

## Online Courses Can Improve Life on Campus

The future of on-campus learning lies in the right combination of digital and traditional tools

Robert A. Lue

When I taught my first online course more than a decade ago, I was an oddity in my department. My primary motivation was to share information about the biology of HIV as part of an overall effort to combat the many misconceptions surrounding AIDS in the public mind. The course was made up of video captures of in-class lectures that were transmitted to the world as part of our continuing education programs.

Today the situation is markedly different. In May 2012 Harvard University and the Massachusetts Institute of Technology announced the creation of edX, an institutional partnership aimed at expanding access to high-quality education through online classes while also transforming teaching and learning on our respective campuses. Faculty interest in online teaching has climbed, even as healthy dialogue continues on the potential impact of making these classes so widely available on the Web.

Online classes are not just about sharing educational materials via the Internet; they are also about developing new ways of teaching based on those materials for both on-campus and online audiences. Many of my colleagues are already applying digital tools from online courses in an effort to transform student experiences here in Cambridge, Mass. For example, every video tutorial and interactive assessment developed for David J. Malan's introductory course to computer science fully supports Harvard undergraduates in his on-campus course. The software, which he designed to give students instantaneous feedback on the quality of their code, is as useful for students on campus as it is for those online. Likewise E. Francis Cook and Marcello Pagano of the Harvard School of Public Health developed a novel online course in biostatistics and epidemiology that they will use this fall to support a flipped classroom model—in which students watch lectures or other course material online and come to class for active discussions with instructors and peers.

The rapid evolution of digital resources such as video, interactive multimedia and new modes of assessment challenges us to reimagine what we can and should do when we are face-to-face with our students. As I develop an online course on cellular metabolism, for instance, I hypothesize that the combination of animation with embedded and self-paced assessments will communicate the intricacies of electron transfer more effectively than that portion of my traditional lecture. After rebalancing class assignments to include both reading and online materials while maintaining the same overall workload, I nonetheless gain time with my students in the classroom to discuss and critically analyze the metabolic consequences of experimentally disrupting electron transfer. In other words, I can spend more time on the concepts that are most challenging for my students. In this regard, the flipped classroom may provide students with greater and more effective faculty attention than ever before.

Underlying all these exciting efforts is the awareness that experimentation is key and that we do not yet know how to best harness the enormous positive potential of the online revolution for on-campus

learning. This is why every course or module in HarvardX—Harvard's university-wide digital-education initiative that includes participation in edX—has an associated research component. We measure student progress as it relates to the sequence of course material, how that material was delivered (that is, lecture versus video animation), whether the instructor used interactive assessments, and other parameters. Such complementary research with each online course will form the basis for improvements in pedagogy both online and on campus. Indeed, institutions of higher education must engage with this process of exploration if we are to develop effective new models that broaden access to high-quality educational content while sustaining and indeed growing the in-person structures that support the joint enterprise of research, scholarship and teaching.

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