Building a learning community in remote classrooms

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How my teaching method evolved in time…

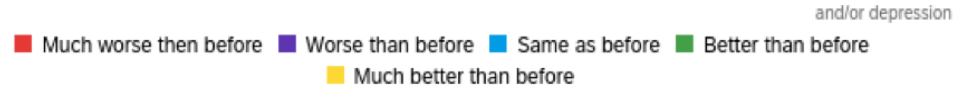
- Worcester Polytechnic Institute – 2012-2014 – got started
  - Mostly lecturing for entire time in class
  - Lab/hands-on experiences included in teaching when possible
  - Often end of semester project
- University of Cincinnati – 2015-2018
  - Great faculty community that exposed me to practical active learning strategies
  - Benefits of active learning
  - Lab classes
- San Jose' State University – 2019-present
  - Active learning both in person and online

What I’ll talk about

- Results of surveys/interviews about transition to online
- Active learning in an online setting
- Fostering a remote learning community through group work
- End of semester project as open ended assessment

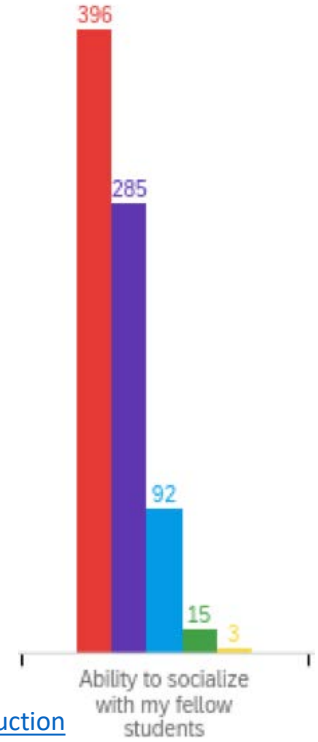
Some initial data from students & faculties @ SJSU after online transition

- At the end of SS20, we conducted surveys and interviews to understand the impact of online transition
  - Team: Patricia Backer (PI), Dr. Laura Sullivan-Green (co-PI), Dr. Maria Chierichetti (co-PI), Dr. Liat Rosenfeld (co-PI), Cynthia Kato (co-PI)
  - Complete analysis on COE website: https://www.sjsu.edu/engineering/resources/instructional-design/covid-student-survey.php
- Students
  - Survey: 993 respondents (~ 15% of students enrolled in SS20)
  - Interviews: 40 students
- Faculties
  - Survey: responded 104 faculty (~ 36% of faculty teaching in SS20)
  - Interviews: 23 faculties
- Often disconnect between students' perception and faculty's perception



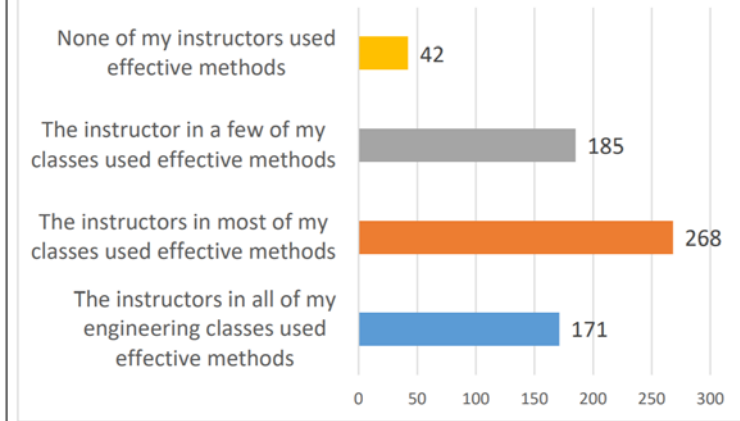
Students' survey/interviews: key points

- Key points
  - Socialization with peers and friends is an issue
  - Students gave some suggestions on how online instruction could be improved.
    - record lectures and post online,
    - use active learning in online classes,
    - utilize better online teaching methods,
    - use Canvas and Zoom more effectively,
    - better communication with students,
    - give/use more practice problems,
    - be more organized
  - Controlled testing environments
    - increases students' stress when taking an exam.
    - increases the time it took to finish an exam



From: https://www.sjsu.edu/engineering/resources/instructional-design/covid-student-survey.php

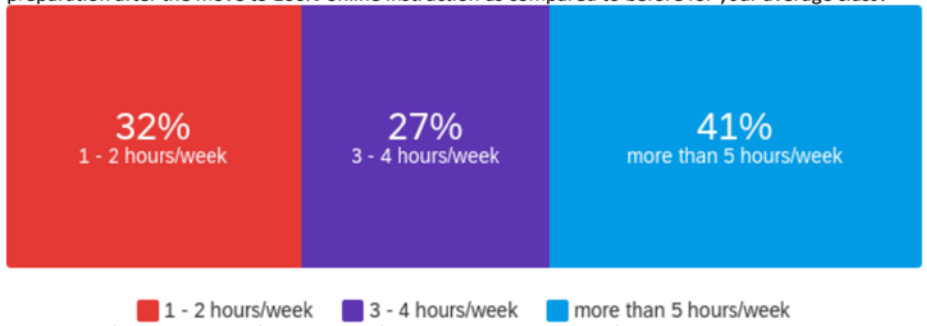
Figure 16. Student response to the question: How effective was the instruction in your online engineering classes after March 2020?



Faculty's survey/interviews: key points

- Key points
  - Increased workload
  - Changed pedagogy very quickly
  - Overall positive experience, seamless transition
  - Many tried to incorporate activities to promote learning online
  - Increased family obligations during shelter in place
  - Worried both because of students' & personal wellbeing

Figure 13. Faculty Responses to the Question: How many more hours did you spend on course preparation after the move to 100% online instruction as compared to before for your average class?



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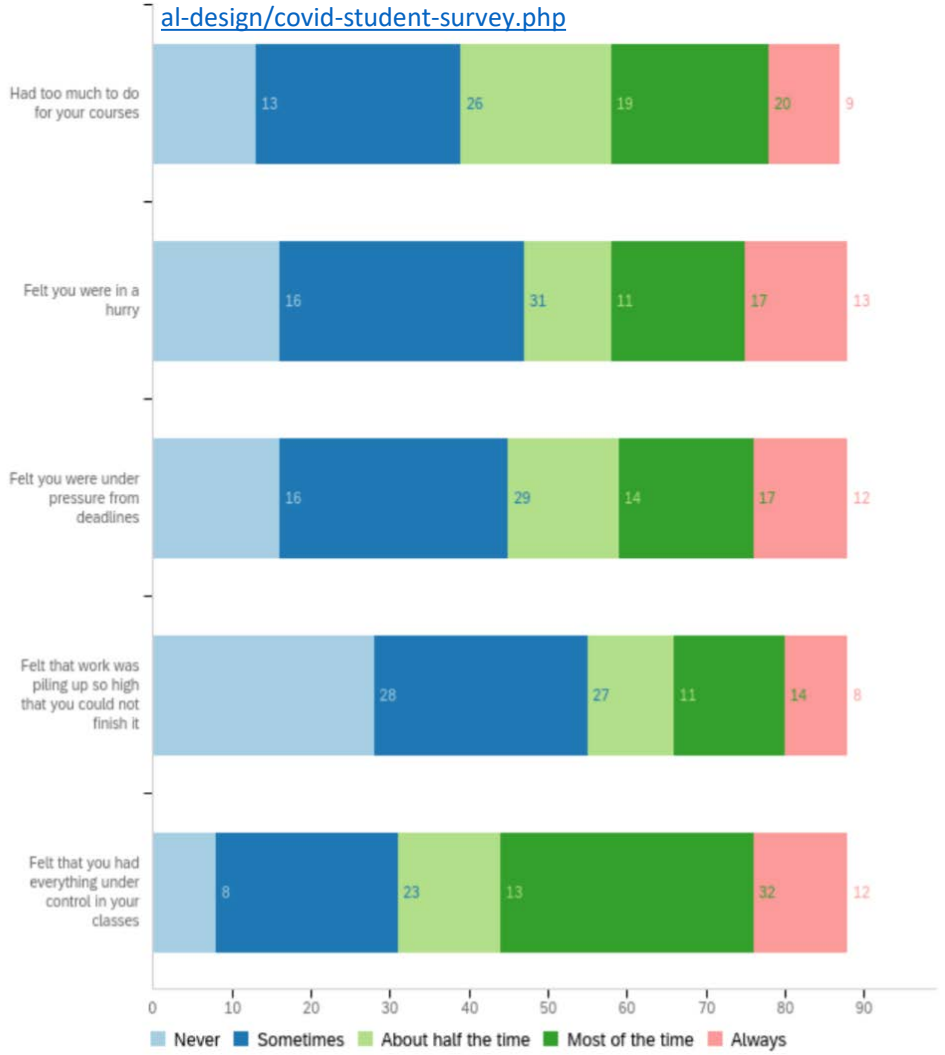


Active learning

- In class (recorder + posted on youtube with private link)
  - Start class with 10-15 minutes of conceptual review
  - Assign 1-3 problems for students to solve (similar difficulty as formal assessment)
    - Assign to breakout room
    - Join students in breakout rooms for a few minutes
      - Answer questions
      - Check on how students were doing
      - Easier to discuss with students in smaller groups
      - If class is large, maybe ISA/TA can help with this
      - Be mindful of time
  - Solution (quick) together
- Assessment
  - Weekly or bi-weekly homework
  - Weekly 15 min quizzes (classes with lots of short problems) on the weekly topic (create question banks in canvas that are randomly shuffled)
  - If no quizzes, midterm
  - End of semester project
  - Final exam

Benefits

- Students more engaged
- Students practice what they are taught multiple times
- Informal coaching
- Helps form a community of learners
- Helps keep tracking of students & proactive contact

Difficulties/cons

- Dysfunctional group
- Some students prefer to work individually
- Easy to loose track of time

Let’s try to be students

- Breakout rooms
- Questions to be discussed
  - How is your break going? What has been challenging and what relaxing/refreshing?
  - Have you tried active learning (or a more students’ centered approached) before?
    - If yes, discuss one aspect that you like
    - If not, discuss one aspect that discourages you from trying it in one of your classes
- One of you will report for 1 minute to the group
- You have 5-6 minutes

Breakout room experience

- Share your reflections about your experience in the breakout room
  - How was the interaction?
  - What helped? What made it challenging?

Active learning thoughts

- Can you report your discussion about active learning?

Group collaboration during class

- In an in-person format, I usually have 15 minutes sessions problem solving during class (twice per class minimum). Students naturally help each other with neighbors classmates, which become a pretty stable group by end of semester. I let the collaboration be informal and free
- I tried to recreate a similar concept at the beginning of online transition with random breakout rooms, did not work well (no discussion in many groups)
- I value collaboration and building a community of learners, as more needed in an online environment in situations when no in-person community is available
  - Pre-defined breakout rooms of 3-4 students (change 1 or 2 times a semester)
  - Use the groups both for in-class group problem solving and semester long project
  - In the first few classes, use the breakout rooms with ice-breakers and short/simple community building activities
  - It becomes easier to keep track of students even without a formal attendance policy and

Initial ice-breaker activity

- Might be simple topics/often disregarded, but help to create a personal touch in a virtual environment, reduces the distance
- It is more difficult to be connected and form a learning community in a virtual environment
- Students need the support of a community of learners to succeed

- As faculty, we need to monitor the group and assess whether there are some team issues, or some team members do not actively participate

Examples

- Introduce yourself to your classmates. What do you do outside of school? What do you enjoy?
- How was your break? What was your favorite activity?
- Discuss the most joyful/rewarding/easiest and most challenging situation that the covid-19 pandemic created for you. Report as a group.
- Find some quotes for the groups to discuss
- After a few class: what are some aspects of the class that are working well and some that you would change?

Semester-long open ended project

Benefits

- Reduces assessment based on online testing which have limitations in terms of proctoring
- Exposes students to engineering design process and to collaborative work (soft skills)
- Students are required to tackle an open ended project (ideally different for each group)

Cons

- Group assessment
- May be difficult to arrange/handle for large class; review sessions with instructor and TA during class time may be helpful
- More difficult to grade: use rubrics

End of semester project ideas

How I came up with a list of projects for the students

- Ask each group to come up with a hands-on demonstration of a topic in the syllabus (or assign a topic to each group – budget constrained; students can meet outdoor to assemble)
  - I used it for my junior year class “Aircraft Structures I” – part of service learning activities
  - Students had a deliverable each 2-3 weeks starting from project proposal, literature review, initial design, construction, re-design if necessary, demonstration, final write-up/presentation
- Create a list of projects and each group will choose based on interest
  - I used it for my senior class (individual project) – “Aircraft Structures II”
  - Most of my projects required students to analyze aircraft/spacecraft crashes that happened in the last 30 years due to structural failure
  - A few projects gave the option to work on advanced topics/additional skills not presented in class, such as FEM
  - Some students proposed a different topic (usually pretty advanced) and I looked into it on a case by case
  - Very positive feedback, highly engaging, students could choose how much to challenge themselves

Other ideas

- Have students implement in Matlab (or similar) the model of a system with added complexity (i.e. rigid body motion, image processing, motion detection from short video they create, data analysis, etc)
  - Free full-license Matlab for students/faculties
  - Open source libraries for data analysis
  - Can the students collect data from smartphones/tablet/laptop sensors? If not, faculty can provide raw data

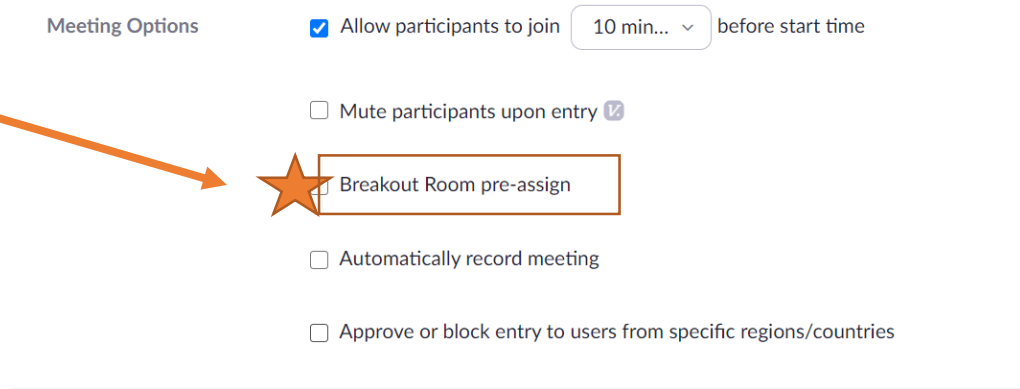
https://www.youtube.com/watch?v=umE6gUPbQBE&t=2s

Pre-assign breakout rooms

- Create a CSV file with two columns

Room Name	Email
Group 1	student1@sjsu.edu
Group 1	student2@sjsu.edu
Group 1	student3@sjsu.edu
Group 2	student4@sjsu.edu
Group 2	student5@sjsu.edu
Group 3	student6@sjsu.edu

- Open zoom web portal and schedule a meeting (>> zoom.com >> myaccount >> schedule a meeting)
- Scroll down to meeting options and select “breakout room pre-assign”
- Click on “import from CSV” and follow instructions
- After class starts and ready to start breakout room, select “breakout rooms” in meeting option
- NB: students need to sign in with their SJSU email account



Thank you!