

Making the jump to online and remote teaching: tips and tools

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Don't forget
the humor...



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Online learning is the next progression in education technology...



My journey with online/remote learning

2012-2013: Got involved in Massive Open Online Courses (MOOCs)

2013-2014: “Flipped” my writing and intro stats courses at Stanford

2014-2015: Flipped my advanced stats courses at Stanford

2020: Currently adapting in-class components for remote learning

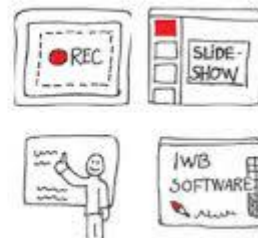
Flipped classroom works well for subjects where you learn by doing, e.g., writing and applied statistics.

What do we do in class?

- examples from the news
- challenge problems
- data analysis
- *code diagnosis*
- homework assignments
- cool projects, example: Community service data analysis projects.



THE FLIPPED
CLASSROOM



Tips for pre-recorded lectures

- Break lectures into “chunks”



- It is *not* necessary to follow hard-and-fast rules for the lengths of these chunks

- Write on the screen



- Include “pause the video” exercises
- Follow videos with easy online quizzes
- Consider including “how to”/“demo” videos...

Quiz

1 point possible (graded)

After a particular surgery, patients can have up to 3 major adverse events.

X (# of adverse events)	0	1	2	3
P(x)	.80	.13	.05	.02

What is the expected value for the number of major adverse events?

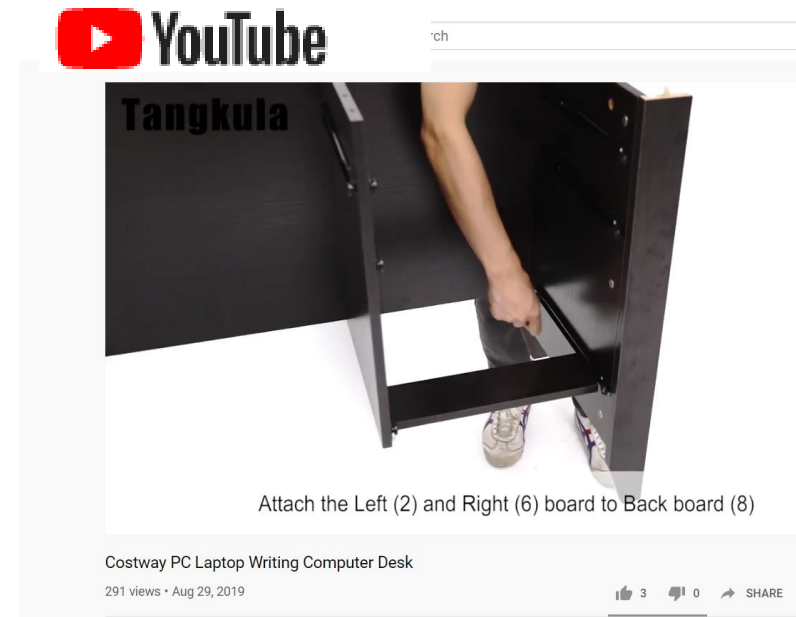
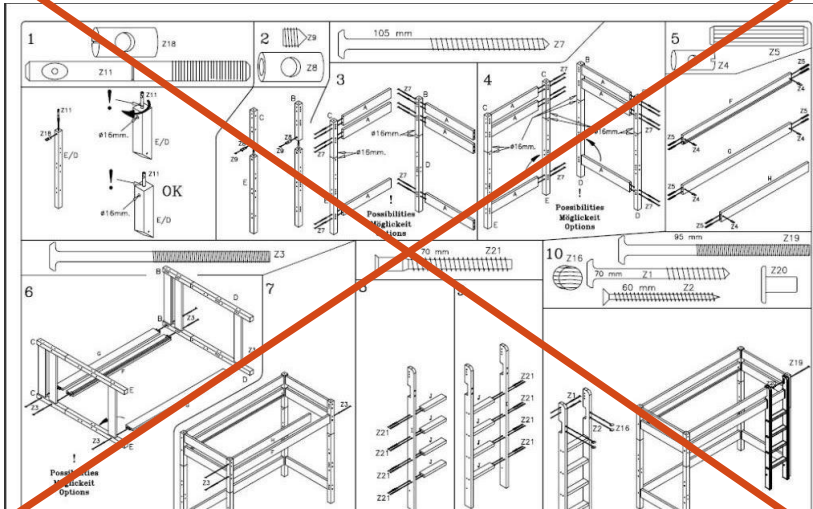
☐ a. 0.51

☐ b. 0.29

☐ c. 1.5

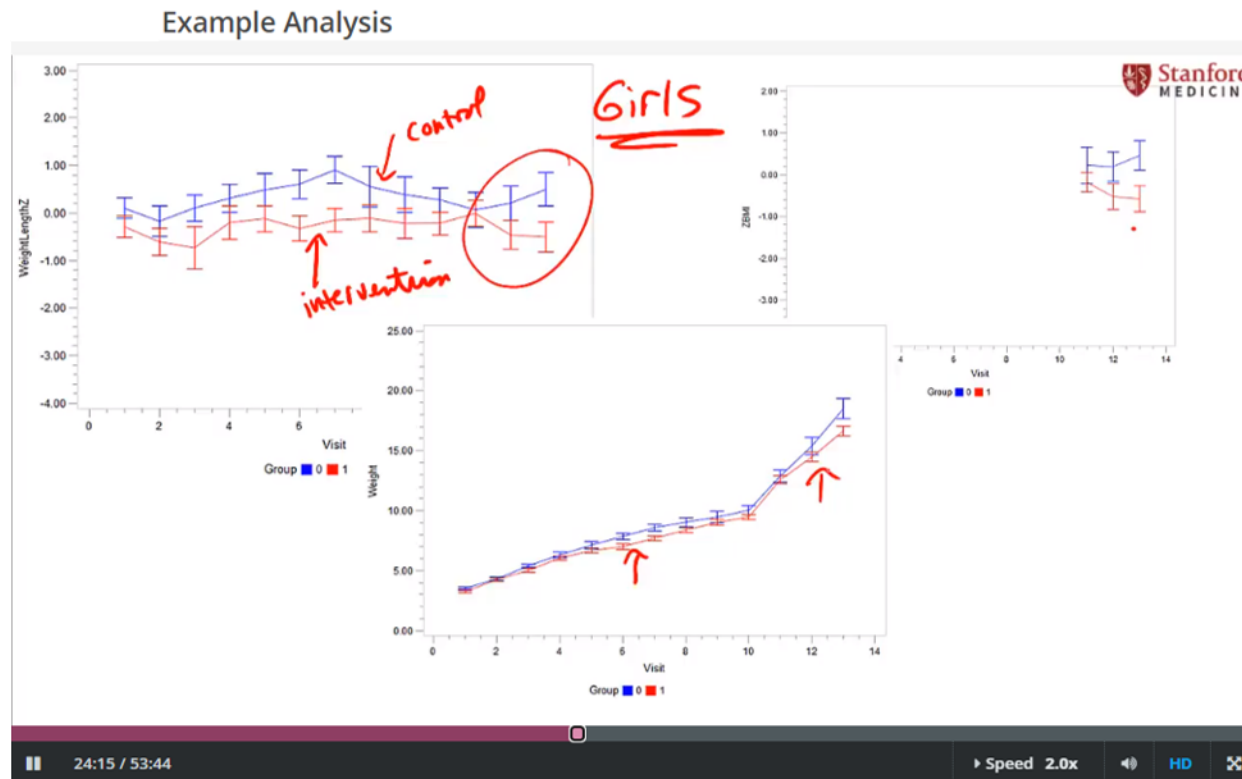
☐ d. 2

“How to” lectures



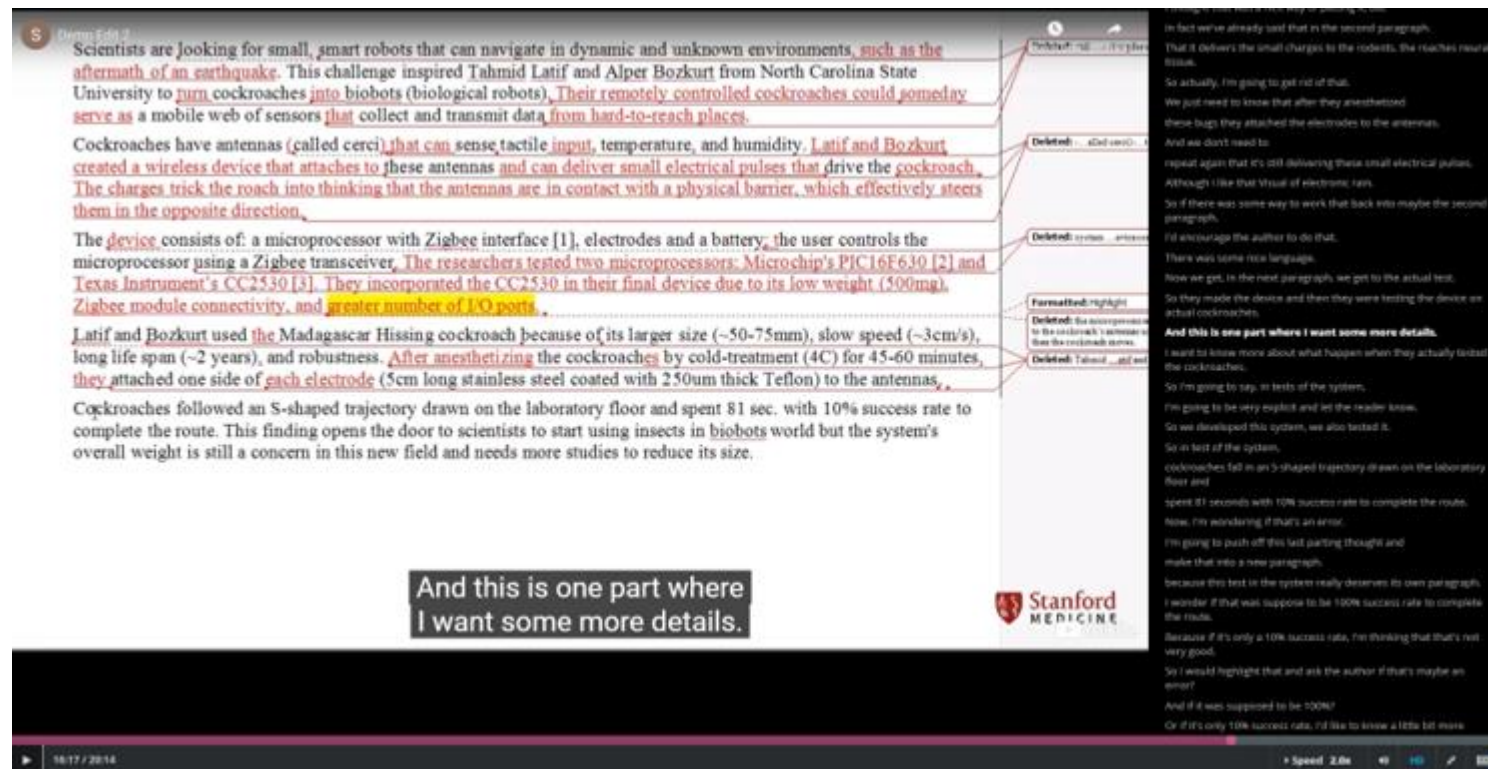
Statistics Demo

Walk through a data analysis from start to finish (50 minutes)



Editing Demo

Edit a 500-word essay in real-time (30 minutes).



The screenshot displays a video editing software interface. The main window shows a document with red annotations. A text box at the bottom center reads: "And this is one part where I want some more details." The document text includes:

Scientists are looking for small, smart robots that can navigate in dynamic and unknown environments, such as the aftermath of an earthquake. This challenge inspired Tahmid Latif and Alper Bozkurt from North Carolina State University to turn cockroaches into biobots (biological robots). Their remotely controlled cockroaches could someday serve as a mobile web of sensors that collect and transmit data from hard-to-reach places.

Cockroaches have antennas (called cerci) that can sense tactile input, temperature, and humidity. Latif and Bozkurt created a wireless device that attaches to these antennas and can deliver small electrical pulses that drive the cockroach. The charges trick the roach into thinking that the antennas are in contact with a physical barrier, which effectively steers them in the opposite direction.

The device consists of: a microprocessor with Zigbee interface [1], electrodes and a battery, the user controls the microprocessor using a Zigbee transceiver. The researchers tested two microprocessors: Microchip's PIC16F630 [2] and Texas Instrument's CC2530 [3]. They incorporated the CC2530 in their final device due to its low weight (500mg), Zigbee module connectivity, and greater number of I/O ports.

Latif and Bozkurt used the Madagascar Hissing cockroach because of its larger size (~50-75mm), slow speed (~3cm/s), long life span (~2 years), and robustness. After anesthetizing the cockroaches by cold-treatment (4C) for 45-60 minutes, they attached one side of each electrode (5cm long stainless steel coated with 250um thick Teflon) to the antennas.

Cockroaches followed an S-shaped trajectory drawn on the laboratory floor and spent 81 sec. with 10% success rate to complete the route. This finding opens the door to scientists to start using insects in biobots world but the system's overall weight is still a concern in this new field and needs more studies to reduce its size.

Annotations on the right side of the document include:

- Deleted: ...
- Deleted: ...
- Deleted: ...
- Formatted: highlight
- Deleted: ...
- Deleted: ...

The video player at the bottom shows a progress bar at 10:17 / 20:14 and a speed control set to 2.0x.

Tools for video production

Camtasia, <https://www.techsmith.com/video-editor.html>

iSpring Suite, <https://www.ispringsolutions.com/ispring-suite>

Powtoon, <https://www.powtoon.com/>

Biteable, <https://biteable.com/>

Rawshorts, <https://www.rawshorts.com/>


Adobe Spark, <https://spark.adobe.com/>

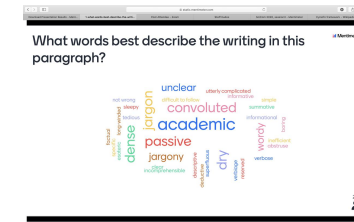
Do-it-yourself lightboard:

<https://www.youtube.com/watch?v=L1au1JxMSaA>



Tips for synchronous remote lectures

- Do *not* simply deliver your in-class lecture online.
- Break lectures into smaller segments
- Intersperse didactic materials with interactive exercises
- Have a TA or co-instructor present to monitor the chat for questions
- Have a TA or co-instructor present to interject with questions/create a dialogue
- Give breaks for classes >1 hour 
- If bandwidth permits, ask students to leave their videos on
- “Cold call” on students
- Be flexible!

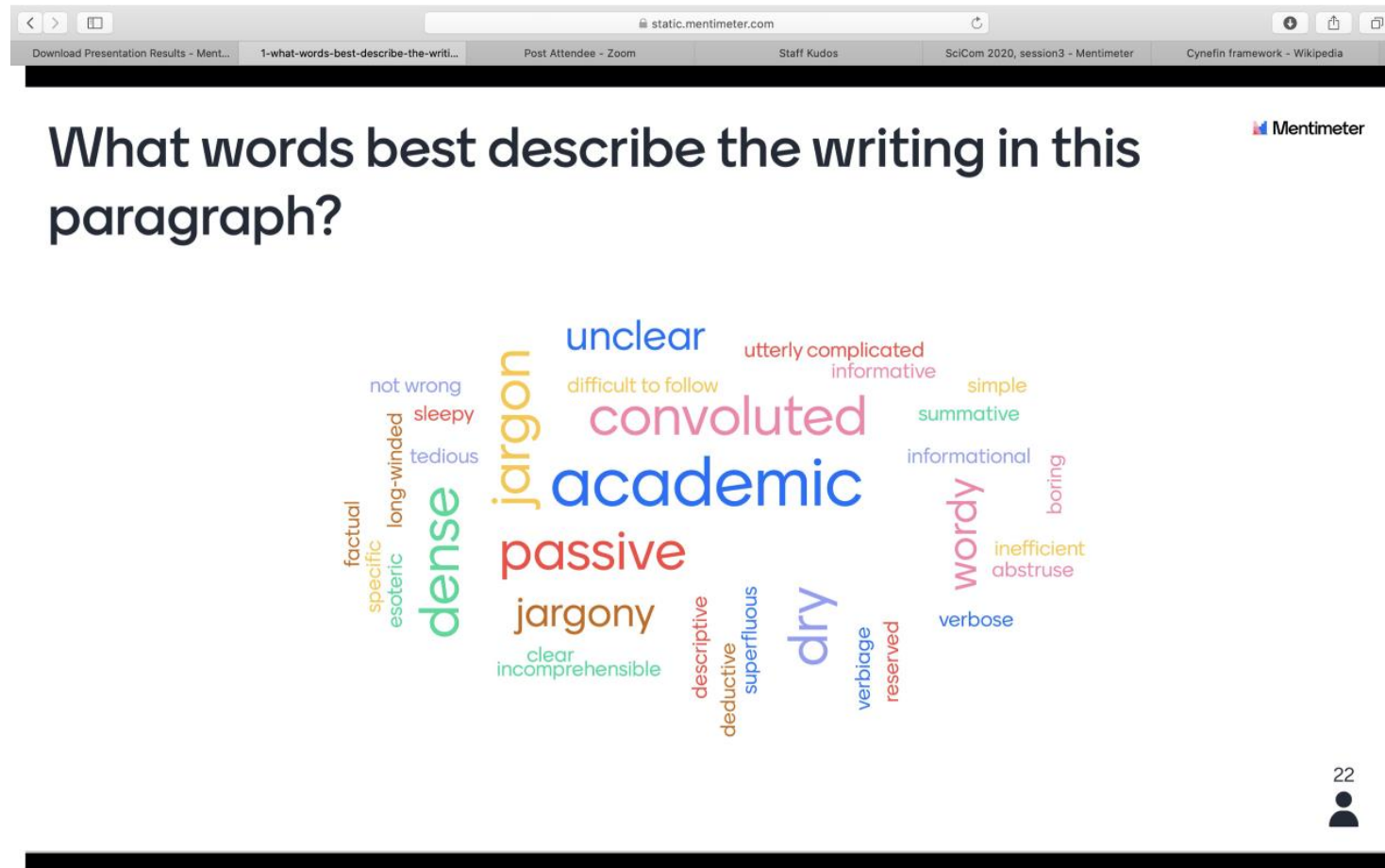


Interactive Poll

Go to Menti.com and enter the code: 99 16 59 3

Poll question: During a typical Zoom (or equivalent) meeting with >5 people, about what percent of time do you spend multi-tasking (e.g., checking email)?

Mentimeter (polls, word clouds)



Google docs

Spotting Jargon, Thursday ☆ 📁 ☁

File Edit View Insert Format Tools Add-ons Zotero Help [Last edit was made yesterday at 3:18 PM by anonymous](#)

75% Normal text Arial 18 B I U A 🔗 📎 📷 ☰ ☷ ☹ ☺ ☻ ☼ ☽ ☾ ☿ ♀ ♂ ♋ ♌ ♍ ♎ ♏ ♐ ♑ ♒ ♓ 🔍 ↺

1 2 3 4 5 6 7

1

Highlight jargon and “scientist speak” (words and phrases not found in nature!):

1. Here we leverage the wide usage of smartphones with built-in accelerometry to measure physical activity at the global scale. We study a dataset consisting of 68 million days of physical activity for 717,527 people, giving us a window into activity in 111 countries across the globe. We find inequality in how activity is distributed within countries and that this inequality is a better predictor of obesity prevalence in the population than average activity volume.
2. This protein is interesting as it seems to be a gain of function protein. We thought prions were formed by an entirely aberrant process that was confined to the space of disease, but we've realized that prions are formed by natural conformation changes that happen stochastically or are induced by environmental signals as an adaptive mechanism. There are actually plenty of examples of prions that have this ability to take on alternate conformations.

Whiteboard Fox

↶
Undo

↷
Redo

Draw

Erase

Move

Options

Clear

Whiteboard 3149306-5491-0955

$$\begin{array}{r} 3.11 \\ \times .56 \\ \hline 6 \end{array}$$

Tools for interactive exercises

- Mentimeter, <https://www.mentimeter.com/>
- Google docs, <https://docs.google.com/>
- Poll Everywhere, <https://www.polleverywhere.com/>
- Padlet, <https://padlet.com/>
- Whiteboard Fox, <https://whiteboardfox.com/>
- A Web Whiteboard, <https://awwapp.com/>
- Google jamboard, <https://edu.google.com/products/jamboard/>
- Annotate (in Zoom), <https://zoom.us/>

Tips for conducting active learning exercises remotely

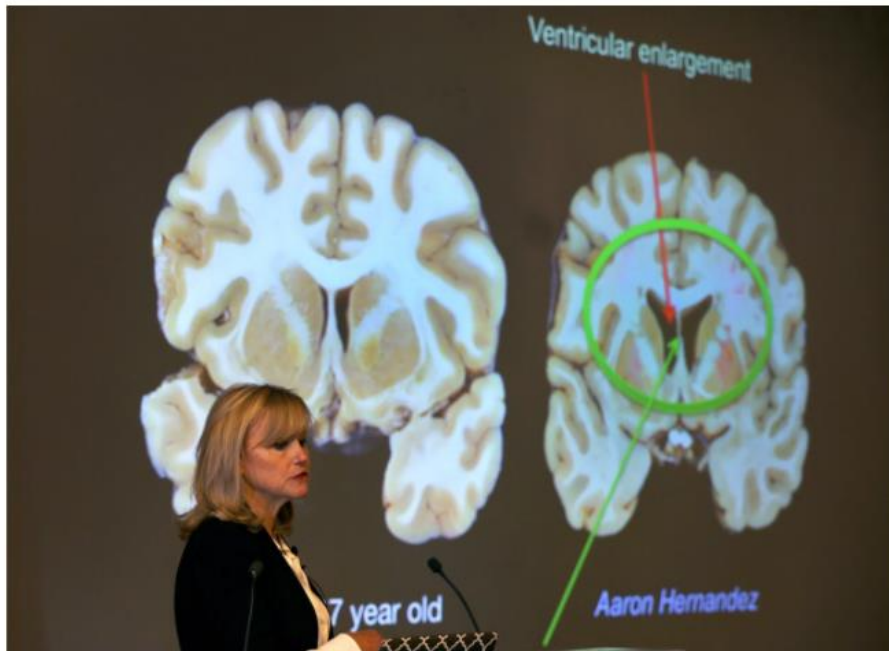
- There is a treasure-trove of real-world statistics examples in the news right now!
- Twitter is a good source for examples
- Use break-out rooms to allow students to work in smaller groups
- Offer multiple remote office hours for code help

Article in FiveThirtyEight.com

Why We Still Don't Know How Many NFL Players Have CTE

By Christie Aschwanden

Filed under NFL



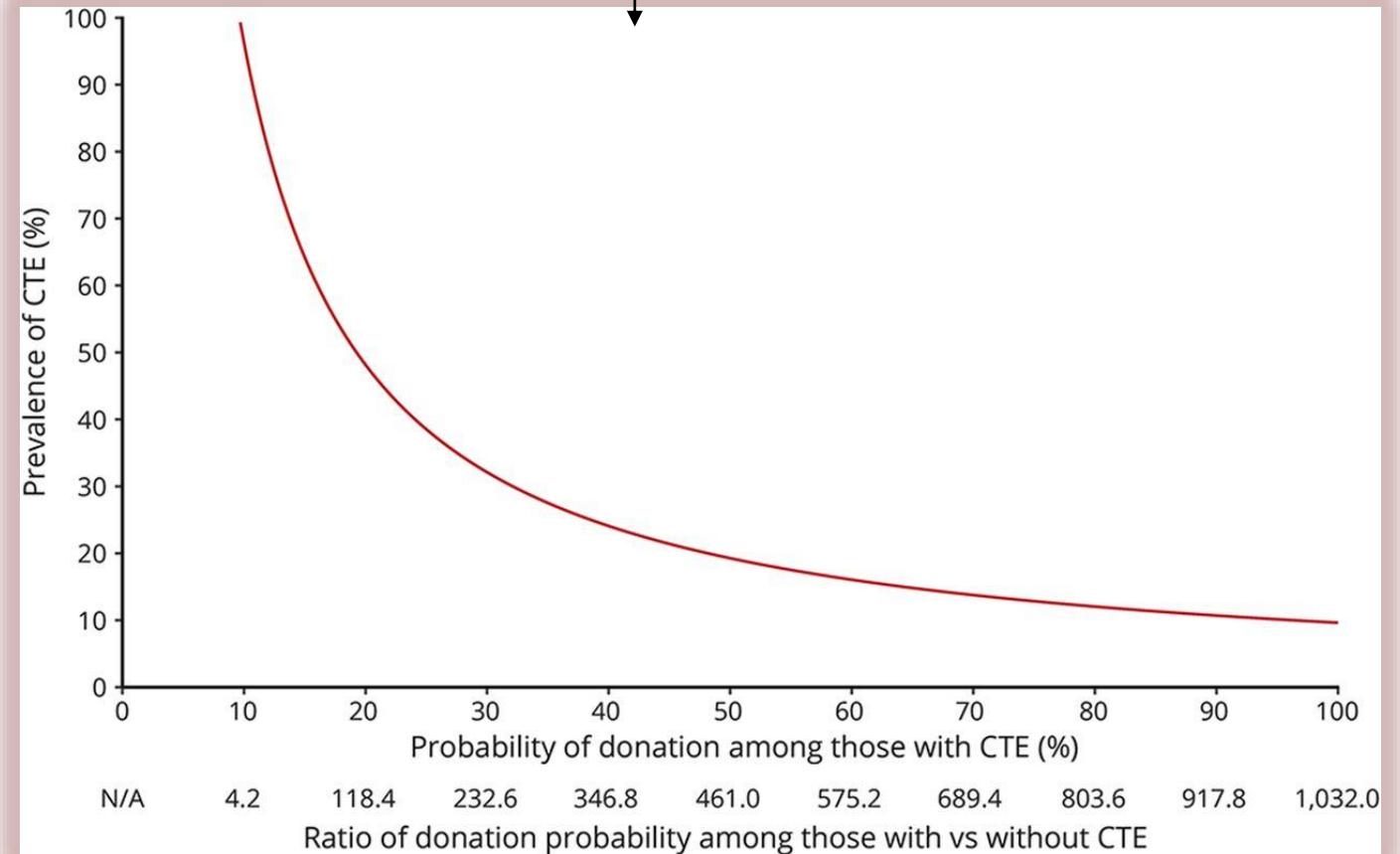
Dr. Ann McKee announces her findings after an examination of a former NFL player's brain in 2017. JOHN TLUMACKI / THE BOSTON GLOBE VIA GETTY IMAGES

Journal Article in *Neurology*

SHARE January 01, 2019; 92 (1) CLINICAL/SCIENTIFIC NOTES

Estimating the prevalence at death of CTE neuropathology among professional football players

Zachary O. Binney, Kathleen E. Bachynski



Zachary O. Binney, and Kathleen E. Bachynski *Neurology* 2019;92:43-45

Ready-made statistics lessons on Twitter!

← Thread

1/n This (and the next) tweet from an official in media affairs at the FDA is a great lesson for a statistics class, and also almost an exact duplicate of an example in [@CT_Bergstrom's Calling Bullshit](#)



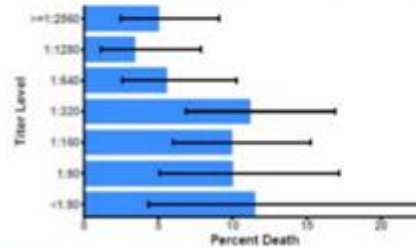
Emily J. Miller - FDA
@FDASpox

Convalescent plasma has shown to be beneficial for 35% of patients. This risk reduction figure - shown in chart below - is from [@MayoClinic](#) data from expanded access program that was analyzed by FDAA for the emergency use authorization announced today.

COVID-19 Convalescent Plasma Reduction in Death at 7 Days

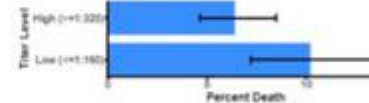


Non-intubated patients treated within 72 h age 80 or less (n=1018)



www.fda.gov

Statistically significant 37% reduction in mortality in those treated with high titer convalescent plasma ($p=.03$)



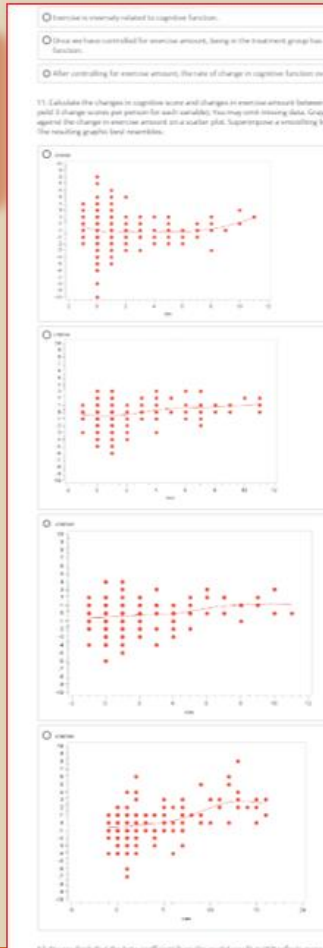
High titer corresponds approximately to Ortho VITROS S/C level ≥ 12

1

Tips for online assignments and exams

- Give clear instructions for auto-graded materials
- Build in sufficient tolerance for rounding errors
- Use multiple choice for checking that students have properly graphed data (with “decoy” graphs)
- Include multiple versions of questions, randomly assigned, if software/platform allows
- Make timed exams open-book—ask questions that require students to think or do
- Include some assessments that are graded off-line

2. Examine the correlation and covariance matrices for MMSE0-MMSE3. What is the correlation between years 2 and 3? Round to 2 decimal places.



Parting thought

Education was moving in this direction anyway. The pandemic is just going to kick us there faster!

