Student Engagement in an Online Environment:
Considerations & Actions in a Quarter System

Katerina Ziotopoulou
Assistant Professor
Department of Civil and Environmental Engineering
Thoughts

- Remote teaching is a lot of work
- Remote teaching as a 1-way street is even more work
- Remote teaching as a 1-way street during a pandemic is hard and too much work
- Less if you treat it as an investment or a mission

- Designing a remote/online course is a non-linear process
- Decide preferred structure = \( f \) (student body, Learning Objectives, personality, tools)
- Compromise between quality & quantity

Goals for student engagement:

- ...before the quarter
- ...during the quarter
  - Morale & drive & excitement
  - Communication – catch issues
  - Performance: active learning & assessment
Engagement before the Quarter

- Get to know the students:
  - UC Davis-wide survey on student demographics
  - Did an “open-zoom-door” time before 1st lecture
  - Circulated own informal “calibration” survey before deciding anything. E.g.

Live Online Teaching: Do you have reliable internet connection at all times?

- Yes
- Yes – not sure though how connection will be affected by online traffic
- No -- but if I know when I will need it I can make sure I have it
- No -- and can't commit to finding internet when you want me to
- Other: __________________________________________

Recorded Online Teaching: Do you have reliable internet connection at all times?

- Yes
- No -- but I can find a solution
- No -- and I can't find a solution
- Other: __________________________________________
Engagement before the Quarter

- Get to know the students:
  - UC Davis-wide survey on student demographics
  - Did an “open-zoom-door” time before 1st lecture
  - Circulated own informal “calibration” survey before deciding anything. E.g.

- Get the students to know you:
  - ECI 171 – Soil Mechanics The Movie Trailer, introducing instructor & TAs
Engagement during the Quarter

- Fact: there about 1 million methodologies, advice, tools, ideas, options out there
- Ultimately, it’s wise to decide few things to do and stick with those

- For Soil Mechanics SQ2020 – each week one Topic!
  Asynchronous Lectures for each Tuesday, and Synchronous Lectures for each Thursday

To provide flexibility for students & me
To cover theory and provide reflection time

To practice, interact, and be human!
Asynchronous Lectures on Tuesdays

- Build videos that are no longer than 15 min (maximum!)
- Add “interactions”
  - One in the beginning with the LOs
  - Some spread out in between (2 attempts each, T/F, check all, multiple choice, free response)
  - One assessment at the end with a space for questions
  - Collect questions and answer them at the beginning of the Thursday lectures

- All synced back to Canvas automatically!
- Low stakes grading for extra accountability
Synchronous Lectures: Thursdays

- While in main room, occasional polling via zoom
- Established a chat protocol for communications*. In chat, write:
  - H to raise hand when I ask a question
  - Q to ask question
  - If I want to talk uninterrupted I write ”-----”

- Comments / Observations:
  - Don’t have concrete numbers but impression is students have participated more
  - Some wrote in chat, some spoke up – I found that was great!
  - You need to be more patient than in classroom as you await responses

* https://www.spinellis.gr/blog/20200406/
Synchronous Lectures: Thursdays

- Completely repurposed the TAs & Readers: joined the online lecture every Thursday
- All equipped with tablets (thank you UCD-CEE dept!)
- Each one joined with two instances (one with laptop & camera, one with tablet)
- Split 70 students in 7 breakout rooms (4 TAs + 2 Readers + 1 me)
- Using csv-based creation of breakout rooms so that students see the same person every week & build some rapport

- Practice, practice, practice – think, pair, share
- Same material for all, timed session, all TAs had solutions from me to ensure consistency
- Independent interactions in every room so more privacy (found that students would turn on videos with the TAs but never with me!)
- Behind the scenes interaction with TAs via #Slack
- This was their FAVORITE part of the course
Questions are welcome.

Thank you for your interest.

Happy to chat and brainstorm on options!

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@KaterinaZiot
Apps that I use for Teaching

canvas

PDF expert for annotating pdfs

Zoom for preparing videos

GoodNotes5 for Freehand Writing

Screen broadcasting

+ SCREEN Recording

playposit

Embedding quizzes in videos: attention span & accountability

gradescope

AI-based grading

slack

One thread for teaching squad coordination

Everything really!
Ready, Set, Remote!
Student Engagement Online

Stacey Kulesza
Associate Professor
Kansas State University
Kulesza Class Structure

- Everything in LMS (Canvas)
- Tuesday Lecture (11:30 am)
- Online problem
  - Unlocks after class, due 11:29 am
- Thursday lecture (11:30 am)
- Thursday lab (2:30 PM)
- Homework (due Tuesday 11:29 am)
Pre-lecture debrief

Geo-Legend

$$\sigma' = \sigma - u$$
$$\Delta \sigma = I_\sigma q$$

“Live” content

Settlement: *How much & How Long*

1. Distortion settlement
Tuesday lecture – kitchen demo

Consolidation Settlement

\[ t=0 \quad \sigma = \sigma^' + u \text{ psi/ft} \]

Apply load

\[ t=1 \text{hr} \quad \sigma + \Delta \sigma = \sigma^' + u \]

I'd like to thank Frank, the kitchen rooster, for his supervisory role in today's in-class consolidation demo.

#nailedit #KeepTeaching #GeoEngineering #kstate
HW 10 - Change in Vertical Effective Stress

Started: Jul 23 at 11:50 am

Quiz Instructions

\[ \sigma_h' = 1 \times 62.4 + 3 \times 110 + 2 \times 135 - 6 \times 62.4 = 288 \text{ psf} \]

If the unit weight in the layer above the water table (\( \gamma = 0.7 \)) is 98 lb/ft² and the unit weight below the water table (\( \gamma = 0.9 \)) is 100 lb/ft², find the vertical effective stress at A before the fill is placed in lb/ft².

Using the same information from above, what is the vertical effective stress at A after the fill is placed in lb/ft²?
Kulesza “Remote” Class Structure

• Effective use of an LMS keeps students engaged
  • All HO, HW, “Reminders” online and linked with dates/time (SAME!)
  • Structured, frequent knowledge checks (SAME!)
  • Online problem (SAME!)
  • Recyclable year to year

• Recorded Lecture format
  • Title with date and topic
    • Future you thanks you!
  • Imperfect is more engaging
  • Demos still possible

“Always very prepared for class, willing to zoom if I have any questions, and the easiest transition from in class lectures to remote”
Ready, Set, Remote!
Student Engagement Online

Stacey Kulesza
Associate Professor
Kansas State University

Geo-Legend
\[ \sigma' = \sigma - u \]
Term Projects
set on a backdrop of flipped and ungraded classrooms

Bret N. Lingwall
PhD, PE
South Dakota School of Mines
What is a grade almost always based on?
- Accumulating points?
- Accumulating demerits?

An ungraded classroom is a wonderful opportunity to help engender deep learning through term projects that are revised continuously all semester long.

How did you learn your subject deeply?
- I’ll bet it wasn’t by sitting through lectures endlessly….. It was by doing and revising until things were “perfect”

What should a grade be based on?
- Actual learning and development
- Improvement of critical thinking and design to ability
Why flipped classrooms?
- To be a "guide on the side" in the classroom and engage students throughout the week

What everyone wants to focus on in developing the flipped format?
- The online content

What really matters for student buy-in for flipped classrooms?
- The in-class interactive content

Why flipped, ungraded classes that center on term projects?
- An opportunity to move the class "up" on Bloom’s Taxonomy
- Student engagement
A statement of a **learning objective** contains a **verb** (an action) and an **object** (usually a noun).

- The **verb** generally refers to [actions associated with] the intended **cognitive process**.
- The **object** generally describes the **knowledge** students are expected to acquire or construct. (Anderson and Krathwohl, 2001, pp. 4–5)

In this model, each of the colored blocks shows an example of a learning objective that generally corresponds with each of the various combinations of the cognitive process and knowledge dimensions.

**Remember:** these are **learning objectives**—not learning activities. It may be useful to think of preceding each objective with something like: “Students will be able to …”

1. Term Projects
   1. Take advantage of the online and hybrid learning
      1. Hard to do timed exams, so….
         Reduce them and replace with a well-constructed and meaningful term project
   2. Makes office hours meaningful
      1. Even over Zoom
      2. Lots of questions!!!
   3. Have them ENGINEER something
      1. Iteration and review
      2. Interaction with you, the reviewer

Student Online Collaboration
   - Flipgrid is fun, and beats written message or discussion boards
     - Posting videos and video replies is our students in their natural habitat
   - Breakout rooms on Zoom during online class
   - We need better online tools that all students will consistently use
     - Getting buy-in from the “last 20%” is difficult
     - Some interact with me but not others
     - Others interact with students but not with me
     - Some just don’t
1. Incentives
   1. HW that builds tools for the term project
   2. Exam questions that cover concepts from the background materials
   3. Quizzes that cover concepts from the videos only
   4. Small group discussions on the reading assignments
      1. Each student brings a small summary of what they learned from the reading to share with their breakout group
      2. The summary is submitted for instructor inspection

**In-Class Activities**
- MUST help students build tools for the term project
- MUST refer frequently and precisely to the background videos and reading
- MUST have a strong active-learning component
- MUST include dialogue between students and instructor
- MUST-NOT be another lecture
- Student participation is good
- Student lead is better
- Student INITIATED is best
Misc. Lessons Learned

1. Less time spent grading! Less cheating!
2. Student athletes and Non-traditional students
3. Time in-class to work on critical skills (group work, writing)
4. Time in-class for frequent assessments and focus groups
5. Not every student will like it. Some will hate it.
   1. All benefit (employer feedback is awesome)
6. Student time spent on the class has an upper limit. Manage the time demands between watching-reading-class-HW-study-projects-labs
   1. It’s easy to over-load the students
   2. 9-hours per week MAXIMUM
Ready, Set, Remote!
Exams Dilemma –
To test or not to test?

Lalita Oka
Outline

• Background
• Exams - Assessing Outcomes
• Methods
• Lesson Learned
• Summary
Background

Who are/were my students? ~ 50% URM

3 Courses: Spring 2020

<table>
<thead>
<tr>
<th>Course</th>
<th>Student Level</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statics</td>
<td>Sophomore</td>
<td>25</td>
</tr>
<tr>
<td>Soil Engineering</td>
<td>Junior</td>
<td>43</td>
</tr>
<tr>
<td>Geotechnical Engineering Design</td>
<td>Senior</td>
<td>29</td>
</tr>
</tbody>
</table>
Exams and Other Assessments
- How Important is the Exam? – Teacher’s perspective v/s student’s perspective
- Importance of other assessments
- How often?
- How to address cheating?
Methods

Learning Management Systems / Tools

• Canvas  https://www.instructure.com/canvas/
• Mastering Engineering  → Good for practice problems  
  https://www.pearsonmylabandmastering.com/northamerica/
• TopHat  https://tophat.com/  → LMS
• Respondus Lockdown Browser / Monitor  → Cheating Deterrent  
  https://web.respondus.com/he/lockdownbrowser/
Lessons Learned
- Evaluate options: Exam/No Exam, Open Book v/s Closed Book
- Student access to laptop/desktop/internet /
- Combination of “types” of questions
- Creating question banks
- Practice exam
- Students in different time zones
- Students with disabilities
- Taking students into confidence – Clear Instructions
Summary

- Knowing your students
- Knowing course material
- Testing course outcomes
- Low-stake multiple exams rather than high-stake exams
THANK YOU!
### TRY THIS

<table>
<thead>
<tr>
<th>TRY THIS</th>
<th>INSTEAD OF</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BE KIND TO YOURSELF AND PATIENT WITH THOSE AROUND YOU</strong>, especially students and support providers. Be sensitive to your students’ emotional needs and your own at this time.</td>
<td><strong>MAKING THIS SHIFT SOMETHING IT IS NOT</strong> You are not “teaching online.” You are quickly adopting an alternative format to provide instructional continuity in a crisis. Seek assistance from your teaching and learning center.</td>
</tr>
<tr>
<td><strong>SEEK STUDENT FEEDBACK</strong> Build community by asking students about their access to technology so you’re not assigning work they cannot do. Make them partners with agency, and survey them periodically.</td>
<td><strong>USING THE SAME APPROACH</strong> What you do in the classroom may not work remotely or online. Presenting content without giving students voice and choice, or acknowledging the reality of life now, may leave them overwhelmed.</td>
</tr>
<tr>
<td><strong>PLAN ASYNCHRONOUS LEARNING</strong> Create learning experiences for students to work at their own pace and spend the time they need to grasp concepts.</td>
<td><strong>RELYING ON SYNCHRONOUS ATTENDANCE</strong> Students may not be available when class was scheduled, and they may not have reliable internet access. Acknowledge disrupted routines and shifting responsibilities. If you must teach synchronously, be as flexible as possible with students.</td>
</tr>
<tr>
<td><strong>FOCUS ON CORE CONCEPTS</strong> Prioritize essential course concepts. Assignments may take twice as long to complete off-campus during disruption.</td>
<td><strong>SETTING UNREALISTIC GOALS</strong> Course learning outcomes can be achieved without the same expectations regarding “classwork” and “homework.” Learning can be achieved and measured differently.</td>
</tr>
<tr>
<td><strong>IDENTIFY LESSON OBJECTIVES</strong> Make the purpose of each learning activity and assessment (formative or summative) clear.</td>
<td><strong>REQUIRING LOTS OF WORK</strong> Think quality, not quantity. Avoid assigning online activities just to tally credit hours. Consider eliminating non-essential activities.</td>
</tr>
<tr>
<td><strong>PRACTICE TRANSPARENT DESIGN</strong> Make the purpose and task for each activity clear. Specify steps and criteria for evaluation. Estimate time to complete.</td>
<td><strong>LETTING STUDENTS FIGURE THINGS OUT</strong> Instructions that are simple, vague, open-ended or overly-complex don’t promote success in any modality.</td>
</tr>
<tr>
<td><strong>COMMUNICATE CONSISTENTLY AND OFTEN</strong> All instructions and assignments should be conveyed via the campus LMS (Canvas, Moodle, Blackboard). Communicate regularly using the same platform, and check-in with those who don’t respond.</td>
<td><strong>ADOPTING MULTIPLE NEW PLATFORMS</strong> Experimenting with multiple new platforms, especially without guided instruction, can frustrate you and your students.</td>
</tr>
<tr>
<td><strong>BE PRESENT FOR “OFFICE HOURS”</strong> Do your best to be available by phone, Zoom, or email at specific, regular times to provide support, answer questions, and clarify assignments and feedback. Real-time human interaction will be helpful for your students.</td>
<td><strong>EXHAUSING YOURSELF</strong> Instead of responding to every email right away, model how to discern what is urgent. Exemplify self-care.</td>
</tr>
<tr>
<td><strong>PROMOTE DEEP LEARNING AND RETENTION</strong> Curate multimedia materials to motivate engagement. A YouTube video on your lecture may already exist. Use digital tools to create opportunities to interact with course content and peers.</td>
<td><strong>TRYING NEW TOOLS</strong> There will be time for that later. Deploying new tools may lead to technological difficulties, increase challenges and frustration, and shut down learning.</td>
</tr>
<tr>
<td><strong>BE EMPATHETIC</strong> Assign a reasonable workload and pacing. Check-in with students and be flexible with deadlines.</td>
<td><strong>BEING OVERLY TIME- AND TASK-ORIENTED</strong> Place student well-being above all. Some students may be able to maintain a sense of normalcy; some will need to revise their goals.</td>
</tr>
<tr>
<td><strong>EMPHASIZE LEARNING OVER TESTING</strong> Necessity is the mother of invention. When possible, replace high-stakes exams with projects that demand creativity and collaboration. You and your students might create new ways to integrate and demonstrate learning.</td>
<td><strong>WORRYING ABOUT CHEATING</strong> Elaborate plans to thwart cheating send the message that we don’t trust students. They are managing crises right now. Hold them harmless by creating assignments that resist plagiarism and individual dishonesty. If you must continue testing, utilize an e-proctor product procured by your campus.</td>
</tr>
<tr>
<td><strong>ACKNOWLEDGE THE INTERRUPTION</strong> Incorporate the disruption into course work and offer a different, valuable learning experience.</td>
<td><strong>PRETENDING IT’S BUSINESS AS USUAL</strong> You have made sweeping and sudden changes. Know that your teaching, no matter how different, matters more than ever.</td>
</tr>
</tbody>
</table>

Adapted from Alison Yang, Online Teaching @ KIS: Do This, Not That.
Ready, Set, Remote: Online Labs

William Kitch
July 27, 2020
Outline

• Types of online labs

• Resources for online geotechnical labs

• Tools for building online content
Types of online Labs

• Remote lab
• Simulation
• Video Recorded
Remote labs

- Student access and operate lab equipment remotely over web
- Student control testing operation and data collection
- Testing digitally controlled with digital data collection
- Used mostly for nondestructive tests: circuits & electronics, wind tunnel, pumps
- Significant research and development from mid 1990s through 2015
- Long-term maintenance & operations are big limitations
Remote Lab Development Opportunity?
Simulation

• Numerical simulation of physical lab experiments
• Geotechnical examples
  ▪ Triaxial strength tests
  ▪ Consolidation
  ▪ Hydraulic conductivity
• Number of programs developed 1990s and 2000s
  ▪ University of Arizona
  ▪ University of Alberta, Edmonton
  ▪ University Tennessee, Knoxville/Georgia Tech, India Inst Tech
    • Geo-Sim https://igrip.iitgn.ac.in/geo-sim/
• Long-term maintenance major limitation
Video Capture with Data

• Video a faculty member, grad student, or lab tech performing experiment and films steps
• Provide students with raw data to analyze
• Sometimes use video capture of instruments or gauges
Resources for Online lab

- **MyGeoWorld Group: Geotech Lab Instruction Share (GLIS)**
  - [https://www.mygeoworld.com/groups/geotech-lab-instruction-share](https://www.mygeoworld.com/groups/geotech-lab-instruction-share)
  - Catalog of who has laboratory resources: Videos & Data

- **Curated YouTube Video Resources**
  - Bill Kitch Angelo State University
    [https://www.youtube.com/channel/UCyt3w3SogxUSJ7RSxQusXXA](https://www.youtube.com/channel/UCyt3w3SogxUSJ7RSxQusXXA)
  - Eric Steward, University of South Georgia
    [https://www.youtube.com/channel/UCP6v5TH8RF01sHzjyCmaTTw](https://www.youtube.com/channel/UCP6v5TH8RF01sHzjyCmaTTw)
  - NDSU Upper Great Plains Transportation Institute
    [https://www.youtube.com/playlist?list=PLk1zpQxZlZO24002MrjUADNHdA1i1Y3tL](https://www.youtube.com/playlist?list=PLk1zpQxZlZO24002MrjUADNHdA1i1Y3tL)
  - Middle Eastern Technical University
    [https://www.youtube.com/user/METUGeotech/videos](https://www.youtube.com/user/METUGeotech/videos)
  - Ronaldo Luna, St. Louis University/Missouri S&T
    [https://www.youtube.com/user/ronaluna](https://www.youtube.com/user/ronaluna)
Types of lab Videos

• Theory Presentations
  ▪ Classroom Lectures on theory behind lab

• Pre-lab preparation
  ▪ Recap of theory
  ▪ Overview of lab procedure

• Lab execution
  ▪ Step by step procedures
  ▪ Specimen preparation
  ▪ Data collection
Other good resources

• Geoengineer.org
  ▪ Education menu
  ▪ Lab testing resources
  ▪ Lab Manual

• USUCGER
  ▪ Resources & Media>Teaching Aids
Tools for creating online content

• Video recording
  ▪ iPhone: Use external lapel mic
  ▪ Video camera

• Graphics, Text, Simple animations
  ▪ PowerPoint (https://www.youtube.com/watch?v=S5Zt2qo63qY)

• Hand drawing & Writing
  ▪ Doceri $30 (https://www.youtube.com/watch?v=QrIaPVYS7og)

• Video Editing
  ▪ Camtasia ~$250
Summary

• Remote & Simulated labs: Seem to die after one generation
• Video labs with prerecorded data currently most viable method
• Plethora of online videos—curating them for your course and application is the issue
• Video creation and editing tools are inexpensive
• Time is the cost—payoff is long-term usage