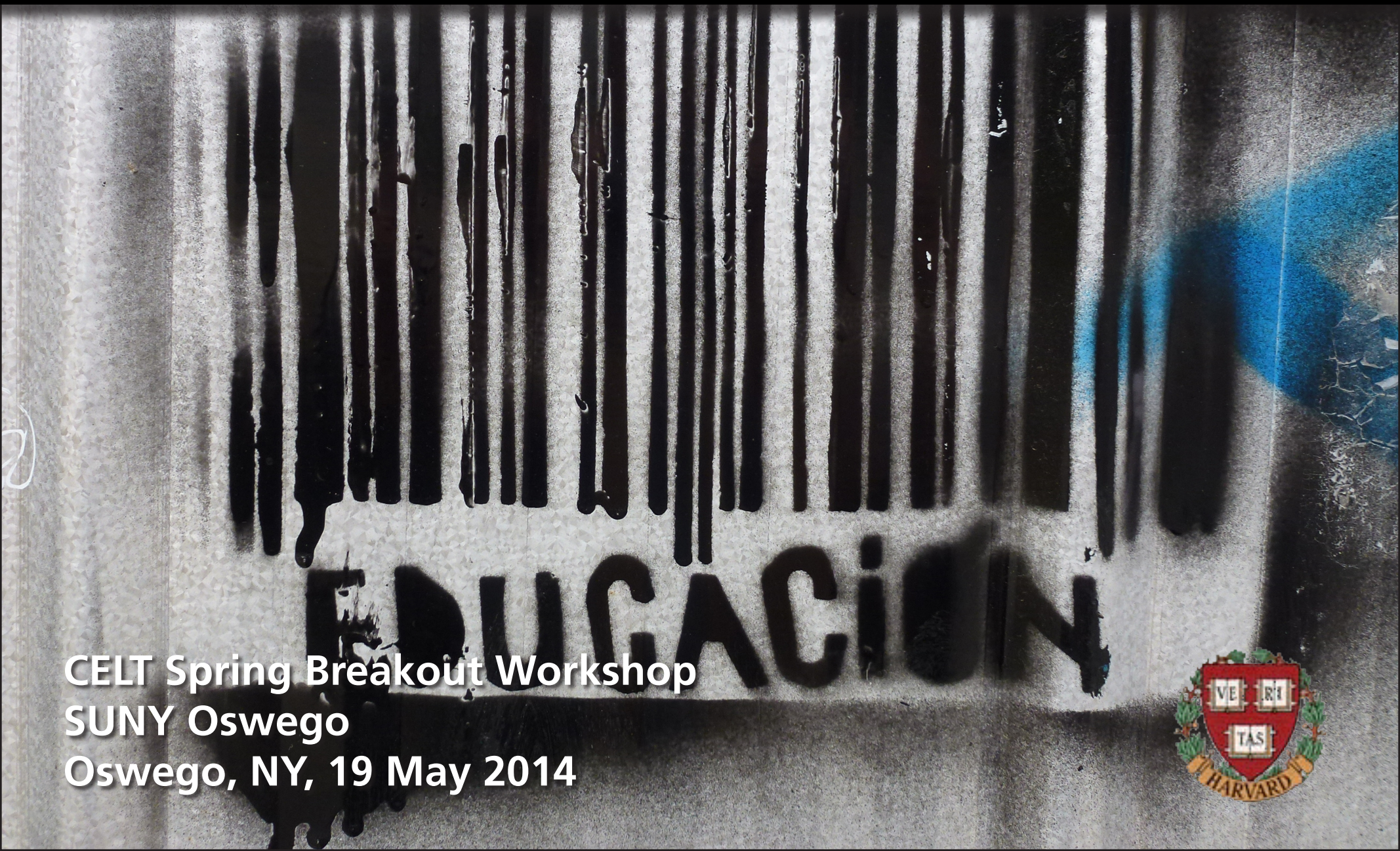


# Confessions of a converted lecturer



CELT Spring Breakout Workshop  
SUNY Oswego  
Oswego, NY, 19 May 2014



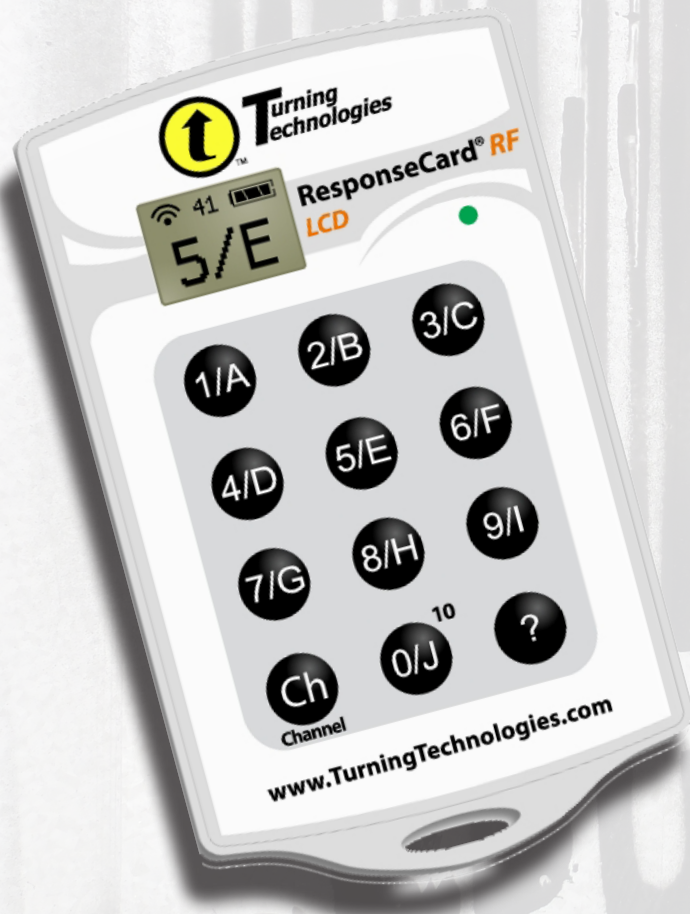
# Confessions of a converted lecturer



@eric\_mazur

CELT Spring Breakout Workshop  
SUNY Oswego  
Oswego, NY, 19 May 2014





- no ON/OFF button
- only last "click" counts
- display shows recorded answer



[www.TurningTechnologies.com](http://www.TurningTechnologies.com)



**unique ID on back of clicker**

**Think of something you are good at**

**EDUCACION**

**Think of something you are good at**

***How did you become good at this?***

**EDUCACION**

**Became good at it by:**

- 1. trial and error**
- 2. lectures**
- 3. practicing**
- 4. apprenticeship**
- 5. other**











1 education

2 PI



1 education

2 PI

3 test



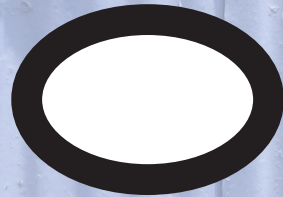
**better pay  
attention!**

**1** education

**2** PI

**3** test

**What happens  
in a lecture?**

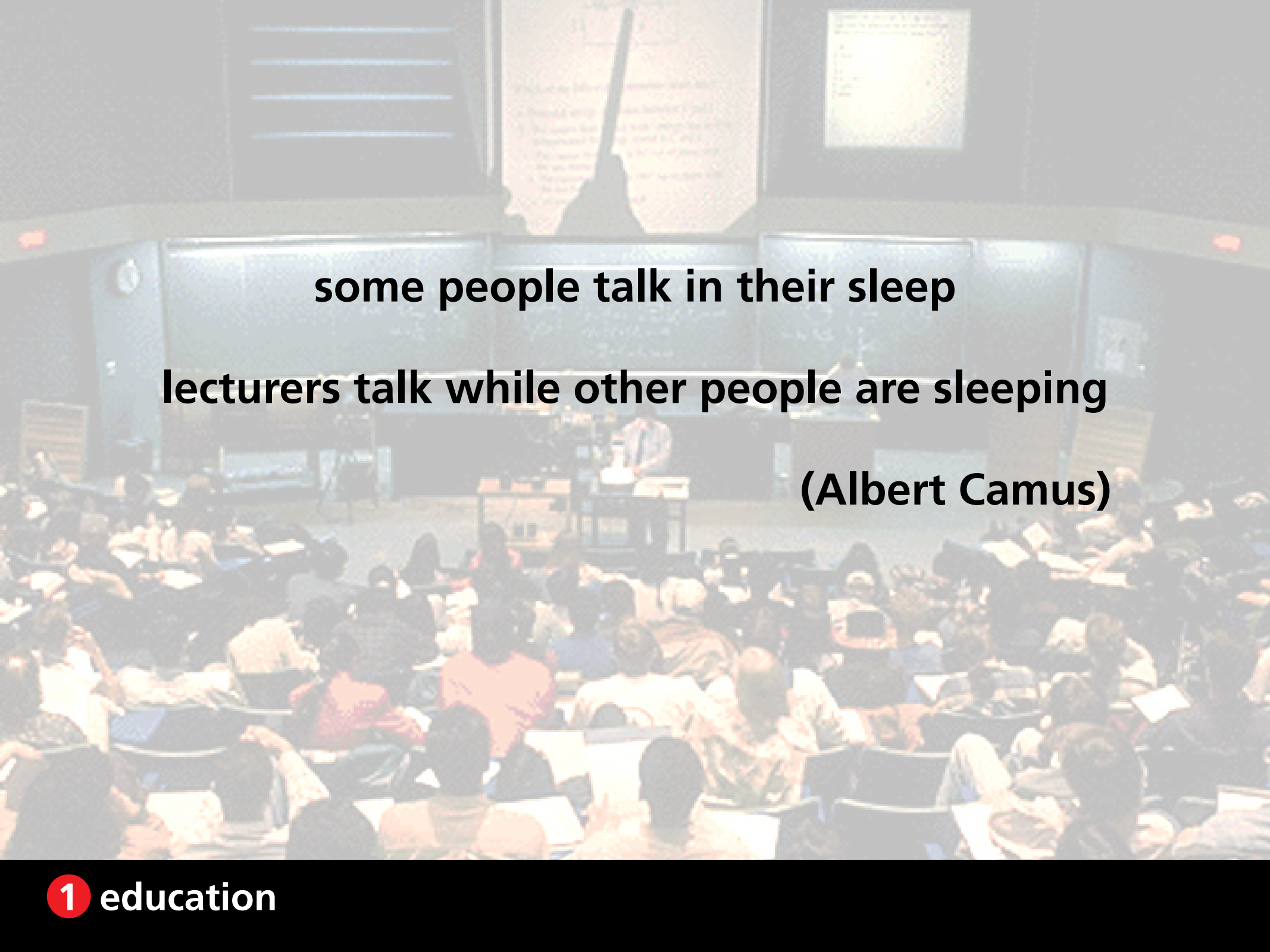




A large lecture hall with a professor at a podium and students in the audience. The professor is standing at a podium on the stage, facing the audience. The audience is seated in rows of chairs, filling the lecture hall. The stage has a large screen behind the professor displaying text. The text on the screen is partially legible and appears to be a list of items or a document. The overall scene is a typical classroom or lecture hall setting.

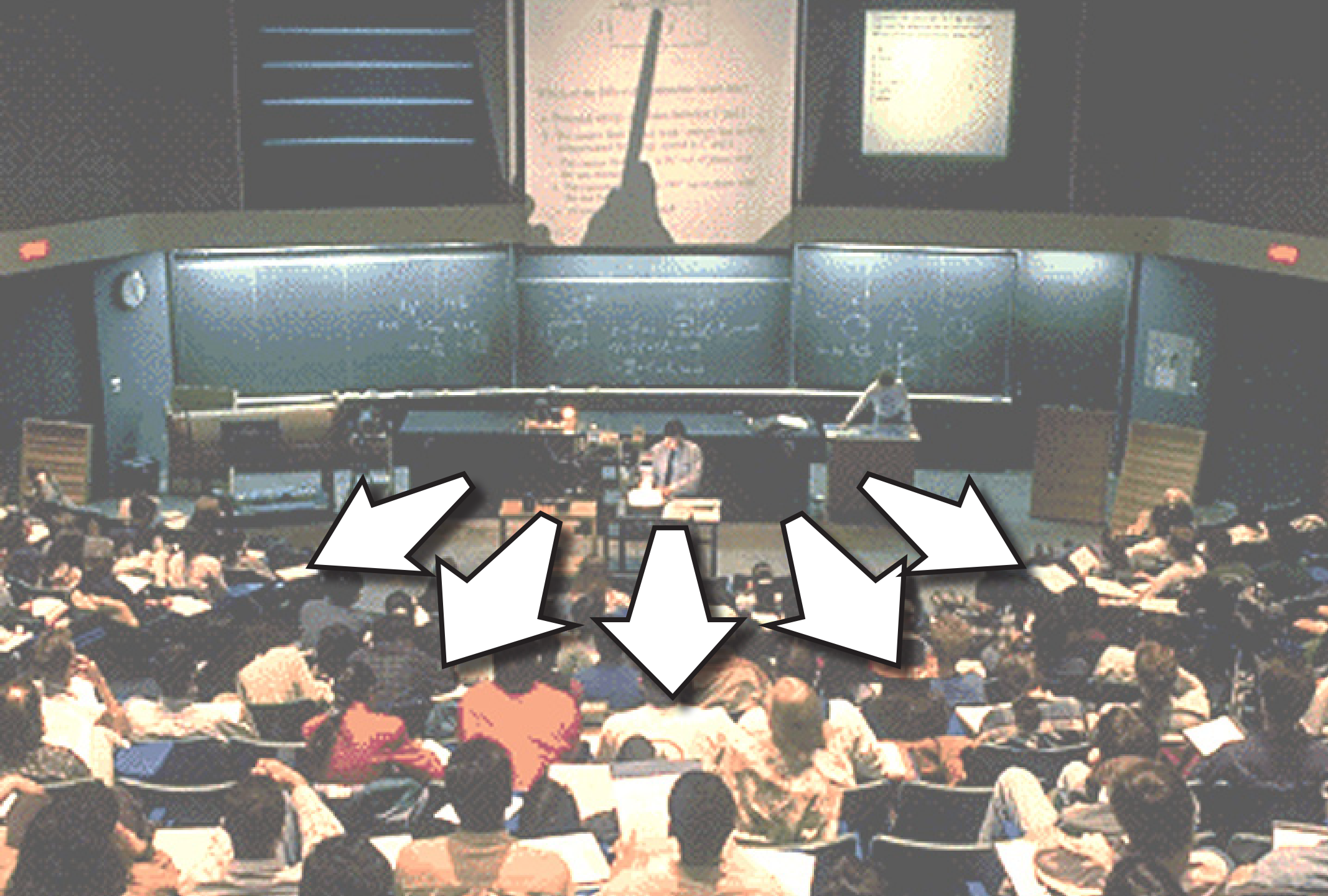
**some people talk in their sleep**



A large lecture hall with a lecturer at a podium and an audience of students. The room is filled with people, many of whom appear to be sleeping or resting. The lecturer is standing at a podium in the center, facing the audience. The audience is seated in rows of chairs, and many students have their heads down or are looking away. The room has a high ceiling and large windows. The text is overlaid on the image.

**some people talk in their sleep**  
**lecturers talk while other people are sleeping**  
**(Albert Camus)**





The result?

EDUCACION

**Lack of learning**

**EDUCACION**

**Lack of learning**

**Lack of retention**

**not transfer but assimilation of information is key**

**EDUCACION**



1 education

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!**

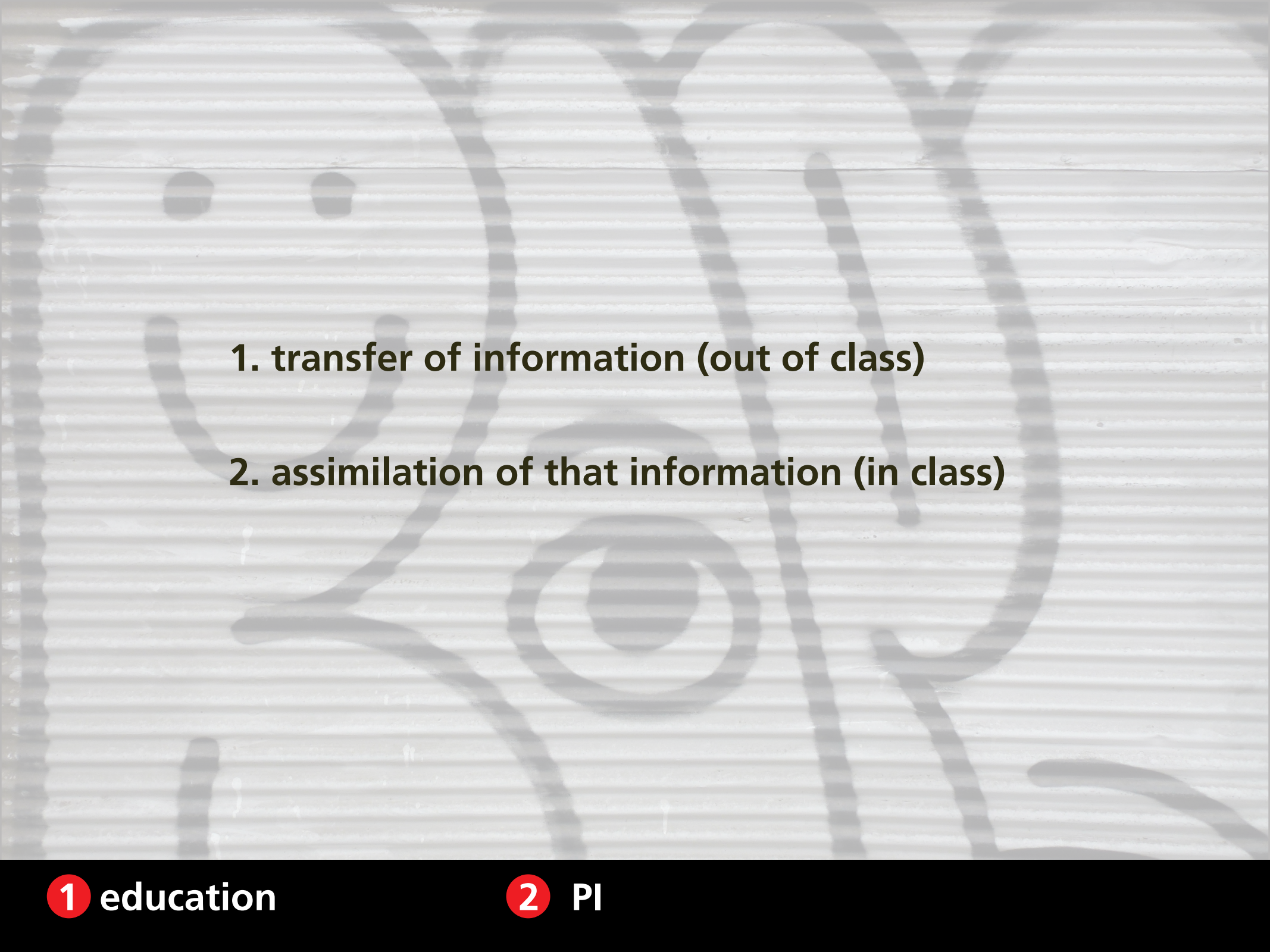
1. transfer of information (in class)

**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)**

# Peer



1. transfer of information (out of class)

2. assimilation of that information (in class)

INSTRUCTION



question

1 education

2 PI

question



think

question



think



poll

**question**



**think**



**poll**



**discuss**

**question**



**think**



**poll**



**discuss**



**repoll**

**question**



**think**



**poll**



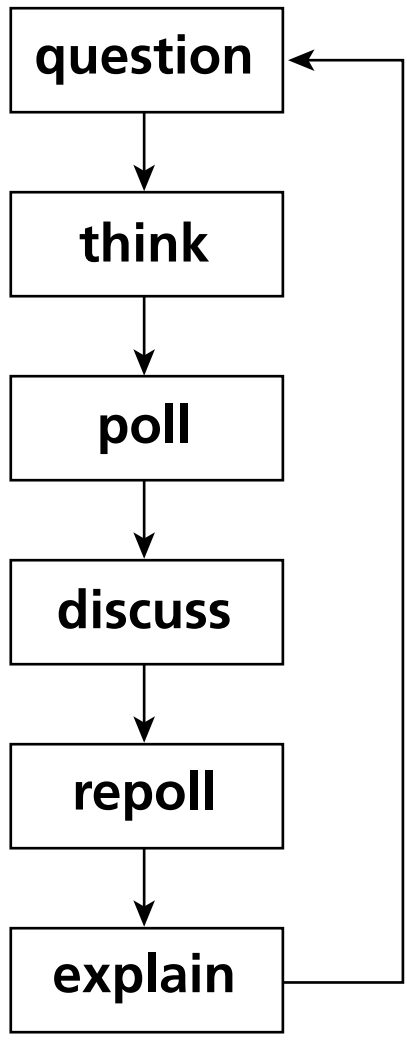
**discuss**

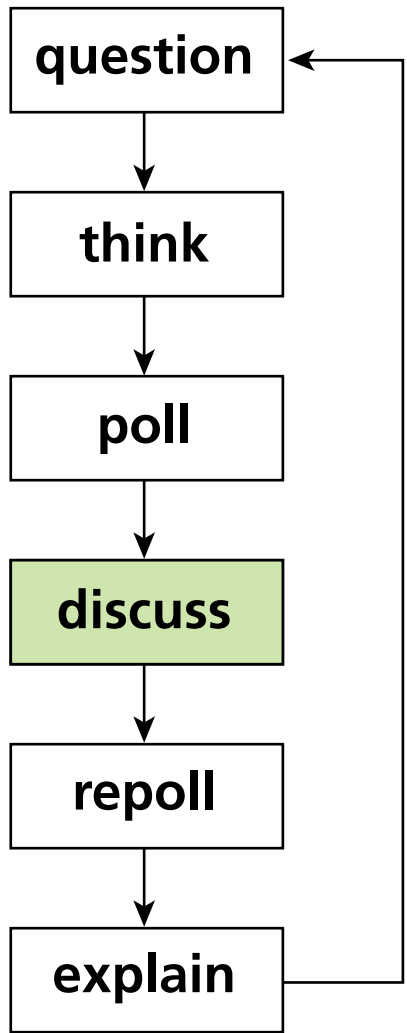


**repoll**



**explain**







**1** education

**2** PI

Let's try it!

QUESTION

think

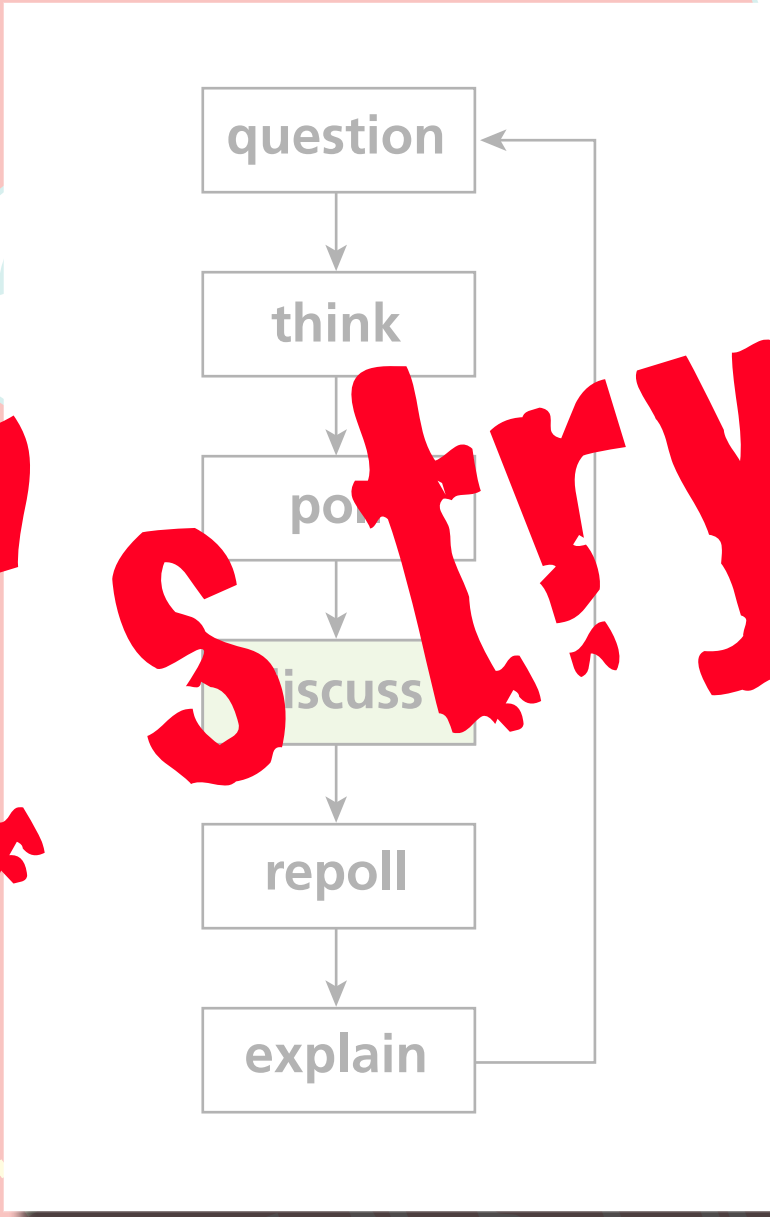
poll

discuss

repoll

explain

ACTION

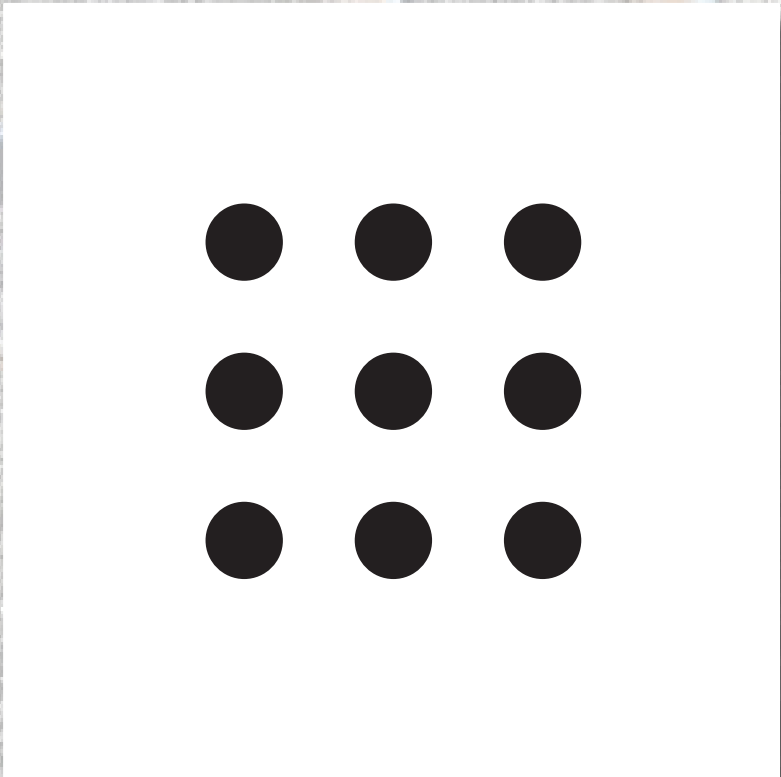


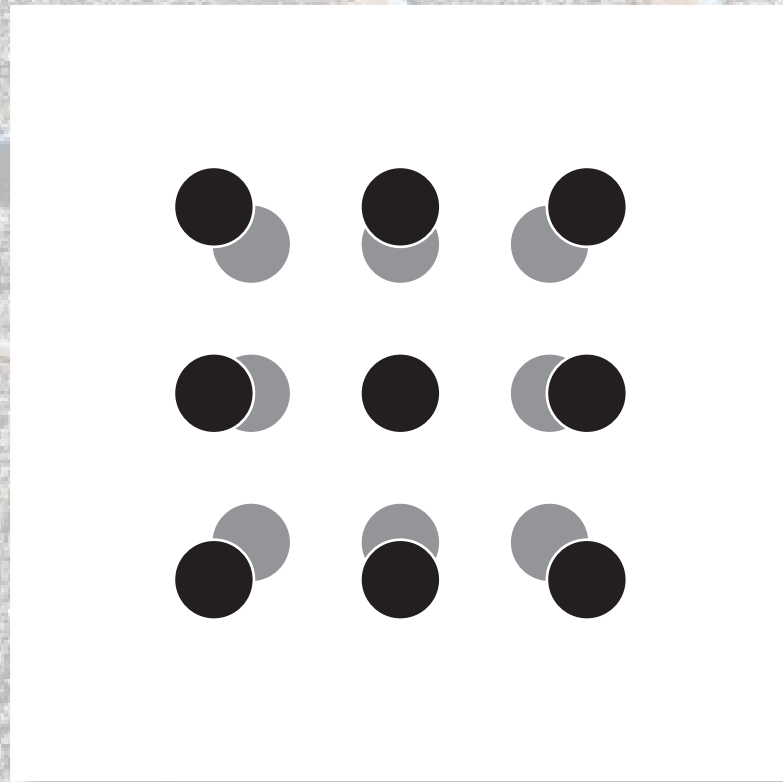
1 education

2 PI

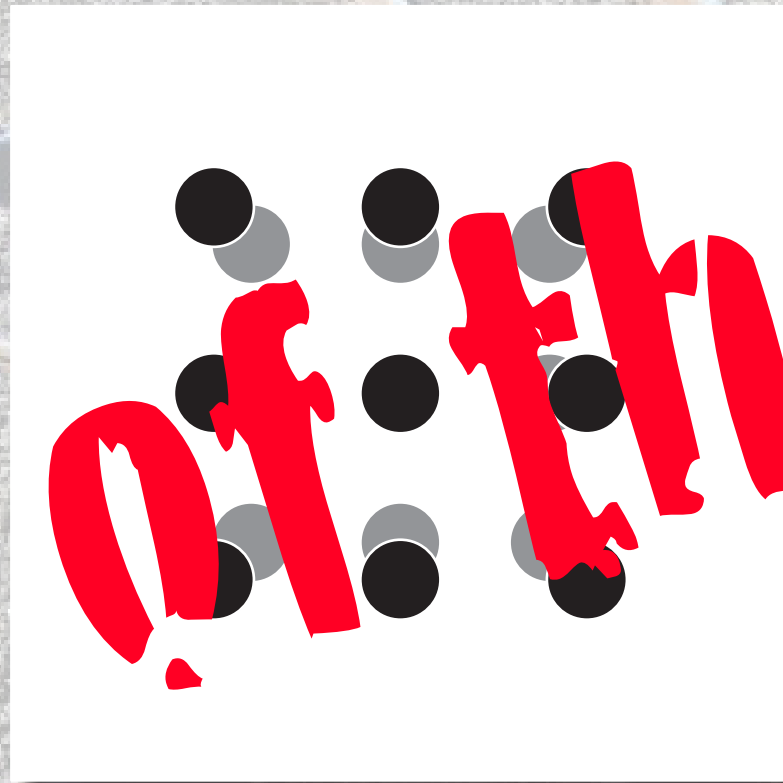
A photograph of a gravel path with a blue wavy line drawn on it, illustrating thermal expansion. The path is made of grey gravel and is bordered by green grass on both sides. The blue line is drawn in a series of connected, rounded curves, resembling a sine wave. The text "thermal expansion" is overlaid in the center of the path.

**thermal expansion**





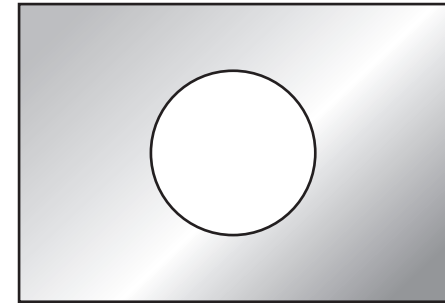
**all of them!**



**1 education**

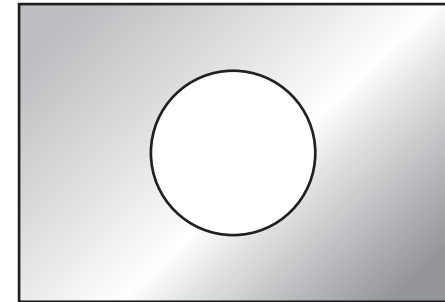
**2 PI**

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



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

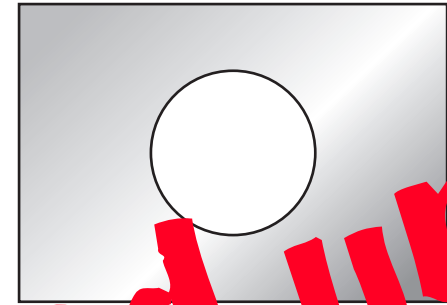
**When the plate is uniformly heated, the diameter of the hole**



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



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



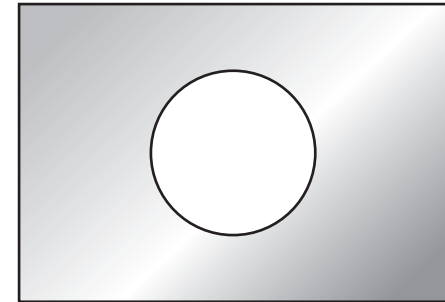
When the plate is uniformly heated, the diameter of the hole

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.**

**Before I tell you the answer...**

**1** education

**2** PI

**3** test

**Before I tell you the answer, let's analyze what happened.**

**1** education

**2** PI

**3** test

**Before I tell you the answer, let's analyze what happened.**

**You...**

**Before I tell you the answer, let's analyze what happened.**

**You...**

**1. made a commitment**

**Before I tell you the answer, let's analyze what happened.**

**You...**

- 1. made a commitment**
- 2. externalized your answer**

**Before I tell you the answer, let's analyze what happened.**

**You...**

- 1. made a commitment**
- 2. externalized your answer**
- 3. moved from the answer/fact to reasoning**



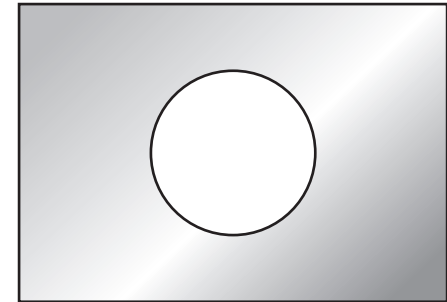
**Before I tell you the answer, let's analyze what happened.**

**You...**

- 1. made a commitment**
- 2. externalized your answer**
- 3. moved from the answer/fact to reasoning**
- 4. became emotionally invested in the learning process**

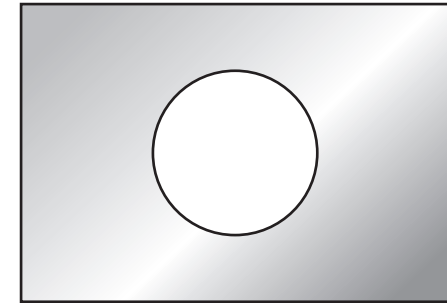
**Consider a rectangular metal plate with a circular hole in it.**

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



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

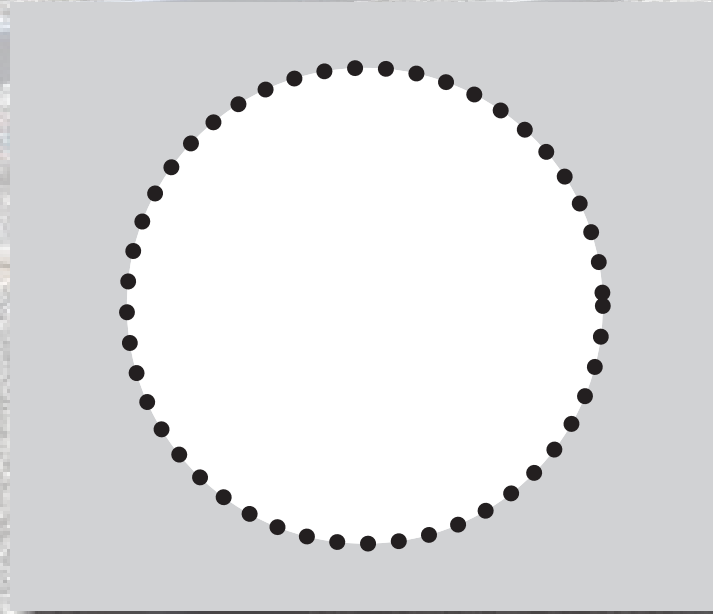
Consider a rectangular metal plate with a circular hole in it.



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

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

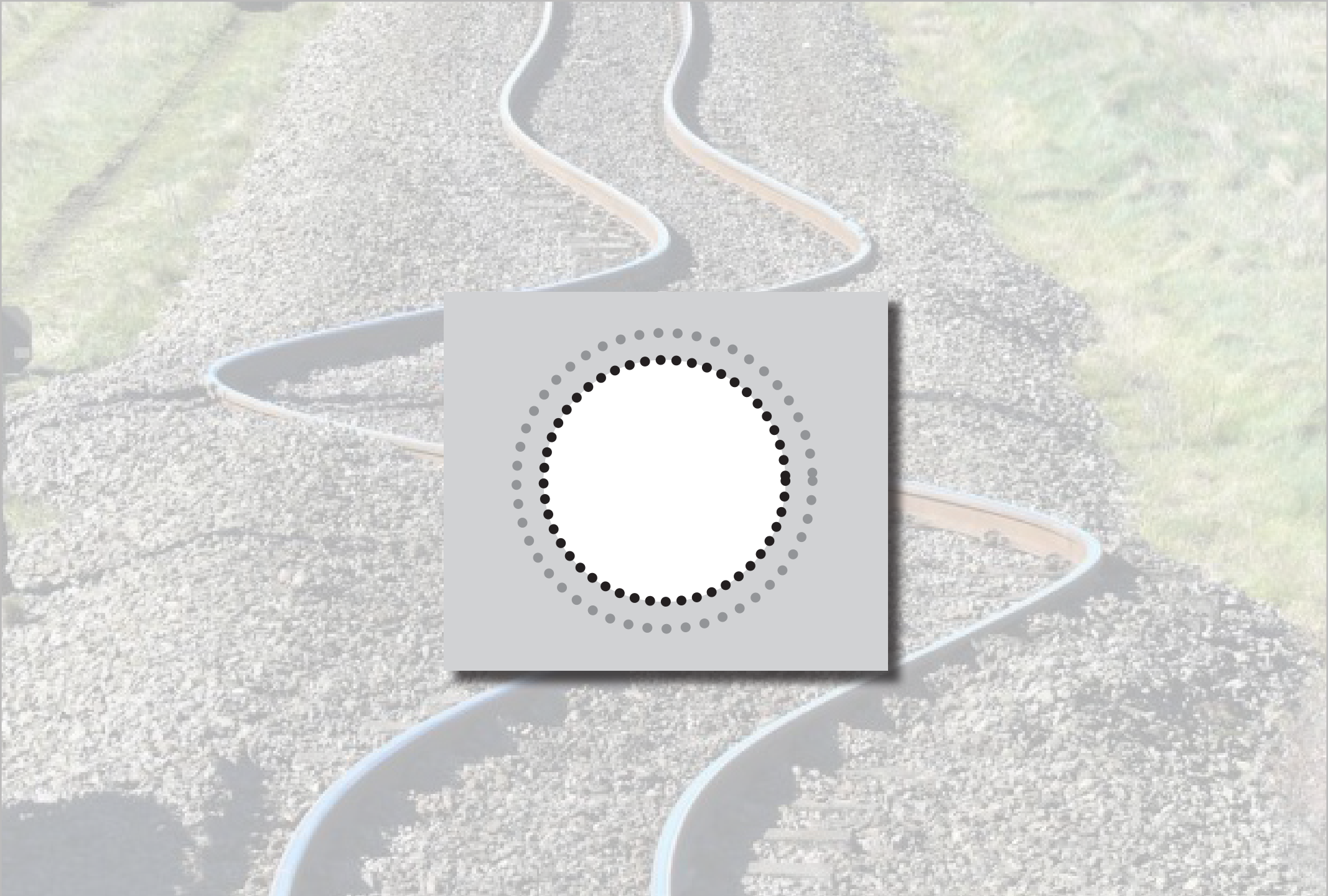
consider atoms at rim of hole



1 education

2 PI

3 test

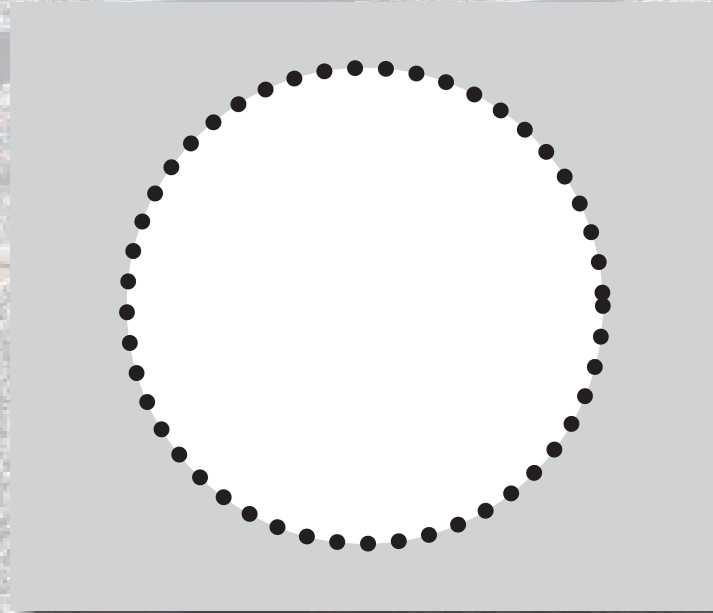


**1** education

**2** PI

**3** test

consider atoms at rim of hole

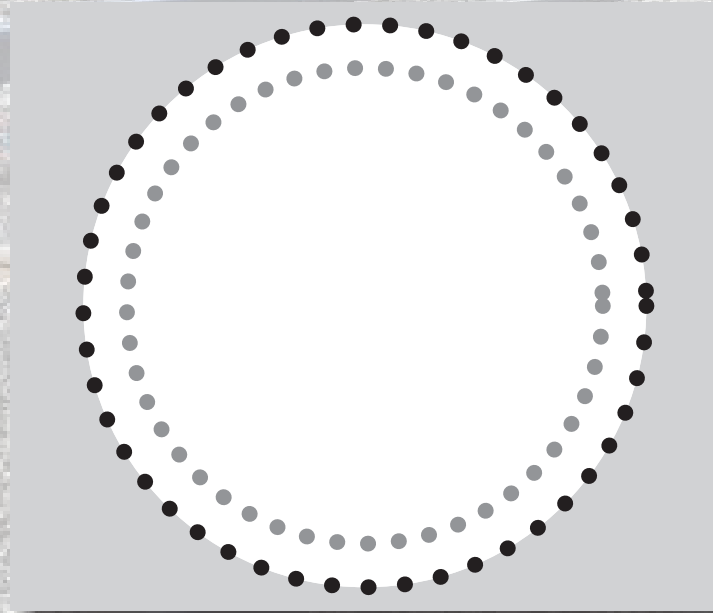


**1** education

**2** PI

**3** test

consider atoms at rim of hole



1 education

2 PI

3 test

consider atoms at rim of hole

**you won't forget this**



**1** education

**2** PI

**3** test



# Peer

## back to PI

### INSTRUCTION

1 education

2 PI

3 test

Peer  
Greater learning gains

INSTRUCTION

1 education

2 PI

3 test

**Peer**  
**Greater learning gains**

**Better retention**

**INSTRUCTION**

**1** education

**2** PI

**3** test



**1** education

**2** PI

**3** test

in a lecture, students...

**1** education

**2** PI

**3** test

**in a lecture, students...**

**1. don't pay utmost attention**

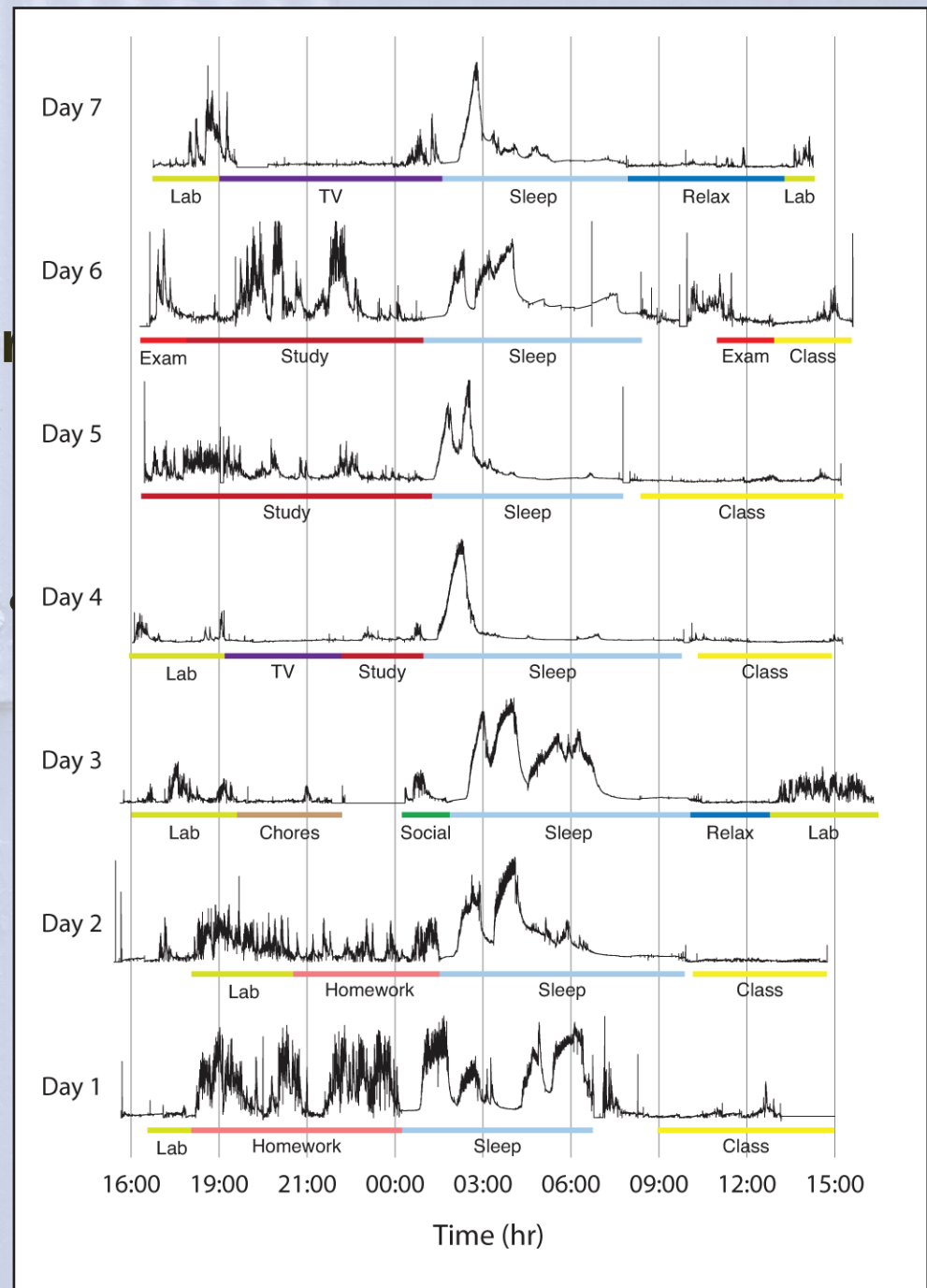
**1** education

**2** PI

**3** test

in a lecture

1. don't pay utmost



doi: 10.1109/TBME.2009.2038487

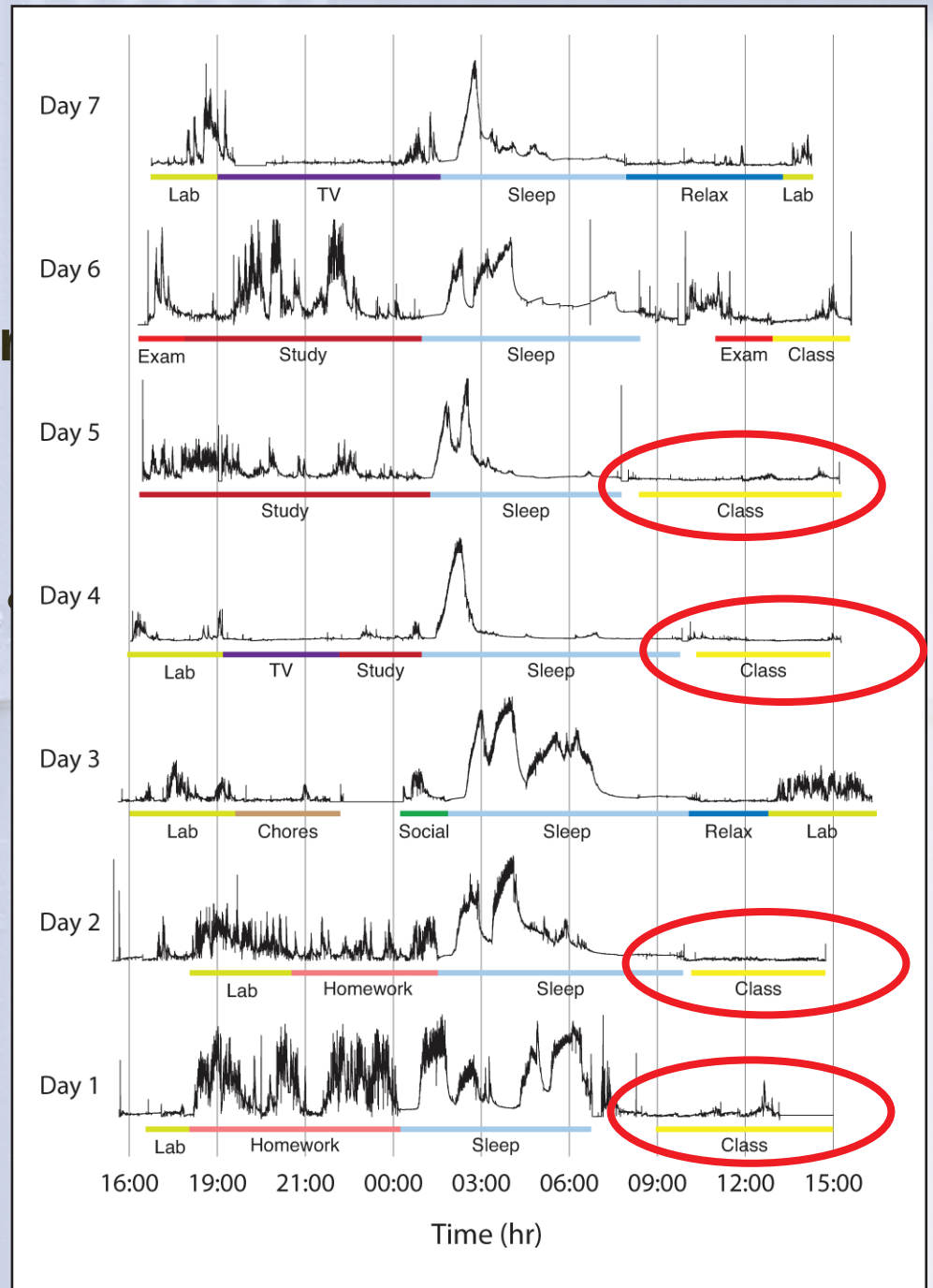
1 education

2 PI

3 test

in a lecture

1. don't pay utmost



doi: 10.1109/TBME.2009.2038487

1 education

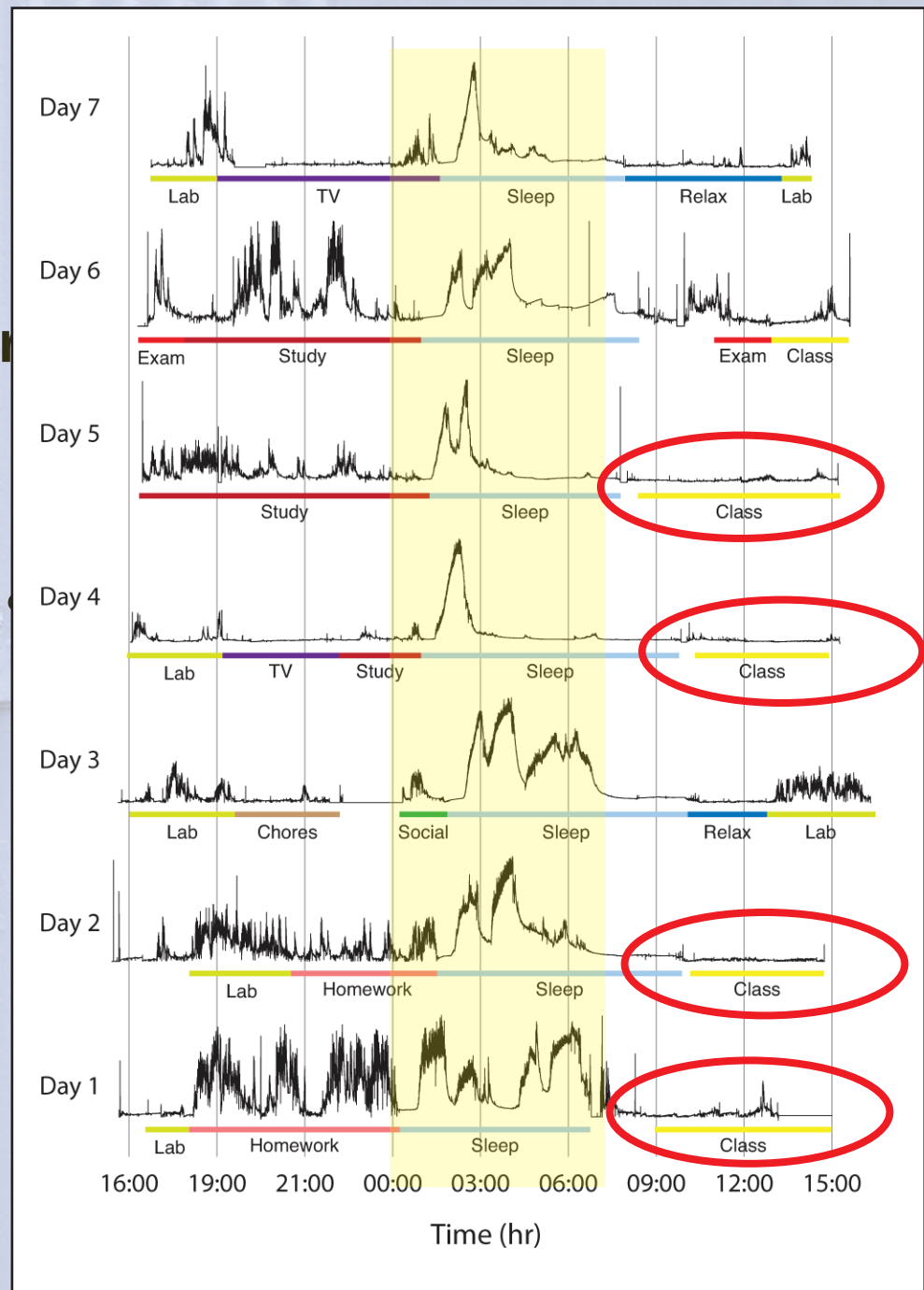
2 PI

3 test



in a lecture

1. don't pay utmost



doi: 10.1109/TBME.2009.2038487

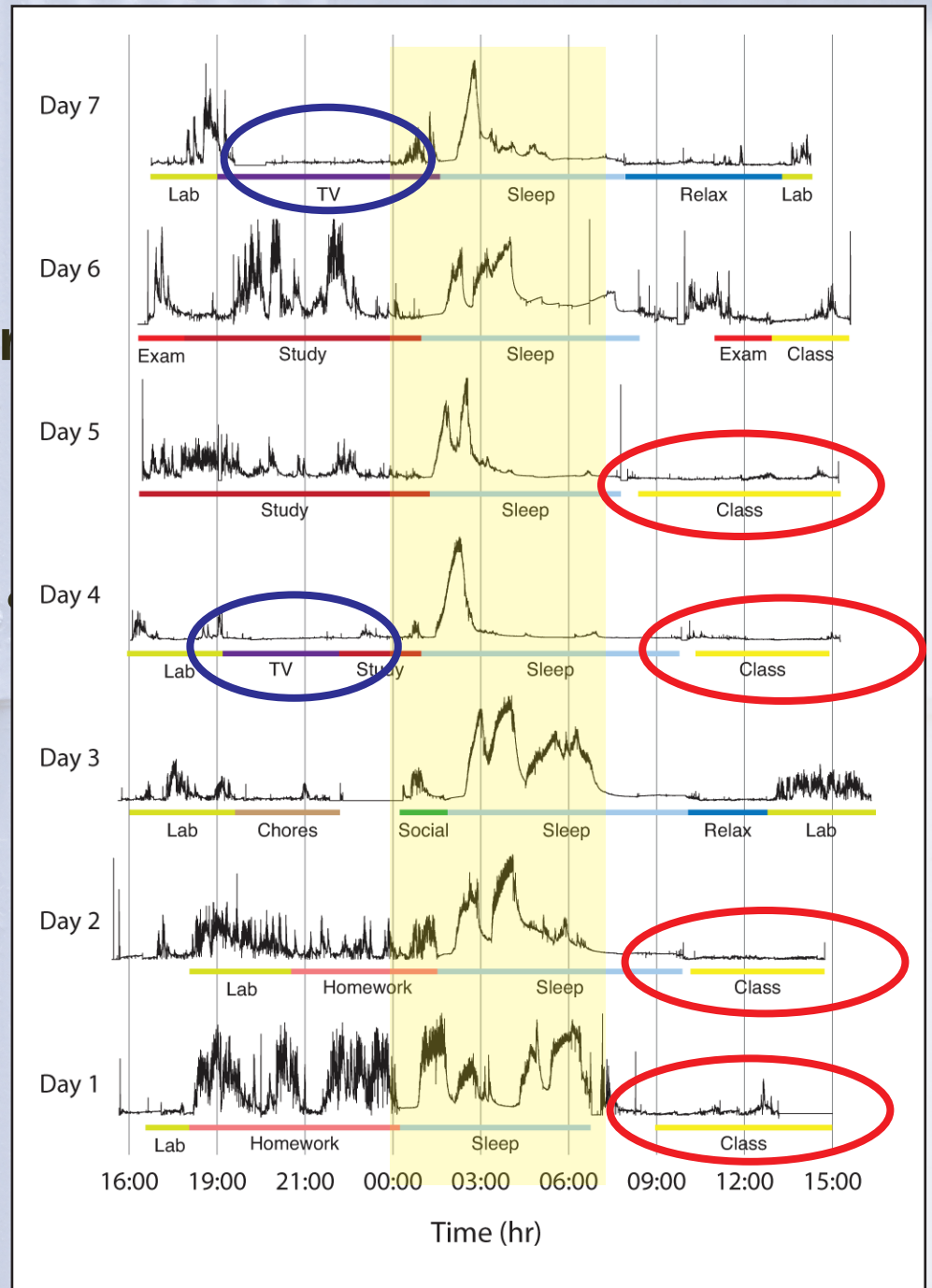
1 education

2 PI

3 test

in a lecture

1. don't pay utmost



doi: 10.1109/TBME.2009.2038487

1 education

2 PI

3 test

**in a lecture, students...**

**1. don't pay utmost attention**

**2. think they know it**



<http://www.babble.com>

**1** education

**2** PI

**3** test

A close-up photograph of a calico cat's face, showing its green eyes and white fur with orange and black patches. The image is slightly faded to allow text to be overlaid.

## 2 short video lectures on calico cats, same content

doi: [10.3758/s13423-013-0442-z](https://doi.org/10.3758/s13423-013-0442-z)

**1** education

**2** PI

**3** test

**2 short video lectures on calico cats, same content**

**fluent video**



**speaks fluidly w/o notes**

**upright**

**maintains eye contact**

doi: 10.3758/s13423-013-0442-z

**1 education**

**2 PI**

**3 test**

## 2 short video lectures on calico cats, same content

**fluent video**



**speaks fluidly w/o notes  
upright  
maintains eye contact**

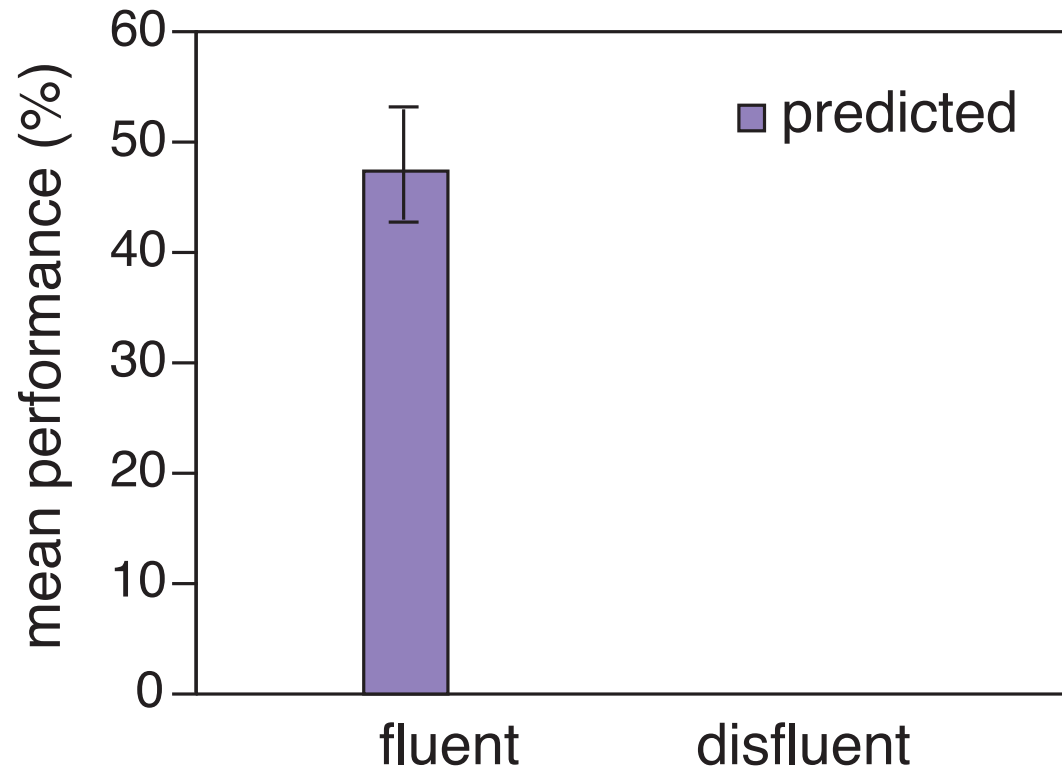
**disfluent video**



**speaks haltingly from notes  
slumped  
looks away**

doi: 10.3758/s13423-013-0442-z

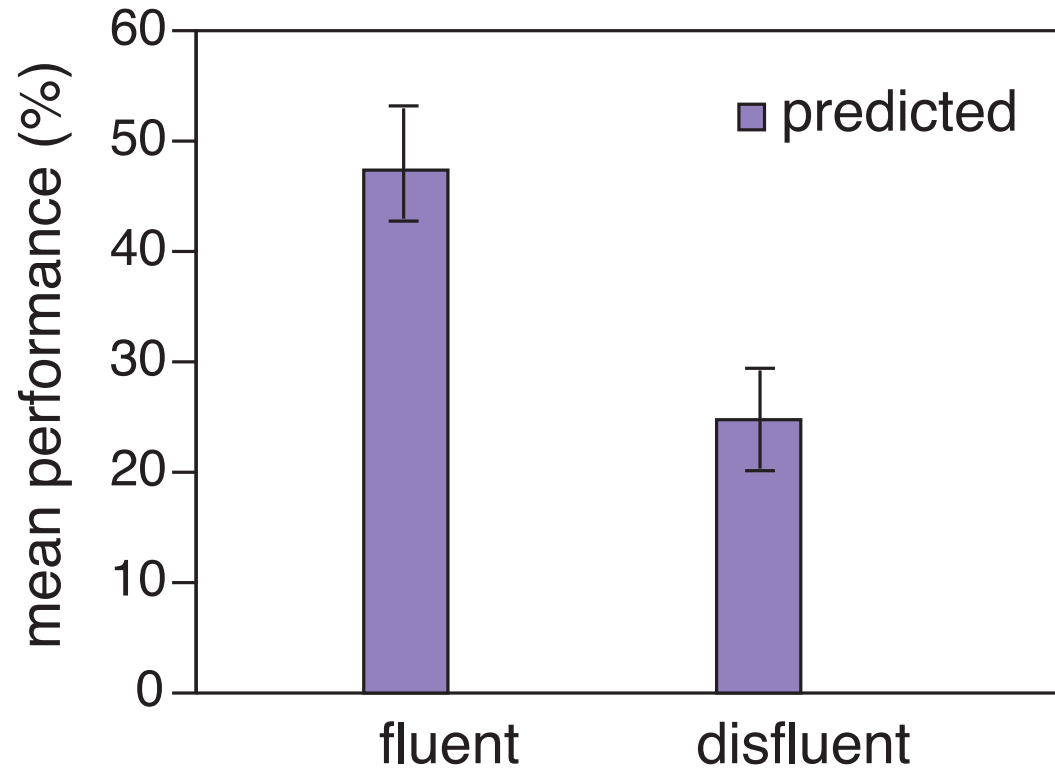
## judgement of learning



doi: 10.3758/s13423-013-0442-z

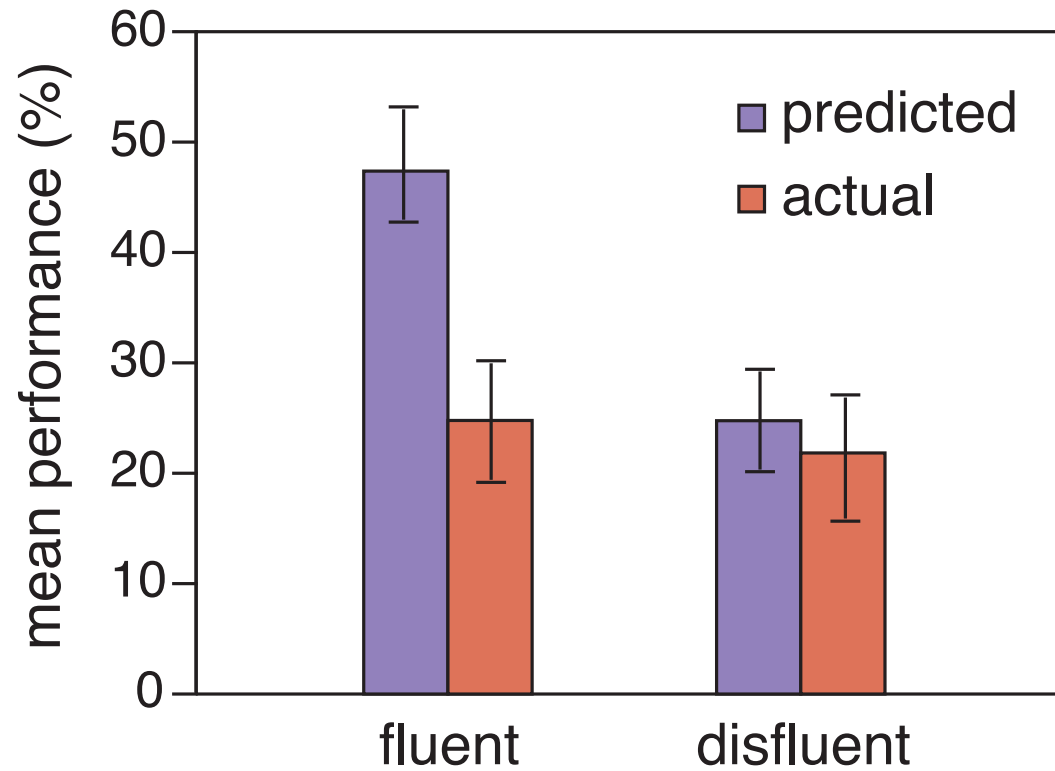


## judgement of learning



doi: 10.3758/s13423-013-0442-z

## judgement of learning



doi: 10.3758/s13423-013-0442-z

**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** education

**2** PI

**3** test



**an illusion. . .**

**1** education

**2** PI

**3** test



**Education is not just about:**

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

**1** education

**2** PI

**3** test



**Education is not just about:**

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

**active participation a must!**

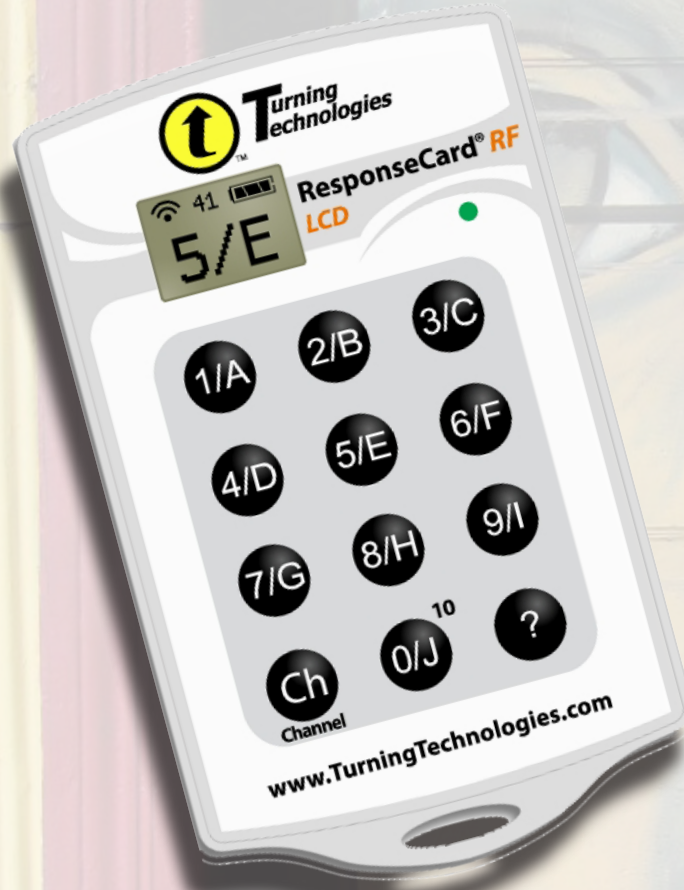




**Join now!**

**PeerInstruction.net**

# PLEASE RETURN YOUR CLICKER!



1 education

2 PI

3 test

**Funding:**

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