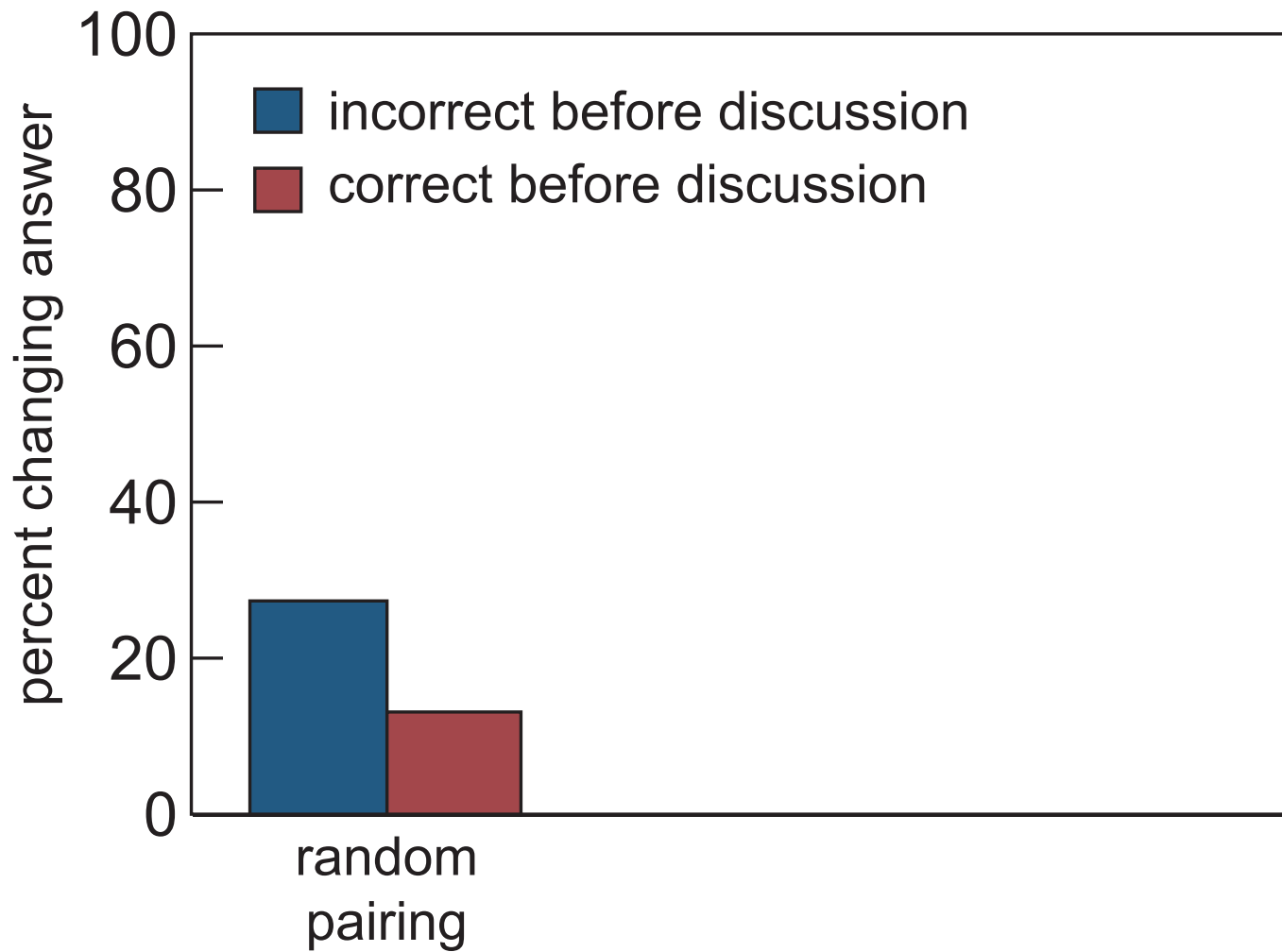
3 PI 2.0

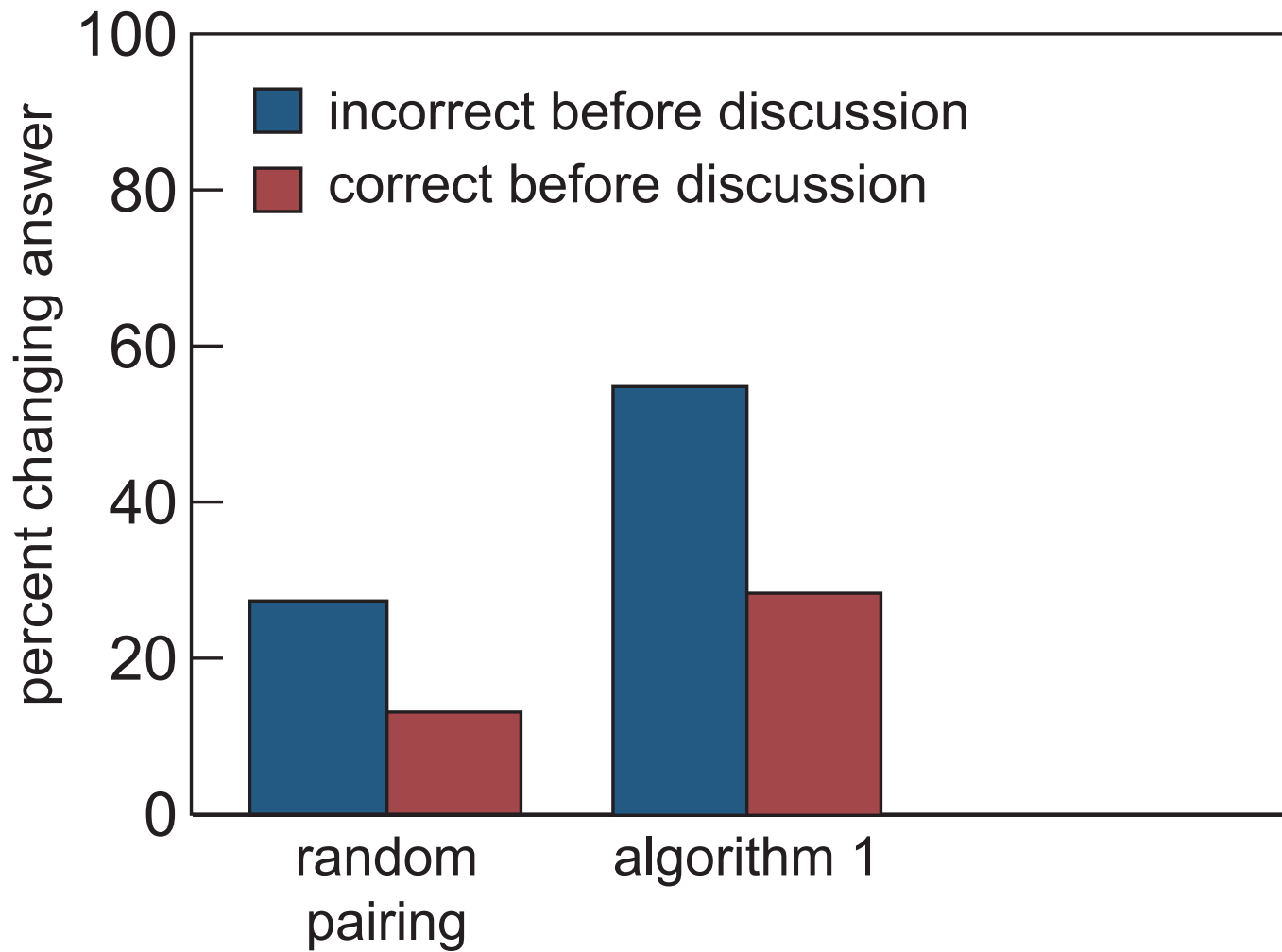


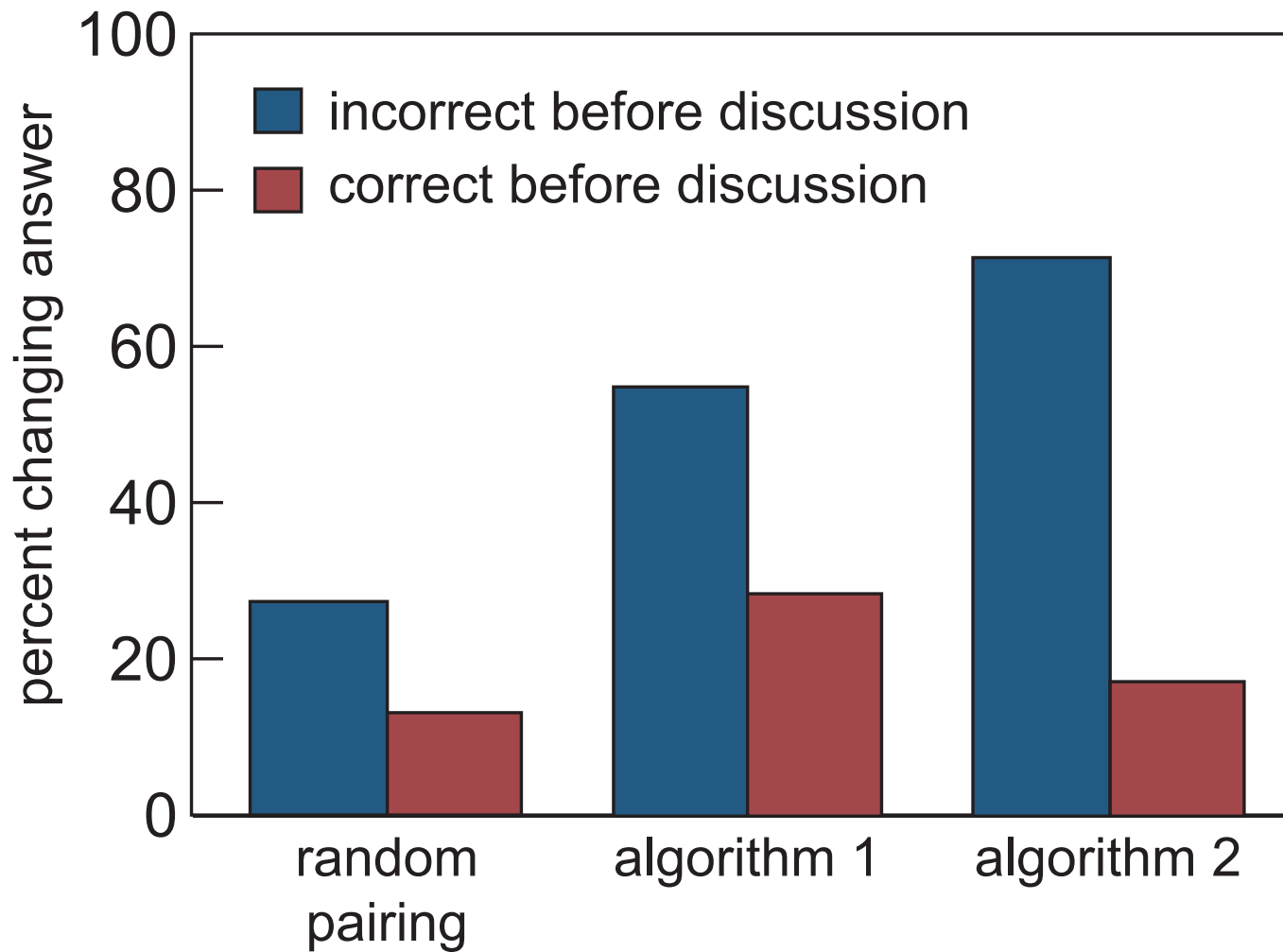
1 lecture

2 PI

3 PI 2.0









1 lecture

2 PI

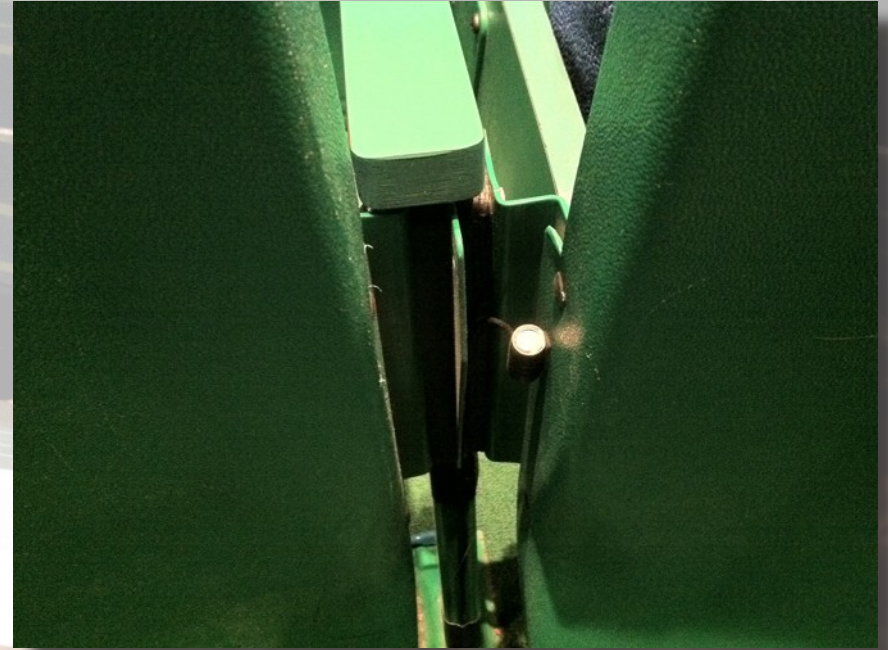
3 PI 2.0



1 lecture

2 PI

3 PI 2.0



1 lecture

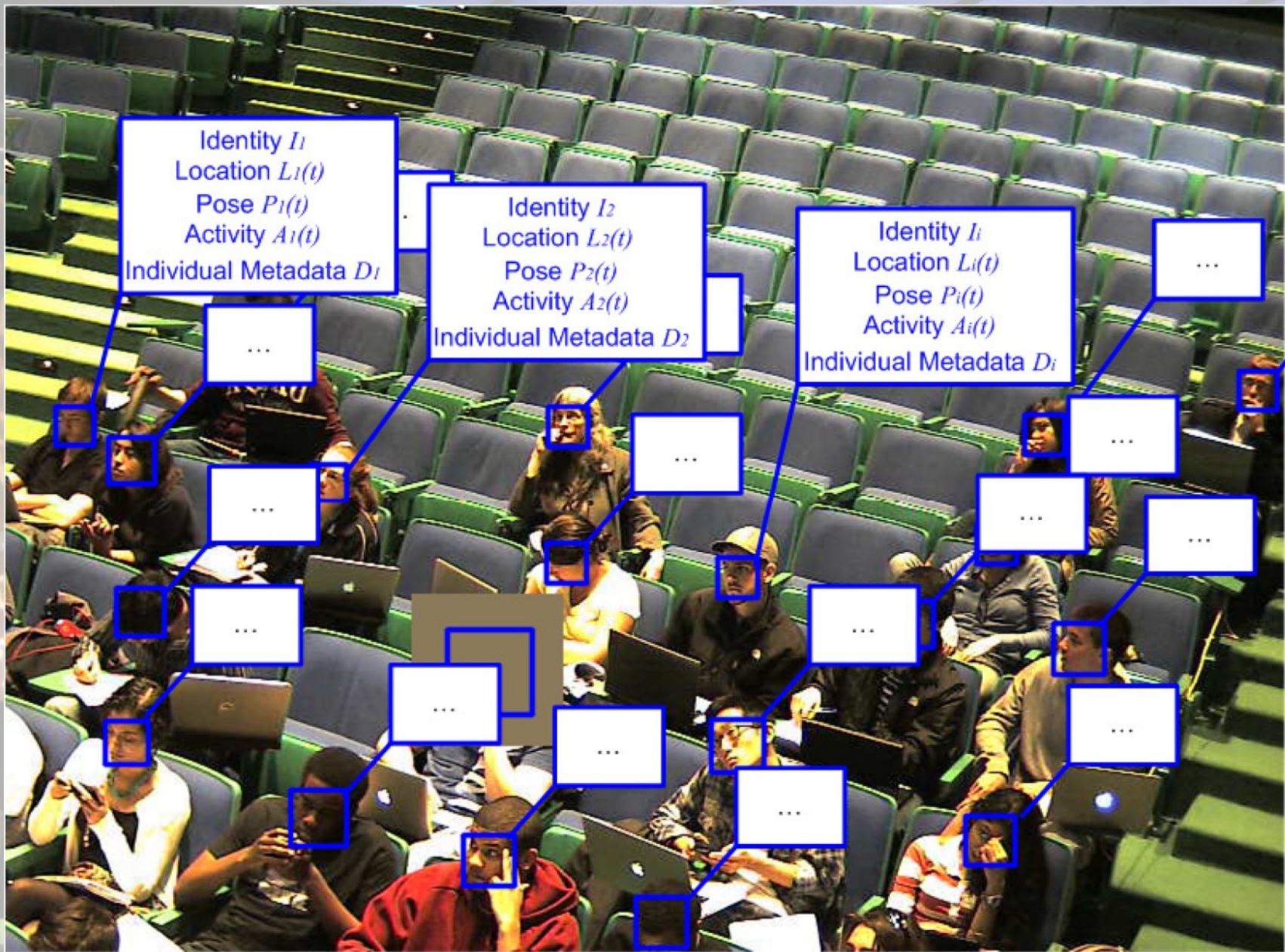
2 PI

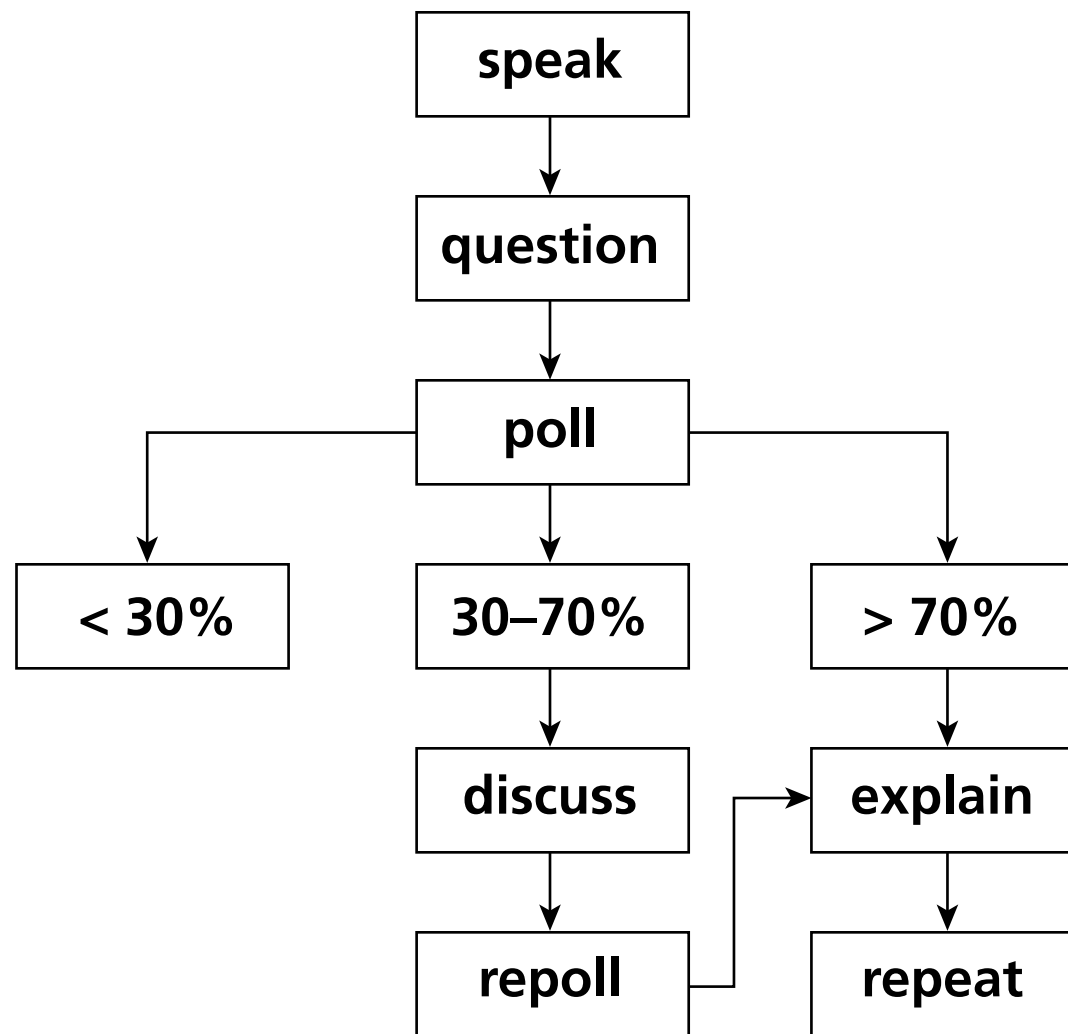
3 PI 2.0

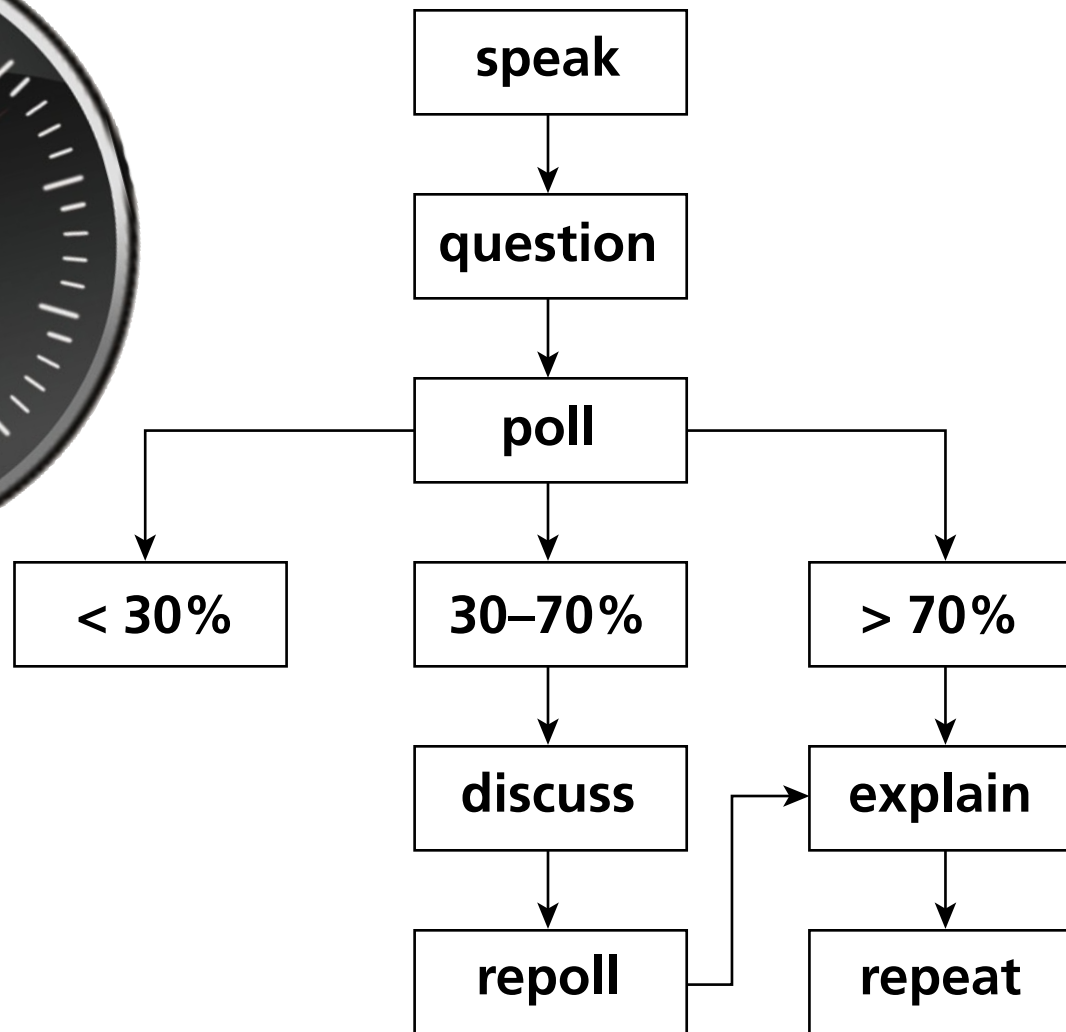
1 lecture

2 PI

3 PI 2.0









1 lecture

2 PI

3 PI 2.0



the future is here!

1 lecture

2 PI

3 PI 2.0



System currently in use at:

- **Harvard University**
- **very large state school**
- **high school**
- **medium-size research university**



Many thanks to:

Computer Vision

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Ely Spears
Parker Porfolio

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

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Ryan Smith
Abdi Aden

Learning Catalytics

Prof. Gary King
Dr. Brian Lukoff

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