

Confessions of a converted lecturer



ECEL 2012
Universiteit Groningen
Groningen, Netherlands, 26 October 2012



Confessions of a converted lecturer



@eric_mazur

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Think of something you are good at

EDUCACION

Think of something you are good at

How did you become good at this?

EDUCACION



11

- The first step in the derivation of the...
- The second step is to...
- The third step is to...
- The fourth step is to...
- The fifth step is to...

1	2	3
4	5	6
7	8	9
10	11	12
13	14	15
16	17	18
19	20	21
22	23	24
25	26	27
28	29	30
31	32	33
34	35	36
37	38	39
40	41	42
43	44	45
46	47	48
49	50	51
52	53	54
55	56	57
58	59	60
61	62	63
64	65	66
67	68	69
70	71	72
73	74	75
76	77	78
79	80	81
82	83	84
85	86	87
88	89	90
91	92	93
94	95	96
97	98	99
100	101	102

Equation 1

$$\frac{d}{dt} \left(\frac{1}{r} \right) = -\frac{1}{r^2} \frac{dr}{dt}$$

Equation 2

$$\frac{d}{dt} \left(\frac{1}{r} \right) = -\frac{1}{r^2} \frac{dr}{dt}$$

Equation 3

$$\frac{d}{dt} \left(\frac{1}{r} \right) = -\frac{1}{r^2} \frac{dr}{dt}$$








1 education

2 PI

3 results

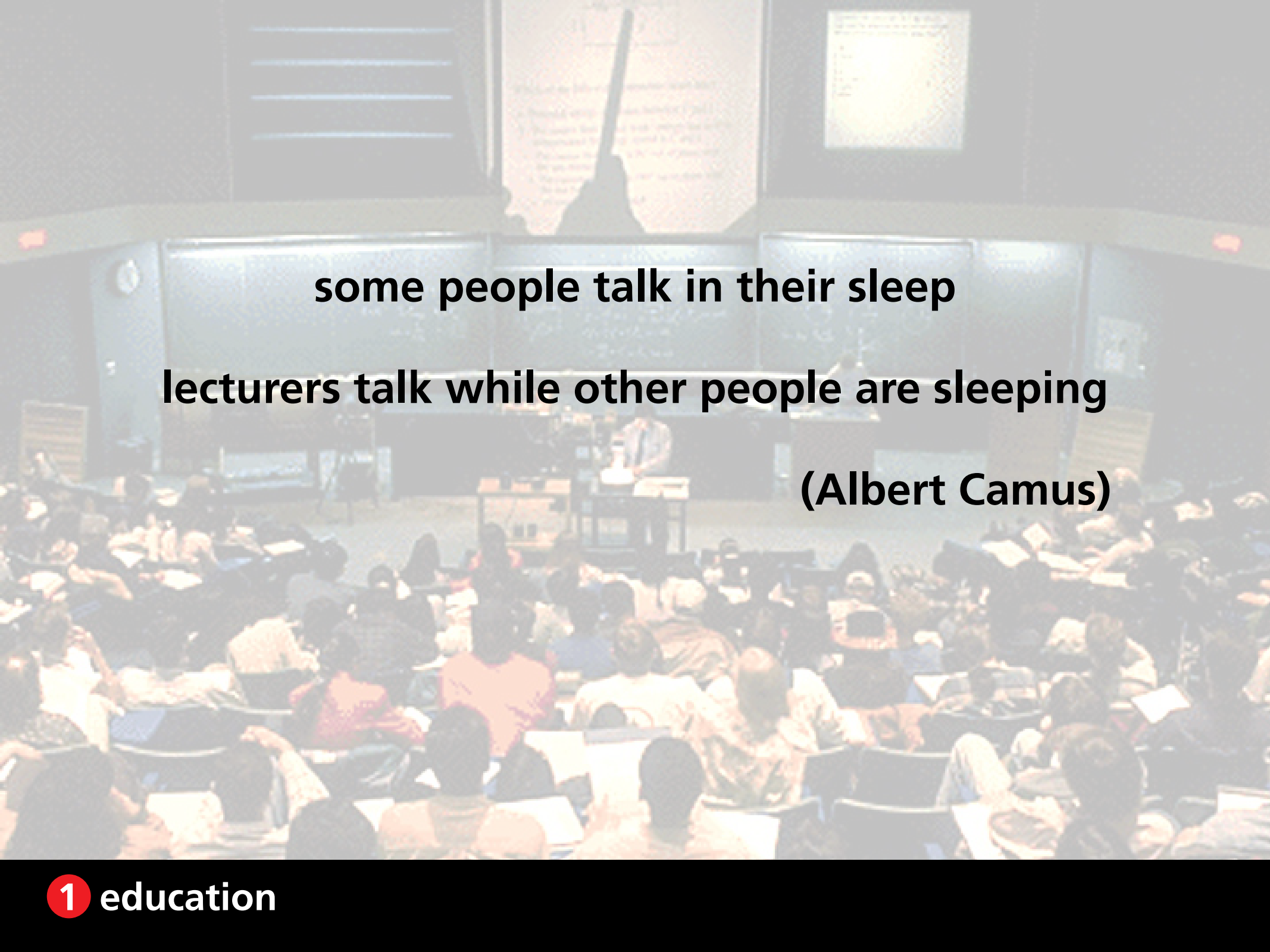


**What happens
in a lecture?**



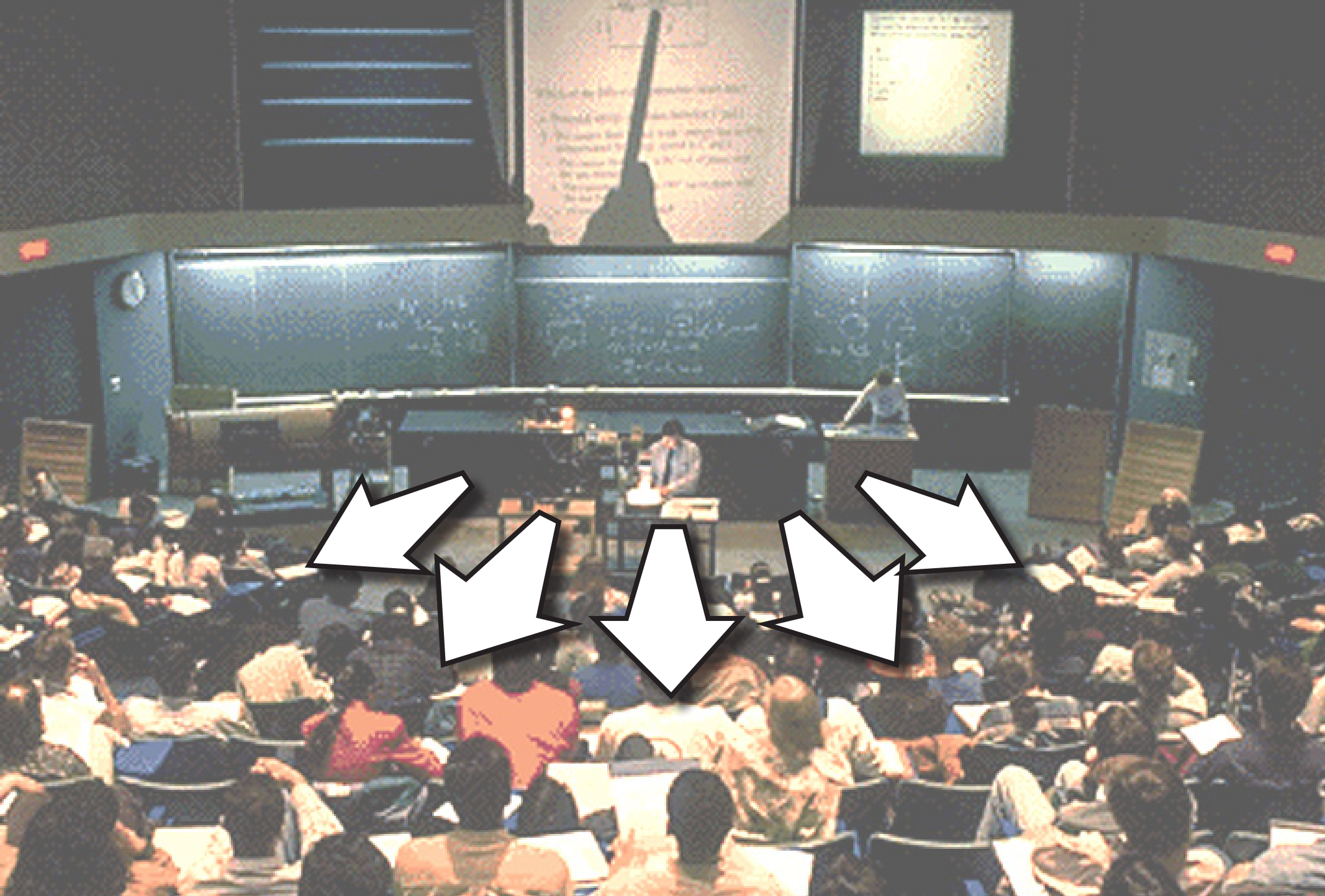
A wide-angle photograph of a large lecture hall. The room is filled with students seated in rows of chairs. Many students appear to be asleep, with their heads resting on their desks or hands. At the front of the room, a lecturer is standing near a podium, addressing the class. Behind the lecturer are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

some people talk in their sleep

A large lecture hall filled with students. Many students are sleeping in their seats, with their heads resting on their desks or hands. The room has a curved front wall with a large screen displaying text. The lighting is dim, and the overall atmosphere is one of a lecture where many students are asleep.

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

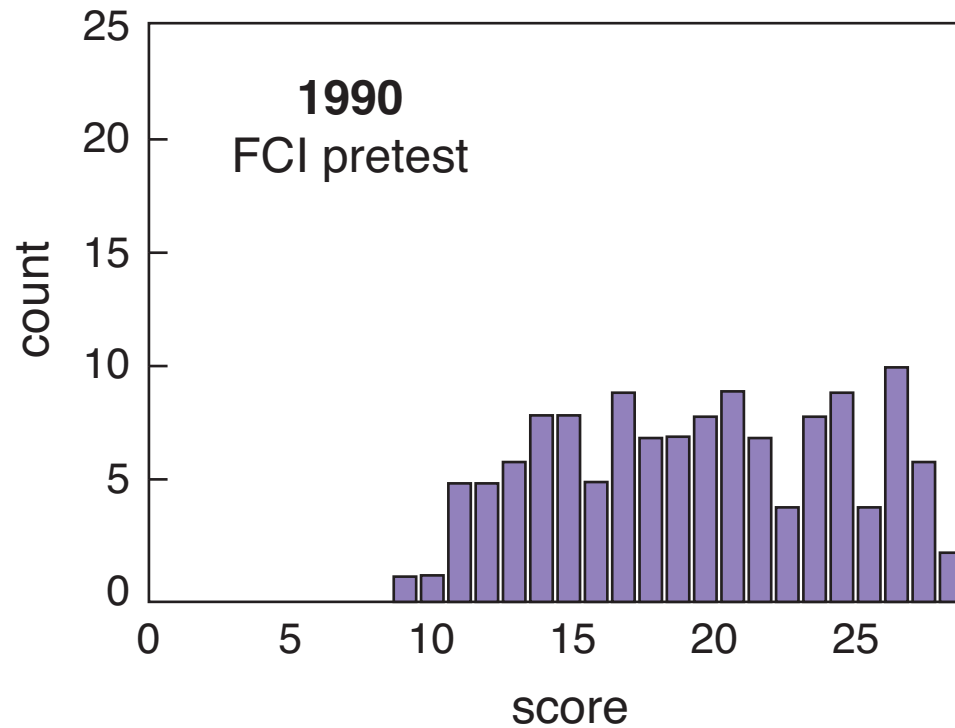




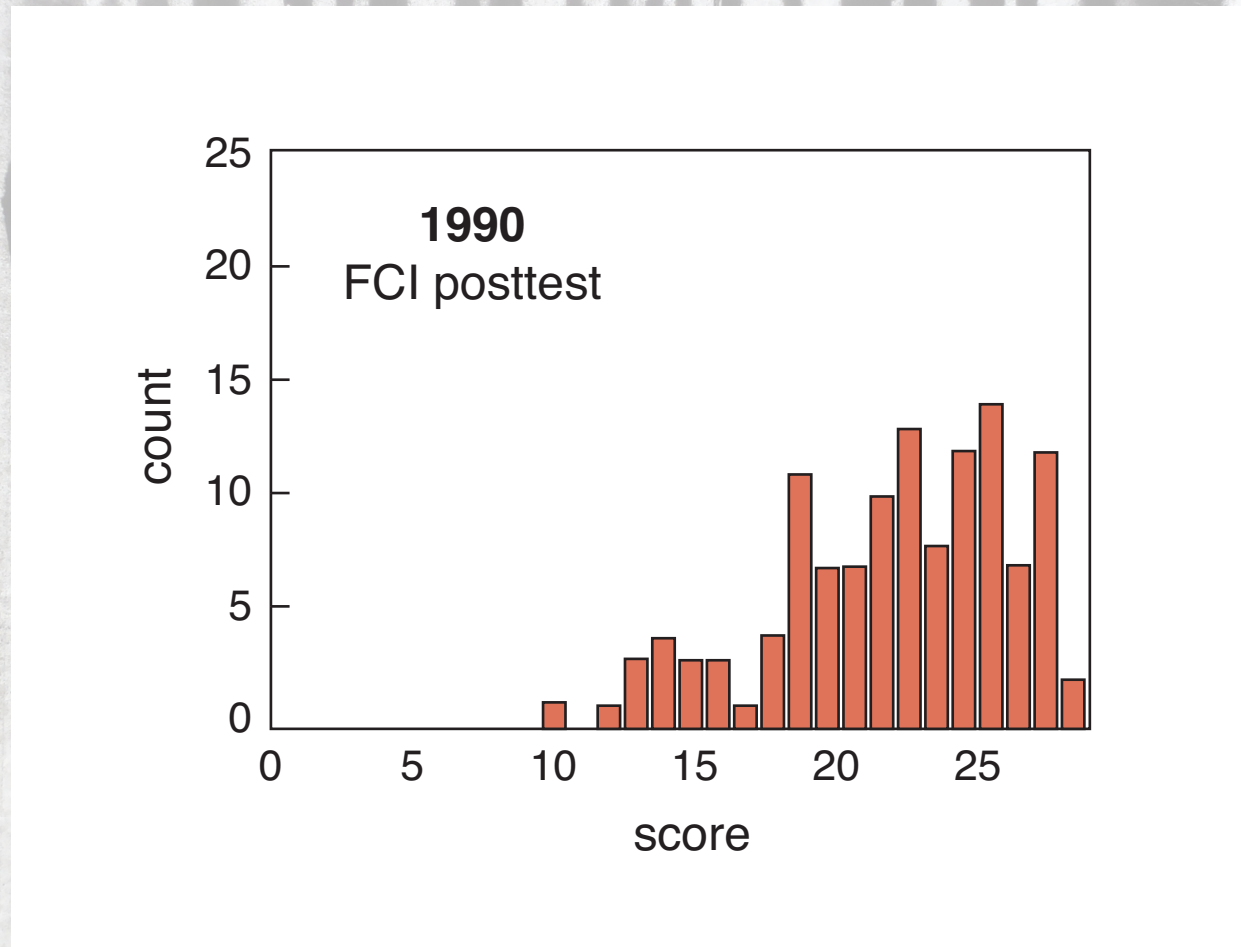
The result?

EDUCACION

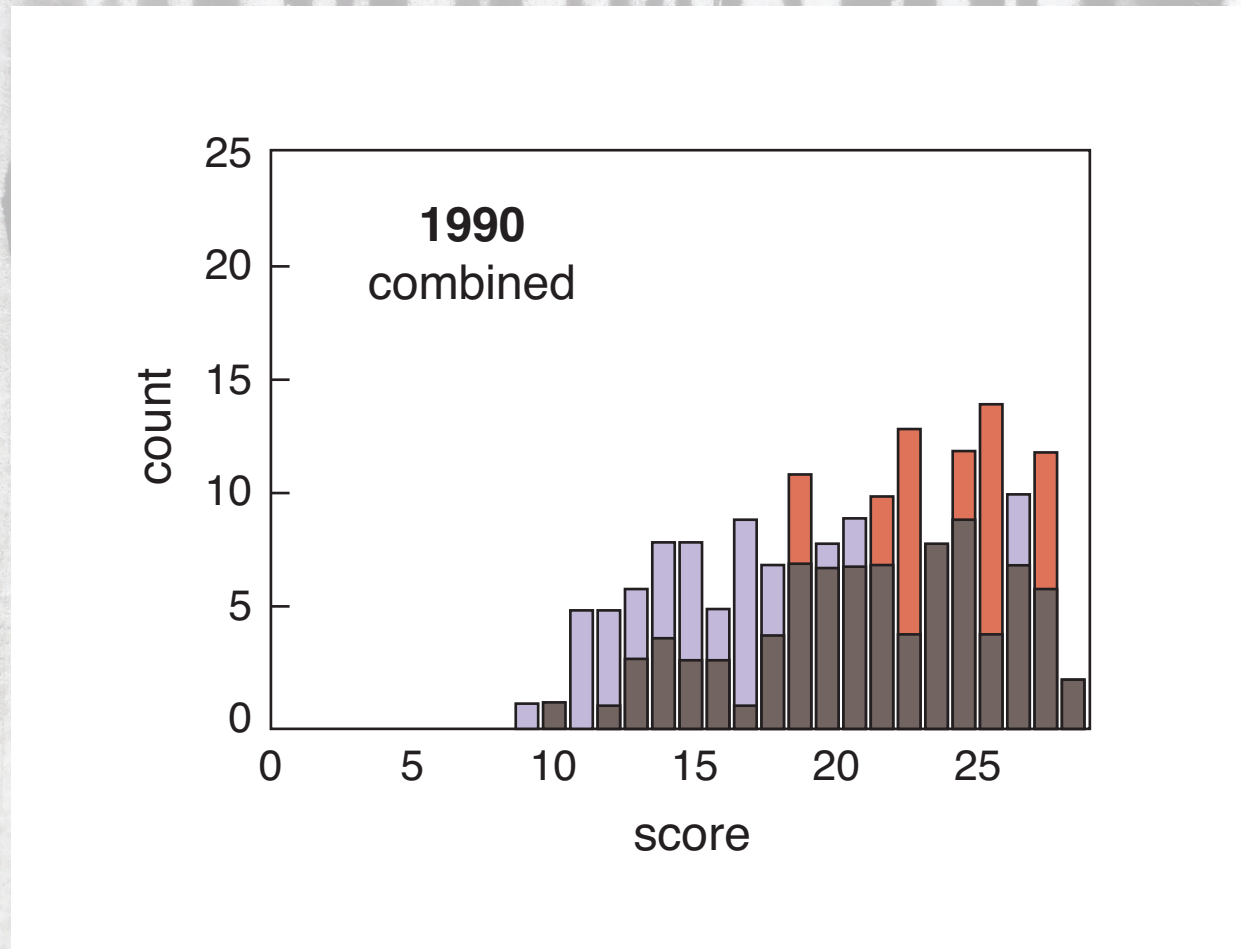
education is not just information transfer

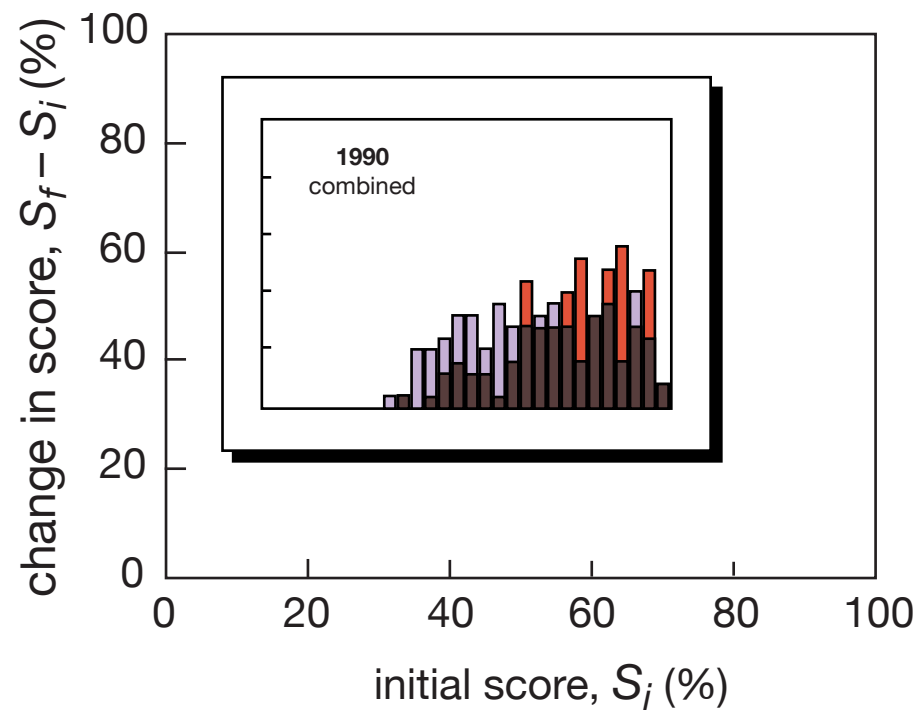


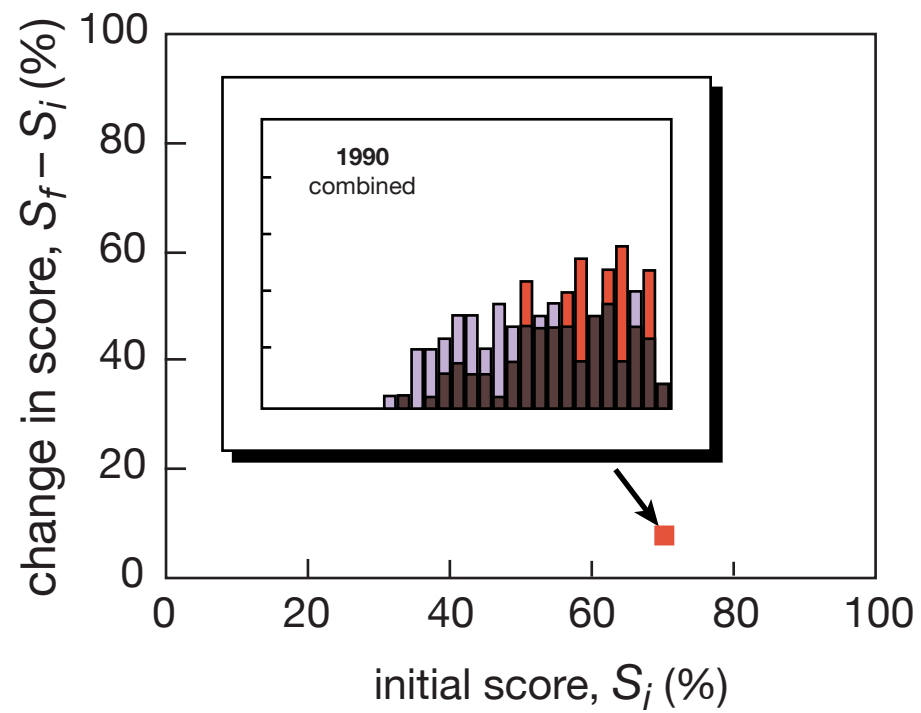
education is not just information transfer

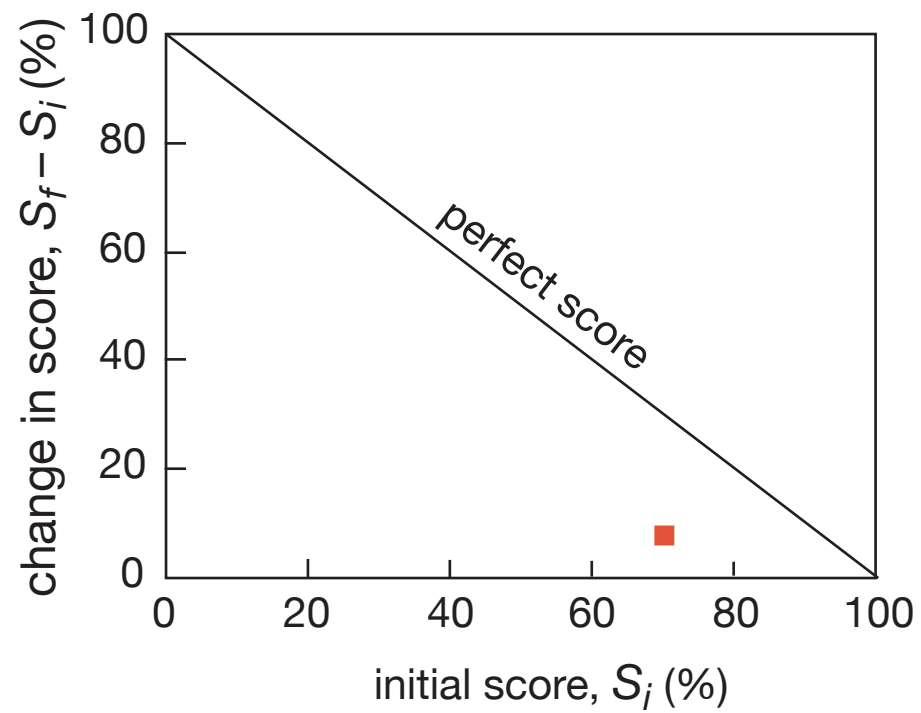


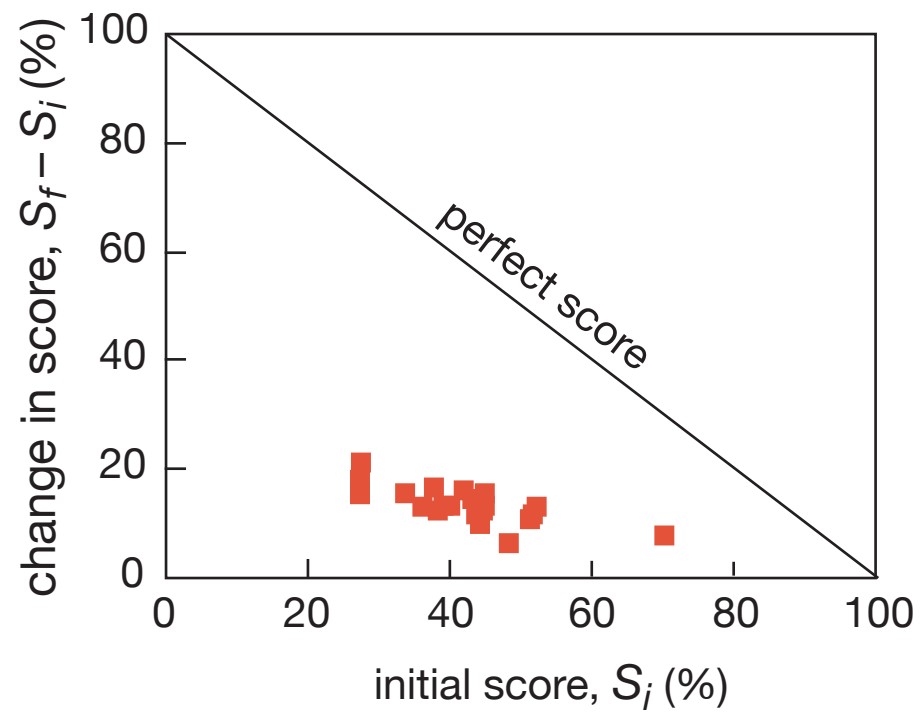
education is not just information transfer





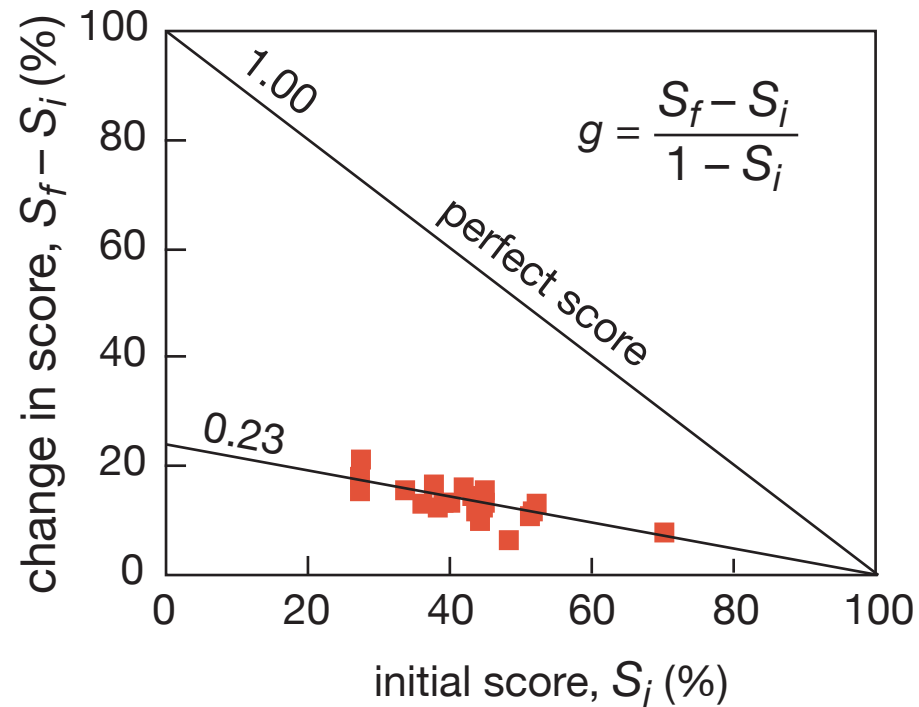






R.R. Hake, *Am. J. Phys.* 66, 64 (1998)

only one quarter of maximum gain realized



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

not transfer but assimilation of information is key

Lack of learning

EDUCACION

Lack of learning

Lack of retention





1. transfer of information



1. transfer of information

2. assimilation of that information



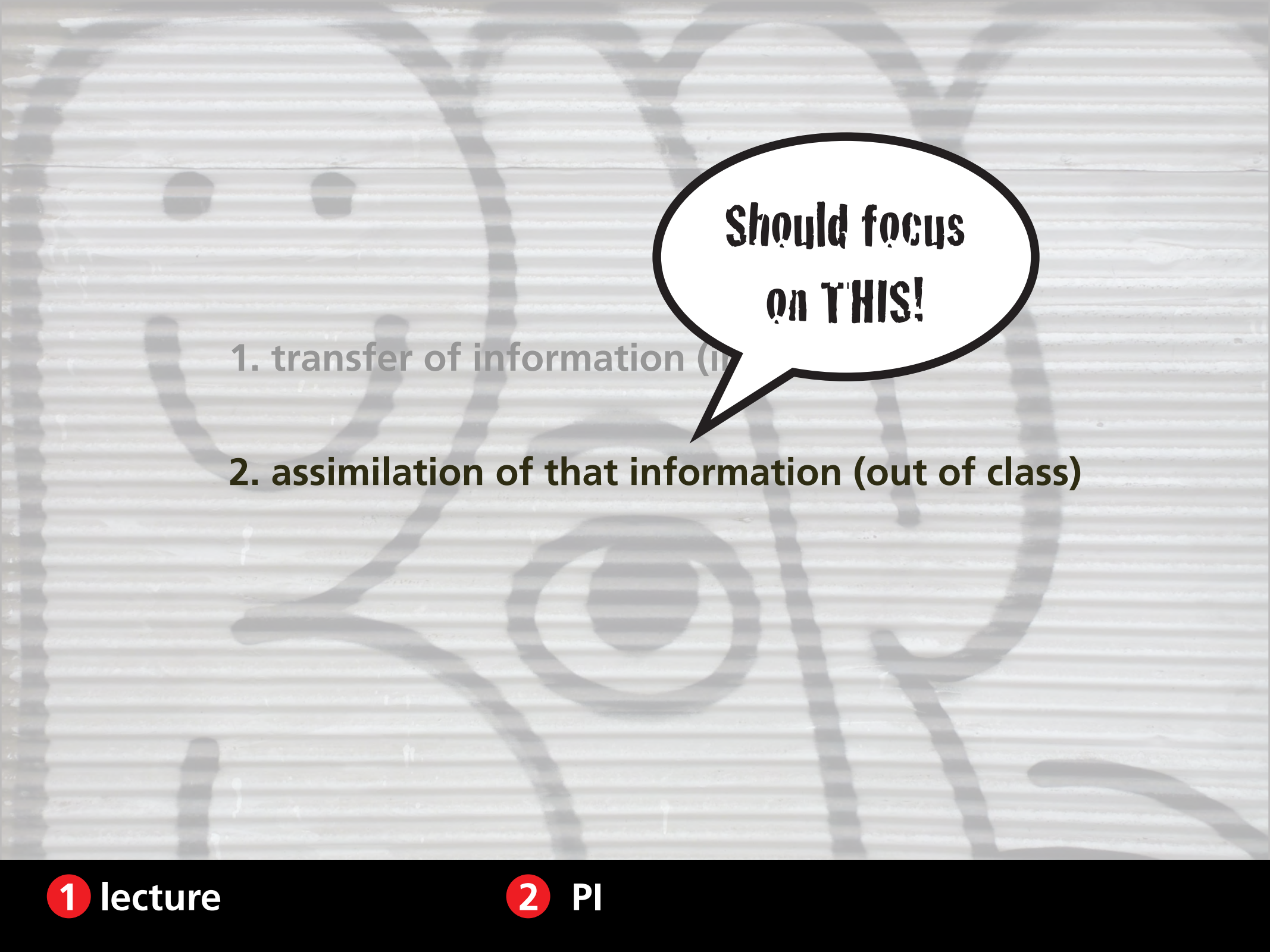
1. transfer of information (in class)

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)

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





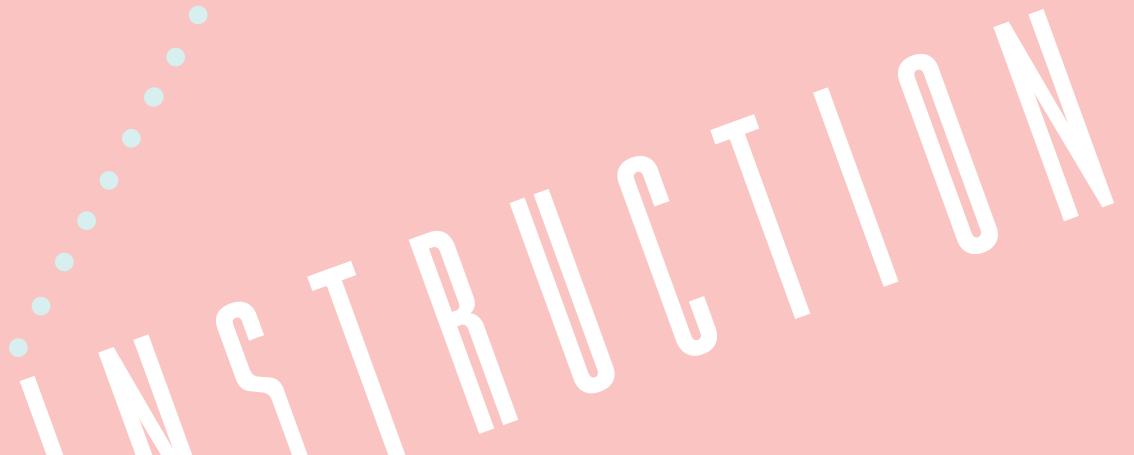
1 education

2 PI



Peer

is it any good?



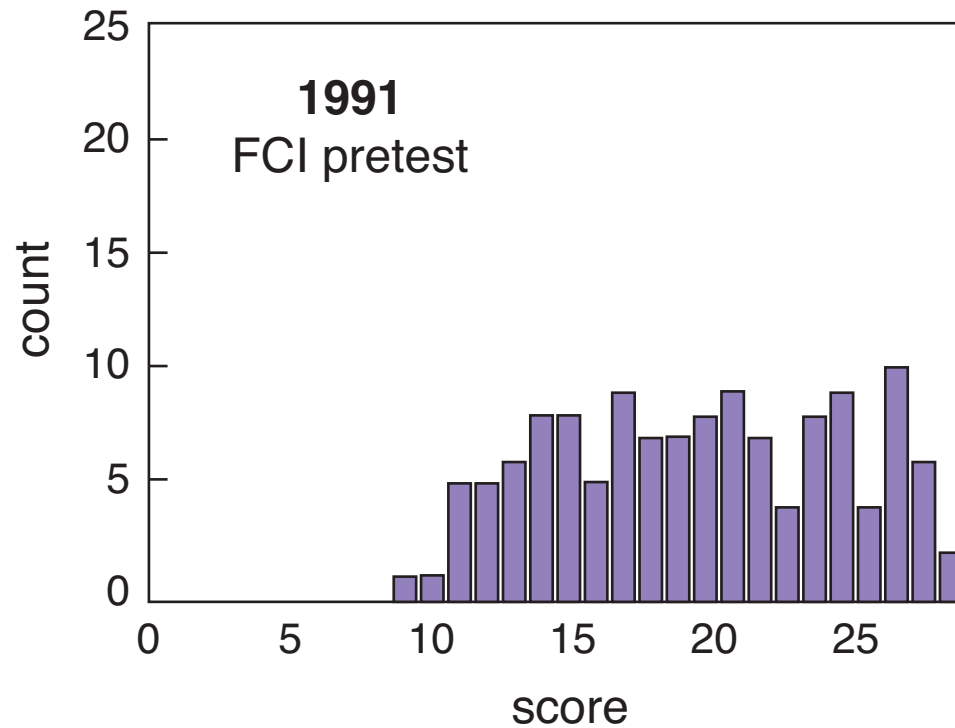
INSTRUCTION

1 education

2 PI

3 results

first year of implementing PI

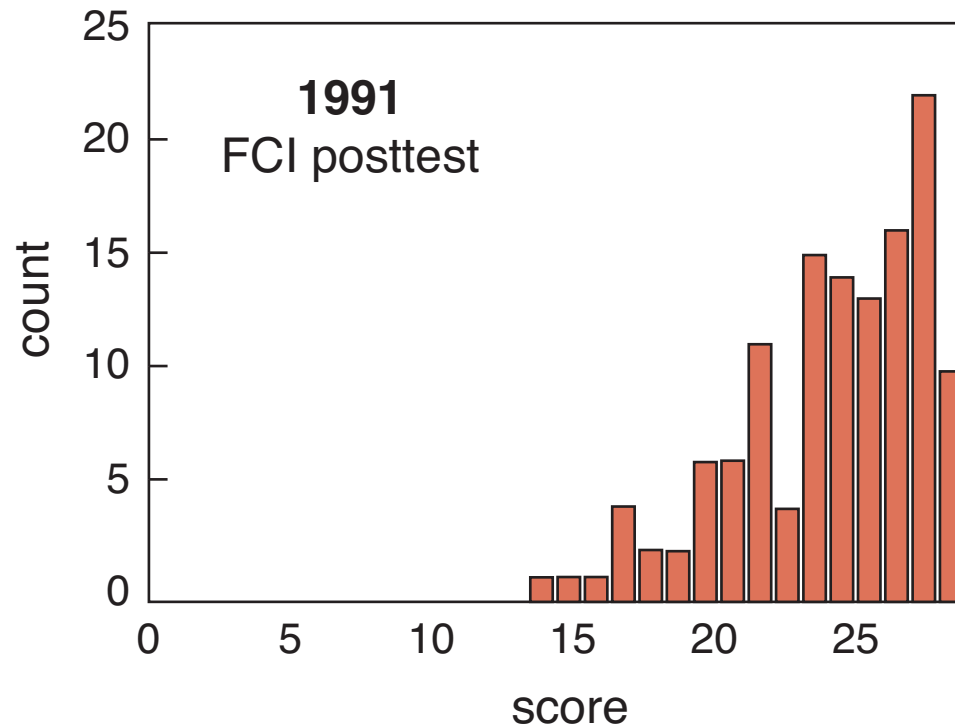


1 education

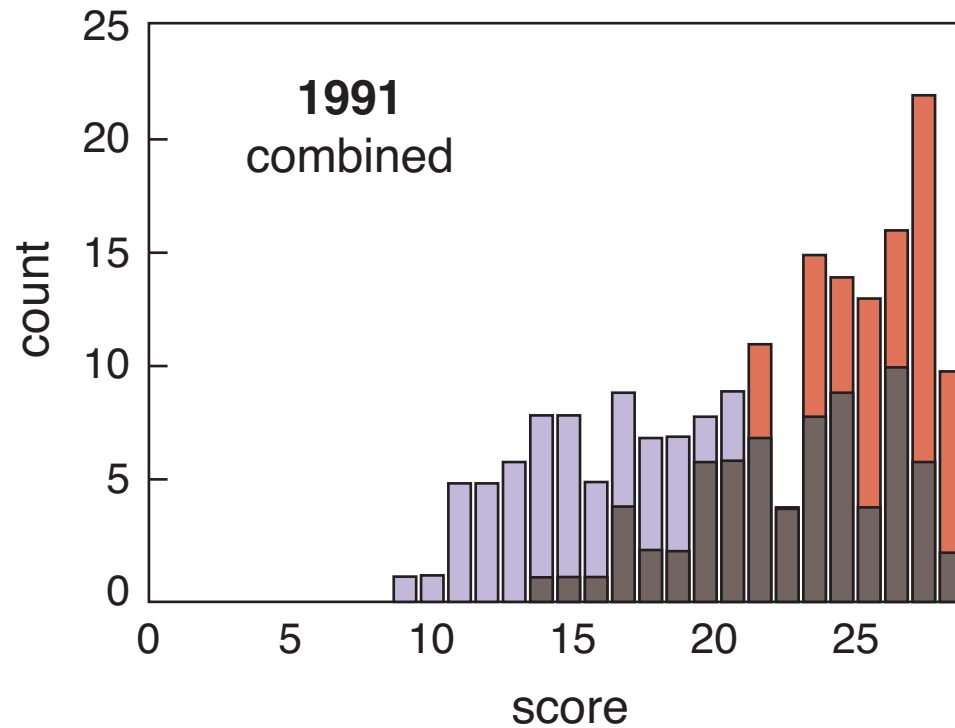
2 PI

3 results

first year of implementing PI



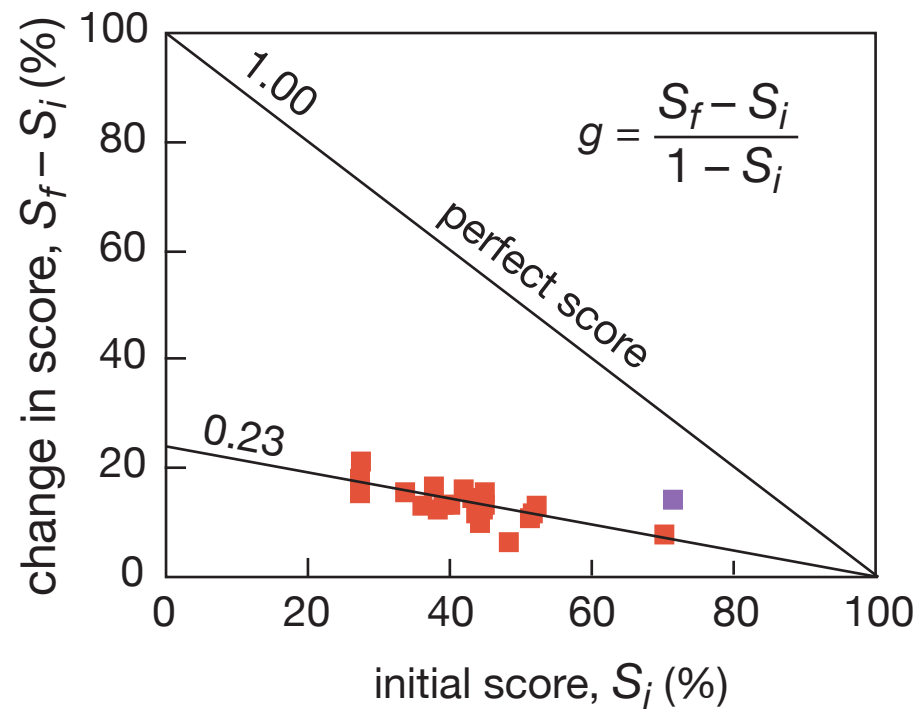
first year of implementing PI



1 education

2 PI

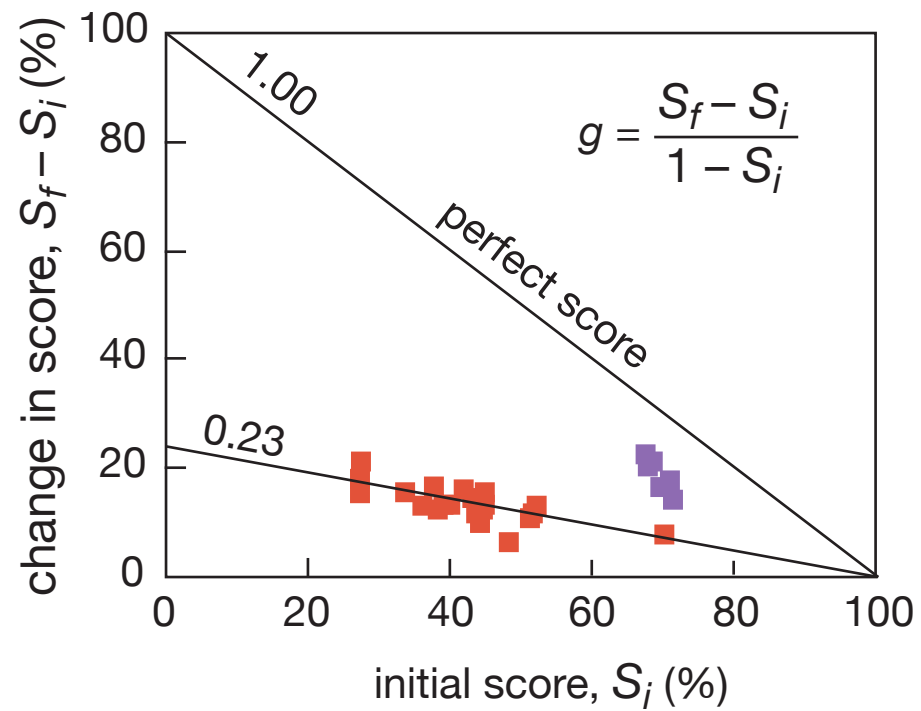
3 results



1 education

2 PI

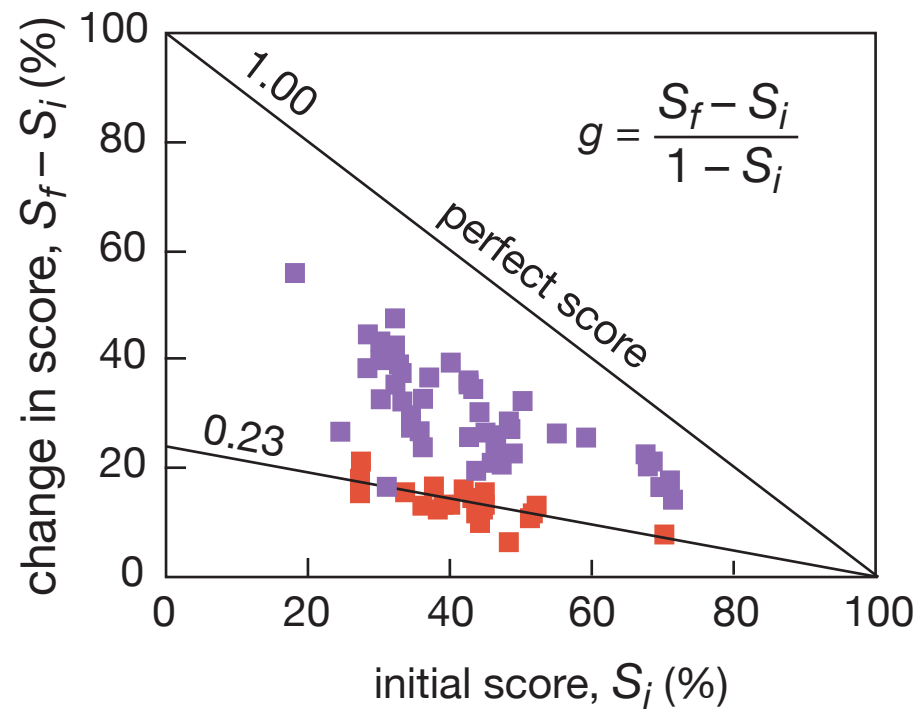
3 results



1 education

2 PI

3 results

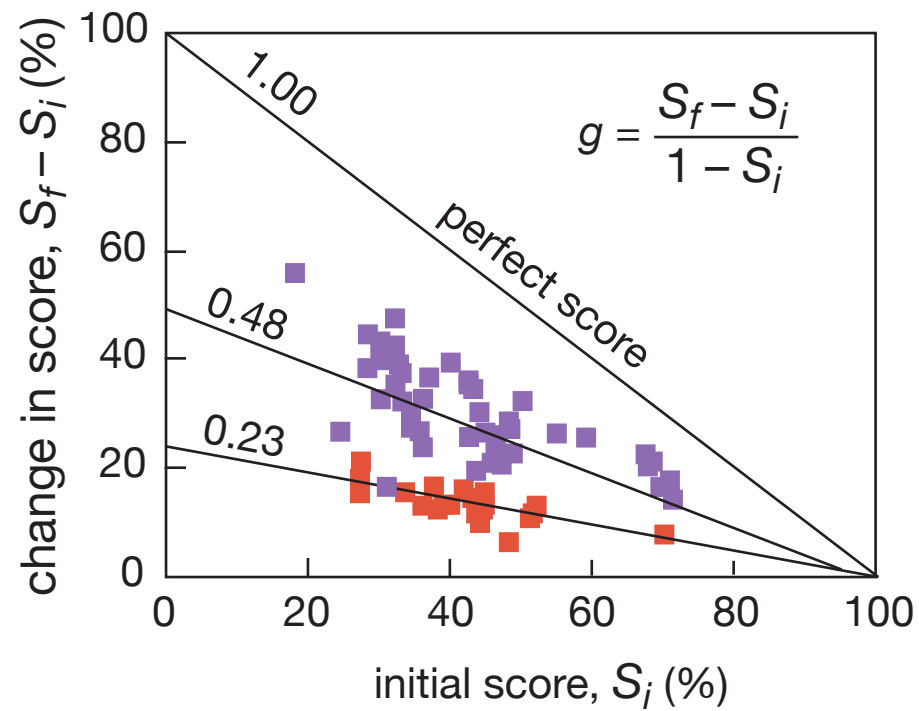


R.R. Hake, *Am. J. Phys.* 66, 64 (1998)

1 education

2 PI

3 results



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

1 education

2 PI

3 results



Peer

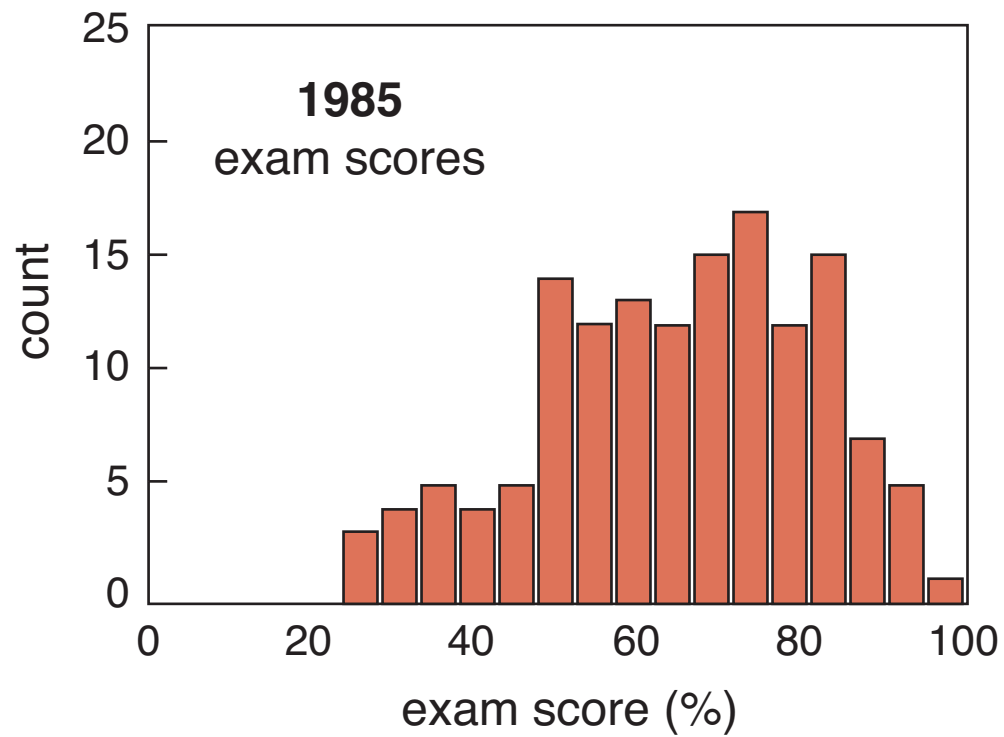
what about problem solving?

INSTRUCTION

1 education

2 PI

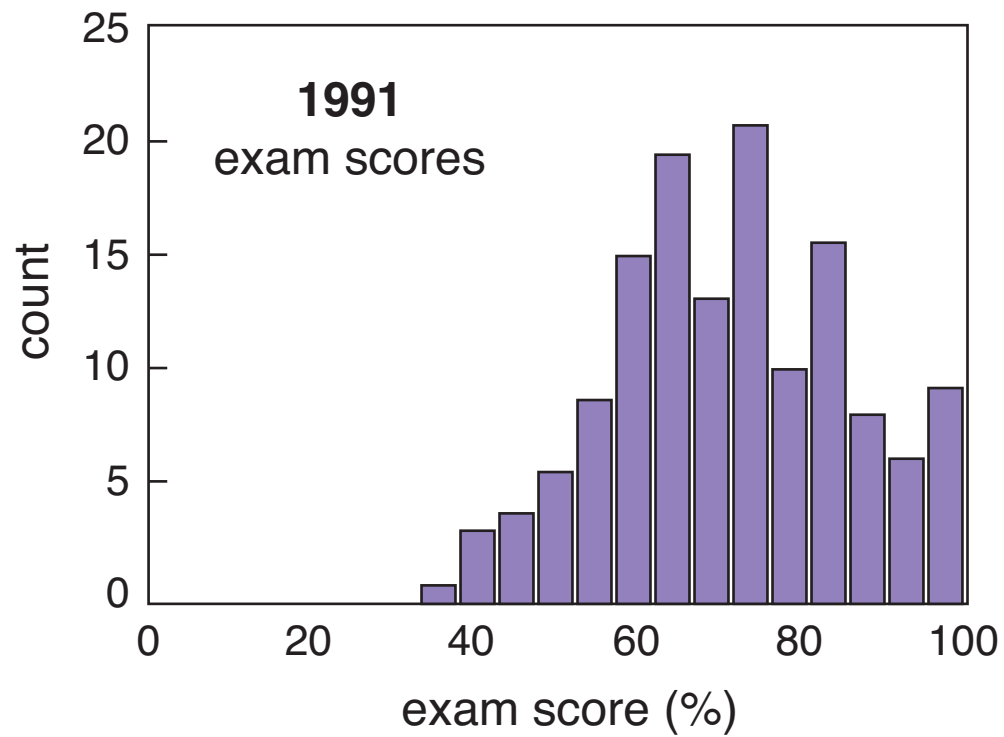
3 results



1 education

2 PI

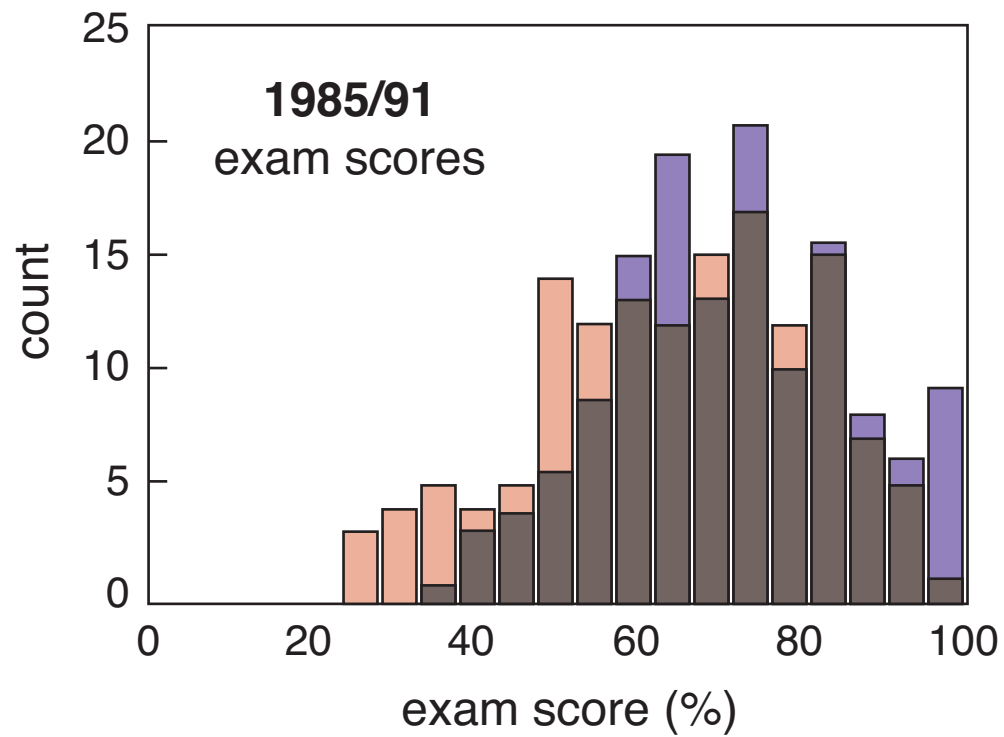
3 results



1 education

2 PI

3 results



1 education

2 PI

3 results



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

1 education

2 PI

3 results



So better understanding leads to better problem solving!

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

1 education

2 PI

3 results



1 education

2 PI

3 results

in a lecture, students...

1 education

2 PI

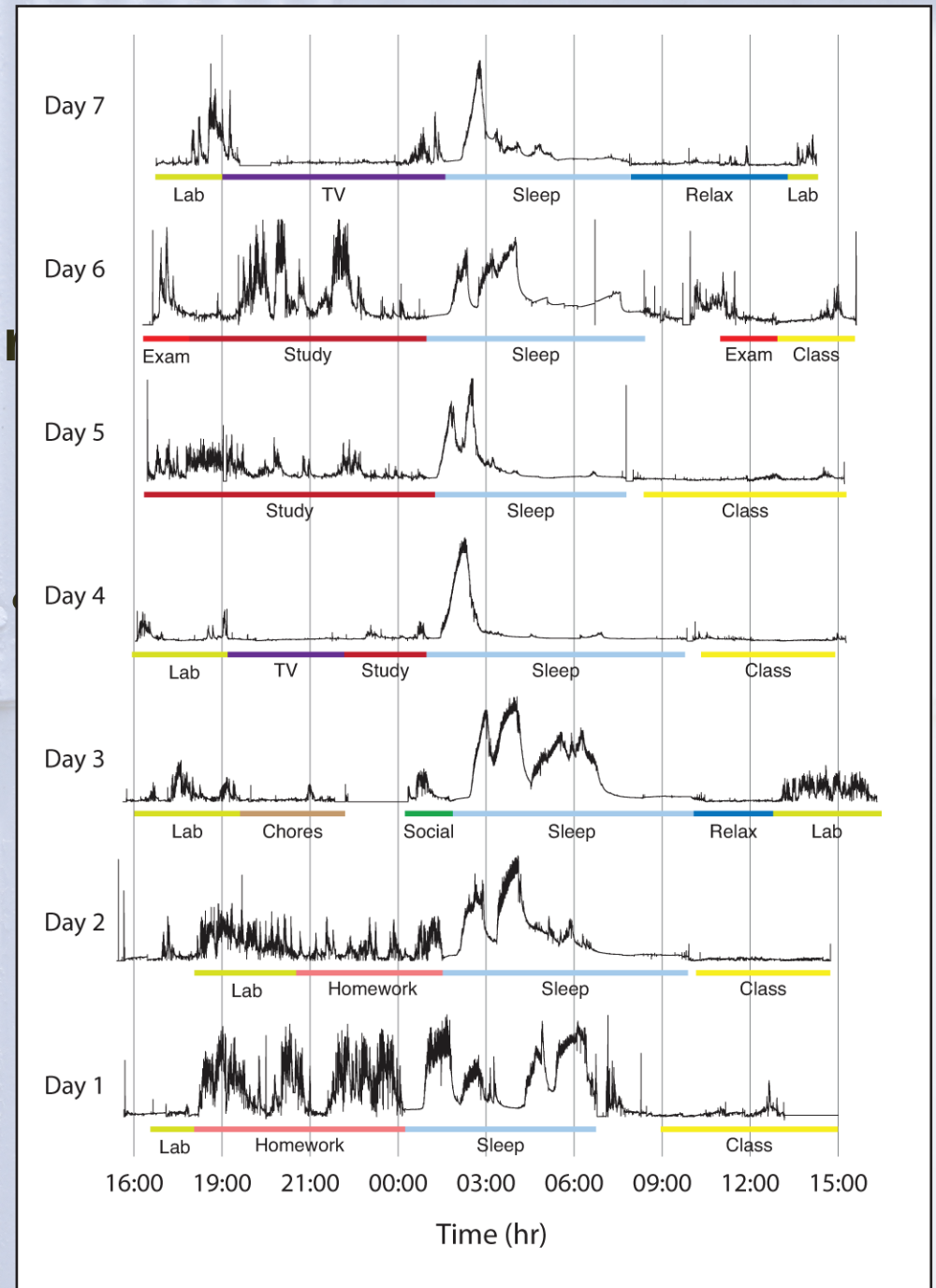
3 results

in a lecture, students...

1. don't pay utmost attention

in a lecture

1. don't pay utmost



doi: 10.1109/TBME.2009.2038487

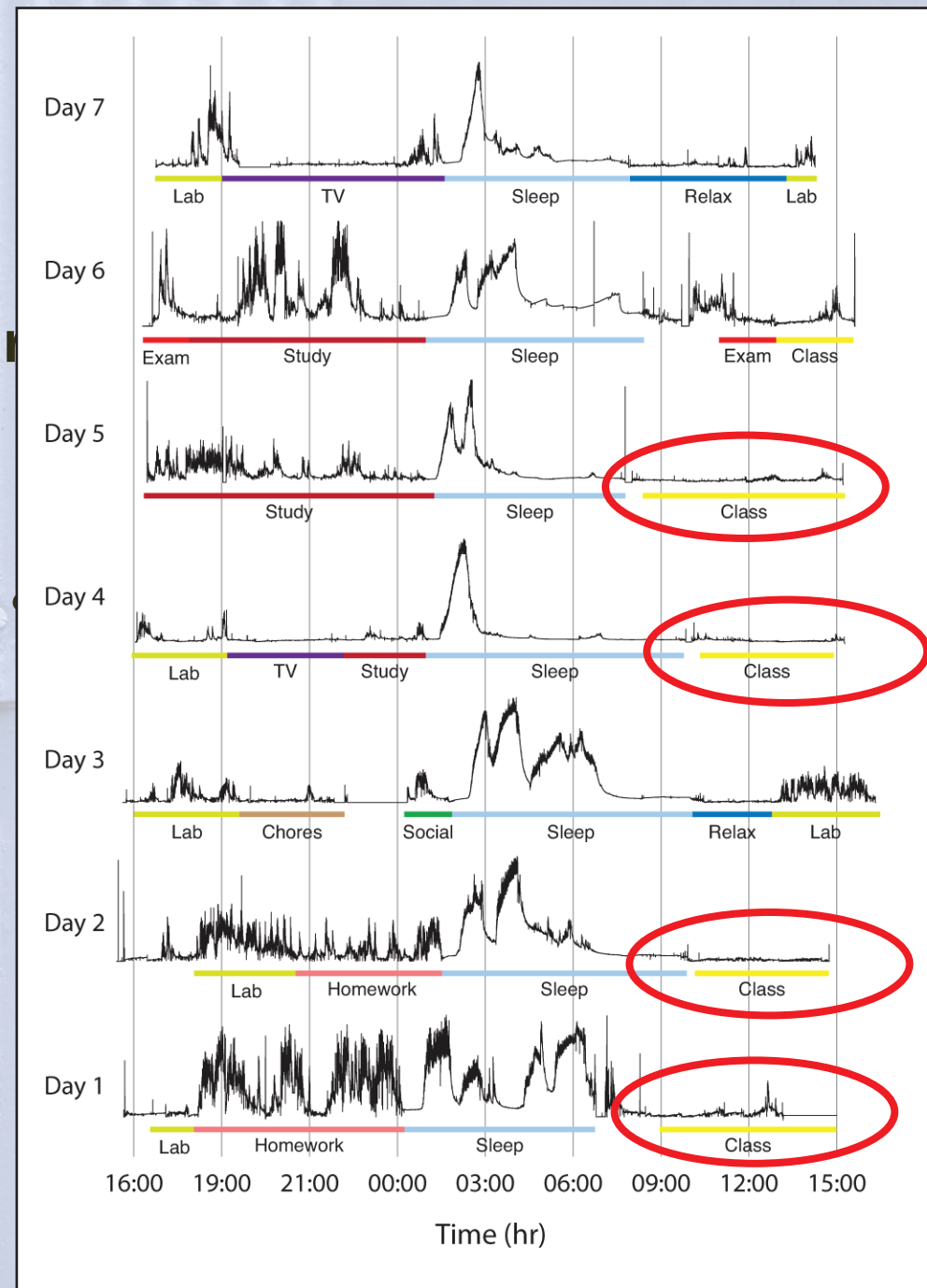
1 education

2 PI

3 results

in a lecture

1. don't pay utmost



doi: 10.1109/TBME.2009.2038487

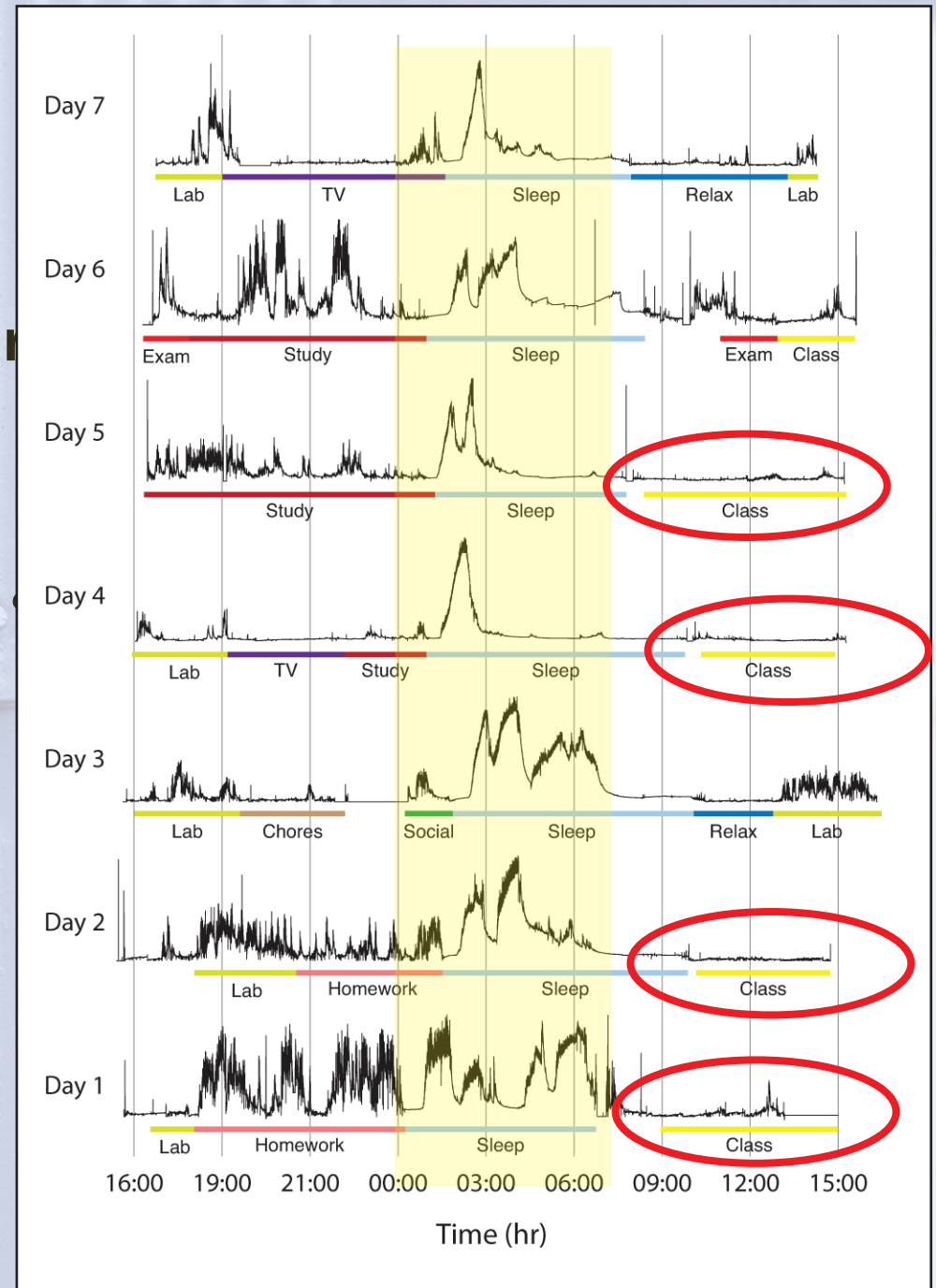
1 education

2 PI

3 results

in a lecture

1. don't pay utmost



doi: 10.1109/TBME.2009.2038487

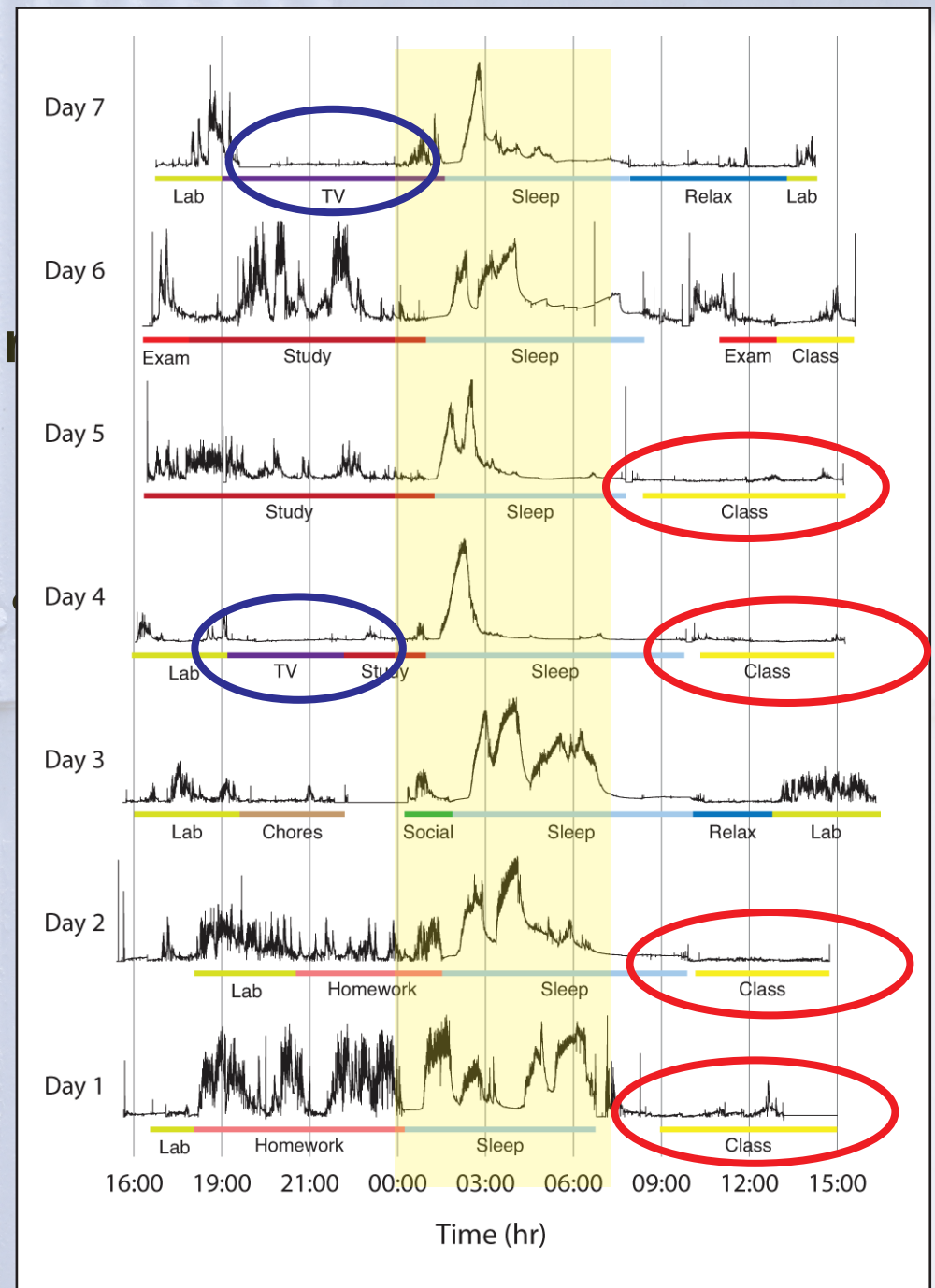
1 education

2 PI

3 results

in a lecture

1. don't pay utmost



doi: 10.1109/TBME.2009.2038487

1 education

2 PI

3 results

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 results



an illusion. . .

1 education

2 PI

3 results



Education is not just about:

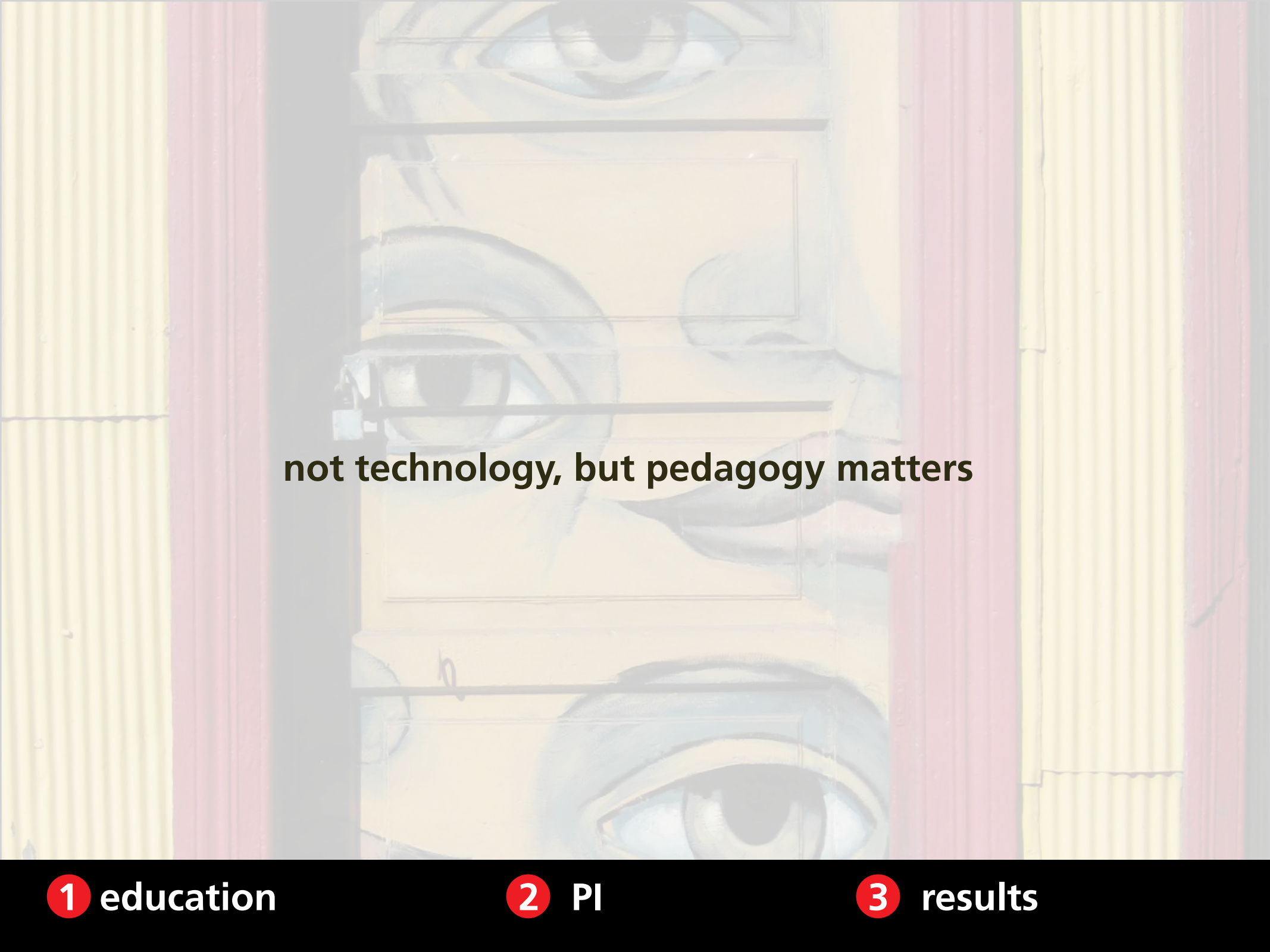
- **transferring information**
- **getting students to do what we do**



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 results



@mar_shmalloh

12:27 PM - 23 Oct 12

"Dear professor, you force us to come to class for clicker points but no one pays attention after cuz the notes are online. Can I go home?"

Funding:

National Science Foundation

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