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Edward  
Tenner

## Higher Education's Internet Revolution

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Are Massive Open Online Courses (MOOCs) a failure? Two years ago, their advocates predicted a revolution in higher education, with courses by the world's leading lecturers offered free, or at low cost, to tens or even hundreds of thousands of students, sometimes even for credit. Was this the answer to escalating tuition and

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crushingly high levels of student  
debt?

The initial numbers were remarkable. Sebastian Thrun, a Stanford computer science professor famous for his contributions to self-driving automobiles, co-founded an online education company called Udacity and offered a free course on artificial intelligence that had an initial enrollment of more than 150,000 students. It was soon joined by another for-profit, Coursera, and a nonprofit founded by Harvard and MIT, edX. At least in the sciences, MOOC professors do their best to go beyond the series of recorded lectures that have long been available by offering tutorials and exercises aimed at developing skills as conventional courses do. There are often "mentors" who have roles similar to those of teaching assistants, and final examinations given on an honor system. One investor, as quoted in the magazine *Fast Company*, described the program as "Harvard on a piece of glass" that

could reach even poor farm children in Africa if they could only be supplied with tablets.

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For all this enthusiasm, in a profile in Fast Company's December 2013/January 2014 issue, Thrun makes a sudden and widely noticed retreat. A Google vice president as well as an academic, he believes in the power of data, and to him MOOCs' low completion rate paints a stark picture. Only five out of every 100 enrolled students completed his course with a passing grade. "We don't educate people as others wished, or as I wished. We have a lousy product," he said. "It was a painful moment."

At least partly as a result of Thrun's disappointment, Udacity has shifted its focus to more immediately usable

skills, its courses underwritten by corporations hoping to expand their pools of qualified job candidates. For MOOCs in the humanities, where the conventional lecture format prevails, MOOCs appear to some critics not as an assault on elite academic privilege but as an entering wedge for cost-cutting elimination or downgrading of faculty positions. Far from weakening the Ivies and Stanford, critics believe, MOOCs could become tools of hegemony. Jonathan Malesic, a professor of theology at King's College in Pennsylvania, warns that MOOCs are incompatible with Roman Catholic colleges' belief in moral and spiritual education and the faculty's face-to-face understanding of each student as a person. And Philip G. Altbach, an international education specialist at another Catholic university, Boston College, believes that through MOOCs, third world children might become victims of intellectual colonialism.

Enthusiasm and fear thus go together. But the real threat to faculty members,

especially younger professors, isn't the MOOC at all, it's the profession's growing stratification and creation of a permanent adjunct underclass, like the split between elite law firm partners and contract attorneys. The global scope of MOOCs gives an advantage to renowned researchers like Thrun, to the disadvantage of the many outstanding teachers without such visibility or resources for course development. And the real problem of MOOCs may not be the low completion rate either. In fact, Professor Thrun's program, without screening or prerequisites, did well indeed: it yielded fully 7,500 successful students. That's more than twelve years' enrollment in Stanford's most popular on-campus computer science course, CS106a. Judging from comments by MOOC students, it appears that many register to sample a number of courses and complete only the minority that interest them strongly enough. That's a feature, not a bug, of the genre; dropping courses can be a costly ritual in conventional universities. Besides, low yields are

part of elite education: Stanford accepted only 6.6 percent of applicants in 2012.

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With systematic feedback from students of different backgrounds, I'm sure that MOOCs can improve their yields both by modifying content and by better specifying background knowledge. It's inherently difficult to prepare a course for a diverse audience with different levels of preparation, as I learned when I gave a course in the history of information as a visiting lecturer. Colleagues in history liked my [syllabus](#), but I assumed too much from those students coming from the sciences.

The best argument for MOOCs *and* the best illustration of their problems may have been made in a recent [lecture](#) by Princeton computer

science professor Robert Sedgewick. As the Chronicle of Higher Education has noted, Sedgewick was originally a skeptic but became an enthusiast. His course attracted 80,000 registered students. (It has exercises and a final examination but offers no certificate). What may surprise friends and critics of MOOCs alike is how much preparation the course required. These were not experimental lectures; as one of the pioneers of today's computer science education, Sedgewick has taught a course on algorithms for 40 years, and it has become one of Princeton's most popular, with 25 percent of students taking it. Despite this background, developing the MOOC was almost a full-time job. It took 50 to 100 hours of preparation for each lecture. Creating dynamic content illustrating the principles of the course, like binary search trees, demanded at least six different development tools. A successful MOOC at this point needs a big subsidy – from a foundation or corporate sponsor, from an institution, or from the instructor's and

volunteers' spare time.

Why invest so much effort in a still-unproven concept? Sedgewick makes a strong case. It's almost a truism that advanced technology ventures need to move aggressively, in this case to build enrollments, until it becomes ubiquitous — and then possibly profitable. That's one lesson from the rise of Amazon, Google, Facebook, Twitter, and others. (As recently as 2000, it was unclear how Google would ultimately support itself, as I recall from a futurist workshop in which I participated that year). Many more companies have failed, of course, but the greatest successes have followed what Amazon's Jeff Bezos called "regret minimization." For the MOOC professor, the incentive is the chance to influence the field. It's self-defense, too. As Sedgewick said, "I wouldn't want anyone else to be the first to put an algorithms course out there."

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In the end, the biggest surprise about MOOCs is how conservative they are. They work to the advantage of elite universities, first in providing a social benefit at a time when some critics wonder whether they are truly charities, and second in further stimulating overseas interest in enrolling for the conventional residential course at full tuition. While in principle they increase opportunities, in fact a large proportion of students are professionals who already have degrees. And there's a third unexpected finding. Far from replacing conventional textbooks like Sedgewick and Kevin Wayne's Algorithms, fourth edition (600,000 copies sold), it has resulted in record orders. Sedgewick expects his royalties to double between 2011-12 and 2012-13.

MOOCs will succeed or fail depending on the willingness of gifted instructors to forge other

gilted instructors to forgo other opportunities. It would be more exciting if they were as transformative as some advocates claim, or as sinister as many critics fear. The prosaic fact is that a course, no matter how sophisticated its mode of delivery, is labor-intensive – for both the professor and the students. That makes MOOCs potentially valuable. It also makes the movement, for better or worse, self-limiting.

Edward Tenner is author of *Why Things Bite Back: Technology and the Revenge of Unintended Consequences and Our Own Devices: How Technology Remakes Humanity*. He is a visiting researcher in the Rutgers Department of History and the Princeton Center for Arts and Cultural Policy Studies.

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