

## **A blended CURE: How the Pandemic Helped Me Combine the Best of Remote and In-person Teaching**

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Prior to the pandemic, I taught *Life Under Water in the Anthropocene* as an authentic laboratory research experience for undergraduate students based on principles from the CURE literature (Auchincloss et al., 2014; Bangera et al., 2014; Cooper et al., 2017; Dolan, 2016). The pandemic and my university's policies led us to redesign the course for flexibility by leveraging new digital strategies for the required online portions. In complying with regulations for our limited in-person time, we profited from unanticipated opportunities for spontaneous collaboration and community learning. The experience was an exciting and therapeutic distraction.

During the summer of 2020, I worked remotely with a team of undergraduates compensated to help me create a 14-week resilient version of my CURE course for Fall 2020. Much of what we did incorporated my participation in the extraordinarily creative Anchor Program designed by Brown's Sheridan Center for Teaching and Learning (SCTL). Given the uncertainty around the extent to which in-person laboratory work would be possible and the need to be flexible for students who might be learning remotely, we prepared for three very different possibilities. Designing with this kind of flexibility required substantial work upfront but helped us be effortlessly responsive to our students' needs and any changes to campus health and safety protocols.

In the end, the sandwich structure the pandemic imposed on us proved highly effective and worth continuing: Begin with remote instruction, transition to in-person learning, and return to remote instruction. Serendipitously, I believe this approach created a more authentic research experience.

**1. A remote start.** The challenge to teach remotely for the first four weeks, and to finish in fourteen, forced us to fundamentally restructure how I had taught the course and to embrace new digital technologies. We dedicated the first month to building community and project design. Laboratory classrooms are not cozy spaces with their food and drink bans. Getting to know each other, reflecting on diversity, equity and inclusion in the academy, and examining the disproportionate impact of anthropogenic disturbances on disadvantaged communities were activities that felt more comfortable online and in breakout rooms accessed from safe spaces with snacks and fluids. Reading the relevant literature and using Google Jamboard to brainstorm

ideas and to find research project partners would not have been as comfortable in the lab with spatial distancing and mask wearing. Writing, presenting, discussing, and reviewing draft research proposals would have been disrupted by the relentless humming of the HVAC and reverberating acoustics of the laboratory classroom. Online, I saw faces and heard voices clearly. I also made some assignments asynchronous, giving students more flexibility to manage their time. The restructured online version expanded the time students had to think deeply about their projects, share their ideas and predictions for peer feedback, select appropriate methods, and plan data analyses before data collection began. We used breakout rooms for small group discussions, Google Docs for silent discussions, and Canvas for asynchronous discussions. By the end of the first four weeks, everyone's voice had been heard multiple times and often more profoundly than through those obligatory and awkward introductions on day 1 of a face-to-face course meeting. My team did a spectacular job of creating digital content to support this part of the course, and the experience made them superb teaching assistants.

**2. An in-person filling.** It was pretty obvious by May 2020 that having teams of 2-3 undergraduates work on their projects in my research laboratory in the Fall was unrealistic and impractical. I had also found it challenging to supervise multiple simultaneous projects that were distally located in different rooms when I taught the course in 2019. I resolved to have my students conduct their projects in the biology lab classroom where the bench layout was conducive to social distancing but allowed for community observation and engagement. We purchased some new equipment and imagined creative ways to use laptops and smart phones. My team learned new software and wrote basic scripts to support new experimental protocols for data collection. When our class met in-person in October 2020, it felt like we were in a post-pandemic dream. Clad in our lab coats, gloves, and other protective PPE, masks seemed almost normal. Remote students joined via Zoom to help us break new ground and find answers to problems that no one else had already answered. I imagine the benefits of collecting data in a community will be even better when students are no longer restricted from visiting different benches for an up-close and personal view of what their peers are doing. Too often, we don't convey strongly enough the collaborative nature of research and the value of serendipitous and spontaneous conversations with research colleagues.

**3. A remote finish.** COVID infection rates began to surge late in Fall 2020 and in-person meetings were abruptly suspended a week earlier than planned. Except for the fact that we didn't have a chance to say thank you and good bye in person, the decision to suspend in-person classes may, in retrospect, have been fortuitous. On Zoom, students shared their screens to show a graph of their data and walk their peers through it. Questions abounded and no one had trouble hearing the speaker or seeing their slides. A week or so later, we gathered for a virtual conference with guests from our SCTL. By now, we were all Zoom experts and the presentations were expertly delivered. In talking later with students, many confessed that they found Zoom presentations much less stressful than standing at the front of the class and delivering a talk. On Zoom, students

found it easier to use their notes, were less preoccupied with their appearance, and able to imagine that attention was focused on their shared slides; in a face-to-face presentation, speakers may see attention focused on themselves, on a phone, or on a laptop, none of which necessarily inspires calm or confidence in an anxious presenter. Zoom also facilitated hosting campus guests and off-campus attendees. For a CURE course, that is a huge benefit when working with community partners.

Looking back, the challenges and pandemic-related restrictions I faced teaching in Fall 2020 helped shape a stronger, more focused course that prioritized learning outcomes, building connections, and embracing the core concepts of a CURE. These lessons have spilled over into my other courses. I reflect more carefully on how every activity supports my learning outcomes. I also balance the strengths of online and in-person learning depending on what my students need to do. I am grateful that I didn't "let a good crisis go to waste."

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