

A Moral Dilemma: How will we teach after the Pandemic?



33rd International Conference on Technology in
Collegiate Mathematics (ICTCM) 2021
8 October 2021

A Moral Dilemma: How will we teach after the Pandemic?

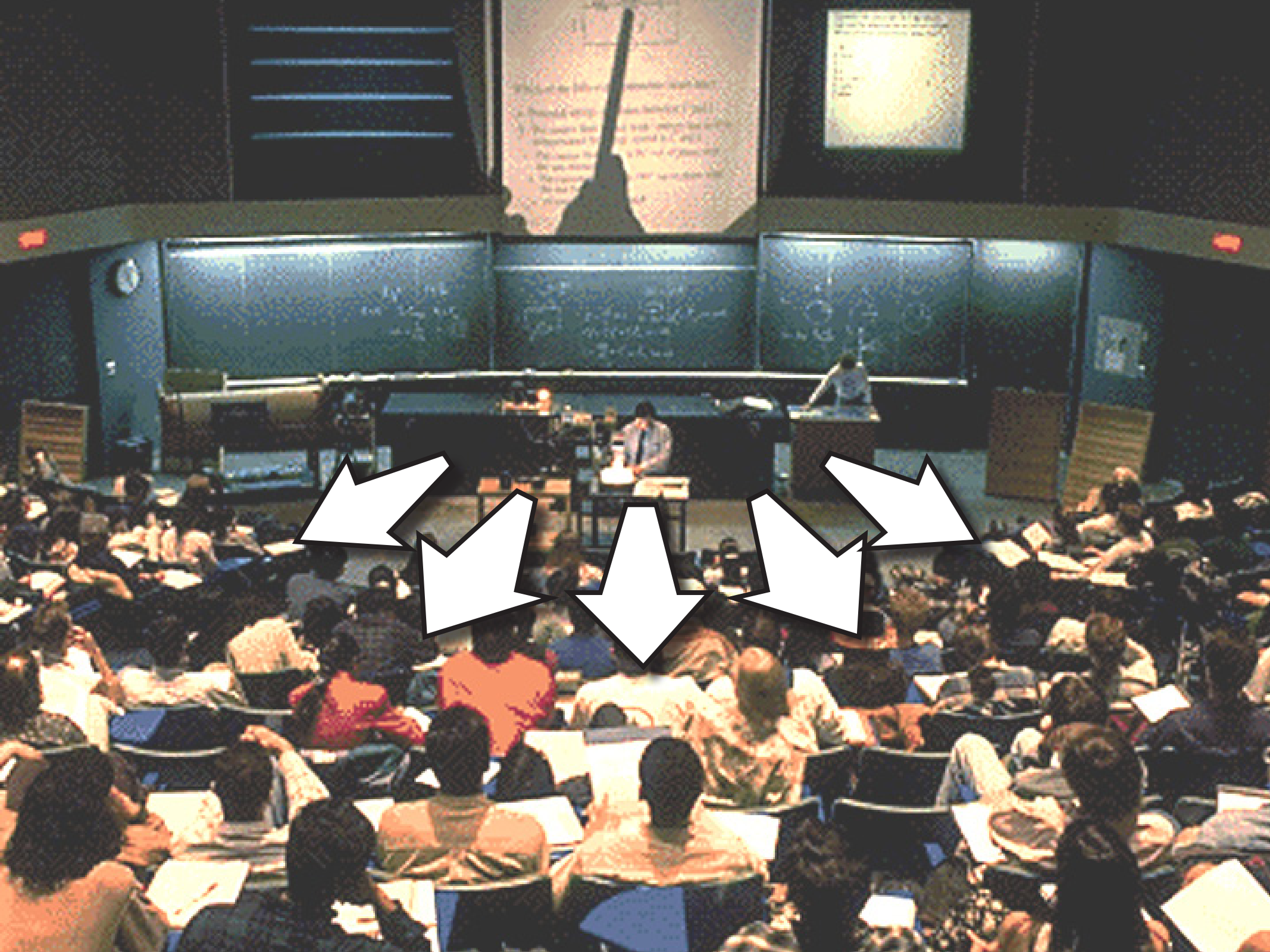


@eric_mazur

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Collegiate Mathematics (ICTCM) 2021
8 October 2021







Higher learning gains

Better retention

INSTRUCTION

March 2020

AP50

1 before (and just after) pandemic

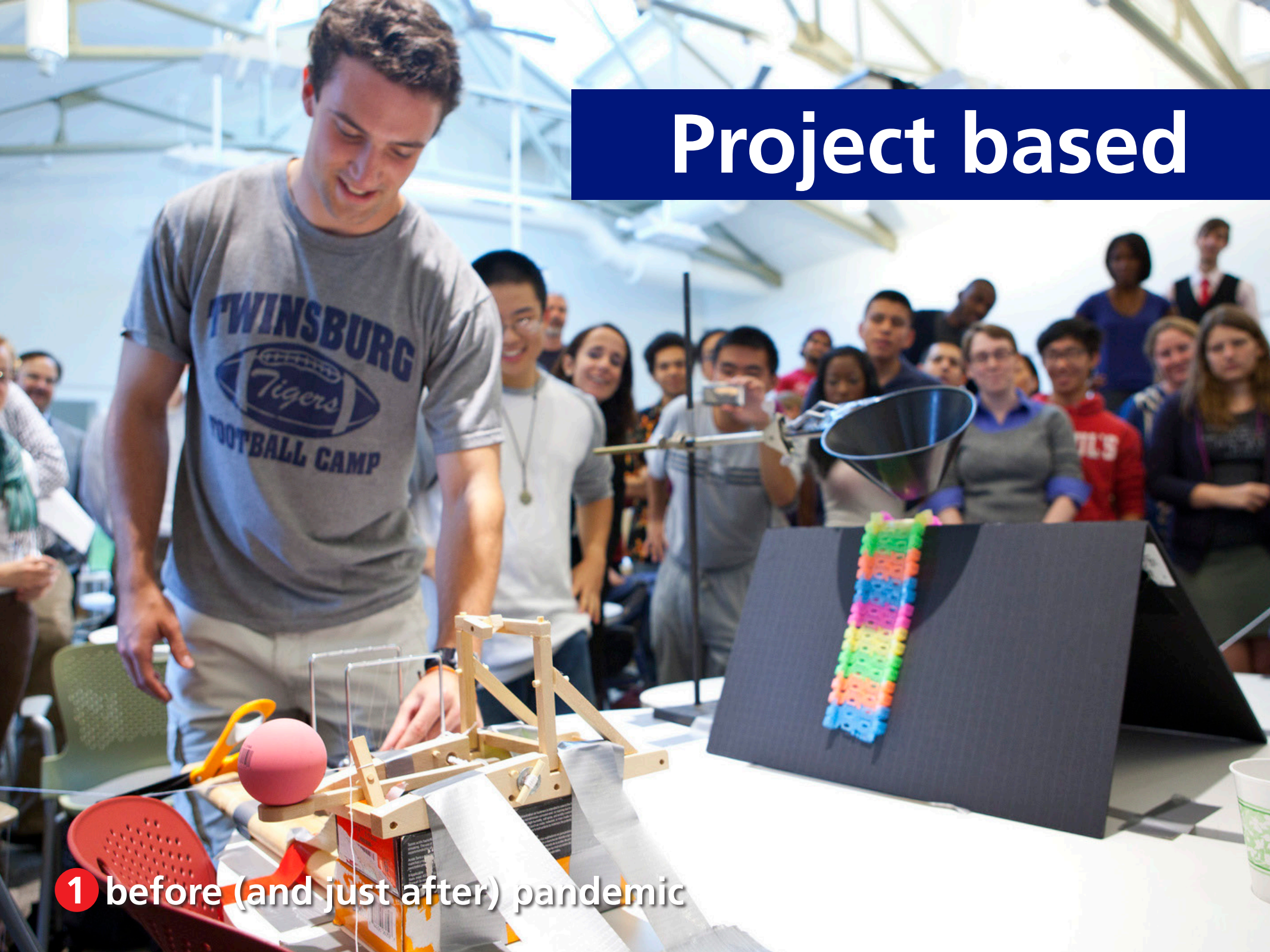


Team based

1 before (and just after) pandemic

Project based

1 before (and just after) pandemic






Intrinsic motivation

1 before (and just after) pandemic



1 before (and just after) pandemic



no lectures

no exams

① before (and just after) pandemic

blend of 6 scaffolded “best practices”

understand

LC: Learning Catalytics

90 min



Instructor poses question
Answer alone
Discuss in team
Answer again



bring device

Tutorial

60 min



Work on worksheet with team
Explore concepts
Discuss with staff

apply

EA: Estimation Activity

30 min



Estimate quantities
Develop individual strategy
Discuss and solve as team



Conduct experiment with team
Take measurements
Analyze data
Carry out simulations



bring device

evaluate

Problem Set & Reflection

90 min



Work problems alone BEFORE class
Discuss with team, mark up
Self-assess & turn in

RAA: Readiness Assurance Activity

90 min



Part 1: solve problems alone
Open book, open internet
Part 2: solve with team



bring device

1 before (and just after) pandemic

A group of four students are gathered around a wooden box containing a project. A woman with glasses is pouring liquid from a white cup into a grey tube. A man in a plaid shirt is standing and smiling. A woman in a grey shirt is leaning over the box. A woman in a maroon hoodie is sitting and smiling. The box has a circuit board with many small lights on it. The background shows a classroom or lab setting with other people and equipment.

bit.ly/ap50class

1 before (and just after) pandemic



March 13, 2020

1 before (and just after) pandemic



instructional continuity between first and second half?

1 before (and just after) pandemic



instructional continuity between first and second half?

86% agreed

1 before (and just after) pandemic



Summer 2020

Moving online

"How can I transfer online what I do in the classroom?"

Moving online

***"How can I transfer online what I do in the classroom?"
(challenge)***

Moving online

***"How can I transfer online what I do in the classroom?"
(challenge)***

Moving online

"How can I transfer online what I do in the classroom?"
(challenge)

"What can I do online that I cannot do in the classroom?"
(opportunity)

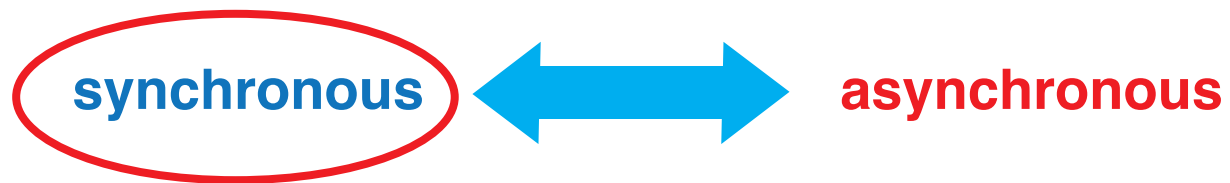
Changes implemented

- **Minimize sync/instructor-paced**
- **Personalize instruction**

Minimize sync/instructor-paced

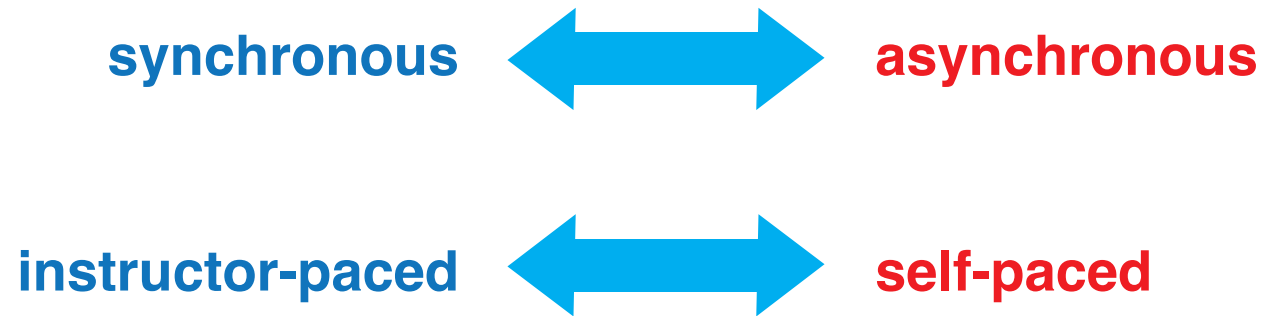
synchronous ↔ asynchronous

Minimize sync/instructor-paced

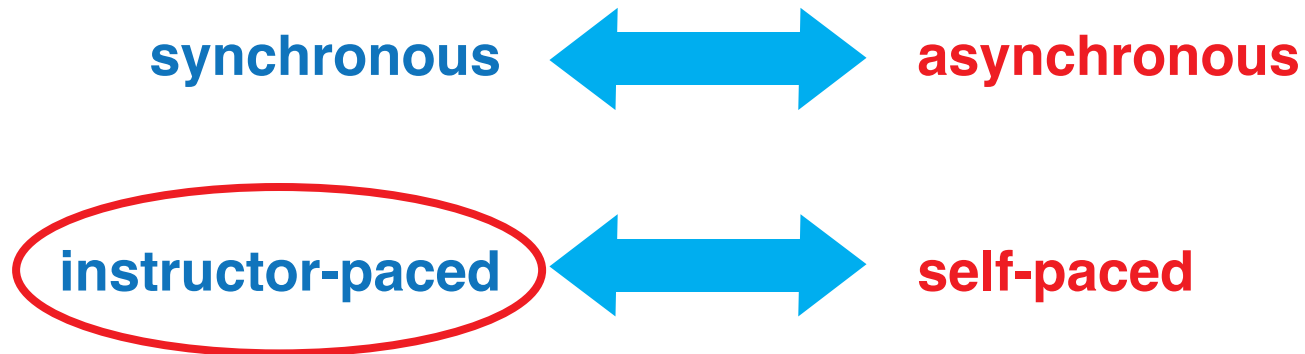


everybody together
at the same *time*

Minimize sync/instructor-paced

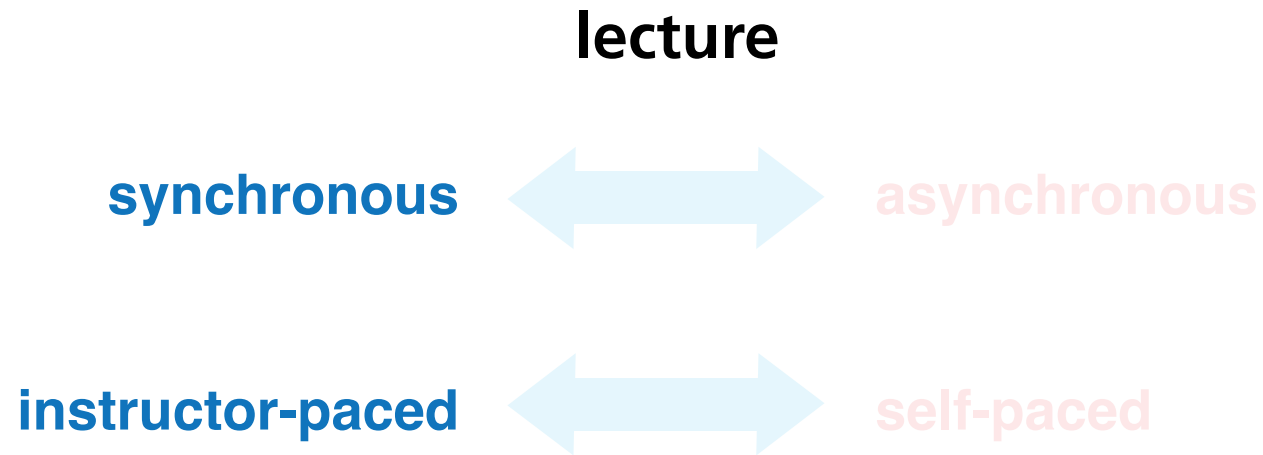


Minimize sync/instructor-paced



everybody together
at the same *pace*

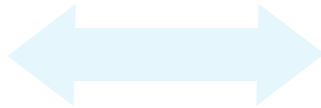
Minimize sync/instructor-paced



Minimize sync/instructor-paced

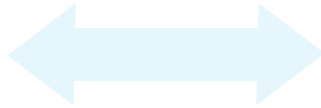
recorded lecture

synchronous



asynchronous

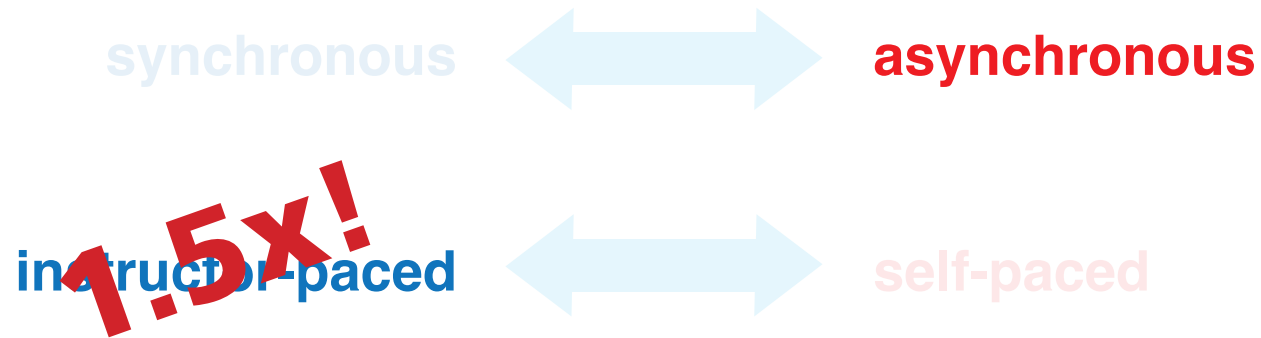
instructor-paced



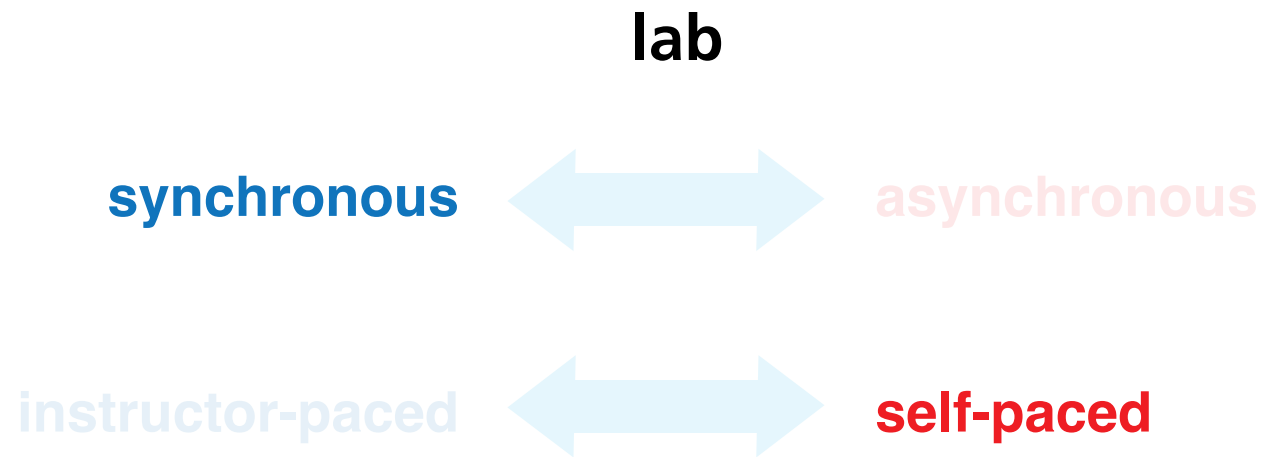
self-paced

Minimize sync/instructor-paced

recorded lecture



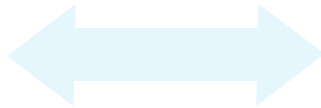
Minimize sync/instructor-paced



Minimize sync/instructor-paced

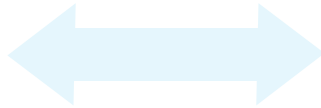
homework/study

synchronous



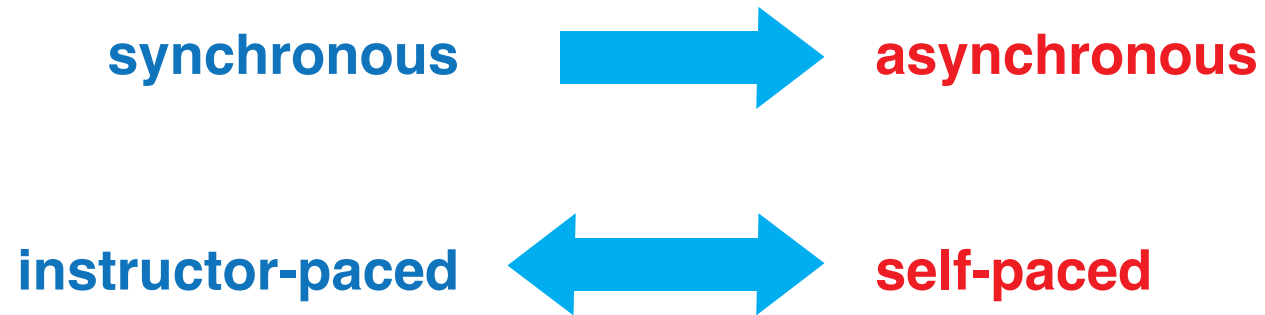
asynchronous

instructor-paced

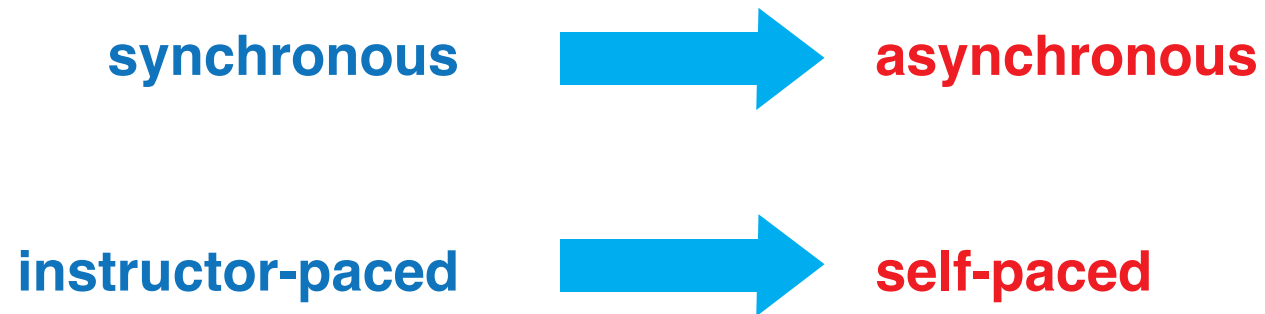


self-paced

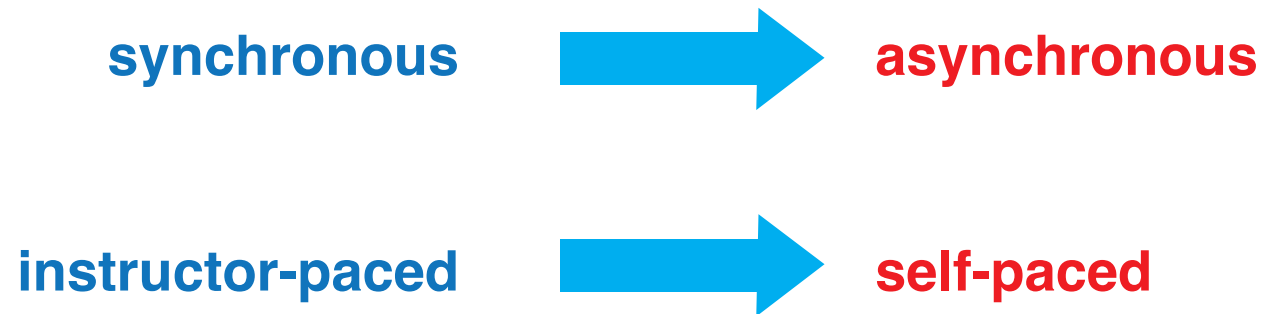
Minimize sync/instructor-paced



Minimize sync/instructor-paced



Minimize sync/instructor-paced



**more time to help students
where it really matters!**

A background image of a modern classroom or meeting space. Several students are seated around a large white circular table, working on laptops. One student in the foreground is looking at a laptop screen displaying a data visualization. Other students are in the background, some standing and some sitting, engaged in various activities. The room has large windows and a bright, open atmosphere.

Personalize instruction

instead of all students coming to instructor's room...

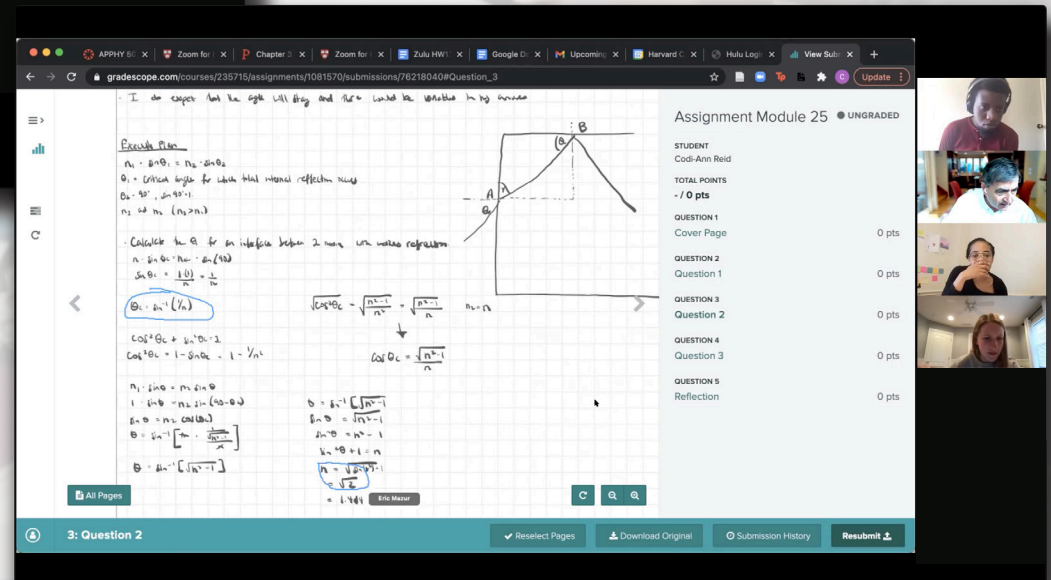
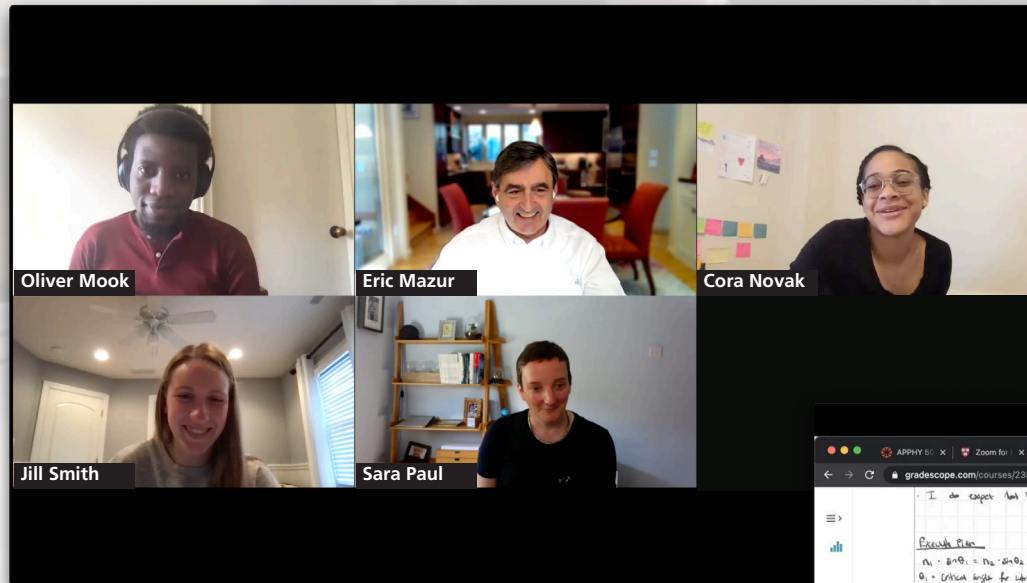
Personalize instruction

instead of all students coming to instructor's room...

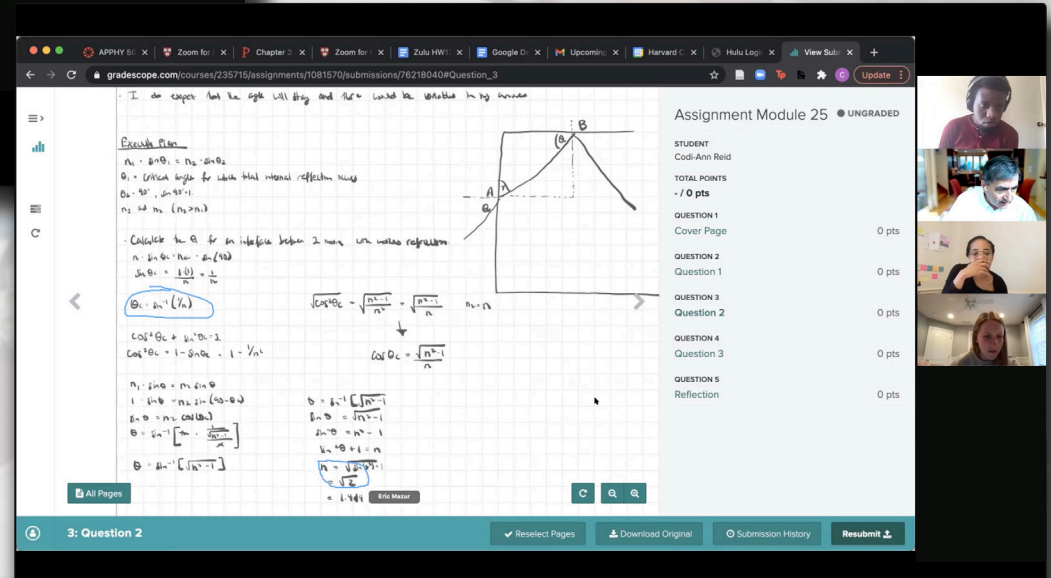
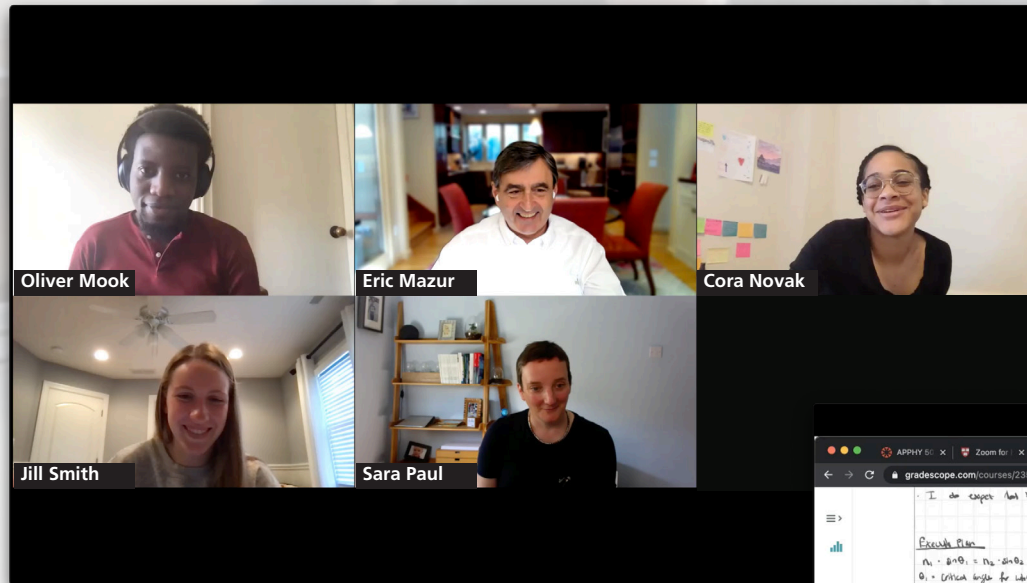
...instructional staff visits each team's own room

Personalize instruction

80 students in one room → 20 rooms with 4 students



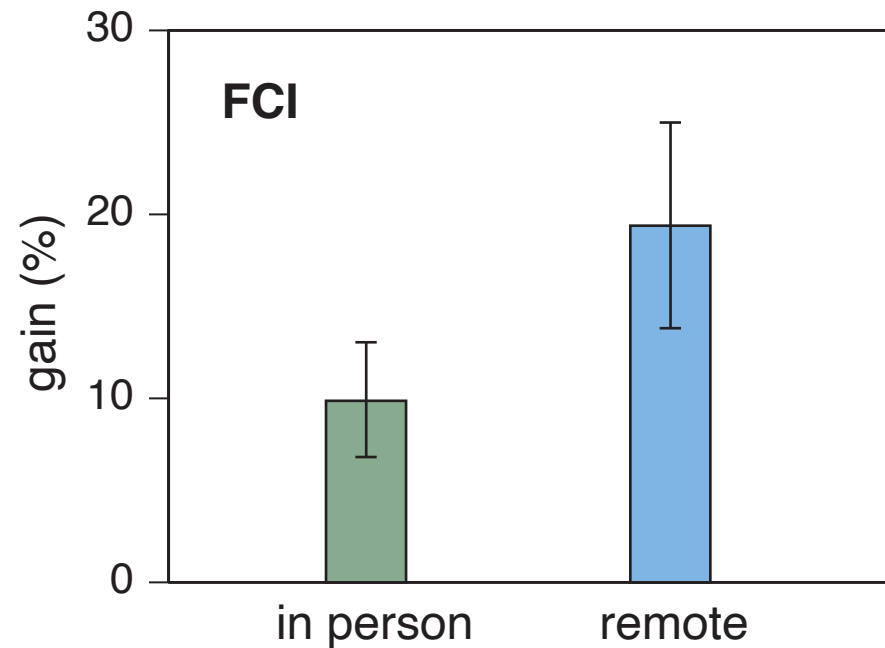
every student on front row



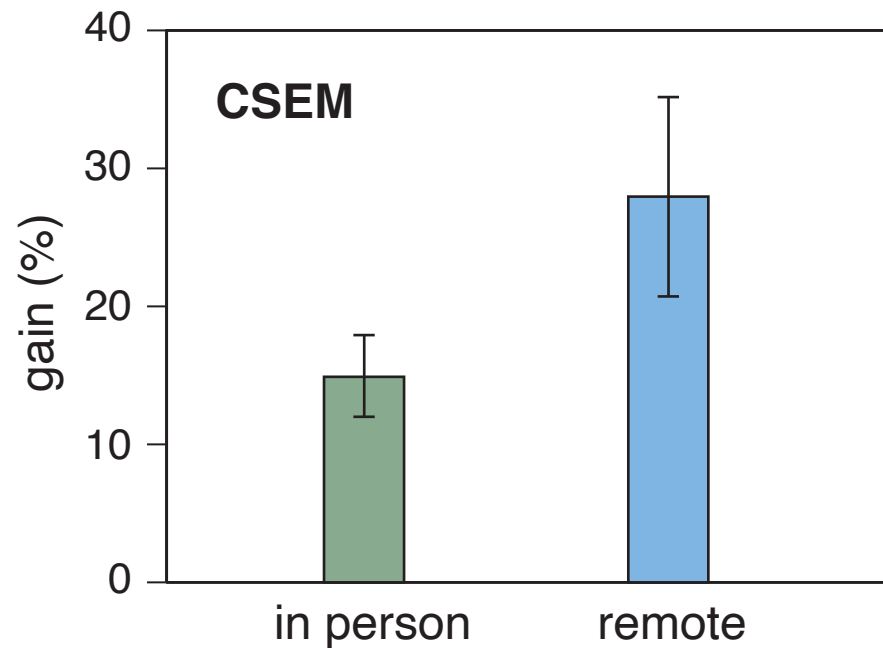
Changes implemented

- **Minimize sync/instructor-paced**
- **Personalize instruction**
- **Specifications Grading**

Fall Content Learning Gain



Spring Content Learning Gain



Self Efficacy

belief in ability to succeed in a certain domain

Doubling of

- content learning gains
- physics self-efficacy gains

Research Shows Students Falling Months Behind During Virus Disruptions

The abrupt switch to remote learning wiped out academic gains for many students in America, and widened racial and economic gaps. Catching up in the fall won't be easy.

Improved

- sense of growth and autonomy
- sense of support and community
- course evaluation

The background is a collage of various educational and news websites. At the top left, there's a 'kbeat' logo. Below it, 'EdSurge' is visible with its lightning bolt logo. To the right, 'THE WALL STREET JOURNAL.' is partially visible. Further right, 'Intelligence' is written in a large, bold, sans-serif font. Below 'Intelligence', 'The New York Times' is visible in its signature font. At the bottom left, there's a red circle with the number '3' followed by the word 'results'. The main text 'I did my best teaching ever remotely!' is centered in a large, bold, black font. The collage also includes various navigation links like 'SUBSCRIBE', 'ABOUT', 'RSS', 'News', 'Research', 'Events', 'John', 'COLUMN', 'HIGHER', 'Maps and Cases', 'State Reopening Tracker', 'Vaccine Rollout', and 'Second D'.

I did my best teaching ever remotely!

3 results

Research Shows Students Falling Months Behind During Virus Disruptions

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I did my best teaching ever remotely!

So, now what?

Building together





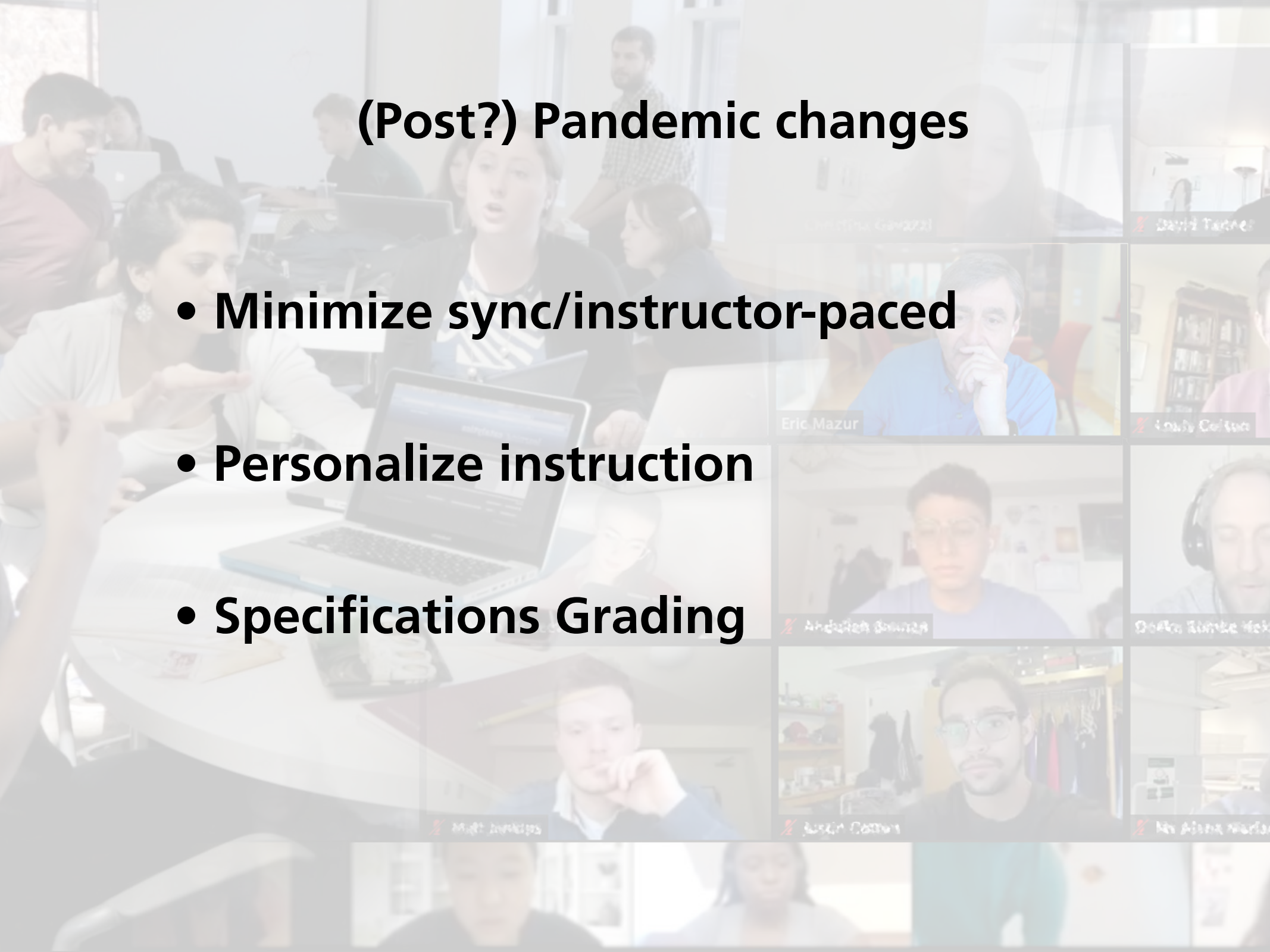
Project Fairs



Revert back?

(Post?) Pandemic changes

- **Minimize sync/instructor-paced**
- **Personalize instruction**
- **Specifications Grading**





“breaking down classroom walls”

Christina Gonzalez

David Turner

Eric Mazur

Kevin Coffey

Amanda McKeever

Andrew Brown

Debra Bunka McK

Matt Jenkins

Justin Cohen

Mr. Anna Martin

[Weekend long reads](#)

Life & Arts

Yuval Noah Harari: the world after coronavirus

This storm will pass. But the choices we make now could change our lives for years to come

Yuval Noah Harari MARCH 20 2020



Save

Humankind is now facing a global crisis. Perhaps the biggest crisis of our generation. The decisions people and governments take in the next few weeks will shape the world for years to come. They will shape not just our lives but the lives of future generations. We must act



Many short-term emergency measures will become a fixture of life. That is the nature of emergencies. They fast-forward historical processes. Decisions that in normal times could take years of deliberation are passed in a matter of hours. Immature and even dangerous technologies are pressed into service, because the risks of doing nothing are bigger. Entire countries serve as guinea-pigs in large-scale social experiments. What happens when everybody works from home and communicates only at a distance? What happens when entire schools and universities go online? In normal times, governments, businesses and educational boards would never agree to conduct such experiments. But these aren't normal times.





Many short-term emergency measures will become a fixture of life. That is the nature of emergencies. They fast-forward historical processes. Decisions that in normal times could take years of deliberation are passed in a matter of hours. Immature and even dangerous technologies are

pres
tire

Remote teaching may well become a fixture of life

happens when everybody works from home and communicates only at a distance? What happens when entire schools and universities go online? In normal times, governments, businesses and educational boards would never agree to conduct such experiments. But these aren't normal times.



Yuval Noah Harari MARCH 20 2020

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We must act

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