



Academics face empty classrooms during the current coronavirus pandemic.

## INTO THE DIGITAL CLASSROOM

Five tips for moving teaching online as COVID-19 takes hold. By Virginia Gewin

In early February, Leonardo Rolla had two weeks to work out how to start teaching online. A mathematician at the National Scientific and Technical Research Council in Buenos Aires, Rolla also teaches maths for two terms each year at New York University (NYU) Shanghai in China. He had been visiting family when the outbreak of the COVID-19 coronavirus forced universities in China to shut, and he couldn't return to Shanghai.

Rolla had never taught an online class. The transition required many hours of work and a lot of patience. He had to learn the technology and identify the best teaching tactics for his

advanced linear-algebra class of 33 students. Part of the problem was that his students are in a time zone 11 hours ahead of him.

With technological help from colleagues at NYU Shanghai, he developed a strategy for teaching remotely from the other side of the world. Each day, using a program called

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VoiceThread, he records several short videos of himself explaining maths concepts, adding up to 15–30 minutes collectively. During their day, the students watch the videos on a website and, in turn, insert videos they make of their assigned theorem proofs, for example, or a question, a comment or a critique of a classmate's proof. Together, Rolla and his students produce an interactive, if asynchronous, class recording.

### Working together

Rolla has one crucial tip: seek constant feedback from students. “I am the director of this movie,” he says, “but we are all in this together.” He asks his students precise questions to demonstrate what they have just learnt and how each concept builds on their existing base of knowledge. He also asks for feedback to improve the course. When students asked for more concrete examples of complex, abstract theorems to make sure they understood the concepts, he obliged. “The biggest risk is that you become a talking head explaining things that students are not following,” he says, “and they give up and just pretend.” His video-based approach has earned high praise from students and colleagues.

Although Rolla is pleased to have met the technical challenges of teaching remotely, he notes that he had one significant advantage: he had already taught this group of students. If he hadn't, he says, he would have scheduled a few live sessions to meet them. “The hardest part is that it takes a lot of time,” says Rolla, “at least three times as much work as a traditional lecture, and that's once you're familiar with the tools.” He estimates that since February, he's been spending 35 hours weekly preparing his online teaching content.

### Tips for the transition

As faculty members worldwide face online teaching, they must consider how to maximize value for their students. Here are five tips for pivoting to remote instruction.

**Don't convert your entire lecture to video.** “Students don't want to watch slides without a teacher's face or voice,” says Kyungmee Lee, a lecturer in technology-enhanced learning at Lancaster University, UK. If you normally teach a 3-hour class, summarize its essence in a video no longer than 30 minutes, says Lee. Justin Reich, a digital-learning researcher at Massachusetts Institute of Technology in Cambridge, agrees that it is best to be succinct. “Strategically reduce your goals,” he says. Instructors need to identify a few specific things that they want their students

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to learn, and focus on those.

**Don't rely on live video.** Don't use live conferencing for every facet of the course, says Lee. You can't guarantee the quality of your feed, especially amid concerns that some online conferencing platforms, such as Zoom, will be overloaded and could crash.

**Invite student engagement and feedback.** The best online instructors, Reich and Lee agree, set up their courses so that students can pursue self-paced enquiry – exploring the topic under their own initiative. For example, you can give students a range of links for further reading. Ideally, they will be able to choose content on the basis of their own interests, but you need to ensure that your expectations are clear, says Lee. It's also important to find out what students most care about, adds Reich. "The most common misstep is not listening to your students," he says. Asking students what

they hope to get out of the online course, and how you can best serve them, offers instructors ideas for teaching and gives students ownership of the process, he says.

**Check in with students often.** "If you can't see a student's face, it's impossible to tell if they understand the material," says Lee. Consider interactive elements such as short quizzes. Students might miss social interaction, so it helps to engage them with opportunities to talk to one another during a live session, says Lee. She groups students into teams of five so that they can support one another. If students have a question about content, they ask their group first, and come to her only if they still can't get a satisfactory answer. "Make sure students support each other. Don't try to do everything yourself," she says.

**Identify and support struggling students.** Research suggests that almost every student

experiences some type of 'performance penalty' – they earn a lower grade than they might have otherwise, or fail to complete the course – when they switch to remote learning, even under the best circumstances, says Reich (C. M. D. Hart *et al. Educ. Finance Policy* 13, 42–71; 2017). "It's worse for the most vulnerable students." To identify those students, instructors can ask whether class members have adequate Wi-Fi and access to devices, and how concerned they are about the transition to online learning. Reich says that the most successful virtual teachers conduct frequent assessments, and check in by phone, text or e-mail with each student – most often with those who are struggling.

"We should not bring a 'sink or swim' approach to online teaching," says Reich. "It's not the right attitude for a pandemic."

**Virginia Gewin** is a freelance writer in Portland, Oregon.

# GENDER-EQUITY AUDITS URGED FOR GRANT RECIPIENTS

US national academies propose that funding agencies vet institutions' policies to include and promote women. **By Chris Woolston**

**T**he US national academy is urging funders to subject institutions to 'equity audits' to increase the representation of women – especially those from minority ethnic groups – in science, technology, engineering, mathematics and medicine (STEMM).

Among other recommendations in a 200-page report, the National Academies of Sciences, Engineering, and Medicine proposes that, as part of the grant-evaluation process, funding agencies conduct thorough examinations of institutions' policies to promote gender equity. In theory, institutions would do more to improve gender equity if funding were at stake, says Vivian Pinn, a member of the committee that created the report and the founding director of the Office of Research on Women's Health at the US National Institutes of Health in Bethesda, Maryland.

The report suggests that audit results be made available to the public, which could amplify the pressure. If institutions know many eyes are on them, they might come to see equity as "more important at all levels of leadership than perhaps it was in the past", Pinn says.

In practice, she says, it would be impossible to force funding agencies to police all the institutions they support, and any sort of

formal system with passes and fails would be impractical. But, she adds, the mere concept of an equity audit could encourage institutions to pay closer attention to gender equity in recruitment, retention and advancement.

Equity audits could be especially effective if they were supported by real resources and positive incentives for change, says Sindy

**"Institutions might come to see equity as more important at all levels than perhaps it was in the past."**

Escobar-Alvarez, the senior programme officer for medical research at the Doris Duke Charitable Foundation in New York City. She and her colleagues discussed how funding agencies can promote gender equity last year in *The Lancet* (S. N. Escobar Alvarez *et al. Lancet* 393, E9–E11; 2020).

Escobar-Alvarez warns that equity audits could also have unintended consequences. If history serves as a guide, she says, it's likely that women would bear much of the administrative burden. "Female faculty members might be tasked with gathering and analysing

the data for an equity audit more often than men," she says. "Such efforts would require a great deal of time and could take women away from research and teaching activities that help to get them promoted."

Escobar-Alvarez adds that funding organizations don't need a formal auditing system to work closely with institutions. For example, her organization has started a Fund to Retain Clinical Scientists, which provides money to help support early-career faculty members with childcare or other caring responsibilities. Participating institutions include Duke University in Durham, North Carolina; Yale University in New Haven, Connecticut; and Johns Hopkins University in Baltimore, Maryland.

The National Academies report points to fundamental obstacles facing women in STEMM, including bias, discrimination and harassment. Until those factors are addressed, equity audits can only do so much, Pinn says.

"This isn't about 'fixing' women," she says. "This is about changing the institutional organizations in which they have to survive. The system needs to be more accommodating and more supportive."

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