Tips for Teaching On-Line from Rice Science and Engineering Faculty

Things that seem to work for remote teaching

- Upload as much relevant material as possible into Canvas ahead of time for students
- Students like having recordings that they can pause and review
- Increase communication outside of class to maintain personal connection
- Most instructors who had some sort of session designed around problem solving reported positive results in a remote format
- Synchronous lectures with a high degree of interactivity
    - Polling questions
    - Chat function in zoom
    - Breakout rooms with a high level of planning
- Asynchronous chat via virtual discussion boards
- If goal is to have a discussion via Zoom, consider posting some of the questions in advance to give students more time to think.
- Use TAs in new ways to support teaching (e.g. monitoring chat, and alerting you to common questions; or helping manage tech in a synchronous classroom lecture)
- Use low and high stakes assessments more frequently to help students understand how their learning is progressing

Ideas to include remote synchronous students in labs or design work

1. Team-focused studies can be done by separating one student per bench, lab station, set-up, etc. and have the others on a team participate remotely. With the aid of high quality A/V equipment all team members could watch the procedures, help guide the work, correct mistakes, record observations, etc. as they would in a normal situation.
2. Have students "direct" the lab and use instructor and/or TAs to do the physical (in-person) experiments/work. Instructors would essentially work as their technicians under the students' supervision.

Zoom has useful features, but they take time to learn.

- Polls get generally positive marks
    - You either have to upload questions ahead of time OR have question written on board/slide and only use the poll for the answers. You cannot write questions in the poll function during class/zoom session.
- Chat is used by students to ask a lot of questions (often more than in person)
    - Have TAs monitor chat can be very helpful, and in large classes is <u>necessary.</u>
- Chat can be used to get quick granular feedback on comprehension

    - Ask students a question that they can answer in just a few words in the Chat box. You or the TA can skim them quickly for misconceptions.
- Breakout rooms are hit or miss.
    - Set expectations ahead of time of how the group work will function in the breakout room
    - Introduce accountability (e.g. ask groups to report answers to problems or have students self-assess their participation)
    - Breakout rooms can be pre-assigned (instructions via Zoom help pages), meaning you can assign specific students to assemble in a specific breakout room as opposed to random assignments to breakout rooms. However, for preassigned breakout rooms to work properly, students need to be logged in to the session with their rice.edu Zoom account (not their gmail account or Facebook account). If you have a relatively small class (<25), it's not hard to add a few stray students to into breakout groups in real-time, but if you have a large class, it is difficult.
    - Students can be required to register for Zoom meeting (forcing the correct Rice login), but this adds an additional barrier to attendance, which is generally undesirable.
    - In large classes, compliance can't reasonably be expected to be more than about 70%, even with instructions.

- It is important to consider appropriate setting when creating your Zoom meetings.
    - Turn off Join Before Host to prevent students from joining before you're ready for them. Consider assigning a co-host to join a few minutes before class begins to facilitate discussion and socializing among the students, help with equipment checks, and any other pre-class housekeeping items.
    - Enable waiting room to better control who can join the online classroom during the class.
    - Lock your meeting after you know everyone has joined to prevent unwanted guests from joining.
    - Turn off Attendee Annotation to prevent visual distractions by other students during class.
    - Disable Private Chat to prevent distractions between students during class.

Other useful technologies

- Writing on a "graphics tablet" with MS whiteboard
    - graphics tablets are cheaper and have better resolution
- GradeScope (https://www.gradescope.com) - we will be able to pilot this in the fall
    - Contact teaching@rice.edu if you want to be involved in the pilot
- Slack for messaging / community building

- iMovie for pre-recording lectures: easy once you are familiar with it
- Piazza for asynchronous chat/discussion board
- Socrative for in class interaction
- Suggested apps for document scanning via smartphone: scannable, scanner app

Challenges:

- TAs need to shift office hours to either early morning or late evening to accommodate students in a time zone with a 12-hour time difference.
- It may not be possible to conduct "live" oral presentations given the differences in time zones. Some of the presentations may have to be recorded.
- Students may be in situations where their internet connection prevents them from being able to use their camera.

Things that seem to NOT work for remote teaching:

- Synchronous lecture with little interaction
- Asynchronous videos + optional office hours
- Breakout rooms without careful planning

Various strategies for take home exams have been used and are planned:

- Most faculty are planning open book/open note exams because of potential for violations otherwise; questions are planned to be harder/more about explaining or higher-level applications
- Post exam (or link to exam) pdf on Canvas, then student uploads to Canvas/Gradescope--this has time stamps on both ends if you want to enforce a time limit
    - Note: It took an average of 20 minutes from pencils down to completing an upload for multi-page exams; longest time was ~1 hour
- Canvas quiz (timed or untimed) for both download and upload of an exam (generally pdf)
    - The timed quiz allows for rigid enforcement of time limit
- Canvas quiz with multiple choice/numerical/essay/etc. questions directly on Canvas
- One instructor plans to break exam into 30-minute "chunks" rather than one long exam (all on Canvas); this is designed to circumvent potential schedule and internet problems
- Have a two-step process for doing an exam, especially multiple-choice:
    - Allow students to download a pdf of the exam, with the multiple-choice answers, and work it offline.

    - Students return to Canvas to select their answers using a multiple-choice Canvas quiz that is identical to what they downloaded.
    - A similar version is being used for a non multiple-choice exam, where students access the questions via Canvas quiz, and just upload a document of answers
- Most plan a window of anywhere from 7 hours - 4 days for the take home exam
    - Most common is around 48-72 hrs.
    - Organic Chemistry has used an 8 hour window with no problems.
    - The actual windows can be different for students in very different time zones

Useful tips:

- Check with students ahead of time and try to provide alternative to those that have unstable internet connections
- Give a "practice" exam (no material) simply for students to figure out their own best method for scanning and/or uploading their actual completed exam.
- Use Piazza discussion board for students to share best practices for uploading
- Include uploading best practices in exam instructions (example here from Devika Subramanian)
- Canvas can be formatted to only accept certain file types (e.g., pdf)
- Multiple choice questions on Canvas can have randomizable variables to make comparing answers with peers harder
- Piazza discussion board can be inactivated during exam period so students don't post questions about the exam
- It's a good idea to directly survey students at beginning of semester to see how many have time zone issues
- Hold office hours during the exams to address questions, or have defined time periods when you will be "on-call"
- Make the course syllabus very clear about how these new processes and policies will work for your class.
- Advise students to keep a copy of work during exams in case there are technical malfunctions at the end (e.g. save essays to a word doc, not just type into Canvas)
- Undergrad TAs and/or students who recently completed the course can be resources for ideas on exam implementation (and cheating prevention) from the student side