The Potential for Online Learning: Promises & Pitfalls

By William G. Bowen

I am a convert. When I gave the Romanes Lecture at the University of Oxford in 2000, I concluded: "All the talk of using technology to 'save money by increasing productivity' has a hollow ring." I did, however, add the not-so-profound thought that "this could change." Indeed, when I delivered the Tanner Lectures at Stanford University in 2012, I stated: "Far greater access to the Internet, improvements in Internet speed, reductions in storage costs, and other advances have combined with changing mindsets to suggest that online learning, in many of its manifestations, can lead to good learning outcomes at lower cost."
Converts, though, can sometimes be overly optimistic. I would here like to temper the optimism for improvements in access and the acquisition of knowledge with a realistic discussion of opportunities, noting some pitfalls to be avoided. I will start by providing a few general reminders, followed by eight propositions for us to keep in mind as we look for ways to harness information technology through the medium of online learning.

Reminders

These are early days.

We cannot expect to have answers yet to the important questions about online learning. At this point, the most we can hope for is to have identified key questions, to have shown a willingness to test ideas, and to have demonstrated a readiness to modify approaches if doing so is indicated.

Much of the discussion about online learning has too breathless a quality. There is too great an inclination to declare sweeping success or dismal failure before we know very much. We need patience.

In the book *Higher Education in the Digital Age*, I told the story of the Black Horse, from *The Arabian Nights*: A prisoner who was about to be executed was having his last audience with the Sultan. He implored the Sultan: “If you will spare me for one year, I will teach your favorite black horse to talk.” The Sultan agreed immediately with this request, and the prisoner was returned to his quarters. When his fellow prisoners heard what had happened, they mocked him: “How can you possibly teach a horse to talk? Absurd.” He replied: “Wait a minute. Think. A year is a long time. In a year, I could die naturally, the Sultan could die, the horse could die, or, who knows, I might teach the black horse to talk.”

The world of educational technology continues to develop rapidly and could go in a great many directions. Although we cannot afford to do nothing, we need to proceed with caution; we also need to be prepared to find ourselves, at times, waiting to see how developments unfold. Maybe we will teach the black horse to talk.

Context matters.

Discussions about online learning should be placed squarely within a context shaped by the prospects for higher education in general—considering fiscal and political realities and the values and goals of the educational enterprise, both in the United States and around the world. It will not do to simply assume away serious problems, such as the fact that in the United States, the prospects for more generous state funding of higher education are bleak.

Ideological assumptions can be limiting.

Although we should be aware of the interests of key stakeholders, we should not be too quick to condemn what some in higher education may regard as impure motivations—for example, making money. Making money can be just fine, and even necessary for sustainability. We should focus more on incentives, on behavioral effects, and on outcomes than on who makes what kind of return on an investment. Glorifying nonprofits simply because they are nonprofits is a mistake. Some of us have learned (often, the hard way) that nonprofits, as well as for-profits, can behave abominably.

Similarly, we should be careful not to glamorize “open” systems just because they are open, and we should be careful about uncritically accepting assumptions such as “information wants to be free.” As economists keep insisting, nothing is really “free.” We must not forget what is needed to create content and what is needed to sustain digital resources. My worry about MOOCs (massive open online courses) right now is not that they are too heavily focused on making money but that they may not be sufficiently focused on generating the continuing flow of resources needed to maintain, upgrade, and sustain their offerings.

Propositions

1. We need to distinguish among target populations.

Much of the discussion around MOOCs is marred, in my view, by too much of a tendency to search for a single grand narrative. “To disrupt or not to disrupt” is hardly the way to frame any discussion of online learning, especially when there are so many variations in modes of delivery and so many variations in target populations, with different needs and priorities.

Absolutely crucial is the distinction between the needs of individual learners and the needs of the institutions—colleges and universities—that are currently in the business of teaching students and awarding degrees. Providers of new forms of online teaching are going to evolve differently depending on whether they are primarily providing courses directly to individual learners (a business-to-consumer offering) or are primarily providing courses and services to academic institutions (a business-to-business offering). Both approaches will develop in this marketplace, and both are likely to have real impact.
Can MOOCs serve what are, in effect, two quite different masters—organizations as well as individual learners?

There are, of course, major differences within each of these two broad categories: individual learners and institutions. Individual learners, whether in the United States or abroad, face a variety of constraints and have a variety of objectives. Many MOOC students live in countries where educational capacity is very limited—for example, in Africa or India. Both the availability of educational offerings and the educational funding models in these countries are generally very different from those found in most of the United States. In these settings, providing access to a wide selection of good content is key. We know now that, at the minimum, online offerings stimulate learning among a large, underserved population—which is a terrific benefit. But the content and delivery systems appropriate for much of this population may differ from what is appropriate in other contexts. This is significant because many U.S. colleges and universities want to reach an international population (either directly or through outposts abroad), and online learning can be an important way of doing so.

As noted, individual learners differ markedly in their objectives:

- Some want to learn simply for learning's sake.
- Others are trying to earn a certification that might help them in their careers. In the United States, and also in other countries, “non-traditional” students are especially likely to be limited in their educational options because of their location or work/family obligations. For many of these individuals, the choice is not attending a residential college or taking an online course; their choice is taking an online course or doing nothing.
- Still other individuals who are currently attending a traditional college or university see MOOCs as a way of assisting them in the pursuit of their degrees, perhaps by allowing them to complete their programs more quickly and at a reduced cost. Certifying the quality of course offerings and of individual students' accomplishments is especially important to many of these students, as well as to some students who are not affiliated with individual colleges or universities.

As for differences within institutions, at one corner of the educational landscape is a set of “elite” institutions: selective, relatively wealthy, mostly but not all located in the United States, with mostly resident students. These institutions may not have a pressing need for online learning, but they can benefit from exposing their students to online pedagogies—and there is certainly everything to be said for improving the teaching process in all settings. Many faculty members at these institutions are likely to be the producers of much online content (though certainly not all of it)—and of content that will often be used more extensively elsewhere than “at home.”

Then there is a residual, “other” set of educational institutions, both public and private, that are less privileged and more hard-pressed financially than those in the “elite” set. A highly varied population of students attends this highly varied set of institutions. I believe that the biggest generic challenge for MOOCs is to demonstrate that they can provide real value to these institutions—which, after all, educate the lion's share of undergraduate students in the United States. There are important subsets of colleges and universities within this huge, rather amorphous category, and special attention should be paid to (a) state university systems offering BA degrees; (b) regional private colleges and universities; and (c) community colleges. All of these subsets serve large numbers of non-traditional students. It is far from obvious that MOOCs can adapt easily (or effectively) to the needs of these institutions qua institutions. Can MOOCs serve what are, in effect, two quite different masters—institutions as well as individual learners? Right now, no one knows the answer to this key question.

The question is enormously important precisely because this potpourri of institutions matters greatly. Institutions in this second, larger set are—and will remain, for the foreseeable future—both the main assessors of student achievement and the organizing vehicles through which educational resources, including student aid, are channeled. MOOCs and other online learning providers must work closely with these institutions, attempting to meet their all-too-real needs, and must not simply ignore or bypass them. I am a great admirer of the elite research universities, having lived most of my professional life within one of them, but I have to say that what happens within the far broader amalgam of other sectors is at least as important—and quite possibly more important—from the perspective of the future of online learning.

2. Different pedagogies are right for different disciplines.

Sophisticated “adaptive learning” methods of machine-guided instruction are a highly promising way to teach basic concepts in subjects such as beginning statistics, in which there are agreed-upon answers to questions such as “What is a t-test?” or “What is a confidence interval?” Candace Thille and her colleagues at the
Open Learning Initiative (http://oli.cmu.edu/) have been the pioneers in using cognitive science and masses of data on how students learn (and what mistakes they commonly make) to create a pedagogy that is rich in feedback loops and highly structured “hints.” My ITHAKA colleagues and I have conducted research demonstrating the potential that this kind of teaching can hold for mainstream public university campuses.1

This is, however, a complicated and expensive pedagogy to develop, and I suspect it can be justified in only a limited number of situations. But it should scale well, and when offered in a hybrid mode (with a limited amount of face-to-face support for students who need help staying on task), it should be valuable for attacking one of the most vexing problems in higher education today—namely, how to get much larger numbers of students successfully through gateway courses in fields such as math and statistics, in a reasonable amount of time and at a reasonable cost. My guess—my hope—is that this kind of adaptive learning will evolve over time.

In addition, online technologies of various kinds can impact courses other than those teaching material that “has a single right answer.” But we should not spend scarce resources attempting to mimic the approach that works in statistics for instruction in discursive fields less well suited to it. I am now convinced that approaches other than the adaptive learning model—especially peer-to-peer interactions made possible by ubiquitous access to networks of online learners—can work well in discursive fields such as literature and international affairs. Certainly the success of courses of this kind is encouraging. These approaches are also less expensive to develop than interactive instruction. Here too, however, there is much work to be done: in improving both online forums (the aggregation of threads and the sorting of comments) and the presentation of material. This will happen. Indeed, it is happening. The pace of experimentation is breathtaking. My plea is that experimentation be accompanied by rigorous assessment of outcomes—preferably by disinterested third parties.

3. A limited degree of “local” customization of online courses is important and should be facilitated.

The ITHAKA study of barriers to the adoption of online courses emphasizes the need to allow some degree of customization if faculty are to be persuaded to use online pedagogies.4 Providers of the platforms and of the core content in basic courses need to assign a high priority to facilitating at least a modicum of customization. “Local” faculty should by all means be able to enrich basic course content and make it more applicable to local circumstances—but they should not feel a need to start from scratch. A careful balance needs to be struck. Not all wheels need to be reinvented, and I continue to believe that the centralized development of basic course “scaffolding” makes all kinds of sense. Coursera (https://www.coursera.org/) is doing yeoman work of this kind, and its basic platform development nicely complements the discipline-specific add-ons that individual colleges and universities are well positioned to provide. EdX (https://www.edx.org/) is also seeking to create a platform that will meet this need.

4. It is critically important that we assemble more real evidence, from more rigorous research, concerning the learning outcomes associated with online offerings.

A March 2013 survey of college and university presidents by Inside Higher Ed found: “Presidents remain unpersuaded by, if not skeptical of, MOOC mania. Only 14 percent of presidents strongly agree, and another 28 percent agree, that massive open online courses have ‘great potential to make a positive impact’ on higher education; 31 percent disagree or strongly disagree, and the rest are neutral.” The presidents were much more optimistic about the potential of a number of other innovations, so they were not just being skeptical about everything.

It is appalling how little is actually known about the learning outcomes produced by various forms of online learning. My colleague Kelly Lack has produced a comprehensive review of the literature on this subject; her work reveals the lack of solid research (especially on undergraduate student populations at mainstream public universities).6 Failure to control for selection effects is a major shortcoming of most studies; the use of small sample sizes is another. There is also a distressing dearth of reliable third-party assessments. Assertion, anecdotes, and self-study take us only so far. We especially need to look rigorously at differences in outcomes for student subsets defined by socioeconomic status and academic background, as demonstrated by the findings of a February 2013 study noting that specific subgroups of students taking online courses—including those who are younger and/or have lower GPAs—perform worse than their peers on indicators of course grades and persistence.

Having labored in this vineyard myself, I know how hard it is to do this research. We must keep looking for cost-effective ways of conducting rigorous studies that are manageable. We need to take a reasonably long time-horizon and be at least somewhat patient. The desire for instant results, for instant gratification (which is common among college and university presidents as well as among producers of content), has to be tempered by an understanding of how important it is to get things right and to amass evidence that will impress skeptics.8
5. We must focus self-consciously, and relentlessly, on controlling educational costs.

I continue to be more bemused—actually, I am dismayed—by the lack of attention being paid to the implications that online learning can have on educational costs (for both institutions and students). To be sure, talking about the need to control costs can be unpopular and may seem to be less forward-looking than talking about the desirability of reaching more students and teaching in new and exciting ways. But we dare not just keep gilding the educational lily—such an approach risks further erosion of public support for the entire educational enterprise. It is entirely possible that more demonstration, by educational institutions themselves, of commitment to the intelligent pursuit of cost-effective ways of educating students would increase the public's confidence in the ability of these institutions to change and would also increase political support for at least somewhat more generous state funding.

Faculty members understandably fear job losses, as Professor Albert J. Sumell, at Youngstown State University, cogently and sympathetically explains in an article aptly titled “I Don’t Want to Be Mooc’d.” Although there are ways of minimizing such risks of job loss (e.g., by redeploying faculty to higher-value tasks and by teaching more students), we have to be prepared to contemplate shifts in faculty ranks—both in overall numbers and in composition. We also have to recognize the implications of such possible changes for graduate education and for what is called “departmental research.” John Hennessy, at Stanford University, is one of the few leaders in higher education willing to be brutally candid in talking about such subjects.

The plain fact is that a combination of fiscal and political realities will continue to put inexorable pressure on the economic structure of higher education in the United States, especially in the public sector. Although an intelligent reexamination of tuition policies and financial aid policies can be of some help, I do not think there is any way to avoid thorough-going efforts to raise productivity—both by reducing the “inputs” denominator of the productivity ratio and by raising the “outputs” numerator.

Just as we need more and better studies of learning outcomes, we also need sophisticated studies of possible ways to control costs. Simulations of future steady-state options are definitely in order, because we know that contemporaneous comparisons of the costs of online learning models and various face-to-face models are flawed by the fact that the costs of doing almost anything for the first time are greater than the costs of doing the same thing for the nth time.

It can be possible, over time, to loosen constraints and improve how we utilize new technologies.

The greatest opportunity to raise productivity lies in an imaginative rethinking of how to schedule courses, how to make more efficient use of fixed plant, and how to facilitate the flow of students through what should be viewed as an “educational system,” not a static set of programs and rigid scheduling conventions. The real trick is to use technology to both raise completion rates and reduce time-to-degree. And the place to begin is by embracing the desirability of such efforts.

6. System-wide thinking is required; many of the most challenging questions for our educational system cannot be addressed on a single-campus basis.

This proposition follows directly from what I just said about scheduling and flow through the system. In New York, the City University of New York (CUNY) has been courageous, as well as thoughtful, in directly taking on these challenges through its Pathways initiative (http://www.cuny.edu/academics/initiatives/pathways.html). In the fall of 2013, all students in the system are required to complete 30 general education “Common Core” credits; each CUNY college can also require bachelor’s degree students to take another 6 to 12 general education “College Option” credits. Once fulfilled at one CUNY college, these general education credits will carry over if a student transfers to another CUNY college.

External certification of knowledge acquisition can be an important part of the process of thinking and acting system-wide. I applaud the decision by the College Credit Recommendation Service (CREDIT) of the American Council of Education (ACE) to review MOOCs for recommendation, and I hope that we will not be too timid in pressing ahead in such directions. But as Richard Ekman, the president of the Council of Independent Colleges, keeps reminding us, the overall structure of an educational program matters greatly: education should consist of more than simply passing a miscellaneous set of individual courses. Ekman has noted: “I worry a lot about the coherence of degrees. There’s got to be an informing philosophy of education.”

A major problem in many settings is the difficulty that students experience getting into—and getting through—gateway (“bottleneck”) courses. In California, budget constraints forced community colleges to turn away about 500,000 students. In an effort to address this problem, Democratic State Senate President Pro Tem Darrell Steinberg devised a plan to require public colleges to award credit for work done by students in online
programs unaffiliated with their colleges (sometimes called “outsourcing”). Steinberg’s plan included a provision for a nine-member council of faculty members to decide which courses would qualify for this program. Not surprisingly, faculty opposition to the plan surfaced quickly. Faculty prefer that the state simply fund more “regular” offerings on their campuses, but it is far from obvious that this is a practical alternative given the fiscal realities in California.

This may be the right place to address another pervasive problem that no one wants to talk about: the preoccupation of many in academia with what may soon be outdated notions about status. The more thoughtfully integrated system of higher education that I envision contemplates different roles for different players (both institutions and individuals) and values complementarities. It may well be that some individuals and some institutions are better positioned to be leading “producers” of content than are others, and it may well be that some individuals and some institutions are better positioned to be extremely skillful consumers of content that originated mostly, if not entirely, elsewhere. My argument is simply an argument for taking advantage of division of labor and economies of scale. I certainly do not mean to suggest that there are “superior beings” or “superior institutions” preordained to do the really creative work. Different kinds of talent exist almost everywhere, and we should be careful not to exclude people (or institutions) from some kinds of tasks for arbitrary reasons linked to wrong-headed notions of status. In fact, I suspect that market mechanisms will help achieve this sorting of people, institutions, and functions—a result that seems to me to be desirable and efficient from a system-wide perspective. At the same time, refusing to recognize the existence of institutional differences would be foolish. Some places are fortunate to have an unusually powerful combination of intellectual and financial resources—a combination that is sometimes tied to scale and even to institutional culture. If the institutions especially well positioned to make significant contributions to course content and delivery mechanisms do so effectively, all of higher education will benefit.

Human nature is what it is, but I think we should at least try to resist “above and below the salt” thinking. At the end of some future day, the real kudos may go to the highly creative institutional assemblers of organizational ideas, intellectual content, and a variety of pedagogies. There should be a real pay-off to institutions that are especially skillful in harvesting content provided by others and then adding educationally-rich value of their own, including mentoring and directed study.

7. New thinking is needed on faculty roles and on optimal organizational and decision-making mechanisms.

Over dinner at an MIT/Harvard edX gathering, one of MIT’s leaders and I had a lively discussion regarding the biggest challenges for the further development of MOOCs. He was naturally focused on technical issues, which are of course real and challenging. Fortunately, lots of big brains are focused on them. But I have come to believe, more and more strongly, that the effective adoption of online pedagogies is going to require new thinking about decision-making in academia and about the role of faculty. In my view, the organizational and decision-making challenges are at least as daunting as—maybe more daunting than—the purely technical challenges.

I question whether the “shared governance” models that have been developed over the last century are well-suited to the digital world. Shared governance often means dividing up tasks in seemingly clear-cut ways: leaving “corporate” decisions of one kind or another entirely in the hands of trustees and placing “academic” decisions entirely in the hands of faculty. But if wise decisions are to be made on key topics such as teaching methods, the decisions must be made by a mix of individuals from different parts of the institution: including faculty leaders but also others who are well-positioned to consider the full ramifications of the choices at hand. Relying on the compartmentalized thinking that too often accompanies the decentralized modes of organization to which we have become accustomed leads to real dangers.

Given the institution-wide stakes associated with judgments as to when and how digital technologies should be used to teach some kinds of content, there is a strong case to be made for genuinely collaborative decision-making that includes faculty, of course, but that does not give to particular professors, or even to particular departments, full authority for determining teaching methods. There are too many “spillover” effects. In the digital age, faculty are dependent on tools that are available via an infrastructure that serves users across classes, courses, departments, and at times even institutions. The days are over when faculty can expect to have complete control over the tools they use. Faculty operating in online environments will find it more and more difficult to speak of “my course.”

Specific organizational solutions will vary from institution to institution, but the general principle is clear: some centralized calibration of both benefits and costs is essential. In a less complex age, leaving almost all decisions concerning not just what to teach, but how to teach, in the hands of individual faculty members may have been sensible. But it is by no means clear that this model is the right one going forward. The mainstream academic community needs to take up this issue and address it before
"outsiders" dictate solutions. To repeat: faculty involvement is essential. There is a self-evident need for consultation with those who are experts in their disciplines and experienced in teaching—but this does not mean that faculty should be given veto power over change.

Questions concerning the exercise of proprietary rights and of "ownership" more generally have to be thought through very carefully. Google has taught all of us the economic value of exploiting huge amounts of proprietary data to create, in Google's context, opportunities for highly targeted advertising. Online learning—MOOCs specifically—is generating and will generate masses of valuable information on how students learn. For those who harvest such data, it must be tempting to maintain their proprietary status by using the data to improve their own teaching resources. But there is also a "public good" aspect to such data, and a case can certainly be made for creating some kind of public depository so that all scholars and teachers can use the data to improve learning outcomes.

Another set of issues that deserves much more thought is how intellectual property rights in content should be regarded. This issue ties in directly to the question of whether and how MOOCs will be repeated. What happens if the creator of a particular MOOC moves from one institution to another? If the MOOC creatorretires or dies? As one experienced student of online learning (Ira Fuchs) commented to me: "Coursera has hundreds of wonderful courses, but if I can't tell people about one with the expectation that they can take it in the future, then MOOCs will never have much impact."

I am reminded of a similar issue that JSTOR had to confront early on. JSTOR (http://www.jstor.org/) was offering to make, and keep available, electronic back issues of journals; if libraries were to redesign themselves (as many have), they had to be supremely confident that the electronic back issues would always be there. JSTOR developed specific contractual language to address this issue and set aside resources to guarantee that it could do what it said it would do. I suspect that MOOCs will soon need to confront a variant of this question and wrestle with how they are going to generate a predictable stream of sustainable resources so that they can constantly upgrade, as well as maintain, their offerings.

8. Stratification worries deserve much more attention than they receive.
I find it more than mildly ironic that a wonderful technological advance designed to improve access to high-quality
content worldwide could conceivably end up being used (“abused”) in ways that actually widen gaps in educational opportunity and achievement in the United States.

In delivering the Robert H. Atwell Lecture at the 2013 ACE annual meeting, Brit Kirwan, the chancellor of the University System of Maryland, bemoaned the difficulty we are having in “making real” the American Dream—the belief that a person’s status at birth should not determine his or her status throughout life. The facts are sobering. According to Chancellor Kirwan: “A child born into a family in the highest quartile of income has a roughly 85 percent chance of earning a college degree. A child born into a family in the lowest quartile of income has a less than 8 percent chance of earning a degree.” That is a tenfold difference! Studies at Stanford University and at the University of Michigan find that education gaps between the rich and the poor in the United States are growing, not shrinking, and Kirwan reminds us of OECD data showing that “children of less-educated parents in the U.S. have a tougher time climbing the educational ladder than in almost any other developed country.”

The Nobel prize–winner Joseph Stiglitz has called equal opportunity “our national myth.”

Unfortunately, the facts are all too clear. There is a growing stratification within higher education in the United States, with widening gaps not just between students from different socioeconomic backgrounds but also between institutions. For reasons too complicated to go into here, the resources available to the wealthiest institutions have grown more rapidly than the resources available to institutions down the line.

How does this connect to online learning? The promises that online learning offers, including the promotion of educational opportunity worldwide, could simultaneously have the perverse effect of widening the gap between the “haves” and “have-nots” in U.S. higher education. In my view, the intelligent application of new technologies will almost certainly improve education at the most privileged places. Is it likely that esteemed liberal arts colleges or the most selective residential universities will allow online approaches to de-personalize instruction and deprive future generations of students of the wonderful residential experience characteristic of these places? No way!

There will always be a coterie of families willing and able to pay the price for this special kind of education, almost regardless of cost. As a believer in “revealed preference” (the notion that people reveal their beliefs through their actions), I am mightily impressed by the extraordinary number of applicants to the most selective and expensive institutions. But as everyone agrees, the children of affluent families are much more likely than other children to have not only the wherewithal to attend but also the requisite qualifications for admission—in part because affluent families generally invest both far more money and far more time in the educational preparation of their children. Because of generous financial aid, the mix of students at the most selective colleges and universities will include some number of highly talented individuals from poorer families. Yet how many such students are there likely to be in this increasingly rarified subset of U.S. higher education? The overall number is going to be very, very small. So, as Stiglitz has put it, the problem is not that “social mobility is impossible, but that the upwardly mobile American is becoming a statistical oddity.”

Recent pronouncements by the governors of some states lead me to worry that the assumed promise of online education—and the overhyped promise of extremely rudimentary online education that lacks any face-to-face component—could do real harm. States will be tempted to use relatively inexpensive online programs to serve the less-affluent, less-prepared segment of potential college-goers. It is critically important to remember that there is enormous variation in the quality of online learning. Some consists solely of PowerPoint slides and textbook assignments posted online. Imposing such “courses” on poorly prepared students is hardly a promising path forward. If I am right in thinking that residential campuses and the other advantages offered by the more selective sector of higher education will continue to confer major benefits on those privileged to attend them, it is not hard to envision the “haves” continuing to gain considerable ground on the “have-nots.” In short, excessive belief by some in the value of minimalist online approaches to learning, and the temptation to use the allure of online learning to justify a further defunding of public higher education, could lead to an even more bifurcated system of higher education in the United States.

Let me not end on a down note. I am optimistic that the world at large will be a far better place because of online learning—and because of MOOCs. But for that to happen, we need to be able to take full advantage of the wonderful, if problematic, opportunities provided by ingenuity and technological prowess. And we must include in our calculations the needs of the less privileged. At the end of the day, we have to ask ourselves...