

- 1. Go to: <http://LCatalytics.com>**
- 2. Create instructor account**
- 3. After logging in, click the "Student view" tab**
- 4. Join session 1234567**
- 5. Ignore seat ("Can't find my seat")**



**1. Go to <http://LCatalytics.com>**

**2a. If you have instructor account: Log in, click "Student view"**

**2b. Otherwise: Create *student* account with signup code DEMO**

**3. Join session 1234567**



# Confessions of a converted lecturer



CA Education Foundation Symposium  
Vancouver, BC, 6 June 2013





# Confessions of a converted lecturer



**@eric\_mazur**

CA Education Foundation Symposium  
Vancouver, BC, 6 June 2013





Think of something you are good at

EDUCACION

- 1 [lcatalytics.com](https://lcatalytics.com)
- 2 create student account
- 3 ID 1234567



Now think how you became good at it



- 1 [lccatalytics.com](https://lccatalytics.com)
- 2 create student account
- 3 ID 1234567





1. The first of the following statements is true  
2. The second statement is false  
3. The third statement is true  
4. The fourth statement is false  
5. The fifth statement is true  
6. The sixth statement is false  
7. The seventh statement is true  
8. The eighth statement is false  
9. The ninth statement is true  
10. The tenth statement is false

Year	Score
1990	85
1991	88
1992	90
1993	92
1994	95
1995	98
1996	100

1. The first of the following statements is true  
2. The second statement is false  
3. The third statement is true  
4. The fourth statement is false  
5. The fifth statement is true  
6. The sixth statement is false  
7. The seventh statement is true  
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1. The first of the following statements is true  
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4. The fourth statement is false  
5. The fifth statement is true  
6. The sixth statement is false  
7. The seventh statement is true  
8. The eighth statement is false  
9. The ninth statement is true  
10. The tenth statement is false















1 education

2 PI

3 test






1 education

2 PI

3 test





**What happens  
in a lecture?**



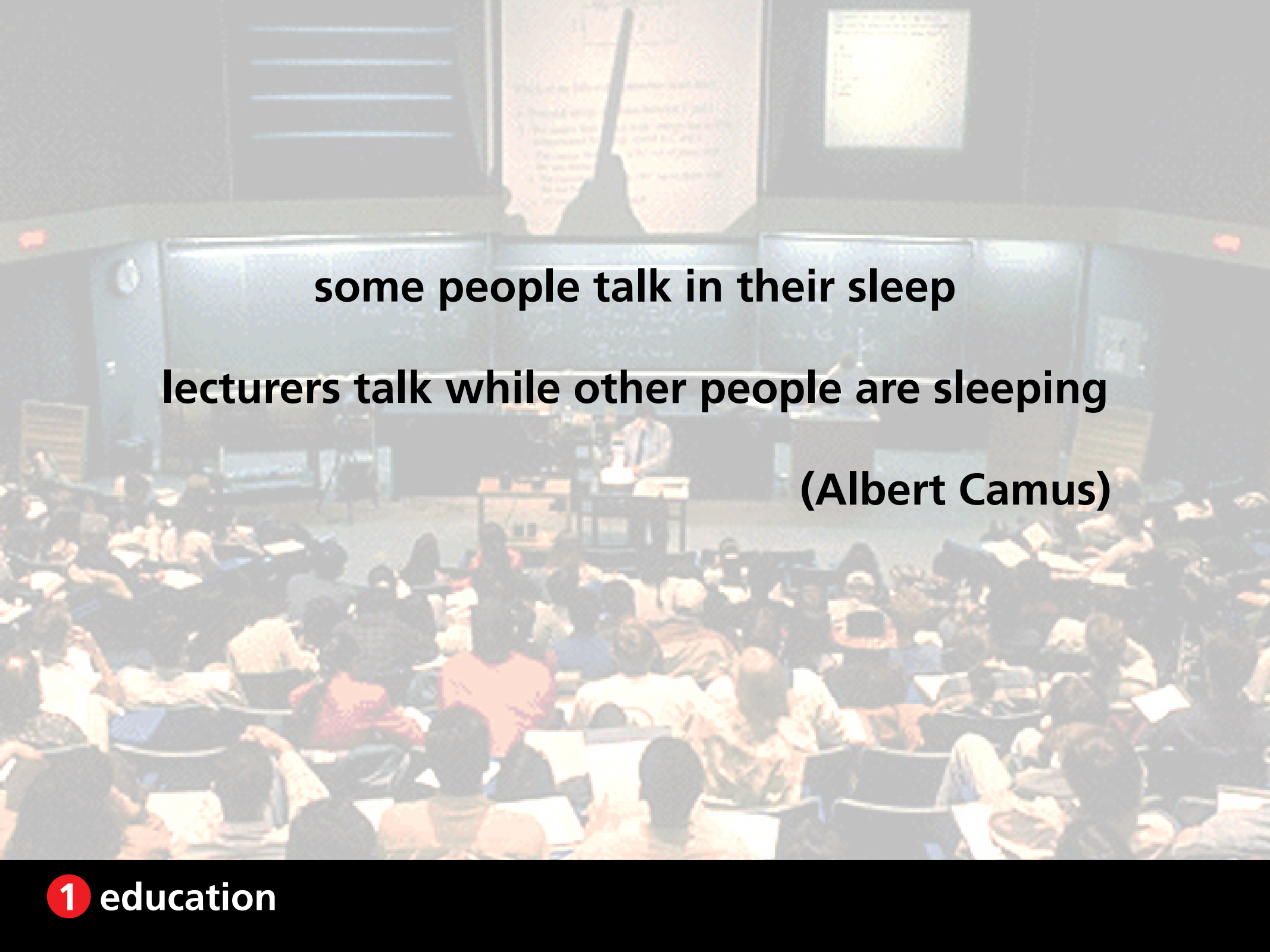




A wide-angle photograph of a large lecture hall. The room is filled with students seated in rows of chairs. Many students appear to be asleep, with their heads resting on their desks or hands. At the front of the room, a lecturer is standing near a podium, addressing the class. Behind the lecturer are several large projection screens displaying text and diagrams. The room has a high ceiling and a curved front wall.

**some people talk in their sleep**



A large lecture hall filled with students. Many students are sleeping, with their heads resting on their desks or hands. The room has a curved wall with several large screens or whiteboards at the front. A lecturer is visible at a podium in the center of the front. The overall atmosphere is one of a lecture where many students are not paying attention.

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









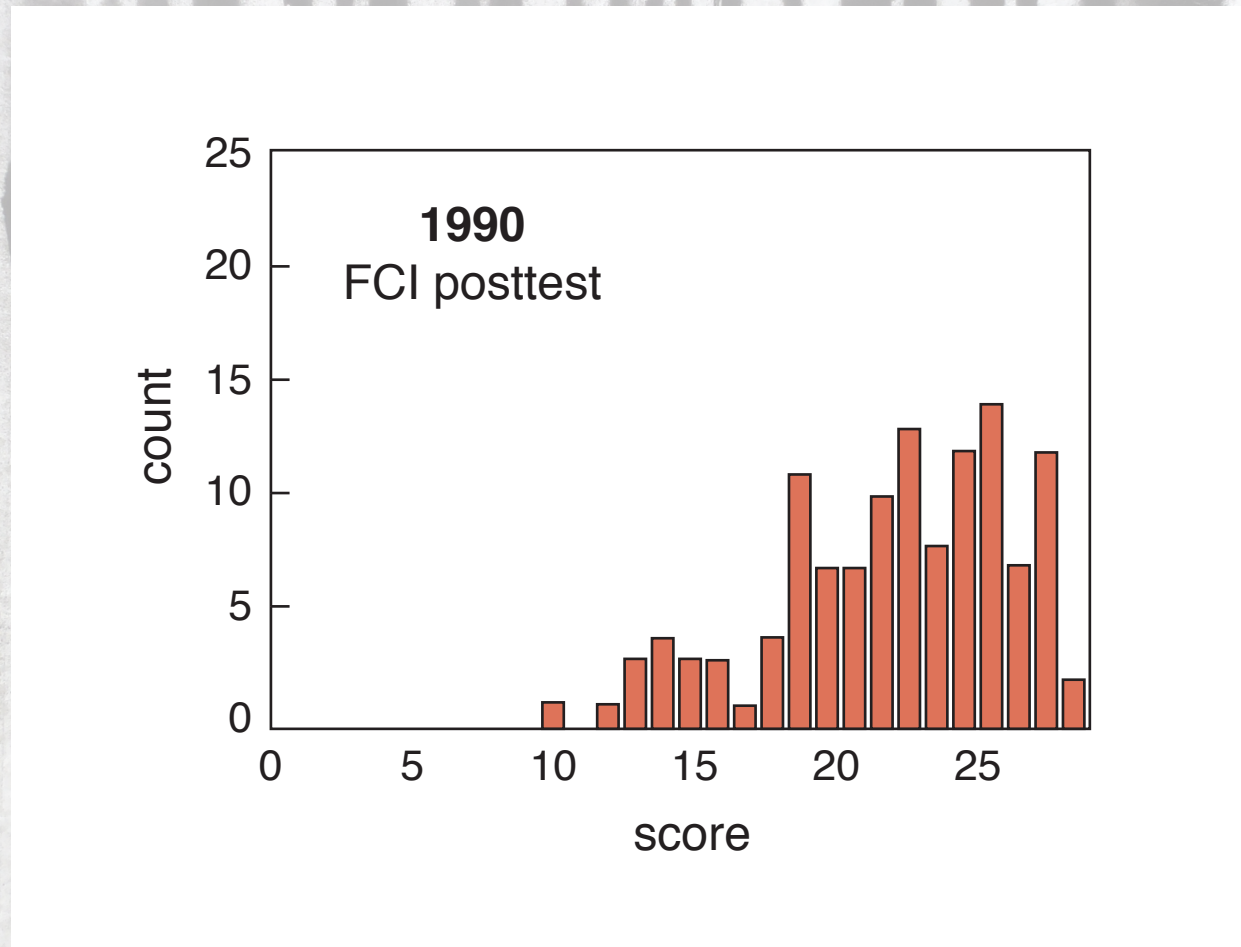


The result?

EDUCACION

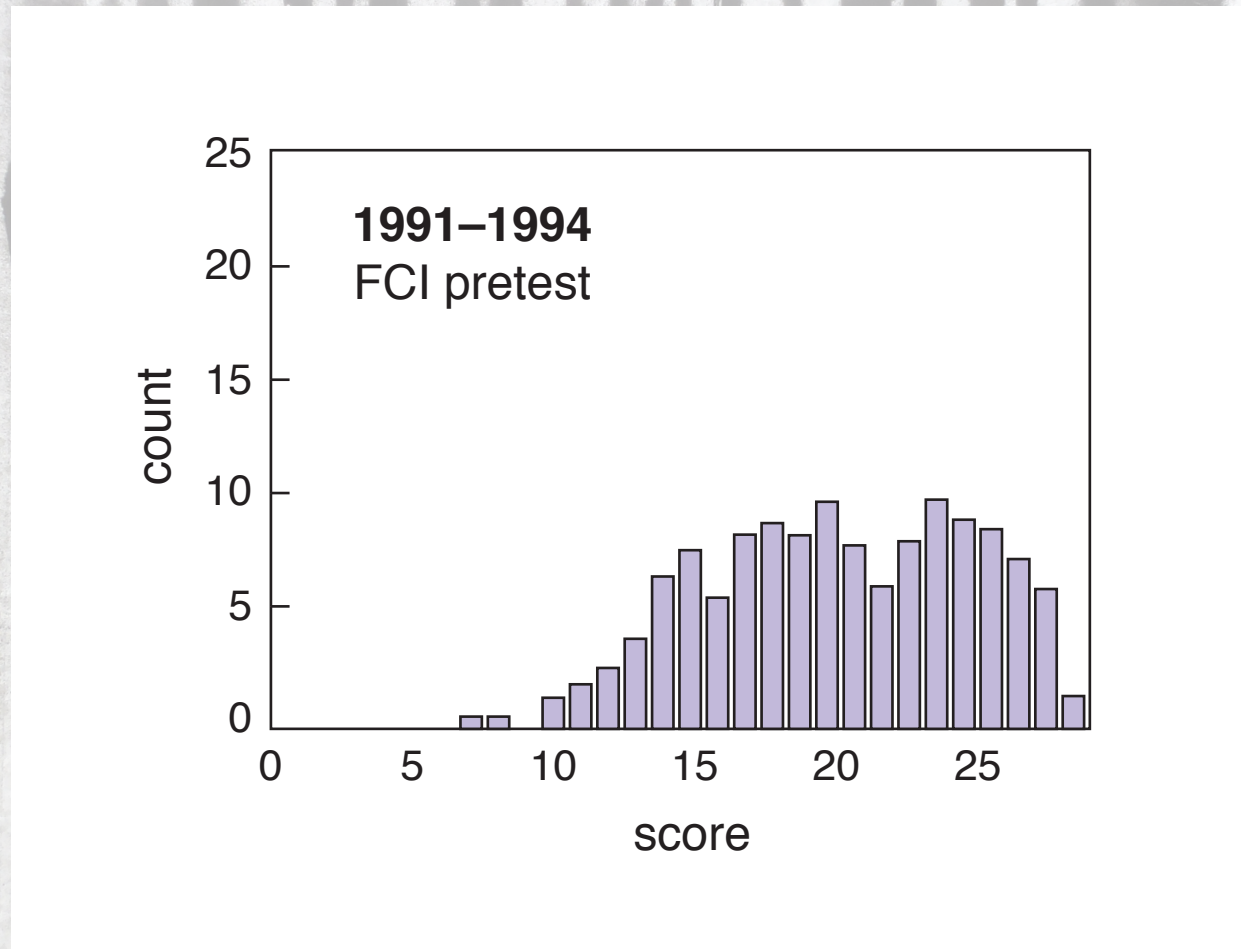


education is not just information transfer



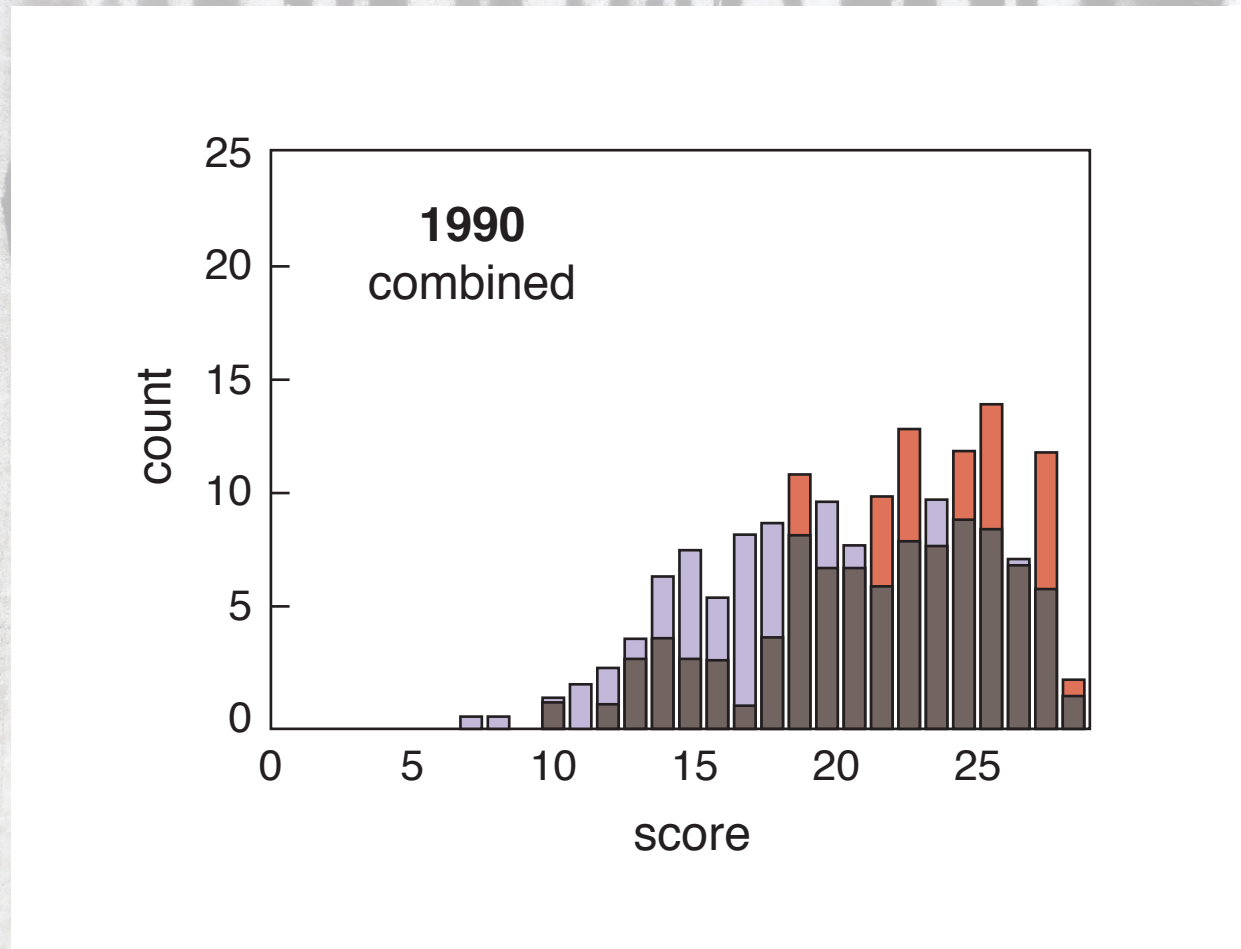


## education is not just information transfer

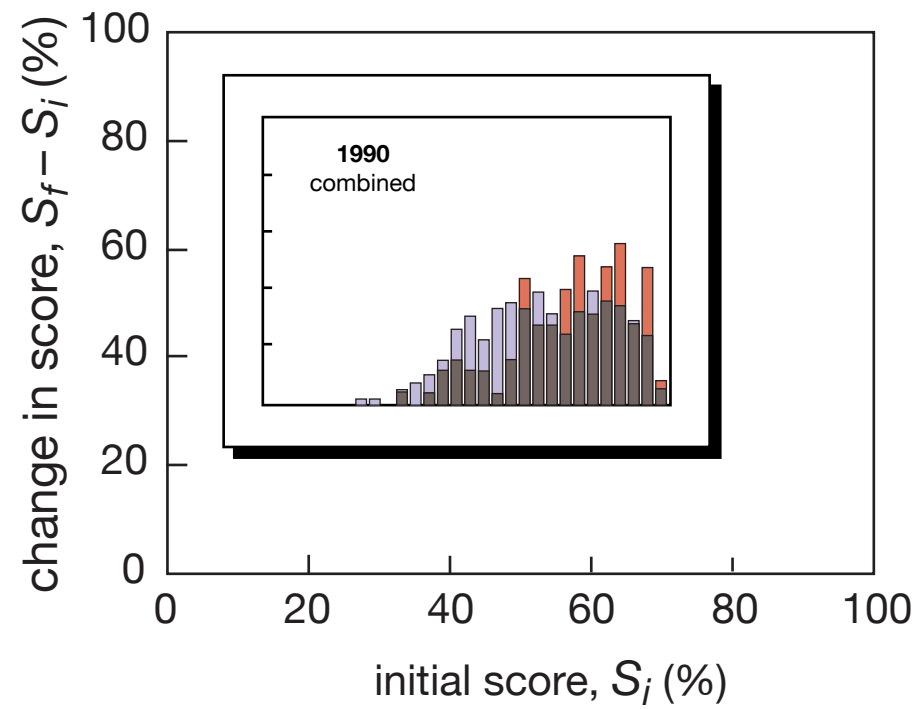




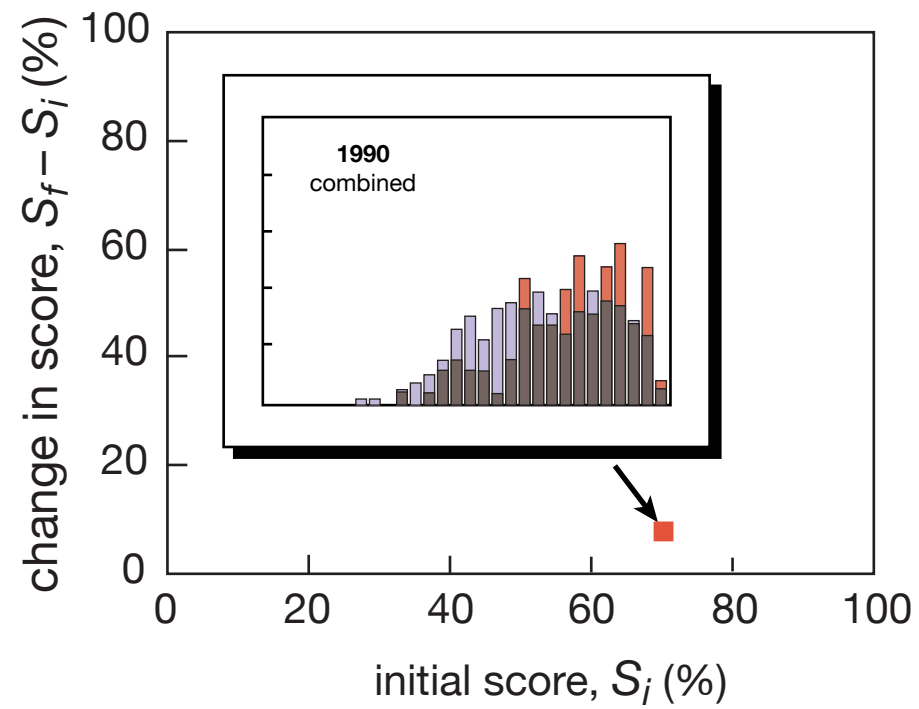
# education is not just information transfer



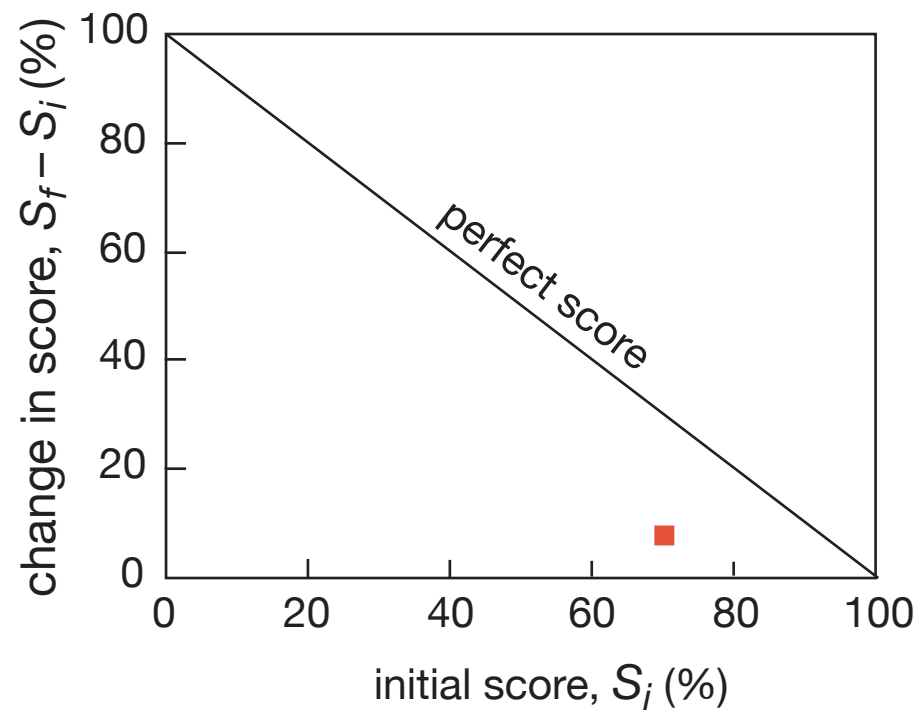




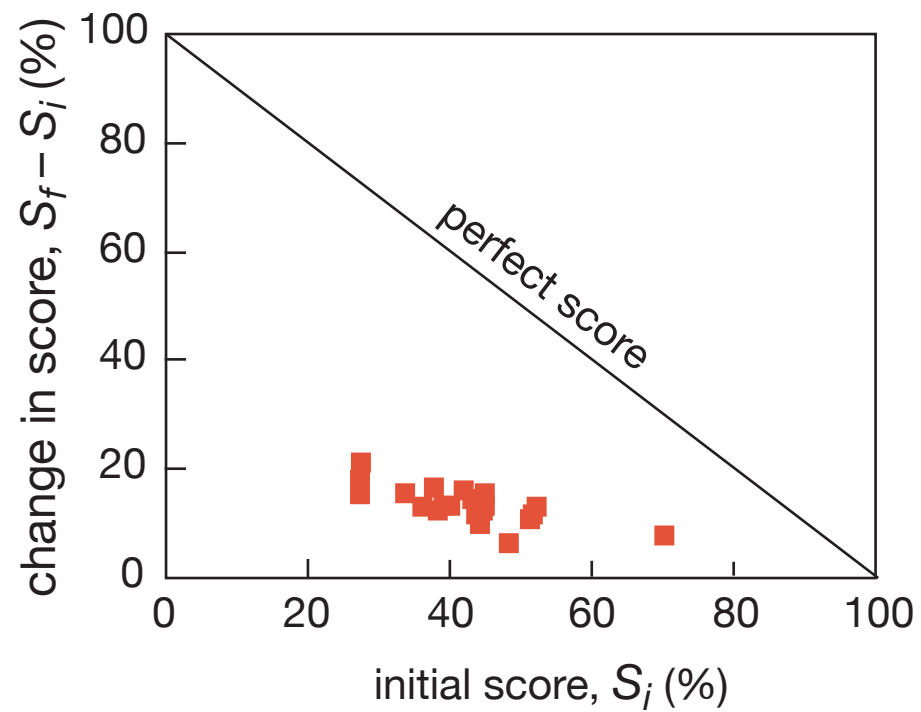








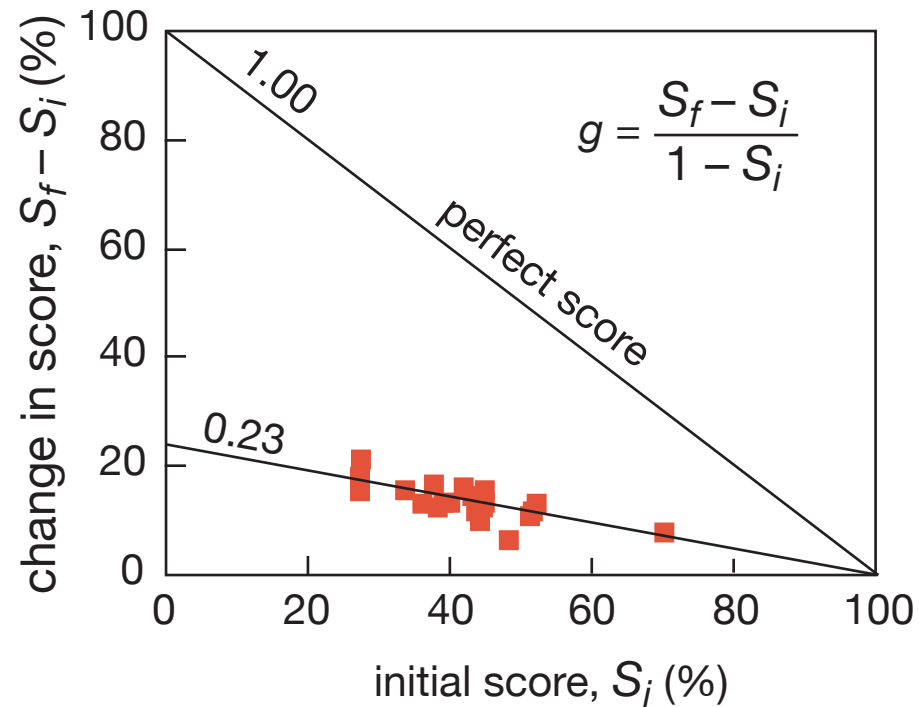




R.R. Hake, *Am. J. Phys.* 66, 64 (1998)



only one quarter of maximum gain realized



R.R. Hake, *Am. J. Phys.* 66, 64 (1998)



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









## 1. transfer of information





**1. transfer of information**

**2. assimilation of that information**





**1. transfer of information (in class)**

**2. assimilation of that information**

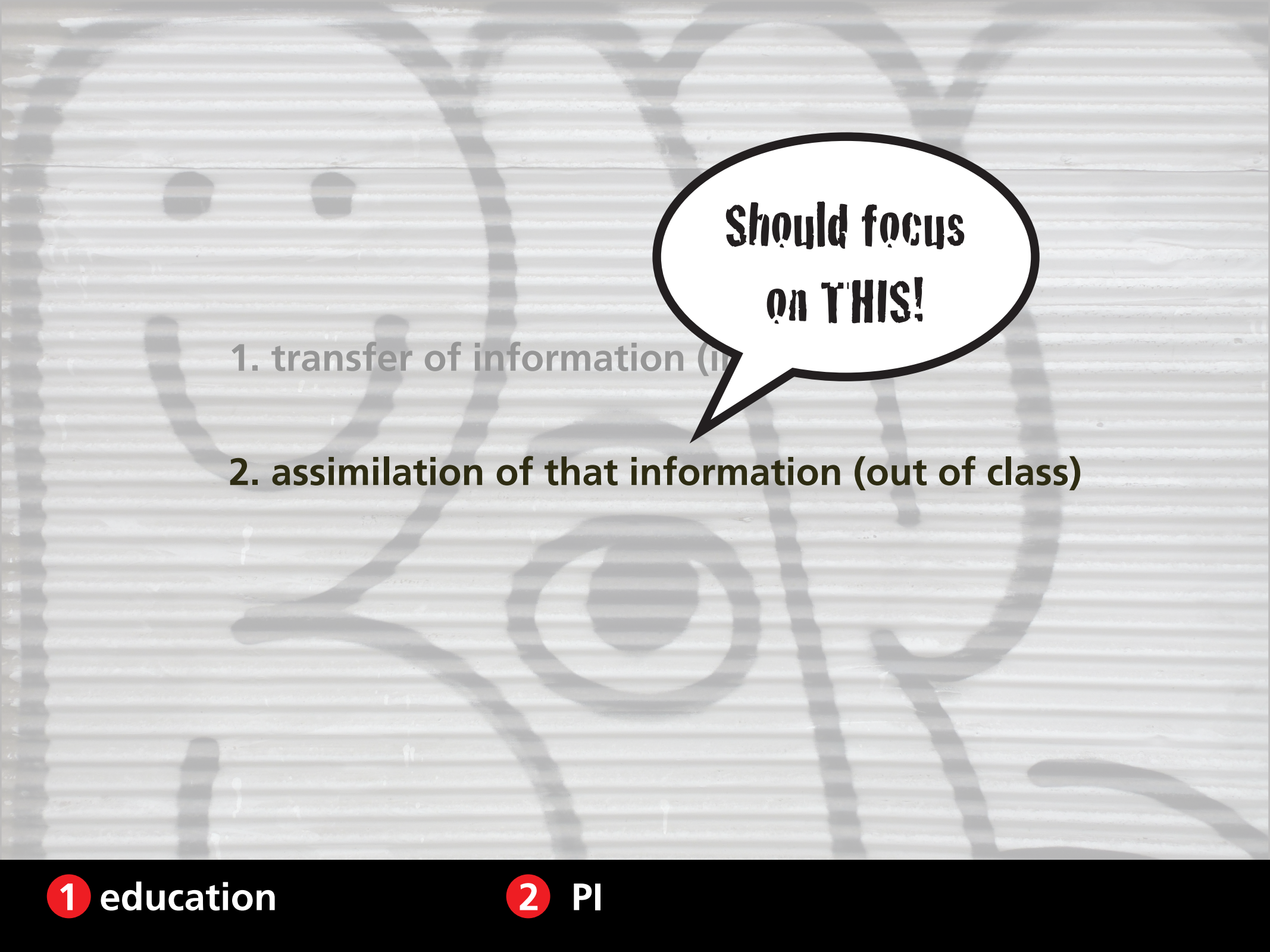




1. transfer of information (in class)

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**



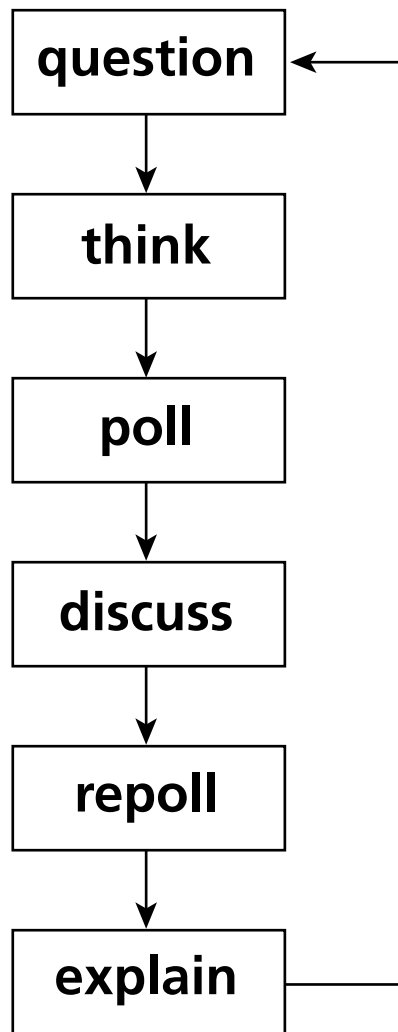
**discuss**



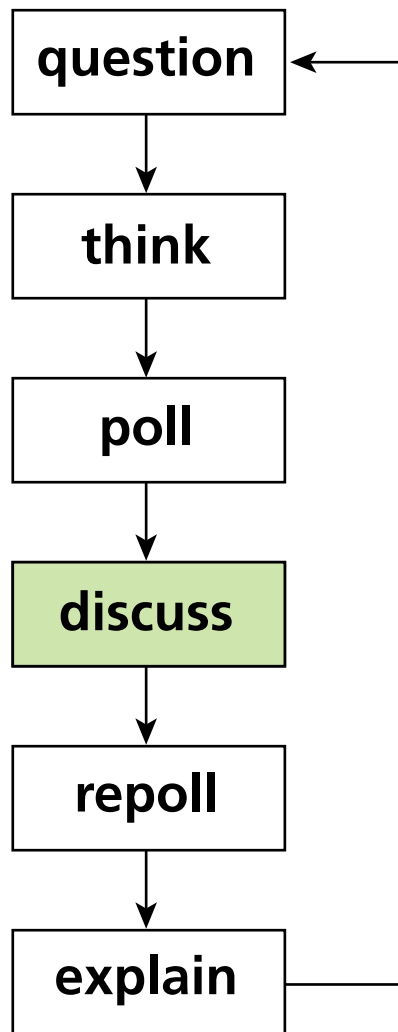
**repoll**



**explain**







1 education

2 PI





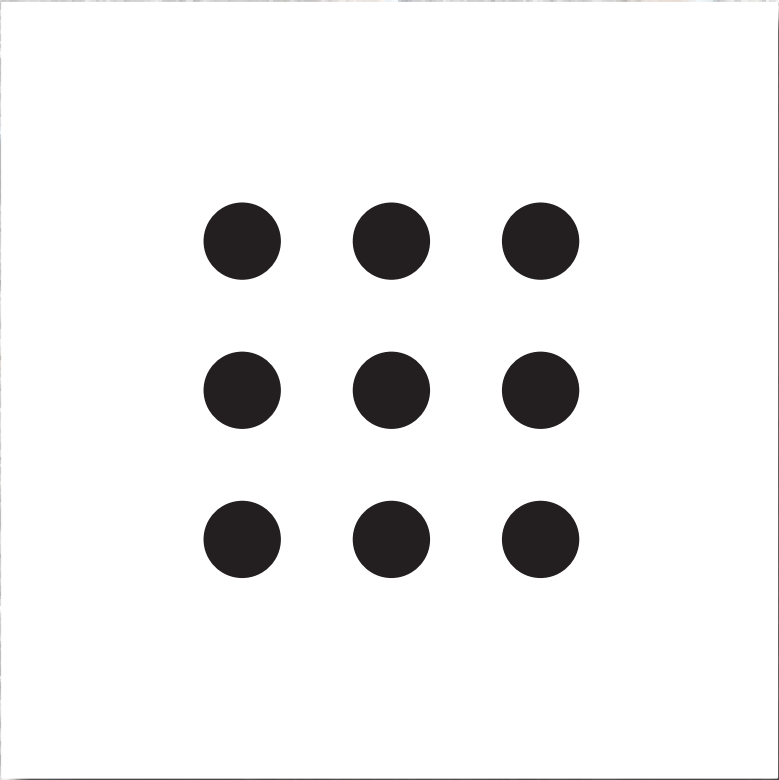
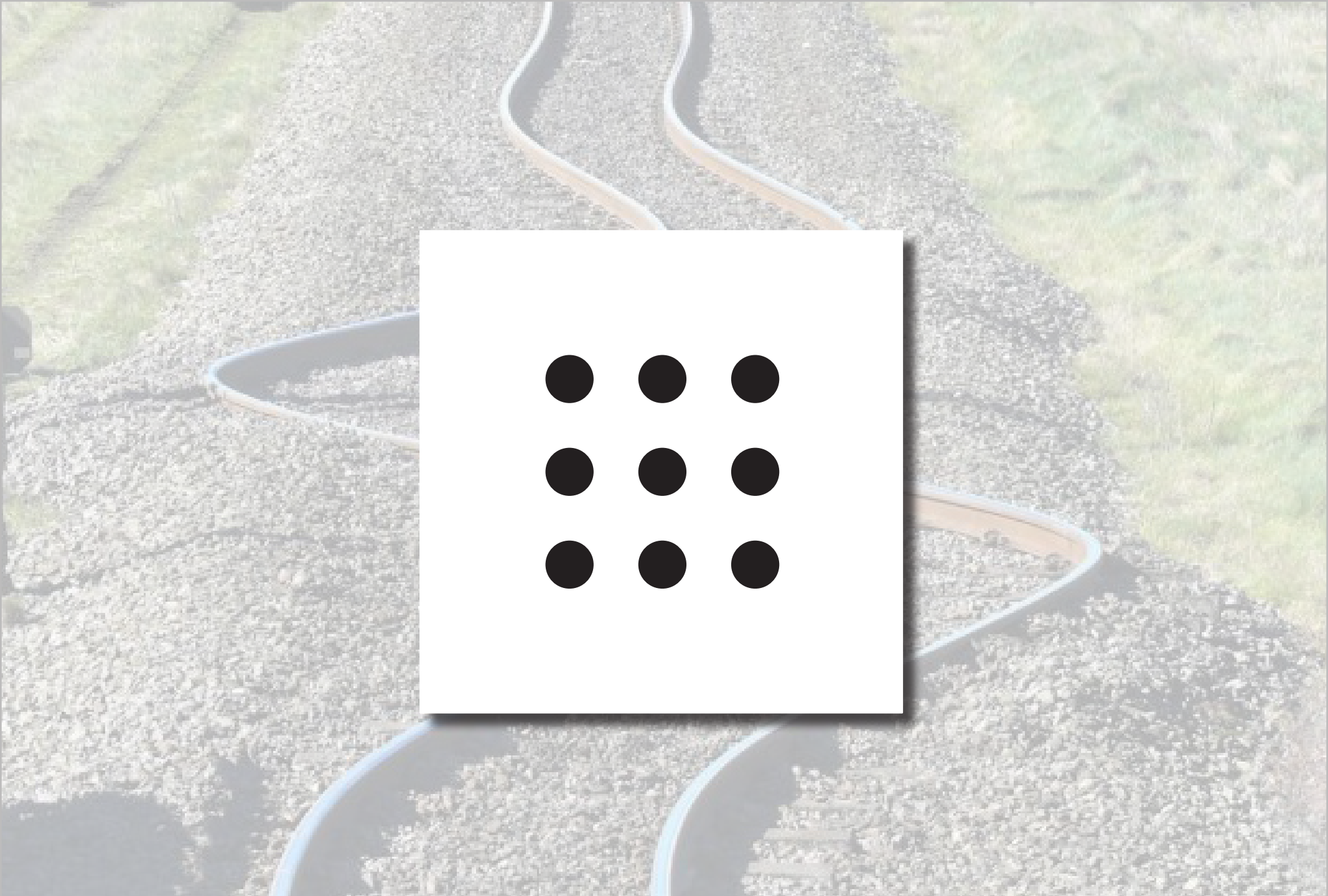
1 education

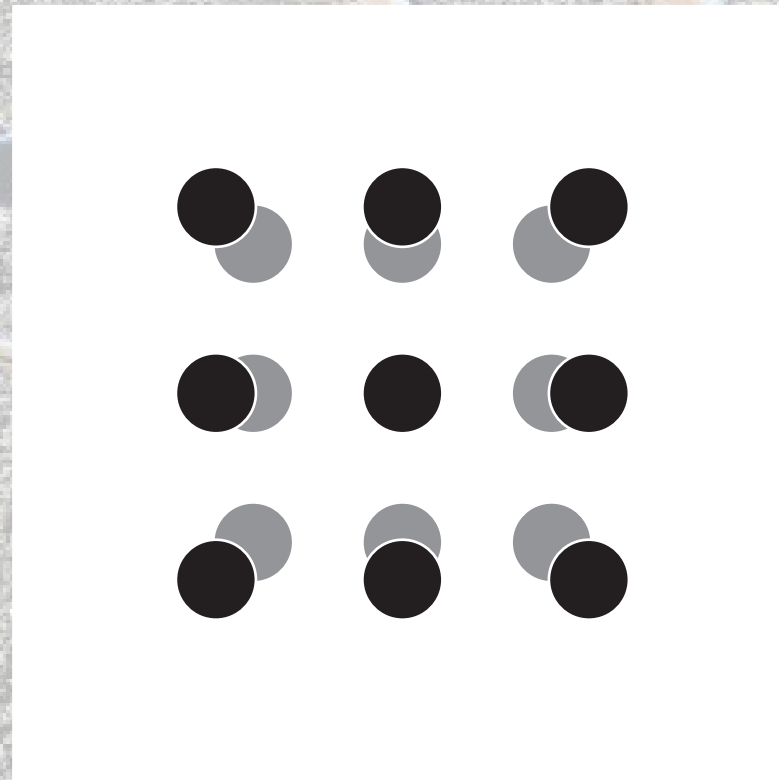
2 PI

An aerial photograph of a railway track. The track is composed of two parallel rails, which are slightly wavy, set on a bed of dark gravel. The surrounding area is green grass. The text "thermal expansion" is overlaid in the center of the image.

**thermal expansion**

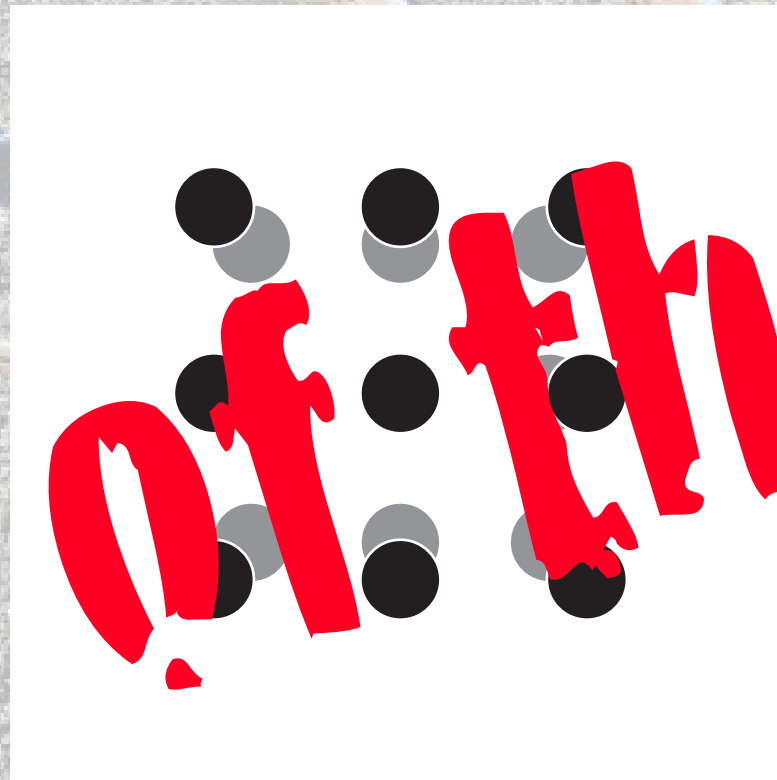








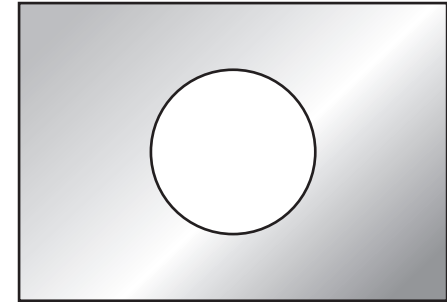
all of them



1 education

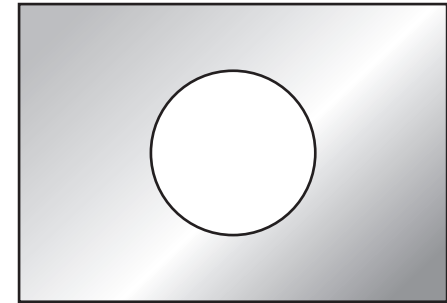
2 PI

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





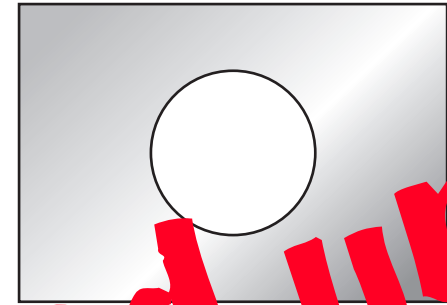
**Consider a rectangular metal plate with a circular hole in it.**



**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.



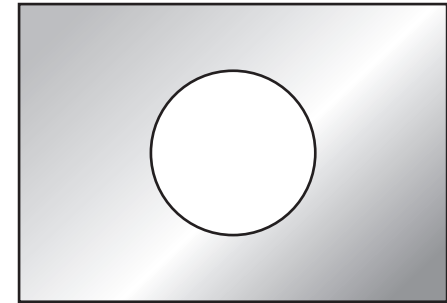
When the plate is uniformly heated, the diameter of the hole

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...**



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

**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**

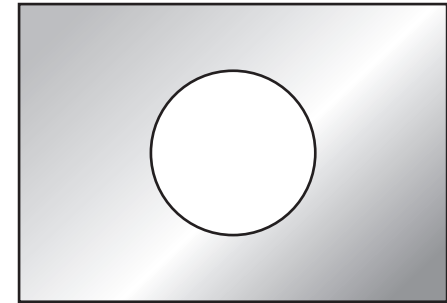
**Before I tell you the answer, let's analyze what happened.**

**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**



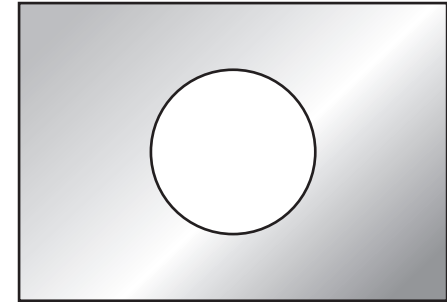
**Consider a rectangular metal plate with a circular hole in it.**



**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.**

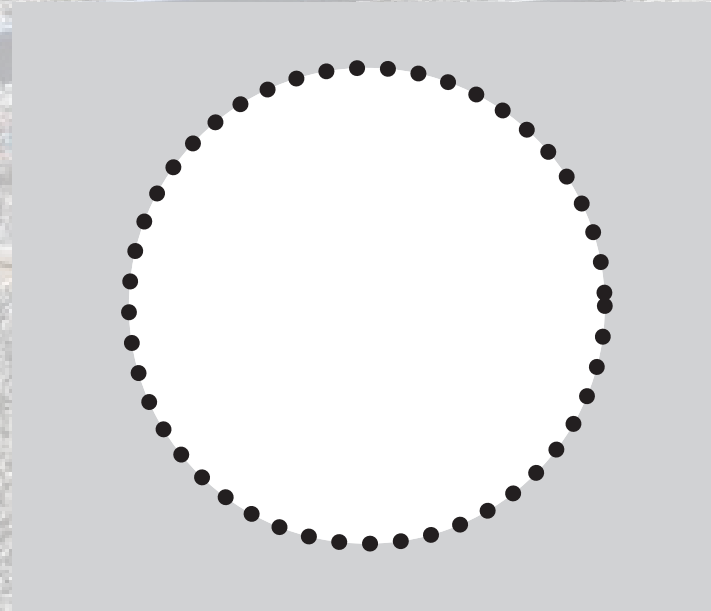


**When the plate is uniformly heated, the diameter of the hole**

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



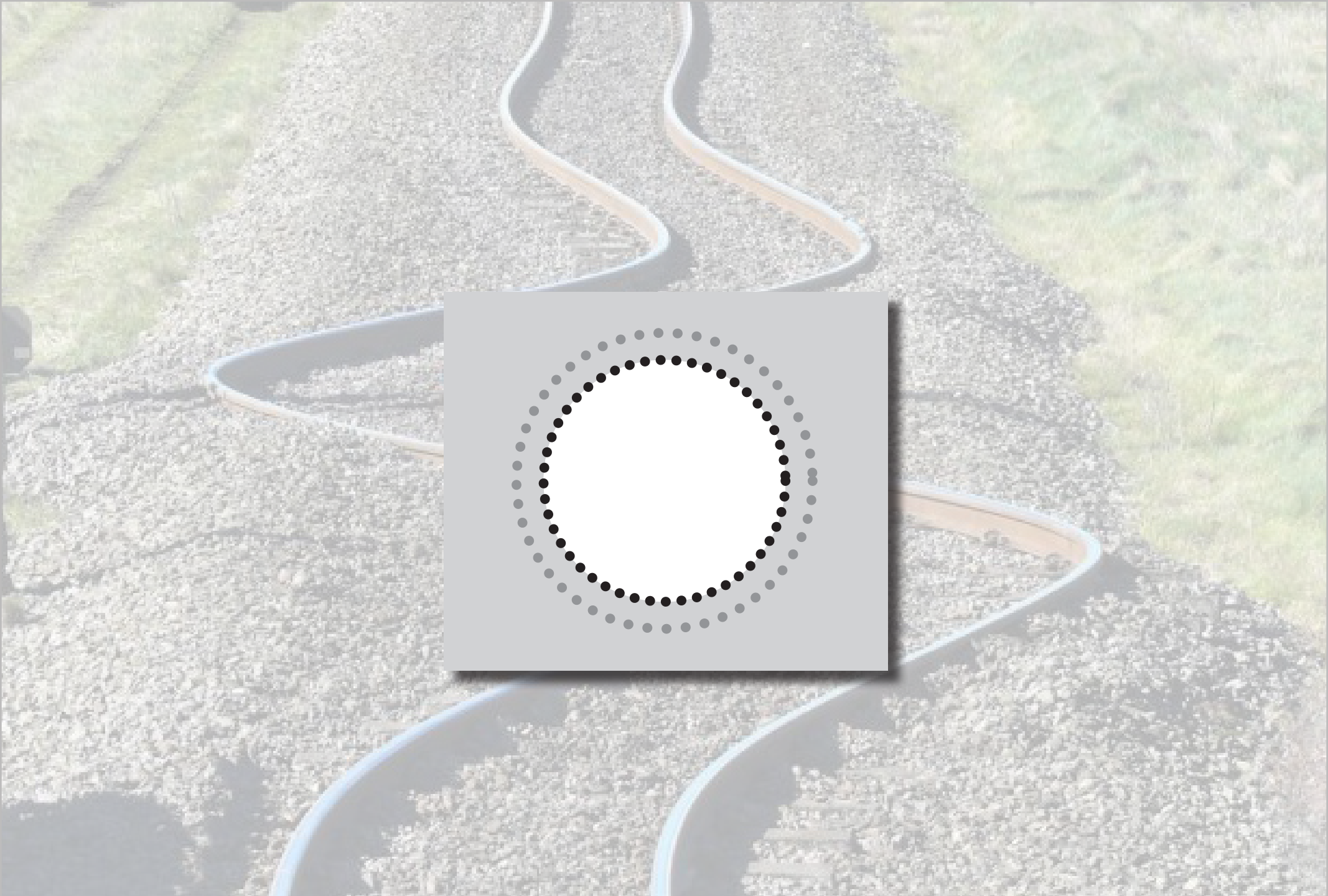
consider atoms at rim of hole



1 education

2 PI

3 test



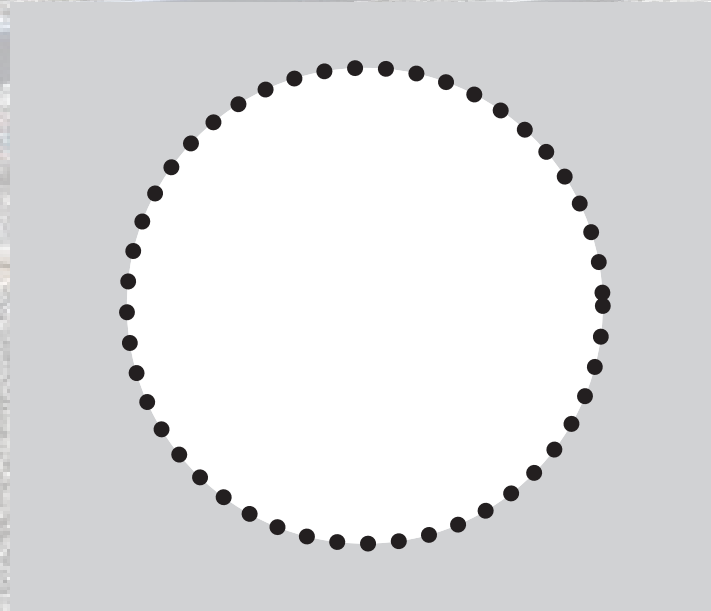
**1** education

**2** PI

**3** test



consider atoms at rim of hole

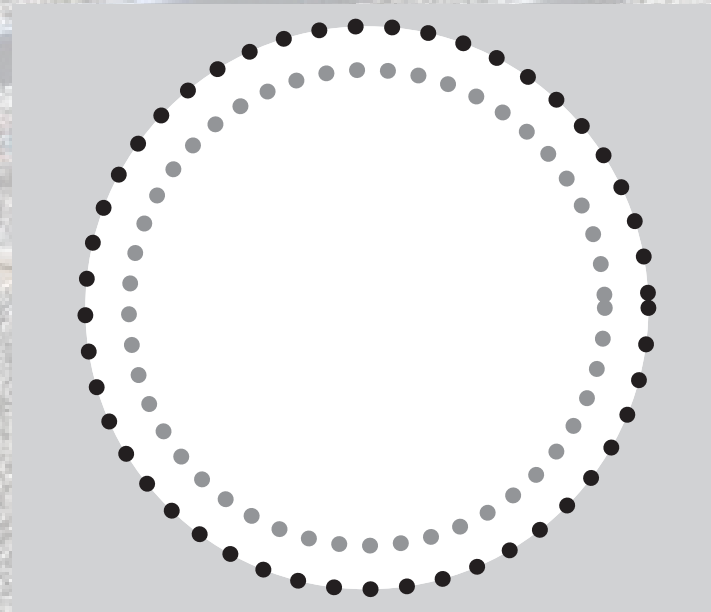


**1** education

**2** PI

**3** test

consider atoms at rim of hole





consider atoms at rim of hole

you won't forget this

1 education

2 PI

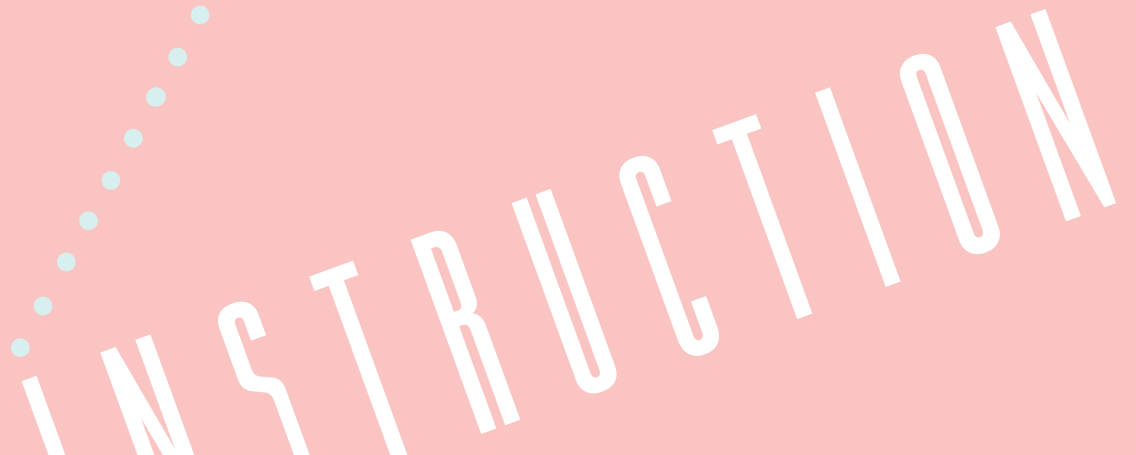
3 test



Peer



back to PI



INSTRUCTION

1 education

2 PI

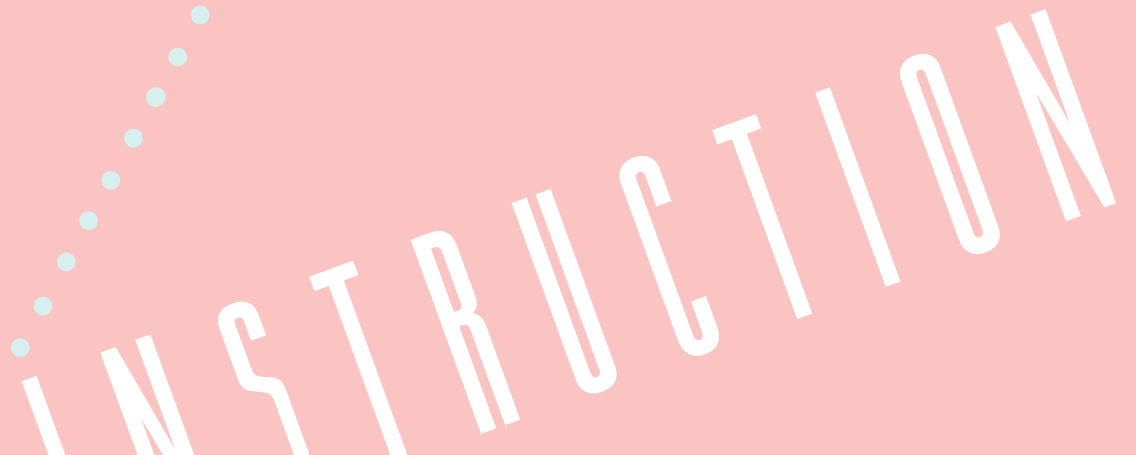
3 test





Peer

is it any good?



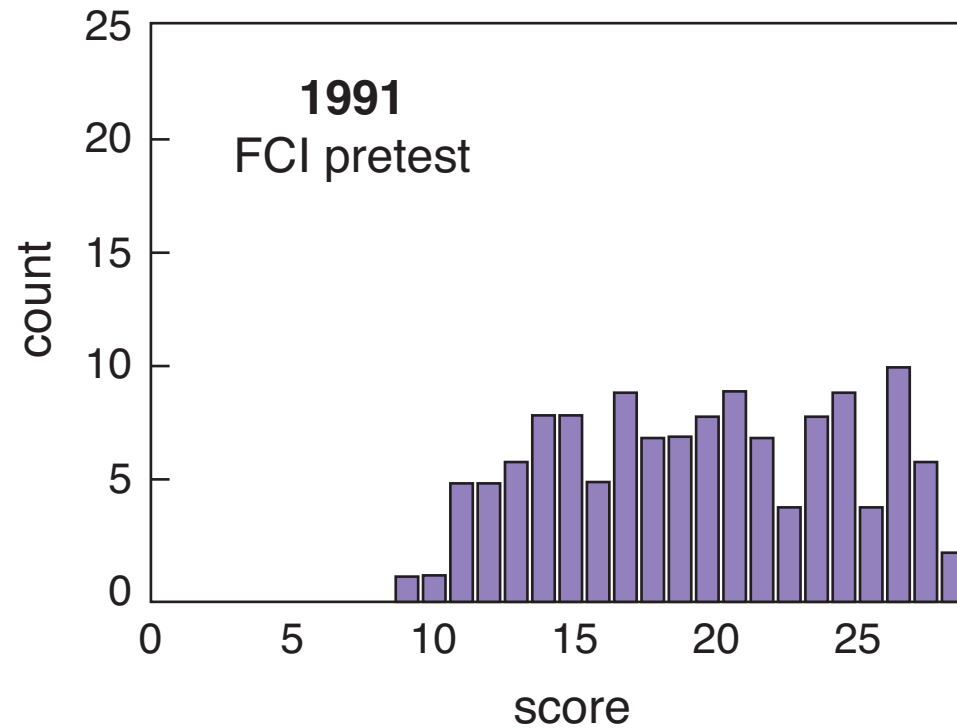
INSTRUCTION

1 education

2 PI

3 test

## first year of implementing PI

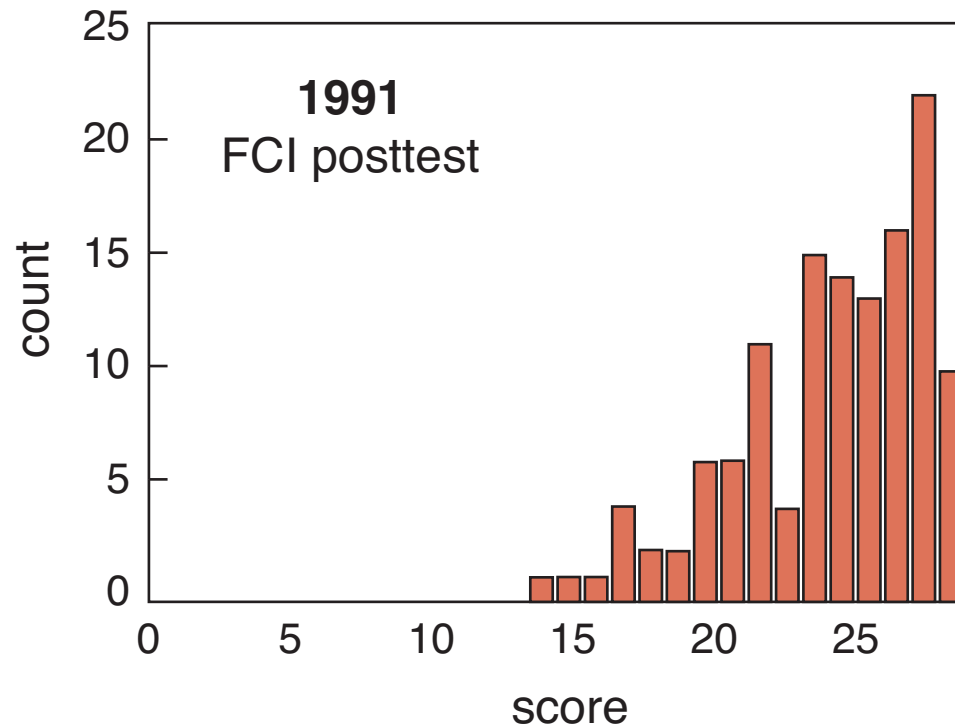


1 education

2 PI

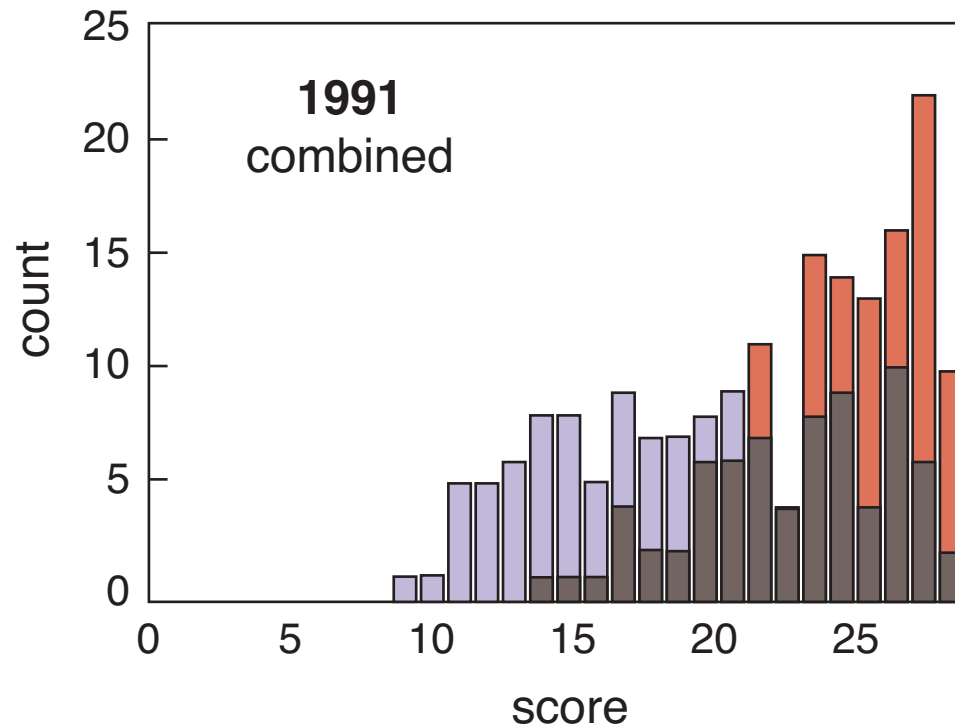
3 test

## first year of implementing PI





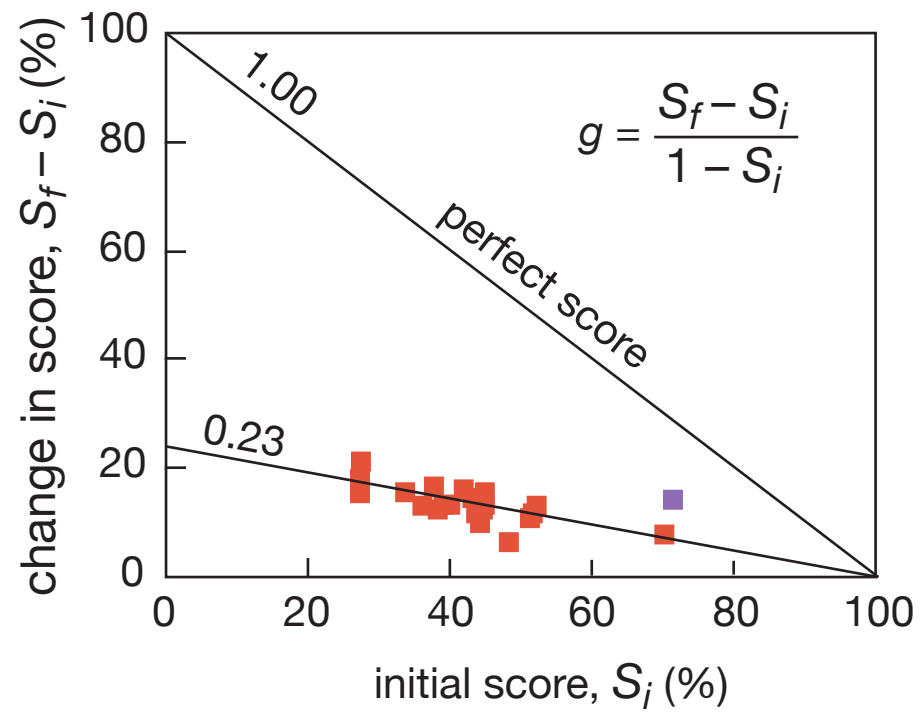
## first year of implementing PI



1 education

2 PI

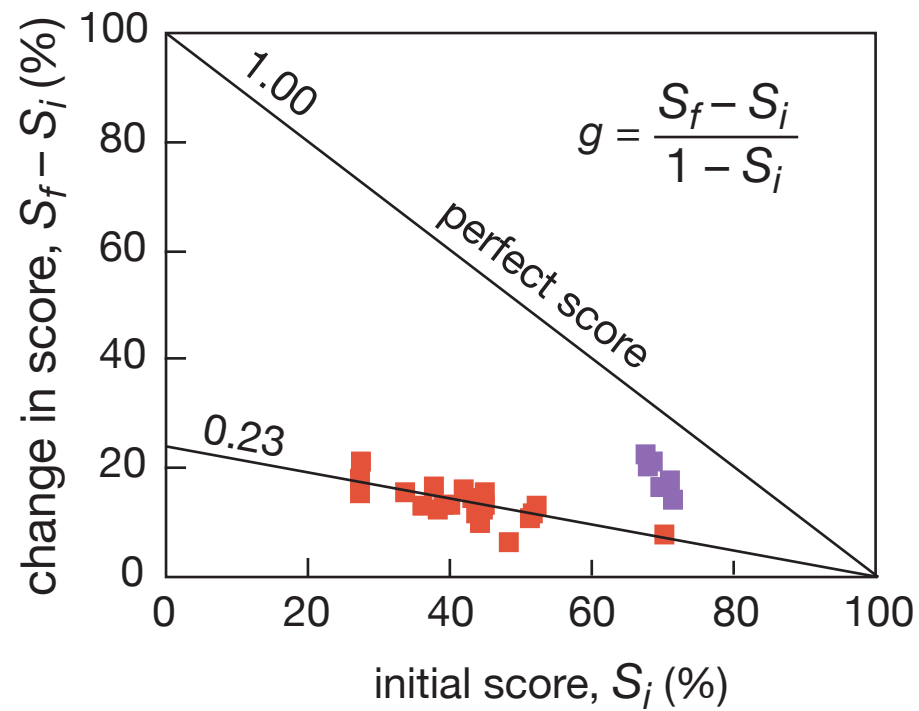
3 test



1 education

2 PI

3 test

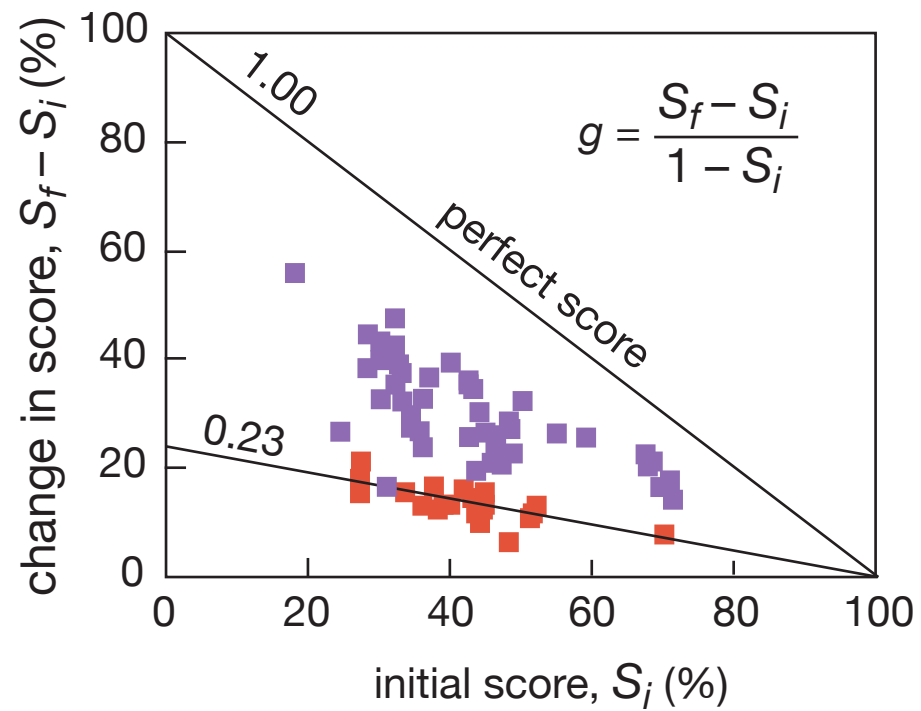


1 education

2 PI

3 test



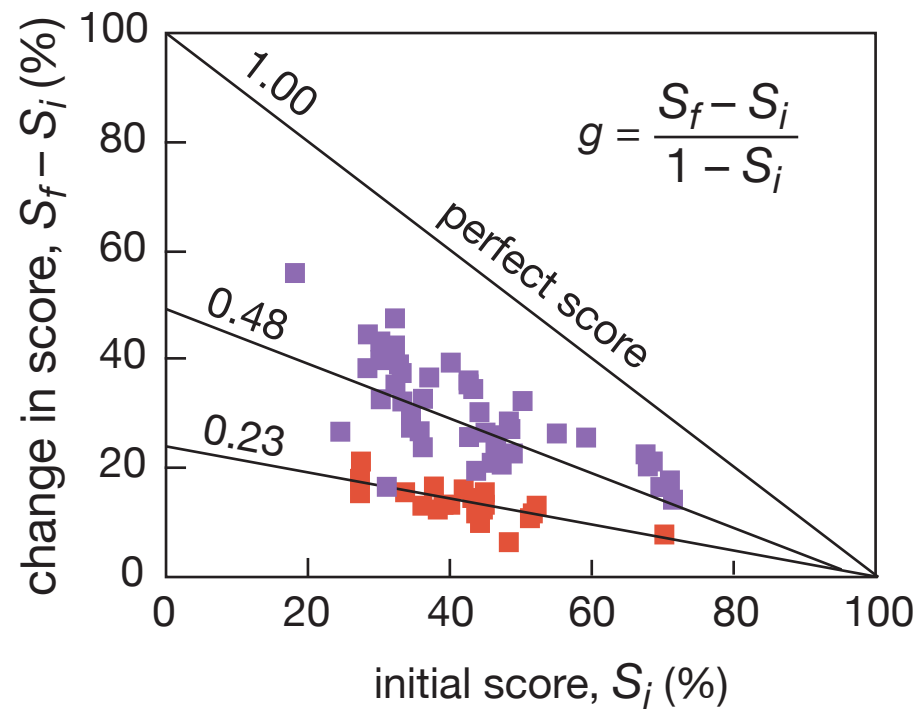


R.R. Hake, *Am. J. Phys.* 66, 64 (1998)

1 education

2 PI

3 test



R.R. Hake, *Am. J. Phys.* 66, 64 (1998)

1 education

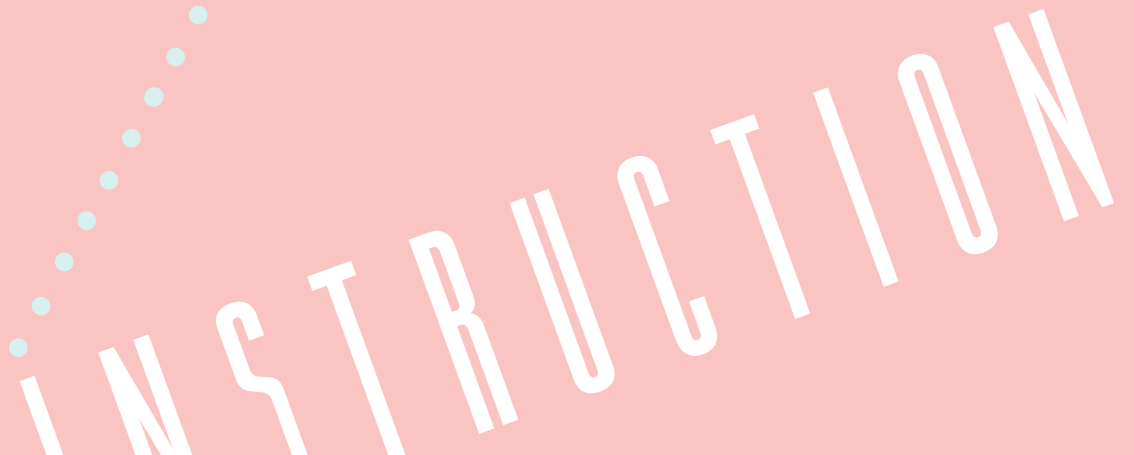
2 PI

3 test



# Peer

**what about problem solving?**



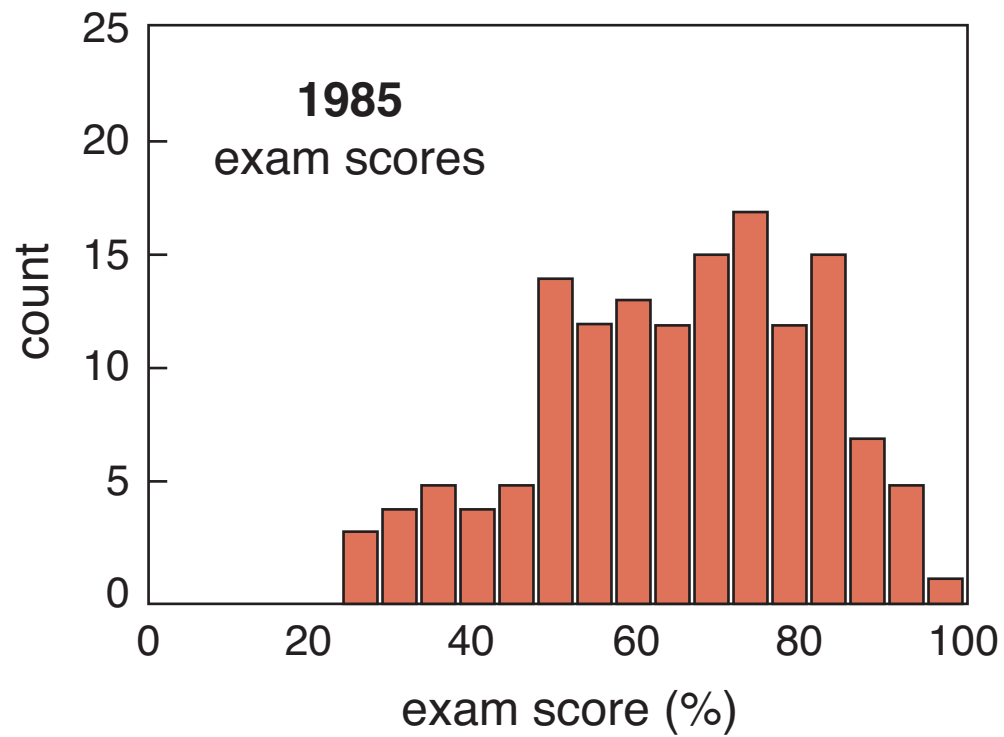
# INSTRUCTION

**1** education

**2** PI

**3** test

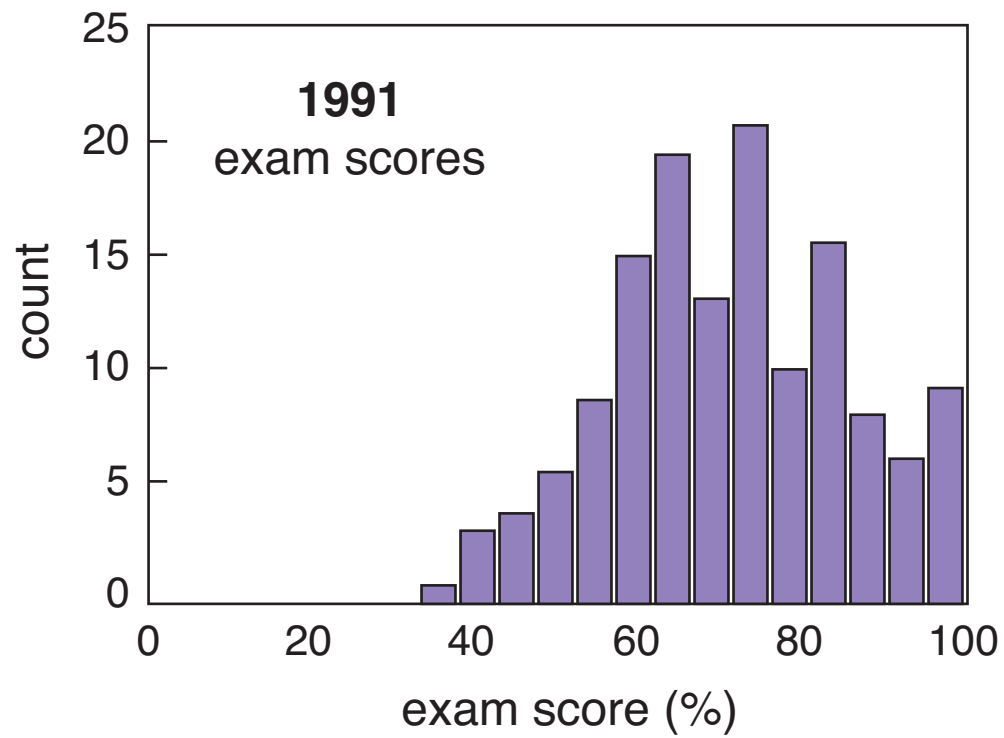




1 education

2 PI

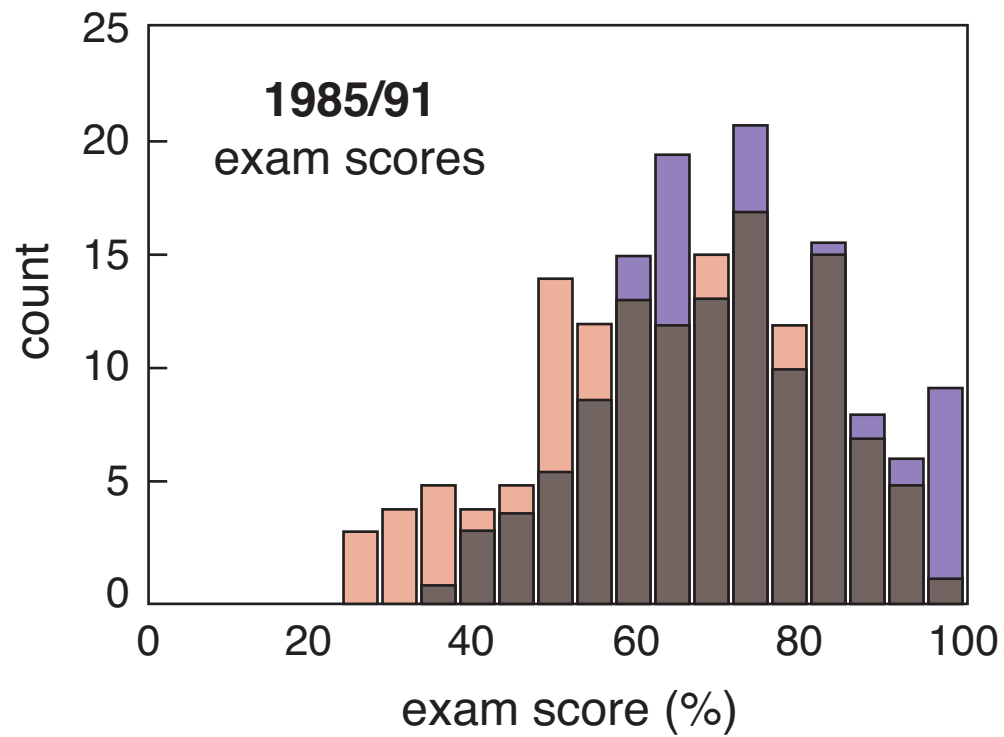
3 test



1 education

2 PI

3 test



1 education

2 PI

3 test





**So better understanding leads to better  
problem solving!**

**1** education

**2** PI

**3** test



**So better understanding leads to better problem solving!**

**(but “good” problem solving doesn’t always indicate understanding!)**

**1 education**

**2 PI**

**3 test**





**1** education

**2** PI

**3** test



in a lecture, students...

**1** education

**2** PI

**3** test



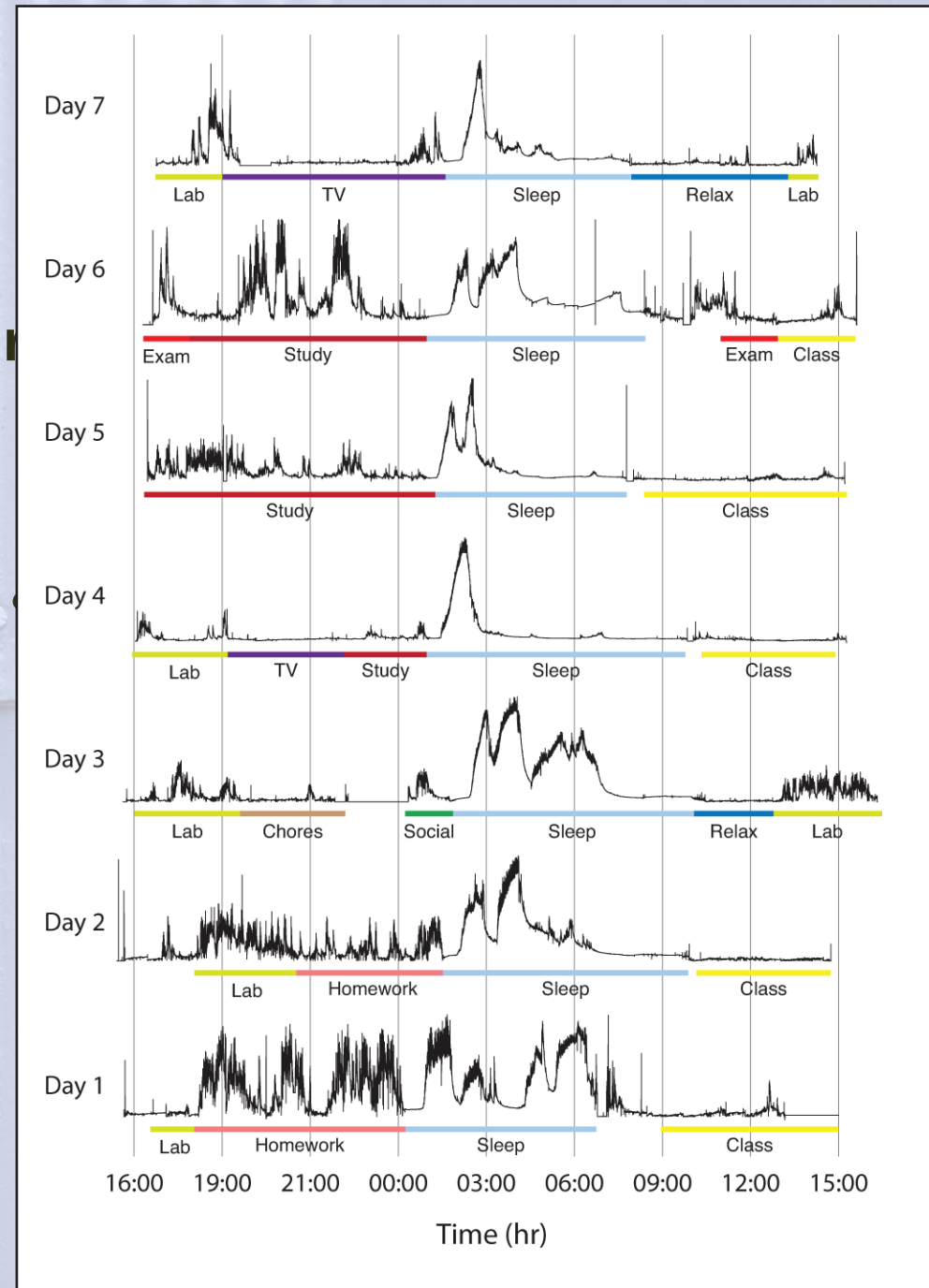
**in a lecture, students...**

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



in a lecture

1. don't pay utmost



doi: 10.1109/TBME.2009.2038487

1 education

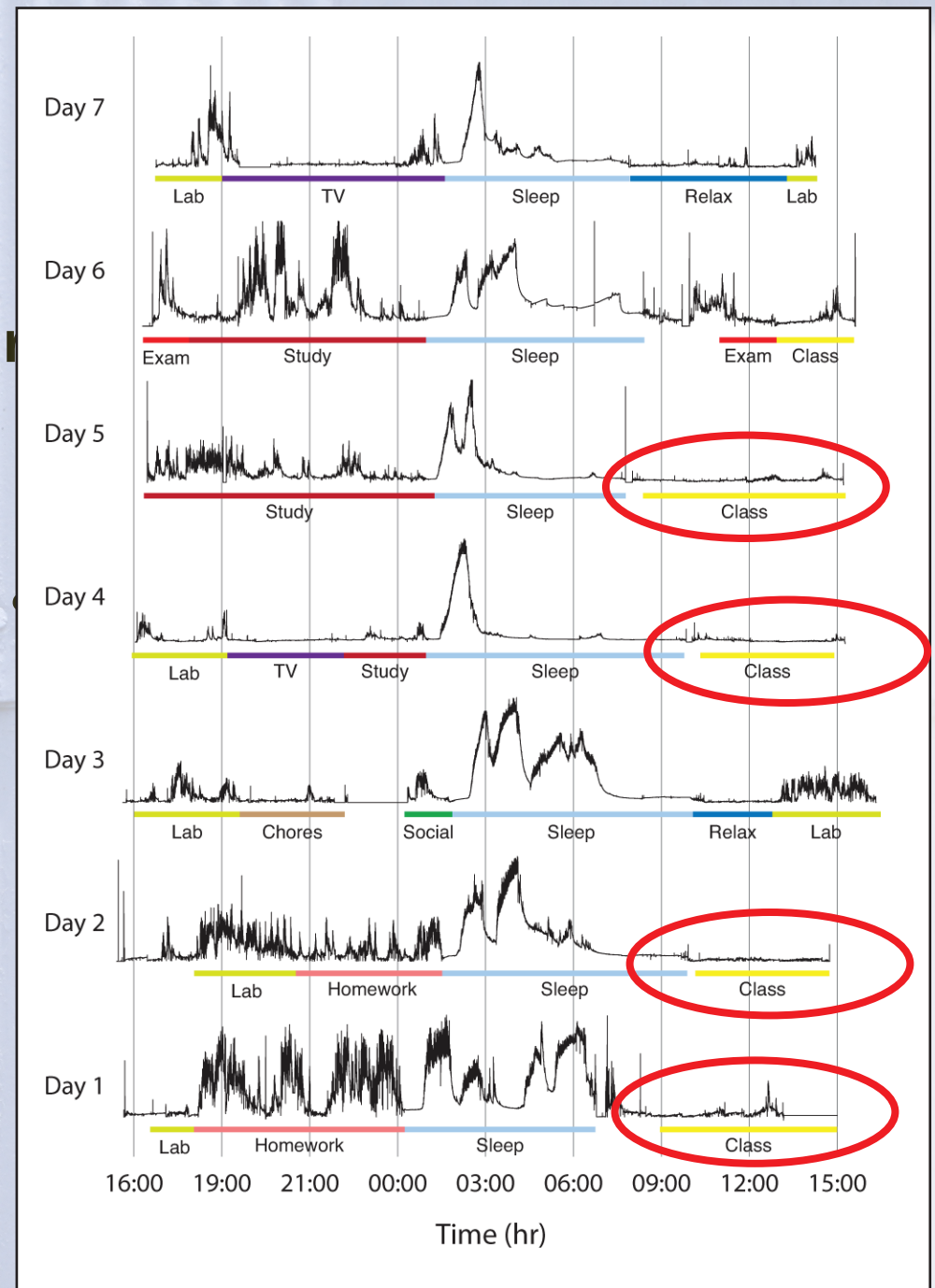
2 PI

3 test



in a lecture

1. don't pay utmost



doi: 10.1109/TBME.2009.2038487

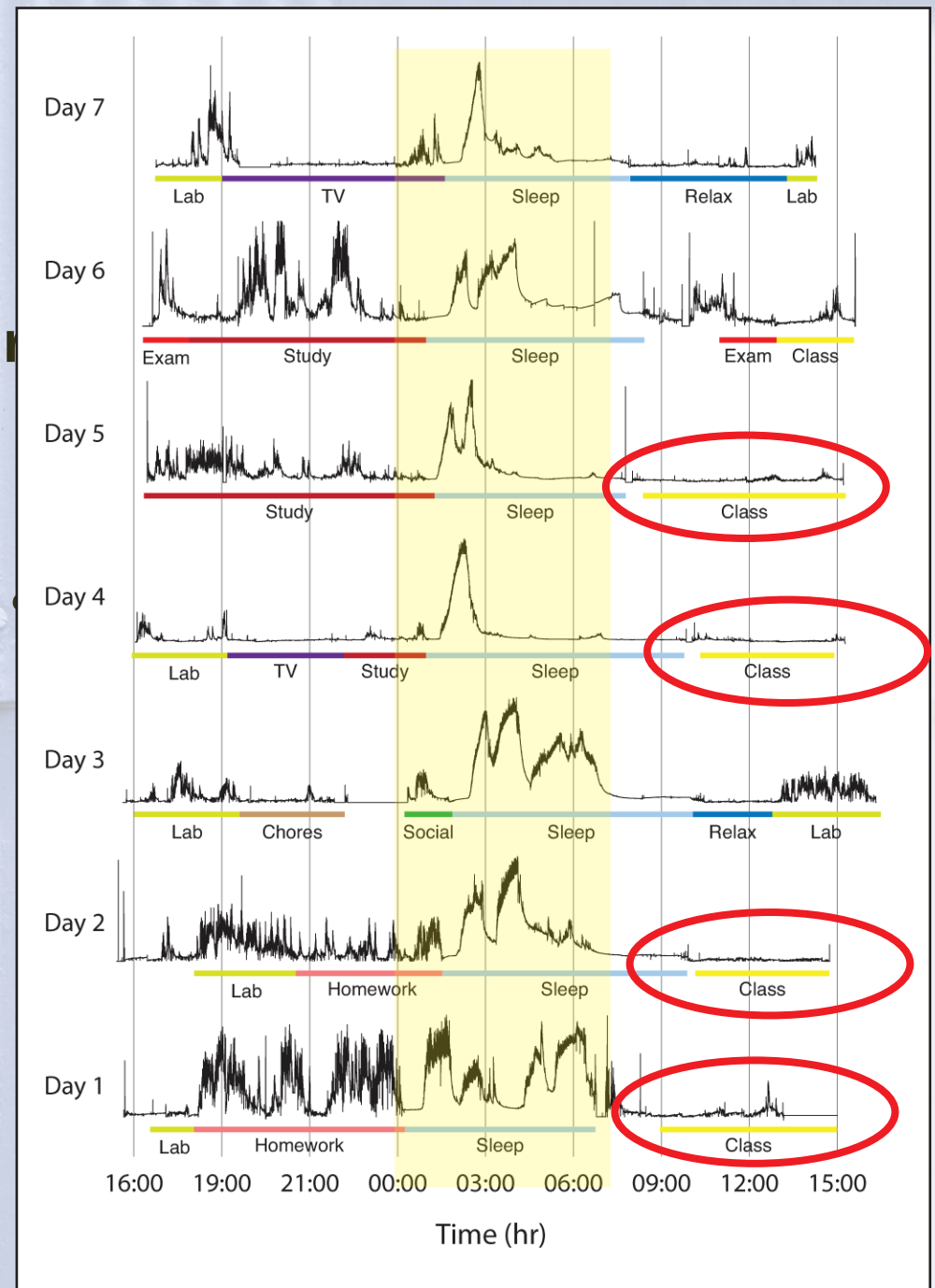
1 education

2 PI

3 test

in a lecture

1. don't pay utmost



doi: 10.1109/TBME.2009.2038487

1 education

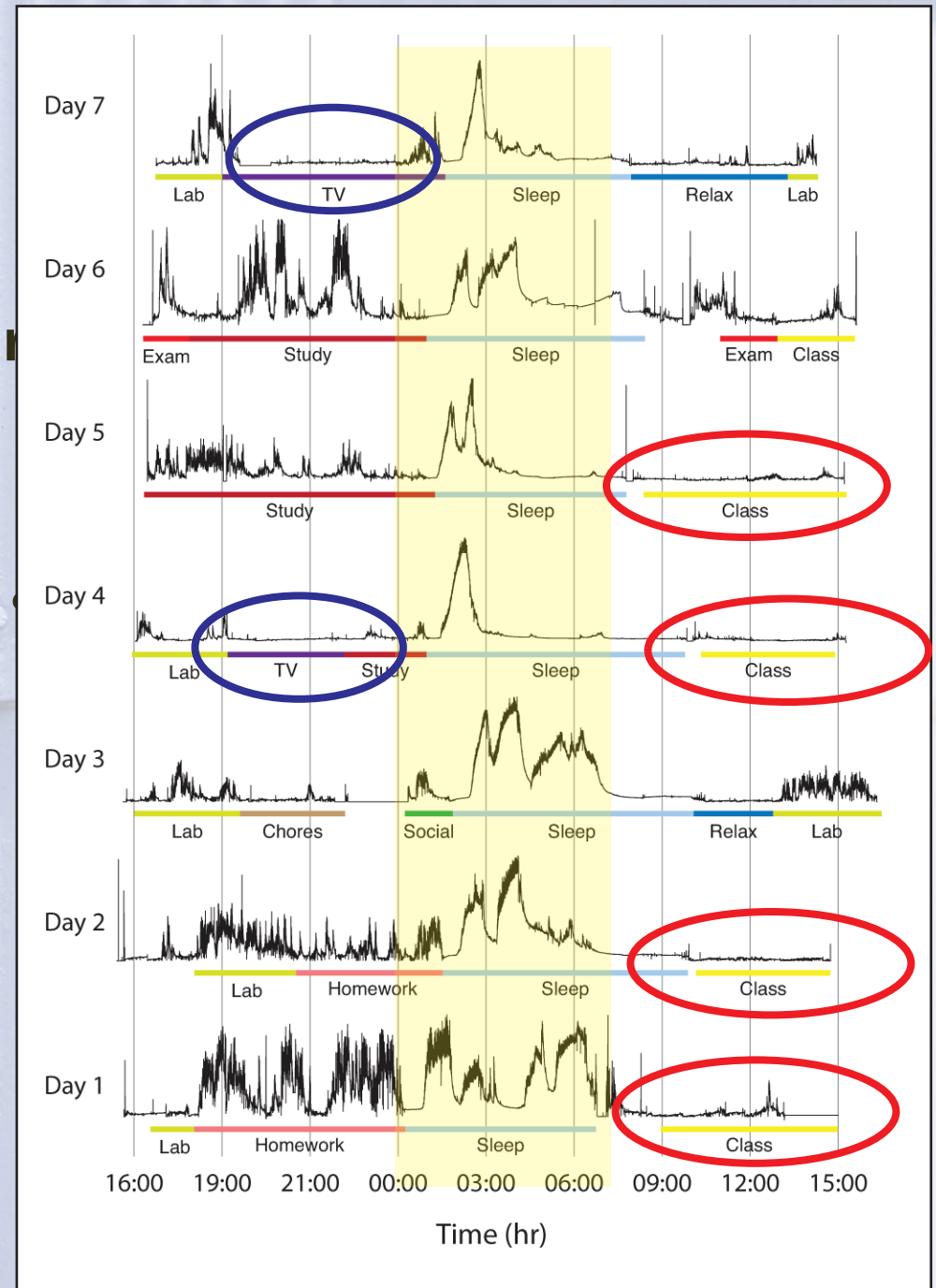
2 PI

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**



**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



The background is a faded, classical-style painting. It depicts a face, possibly a classical figure, with multiple eyes visible. The face is rendered in a pale, yellowish-tan color, and the eyes are large and detailed. The overall style is reminiscent of a classical portrait, but with a surreal twist of multiple eyes. The text 'an illusion...' is overlaid in a bold, red, serif font.

**an illusion. . .**

**1** education

**2** PI

**3** test



**Education is not just about:**

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

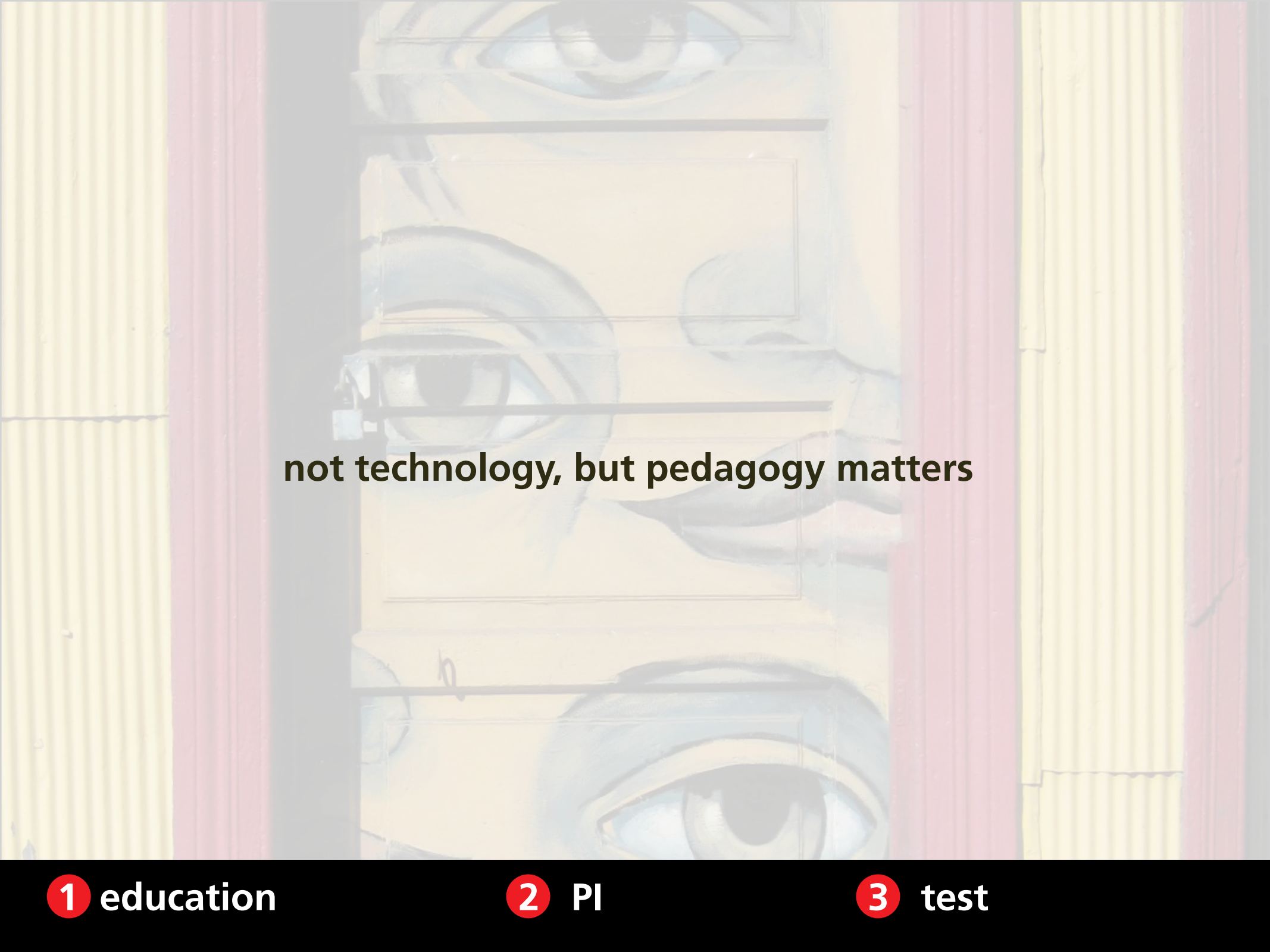




**Education is not just about:**

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

**active participation a must!**



**not technology, but pedagogy matters**

**1** education

**2** PI

**3** test



**Join now!**

**PeerInstruction.net**



**Funding:**

**National Science Foundation**

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