Innovative flipped classrooms

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March 5, 2013

3 2 1

After taking this workshop you will be able to use research-based methods to:

1. Motivate your students to prepare before coming to class
2. Engage your students inside class
3. Find resources for getting started and learning more

Think of something you are very good at, something you know you do well and write that down.

How did you get good at that something?

Also jot that down.

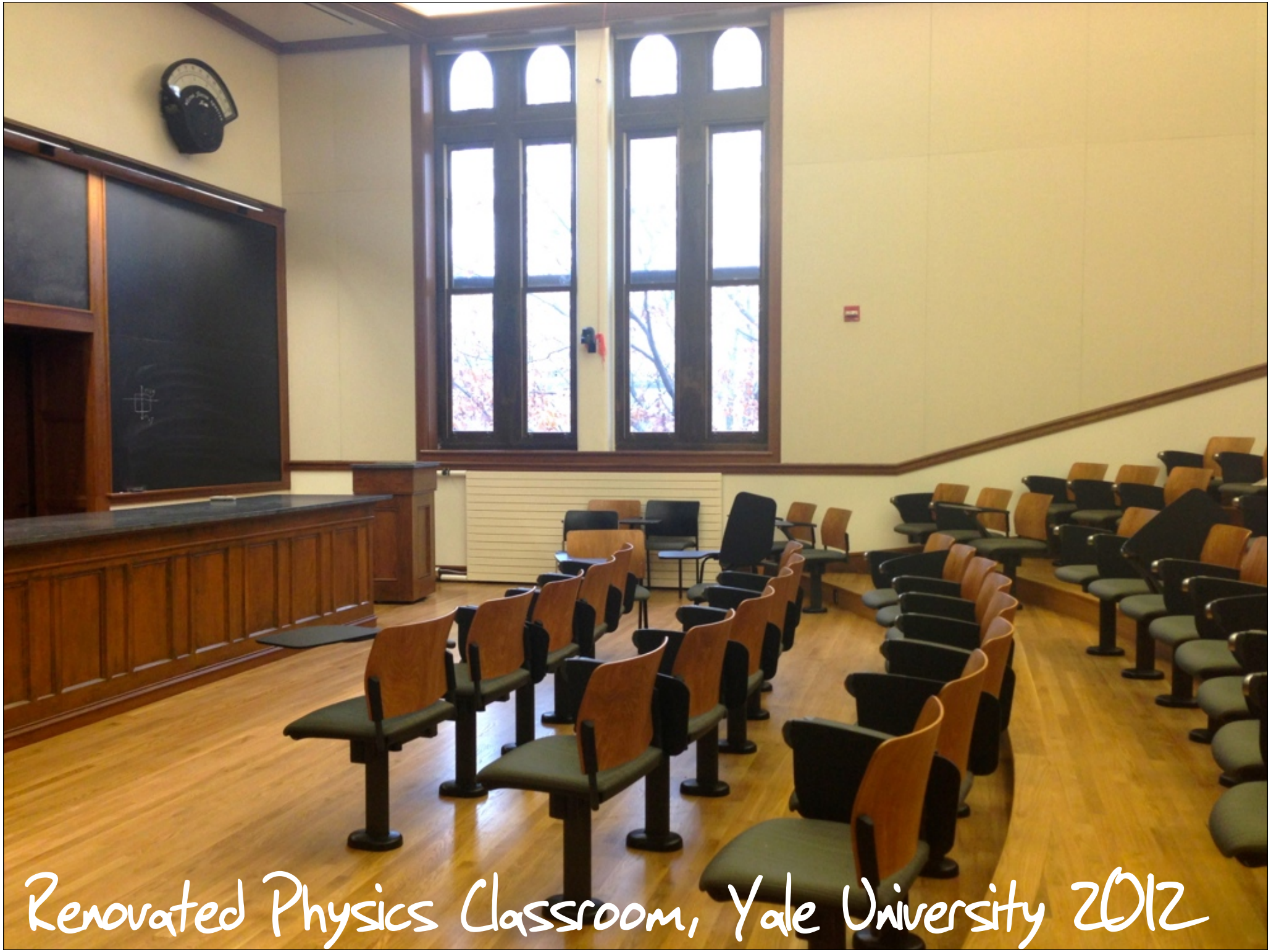
Which option best matches how you got good at it?

A. listening to someone else talk
B. practice or trial & error
C. taught myself
D. other

What is the model of education in most classrooms?

The primary model of education is knowledge delivery or information transfer, not doing.


Greek amphitheater, 4th Century BC


Renovated Physics Classroom, Yale University 2012

"Lectures were once useful; but now, when all can read, and books are so numerous, lectures are unnecessary. [...] I cannot see that lectures can do as much good as reading the books from which the lectures are taken. I know nothing that can be best taught by lectures....You may teach chemistry by lectures--you might teach making shoes by lecture."

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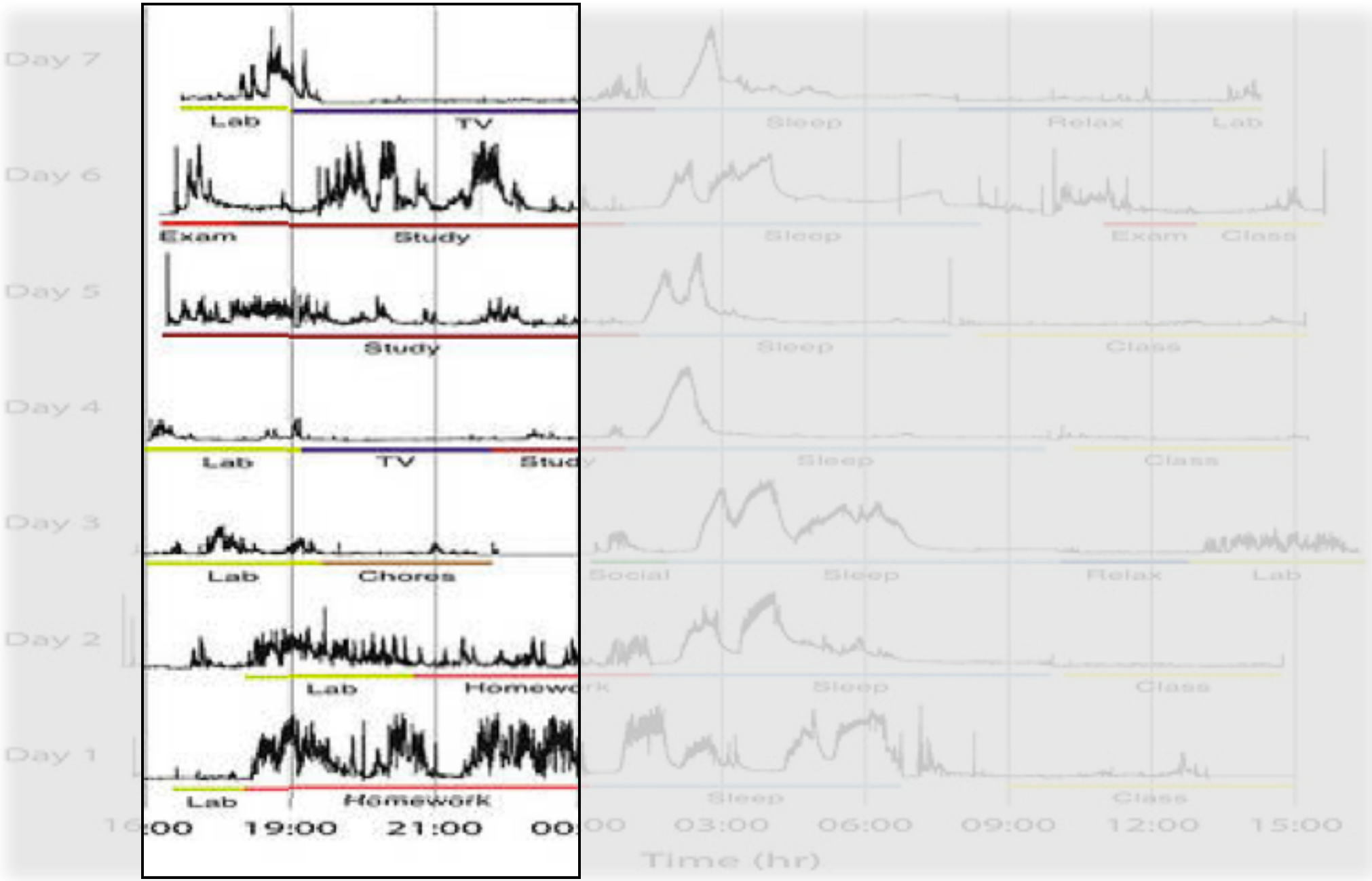
Johnson , 1799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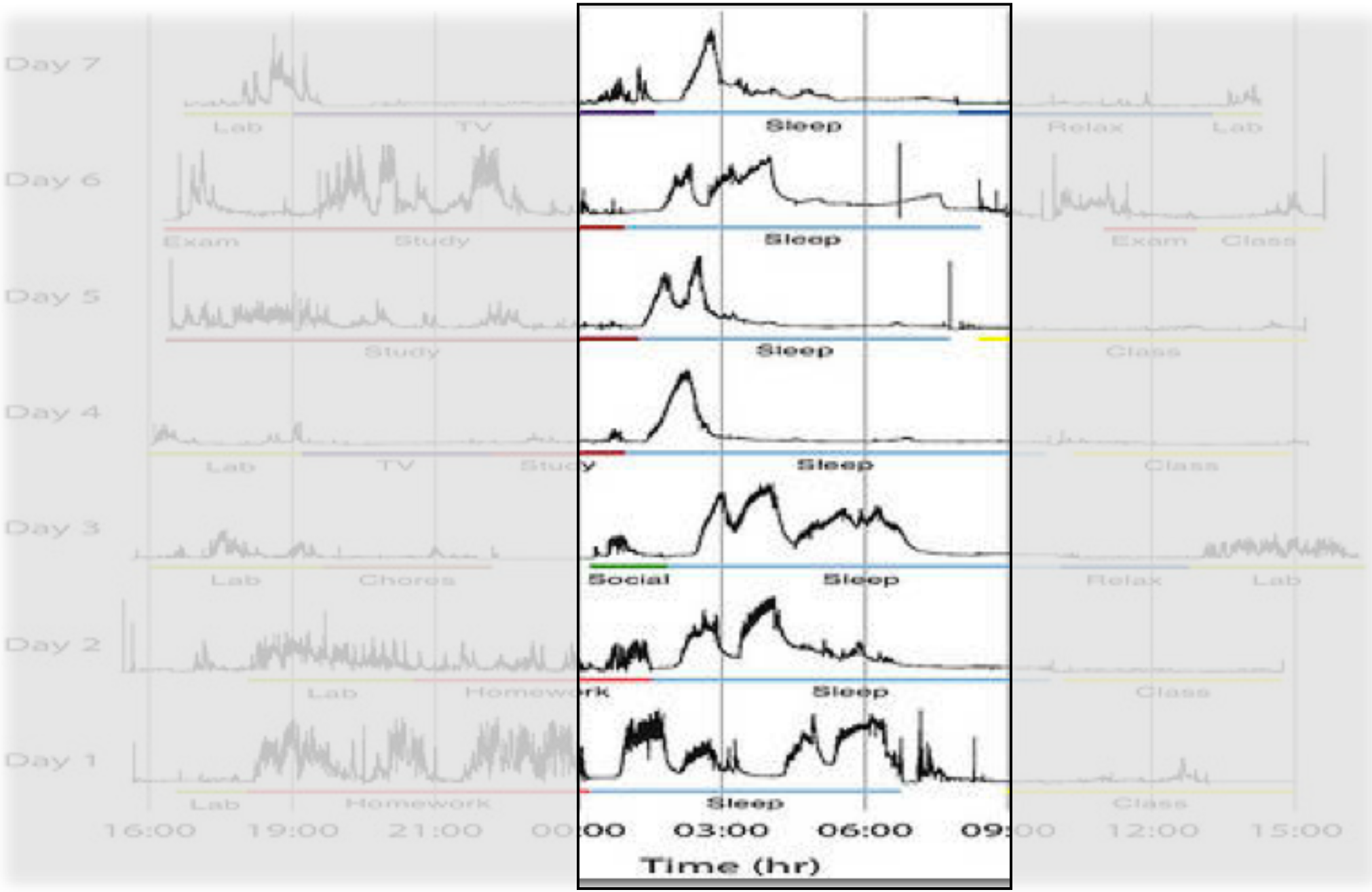
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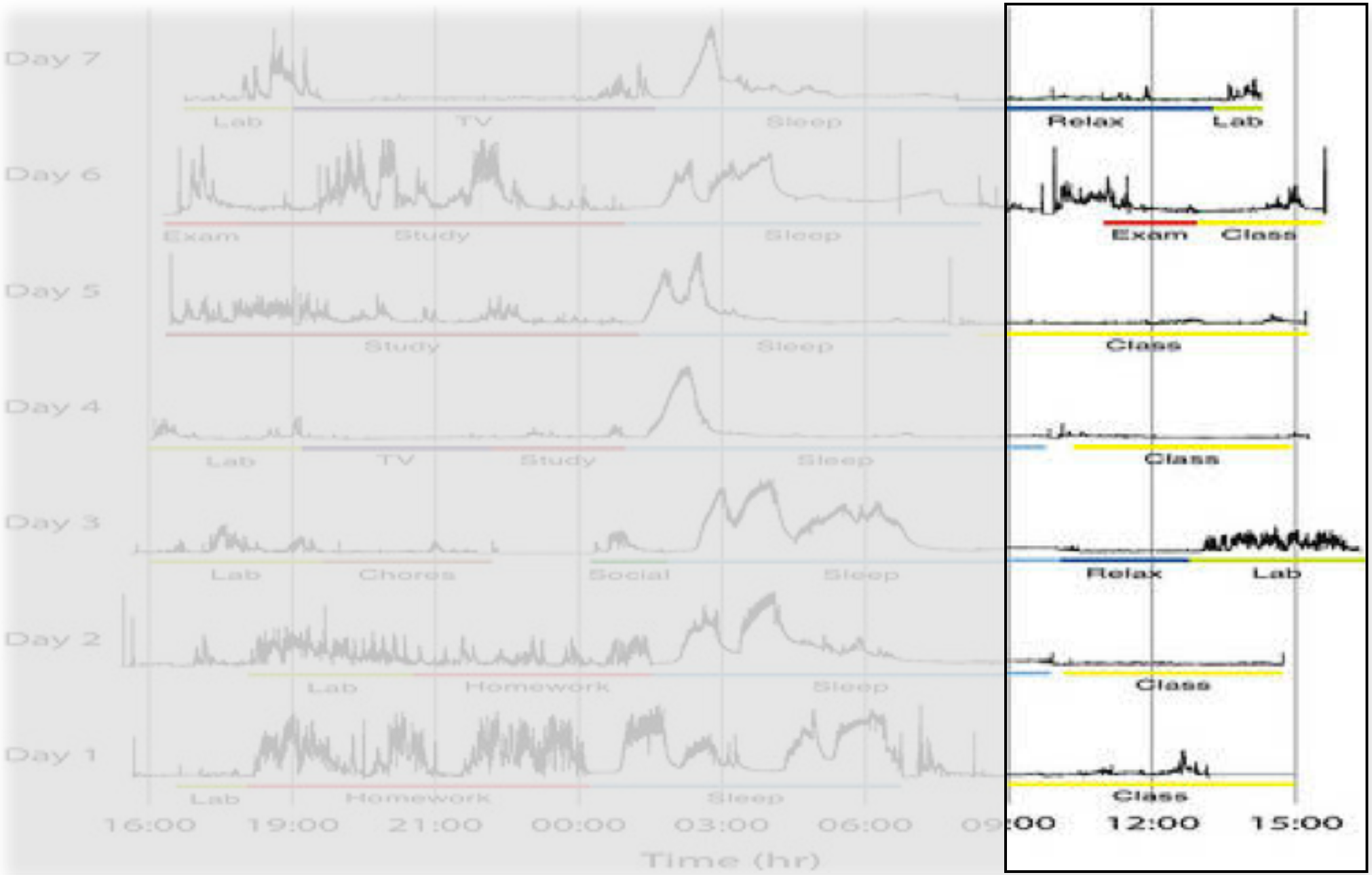
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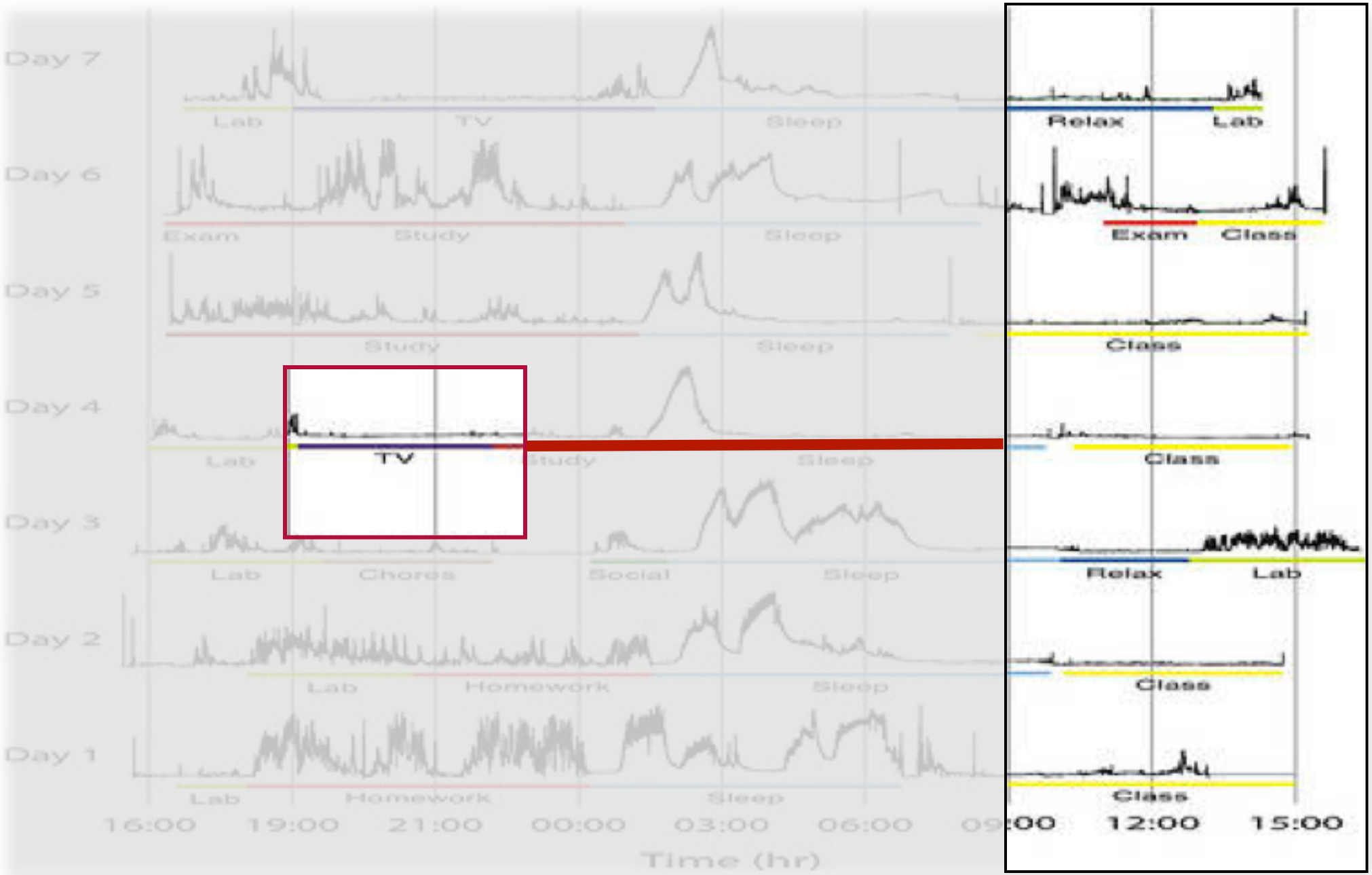
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Relax
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Class
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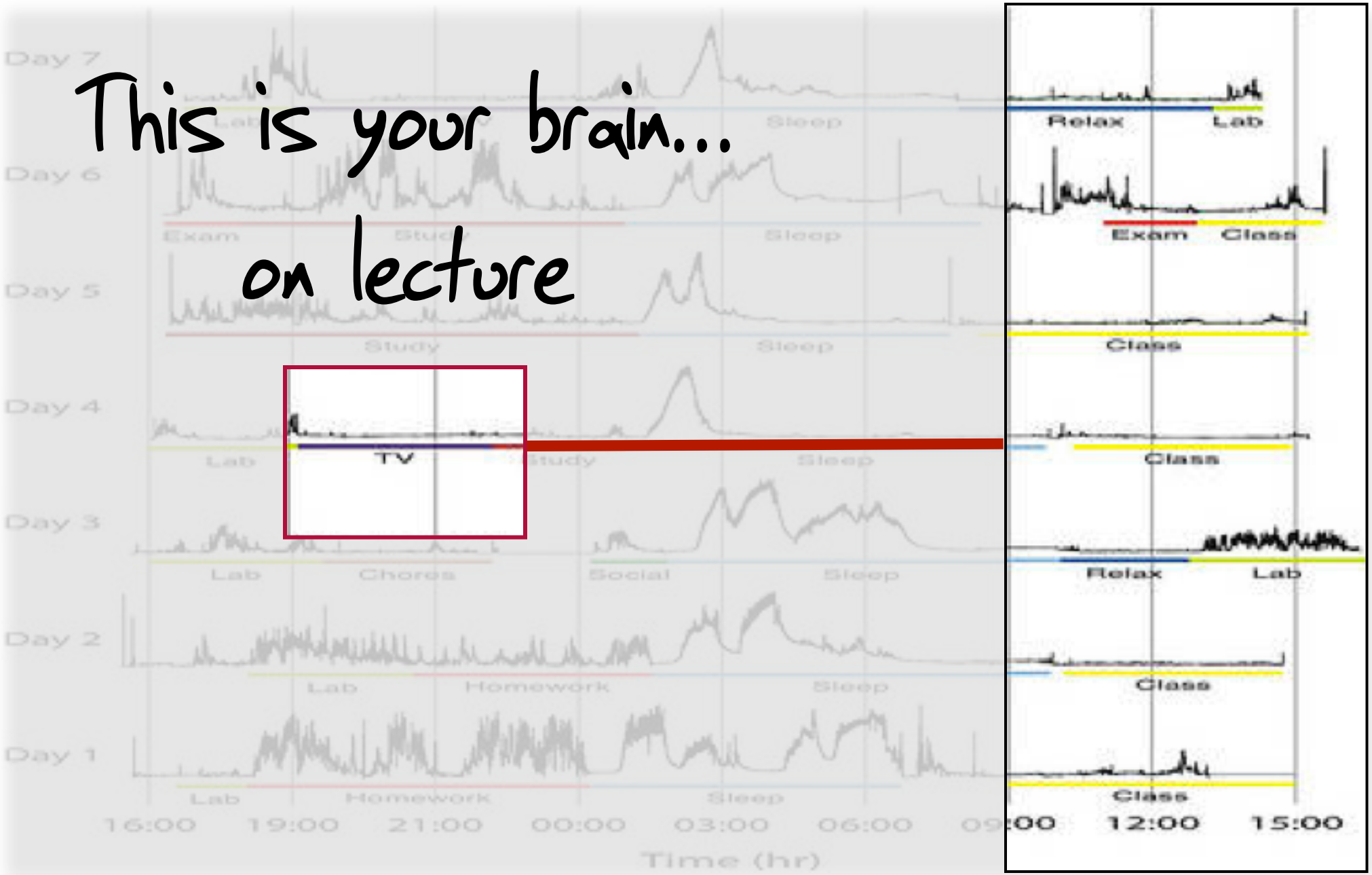
This is your brain... on lecture



IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING, VOL. 57, NO. 5, MAY 2010

What keeps you up at night?

"How boring I am and how little will be retained by the student."

To get from his high school to his home in an rural area with no buildings, Martin travels 5.0 miles east and then 4.0 miles north. When Veronica goes to her home from that same high school, she travels 8.0 miles east and 2.0 miles south.

What is the approximate measure of the shortest distance, between Martin's home and Veronica's home?

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What is the approximate measure of the shortest distance, between Martin's home and Veronica's home?

A. ~3 miles
B. ~6 miles
C. ~9 miles
D. ~17 miles

What do you need to know and be able to do to solve this problem?

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$$a^2 + b^2 = c^2$$

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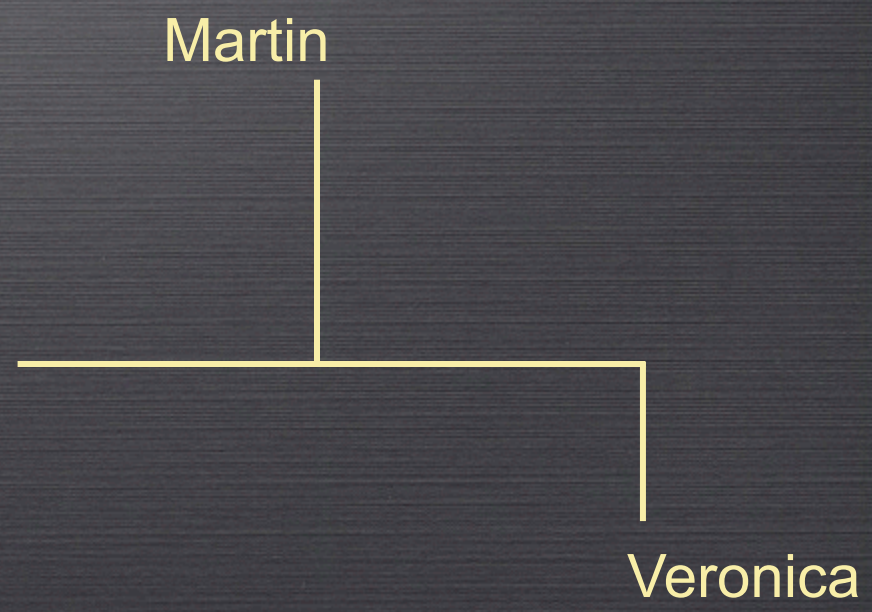

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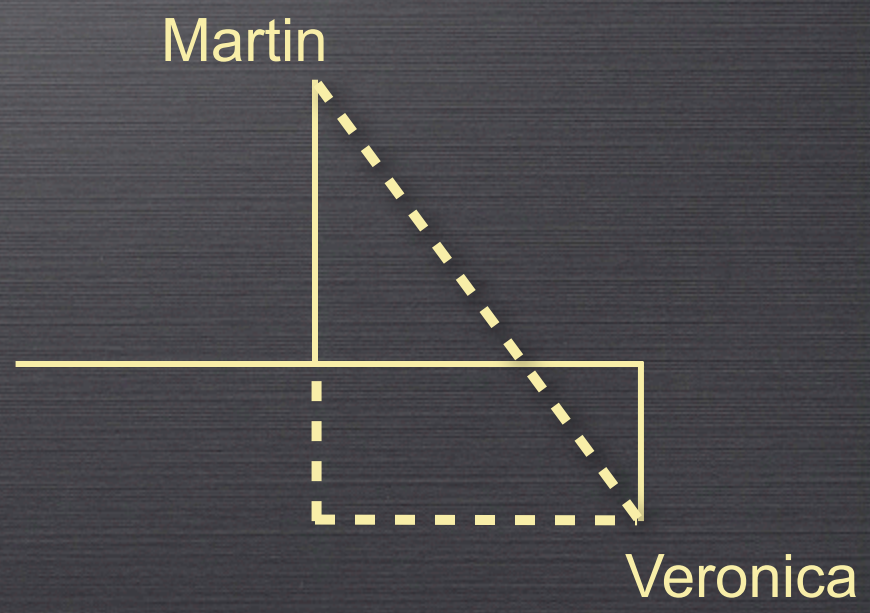

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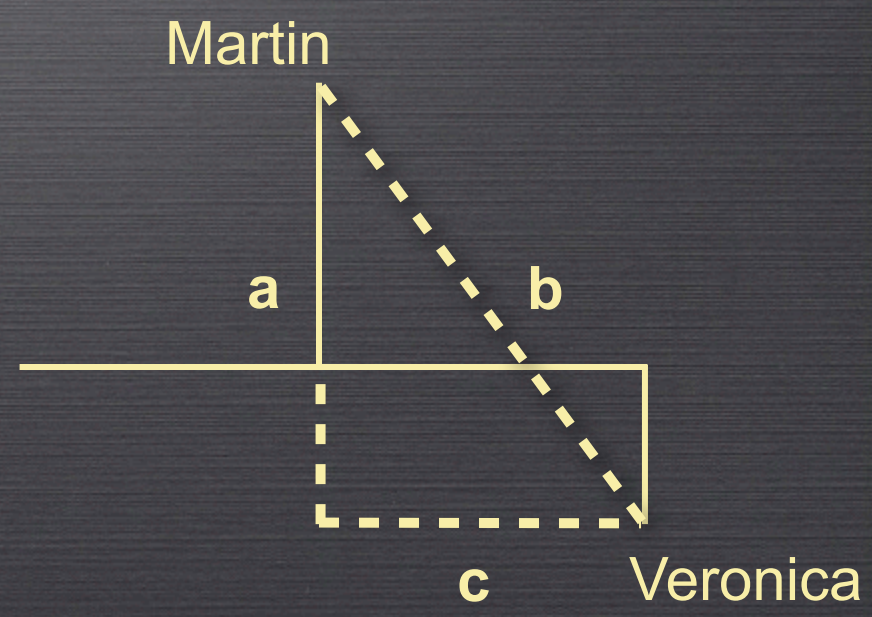


What percentage of US 10th grade students get Pythagorean theorem problems right on standardized tests?

A. 25%
B. 33%
C. 50%
D. 66%

What percentage of 10th grade MA students got this problem right?

33%

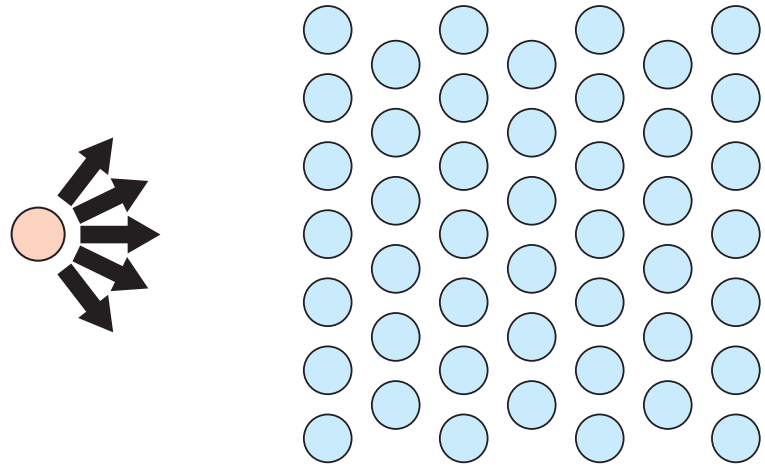
Something is very wrong if after 9,000 hours of compulsory schooling kids can't transfer knowledge across contexts.

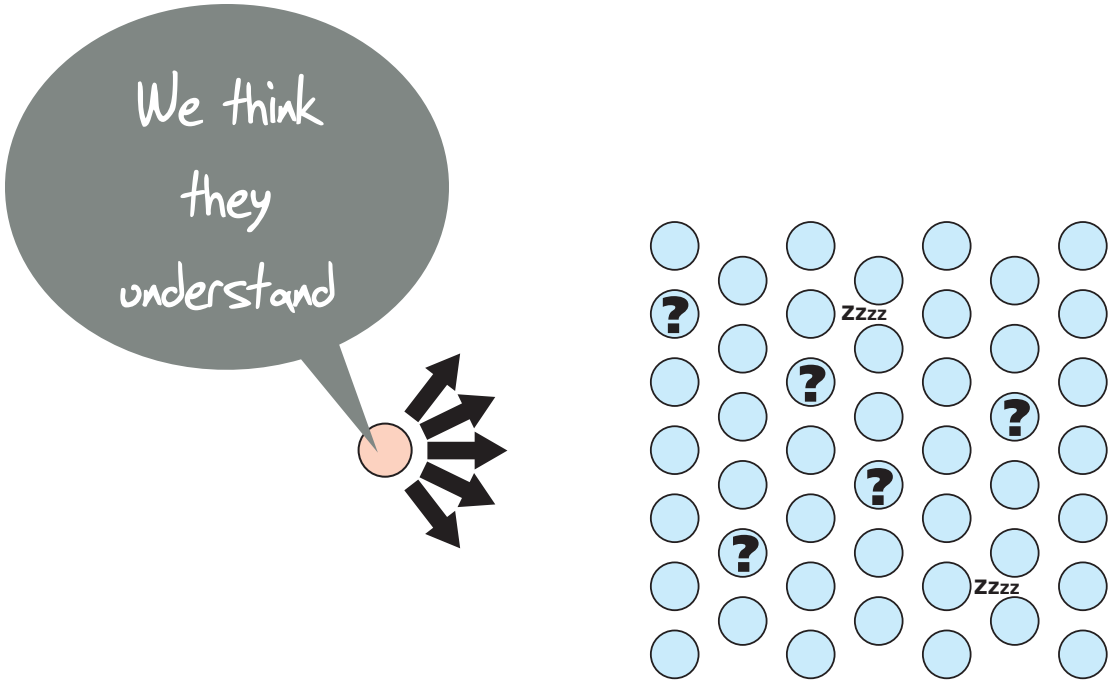
Why is this happening?

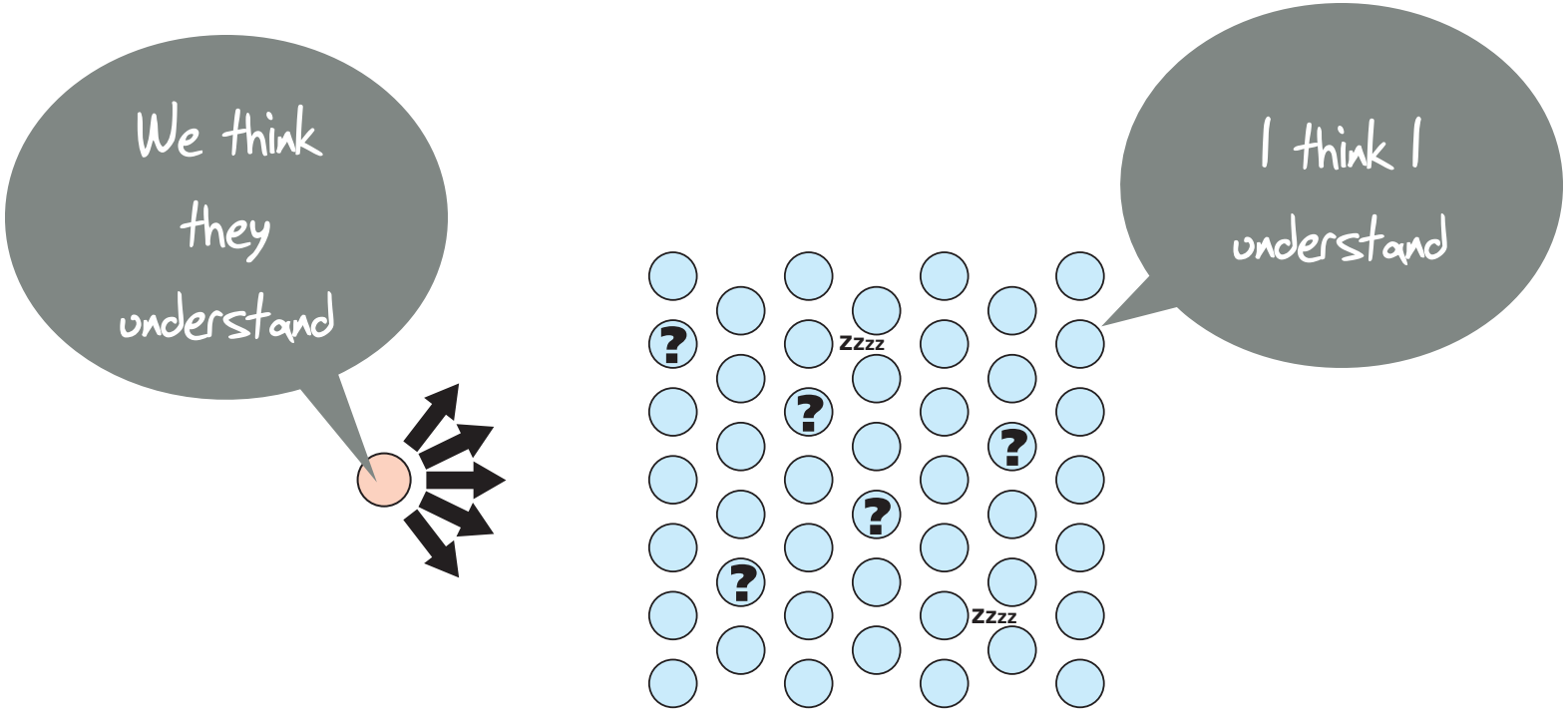
Education teaches situated, procedural knowledge.

we tell

$a^2 + b^2 = c^2$




We think they understand
Zzzz
Zzzz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I think I understand
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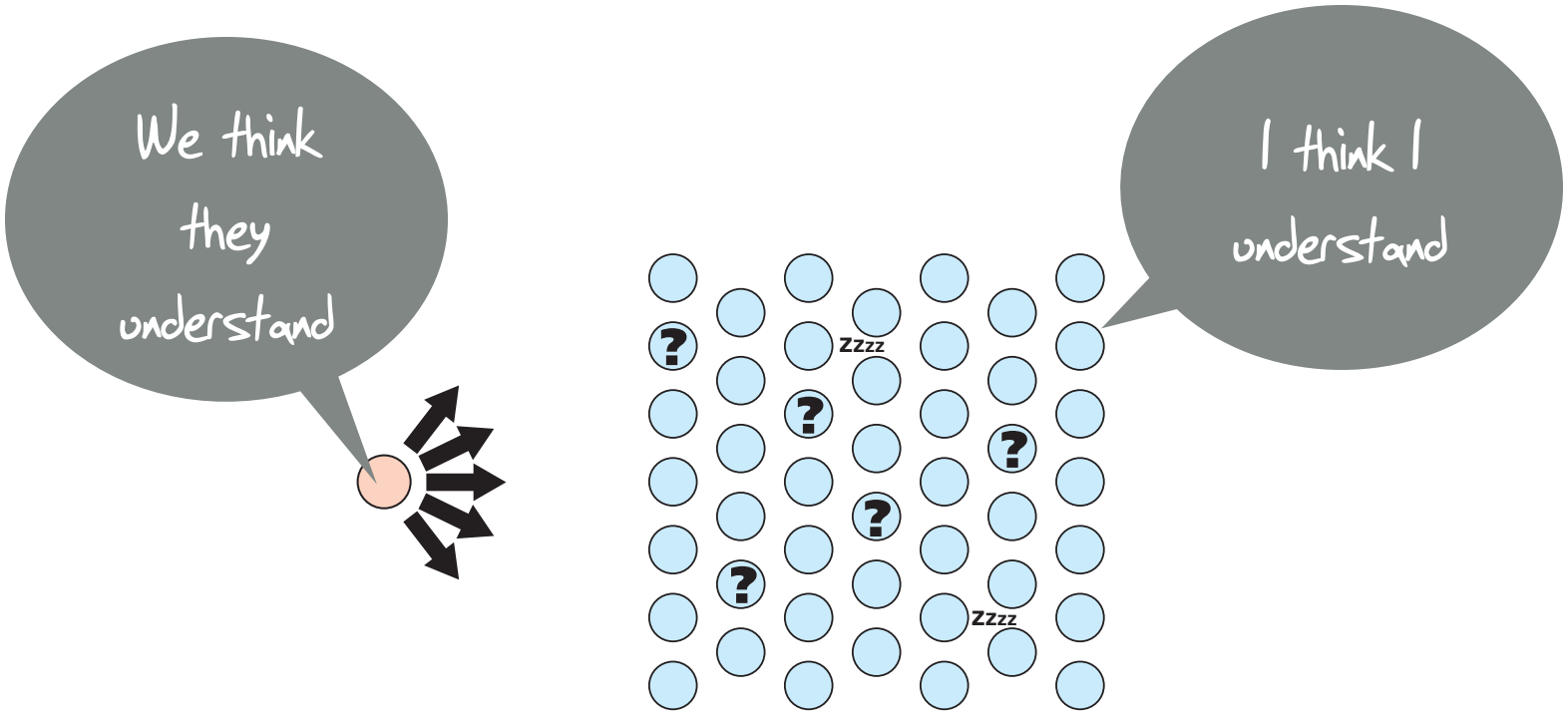
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I think I understand
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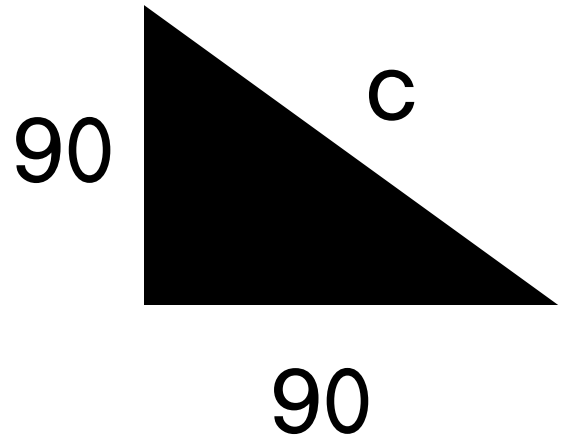
we test


90
c
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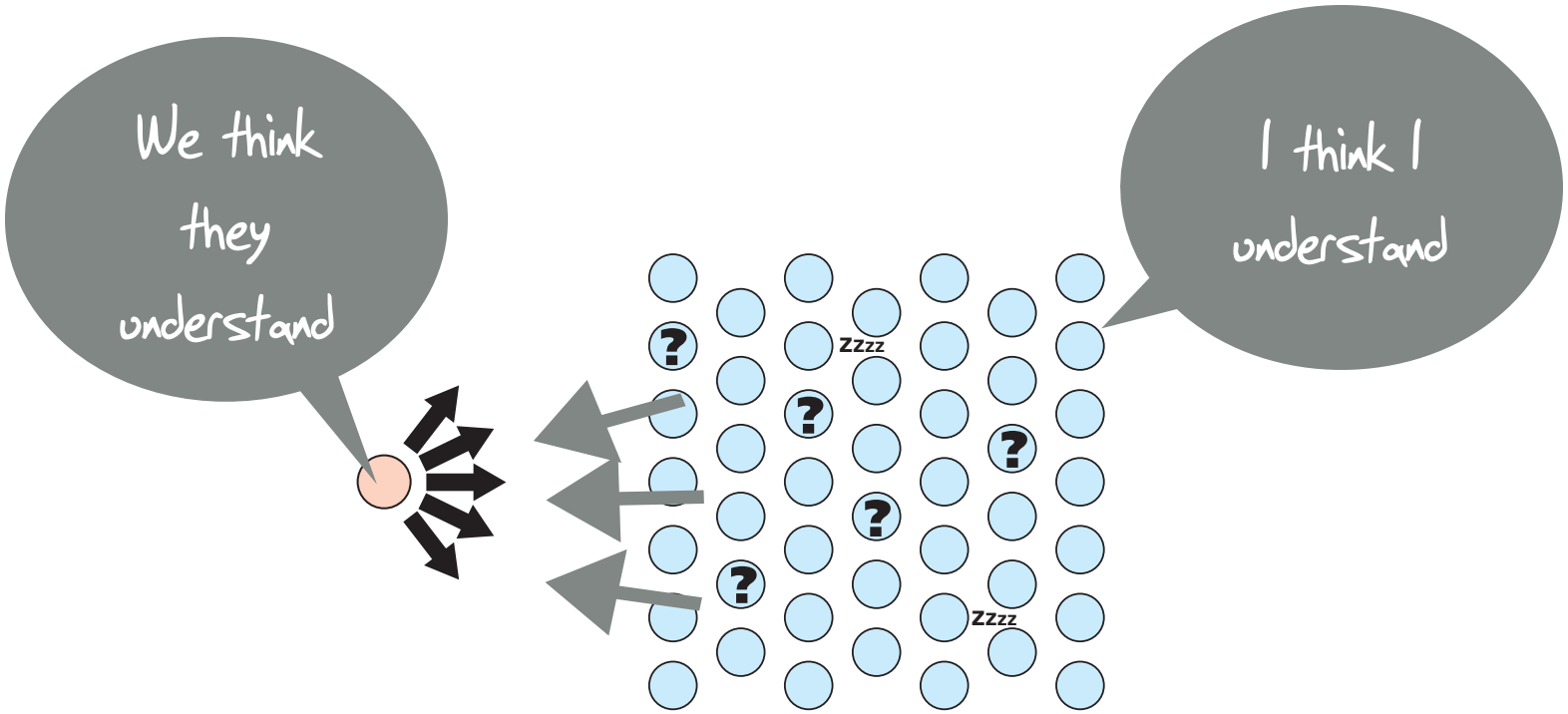
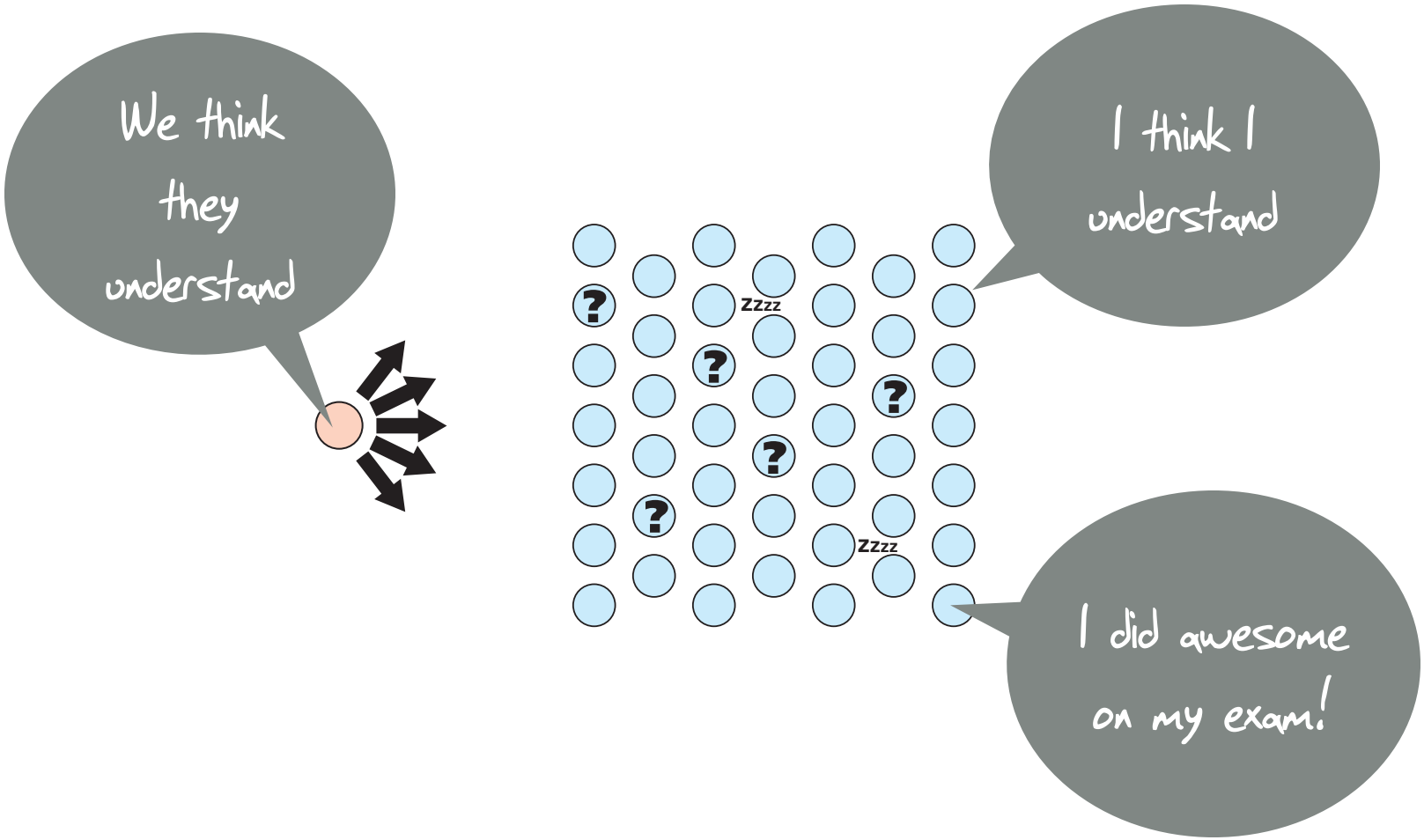
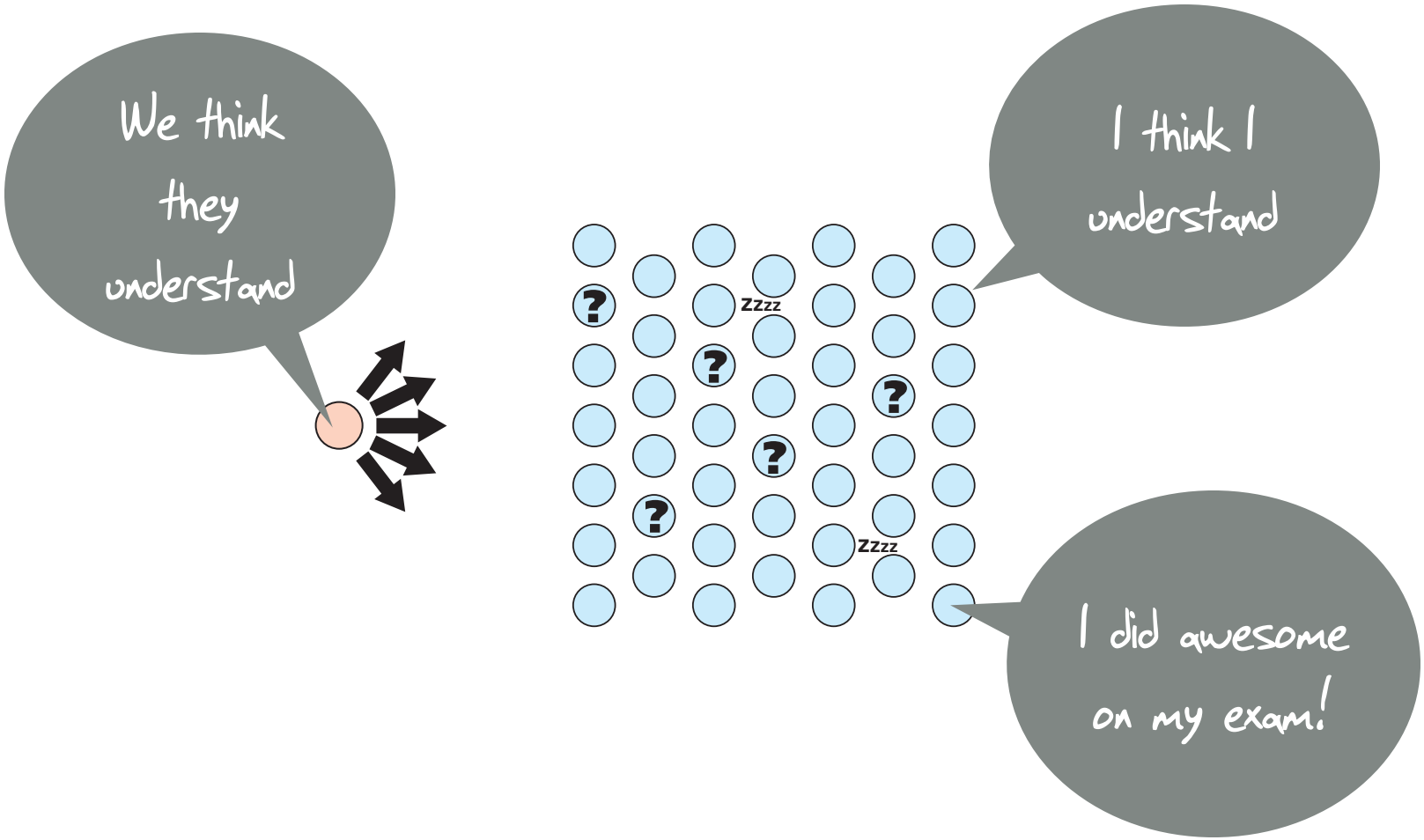


They tell us back


We think they understand
I think I understand
Zzzz
Zzzz
I did awesome on my exam!



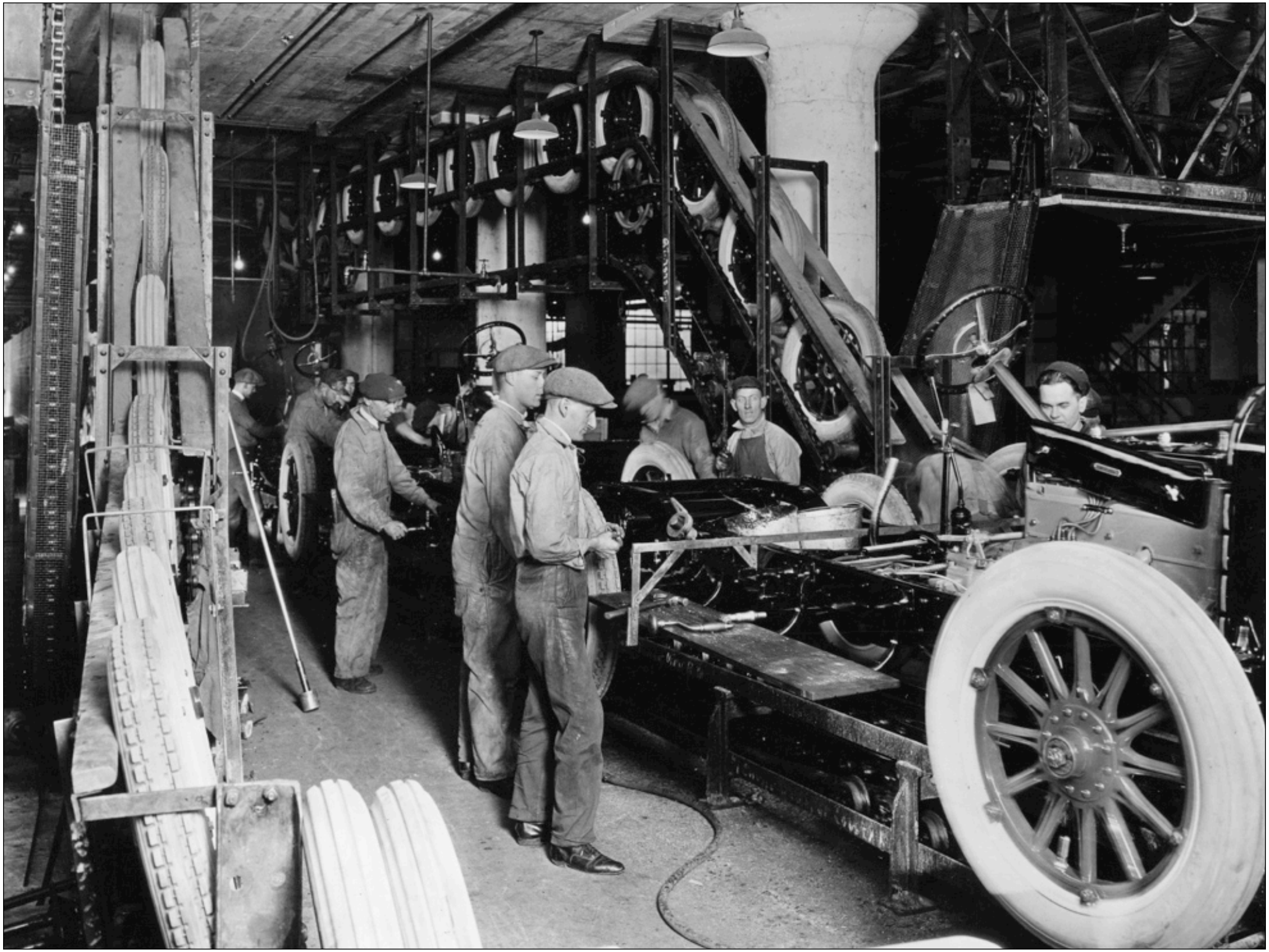
Lecture's Lullaby

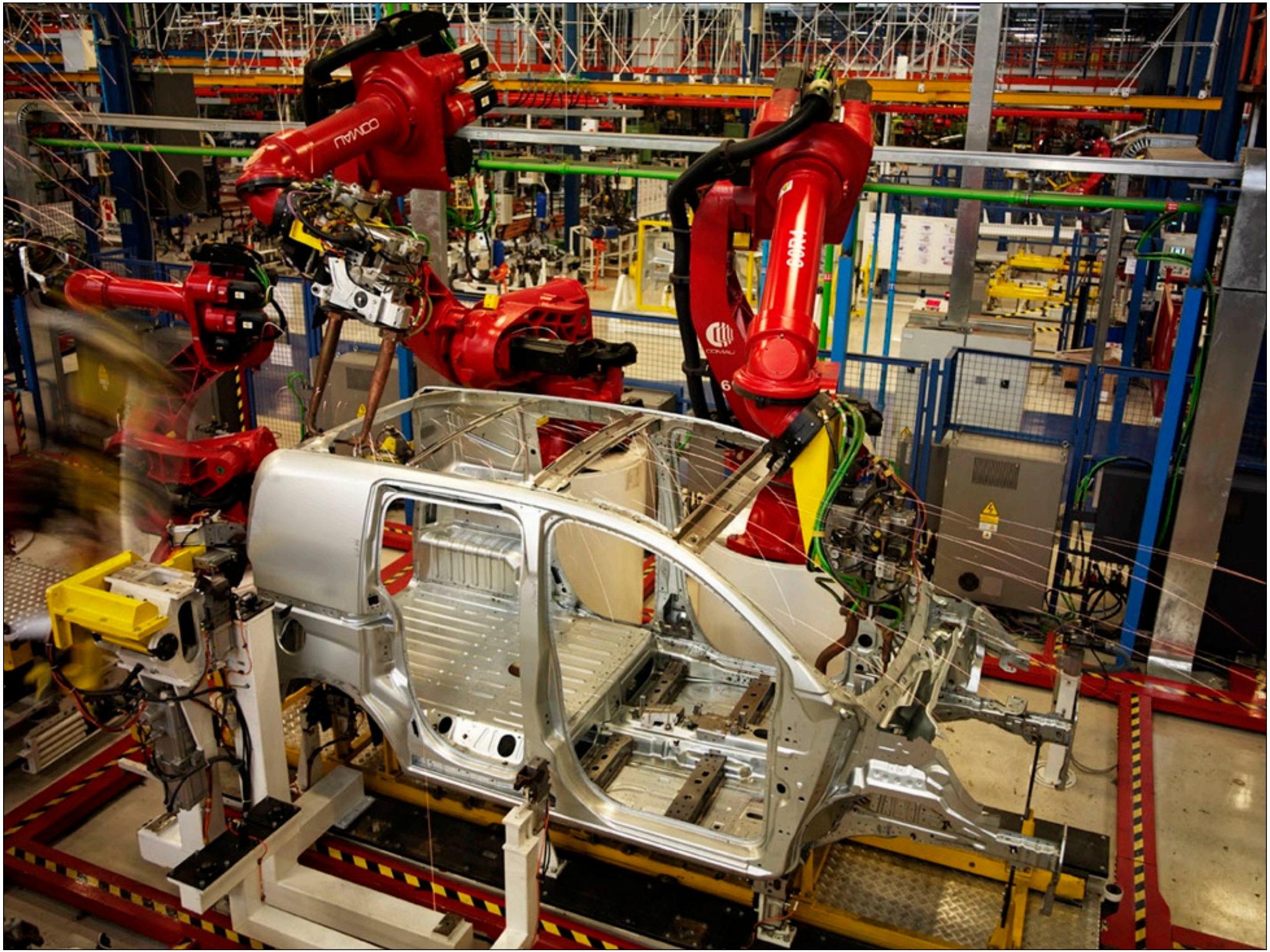
6 symptoms of an education pandemic

1. Students are resistant to learning on their own
2. Cannot tolerate having to think outside the box
3. Lack perseverance
4. Cannot transfer knowledge across contexts
5. Unwilling or unable to risk failure
6. Don't retain what they learn, lack of basics

Adapted from Dan Meyer: http://www.ted.com/talks/dan_meyer_math_curriculum_makeover.html

We are in a world now where we need transferable, heuristic knowledge.




COMAU

"Our current classroom models are doing an incredible job of preparing students for the 20th Century!"

Cathy Davidson, 2012

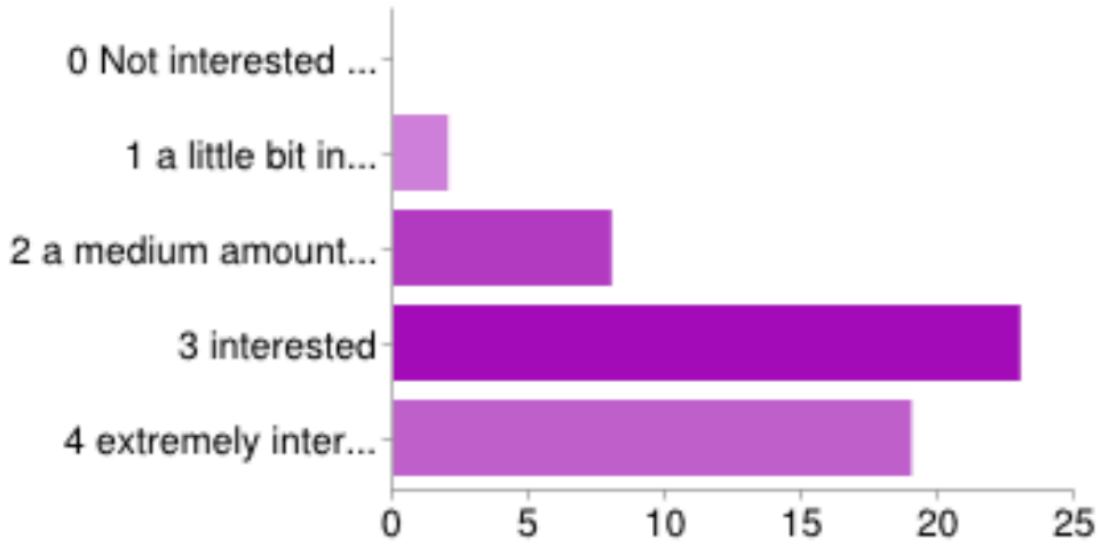
Innovative flipped teaching offers one way to change the education experience.

1

How do I motivate my students to prepare before class?

TWO

Please rate your interest in the answers to the following questions - How do I motivate my students to read before class?



0 Not interested at all	**0**	0%
1 a little bit interested	**2**	4%
2 a medium amount of interest	**8**	15%
3 interested	**23**	43%
4 extremely interested	**19**	36%


If you assess it...
they will come

My students do at least 30 mins of reading or prep before coming to class...

a. true

b. false

c. depends

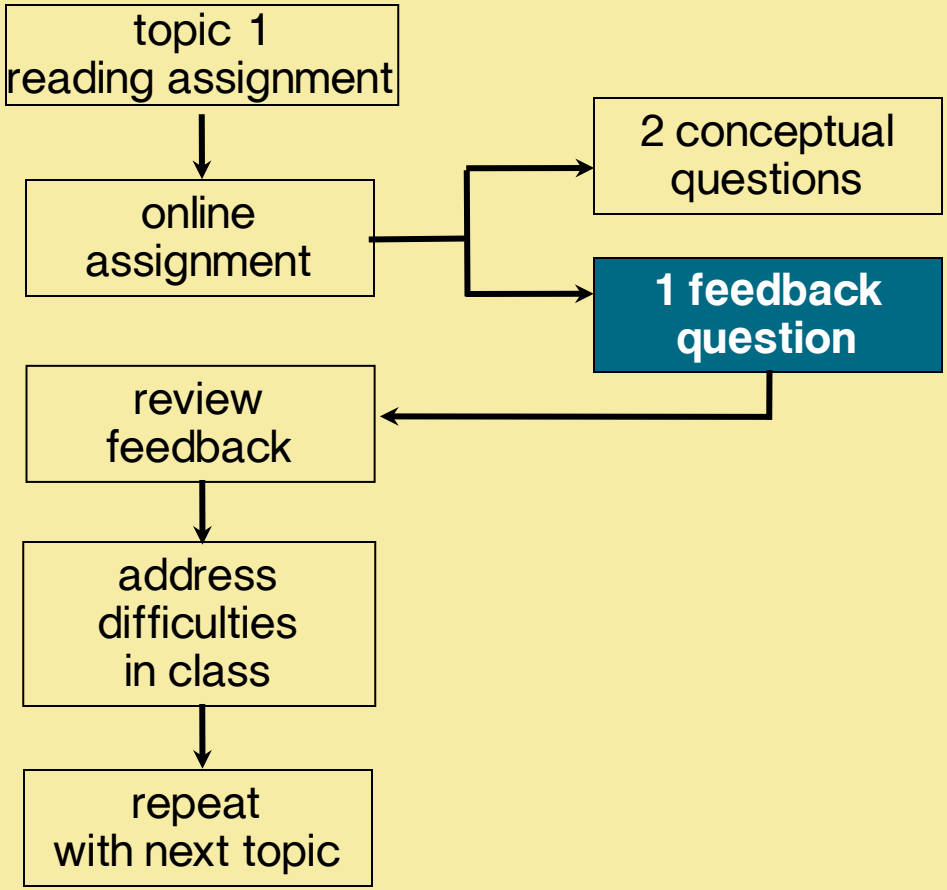
I would like my students to do at least 30 mins of prep before coming to class...

a. true

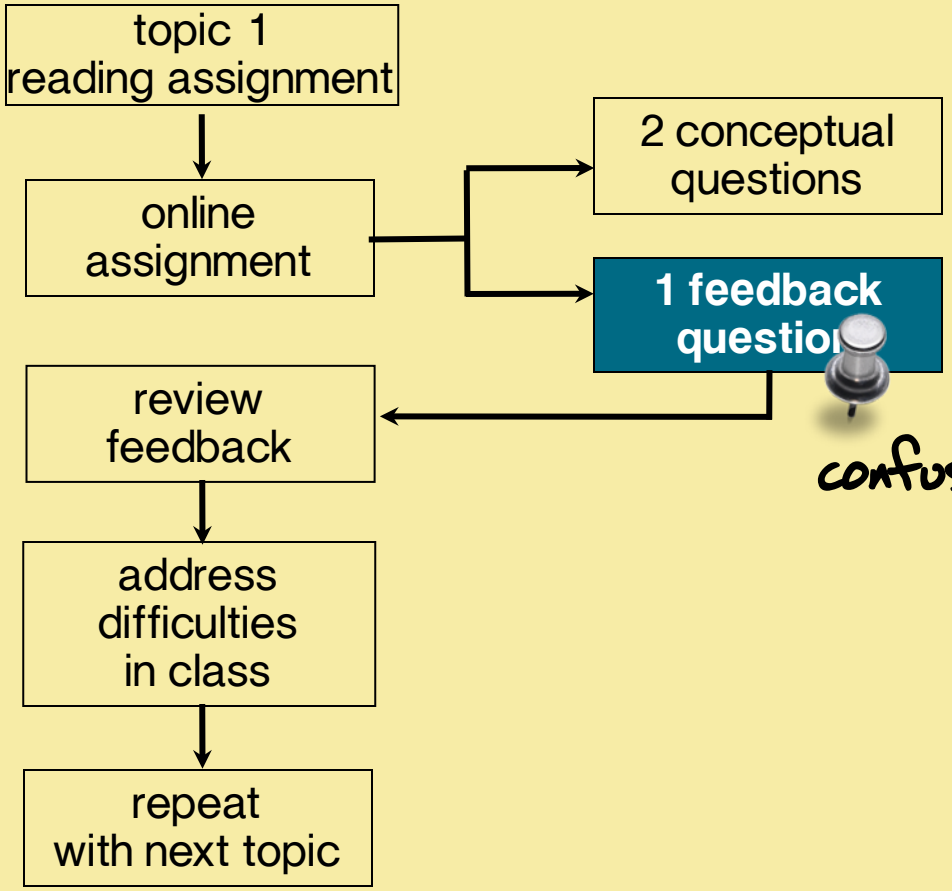
b. false

c. depends

Just-in-Time Teaching



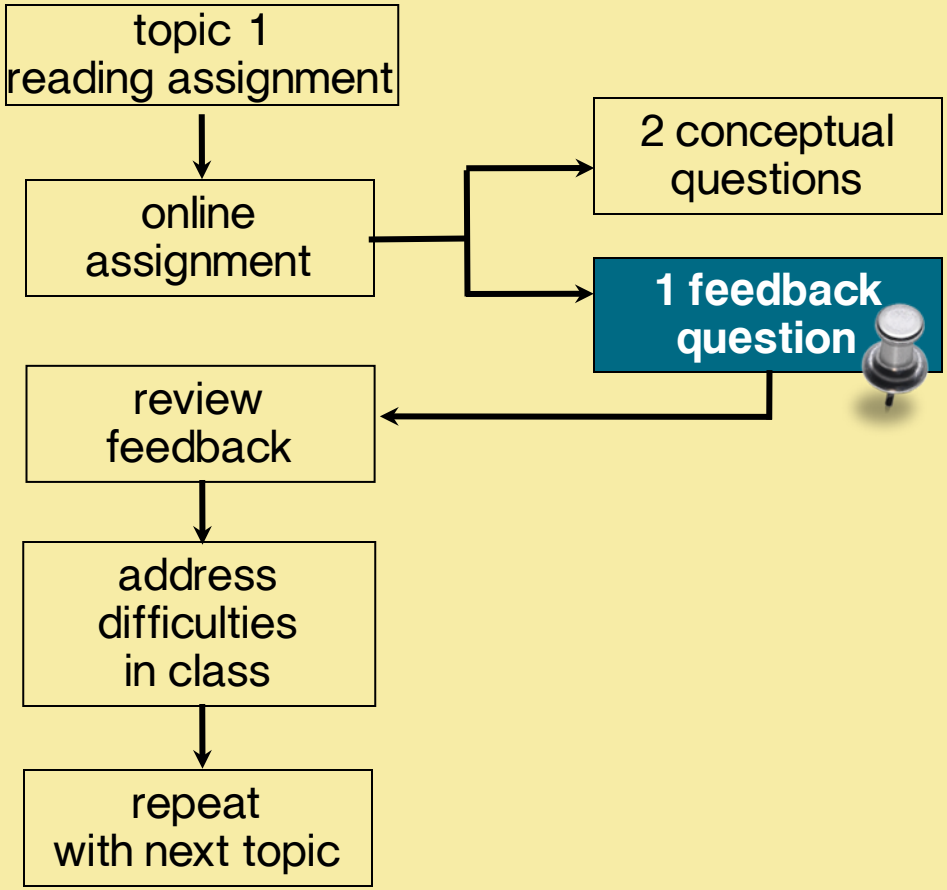
Just-in-Time Teaching



What do you find most confusing about what you read?

Muddiest Point Technique

Just-in-Time Teaching



What do you wonder about this topic? Wonder Question

What kinds of "feedback" questions have you tried?

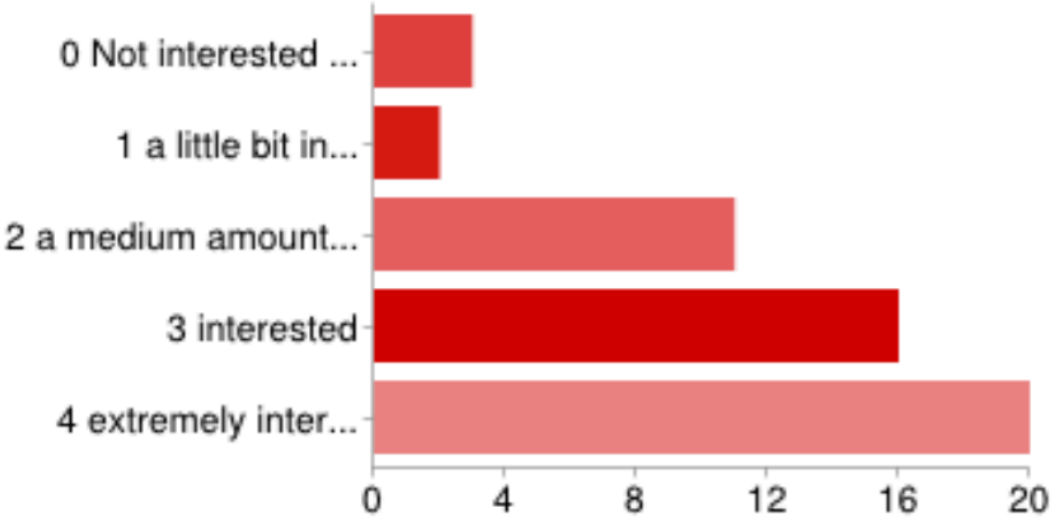
Think

Pair

Share

TWU

Please rate your interest in the answers to the following questions - How to write questions that will engage my students?



0 Not interested at all	**3**	6%
1 a little bit interested	**2**	4%
2 a medium amount of interest	**11**	21%
3 interested	**16**	30%
4 extremely interested	**20**	38%

Pride and Prejudice

"My reasons for marrying are, first, that I think it a right thing for every clergyman in easy circumstances (like myself) to set the example of matrimony in his parish. Secondly, that I am convinced it will add very greatly to my happiness; and thirdly -- which perhaps I ought to have mentioned earlier, that it is the particular advice and recommendation of the very noble lady whom I have the honour of calling patroness."

Pride and Prejudice

What is Collins' profession?

A. Farmer

B. Businessman

C. Pastor

D. I don't know

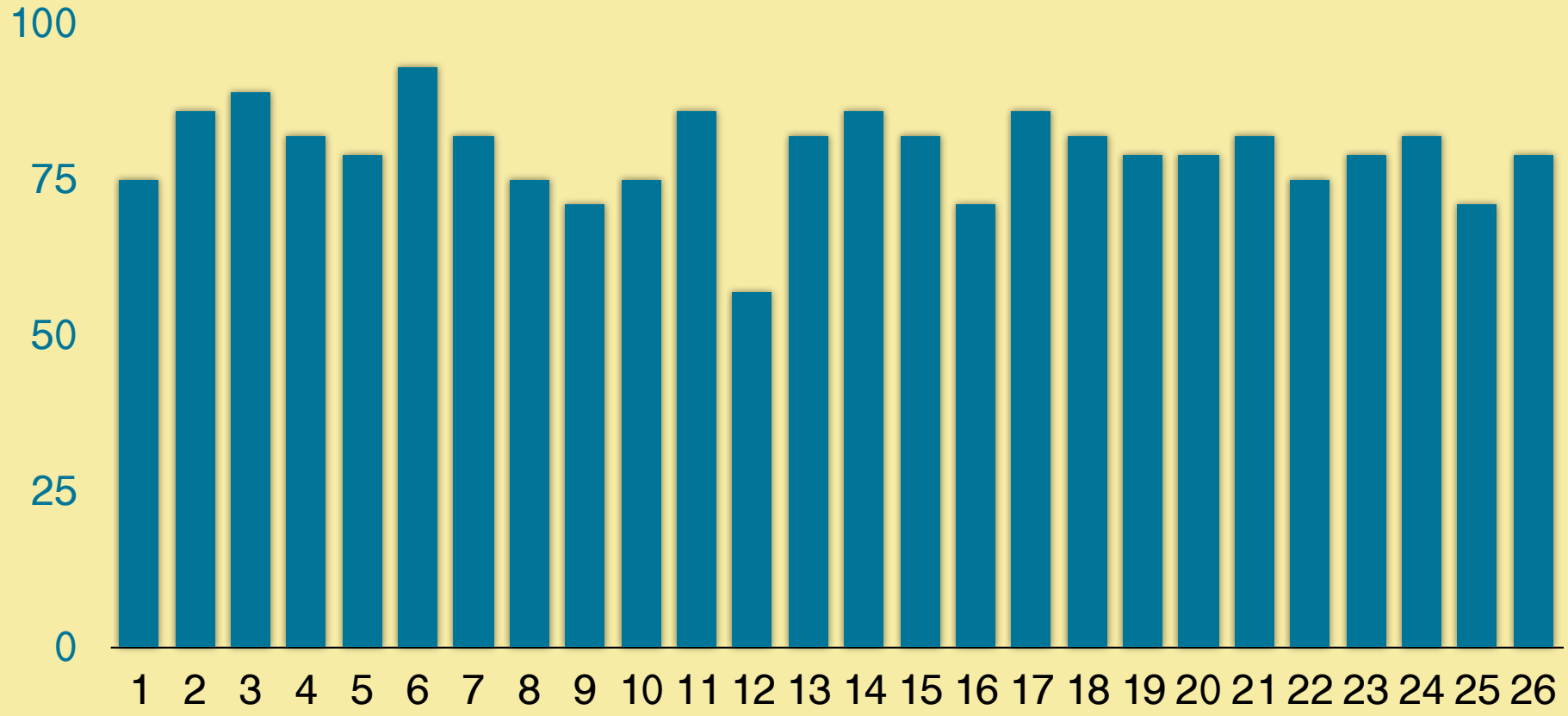
Hypothesize Collins' perception of the purpose of marriage.

What do you wonder about Collins' proposal?

Just-in-Time Teaching

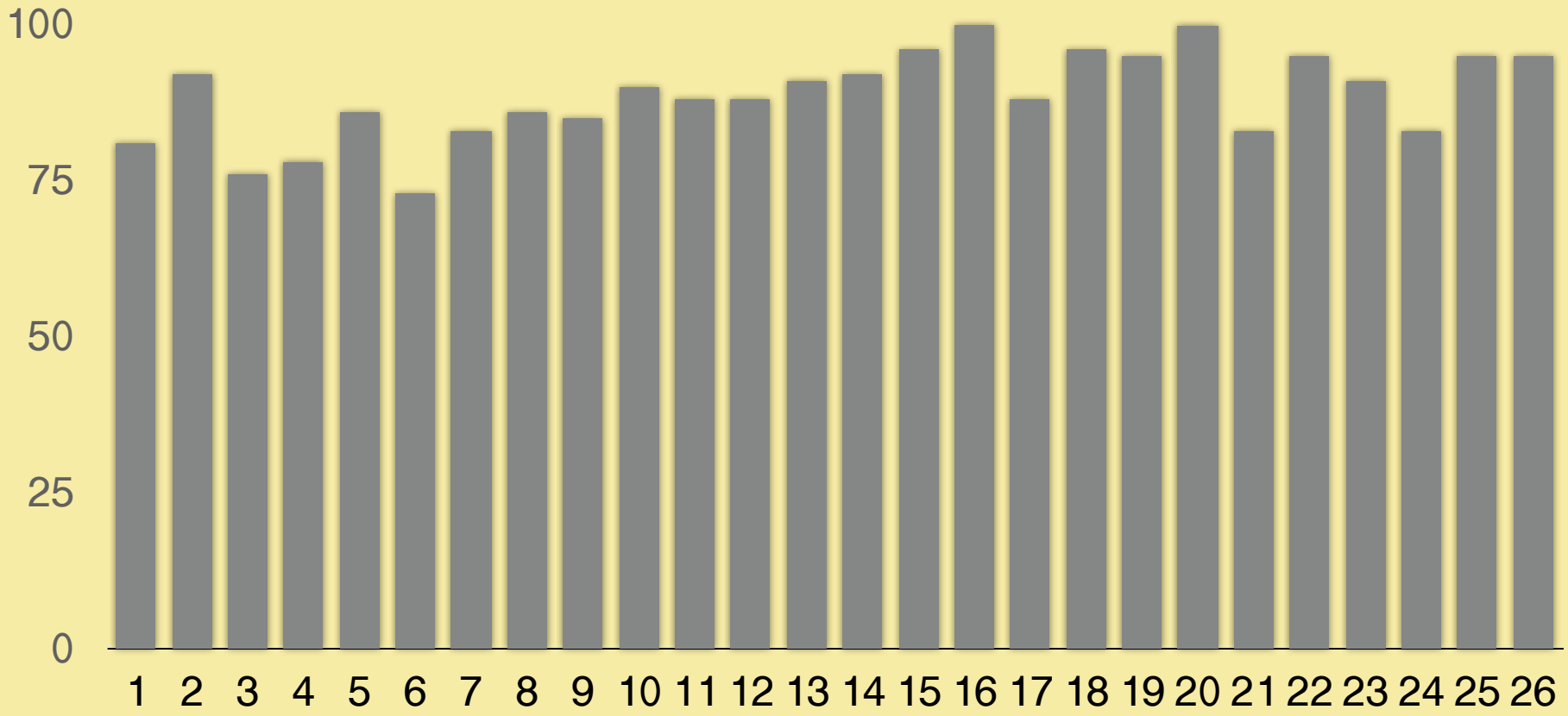
"It is important to cite achievement data & research about student engagement not just perceptions."

Just-in-Time Teaching



% of students (n=28) completing reading assignment (n=26)

Just-in-Time Teaching

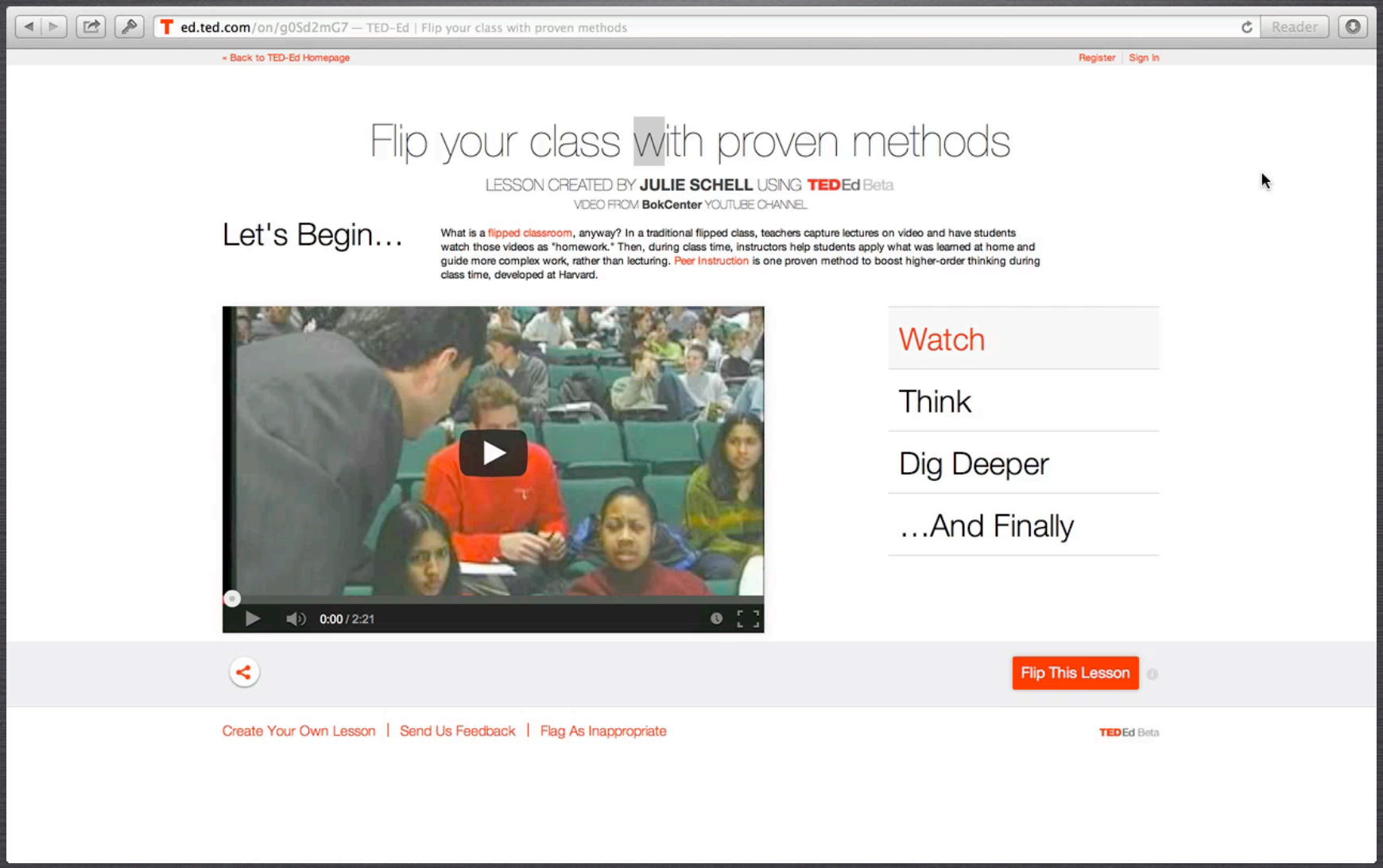


% of students (n=28) reading assignment engagement (n=26)

Score for each question	Criteria (Students are asked to respond with an answer and a rationale for that answer)
0	Question is left blank or incomplete
1	Response includes an answer, but does not include any or includes only very minimal reasoning or rationale (regardless of correctness)
2	Response includes an answer AND reasoning or rationale (regardless of correctness)

What are alternatives to JiTT?

http://ed.ted.com/on/g0Sd2mG7



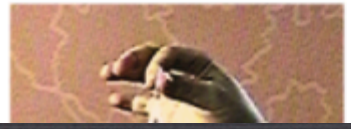
http://nb.mit.edu

strips of tape and various nearby objects, the magnitude of the electric force depends on distance — it decreases as you increase the separation.

22.2 Suspend a freshly pulled strip of transparent tape from the edge of your desk. (*a*) Pull a second strip of tape out of the dispenser and hold it near the first strip. What do you notice? (*b*) Does it matter which sides of the strips you orient toward each other?

As Checkpoint 22.2 makes clear, not all electric interactions are attractive. Even if you increase the mass of the strip by suspending paper clips from them, the repulsion between the strips is large enough to keep the paper clips apart (Figure 22.2). Now place your hand between two repelling strips and notice how both strips fly toward your hand! Then run each tape several times between your fingers and notice how the electric interaction diminishes or even disappears.

22.3 Suspend two freshly pulled 20-cm strips of transparent tape from the edge of your desk. Cut two 20-cm strips of paper, making each strip the same width as the tape, and investigate the interactions between the paper strips and the tape by bringing them near each other. Which of the following combinations display an electric interaction: paper-paper, tape-paper, tape-tape?



22.2 Electrical charge

As we saw in the previous section, electric interacti
are sometimes attractive and sometimes repulsive
addition, the experiment you performed in Checkpo
22.3 demonstrates that paper strips, which do not
teract electrically with each other, do interact elec
cally with transparent tape. What causes th
interactions? To answer this question, we need to ca
out a systematic sequence of experiments.

Figure 22.3 illustrates a simple procedure for rep
ducibly creating strips of tape that interact electric
A suspended strip created according to this proced
interacts in the following ways: it repels another s
created in the same manner, and it attracts any ot

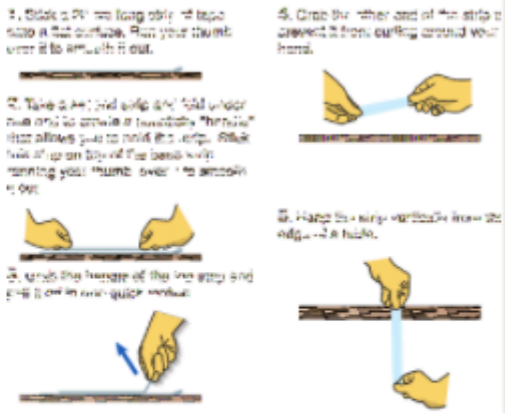


Figure 22.3 Procedure for making strips of transparent t
that interact electrically. The lower strip is used to provi
standard surface—the top side of a piece of tape — beca
surface properties may vary from one tabletop or deskto
another.

Welcome to NB !

Use your mouse or the ↑ and ↓ keys to move from discussion to discussion.
Use your mouse or the ← and → keys to scroll up and down the document.
Drag across any region on the pdf to create a new discussion
Right-click on any comment to post a reply

More help...

New note...

- The entire class
- Instructors and TAs
- Myself only

☐ Anonymous to students

Save

NB

Name	Assignment	Download PDF	Stats		
ch22	No	original	me 1	unread 39	all 50
ch32	No	original	me 0	unread 73	all 73
ch25	No	original	me 0	unread 131	all 131
ch33	No	original	me 0	unread 99	all 99
ch26	No	original	me 0	unread 96	all 99
ch24	No	original	me 0	unread 169	all 180
Ch30	No	original	me 0	unread 81	all 81
ch29	No	original	me 0	unread 38	all 38
ch27	No	original	me 0	unread 53	all 55
ch23	No	original	me 0	unread 154	all 172
ch28	No	original	me 0	unread 79	all 79
ch31	No	original	me 0	unread 41	all 41

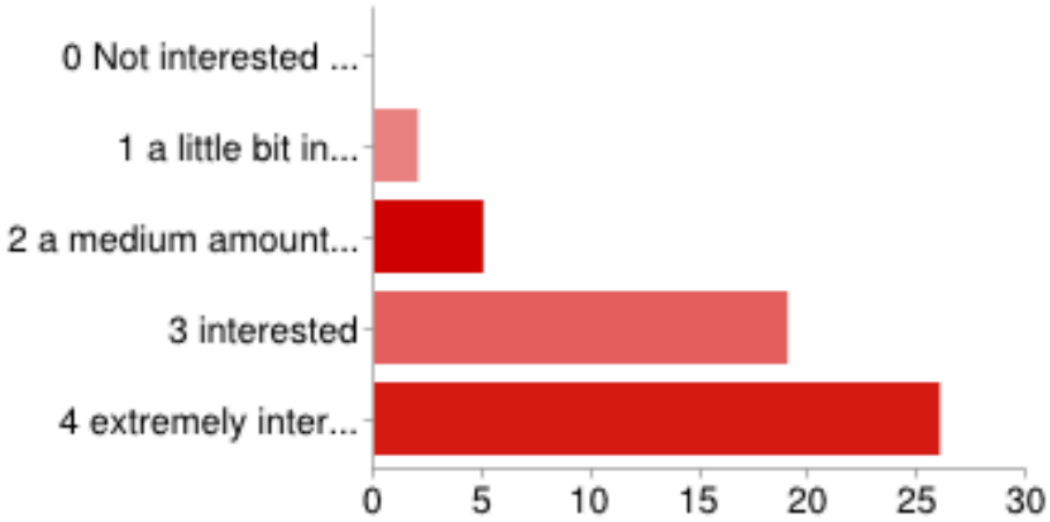
Tips for JiTT

- give students points for effort doing reading assignments
- organize class time around results of feedback
- display their comments anonymously in class
- put content covered in assignments on formal assessments
- find a colleague doing it on campus

How do I engage my students in class?

TWU

Please rate your interest in the answers to the following questions - What are tools for engaging students in class?

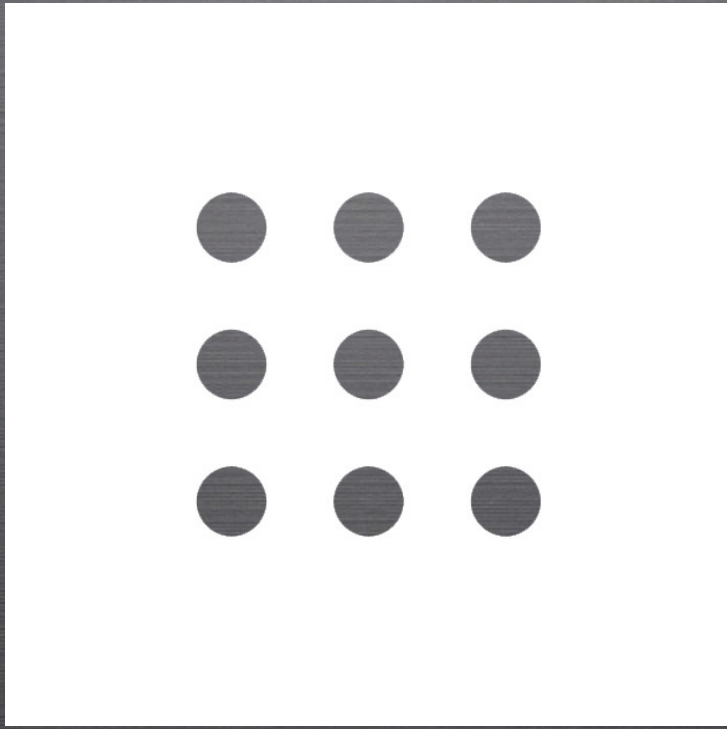


0 Not interested at all	**0**	0%
1 a little bit interested	**2**	4%
2 a medium amount of interest	**5**	9%
3 interested	**19**	36%
4 extremely interested	**26**	49%


FOUND DEEP

Thermal Expansion

When metals heat up, they expand



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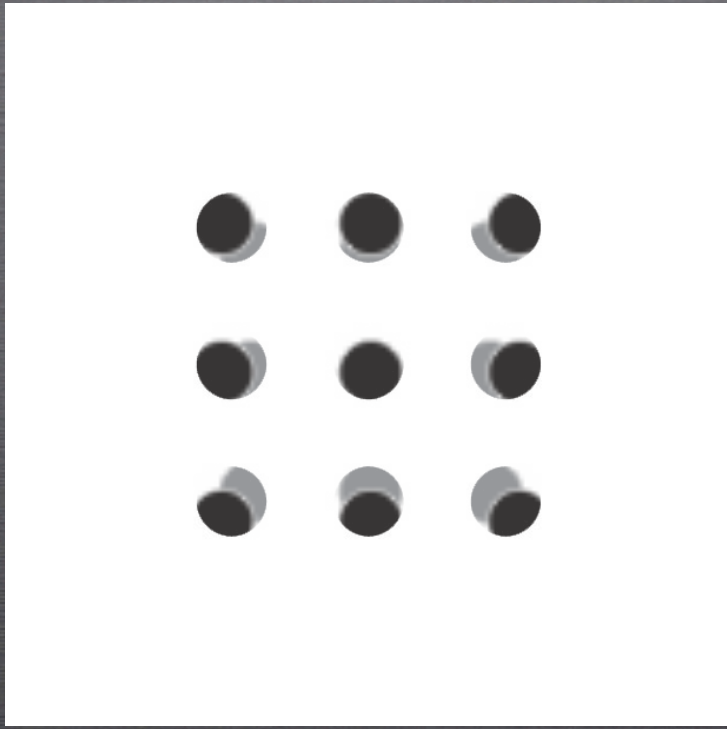
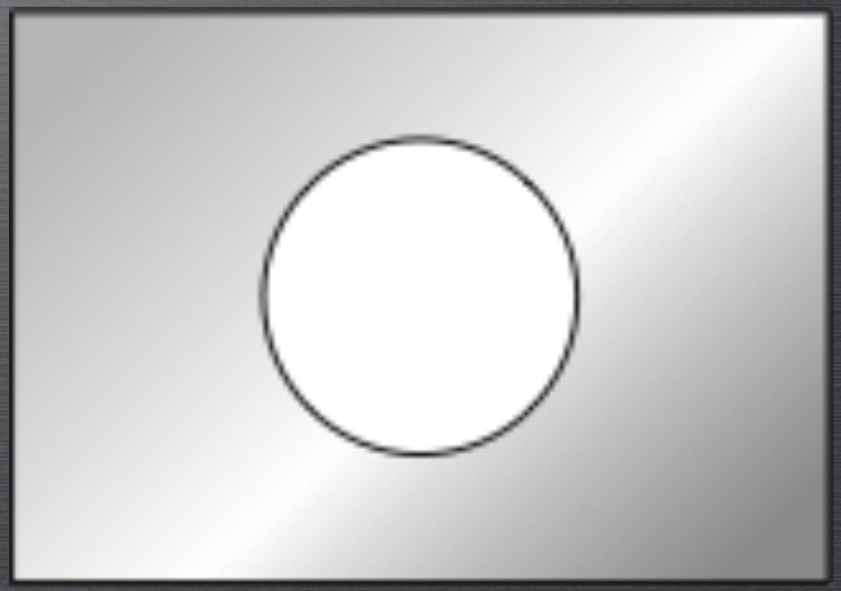
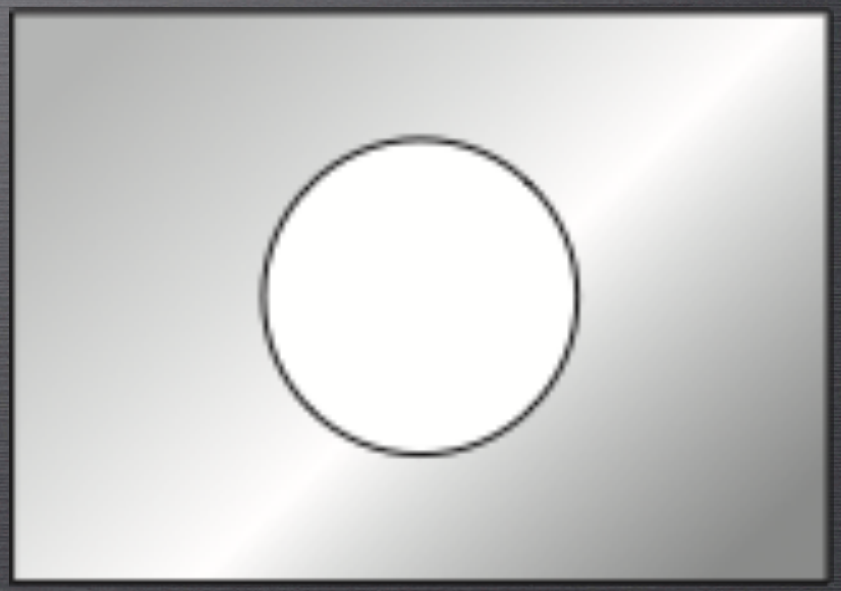


Consider a metal plate with a hole in it...

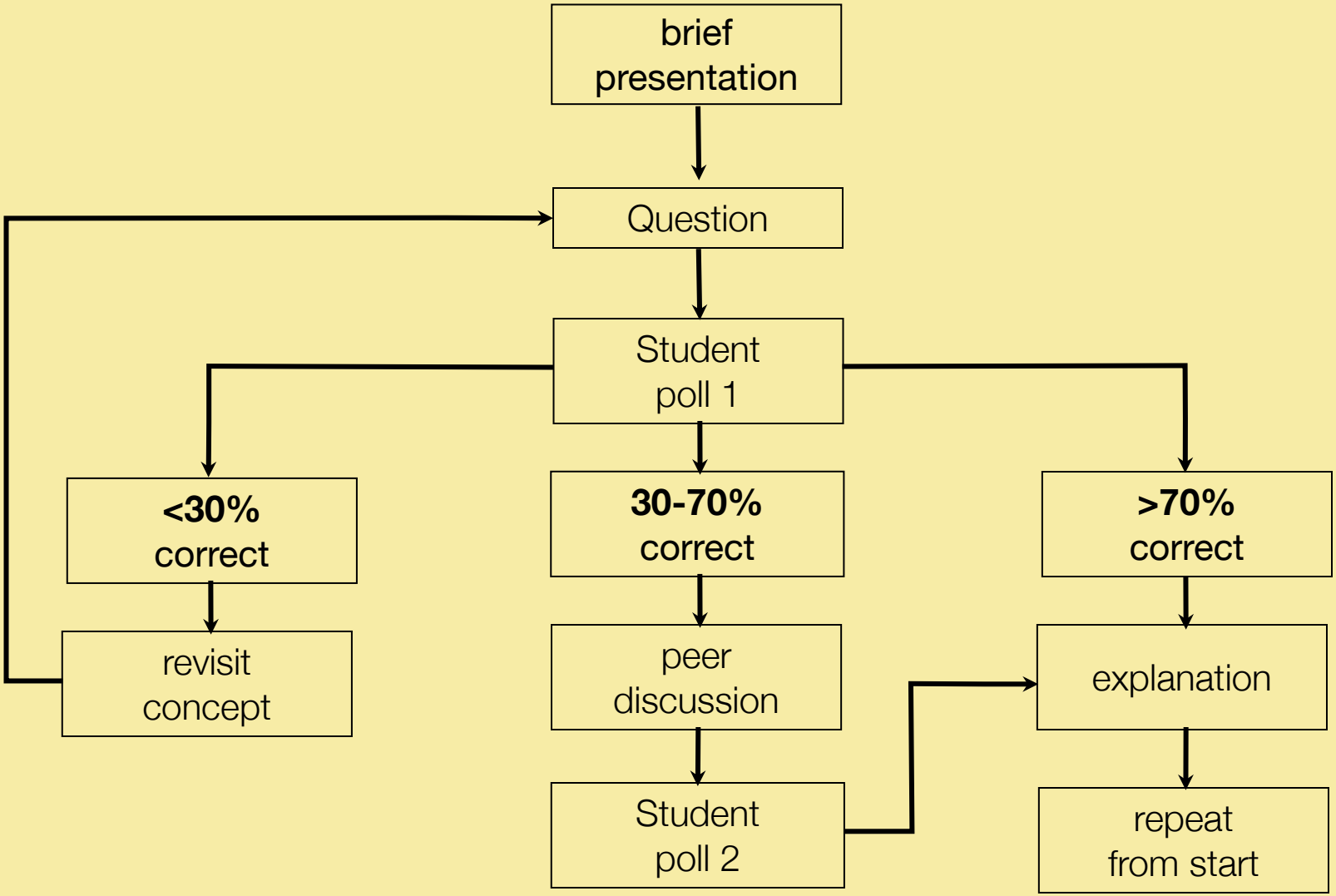


If you heat the plate uniformly, what happens to the hole?

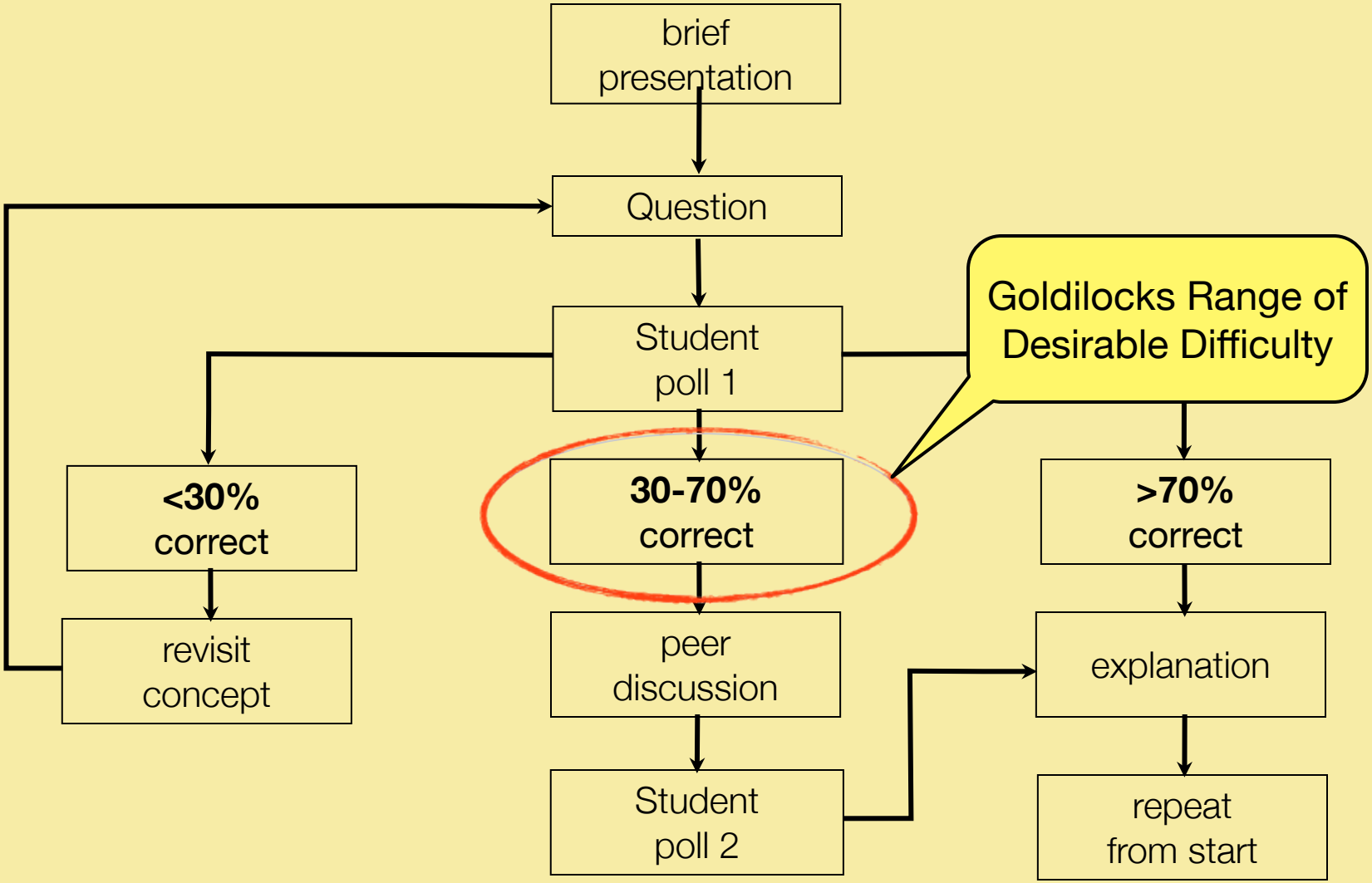


A. increases
B. stays the same
C. decreases

Peer Instruction



Peer Instruction



Systematic Moral Analysis

Gert's Moral Rules

Everyone must follow!

1. Do not kill.
2. Do not cause pain.
3. Do not disable.
4. Do not deprive of freedom.
5. Do not deprive of pleasure.
6. Do not deceive.
7. Keep your promises.
8. Do not cheat.
9. Obey the law.
10. Do your duty.

Heinz's wife was near death, and her only hope was a drug that had been discovered by a pharmacist who was selling it for an exorbitant price. The drug cost $20,000 to make, and the pharmacist was selling it for $200,000. Heinz could only raise $50,000 and insurance wouldn't make up the difference. He offered what he had to the pharmacist, and when his offer was rejected, Heinz said he would pay the rest later. Still the pharmacist refused. In desperation, Heinz broke into the store and stole the drug.

Should Heinz have broken into the store to steal the drug for his wife?

A. Yes
B. No

In Peer Instruction – is it always necessary to give students time to answer on their own first?

A. Yes
B. No

In Peer Instruction – is it always necessary to give students time to answer on their own first?

A. Yes

B. No

Should I show the histogram to students before they vote?

A. Yes

B. No

Should I show the histogram to students before they vote?

A. Yes

B. No

C. It depends

What are alternatives to clickers?


POWER
LOW BATTERY
VOTE STATUS
i-clicker
jump search
clear
send
sym
A/1
B/2
C/3
D/4
E/5
F/6
G/7
H/8
I/9
J/0
5/E
1/A
2/B
3/C
4/D
5/E
6/F
7/G
8/H
9/I
Ch
0/J
?
www.TurningTechnologies.com
SMART
SMART Response PE
Enter
del

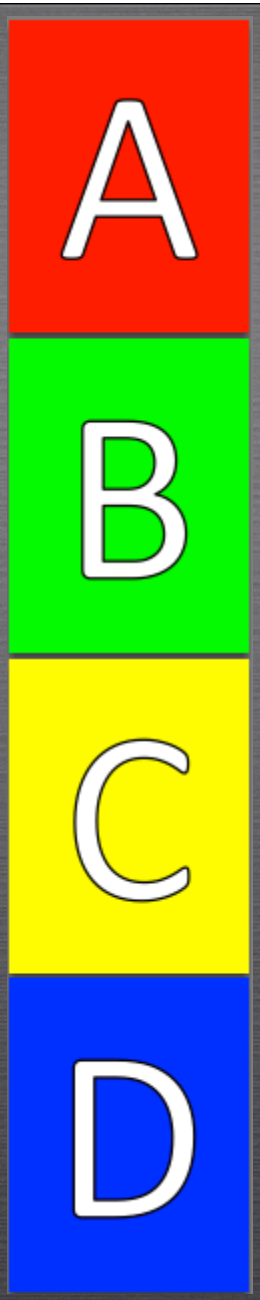
A

B

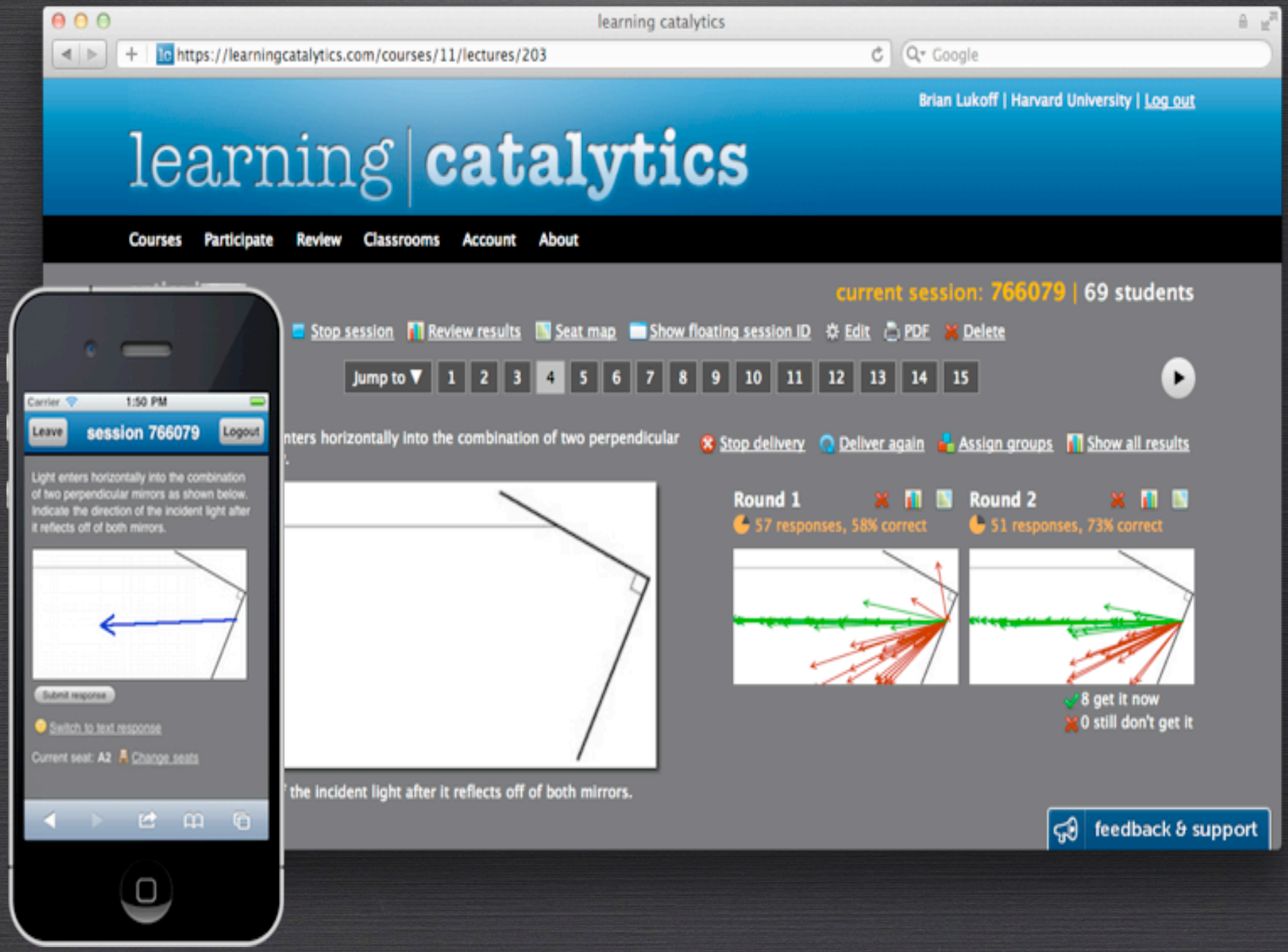
C

D

http://bit.ly/TgzlcQ



http://bit.ly/VnXtN5


learning catalytics
https://learningcatalytics.com/courses/11/lectures/203
Google
Brian Lukoff | Harvard University | Log out
learning | catalytics
Courses
Participate
Review
Classrooms
Account
About
current session: 766079 | 69 students
Stop session
Review results
Seat map
Show floating session ID
Edit
PDF
Delete
Jump to
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
nters horizontally into the combination of two perpendicular
Stop delivery
Deliver again
Assign groups
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
the incident light after it reflects off of both mirrors.
feedback & support
Carrier
1:50 PM
Leave
session 766079
Logout
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
Current seat: A2
Change seats

Socrative.com

Peer Instruction

My quick start guide for flipping your classroom with Peer Instruction!

blog.peerinstruction.net

Tips for PI

- can use with just one concept in a course
- always give students a chance to vote first before discussion
- have students give explanations of different responses as closure activity
- don't show histogram after first vote if there is a correct answer

3

How to get started or learn more?

#1 Tip for Getting Started

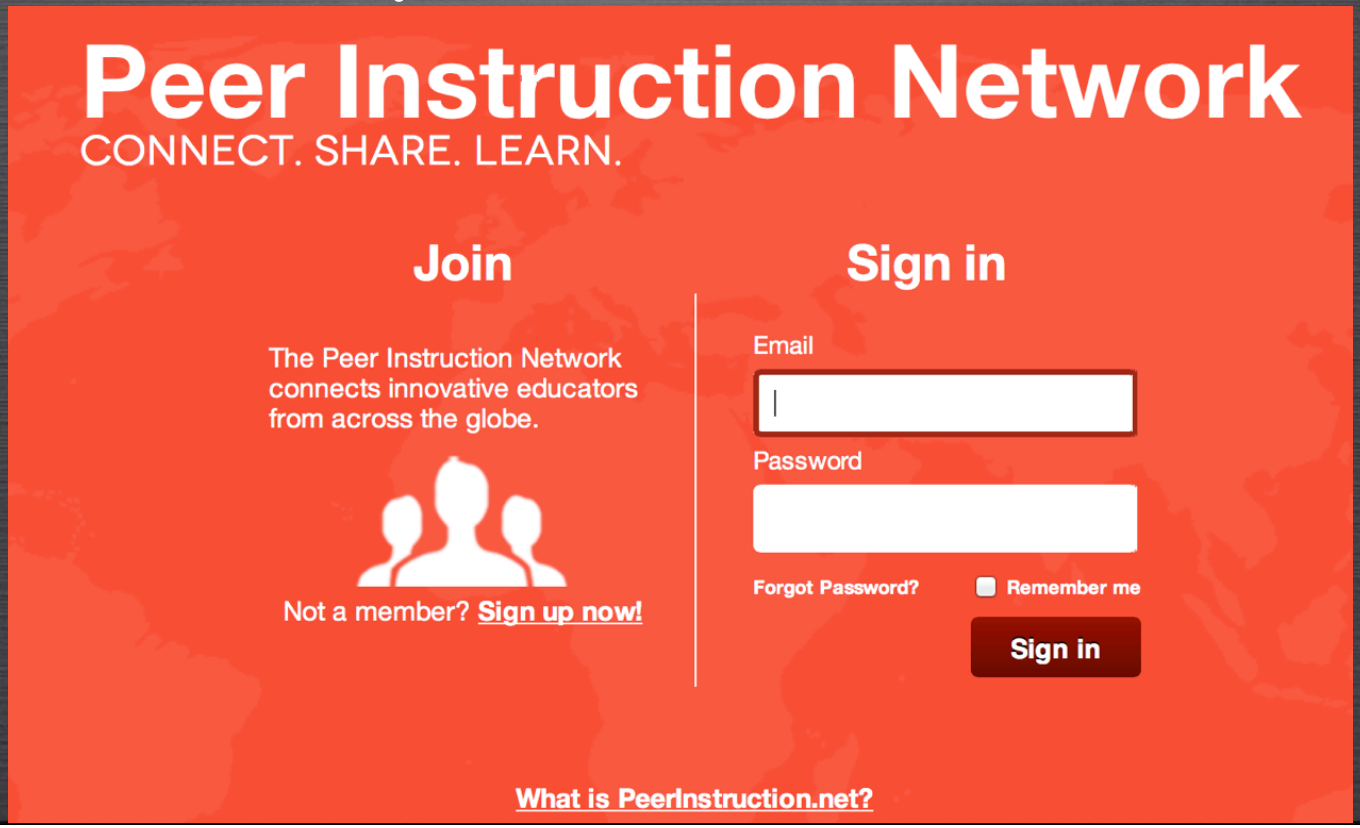
Find a mentor


hero
mentor

Peer Instruction Network

Connect. Share. Learn.

www.peerinstruction.net



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Acknowledgements

PEOPLE

Eric Mazur

Ives Araujo

Vagner Oliveira

Cassandre Alvarado

Brian Lukoff

Peter Newbury

Dan Meyer

Nancy Duarte

BOOKS

Flip Your Classroom

Peer Instruction a User's Manual

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