Ask Me Anything: Best Practices in Teaching during the Pandemic

ED: I am Erin Dolan, a Georgia Athletic Association Professor of Innovative Science Education in the Department of Biochemistry & Molecular Biology at the University of Georgia.

I teach introductory biology and junior-level biochemistry, and my research is in science education. I have experience teaching in-person, online, and in hybrid formats, familiarity with research on teaching and learning, and experience working with faculty to shift their instruction to online formats. I look forward to discussing how to maximize the effectiveness and inclusiveness of our instruction during these unprecedented times.

Please Reply to this post to ask me a question.

Q: Hi Erin -

Thanks for doing this AMA today. I have seen many academic institutions issue statements about the importance of inclusive and equitable practices in the wake of the George Floyd killing. At my institution, this type of statement has been followed by an increase in the number of offerings of DEI-oriented professional training opportunities for faculty and staff. So far, these trainings have all been optional. Additionally, I have seen little in the way of proposed or actual policy changes.

What evidence-based policy changes do you think institutions should consider enacting to make teaching and learning more equitable and inclusive?

ED: Great question for now and beyond the pandemic. Policy changes that I think could help are:
- requiring diversity, equity, inclusion, and justice (DEIJ) statements from applicants to faculty positions
- requiring DEIJ statements in annual review documents and dossiers for promotion and tenure, including goals and accomplishments
- integrating DEIJ related questions into student mid-term and/or course evaluation surveys so that students have a voice about inclusiveness of classrooms
- changing evaluation of teaching for P&T to include instructor self-reflection, with prompts related to teaching effectiveness and inclusion, and to include peer observations using structured processes, protocols, or rubrics that attend to BOTH effectiveness and inclusion (e.g., whose voices are heard in the classroom?)

I'd be interested to hear thoughts and examples from others.

Q: Hi Erin,
Thanks for doing this today! Do you have any advice on online exams, especially for a biochemistry course?
Thank you!

ED: Good question - some faculty have concerns about cheating. I am not so concerned about this for a few reasons, but I also take steps to make it not so easy to cheat.
I don't ask questions that are easy to google - this means that I have expectations that students are going beyond recalling steps of the citric acid cycle, for example, and instead have to make predictions based on the levels of allosteric regulators.

I make my exams open book - I still encourage students to study! Sometimes they think they can just look stuff up if it is open book, but it takes too much time to look up info and think about how to apply it if they haven't practiced doing this before. Open book means that I don't worry about using a lockdown mode or watching them on zoom during the exam, etc. This is not only easier for me but easier for students who might have technology issues that prevent them from working on and completing the exam and adds to their stress during an already stressful moment (exam) and stressful time (pandemic, ongoing racial injustices).

I have also opted to give weekly quizzes (14 total over the semester with dropping the two lowest scores) that are worth fewer points instead of 4 big exams & a final. This helps students stay on top of the material over time, which is particularly difficult right now. It also lowers the stakes of any particular quiz - this again lowers stress and makes it less tempting to cheat.

There is a good body of research showing that people live up (or down) to expectations. If I expect my students won't cheat and set the tone that I trust them, most if not all will live up to this expectation. My averages are quite similar to previous years, which suggests cheating is not a big issue.

In general, practice helps everyone, so consider giving your students a practice exam or quiz so they can practice assessments in this new format/environment. The practice will also help you figure out and solve any issues before it really matters. For example, I ask questions in class and on homework that are similar to the types of questions I expect students to complete on quizzes, so they get plenty of practice.

Hope that helps!

Q: Dear Erin,  
It has been a challenge for me to know if the students I am teaching are engaged or paying attention in the on-line format (zoom typically). I am reluctant to ask them to turn their cameras on given some of the challenges of learning from home. Are there any strategies you can suggest to try and overcome that seeming barrier between the instructor and the students when teaching remotely?

ED: I also am reluctant to ask students to turn on cameras. Occasionally when a student turns on their camera, I note how lovely it is to see a face - then more will often turn their cameras on for a few minutes and wave before turning them off again to save bandwidth.

Although it is not for everyone, I use the chat function in zoom all of the time - I pose questions and ask folks to type in the chat. If I'm getting nothing, then I will sometimes ask folks to let me know if they can hear me and then I'll try to ask a different way so I can figure out if they are not hearing me or not understanding the question. Not all students participate, but if you use wait time - like 45 seconds to a minute where you tell students to think but not type, and then let them know when they can type, I usually get a good number of responses.

The other thing I do is use a google doc that everyone works on to complete homework together (they complete on their own and then contribute to the joint doc) and I expect students to post and
respond to each other’s questions on a discussion board. Some students prefer this asynchronous engagement, and I think that's ok.

Hope that helps!

**Q:** The pandemic has clearly required changes to the way that course material is delivered to students (largely on-line), which has major effects on lesson planning and presentation. Have these changes in course format impacted your approaches to student assessment, either in terms of format or frequency?

**ED:** Good question. Yes, absolutely, I’ve made a number of changes. What has been most challenging for me is trying to teach in person and online at the same time (what has been dubiously titled "hyflex"). I structure my teaching / course pretty differently for online and in-person. Based on advice from others, I have moved to a weekly schedule where students:
- complete a reading and take a reading quiz on Tuesday before class
- meet synchronously in person or on zoom during class sessions Tuesday and Thursday, working through assignments / learning tasks interspersed with short lectures and discussion in whole group and breakouts
- post remaining questions, points of confusion, etc., on a discussion board starting after class Thursday through Sunday (when I find a lot of students study)
- take a post-lesson quiz for 45-60 minutes any time between Sunday evening and 11:59 Monday

This weekly pattern is super helpful for keeping students on track and identifying those who may be slipping through the cracks that I would miss because we are not in person. Students can drop their two lowest reading quizzes (MC questions based on content learned from reading - mostly recall/facts; scored for accuracy), two lowest discussion board post (points earned for two quality posts), and two lowest post quizzes (MC, short answer, and drawing questions that require application or analysis, not just recall; require scored for accuracy).

The man difference between this structure and my in-person format is the post-lesson quizzes for assessment each week (more frequent/lower stakes than my once per month exams in person) and the weekly structure instead of month-long units.

The level of the assessment (recall/knowledge on reading quizzes and application/analysis on post-lesson quizzes and exams) is very similar to my in person teaching.

What do you think - does this sound appealing or manageable for you?

**Q-MultiPart:** I taught a graduate Cell Biology course in the spring online and a capstone undergraduate discussion course in the online fall semester. Both appear to work as well as, or perhaps a little better than, in-person courses, although they seem to be a bit more work for me. I am curious as to your experiences with hybrid courses in terms of safety effort and how much the students learn.

**ED:** Good question.
To be honest, I don't have much of a choice as the University System of Georgia (UGA’s governing body) expects us to teach at least in part in person. Students can opt to attend entirely online, and faculty who need accommodations can get them, but otherwise there is an expectation of in person instruction.

I have set it up so students have one class session per week (class meets 3X per week) that is their day and they can attend in person that day or be on zoom. The class meets synchronously, which
means I have 30-40 on zoom and 5-10 in person (with some missing each session for a variety of reasons - I record and make the recording available after class for those students).

I don't love the split. I would prefer mostly in-person or all online - it is exceedingly difficult to engage with 30 students online while 10 are right in front of me. Generally the feedback from students has been that this is working better for them than their classes where there is only a lecture/lecture recording and monthly exams. They are able to ask and resolve questions or confusions and keep up because of the weekly structure.

In my view, this speaks to the importance of design - a good design suited to the environment can result in good engagement and learning, but poor design doesn't save either an in person or online course. One nice thing about online is that students who might not otherwise be comfortable talking aloud in class in person might be more comfortable chiming in on a chat or during a breakout. So this ultimately leads to more equitable engagement and richer discussion (more minds and perspectives involved!). Plus this format "de-centralizes" the instructor - students aren't expecting the person "up front" or standing up to do all of the talking and thinking because online there is no front or standing up!

Maybe this is one reason online seems to work better that in person for you?

Q-MultiPart: Thanks Erin, very informative answer. All in-person turns out not to be practical at my institution because there are likely to be some students in quarantine, so you have to prepare online classes for them in any case. I have discovered that there are a few positives with respect to online classes that I had not thought of prior to teaching them. For example, I record my classes and, by looking at the recordings, I can improve my presentations and correct things that might be unclear. I make them available to students as well and they don't have to scramble to take notes. I do find that students are a little less likely to ask questions during class. My classes haven't been structured to incorporate chat rooms, but they would probably be very helpful in the class I am teaching now.

ED: Interesting - one thing that I started doing last spring that have improved the mini-lectures I give in class is to write scripts to generate voiceover ppts. I find this works well for asynchronous lectures and can be easily converted to an mp4 that students can work on a platform of their choice. I complement these with short quizzes students can take multiple times to check their understanding.

I find that scripts help a LOT with the flow of the lecture when it is being recorded. Plus they can be given to students so they focus on making sense of the info and applying it rather than scrambling to write it down, as you note. The one thing that I worry a little about is that writing itself can support learning - not just transcribing but writing synthetic notes. But my students still seems to be writing their own notes, even when I give them my script. Thanks for sharing your experience!

Q: Thank you for answering questions today. What technologies have you found most useful for teaching online?

ED: I think everyone has to find technologies that fit their situations - what the institution supports both financially and in terms of infrastructure is where I would start. For my 40-50 student class, I use zoom, capture recordings in kaltura (which I don't love but my institution pays for and supports with easy integration into our LMS), google docs, and our LMS (D2L) for quizzing, course content, and discussion boards. In my large enrollment class, I use voiceover ppt, top hat, and/or the quizzing function in our LMS. The only thing that costs students is top hat.
The only thing I have tried and NOT liked is the polling function in zoom. Top hat and our LMS provide much better support for creating questions, interpreting and visualizing responses, response statistics, etc.

What technologies have you tried and liked or not? I'm interested to hear from everyone!

**Q:** Let me add my thanks to you for taking the time to answer questions today. What are some ways to assess whether the online material is being effective for student learning?

**ED:** There are lots of ways to assess - the main thing I try to think about is what evidence do I need to see that students have XYZ knowledge or skill.

This is where design approaches like "backward design" can be super helpful.

- start by articulating a learning objective - here is one from my biochem class this week: Predict how availability of reactants, products, and regulatory molecules will influence flux through the pyruvate dehydrogenase complex (PDHC) and citric acid cycle

- then think about the kind of question or problem a student will be able to respond to that will reveal that they have achieved the objective or not. For example, I asked a question during class yesterday: ADP is an allosteric regulator of PDHC - would you expect it to be an inhibitor or activator? Explain the reasoning for your response.

In class, I would ask students to think then type their prediction in the zoom chat, and then explain their reasoning aloud in the zoom meeting. In a quiz, I might ask a multiple choice question for the first response and a short answer (e.g., "In 2 sentences, explain...") for the second.

Effectiveness is not just about knowledge or skills, it can be about whether all students actually engage with the material in a way that reveals their thinking. This is where I use discussion boards and ask students to post and respond to each other's thinking/questions. By getting students to write something, I can "see" their thinking and identify where more instruction / clarification is needed.

You might be interested in this practical essay on assessment by ASCB member Kimberly Tanner: https://www.lifescied.org/doi/10.1187/cbe.04-03-0037

**Q:** Sorry for the late question (I see that all of the questions were answered 3 days ago). I am teaching an Intro Bio course for the first time (in any format) and would love to make my class more active by having the students work through assignments and tasks in breakout rooms on Zoom. The problem that I am having is that these activities take a lot of time for me to prepare, especially since I do not have material ready. My colleagues have offered some material that I have used, usually after modifying them slightly, but for some of them, I feel that they either do not emphasize the points that I would or they do not reflect the flavor that I have given to my class. Likewise with the material provided by the book publisher.

Is there a good source of active earning material out there?

**ED:** I completely understand. It takes a lot of time to develop good instructional materials and even more time to make sure they work for different students in different contexts. Some of my go to repositories include:
- CourseSource
- HHMI Biointeractive
- National Center for Case Study Teaching in Science
All are linked from ASCB’s Teaching page: https://www.ascb.org/career-development/teaching/