Transitioning to online and remote teaching

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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.
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...
“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).

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 Yahimッド Latt and Albert Bockast from North Carolina State University to create cockroaches into robots. These remotely controlled cockroaches could 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. Latt and Bockast created a wireless device that attaches to these antennas and can deliver small electrical pulses that control the cockroach. The charge tank of the cockroach, which is connected to the antenna, is an effective way to transmit data in the opposite direction.

The device consists of a microprocessor with Zigbee interface [1], an electronics and battery, which controls the microprocessor using a Zigbee transmitter. The researchers tested the insect's capabilities and found that the system could effectively control the insect's movements.

Latt and Bockast used the bimetallic Higgin's cockroach because of its large size (~50 mm), slow speed (~3 cm/s), long life span (~2 years), and robustness. They equipped the cockroach with a cold-movement (6 kg) for ~5 to 15 minutes. They attached one side of pach electrode (2 cm long and 3 cm wide) to the antenna.

The cockroach followed an S-shaped trajectory drawn on the laboratory floor and spent ~1 sec with ~10% success rate to complete the stroke. This finding opens the door to scientists to start using insects as robots, but the system's overall weight is still a concern in this new field and needs more studies to reduce its size.

And this is one part where I want some more details.
Tools for video production

Camtasia
iSpring Suite (entire course development)
Powtoon (animated videos)
Biteable
Rawshorts
Adobe Spark
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 Exercise

Go to Menti.com and enter the code 63 46 12

How would you rate these statements?

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-person teaching is more effective than remote teaching.</td>
<td></td>
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<tr>
<td>I feel prepared for delivering my fall courses remotely.</td>
<td></td>
</tr>
<tr>
<td>When the pandemic ends, I plan to revert to my pre-pandemic teaching approaches.</td>
<td></td>
</tr>
</tbody>
</table>
How would you rate these statements?

- In-person teaching is more effective than remote teaching.
  - Rating: 4.5

- I feel prepared for delivering my fall courses remotely.
  - Rating: 3.8

- When the pandemic ends, I plan to revert to my pre-pandemic teaching approaches.
  - Rating: 4
Online 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/
• Annotate (in Zoom)
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, 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
Parting thought

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