

I T H A K A

The 'Cost Disease' in Higher Education: Is Technology the Answer?

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Costs and Productivity in Higher Education^{*}

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As my wife keeps reminding me, I have a Don Quixote-like tendency to flail away at windmills—to take on topics such as race in America and affirmative action; the insidious problems with college sports at all levels, including Division III and the Ivies (which cause me to cringe whenever the NCAA refers to its legions of “student-athletes”); and, yes, the unforgiving economics of labor-intensive “industries,” such as the performing arts and higher education. But, my DNA is what it is, and so I am now adding to this list the potential implications of online learning for college costs.

Context matters, and I will begin, in this first lecture, by outlining as succinctly as I can aspects of the economics of higher education that are relevant to my topic:

- trends in costs, the “cost disease,” and how to think about changes in productivity;
- other forces, some deeply ingrained in the fabric of higher education, that also push up costs; and
- growing worries about affordability, especially in the public sector, where reductions in public support have been coupled with significant increases in tuition.

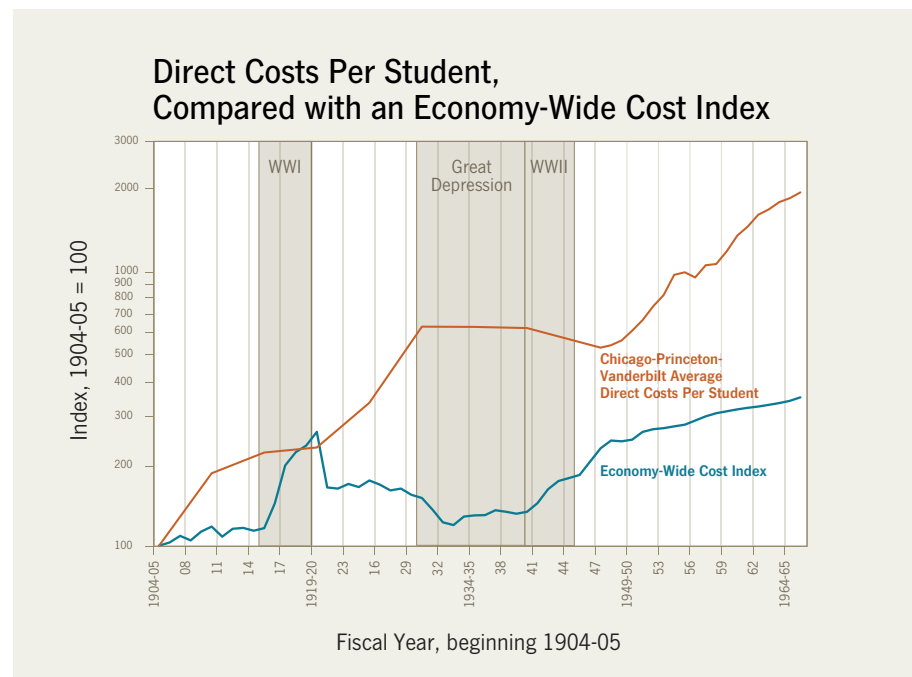
Then, in my second lecture, I will tell you what I think—or, better said, what I suspect—about the variety of approaches to online learning that are everywhere present, including of course at Stanford and at Stanford spin-offs such as Coursera and Udacity. Is there, as President Hennessy has suggested, a tsunami of some still ill-defined kind coming? Is it realistic to imagine that online learning is a “fix” (at least in part) for the cost disease? Throughout, I will try to maintain a “system-wide” perspective.

Cost Trends, the “Cost Disease,” and Productivity in Higher Education

It is fitting that I am giving this talk in close proximity to Clark Kerr’s neighborhood, since it was President Kerr, in his capacity as Chairman of the Carnegie Commission on the Future of Higher Education, who commissioned a study of mine in the mid-1960s that became *The Economics of the Major Private Universities*. In that study I documented the seemingly inexorable tendency for institutional cost per student (which is of course different from tuition charges, though obviously related) to rise faster than costs in general over the long term. Kerr christened this finding “Bowen’s Law,” although he was, he said, “originally skeptical about it.”¹

What is important today is not the exact numbers contained in that study (which was based largely on a detailed examination of the experiences of the University of Chicago, Princeton, and Vanderbilt between 1905 and 1966) but the underlying pattern, which has been found to hold for public as well as private universities, and for colleges too. I reproduce here, as something of an historical relic, a figure from my Carnegie study (re-labeled as Figure 1). The figure shows that, excepting war periods and the Great Depression, which require separate analysis, cost per student rose appreciably faster than an economy-wide index of costs in general. The consistency of this pattern suggested to me then, as it does today, that we are observing the effects of relationships that are deeply embedded in the economic order.

Figure 1



Running through all the factors at play (and there are many, as I will indicate shortly) is a key proposition that my teacher and life-long friend, William Baumol, and I first articulated in our study of the performing arts which also dates from the mid-1960s.² The proposition is known to this day in the literature as

“the cost disease.” The basic idea is simple: in labor-intensive industries such as the performing arts and education, there is less opportunity than in other sectors to increase productivity by, for example, substituting capital for labor. Yet, over time, markets dictate that wages for comparably qualified individuals have to increase at roughly the same rate in all industries. As a result, unit labor costs must be expected to rise relatively faster in the performing arts and education than in the economy overall.

Robert Frank provided this succinct explanation of the cost disease as recently as March of 2012: “While productivity gains have made it possible to assemble cars with only a tiny fraction of the labor that was once required, it still takes four musicians nine minutes to perform Beethoven’s String Quartet in C minor, just as it did in the 19th century.”³ In short, productivity gains are unlikely to offset wage increases to anything like the same extent in the arts or education as in manufacturing; hence differential rates of increase in costs are to be expected—a finding Baumol and I reported for major orchestras at about the same time that my Carnegie study of higher education was underway.⁴

About a decade after the Carnegie study, I reported a similar pattern in my 1976 President’s Report at Princeton: “While prices in general have risen about 50% [over the last ten years alone], the most widely used price index for higher education has risen about 70%.”⁵ And this summer [2012], three-and-a-half decades later, Sandy Baum, Charles Kurose, and Michael S. McPherson reported basically the same pattern. They cite a careful study using data from the Delta Cost Project that shows that “education and related expenditures per FTE student increased at an average annual rate of about 1% beyond inflation at *all* types of public institutions from 2002 to 2008” [the most recent period reviewed by the Delta Cost Project].⁶ There is no need to burden this talk with more data about trends in institutional costs, which are notoriously hard to interpret in any case, in part because they often involve aggregations of various kinds. It is easy to get mired in the underbrush, and we do well to remember the admonition of the architect Robert Venturi: “Don’t let de-tails wag the dog.”

It is the public institutions that have suffered more than most of the private institutions, largely as a result of sharp cut-backs in state appropriations.

There is, however, a final big point to note about cost trends—namely, the reversal that has occurred in the last decade or so in the respective positions of private and public institutions. When I wrote my 1976 report from the perspective of the president of a private university, there was widespread concern about the then-widening gap in charges between the privates and the publics (with the privates becoming ever more expensive, relative to the publics). In those years, the privates were hit especially hard by the stagflation of the time, with its dampening effect on stock market values that in turn affected both returns on endowments and private giving. Today, it is the publics that have suffered more than most of the privates (and certainly more than the most selective privates), largely as a result of sharp cut-backs in state appropriations.

I am aware that thus far I have been using an important word—“productivity”—without defining it. Put simply, productivity is the ratio of outputs to the inputs used to produce them. But this formulation conceals at least as much as it reveals, since it is maddeningly difficult in the field of education to measure both

“outputs” and “inputs”—even within a single institution, never mind across institutions serving different missions. If only we produced standardized “widgets” or harvested blueberries!

As one illustration of how treacherous this terrain is, the National Academy of Sciences released last May a massive report of over 200 pages devoted to the measurement of productivity in higher education.⁷ A major virtue of the report, which in turn cites a voluminous literature, is that it debunks the idea that productivity in higher education is unidimensional. It warns against a multiplicity of dangers that lurk behind the use and misuse of (inevitably) simplified measures. The report insists that “quality should always be a core part of productivity conversations, even when it cannot be fully captured by the metrics.” It also emphasizes the complications stemming from joint production of outputs such as teaching and research, and the need to recognize a complex mix of inputs, including capital and student time.

In thinking about the implications of these myriad complications for the ways in which technology might impact the cost disease, I have been helped greatly by the authors of a recent piece in the *New England Journal of Medicine (NEJM)* who have captured quite skillfully factors that explain what is known as “the IT productivity paradox”—the apparent tendency, noted by Robert Solow of MIT in 1987, for computerization to fail to improve standard measures of productivity. Solow noted famously, “You can see the computer age everywhere but in the productivity statistics,” an observation said to have launched more than two decades of research into the sources of the paradox.⁸

The authors of the *NEJM* article argue that explanations for the IT productivity paradox fall into various categories. Under the heading of “mismeasurement,” they note that “important dimensions of service output such as accessibility and convenience—factors that are greatly improved by IT—are difficult to quantify and are rarely captured by productivity metrics.” For example, ATMs increased consumer convenience in banking, but this increased convenience, and all the time saved by customers, was not captured by traditional measures of productivity.

The authors go on to point out that: “In terms of ‘mismanagement,’ the introduction of new technologies usually forces reexamination of the assumptions that underpin less productive processes.” They give a telling example concerning the introduction of electricity in manufacturing: “[Early on,] factories simply swapped large electric motors for waterwheels and steam engines but retained inefficient belt-and-pulley systems to transmit power from the central power source. Real productivity gains came only after manufacturers realized that many small motors distributed throughout a factory could generate power where and when it was needed.”

This discussion, aimed at implications for the health industry, resonates with the uses of IT in education. You will think of examples as readily as I can (including the tendency in the early days of online teaching simply to mimic typical classroom teaching methods, often by video-taping lectures, rather than re-engineering the teaching process as a whole).

Information technology has been extremely consequential in higher education over the last 25 years, but principally in “output enhancing” ways that do not show up in the usual measures of either productivity or cost per student.

From the standpoint of our interest in the cost disease, it is critical to keep in mind that the productivity ratio has both a numerator and a denominator. Productivity improvements can be either “output enhancing” (raise the numerator) or “input-conserving” (lower the denominator). It seems evident that information technology has been extremely consequential in higher education over the last 25 years, but principally in “output enhancing” ways that do not show up in the usual measures of either productivity or cost per student. There has been an especially big impact on research output. Data management systems and powerful number-crunching capacities have permitted research that would have been simply impossible otherwise. Work in particle physics and studies of the human genome system are but two examples from the physical and life sciences. To cite a much more mundane example from the social sciences, the work that Derek Bok and I did on the effects of race-sensitive admissions would have been impossible without the construction of the College & Beyond database.⁹ More generally, advances in communications, the development of networks and of systems for managing text and exchanging perspectives with colleagues at a distance, have revolutionized how papers are prepared and revised—again and again! Yet these innovations do not show up at all in the usual measures of “output.”

Technology has also led to dramatic improvements in the scholarly infrastructure. If I may again cite activities that I know well, the creation of JSTOR (a highly searchable electronic database of scholarly literature) has changed fundamentally the way scholars use the back files of journals and has had profound effects on libraries.¹⁰ Similarly, ARTstor (a digital repository of high quality images) now permits art historians to study, for example, images of a Bodhisattva on the wall of a cave in Dunhuang, an oasis town on the Silk Road, alongside images of the same Bodhisattva on a silk painting at the Guimet Museum in Paris. It is worth emphasizing that these benefits generally do not accrue to the institutions that made the investments necessary to realize them. For example, the extraordinary time savings for scholars made possible by both JSTOR and ARTstor do not prompt the institutions that employ the scholars to harvest these savings by, for example, increasing teaching loads (unimaginable!).

Although faculty and students have certainly benefitted in many ways from easy Internet access, relatively little has happened with respect to classroom teaching—until quite recently. In my second lecture, I will suggest that we are only at the beginning of the kind of re-engineering that could in time transform important parts—but only parts—of how we teach and how students learn. Most fundamentally, I will argue that we need to improve productivity *through determined efforts to reduce costs—that we need to focus more energy on lowering the denominator of the productivity ratio.*

Factors Other than the Cost Disease Pushing Up Educational Costs

As important as I believe the cost disease to have been (and to be) in putting upward pressure on instructional costs, I certainly do not think that it is the sole villain. Let me now mention three other factors. I will be cryptic. The pressing constraint of time is a good excuse simply to allude to topics that deserve far more attention than I can give them.

Inefficiencies

I am not one of those who looks with disdain at how poorly managed colleges and universities are often alleged to be. (I have seen too much of other organizations in all sectors of the economy, including the for-profit sector.) Still, it is hardly surprising that the severe financial pressures of our time have led to renewed calls for more “business-like” approaches. One consulting firm has found that universities such as Berkeley, Chapel Hill, and Cornell are complex, decentralized institutions that could save money by simplifying oversight structures and centralizing functions such as HR, IT, and purchasing.¹¹

Educational institutions are good at adding things but not good at subtraction.

It is also true that educational institutions are good at adding things but not good at subtraction. Fixed costs are often truly fixed (cutting-edge scientific laboratories in narrowly defined fields, for example). Moreover, universities are collections of highly specialized talents that cannot be readily shifted from, say, teaching Russian to teaching Spanish. Institutional rigidities are facts of life that in many, though hardly all, cases derive from the very nature of the academic enterprise. It is harder, however, to defend antiquated organizational structures such as “centers” of one kind or another that are notoriously difficult to dismantle even when they have ceased serving their purposes. A good rule of the road is to use flexible structures such as workshops or “experimental colleges” that do not take on lives of their own.¹²

A still more controversial aspect of alleged “inefficiencies” on the academic side of the house is the scope of program offerings, the use of cross-subsidization to support low-enrollment programs, and the reluctance to use differential tuition pricing to ration costly offerings and encourage students to go into less costly areas. The “value” propositions at issue are vigorously contested and I can do no more here than recognize the importance of this debate.¹³

An Ingrained Desire to “Buy the Best”

Institutional proclivities are a powerful factor of a very different kind. Charles Clotfelter, in his detailed case-studies of costs at elite universities, found that there was a determination to spend whatever it took to excel.¹⁴ There is, indeed, a deep-seated commitment to enhancing institutional reputation. Given this mindset, the availability of resources is a strong driver of costs.¹⁵ Lawrence S. Bacow, former chancellor of MIT (and former president of Tufts), has said that at MIT, “the mentality was to do what we needed to do to make sure our students mastered the material, regardless of cost. ... We looked to reduce class size, increase teacher-student contact, do more hands-on learning, and so on. All the pressure in elite universities is to drive costs up.”¹⁶ Moreover, faculty and

students often “collaborate” to create inefficiencies. An example is Friday classes, which neither students nor faculty want; it is very difficult for presidents to prevent the demise of these classes when students and faculty agree on such an objective.

Competitive juices are everywhere evident, and I confess that I am conflicted in how I feel about this undeniable source of upward pressure on costs. In company with other economists, I believe that competition generally drives up quality, and that this is basically a good thing. The competitive (entrepreneurial) nature of American higher education stands in sharp contrast to what one often finds elsewhere and is, I believe, a key reason why many American research universities are the best in the world.¹⁷ In recent years, however, I have come to wonder whether, depending on its direction, there can be too much competition for the societal good. We have seen more and more stratification within higher education, with the wealthiest institutions distancing themselves from other very good, but not so wealthy, places.¹⁸ I believe this combination of increased stratification and a determination to “buy the best” can have some pernicious effects. For instance, wealthy institutions routinely make huge investments in the start-up costs of faculty hires in the sciences. This puts great pressure on other places that think of themselves as peers to match such outlays even if they have to divert funds from needy fields such as the humanities.

I worry, too, that the financial aid policies of wealthy institutions apply too much de facto pressure on other institutions to be extremely generous, thereby encouraging “quasi-merit-aid-wars” of dubious societal value. Students and their families complicate all of this by applying pressure of their own for more and more amenities (elaborate student centers and fitness facilities, dormitories that sometimes have features that 99 percent of the population can’t enjoy, and so on). Institutions feel that they have to satisfy the desires of full-paying affluent families who (not surprisingly) want more and more of everything, including more customization.¹⁹ This is hardly surprising in a society in which it is now possible to order highly customized clothing by clicking online. But, of course, the multiplication of choices is expensive. Still another complicating (I would say aggravating) factor is *US News* rankings which encourage institutions to put too much weight on maximizing their yields and keeping up their average SAT score even as more and more evidence casts doubt on the predictive value of these scores.²⁰

Institutions have an understandable interest in always improving themselves, even if the pursuit of immediate institutional self-interest cuts against larger societal interests. Still, the most privileged places should think hard about the ramifications of their actions.

There is a conundrum here. Institutions have an understandable interest in always improving themselves, even if the pursuit of immediate institutional self-interest cuts against larger societal interests. Still, the most privileged places should think hard about the ramifications of their actions. When I spoke at the installation of Morton O. Schapiro as president of Williams College, I used a quotation from the Midrash Tanhuma: “The rich should ever bear in mind that his wealth may merely have been deposited with him to *be a steward over it, or to test what use he will make of his possessions.*”²¹

There is a stewardship responsibility. Moreover, American colleges and universities are so fiercely competitive that I think consideration has to be given to benign forms of collusion and even some regulation. Reluctant as I am even to mention the NCAA in any kind of quasi-favorable light, I think we should acknowledge that there is value in obligatory academic requirements (minimal as they are) for participation in intercollegiate sports.²² I also think that some years

ago the Justice Department did us all a disservice in applying simplistic notions of anti-trust regulation to well-designed efforts to ensure that limited financial aid resources were in fact distributed on the basis of agreed notions of financial need. As another example, President Bacow has suggested that universities might consider limiting tenure to some number of years. The objective would be to combat the costly and sometimes corrosive effects of the end to mandatory retirement.

I should confess that when I was a beginning graduate student I was one of those who objected to mandatory retirement, which was legal at the time. I was in the last class that the brilliant economist, Jacob Viner, ever taught at Princeton on the history of economic thought. Summoning up all my courage, I went into Professor Viner's office to complain about his impending retirement. Viner gave me one of his most piercing looks and said, with a twinkle in his eye: "Mr. Bowen, most of what you say is true. I am at the peak of my powers, smarter than all of my colleagues, and it would be a shame if future Princeton students were deprived of the opportunity to learn from me. But [he added], your conclusion is wrong. I should be forced to retire. I tell you why. My colleagues are good and compassionate people, and they will never distinguish me from all of the other faculty members who should have retired years ago! Either all of us go, or none of us goes. It is much better that all of us go." Here is the end of the story: Professor Viner did have to retire from Princeton, but he went on to teach at leading universities all over the world until his death.

There is a place for well-considered rules, especially when they allow markets to work (as in Viner's case). More generally, I believe that there is a need for a thoughtful study of situations in which some collusion is a good thing, as well as situations in which collusion is injurious.

One source of upward pressure on costs, due in no small degree to status wars, is the proliferation and at times excessive support of middling graduate programs.

Back to the implications of the relentless pursuit of reputation. One specific problem—a definite source of upward pressure on costs that I attribute in no small degree to status wars—is the proliferation and at times excessive support of graduate programs of middling status in fields such as physics. (At the risk of annoying many friends, I call a spade a spade). Neil Rudenstine and I discussed this problem at length in a book we wrote some years ago (*In Pursuit of the PhD*), and there is no evidence that it has done anything but become more serious since.²³

Robert M. Berdahl, when he was president of the Association of American Universities (AAU), courageously asked: "How many research universities does the nation require? I do not know how many we should have. But it is a serious question, worthy of examination."²⁴ Berdahl's probing question led to a two-year, congressionally-mandated assessment of financial threats to the nation's research universities. The study did not, however, answer Berdahl's central question—which is, to be sure, highly sensitive. William ("Brit") Kirwan, chancellor of the University System of Maryland, has called this a missed opportunity "to address that very point more explicitly."²⁵ I agree.

During my time at the Andrew W. Mellon Foundation, I tried a slightly different tactic—namely, to encourage, with the carrot of substantial grant funding, some universities with not-highly-ranked PhD programs to substitute less expensive, yet stronger, post-doctoral programs for them. I was dismayed to find that many presidents agreed privately with my assessment of what made sense but were unwilling to take the political heat that would have been generated by an effort to dis-

mantle any PhD programs. Worries by faculty about potential loss of status in the profession overwhelmed all else, and presidents who had other battles to fight were unwilling to risk a battle with faculty on this issue, with all of its symbolic overtones.

“Supply-Side” Problems and Mismatching

Less controversial and every bit as fundamental are two systemic issues:

(a) ineffective “supply-side” provision of higher education by some institutions, combined with weak incentives for students to finish programs in a timely way; and (b) what is known as the “mismatching” problem.

Declines in resources at less-selective public institutions and students’ tendency to work more hours are at the root of the increase in time-to-degree over the last 30 years.

Sarah Turner et al., in an important and underappreciated paper, have documented a marked increase in time-to-degree (TTD) over the last three decades.²⁶ If it takes longer for students to complete their degrees, and if large numbers never finish, the implications for productivity are clear. As someone observed, “the most expensive degrees are those that are never obtained”—or, one might add, the ones that require five, six, or more years to obtain. Lengthening time-to-degree could, of course, be the result of an influx of poorly prepared students, but Turner and her colleagues have demonstrated rigorously that this is not the main source of the problem. Indeed, they found that “the increase in TTD is localized among those who begin their postsecondary education at public colleges outside the most selective institutions.” A combination of declines in collegiate resources at these less-selective public institutions and the tendency for students to work more hours (at the expense of finishing their studies) is at the root of the problem.

There is abundant evidence that undergraduate students who fail to graduate in four or four and a half years often take more credits than they need, in part because of inadequate guidance, starting and stopping majors, and lack of places in gateway courses.²⁷ Student attitudes are another part of the problem. A recent graduate of a highly selective flagship university in our *Crossing the Finish Line* study said that at his university, graduating in four years was like “leaving the party at 10:30 p.m.”²⁸ But we are starting to see reports that schools are now addressing the problem of long TTD more aggressively, by altering the way they charge for credits and pushing “super-seniors” to graduate in a timely way. There is less willingness to tolerate five- or six-year graduation rates.²⁹ Easing transfer paths from two-year to four-year institutions would also make a considerable difference, and places like CUNY in New York are making active efforts to facilitate “flow through the system.”³⁰

There is also strong evidence that both lower completion rates and longer time-to-degree are caused in no small measure by the failure of surprisingly large numbers of well-qualified students to enroll at colleges and universities for which they are qualified—ending up instead either at less challenging institutions or at no post-secondary institution at all. The primary source of this problem is at the application stage: large numbers of students, and especially students from poor families and some minority groups, simply do not apply to institutions at which students with their qualifications do well. The University of Chicago Consortium on Chicago School Research played a pivotal role in introducing the concept of “match” into this discussion through a detailed analysis of the frustrating

experience in their city of watching students who had worked hard and successfully in high school then fail to take advantage of the potential college-going opportunities that they had earned. In *Crossing the Finish Line*, our research team found strong evidence of this same phenomenon in North Carolina.³¹

The serious consequences of this persistent pattern are related directly to the by now, well-documented empirical relationship between completion rates and the selectivity of colleges and universities. Even after controlling carefully for differences in the qualifications of entering students, evidence shows that students who attend institutions that enroll high-achieving students are themselves more likely to graduate, and to graduate in four years, than are comparable students who attend less selective institutions. This finding may seem counter-intuitive at first—shouldn't it be easier to graduate from less selective (and presumably less rigorous) schools than from those that are more selective (and more rigorous)? But it is correct. Presumably peer effects, differences in expectations for graduation, opportunities to work closely with faculty, and institutional resources such as libraries and laboratories are very important.³²

Two major research projects are now underway to study rigorously alternative ways for alleviating the “mismatch” problem: one is directed by MDRC in New York, and one is led by Professors Hoxby from Stanford and Turner from UVa.³³ Success on this front would raise timely completion rates overall and reduce disparities in outcomes related to socio-economic status—both highly desirable outcomes. But there can be a long distance between good ideas and accomplishments. For now, failures to “match” drive up system-wide costs of all kinds because of lower completion rates and longer time-to-degree—and thus lower productivity for the system as a whole.³⁴

Affordability

The word “affordability” has achieved iconic status and become a part of the ad wars in the 2012 presidential campaign. Is higher education “affordable” today for students and their families? Will it be affordable tomorrow? These are key questions to ponder, but they do not lend themselves to simple answers. This is a murky terrain, and I hope you will be pleased to hear that I intend to ride roughshod over it.³⁵ For my purposes, it will suffice to note commonly-cited numbers generated by others and emphasize a limited number of basic points.

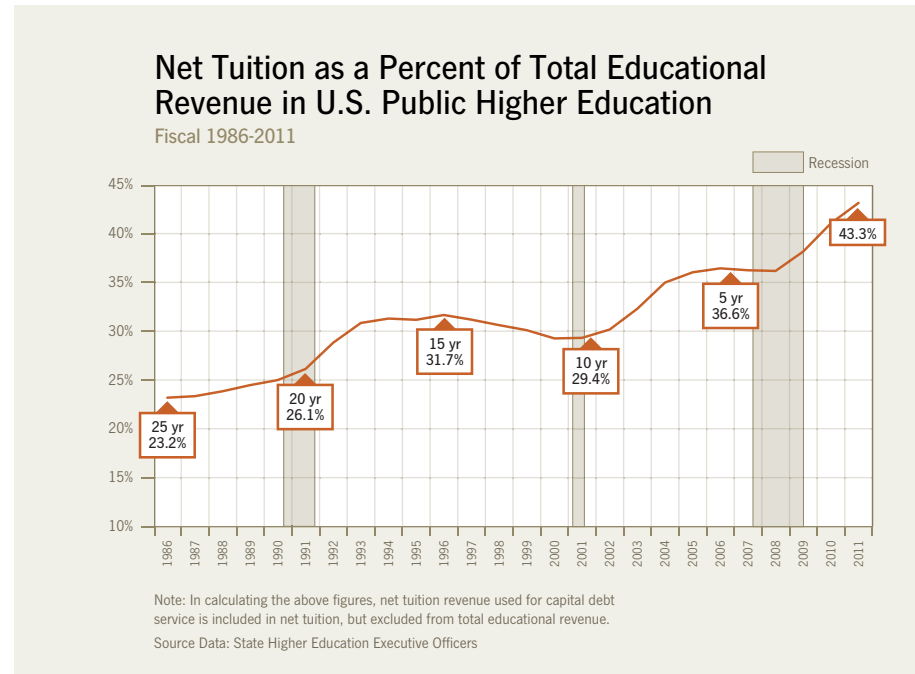
At the root of much of the discussion of affordability is the well-known fact that state appropriations per student have declined sharply in recent years.³⁶ According to one study, the state appropriations share of the total receipts of public colleges and universities fell from 32 percent in 1980 to 18 percent in 2009.³⁷

Particularly in recent years, net tuition at public universities has risen faster than per-student costs (never mind prices in general)—at the same time that these universities have experienced reductions in state and local support.³⁸ Public systems seeking to avoid cutbacks in enrollment and to maintain quality have had little choice but to raise charges. A College Board report indicates that: “The average price of a year at an in-state public four-year college rose to \$8,244 in 2011-12 from \$2,242 (in 2011 dollars) 30 years earlier—an annual growth rate

Net tuition at public universities has risen faster than per-student costs (never mind prices in general)—at the same time that these universities have experienced reductions in state and local support.

of 4.4% beyond inflation.”³⁹ Net charges have increased less rapidly because of both efforts to augment financial aid and the substitution of some federal dollars, including stimulus aid, for state dollars. Still, net tuition as a percent of total educational revenue in public higher education rose from 23 percent in 1986 to 43 percent in 2011 (Figure 2).⁴⁰

Figure 2

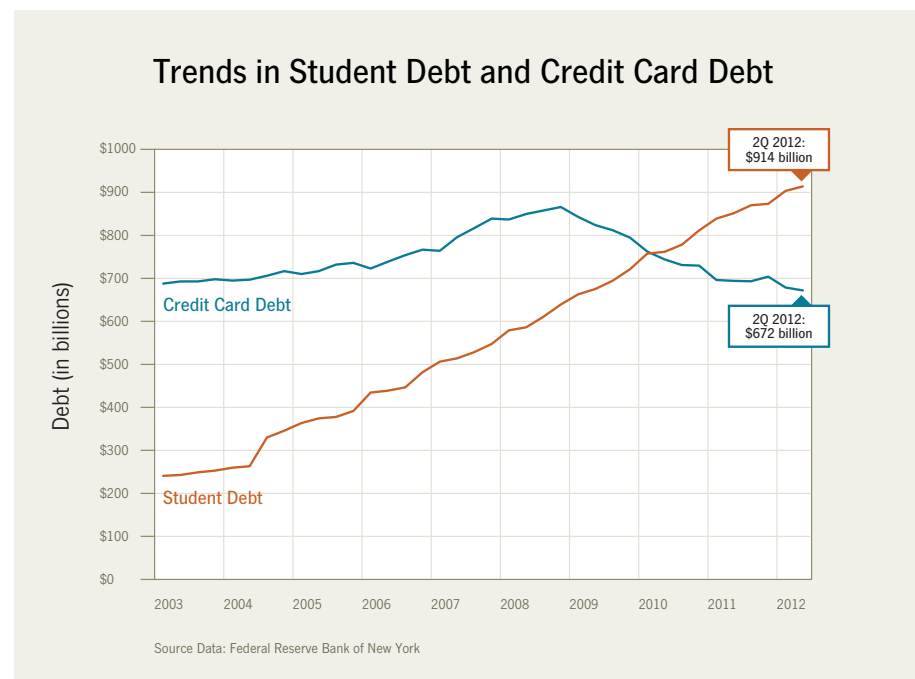


Furthermore, as Joseph Stiglitz, chief economist of the World Bank, has emphasized: “Parents’ ability to pay without resorting to debt is declining. ... The income of the typical American family, adjusted for inflation, declined from 2007 to 2010. Their wealth was down almost 40%. Separate data show that household income is back to the levels of a decade and a half ago.”⁴¹ Economic conditions have indeed taken a toll, and those who complain that college costs are rising faster than incomes should recognize that stagnation of median family incomes is definitely one blade of this scissors.

At the same time, it is important to recognize that these trends have not led most students and their parents to conclude that college is not for them, or is simply beyond their reach. Indeed, 83 percent of college students and parents participating in the most recent Sallie Mae/Ipsos survey strongly agreed that “education is an investment in the future,” and a majority said they were “willing to stretch [themselves] financially” to make this education possible.⁴² Strong demand for higher education appears to be ever present, but it would be helpful to have more hard evidence than is available now as to the actual effects on student behavior of increases in tuition at public universities.⁴³

We get closer to the core of affordability concerns when we recognize that the combination of upward trends in charges and deteriorating family circumstances has led to a large increase in student debt—which, as has been widely reported, now exceeds credit card debt (Figure 3).⁴⁴ For many students, borrowing has become the only option. Student debt has risen sharply—though nothing like as astronomically as the incredibly inept story in the Sunday *New York Times* of May 2012 suggested.⁴⁵ The *Times* reported that 94 percent of bachelor’s graduates leave college with educational debt. The correct number is around two-thirds, as Sandy Baum and Mike McPherson pointed out in their devastating commentary on the *Times* story.⁴⁶ An equally troubling aspect of the *Times* article (again quoting Baum and McPherson) is that it “focused on a student who has more debt than almost every other college graduate and who chose to enroll at an institution, Ohio Northern University, where average debt levels exceed those at almost every other college in the country.”⁴⁷ As a colleague of mine now at the Brookings Institution, Matthew M. Chingos, wryly observed: “Share of student borrowers with >\$54k debt: 10%; share of grads interviewed by NYT with >\$54k debt: 100%.”⁴⁸ Gross misreporting and fear mongering do not encourage thoughtful consideration of a complex issue.

Figure 3



Professors Chris Avery and Sarah Turner have made a commendable effort to create an analytical framework that can be used to think through borrowing decisions.⁴⁹ They ask whether (and when) college students borrow too much, and whether (and when) college students borrow too little. Much depends, they explain, on the aptitudes/talents of an individual, choice of major, institution attended, likelihood of actually getting a degree, career interests and prospects, and so on. An important conclusion of their research is: “The claim that student borrowing is ‘too high’ across the board can—with the possible exception of

for-profit colleges—clearly be rejected.” There are many cases in which students elect (often unwisely, we believe) not to borrow modest sums needed to finish degree programs in a timely way, choosing instead to work so many hours on off-campus jobs that they either delay completing their programs or do not complete them at all.⁵⁰ Education Department data show that most students have been graduating with what seem like manageable debt loads. According to data from the Department of Education, three-quarters of four-year graduates owe less than \$33,857 on earning a degree—often much less.⁵¹ The Pew Research Center recently reported that the average outstanding student loan balance was \$26,682 in 2010 among all households with student debt; the Pew study also shows that (not surprisingly) the relative burden of student debt is greatest for households in the bottom fifth of the income distribution.⁵²

Ironically, many students attending selective, wealthy universities should be the best candidates to borrow to help pay for their education—yet these are the very institutions that often have grant-only financial aid programs.

In correcting over-wrought worries about student debt, I do not want to go to the other extreme. Many students surely borrow too much and have their lives affected adversely. There is evidence that high debt may make students less likely to choose a lower-paying job, and this is one reason why I favor combining loan programs with “forgiveness” features that take account of job choices.⁵³ An irony is that many students attending highly selective, wealthy universities such as Princeton and Harvard should be the best candidates to borrow at least modest sums to pay part of the costs of their education—yet these are the very institutions that, for what are surely praiseworthy reasons, have elected to adopt grant-only financial aid programs. As I suggested earlier, an unfortunate consequence is that less-wealthy colleges and universities can feel pressured to adopt financial aid policies that are unwise for them.

Reluctance to take on even a modest amount of debt may also have a sizeable impact on college choice and contribute to the “mismatch” problem described earlier. Where one goes to school is by no means the “be all and end all,” but it can be important. I am reminded of an experience I had in the aftermath of the publication of the book Derek Bok and I wrote on affirmative action.⁵⁴ I was at a gathering in Washington, DC when a white woman stood up and said that surely there are many fine schools in America, and she couldn’t understand why minorities make such a fuss about getting into a place like Stanford (yes, that was her example). An African-American woman stood up and replied: “Wait a minute. Are you telling me that all those white folks fighting so hard to get into Stanford are just ignorant? Or, are we supposed to believe that attending a top-ranked school is important for the children of the privileged but shouldn’t matter to minorities?” There was dead silence. Interestingly, evidence in *The Shape of the River* shows that the gains associated with attending the most selective schools are, if anything, greater for minorities than for whites.⁵⁵

Is There a Serious Problem—Even a Crisis?

There are certainly reasons to think so. Among measures of educational outcomes, more and more attention is being focused on completion rates.⁵⁶ Yet, in spite of President Obama’s exhortations,⁵⁷ various Department of Education initiatives, and vigorous efforts by the Gates and Lumina Foundations, among other private players, there is no evidence that levels of educational attainment in the US are rising to match the progress made in other countries.⁵⁸ Moreover, serious

questions have been raised regarding the capacity of America's higher education system to deliver on a second core mission: to enhance mobility and serve as a powerful equalizer—as an engine of opportunity. Scholars have found evidence that achievement gaps between rich and poor children have been increasing, not closing.⁵⁹

There are also numerous voices, including those at one consulting firm, saying that many colleges and universities, including even prestigious places, are on financially “unsustainable” paths. Moody's recent “Higher Education Mid-Year Outlook” paints a grim picture of the future of higher education. One of our most esteemed leaders in higher education, Brit Kirwan, Chancellor of the University System of Maryland, has been warning for some time that we are indeed in perilous times. Speaking before the AAU in the spring of 2010, he said, “We are in a period of fiscal famine, experiencing unprecedented resource trauma that threatens the ability of many, if not most, of our institutions to carry out their core missions.”⁶⁰ I agree with Chancellor Kirwan's assessment. But I would add (and I don't think he would disagree) that it is easy, and wrong, to underplay the staying power and resiliency of colleges and universities—a lesson that history teaches us. We should avoid that mistake.

Nor should we blame the “inexorable” workings of the cost disease for whatever grim prospects seem to lie ahead. In a new book, William J. Baumol explains clearly that the same economy-wide increases in productivity that are at the root of the cost disease raise overall wealth and generate additional resources that *COULD* be used to pay the rising relative costs of activities in labor-intensive sectors such as education *IF* we were to choose to spend them in this way. As Baumol notes in his introduction, this proposition about “possibilities” was first explained to him by the renowned Cambridge economist Joan Robinson many decades ago—but even Baumol did not immediately recognize its full implications. Future prospects come down to a matter of priorities. “Could” is not the same as “will.” The key question, then, is whether we will choose, collectively, to invest the fruits of overall productivity gains on “goods” such as quality education.⁶¹

My verdict: “Not likely.” It seems to me, as to many others, that people in general are fed up with rising costs (and especially rising student charges)—however understandable the reasons for them may be. As the very sober “Overview” paper by Baum, Kurose, and McPherson puts it: “The anger and resentment expressed toward college leaders appears to be growing, despite the limited ability of those leaders to make college cheaper quickly without lowering quality in ways that will disappoint the same people who decry higher prices.” They add: “Americans as a whole seem extremely reluctant to accept the idea that they should pay more in order to provide more education to more students. Instead the prevalent view seems to be that colleges and universities, especially those in the public sector, should simply find ways to do more with less. If nothing else, sheer political prudence requires colleges to redouble their efforts to accomplish just that, and to undertake those efforts in the most visible possible way.”⁶²

No part of higher education is immune from the consequences of ignoring this rising tide of anger and resentment. Public perceptions matter, and even seemingly sacrosanct programs such as NIH funding for research could be affected if there is spreading distrust of higher education, and disbelief in its willingness (commitment?) to “do more with less.” Thus, there are self-centered reasons for

There are no silver bullets in sight. But there is promising work to be done, if only we can muster the will to meet organizational, philosophical, and technical challenges.

even privileged institutions such as Stanford and Princeton to pay close attention to these issues. There are also, of course, nobler instincts at play, and I believe, as I will say in the next lecture, that thoughtfully developed system-wide efforts have the potential, not to “cure” the cost disease, but to ease its harshest effects. This will be far from easy. There are no silver bullets in sight. But there is promising work to be done, if only we can muster the will to meet challenges that are at least as much organizational and philosophical as they are technical. As John Doar used to say to me in the context of the Nixon impeachment inquiry which he led, “we will know more later.”

Endnotes

- 1 Clark Kerr, foreword to *The Economics of the Major Private Universities*, by William G. Bowen, Carnegie Commission on Higher Education (New York: McGraw-Hill, 1968).
- 2 See William J. Baumol and William G. Bowen, *Performing Arts—The Economic Dilemma: A Study of Problems Common to Theater, Opera, Music, and Dance*, New York: Twentieth Century Fund, 1966.
- 3 Robert H. Frank, “The Prestige Chase Is Raising College Costs,” *New York Times*, March 10, 2012.
- 4 See *Performing Arts—The Economic Dilemma* (previously cited), especially Chapters 8 and 9, which document trends in the overall cost of performance and trends in performers’ salaries and other cost components.
- 5 See William G. Bowen, “The Economics of Princeton in the 1970s: Some Worrisome Implications of Trying to Make Do with Less,” *Report of the President*, February 1976, especially p. 5. This report also cites data for Australia, as I had earlier cited data for the UK in my Carnegie Commission Report (see first endnote). The cost disease is no respecter of national boundaries. In this 1976 annual report, I also restated the basic “cost disease” proposition a bit more fully: “The central economic fact of life is the very nature of the processes of education and scholarship. To be done well, particularly at advanced levels, they require a degree of personal attention and personal interaction, that simply does not allow the same opportunities for technological change, mechanization, and, it you will, increases in ‘output per unit of labor input,’ that characterize the production of such goods as feed grains and calculators. As a result, we must expect the costs and prices of educational services to rise more rapidly than prices in general over the long run” (p. 5). In retrospect, I am especially pleased that I emphasized that the cost disease is a particularly intractable problem at “advanced levels” of teaching.
- 6 See Sandy Baum, Charles Kurose and Michael S. McPherson, “An Overview of American Higher Education,” prepared for a forthcoming issue of *The Future of Children*. The study they cite based on Delta Cost Project data is: Donna M. Desrochers and Jane V. Wellman, “Trends in College Spending 1999-2009” (Washington, DC: The Delta Cost Project on Postsecondary Education Costs, Productivity, and Accountability, 2011). The “Overview” paper includes a veritable wealth of data on almost every aspect of American higher education over the last 50 years and should be a standard reference. It also contains yet another explanation of the cost disease, and one that is especially detailed—but the paper’s authors do not, as I will not, put all of the onus for rising costs on this phenomenon. The Delta Cost Study, cited extensively in the “Overview” paper, has worked with aggregate data available publicly through the Integrated Postsecondary Education Data System. These data in their raw form are not consistent over time, and a real contribution of the Delta Cost Project has been to “clean” the public data and make them consistent. The Delta Cost Project has looked at both revenues and expenditures, and focused on public research universities, public master’s universities, public community colleges, non-profit private research universities, non-profit private master’s institutions, and non-profit private bachelor’s institutions; the for-profit sector has not been included because it has been too difficult to obtain consistent data on trends. A good summary of the most recent data is provided in Wellman’s testimony before the House Subcommittee on Higher Education; see Jane V. Wellman, Statement to the House, Subcommittee on Higher Education and Workforce Training, Committee on Education and the Workforce, *Keeping College Within Reach: Discussing Ways Institutions Can Streamline Costs and Reduce Tuition*, Hearing, November 30, 2011 (Serial No. 112-48).

Another well known source of data on costs is the Delaware Studies. The official citation for the final published report issued by this project is: Michael F. Middaugh, Rosalinda Graham, and Abdus Shahid, *A Study of Higher Education Instructional Expenditures: The Delaware Study of Instructional Costs and Productivity* (Washington, DC: U.S. Department of Education, National Center for Education Statistics, 2003). This set of studies was mandated by Congress in the 1998 Higher Education Act. In response to the Congressional Mandate, the NCES has published three reports. After publishing the final report, the University of Delaware has continued to survey institutions that volunteer to participate and to give participating institutions their own data, as well as data for sets of “comparable” institutions [defined by Carnegie Classification] so that they can benchmark their own data. The focus of these studies is the academic discipline (such as mathematics). The Delaware Studies focus on direct instructional expenditures and the factors associated with calculations of direct instructional expenditures per student credit hour (enrollment multiplied by course credits) at four-year colleges and universities. A main finding is that differences among institutions are heavily driven by “discipline mix,” with costs higher in the sciences than in the humanities; costs are also related to Carnegie classification (and are higher at research universities) and to variables such as scale.

- 7 Teresa A. Sullivan, et al., eds., *Improving Measurement of Productivity in Higher Education: Panel on Measuring Higher Education Productivity: Conceptual Framework and Data Needs*, pre-publication copy (Washington, DC: National Academies Press, 2012). There are also many papers that discuss ways to improve productivity in higher education. See, for example, Davis Jenkins and Olga Rodriguez's article, "Access and Success for Less: Improving Productivity in Broad-Access Postsecondary Institutions," to be published in a forthcoming issue of *The Future of Children*; and Douglas N. Harris and Sara Goldrick-Rab, "The (Un) Productivity of American Higher Education: From 'Cost Disease' to Cost-Effectiveness," WISCAPE Working Paper, December 2010. But these papers have more to say about forces driving up costs (the subject of my next section) than about the measurement of productivity per se.
- 8 See Spencer S. Jones, Paul S. Heaton, Robert S. Rudin, and Eric C. Schneider, "Unraveling the IT Productivity Paradox—Lessons for Health Care," *New England Journal of Medicine* 366 (June 14, 2012): 2243-45.
- 9 See William G. Bowen and Derek Bok, *The Shape of the River*, Princeton, NJ: Princeton University Press, 1998.
- 10 Kevin Guthrie, founding president of JSTOR and now president of ITHAKA, points out that, thanks to JSTOR, there is now some work that gets done that never would have been done before—as a result, for example, of finding old literature that otherwise would have been inaccessible, thus adding to the numerator of the productivity ratio. Similarly, universities in places like South Africa now have access to both literature (via JSTOR) and art images (via ARTstor) that otherwise never would have been possible.
- 11 For a summary of Bain's work on these campuses, see Kevin Kiley, "Where Universities Can Be Cut," *Inside Higher Ed*, September 16, 2011. Also see Jeff Denneen and Tom Dretler, *The Financially Sustainable University*, Bain and Company and Sterling Partners, 2012, http://www.bain.com/Images/BAIN_BRIEF_The_financially_sustainable_university.pdf. McKinsey has been active in this area as well; see, for instance, Byron G. Auguste, Adam Cota, Kartik Jayaram, and Martha C. A. Laboissière, *Winning by Degrees: The Strategies of Highly Productive Higher Education Institutions*, McKinsey & Company, November 2010, <http://mckinseysociety.com/downloads/reports/Education/Winning%20by%20degrees%20report%20fullreport%20v5.pdf>. In my view, it is not helpful when academics dismiss these studies as contributing to a "corporate mind-set" in higher education. Universities do have to become more business-like in relevant respects, at the same time that they have to retain their basic commitments to academic values.
- 12 When I was at the Mellon Foundation, I resolutely opposed the creation of new "centers" unless there was an overwhelming case for them. The University of Chicago has been an especially creative user of the "workshop" model, which stresses the value of temporary groupings of faculty and students. Tufts has had excellent results with the use of "the experimental college" to test out curricular experiments without making more than one-year commitments.
- 13 For an extended discussion of these issues, written by two veteran leaders of public university business schools, see Gary C. Fethke and Andrew J. Policano, *Public No More: A New Path to Excellence for America's Public Universities*, Stanford CA: Stanford University Press, 2012, especially Chapters 7, 8, and 12. The controversy at the University of Virginia over the leadership of President Sullivan also involved aspects of this debate (how important is it for UVA to teach German?). (See Scott Jaschik, "Fired for Protecting Languages?" *Inside Higher Ed*, June 18, 2012.) Of course, it is easy to state such issues in overly simple terms. For example, it is one thing to insist that UVA must continue to be a leader in the teaching of German, but quite another to insist that many separate language departments are essential—how worthy educational objectives are to be served is a legitimate question, which I raise here without suggesting an answer.
- 14 See Charles T. Clotfelter, *Buying the Best: Cost Escalation in Elite Higher Education*, Princeton, NJ: Princeton University Press, 1996. Clotfelter looks at the economic factors that drive institutions of higher education and examines the escalation in spending in the arts and sciences at four elite institutions: Harvard, Duke, the University of Chicago, and Carleton. He argues that the rise in costs has less to do with increasing faculty salaries or lowered productivity, than with a broad-based effort to improve quality, provide new services to students, pay for large investments in new facilities and equipment (including computers), and ensure access for low-income students through increasingly expensive financial aid.
- 15 For an early presentation of this line of argument, see Howard Bowen's discussion of the revenue theory of cost in his *The Costs of Higher Education: How Much Do Colleges and Universities Spend Per Student and How Much Should They Spend?*, San Francisco: Jossey-Bass, 1980.
- 16 E-mail message to author, November 22, 2011.

- 17 See Philippe Aghion et al., “The Governance and Performance of Research Universities: Evidence from Europe and the U.S.,” NBER Working Paper No. 14851, April 2009, for a study showing that competition “hones research skills” and leads to more patents.
- 18 Even among the most prestigious universities in the nation, there is a dramatic difference in endowments, which has grown, in absolute terms, over the past 10 years. In fiscal year 2001, for instance, Harvard’s endowment was about \$17 billion, and Yale’s, Princeton’s, and Stanford’s were \$10.5 billion, \$8.3 billion, and \$7.6 billion, respectively. By contrast, in that year Columbia had an endowment of \$4.2 billion, and the University of Pennsylvania and the University of Chicago had endowments of \$3.4 billion and \$3.3 billion, respectively. By fiscal year 2011, Harvard’s endowment was over \$31 billion, and those of Yale, Princeton, and Stanford had grown to between \$16 billion and \$20 billion each. In comparison, the endowments of Columbia, University of Pennsylvania, and the University of Chicago each were in the \$6 billion to \$8 billion range. See the 2002 NACUBO Endowment Study and the 2011 NACUBO-Commonfund Study of Endowments by the National Association of College and University Business Officers, both available at http://www.nacubo.org/Research/NACUBO-Commonfund_Study_of_Endowments/Public_NCSE_Tables_.html. For an excellent discussion of stratification more generally, and the forces driving it, see Caroline M. Hoxby, “The Changing Selectivity of American Colleges,” *Journal of Economic Perspectives* 23.4 (2009), especially pp. 95-96 and 98. Hoxby concentrates on stratification by student achievement and notes that only the top 10 percent of colleges were substantially more selective in 2007 than they were in 1962. Most colleges became less selective over this period. Hoxby also explains how student selectivity and educational expenditures interact.
- 19 President Catherine Hill from Vassar spoke eloquently at the April 2012 Lafayette Conference on the pressure selective institutions feel to meet the perceived needs/desires of students from affluent families. Also telling is a recent article in *The Atlantic* about the term of former George Washington University president Stephen Trachtenberg, who, between 1988 and 2007, built not only computer and research labs, but also a “profusion of comforts [that] didn’t just stimulate students’ minds; they also fulfilled their every whim—a change that drew a more selective, more intelligent group of applicants and sent the admission rate plummeting from 75 percent to 37 percent.” Unsurprisingly, these new amenities caused the tuition to double during the term of his presidency (when inflation is taken into account). The article continues: “‘It was a matter of competition,’ Trachtenberg says in the way of justifying the suite-style dorms he built, the remote campus he acquired, and the tuition hikes that he began almost immediately. ‘These sorts of facilities were being offered elsewhere. We were either in the game or we weren’t in the game.’” (See Julia Edwards, “Meet the High Priest of Runaway College Inflation (He Regrets Nothing),” *The Atlantic*, September 30, 2012.)
- 20 See William G. Bowen, Matthew M. Chingos, and Michael S. McPherson, *Crossing the Finish Line: Completing College at America’s Public Universities*, Princeton, NJ: Princeton University Press, 2009, especially Chapter 6, for striking evidence that performance-based indicators, such as rank-in-class and achievement test scores, are far better predictors of almost everything—except family wealth! Pre-occupation with yield is also troubling. I can’t count the number of times at Princeton that I told the admissions office that I didn’t want to hear anything about yield; what matters, I did my best to explain, is the quality and character of the incoming class, not how many promising students elected to go elsewhere.
- 21 The quotation was provided by a former colleague of mine at the Andrew W. Mellon Foundation, Idana Goldberg.
- 22 As president of Princeton, I led an effort within the Ivy League to create and apply an “academic index” to govern admissions requirements. It had some good effects, but it also had some undesirable side effects that I did not understand until much later. (See William G. Bowen and Sarah Levin, *Reclaiming the Game*, Princeton, NJ: Princeton University Press, 2008.)
- 23 William G. Bowen and Neil L. Rudenstine [Princeton University Press, 1992].
- 24 See Robert M. Berdahl, “Reassessing the Value of Research Universities,” *Chronicle of Higher Education*, July 13, 2009.
- 25 See Paul Basken, “Nation’s Research Universities Are Offered Hope of Fatter Budgets—at a Price,” *Chronicle of Higher Education*, June 14, 2012.
- 26 See John Bound, Michael F. Lovenheim, and Sarah Turner, “Increasing Time to Baccalaureate Degree in the United States,” National Bureau of Economic Research, Working Paper 15892, April 2010. Also see the discussion of this study in Baum, Kurose, and McPherson’s “An Overview of American Higher Education,” cited previously. Of course, college readiness is also part of the problem. The low rate of college readiness among high school graduates in, for example, New York is certainly troubling. (See Sharon Otterman, “College-Readiness Low Among State Graduates, Data Show,” June 14, 2011.)

- 27 See *Crossing the Finish Line*, especially Chapter 4. It is Matt Chingos who deserves the credit for this part of the analysis. Similarly, a *Chronicle of Higher Education* article of September 28, 2010, reports that “many students take far more credits than they need to earn a degree” and thus stay in school longer than necessary. (See Eric Kelderman, “Board Suggests Ways of Southern State to Lower College Costs and Increase Degree Production,” *Chronicle of Higher Education*, September 28, 2010.) A significant source of the problem is blocked passages to degrees. A survey conducted by the chancellor’s office of the California Community Colleges system in late August 2012 revealed that more than 472,000 of the system’s 2.4 million students were put on waiting lists for fall 2012 classes. (See Lee Gardner, “Survey of California Community Colleges Reveals Drastic Effects of Budget Cuts,” *Chronicle of Higher Education*, August 29, 2012.)
- 28 See *Crossing the Finish Line*, p. 237.
- 29 See Daniel de Vise, “Public Universities Pushing Super-Seniors to the Graduation Stage,” *Washington Post*, June 2, 2012. Other imaginative efforts have been made to attack this problem. Former Tufts president Lawrence Bacow has reported that Tufts had success with a modest program of grants that allowed the neediest students to attend summer school between junior and senior year (something that the wealthier students often do without institutional help).
- 30 In June 2011 the trustees of the City University of New York (CUNY) approved a resolution creating the Pathways initiative, which is designed to facilitate the transfer process between the system’s two- and four-year colleges. Under this project, all students in the system are required to complete 30 Common Core credits; students who are transferring from community to senior colleges are required to take an additional six to 12 “College Option” credits. Individual colleges have substantial flexibility in determining the content of the “Common Core” credits, and, in the case of the senior colleges, the College Option credits. For more information on the Pathways Initiative, see <http://www.cuny.edu/academics/initiatives/degreepathways.html>.
- 31 See *Crossing the Finish Line*, p. 99, for an extended discussion of this subject that includes references to the important work of the Chicago Consortium.
- 32 See *Crossing the Finish Line*, especially Chapter 10 and pp. 233-35. Hard as we worked to control for selection effects in this study, a new paper by Cohodes and Goodman controls for selection effects even more convincingly by using a research discontinuity design and working with very rich data provided via a Massachusetts Merit Aid program. The authors found that students induced by this scholarship program to attend less selective colleges were more than 40 percent less likely to graduate. They also found that “students are remarkably willing to forego college quality for relatively small amounts of money.” (See Sarah Cohodes and Joshua Goodman, “First Degree Earns: The Impact of College Quality on College Completion Rates,” Harvard Kennedy School Working Paper Series RWP12-033, August 7, 2012.) The classic (crisp) discussion of returns to selectivity is Caroline M. Hoxby, “The Changing Selectivity of American Colleges,” *Journal of Economic Perspectives* 23.4 (2009), especially pp. 114-15. Hoxby emphasizes that colleges and universities that attract high-achieving students also invest more in “student-oriented resources”—which is, of course, an important reason that so many students with strong qualifications go to these schools.
- 33 For a description of the MDRC study and a policy brief explaining the context of the project, please see Jay Sherwin, *Make Me a Match: Helping Low-Income and First-Generation Students Make Good College Choices*, MDRC, March 2012, <http://www.mdrc.org/publications/623/overview.html>. For a description of the Hoxby-Turner project, see “About the Expanding College Opportunities (ECO) Project,” Expanding College Opportunities, <http://www.expandingcollegeopps.org/eco/about>. One reader of a draft of this Tanner Lecture suggested that lessons might also be learned from matching programs for medical students.
- 34 The connection between this problem and system-wide “productivity” is less obvious than the connection to reductions in disparities in outcomes, but it is real nonetheless. Some have wondered if improving “match” would just substitute more qualified students for less qualified students at certain institutions, leaving overall numbers (and perhaps overall graduation rates) unchanged. (The “match” we refer to here is between the selectivity level of the college to which a student with a particular set of qualifications would likely have been accepted, and the selectivity of the college in which that student actually enrolled—see Chapter 5 of *Crossing the Finish Line* for a further discussion of this concept.) This is a good question, but it fails to take into account several things. First, there is more elasticity in the capacity of selective institutions than is sometimes understood—especially when we understand that reducing time-to-degree increases the number of students who can be accommodated with a given number of classroom seats. Second, there is evidence that it is precisely the kinds of students currently “undermatched” who benefit most from attending institutions with challenging academic programs. Some “re-shuffling” of the student population would therefore probably improve overall completion rates and time-to-degree—and productivity. This is especially likely to

be the case when we also recognize that the kinds of students who currently undermatch are much less likely than more affluent students to enroll in “some institution” and, perhaps, complete a degree.

- 35 To move from an analysis of institutional costs in higher education to a discussion of affordability for students and their families requires us to peel several layers off the proverbial onion. First, students in non-profit institutions of all kinds are almost never expected to pay the full costs of their education. State appropriations, federal grants, private gifts, earnings from endowments, and earned income are other sources of revenue which drive a wedge between costs and tuition. Nearly all students in the non-profit sector receive subsidies, which are often non-trivial in size. Second, thanks to financial aid and “discounts,” there is often a sizable difference between quoted tuition (“sticker price”) and what students actually pay (“net tuition”). Third, affordability depends not just on what a student is expected to pay, but on trends in family income and wealth that, in turn, depend on variables external to higher education. Finally, it can be difficult to calibrate the long-run effects of different choices that students and parents make in deciding how to pay their college bills—including how much to borrow and what forms of debt make the most sense. Difficulties involved in making these distinctions are compounded by huge differences in tuition levels across higher education, and the tendency of journalists to pay far too much attention to stated charges at elite private institutions that enroll only a small fraction of students. Also, it has proven difficult for prospective students and their families to understand widely differing financial aid policies and to recognize that in many cases they will be asked to pay far less than sticker price.
- 36 Aggregating data for all state systems, a report by the State Higher Education Executive Officers tells us, “In 2010, state and locally financed educational appropriations for public higher education hit the lowest level (\$6,532 per FTE in constant 2011 dollars) in a quarter century. . . . This downward trend continued in 2011 with state and locally financed educational appropriations at \$6,290 per FTE, a decline of 3.7 percent over 2010 in constant dollars.” The report adds that appropriations per FTE would have been even lower, “except for budget driven enrollment caps in some states and reductions in state financial assistance.” (See State Higher Education Executive Officers, *State Higher Education Finance*, FY 2011, 2012, p. 19.) Also see Figure 3 on p. 20 of the same report.
- 37 See p. 11 of Baum, Kurose, and McPherson, “Overview,” cited in an earlier endnote.
- 38 See Rajashri Chakrabarti, Maricar Mabutas, and Basit Zafar, “Soaring Tuitions: Are Public Funding Cuts to Blame?” Federal Reserve Bank of New York, September 19, 2012, <http://libertystreeteconomics.newyorkfed.org/2012/09/soaring-tuitions-are-public-funding-cuts-to-blame.html#.UFnZJAuLvQ.twitter>, which reports that increases in net tuition at public institutions have been associated with decreases in state and local appropriations since 2007.
- 39 See the 2011 College Board report by Sandy Baum and Jennifer Ma entitled *Trends in College Pricing*. The summary of that report in the text of this document comes from Baum et al., “Overview,” p. 10.
- 40 See the State Higher Education Executive Officers report cited in an earlier endnote.
- 41 Joseph E. Stiglitz, “Debt Buries Graduates’ American Dream,” *USA Today Weekly International Edition*, July 13-15, 2012. Survey data confirm that over the past four years, students have started to foot an increasing share of their families’ total expenditures on college. Between the 2008-2009 and the 2011-2012 academic years, the share of family college expenditures paid for by parents’ borrowing, income, and savings has fallen, from 40 percent to 37 percent, at the same time as the share of the expenditures contributed by the students’ borrowing, income, and savings has risen, from 24 percent to 30 percent. See Sallie Mae and Ipsos, *How America Pays for College*, 2012, p. 8; in addition, the pie chart on p. 7 of this report shows the share of expenses paid from various sources, including savings, grants and scholarships, contributions by relatives, and borrowing by both students and their parents.
- 42 See pp. 14 and 40 of the Sallie Mae/Ipsos report cited in the previous endnote. This is not the place to review the vast literature on returns to education, but I believe many commentators (including, unfortunately, many of those speaking for colleges and universities themselves) put too much emphasis on purely economic returns, important as they are. Years ago, in the midst of the depression of the 1930s, no less a figure than the conservative Chicago economist Frank Knight cautioned against over-emphasis on the virtues of what he called “the business game.” He observed: “However favorable an opinion one may hold of the business game, he must be very illiberal not to concede that others have a right to a different view and that large numbers of admirable people do not like the game at all. It is then justifiable at least to regard as unfortunate the dominance of the business game over life, the virtual identification of social living with it, to the extent that has come to pass in the modern world.” (See Frank H. Knight, *The Ethics of Competition*, 1936, p. 58.) Also

- see the 2010 College Board report by Sandy Baum, Jennifer Ma, and Kathleen Payea, entitled *Education Pays, 2010*, for a useful summary of the benefits higher education confers, on individuals and society in general, beyond earnings effects.
- 43 Economists are strong believers in revealed preferences, and it would be most helpful to see what students actually do, not simply what they say they want to do or even will do.
- 44 See Josh Mitchell, “Student Debt Rises by 8% as College Tuitions Climb,” *Wall Street Journal*, May 31, 2012. This article cites data from the Federal Reserve Bank of New York; the online edition also presents a vivid graphic showing the decline in credit card debt alongside the rapid growth in student debt.
- 45 Andrew Martin and Andrew W. Lehren, “A Generation Hobbled by the Soaring Cost of College,” *New York Times*, May 12, 2012.
- 46 See Sandy Baum and Michael McPherson, “The New York Times Blunder,” *Chronicle of Higher Education*, May 17, 2012. As Baum and McPherson point out, citing Sarah Turner, the source of the error was incompetent analysis of Department of Education data (failing to understand a skip pattern and ignoring correct data which the *NYT* had supplied the authors). What is most disconcerting is that the number the *NYT* reported didn’t pass any semblance of a “smell test;” Baum and McPherson surmise that the “story seemed to be striving for maximum drama rather than for an accurate picture of student debt and the very real problems it creates for too many students.” An even deeper lesson to be gleaned from this fiasco is that there is a terrible lack of sophistication among many journalists (though certainly not all) covering higher education—a point that Nicholas Lemann, Dean of the School of Journalism at Columbia University, has made repeatedly.
- 47 Sandy Baum and Michael McPherson, “The New York Times Blunder,” *Chronicle of Higher Education*, May 17, 2012.
- 48 E-mail message to author, May 13, 2012.
- 49 Christopher Avery and Sarah Turner, “Student Loans: Do College Students Borrow Too Much—or Not Enough?” *Journal of Economic Perspectives* 1 (2012): 1-30. The quotation that follows is from p. 25.
- 50 See *Crossing the Finish Line*, pp. 163-64.
- 51 This figure comes from the Baccalaureate and Beyond data set, collected by the Department of Education’s National Center on Education Statistics, which provides data on the cumulative student loan balances as of 2009 for the graduating class of 2008. (See the May 31, 2012 *Wall Street Journal* article cited previously and Jennifer Cohen and Jason Delisle, “Focusing the Student Loan Conversation on the Average Borrower, Not the Average Loan,” *Ed Money Watch*, New America Foundation, May 15, 2012, http://edmoney.newamerica.net/blogposts/2012/focusing_the_student_loan_conversation_on_the_average_borrower_not_the_average_loan-6.) NCES data also show that, of students who began their undergraduate education in 2003-04 and who had attained a certificate, associate’s degree, or bachelor’s degree by 2008-2009, 62 percent had borrowed for their undergraduate education, and the average cumulative amount borrowed by those students was \$21,700 (in 2012 dollars). For more information about student debt, see Christina Chang Wei, Lutz Berkner, and C. Dennis Carroll, *Trends in Undergraduate Borrowing II: Federal Student Loans in 1995–96, 1999–2000, and 2003–04* (NCES 2008–179rev), U.S. Department of Education, National Center for Education Statistics, Institute of Education Sciences, Washington, DC: NCES, 2008, <http://nces.ed.gov/pubs2008/2008179rev.pdf>.
- 52 Richard Fry, *A Record One-in-Five Households Now Owe Student Loan Debt*, Pew Research Center, September 26, 2012, <http://www.pewsocialtrends.org/2012/09/26/a-record-one-in-five-households-now-owe-student-loan-debt/>.
- 53 See Rothstein and Rouse article cited in Avery and Turner’s “Student Loans: Do College Students Borrow Too Much—or Not Enough?” (The citation provided by Avery and Turner is: Jesse Rothstein and Cecilia Rouse, 2011, “Constrained after College: Student Loans and Early Career Occupational Choices,” *Journal of Public Economics* 95(1-2): 149-63.) As part of the College Cost Reduction and Access Act of 2007, the government enacted an income-based repayment (IBR) program for students who have high levels of debt relative to their income and/or who are pursuing careers in fields with relatively low salaries, such as public service. IBR caps students’ monthly repayments on federal student loans depending on their discretionary income level. The maximum repayment period under this program is 25 years, after which students’ remaining debt will be forgiven. The 2007 law also established a public service loan forgiveness program particularly for students who pursue careers in public service. Under this program, any remaining debt is discharged after borrowers have worked full-time in public service for 10 years and have made 120 monthly payments on an eligible Federal Direct Loan. Unlike IBR’s 25-year forgiveness, the 10-year public service forgiveness is tax-free. For more information, see Mark Kantrowitz, “Income-Based Repayment,” FinAid, 2012, <http://www.finaid.org/ibr/>;

- and Mark Kantrowitz, "Public Service Loan Forgiveness," FinAid, 2012, <http://www.finaid.org/loans/public-service.phtml>.
- 54 See William G. Bowen and Derek Bok, *The Shape of the River: Long-Term Consequences of Considering Race in College and University Admissions*, Princeton, NJ: Princeton University Press, 1998.
- 55 This story is recounted in the introduction to the paperback edition of *The Shape of the River*; see p. xxxix in particular.
- 56 Matt Chingos, Mike McPherson, and I would like to claim some credit for this shift in emphasis from enrollment to degree completion. See *Crossing the Finish Line*.
- 57 See Coffin Eaton, "At White House Meeting on Affordability, A Call for Urgency, Innovation, and Leadership," *Chronicle of Higher Education*, December 5, 2011, and the subsequent editorial in the *New York Times* (February 3, 2012), entitled "Reining in College Tuition," agreeing with President Obama that "the federal government must do more to rein in tuition costs at the public colleges that educate more than 70 percent of the nation's students."
- 58 In 2009, for instance, only about 40 percent of 25- to 34-year-olds in the United States had attained some form of tertiary education, giving the United States a rank of 16th in the world, according a 2011 report by the Organization for Economic Cooperation. By contrast, among adults between the ages of 55 and 64, the United States' rate of higher educational attainment was also about 40 percent, giving it a ranking of third in the world for this age group, and making it virtually the only G20 nation whose rate of attainment had not grown between the older and the younger cohorts. See *Education at a Glance 2011*, Organization for Economic Co-operation and Development, September 13, 2011, doi: 10.1787/19991487.
- 59 See studies by Sean Reardon at Stanford, and Susan Dynarski and Martha Bailey at the University of Michigan, among others, in a volume co-published by the Russell Sage and Spencer Foundations: Greg J. Duncan and Richard J. Murnane, eds., *Whither Opportunity: Rising Inequality, Schools, and Children's Life Chances*, New York: Russell Sage Foundation, 2011. As Jeff Selingo has warned, enrollment caps in states such as California may be at least as serious a problem as reductions in appropriations, since some students, especially those from modest backgrounds, may be deprived of any in-state enrollment option in the public university sector. (See Jeff Selingo, "For Have-Nots, the Rockier Road to a College Degree Increases the Appeal of Alternatives," *Chronicle of Higher Education*, March 23, 2012. Selingo worries that enrollment caps and other large disruptions in the higher education system "could worsen the divide between the haves and have-nots.") Selingo reports that he has never heard any of the critics of the value of traditional higher education say that "they'd surely send their kids to Western Governors University or choose a certificate from MITx over a degree from nearly any four-year college."
- 60 See William E. ("Brit") Kirwan, "The Research University of the Future," speech at AAU Public Affairs Network Meeting, March 22, 2010. Kirwan went on to note: "We have, of course, experienced periods of fiscal decline in the past, one as recent as the early part of this decade. But, this decline has a different character. In the past, economic downturns were followed by periods of economic boom and losses were recovered relatively quickly. I know no one who predicts that will be the case with our current fiscal decline." Kirwan then commented on "the disconnect between the aspirational rhetoric at the national level and the reality on the ground" by observing that, in a single week, "President Obama announced his laudable goal for leadership in higher education completion rates and Charlie Reed, Chancellor of the California State University System, announced that Cal State was turning away 30,000 students this spring because of inadequate funding." This under-appreciated talk is well worth reading in its entirety. Fethke and Policano, in *Public No More*, agree with Kirwan that, in their words, "the diminished role of state government funding is permanent" (p. 218). (See Gary C. Fethke and Andrew J. Policano, *Public No More: A New Path to Excellence for America's Public Universities*, Stanford, CA: Stanford University Press, 2012.) For another sobering assessment of what might happen to colleges and universities, see Jeff Selingo, "The Fiscal Cliff for Higher Education," *Chronicle of Higher Education*, August 12, 2012. Selingo describes a possible "death spiral" for some institutions, and he seems to be referring especially to lower-rated private colleges—which are definitely threatened by increased competition from lower-priced educational options. I suspect that my colleagues and I, in our focus on the large public university systems, have paid inadequate attention to the problems facing the regional private institutions.
- 61 See William J. Baumol, *The Cost Disease*, New Haven, CT: Yale University Press, 2012, especially Chapter 4.
- 62 See previously cited "Overview," pp. 13 and 19.

Prospects for an Online Fix: Can We Harness Technology in the Service of Our Aspirations?*

William G. Bowen
Tanner Lecture II
Stanford University
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* This lecture has been prepared in collaboration with Kelly A. Lack, Lawrence S. Bacow, Kevin M. Guthrie, and Michael S. McPherson have also been especially helpful in commenting on early drafts. I am fully responsible for any errors that remain.

In this second lecture, I will discuss the prospects for using new technologies to address the productivity, cost, and affordability issues that I described yesterday. I regard the prospects as promising, but also challenging. To succeed we will need to adopt a system-wide perspective, be relentless in seeking evidence about outcomes and costs, change some of our mindsets and our decision-making processes, and exhibit more patience than is our wont. None of these conditions is easy to satisfy! My focus will be on the contributions to be expected from established universities already serving large numbers of students. To be sure, we also want to serve new populations, at home and abroad, and a worldwide diffusion of knowledge is a most worthy goal—but it is not my central subject. Finally, in the search for new approaches we need to recognize how well we do some things now, and how important it is that our educational institutions continue to stand for core values. That is the note on which I will end.

I am not a futurist but rather a maddeningly practical person who rarely has visions—and when I do they are usually the result of having had a bad meal! But let me put such predilections to one side and ask you to join me in imagining, just for a moment, how the intelligent harnessing of information technology through the medium of online learning might alter aspects of university life as we know it. Can we imagine a university in which:

- faculty collaborate more on teaching (with technology serving as the forcing function)?
- faculty devote more of their time to promoting the “active learning” of their students and are freed from much of the tedium of grading?
- students receive more, and more timely, individualized feedback on assignments?
- technology is used to bring the perspectives of a more diverse student body onto its campus because of its capacity to engage students from around the world?
- technology extends the educational process throughout one’s life through the educational equivalence of booster shots? And, ideally:
- a university in which institutional costs and tuition charges rise at a slower rate?

Background

Advances such as far greater access to the internet, combined with changing mindsets, suggest that some forms of online learning can lead to good learning outcomes at lower cost.

Before considering with you how nirvana might at least be approached, I want to describe ever so briefly the evolution of my own thinking about technology and online learning, which dates back at least as far as the Romanes Lecture that I gave at Oxford in 2000.¹ In that lecture, I stressed the need to be realistic in thinking about how technology impacts costs, and I cited an early study at the University of Illinois that concluded: “Sound online instruction is likely to cost more than traditional instruction.”² I then cited a supporting observation from another early study: “A cyberprofessor trades the ‘chains’ of lecturing in a classroom for a predictable number of hours at a specific time and place for the more unpredictable ‘freedom’ of being accessible by email and other cyber technologies.... Many cybercourse instructors find themselves being drawn into an endless time drain.”³ My conclusion at that time: “All the talk of using technology to ‘save money by increasing productivity’ has a hollow ring in the ears of the budget officer who has to pay for the salaries of a cadre of support staff, more and more equipment, and new software licenses—and who sees few offsetting savings.”⁴

I next added the not-so-profound thought that “this could change....” I am today a convert. I have come to believe that “now is the time”—that 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. The phrase “in many of its manifestations” is important. Much confusion can result from failing to recognize that “online learning” is far from one thing—and far from static.⁵ It is in fact so many things and is evolving so rapidly that the efforts my colleague Kelly Lack and I made to create an understandable taxonomy did not succeed. They do not justify imposing a complex multi-layered schema on this audience. We felt as if we were trying to “tether a broomstick,”⁶ and we decided to content ourselves with describing (in the Appendix) some distinguishing aspects of this complex landscape.⁷

A far more sophisticated observer of digital trends than I am, President Hennessy, has been quoted as saying: “There’s a tsunami coming ... [But] I can’t tell you exactly how it’s going to break.”⁸ Since I live on the East Coast, not the West Coast, I am even less capable of judging tsunamis, their shape, their force, or their timing, but I too am convinced that online learning *could* be truly transformative.

What needs to be done in order to translate “could” into “will”? The principal barriers to overcome can be grouped under three headings: the appalling lack of hard evidence about both learning outcomes and potential cost savings; the need for shared but customizable teaching and learning platforms or tool kits; and the need for both new mindsets and fresh thinking about models of decision-making.⁹

The Lack of Hard Evidence

Prominent leaders in higher education have made it abundantly clear that the faculty and leadership of many institutions will consider major changes in how they teach if, and only if, much more hard evidence about potential gains is available. To be sure, better “facts” will not suffice to bring about change, but evidence may well be a necessary if not a sufficient condition.

How effective has online learning been in improving (or at least maintaining) learning outcomes achieved by various populations of students? Unfortunately, no one really knows the answer to either this question or the obvious follow-on query about cost savings. There have been literally thousands of studies of online learning, and Kelly Lack and I have attempted to catalog them and summarize their import.¹⁰ This has been a daunting—and, we have to say, discouraging—task. Very few of these studies are relevant to the teaching of undergraduates,¹¹ and the few that are relevant almost always suffer from serious methodological deficiencies. The most common problems are small sample size, inability to control for ubiquitous selection effects and, on the cost side, the lack of good estimates of likely cost savings in steady-state.

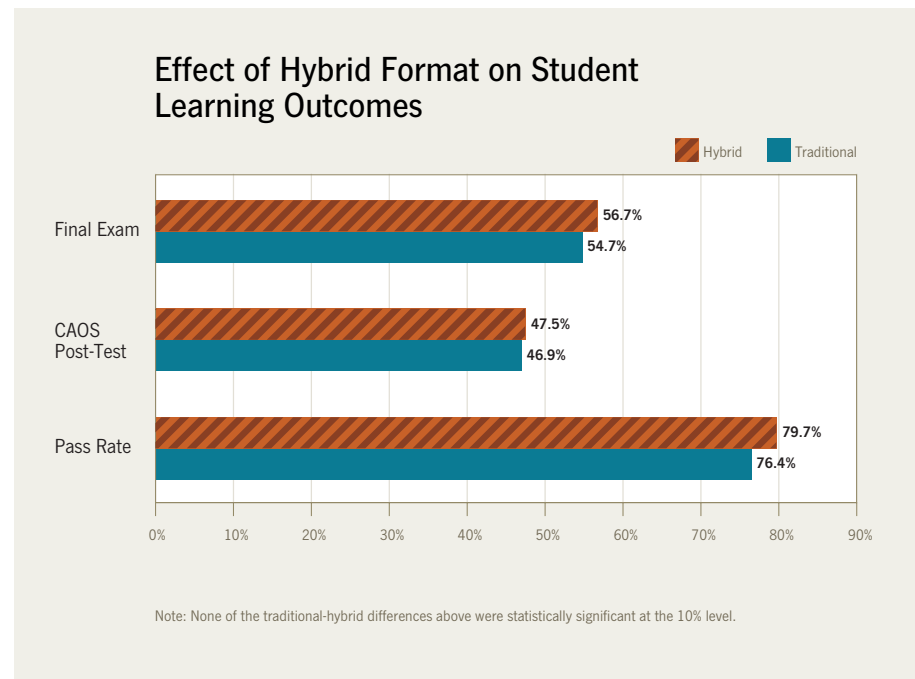
While some forms of online learning are still in their early days, there is no excuse for not working now on plans for rigorous third-party evaluations.

Kelly and I originally thought that full responsibility for this state of affairs rests with those who conducted the studies. We have revised that judgment. A significant share of responsibility rests with those who have created and used the online pedagogies, since the content often does not lend itself to rigorous assessment, and offerings are rarely designed with evaluation in mind. Moreover, the “gold standard” methodology—randomized trials—is both expensive and excruciatingly difficult to implement on university campuses. Also at play is what I can only call “the missionary spirit.” The creators of many online courses are true believers who simply want to get on with their work, without being distracted by the need to do careful assessments of outcomes or costs. In all fairness, I have to add that these are early days, and it is unrealistic to expect to have in hand today careful assessments of potentially path-breaking offerings such as some of the MOOCs (massive open online courses) that have been introduced so recently.¹² Still, there is no excuse for not working now on plans for rigorous third-party evaluations.¹³

In an effort to fill part of this gaping knowledge gap, the ITHAKA organization¹⁴ mounted an empirical study of the learning outcomes associated with the use of a prototype statistics course developed by Carnegie Mellon, taught in hybrid mode (with one face-to-face Q&A session a week).¹⁵ Carnegie Mellon’s course has several appealing features, including its use of cognitive tutors and feedback loops to guide students through instruction in basic concepts. In our study, we used a randomized trials approach to compare the learning outcomes of students who took a hybrid version of this highly interactive course with the outcomes of students who took face-to-face counterpart courses. A rich array of data were collected on campuses at the State University of New York (SUNY), the City University of New York (CUNY), and the University System of Maryland. Although this study had limitations of its own, it was, we believe, the most rigorous assessment to date of the use of a sophisticated online course by the kinds of public universities that most desperately need to counteract the “cost disease.”¹⁶ I will cite only two principal findings about learning outcomes.

First, we found *no statistically significant differences in standard measures of learning outcomes* (pass/completion rates, scores on common final exam questions, and results of a national test of statistical literacy) between students in the traditional classes and students in the hybrid-online format classes. See Figure 1.¹⁷ This finding, in and of itself, is not different from the results of many other studies. But it is important to emphasize that the relevant effect coefficients in this study have very small standard errors. One commentator, Michael S. McPherson, president of the Spencer Foundation, observed that what we have here are “quite precisely estimated zeros.” That is, if there had in fact been pronounced differences in outcomes between traditional-format and hybrid-format groups, it is highly likely that we would have found them.¹⁸

Figure 1



Second, this finding is *relentlessly consistent across not only campuses, but also across sub-groups of what was a very diverse student population*. Half the students in our study came from families with incomes less than \$50,000 and half were first-generation college students. Fewer than half were white, and the group was about evenly divided between students with college GPAs above and below 3.0. The finding of consistent outcomes across this varied population rebuts the proposition that only exceptionally well-prepared, high achieving students can succeed in online settings.¹⁹

Thus, while we did not find transformational improvements in learning outcomes, we did obtain compelling evidence that students with a wide range of characteristics learned just as much in the hybrid-online format as they would have had they instead taken the course in the traditional format.²⁰ Students at the four-year universities in our study “paid no price” in terms of pass rates or other learning outcomes for taking a hybrid course. This seemingly bland result is in fact very important, in light of perhaps the most common reason given by

faculty and deans for resisting the use of online instruction: “We worry that basic student learning outcomes will be hurt, and we won’t expose our students to this risk.” The ITHAKA research suggests that such worries may not be well founded—at least in situations akin to those we studied.

But, what about cost savings? Whether pedagogies such as the one we tested can in fact raise productivity by reducing instructional costs, thereby lowering the denominator of the productivity ratio, is an absolutely central question—which is given even more prominence by our finding of equivalent learning outcomes. Because of its clear importance, we thought hard about how to estimate potential cost savings. But, truth be told, we did not do nearly as well in looking at the “cost blade” of the scissors as we did in looking at learning outcomes. We were able to do no more than suggest a method of approach and hazard what are little more than rough guesses (speculations) as to the conceivable magnitude of potential savings in staffing costs.

A fundamental problem, cutting across all types of online offerings, is that contemporaneous comparisons of the costs of traditional modes of teaching and of newly instituted online pedagogies are near useless in projecting steady-state savings—or, worse yet, highly misleading. The reason is that the costs of doing almost anything for the first time are very different from the costs of doing the same thing numerous times. That admonition is especially true in the case of online learning. There are substantial start-up costs associated with course development that have to be considered in the short run but are likely to decrease over time. There are transition costs entailed in moving from the traditional, mostly face-to-face, model to a hybrid model of the kind that we studied. There is a need to train instructors to take full advantage of automated systems with feedback loops. Also, there may well be contractual limits on section size that were designed with the traditional model in mind but that do not make sense for a hybrid-online model. Such constraints have to be accepted in the short term, even though it may be possible to modify them over time.²¹

To overcome (avoid!) these problems, we carried out simulated cost probes. We conceptualized the research question here not as “how much will institutions save right now by shifting to hybrid-online learning?” but rather as “under what assumptions will cost savings be realized, over time, by shifting to a hybrid-online format, and how large are those savings likely to be?”

The crude models we employed (which ignore entirely the “joint products” issue that grows out of the practice of supporting graduate students as TAs) suggest savings in compensation costs alone ranging from 36 percent to 57 percent when the traditional teaching mode relies on multiple sections.²² Of course this simulation underestimates substantially the potential savings from moving toward a hybrid-online model because it does not account for space costs which can, in many instances, dominate cost calculations. A fuller analysis would also deal with other infrastructure costs, some of which would undoubtedly be higher in a hybrid-online format, as well as take into account reductions in the “time costs” incurred by students.²³ Also highly relevant are the perhaps profound effects of simplifications in scheduling. These could well lead, for many students, to an

The models we used in our study suggest savings in compensation costs alone of 36 percent to 57 percent when the traditional teaching mode relies on multiple sections.

accelerated flow “through the system,” and thus reduce time-to-degree and raise completion rates. “Productivity,” properly measured, could increase substantially via this avenue of impact.

While the ITHAKA study is undoubtedly helpful in overcoming skepticism, it involved only one course, in a field well-suited to online learning, in predominantly on-site contexts. We need many more careful studies of varied approaches to online learning, carried out in a variety of settings (including two-year colleges).

We have to recognize that the answers to these questions about the costs and benefits of different approaches are likely to vary according to the content being presented, the student population, and the setting.

Nor is it sufficient simply to compare outcomes of particular online offerings with outcomes in traditional face-to-face courses. We also need studies that *compare the effectiveness of different approaches to online learning*. Our intuition told us that the highly interactive character of the Carnegie Mellon course, informed by cognitive science, was more promising than simpler approaches—which is why we elected to test the CMU course. But this course was expensive to develop.²⁴ Its value needs to be compared with the value of other approaches that are cheaper and less complex. It would also be highly desirable to compare outcomes and costs associated with various MOOCs against other approaches to online teaching. And we have to recognize that the answers to these questions about the costs and benefits of different approaches are likely to vary according to the content being presented, the student population, and the setting. ITHAKA, working with Coursera and others, is contemplating just such a “cross-platform” study in collaboration with the University System of Maryland.

Designing research strategies in this area is a complicated business under the best of circumstances. Randomized trials are, it is generally agreed, the most promising way of reducing the ever-present risk of selection bias, but a huge take-away from our empirical research using this methodology is that it is expensive and devilishly difficult to carry out on actual campuses. As we learned painfully, there are many important details that have to be worked out: how best to describe the course to be tested; how to recruit student participants in the study (including what incentives to use); how to randomize apprehensive students between treatment and control groups—and to be sure that they stay in their assigned format; how to collect background information about student participants; and how to satisfy Institutional Review Board requirements in a timely way. Moreover, finding good answers requires the day-to-day involvement of campus staff not directly responsible to outsiders like us.²⁵ Looking ahead, I now think—heresy of heresies!—that the case for using randomized trials should itself be subject to careful cost-benefit analysis.²⁶ Appealing as randomized trials are, this may be an instance in which, in at least some instances, “the best is the enemy of the good.”²⁷

Last on my short list of research priorities is the evident need for creative analyses on the cost side of the ledger. This work should do more than just project direct costs (on a forward-looking, steady-state basis). It should include implications for space utilization, capital costs, and indirect costs, hard as these are to estimate. It should also consider freshly the many ways in which online technologies may influence the way sizeable parts of the curriculum can be re-engineered (bearing in mind the injunction of the *New England Journal of Medicine* authors about the need for such re-engineering, as in the much earlier introduction of electricity to manufacturing). The pace at which current students get through

the educational system is enormously important, as are completion rates. It may be possible to utilize online technologies to allow energetic secondary school students to get an early start on their college education—perhaps by preparing them to take college-level tests that will allow them to place out of some introductory courses. The biggest opportunity for MOOCs to raise productivity system-wide, and lower costs, may well lie in finding effective ways for third-parties to certify the “credit-worthiness” of their courses—and the success of students in passing them.²⁸

The Need for Customizable, Sustainable Platforms (Tool Kits)

I now move on to discuss a second need if we are to make real progress in utilizing technology in the pursuit of our aspirations. A major conclusion of ITHAKA’s *Barriers to Adoption* report is that “perhaps the largest obstacle to widespread adoption of ILO-style courses” (where “ILO” stands for “Interactive Learning Online”) is the lack at the present time of a “sustainable platform that allows interested faculty either to create a fully-interactive, machine-guided learning environment, or to customize a course that has been created by someone else (and thus claim it as their own).” A companion conclusion is that “faculty are extremely reluctant to teach courses that they do not ‘own.’”²⁹ As one commentator put it, “no one wants to give someone else’s speech” (even though all of us are happy to borrow felicitous phrases). This is by no means just about ego, although ego is certainly involved. Faculty may understandably feel that they are not sufficiently familiar with content prepared solely by someone else to teach it effectively. Also, both the structure of content and examples often need to be tailored to a particular student audience.

It would be easy—but incorrect—to infer from this line of argument that the development of online courses has to be a responsibility of each individual campus. Reliance on purely “homegrown” approaches would be foolishly inefficient and simply will not work in most settings. It will not take advantage of the economies of scale offered by sophisticated software that incorporates features of well-developed platforms, including effective peer-to-peer interactions.³⁰ Furthermore, many institutions simply do not have the money or the in-house talent to start from scratch to create sophisticated online learning systems that can be disseminated widely. Nor would it make sense to re-invent “wheels” that can be readily shared.

There is a system-wide need for a sophisticated, customizable platform that can be made widely available, maintained, upgraded, and sustained in a cost-effective manner.

There is clearly a system-wide need for a *sophisticated, customizable platform (or tool kit) that can be made widely available, maintained, upgraded, and sustained in a cost-effective manner*. Yet, higher education thus far has failed to find a convincing solution to this problem, and immediate prospects for a solution are uncertain at best. In seeking to address this need, we must recognize the high probability that quite different pedagogies will be appropriate in subjects in which there are concrete concepts to be mastered and “one right answer” to many questions (e.g., basic statistics)—as contrasted with discursive subjects which benefit from the exchange of different points of view (e.g., the Arab-Israeli conflict).

A strong *prima facie* case can be made for a high-level collaborative effort within the traditional higher education community—after all, collaborations have been highly beneficial in sharing other assets, such as ultra-expensive scientific

equipment. It is, however, widely recognized that collaborative efforts are difficult to organize, especially when much nimbleness is needed.³¹ Collective decision-making is often cumbersome, and it can be hard to avoid lowest-common-denominator thinking. My favorite example is the Peace of Paris negotiations at the end of World War I, which ended so disastrously. Keynes' famous account of the collective efforts of the participants is worth recalling: "These then were the personalities of Paris—I forbear to mention other nations or lesser men: Clemenceau, aesthetically the noblest; the President, morally the most admirable; Lloyd-George, intellectually the subtlest. Out of their disparities and weaknesses the Treaty was born, child of the least worthy attributes of each of its parents, without nobility, without morality, without intellect."³²

There is, then, much to be said for seeking leadership from a single entity that is well-respected and has a demonstrated capacity to *execute*. At one time, my colleagues and I were wondering whether Carnegie Mellon might address this need by scaling up the promising, highly interactive system that we tested, and correcting the main shortcomings noted by participants in our study, including their interest in having a more "customizable" platform. Carnegie Mellon has expressed a commitment to developing the tools that are needed for authoring and analytics, which could well improve the scalability of their platform as we had originally hoped, but such an outcome is at least a year or two away.³³ In a field that is evolving as rapidly as this one, it remains to be seen how CMU's cognitive-science, adaptive-learning approach will fit into the online learning landscape over the next few years.

We could of course simply let the marketplace provide; it is possible that for-profit entities, trading on financial incentives, might develop one or more effective platforms. There is, however, a risk that a for-profit might elect to cover some or all of its costs by essentially privatizing the significant amounts of information that such online systems can generate about how students learn. The example of Google illustrates dramatically the value that can be derived from exploiting a proprietary database for purposes such as selling targeted advertising. Massive amounts of data on how students learn can further the core mission of not-for-profit higher education and lead, in time, to the creation of better "adaptive learning" systems in some fields. It would be unfortunate if the potential "public good" benefits of the rich information generated by online learning systems were lost. The educational community writ large should think hard about whether, and if so how, a non-profit depository for such information could be created and maintained.

Because they have a rare combination of assets—impressive technical capacity, a strong financial base, and real standing in the academic community—MOOCs, at least right now, are the "highest-potential game in town."

I have left for last what I regard as the most promising (though still entirely speculative) option at present: namely, the possibility that leading MOOCs might meet the need for readily adaptable platforms or tool kits. Coursera, edX, and Class2Go have said that they are committed to developing systems that can be used widely by others.³⁴ No one should doubt the good intentions of such entities. Nor should anyone undervalue the substantial resources at their disposal. It is precisely because they have a rare combination of assets—impressive technical capacity on which they can call, a strong financial base, and real standing in the academic community (enhanced by extraordinary media coverage)—that I regard them, at least right now, as the "highest-potential game in town." But neither should anyone underestimate the difficulty of modifying MOOCs originally

designed to provide direct instruction to many thousands of *individual students worldwide* so that they can also serve the needs of *existing educational institutions* that serve defined student populations.

The interviews we did for our *Barriers* study revealed “little enthusiasm for prepackaged online courses that did not permit customization regardless of [the standing of] the institution ‘sponsoring’ the course, its quality, or the degree of interactivity.”³⁵ And there is something of an inherent conflict, or at least a tension, between, on the one hand, the structure of MOOC offerings which are designed largely by renowned and high-visibility professors at leading universities and which are generally provided worldwide on an “as-is” basis and, on the other hand, the need for at least some campus-specific customization. A related point is that the cost-effectiveness of MOOCs in their “direct to student” mode stems largely from the fact that their one-size-fits-all structure drives the marginal cost of serving even an extra thousand students close to zero. It is much less obvious how—or even whether—large cost savings can be achieved when a MOOC has to be “customized” for local use by a particular institution with a much smaller student population and a resident teaching staff. In addition, there are IP rights issues that need to be resolved.

We should also recognize that while there has been much discussion about potential sources of revenue for MOOCs (charging for certificates of completion, becoming a kind of job placement enterprise, and so on), the viability of the various hypothetical possibilities remains to be demonstrated.³⁶ A major lesson from the earlier MIT OpenCourseWare (OCW) experience is that it can be much easier to create something like OCW, often with philanthropic support, than to find regular sources of revenue to pay the ongoing costs of maintaining and upgrading the system. MIT is today still paying the running costs of OCW each year, and we are told that the faculty and trustees of MIT are convinced that they cannot go down the same path again – their pride in OCW as a truly pioneering venture notwithstanding.³⁷ “Donor fatigue” is a fact of life, and some regular, predictable source of revenue is needed for sustainability. There is real danger in announcing that something is “free” without knowing who is to pay the ongoing costs, which are all too real and cannot be ignored.³⁸ The “no free lunch” adage comes to mind.

We should try to find effective ways of testing learning outcomes for students using MOOCs and assessing cost-saving options for specific universities and university systems.

These cautions and open questions about MOOCs cannot be ignored or assumed away. Nonetheless, I believe that the educational community should make every effort to take advantage of the great strengths of the leading MOOCs. Not only should we encourage their continuing interest in serving existing institutions as well as a worldwide audience, but we should also try to find ways of testing learning outcomes and assessing cost-saving options for specific universities and university systems. Right now there is, as far as I am aware, no real evidence as to how well MOOCs can produce good learning outcomes for 18-22-year-olds of various backgrounds studying on mainline campuses—and this is a huge gap in our knowledge.³⁹ Moreover, the entire higher education community has an interest in thinking about business models that would assure the sustainability of the most promising MOOCs without compromising educational goals. The experiences of entities such as JSTOR in developing sustainable business models could

be relevant. Indeed, I suspect that at least part of the answer to the sustainability issue could lie in finding a JSTOR-like mechanism for charging reasonable fees to institutions (and/or students) that realize cost-saving benefits from MOOCs.⁴⁰

The Need for New Mindsets and Fresh Thinking about Decision-Making

My third and last category of needs to be addressed is something of a grab bag—but a useful one, I hope. Many of the specific issues mentioned in the *Barriers* report share the attribute of requiring strong institutional leadership and even fresh ways of thinking about decision-making. These include, for example, the fact that “online instruction is alien to most faculty and calls into question the very reason that many pursued an academic career in the first place” (“they enjoyed being students and valued the relationships that they enjoyed with their professors”). Other barriers include fear that online instruction will be used to diminish faculty ranks, and the failure to provide the right incentives for faculty asked to lead online initiatives.

Hard as it sometimes is for beleaguered deans and presidents to confront challenges of these kinds directly, it is rarely wise to gloss over the most sensitive issues. I am convinced that a new, tougher, mindset is a prerequisite to progress. There is too strong a tendency to respond to financial pressures by economizing around the edges and putting off bigger—and harder—choices in the hope that the sun will shine tomorrow (even if the forecast is for rain!).

The seemingly unrelenting upward spiral of costs and tuition charges can be arrested, at least in some degree, only if presidents, provosts and trustees make controlling both costs and tuition increases a priority. Academic leaders must look explicitly for strategies to lower costs. I am not saying that educational leaders lack courage (though, sadly, some do). Controlling costs is a hard sell, in part because strong forces are pushing in the opposite direction, and, as one of our advisers said, “those opposed have so many ways of throwing sand in the wheels.”⁴¹

I continue to believe that the potential for online learning to help reduce costs without adversely affecting educational outcomes is very real. Absent strong leadership, however, there is a high probability that any productivity gains from online education will be used to gild the educational/research lily—as has been the norm for the last 20 years. Presidents and provosts should not mince words in charging their deans and faculty with teaching courses of comparable quality with fewer resources—thereby lowering the denominator of the productivity ratio.

There is a definite political aspect to all of this. *We must recognize that if higher education does not begin to slow the rate of increase in college costs, our nation’s higher education system will lose the public support on which it so heavily depends.* There has been an undeniable erosion of public trust in the capacity of higher education to operate more efficiently.⁴² In this respect, the better-off private and public universities—which rely heavily on many forms of federal support, including direct research grants from NIH, NSF, and other federal agencies, indirect cost recovery, financing of graduate students, and student loan guarantees—are in much the same boat as the more visibly endangered parts of the educational system.

If higher education does not begin to slow the rate of increase in college costs, our nation’s higher education system will lose the public support on which it so heavily depends.

Efforts to save resources should be highly visible. Those who are skeptical about the capacity of established institutions to take positive steps in this sensitive area need to be given evidence that change is possible.

One favorable omen is the openness of many faculty to new ways of thinking—including the desirability of “flipping the classroom.”⁴³ A recent survey shows that a “decisive majority of professors”—69 percent—view with more excitement than fear the prospect of “changing the faculty role to spend less time lecturing and more time coaching students.”⁴⁴ Movement away from reliance on traditional lecturing, especially in large introductory courses, should allow institutions to devote the valuable in-person time of both faculty and students to activities that are more powerfully “educational.”⁴⁵

Decisions in key areas such as teaching methods should be made by a mix of individuals from different parts of the institution, including those well positioned to consider the full ramifications of the choices before them.

Growing openness to such concepts does not translate automatically, however, into new modes of teaching. Required is a willingness to question established norms, including models of decision-making. The challenges are at least as much conceptual, organizational, and administrative as they are technical. I wonder if the particular modes of what is often called “shared governance” that have been developed over the last century are well-suited to the digital world. “Shared governance” can mean dividing up tasks in seemingly clear-cut ways: leaving “corporate” decisions of one kind or another entirely in the hands of trustees and “academic” decisions entirely in the hands of faculty.⁴⁶ But, if wise decisions are to be made in key areas such as teaching methods, it is imperative that they be made by a mix of individuals from different parts of the institution, including faculty leaders, but also others well positioned to consider the full ramifications of the choices before them. There are real dangers in reliance on the compartmentalized thinking that too often accompanies the decentralized modes of organization to which we have become accustomed.⁴⁷

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 full authority to particular professors or even to particular departments. There are too many “spill-over” effects. It is by no means obvious that resources saved by using machine-guided learning in large introductory courses in subjects especially well-suited to this approach should be captured in their entirety by the department(s) concerned.⁴⁸ It is important to think institution-wide about the allocation of savings—with prospective students and their parents among the stakeholders. Also, the investments required to allow such savings—and to sustain initiatives—can be considerable, and often have to be authorized by a central authority.

Specific organizational approaches 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, it may have been sensible to leave almost all decisions concerning not just what to teach, but how to teach, in the hands of individual faculty members. It is by no means clear, however, that this model is the right one going forward, and it would be highly desirable if the academic community were seized of this issue and addressed it before “outsiders” dictate their own solutions. To repeat: faculty involvement is essential. There is a self-

evident need for consultation with those who are expert in their disciplines and experienced in teaching—but this is not the same thing as giving faculty a veto power over change.

Nor is this, I would emphasize, an issue of “academic freedom,” as that crucially important concept is properly understood. Faculty members should certainly be entirely free to speak their minds, as scholars and as teachers. But this freedom of expression should not imply unilateral control over *methods* of teaching. There is nothing in the basic documents explaining “academic freedom” to suggest that such control is included. It is not.⁴⁹ If “academic freedom” is construed to mean that faculty can “do anything they choose,” it becomes both meaningless and indefensible.⁵⁰

What Must We Retain?

Let me now circle back to what I said at the start of this lecture. As we contemplate a rapidly evolving world in which greater and greater use will surely be made of online modes of teaching, I am convinced that there are central aspects of life on our traditional campuses that must not only be retained, but even strengthened. I will mention three.

First is the need to emphasize—and, if need be, to re-emphasize—the great value of “minds rubbing against minds.” We should resist efforts to overdo online instruction, important as it can be. There are, of course, both economic constraints and practical limitations on how much education can be delivered in person. But those of us who have benefitted from personal interactions with brilliant teachers (some of whom became close friends), as I certainly have, can testify to the inspirational, life-changing aspects of such experiences. The half-life of content taught in a course can be short, as we all know; but great teachers change the way their students see the world (and themselves) long after their students have forgotten formulas, theorems, and even engaging illustrations of this or that proposition.⁵¹ Moreover, a great advantage of residential institutions is that genuine learning occurs more or less continually, and as often, or more often, out of the classroom as in it. This cliché, repeated by countless presidents, conveys real truth. Late night, peer-to-peer exchanges offer students hard-to-replicate access to the perspectives of other people. As one of my greatest teachers, Jacob Viner, never tired of warning his students, “There is no limit to the amount of nonsense you can think, if you think too long alone.”

Even the wealthiest, most elite colleges and universities should ask if failing to participate in the evolution of online learning models is to their advantage, or even realistic, in the long run.

My plea is for the adoption of a “portfolio” approach to curricular development that provides a carefully calibrated mix of learning styles. This mix will vary by institutional type, and relatively wealthy liberal arts colleges and selective universities can be expected to offer more in-person teaching than can many less privileged institutions. However, even the wealthiest, most elite colleges and universities that seemingly can afford to stay pretty much as they are, at least in the short run, should ask if failing to participate in the evolution of online learning models is to their advantage, or even realistic, in the long run.⁵² Their students, along with others of their generation, will expect to use digital resources—and to be trained in their use. And as technologies grow increasingly sophisticated,

and we learn more about how students learn and what pedagogical methods work best in various fields, even top-tier institutions will stand to gain from the use of such technologies to improve student learning.

Second, we must retain, whatever the provocations, the unswerving commitment of great colleges and universities to freedom of thought—as exemplified so clearly by my great friend of so many years, Richard Lyman, Stanford’s seventh president, who died in May of this year. President Lyman stood resolutely for civility and protection of the rights of all. When he was compelled to summon the police to curb an over-the-edge demonstration in 1969, his action was applauded by some, but he thought the applause was misplaced. President Lyman said: “Anytime it becomes necessary for a university to summon the police, a defeat has taken place. The victory we seek at Stanford is not like a military victory; it is a victory of reason and the examined life over unreason and the tyranny of coercion.”⁵³

Third, our colleges and universities should focus, unashamedly, on values, as well as on “knowledge”—and we should spend more time than we usually do considering how best to do this. This is most definitely not a plea for pontificating. When Robert Hutchins was urged to teach students at Chicago to do this, that, or the other thing, he demurred, explaining: “All attempts to teach character directly will fail. They degenerate into vague exhortations to be good which leave the bored listener with a desire to commit outrages which would otherwise have never occurred to him.”⁵⁴

Let me now refer to a Baccalaureate address given at Princeton in 2010 by Jeff Bezos, the CEO of Amazon, titled “We Are What We Choose.”⁵⁵ Bezos began by reciting a poignant story of a trip he took with his grandparents when he was 10 years old. While riding in their Airstream trailer, this precocious ten-year old laboriously calculated the damage to her health that his grandmother was doing by smoking. His conclusion was that, at two minutes per puff, she was taking nine years off her life. When he proudly told her of his finding, she burst into tears. His grandfather stopped the car and gently said to Jeff: “One day you’ll understand that it’s harder to be kind than clever.” Bezos went on to talk about the difference between gifts and choices. “Cleverness,” he said, “is a gift, kindness is a choice. Gifts are easy—they’re given after all. Choices can be hard.” Colleges and universities can, and should, find ways to help their students learn this key distinction—and encourage them, at least some of the time, to choose kindness over cleverness.

Online learning can be part of an answer to the cost disease, but it is no panacea for this country’s deep-seated educational problems.

I return, “finally” (what one of my friends called the most beautiful word in the English language), to the question posed at the outset of this talk: “Is online learning a ‘fix’ for the ‘cost disease?’” My answer: “No, not by itself. But it can be part of an answer.” It is certainly no panacea for this country’s deep-seated educational problems, which are rooted in social issues, fiscal dilemmas, and national priorities, as well as historical practices. In the case of a topic as “active” as online learning, we should expect inflated claims of spectacular successes—and of blatant failures. The findings I have reported warn strongly against “too much hype.” What Keynes said about those who claim certain knowledge of “the currency question” can be applied to online learning: “Only one man in a thousand understands the currency question, and I meet him every day.” There is a real danger that the media frenzy associated with MOOCs will lead some

Vigorous efforts should be made to explore further uses of both the relatively simple systems that are proliferating all around us, and more sophisticated systems that are still in their infancy.

colleges and universities (perhaps especially business-oriented members of their boards) to embrace too tightly the MOOC-approach before it is adequately tested and found to be both sustainable and capable of delivering good learning outcomes for all kinds of students.⁵⁶

Uncertainties notwithstanding, it is clear to me that online systems have great potential. Vigorous efforts should be made to explore further uses of both the relatively simple systems that are proliferating all around us, often to good effect, and more sophisticated systems that are still in their infancy—systems sure to improve over time, perhaps dramatically. In these explorations, I would urge us not to hesitate to experiment, but always to insist on assessments of outcomes. I would also urge us to think in terms of system-wide approaches and to exercise that rarest of virtues, patience. The careful development (and testing) of promising new pedagogies can take years and even decades.⁵⁷

I will end with a last story, on the theme of patience. It comes from the Arabian Nights, and I owe it to a very wise man, Ezra Zilkha, who was born in Baghdad. This is the story of the Black Horse. 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 lesson of the story, Mr. Zilkha said, is “if you don’t have an immediate answer, buy time. Time, if we use it, might make us adapt and maybe, who knows, find solutions.” If speaking to a college or university audience such as this one, Mr. Zilkha would add: “It is the job of the Stanfords of this world to teach the black horse to talk.”

Contours

At one corner of this highly variegated spectrum are an extremely large number of relatively straightforward online courses that provide a variety of instructional materials on the web, often including videos, practice problems, and homework assignments. These courses (and some entire degree programs based on them) are usually institution-specific and built on learning management systems; they can be aimed at students in residence, at distance learning populations, or both. They usually carry credit, and are offered by both for-profit universities such as the University of Phoenix, and a wide variety of non-profit educational institutions. Some number of such courses in the non-profit sector—not all of them entirely or even mostly online—have been created with the assistance of the National Center for Academic Transformation (NCAT) through its “course-redesign” initiative that itself involves different models of online instruction.⁵⁸

The spread of online offerings is dizzying. During one week in August, when I was working on these lectures, I came across announcements of online initiatives by institutions as varied as the University of Florida system, a Seminole tribe program also in Florida (the Native Learning Center), Kansas University, Utah Valley University, and a number of HBCUs whose activities were reported by the Digital Learning Lab of Howard University. (Websites are the best way to learn about these and other initiatives too numerous even to mention here.) In addition, there are many online courses overseas, and the Open University in the UK has been especially active in this field for years.⁵⁹ According to the November 2011 report of the Sloan Consortium, which has been tracking the growth of online learning in the United States, between fall 2002 and fall 2010, enrollments in online courses increased much more quickly than total enrollments in higher education. More than three of every ten students in higher education now take at least one online course.⁶⁰ In early September of this year, Indiana University announced “IU Online,” a major new initiative that builds on a long history of work at that university and that illustrates what is happening at a variety of institutions throughout the country.⁶¹

The proliferation of offerings called “online” surely qualifies as a tidal wave if not yet a tsunami. In addition to courses that can be counted, all of us “feel” the pervasiveness of the internet in higher education by the increasing use of it in standard course management systems or virtual reading materials and a rapidly proliferating number of more and more sophisticated electronic textbooks incorporated into the curriculum. Even courses that are called “traditional” almost always involve some use of digital resources.

Carnegie Mellon University deserves special mention as a pioneer in the development of highly interactive online courses that have been built by teams of cognitive scientists, software engineers, and disciplinary specialists under the leadership of Candace Thille’s “Open Learning Initiative.” These “OLI” courses feature cognitive tutors and three types of feedback loops: “system to student,” providing instant feedback to students on their answers to problems and carefully structured “hints” as to how to get the right answers; “system to teacher,”

providing current information to the teacher on how individual students, as well as students in general, are doing (thereby enabling teachers to make more effective use of any face-to-face time that is available); and “system to course designer,” providing information on parts of the course that are working well and parts that need improvement.⁶²

At still another corner of this spectrum are the MOOCs—massive open online courses—usually designed by highly regarded professionals and taught to thousands of students worldwide with minimal day-to-day involvement by professors. Typically, students registered for these courses (and there is usually no charge for registering) watch videos and complete assignments that are machine-graded or graded by other students and/or teaching assistants. With very few exceptions, these courses do not carry college credit or lead to degrees, and they may or may not lead to “certificates of accomplishment” or “badges”—for which students may need to pay a modest fee—that indicate mastery of particular skills. Three of the best-known exemplars of MOOCs are listed below.⁶³ Again, websites are the best source of information about these and other MOOCs.

- Coursera, a for-profit spin-off from Stanford that offers a wide variety of courses in close collaboration with high-profile universities (including Princeton, Toronto, and the University of Michigan, as well as Stanford itself), to which Coursera provides “authoring tools” and other forms of assistance;
- Udacity, another for-profit Stanford spin-off, which concentrates in computer science and related fields; unlike Coursera, Udacity works only with individual professors (rather than through institutions);
- edX, a non-profit partnership of MIT, Harvard, and Berkeley that offers courses of its own, initially focusing mainly on computer science and engineering fields, and that also plans to make its platform available on an open-source basis to faculty elsewhere who wish to create their own courses;

Another well-known provider of free online course materials is Khan Academy, a non-profit organization which is perhaps best known for its short instructional videos hosted on YouTube, but which today emphasizes automated practice exercises that are used heavily by secondary school students. Its instructional videos cover a broad range of disciplines, ranging from civics and art history to computer science, chemistry, differential equations, and the Greek debt crisis, though it has generally been Khan’s mathematics materials that have been used in classroom settings. While one can argue about whether Khan Academy should be classified as a MOOC in light of the fact that its typical offerings are not “courses,” the breadth and widespread appeal of the Khan Academy’s offerings undoubtedly bear mention.

Distinctions

In contemplating the wide array of offerings that populate the online universe, it may be helpful to think in terms of eleven overlapping distinctions, grouped under four headings. A first set of distinctions concerns particular features of online courses. (1) How advanced is the content of the course and are there daunting prerequisites? (2) To what extent does the course contain cognitive tutors (akin to those available in Carnegie Mellon’s OLI courses) or other

adaptive learning features? (3) To what extent does the course allow learners to interact with each other, and perhaps with instructors or teaching assistants who are leading or overseeing the course (if there are any)?

In addition, one can make distinctions based on how the content is delivered.

(4) Is the course purely online, or is it a “hybrid course” with a face-to-face element?

(5) Is the online component of the course offered in synchronous mode (that is, do students all have to be online at the same, specified times), or in asynchronous mode (where students can access the materials any time they choose), or both?

Distinctions can also be based on the entities offering the courses and the intended audiences.

(6) Is the course offered “direct to student” or through an existing college or university? (7) What is the primary intended student population—working adults in the U.S. (who more often than not study part-time), more traditional students (often but not always campus-based), or anyone and everyone with aptitude and interest all over the world? (8) To what extent can the course be adapted, or re-purposed, to serve other sets of students in the future, in various settings? There are important distinctions between online courses that are “homegrown,” designed on a institution-specific platform that has little customization capacity, and intended specifically for use by a known institutional population; courses that are developed for a broader (and unknown) population of students; and courses that are developed alongside, or on top of, a general platform, but that have customizable features and allow for “local” varieties targeted at particular populations.

Finally, there is a set of distinctions related to credentialing and “ownership.”

(9) Does the course offer credit and a path to a degree, a “certificate of accomplishment,” or no assessment of accomplishment? (10) Who owns (and/or has license to use) the intellectual property of the course materials? Is the controlling entity a for-profit or non-profit organization? (11) What is the business model underlying the course offering? Is the course available to students for “free,” and if it is, who pays for the development and ongoing operation of the course?

There are obviously hundreds of possible permutations and combinations involving these and other distinctions. With so many dimensions along which online courses can be classified, a simple taxonomy can be both elusive and more confusing than helpful. The variety of online offerings is often underappreciated, as is the importance of deciding what characteristics are appropriate in a particular setting.

Endnotes

- 1 See William G. Bowen, "At a Slight Angle to the Universe: The University in a Digitized, Commercialized Age," The Romanes Lecture for 2000, University of Oxford, October 17, 2000 [published in pamphlet form by the Princeton University Press]. (A copy of the lecture is also available online at http://www.mellon.org/internet/news_publications/publications/romanes.pdf .)
- 2 See citation in Romanes lecture, p. 24 in pamphlet edition: "Teaching at an Internet Distance," report of a 1998-99 University of Illinois faculty seminar, December 7, 1999, www.vpaa.uillinois.edu/tid/report.
- 3 See citation in Romanes lecture, pp. 23-24 in pamphlet edition: Peter Navarro, "Economics in the Cyberclassroom," *Journal of Economic Perspectives*, Spring 2000, p. 129.
- 4 See Romanes Lecture, pp. 24-25.
- 5 In the words of the authors of one study comparing face-to-face instruction with three different varieties of "distance learning:" "Like Campbell's Soups, distance learning now comes in so many varieties that it is increasingly difficult to generalize about it." (See James V. Koch, and Alice McAdory, "Still No Significant Difference? The Impact of Distance Learning on Student Success in Undergraduate Managerial Economics," *Journal of Economics and Finance Education* (forthcoming).)
- 6 This imagery is from Keynes' explanation of his difficulty rendering a portrait of Lloyd George at the Peace of Paris. See John Maynard Keynes, *Essays in Biography* [Horizon Press, NY, 1951], p. 33. I shall offer one other snippet from this remarkable essay when I discuss collective decision-making.
- 7 Caroline Hoxby has emphasized (in personal e-mail correspondence, September 22, 2012) that it is a serious mistake to "conflate" online learning at the two ends of the educational spectrum. What works for primary and secondary schools serving students with low educational attainment may have little or no relevance for elite universities—and vice versa.
- 8 See "Changing the Economics of Education," interview with John Hennessey and Salman Khan, *Wall Street Journal*, June 4, 2012. See also Ken Auletta, "Get Rich U," *The New Yorker*, April 30, 2012.
- 9 For a fuller study of "barriers to adoption" of online pedagogies, see Lawrence S. Bacow, William G. Bowen, Kevin M. Guthrie, Kelly A. Lack, and Matthew P. Long, *Barrier to Adoption of Online Learning Systems in U.S. Higher Education*, May 1, 2012, available on the ITHAKA website: <http://www.sr.ithaka.org>. The discussion here draws heavily on this report but is both much more cryptic and organizes the issues differently.
- 10 See William G. Bowen and Kelly A. Lack, *Current Status of Research on Online Learning in Postsecondary Education*, originally dated May 18, 2012, <http://www.sr.ithaka.org>. Lack has prepared summaries of subsequent research (and of a few studies missed in our initial survey); these updates are included in the revised version of this literature review now available on the website.
- 11 In the widely cited SRI/DOE Meta Analysis (usually cited as Means et al., 2009), most of the 46 studies reviewed involved online learning in the fields of medicine or health care, and a great many studies compared the use of the two different modes of learning for less than a full semester. In addition, only 25 of the 51 online versus face-to-face comparisons analyzed in the meta-analysis involved undergraduate students. (The other 26 involved students in grades kindergarten through 12, graduate students, or other types of learners.) See Barbara Means et al., *Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies*, U.S. Department of Education, 2009, <http://www2.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf>.
- 12 In general, MOOCs are free or low-cost online courses that are open to interested users—in some cases, by the thousands, tens of thousands, or hundreds of thousands—throughout the world. These courses typically consist of video lectures by well-known professors or experts in a particular field, often affiliated with elite institutions; the video lectures generally are complemented by problem sets and/or other assignments, and, in some cases, discussion boards where students can interact with one another asynchronously. Students generally have very little opportunity to interact with the professor himself or herself (with the exception, in some cases, of mass emails sent by the instructor to all enrolled students), though some instructors have teaching assistants available to answer questions or monitor the discussion boards. Completion of a MOOC is sometimes recognized with a certificate of accomplishment from the professor or from the MOOC itself, though it generally is not attached to credit from the college or university with which the professor is affiliated. See the Appendix to this document for a description of some varieties of online learning, including some of the most well-known MOOCs. The following website also provides a useful and relatively up-to-date overview

of the characteristics of, and the recent developments among some MOOCs: Abby Clobridge, “MOOCs and the Changing Face of Higher Education,” *Information Today*, August 30, 2012, <http://newsbreaks.infotoday.com/NewsBreaks/MOOCs-and-the-Changing-Face-of-Higher-Education-84681.asp>.

- 13 Khan Academy is undergoing an assessment, conducted by SRI International’s Center for Technology in Learning, regarding the adoption and effectiveness of its materials in classrooms from 21 primary and secondary schools in Northern California during the 2011-2012 year; a report with the findings is expected in December 2012. (See “Research Update,” SRI International, Center for Technology in Learning, June 2012, http://ctl.sri.com/news/newsletter_june_2012/june_2012_news.html.) With respect to the MOOCs offering college-level courses, both Coursera and edX have expressed an interest in working with ITHAKA on assessments, and a recent piece in the *Chronicle of Higher Education* reported that edX is planning to test a “flipped classroom” model—combining the use of content from its online courses with face-to-face teaching—at a community college. (See Marc Parry, “5 Ways That EdX Could Change Education,” *Chronicle of Higher Education*, October 1, 2012.) For-profit publishers active in this field have assembled some results that they claim, not surprisingly, make a case for their products. Disinterested third-party assessments are clearly in order. See Appendix B to the Bowen and Lack paper cited above.
- 14 ITHAKA is a non-profit organization created initially by the Andrew W. Mellon, William and Flora Hewlett, and Stavros Niarchos Foundations. It is the parent of JSTOR and Portico and also operates an increasingly important “S+R” (“Strategy and Research”) division. Kevin M. Guthrie is the president of ITHAKA, and its board is chaired by Henry Bienen, president emeritus of Northwestern University. ITHAKA’s mission is “to help the academic community use digital technologies to preserve the scholarly record and to advance research and teaching in sustainable ways.”
- 15 Courses like this exemplify what we call the “Interactive Learning Online” (or “ILO”) approach. We prefer the “ILO” acronym, which emphasizes the interactive features of this kind of online learning. This approach contrasts with more common types of online learning which often mimic classroom teaching without taking advantage of the unique online environment to provide “added value.”
- 16 See William G. Bowen, Matthew M. Chingos, Kelly A. Lack, and Thomas I. Nygren, *Interactive Learning Online at Public Universities: Evidence from Randomized Trials*, May 22, 2012, which is available on the ITHAKA website: <http://www.sr.ithaka.org>, for a full description of the study. We are pleased to report that the study has been very well received by major media outlets such as *The National Review*, *The Boston Globe*, *The Chronicle of Higher Education*, *Inside Higher Ed*, and, in particular, *The Wall Street Journal* (whose writer David Wessel called the report “carefully crafted” and its findings “statistically sound”). In addition to the six four-year institutions included in the study, we tried to include three community colleges. But for a variety of reasons—many logistical—this effort did not succeed, and we caution readers against simply extrapolating our findings to two-year colleges.
- 17 As can be seen from the figure, hybrid-format students did perform slightly better than traditional-format students on three outcomes—achieving pass rates that were about three percentage points higher, scores on a standardized test called CAOS that were about one percentage point higher, and scores on common final exam questions that were two percentage points higher—but none of these differences passes the usual tests of statistical significance.
- 18 Thus, our finding is strikingly different in this consequential respect from an alternative (hypothetical) finding of “no significant difference” which resulted from a coefficient of some magnitude accompanied by a very large standard error. A finding with big standard errors would mean, in effect, that we just don’t know much—the “true” results could be almost anywhere.
- 19 We wondered if the opposite proposition would hold—that is, we thought it possible that students who are subject to what Claude Steele has called “stereotype threat” might actually do better in more anonymous settings. “Not proven,” is the verdict of this study. The size of our study, with over 600 participants, roughly half in the treatment sections and half in the control sections, allowed us to look more carefully than most other studies have been able to do at these more refined groupings of students. We calculated results separately for subgroups of students defined in terms of characteristics including race/ethnicity, gender, parental education, primary language spoken, pre-test score, hours worked for pay, and college GPA. We did not find any consistent evidence that the hybrid-format effect varied by any of these characteristics (see Appendix Table A6 in the *Interactive Learning Online at Public Universities* report).

- 20 We also found, however, that students had a mild preference for traditional face-to-face instruction and thought (subjectively) that they had learned less in the hybrid-format sections, even though objective outcomes were essentially the same for students in the two groups. (See Figure 3 and Appendix Table A7 in the *Interactive Learning Online at Public Universities* report cited earlier, henceforth referred to as the ITHAKA ILO study.) A leader of one of the universities that actively participated in our study opined that a defect of the CMU prototype course is that it has no “addictive” or “Disney-like” appeal; it was, as this person put it, “designed by cognitive scientists” (no offense intended!). In contrast, some students in the traditional format may have been treated to an occasional colorful story, personal recollections of the instructor, or other stratagems sometimes used by faculty to that improved students’ their opinions of their course. The question of what is really going on here—with no differences in learning outcomes, as measured conventionally, combined with a (to be sure, small) difference in qualitative assessments—relates to a larger literature on measured learning outcomes versus more “subjective” measures of student satisfaction with online or hybrid courses, relative to their satisfaction with face-to-face courses (citations given in ITHAKA ILO study).
- 21 The existence of these and other problems probably explains, but only in part, the surprising lack of attention to costs among those who have studied online learning. Unfortunately, proponents of online learning often seem uninterested in costs. Carol Twigg at the National Center for Academic Transformation (NCAT) is an exception to this statement, and she deserves great credit for having focused on costs earlier than most people. (See the discussion of the NCAT studies on p. 6 of Bowen and Lack’s *Current Status of Research* paper, cited earlier.) The NCAT cost studies have been almost entirely self-directed by the institutions involved, which is not ideal. Also, it is unclear in many cases whether initial “successes” with these courses were sustained.
- 22 Appendix B in the ITHAKA ILO study presents these results and many more calculations, along with some graphics showing how sensitive potential savings are as we vary to assumptions about section sizes and compensation.
- 23 Our results indicate that hybrid-format students took about one-quarter less time to achieve essentially the same learning outcomes as traditional-format students.
- 24 For an instructive account of the history of this course, which enjoyed large-scale support from the Hewlett Foundation, see Taylor Walsh, *Unlocking the Gates* [Princeton University Press, 2011], Chapter 4.
- 25 Appendix C of the ITHAKA ILO study contains a detailed discussion of the many lessons we learned along the way—including the importance of running pilots on each campus before conducting the research phase of the study. Others embarking on similar projects may find it valuable to ponder our missteps, most of which, fortunately, we were able to correct, following the pilots. We have great respect for other investigators who have coped with such problems, often in settings outside higher education.
- 26 Some careful work of this kind has been done. For example, an analysis by Shadish, Clark, and Steiner showed that, in some cases, the results of non-experimental studies can approximate those of experimental studies, particularly when a rich array of well-measured and well-chosen covariates is available, and when ordinary linear regression and/or propensity scoring are used to reduce bias. (See William R. Shadish, M. H. Clark, and Peter M. Steiner, “Can Nonrandomized Experiments Yield Accurate Answers? A Randomized Experiment Comparing Random to Nonrandom Assignment,” *Journal of the American Statistical Association* 103 (2008).) Similarly, when Shadish, Cook, and Wong (2008) examined 12 within-study comparisons of randomized and nonrandomized studies, they found that eight of these comparisons produced “reasonably close” results—with two of the remaining four comparisons having close results with respect to some analyses but not others, and the final two comparisons involving “particularly weak observational stud[ies].” More specifically, Shadish and his colleagues found that the three studies involving a regression-discontinuity design “produced essentially the same statistical significance patterns” as long as their analyses used the same assumptions as the experimental designs; that they “[could] also trust” the results from observational studies that minimized initial differences by matching intact control and treatment groups using some sort of baseline measure; and that even in cases where it was not possible to match treatment and control groups, identifying and measuring the correct selection process through the use of ordinary least squares regression, instrumental variables, or propensity score analyses allowed for the reduction of selection bias to some extent. The researchers concluded, “Taken as a whole, then, the strong but still imperfect correspondence in causal findings reported here contradicts the monolithic pessimism emerging from past reviews of the within-study comparison literature.” (See Thomas D. Cook, William R. Shadish, and Vivian C. Wong, “Three Conditions under Which Experiments and Observational Studies Produce Comparable Causal Estimates: New Findings from Within-Study Comparisons,” *Journal of Policy Analysis and Management* 27.4 (2008)).

- 27 I am certainly not suggesting, however, that we abandon the search for rigor. I am suggesting that careful consideration be given to finding simpler approaches (as suggested in the previous note) that approximate the randomized trials model—perhaps by the use of well-chosen matching methods or lotteries in situations in which face-to-face courses are over-subscribed. There is also much to be said for quasi-experimental studies that use cut-offs and regression-discontinuity approaches. As my colleague Kevin Guthrie keeps pointing out, any kind of side-by-side test of different teaching methods is beset by complications. Ironically, it is much less problematic (though less instructive) just to substitute an entirely new approach for what was there before. Manifold issues that concern Institutional Review Boards are thereby avoided. This is a bizarre state of affairs that deserves re-examination.
- 28 Some MOOCs are moving to address worries about cheating by arranging for either remote proctoring services or on-site proctoring of exams, a development that could increase the odds that at least some educational institutions will give credit (or at least advanced standing) to students who earn “certificates” of accomplishment. (See Tamar Lewis, “Colorado State to Offer Credits for Online Class,” *New York Times*, September 7, 2012; and Steve Kolowich, “Site-Based Testing Deals Strengthen Case for Granting Credit to MOOC Students,” *Inside Higher Ed*, September 7, 2012.) Kevin Carey of the New America Foundation also discusses the strong possibility that, over time, MOOCs will gain more and more acceptance, which he believes will lead to some “disintermediation” of educational services (separating credentialing from teaching) and, in turn, some cost savings for students and perhaps institutions. (See Kevin Carey, “Into the Future with MOOCs,” *Chronicle of Higher Education*, September 3, 2012.)
- 29 See previously cited *Barriers* report, p. 21.
- 30 Stanford President John Hennessy has lauded the social networking aspects of MOOCs as a source of added value, relative to what may be gained from more solitary online courses (as well as from some face-to-face courses), specifically calling the speed with which MOOC students responded to each others’ discussion board posts “phenomenal.” (See Salman Khan and John Hennessy, “Changing the Economics of Education,” *Wall Street Journal*, June 4, 2012.) Princeton professor Mitchell Duneier has described his experience teaching a Coursera course in similarly enthusiastic terms. (See Mitchell Duneier, “Teaching to the World from Central New Jersey,” *Chronicle of Higher Education*, September 3, 2012.) EdX’s Anant Agarwal also offers a helpful account of the value of peer-to-peer responses to questions in an online setting, describing the “fascinating” speed with which MOOC students answer each others’ questions—even at 2 A.M. (See Tamar Lewin, “One Course, 150,000 Students: Q&A with Anant Agarwal,” *New York Times*, July 18, 2012.) An irony not to be missed is that from this point of view, “the more students the better”—in contrast to the usual desire to reduce class size in traditional teaching.
- 31 In his contribution to a Windsor Group study in 2007, President Hennessy both stressed the appeal of the idea of collaboration and explained why it is so hard to achieve when institutions have different needs and wish to exploit distinctive differences. (See John Hennessy, “Technology and Collaboration: Creating and Supporting Public Goods,” Draft Memos from Windsor Working Groups (September 24, 2007).)
- 32 John Maynard Keynes, *Essays in Biography* [Horizon Press, NY, 1951], p. 39. I have often thought that private, family-run foundations yield other examples of the perils of collective decision-making absent a clear sense of direction and some precise location of authority.
- 33 Personal email communication from the very able leader of the CMU project, Candace Thille, to Ira Fuchs, a member of the ITHAKA board (September 25, 2012).
- 34 For instance, one of the models proposed for Coursera involves Coursera providing a version of its platform and course content to community colleges to use in for-credit, low-cost courses for their own students; another proposed model would involve students at a particular university taking proctored exams upon completion of Coursera courses, in order to “verify” their skills in a certain area (so that, for instance, these students could receive a course waiver). EdX has likewise said that it “will begin by hosting MITx and Harvardx content, with the goal of adding content from other universities interested in joining the platform,” and has listed, among its goals, to “expand access to education, allow for certificates of mastery to be earned by able learners, and make the open-source platform available to other institutions.” Finally, the website of Class2Go, Stanford Online’s new internal platform, says that its creators “believe strongly that valuable course content shouldn’t be tied to any one platform” and that the platform is open source in order to encourage others to use the platform, or “to work together with similar efforts in other places.” (See Jeffrey R. Young, “Inside the Coursera Contract; How an Upstart Company Might Profit from Free Courses,” *Chronicle of Higher Education*, July 19, 2012; “Online Course Hosting and Servicing Agreement,” quoted in “The U. of Michigan’s Contract With Coursera,” *Chronicle of Higher Education*, July 19, 2012; “What is edX? Answering Common Questions

about MIT and Harvard's New Partnership in Online Education," *MIT News*, May 2, 2012; and "Class2Go. Take Stanford Online Classes. Anywhere," Stanford University, 2012, class2go.stanford.edu.)

- 35 This is a real issue, which not even the prestige of MIT/Harvard/Stanford can overcome readily. Senior academic leaders repeatedly expressed doubts about their desire to offer fully prepackaged courses to their students, citing a desire to "brand" courses as their own in order to preserve institutional identity. Of course, this problem would be alleviated greatly if established institutions were to grant credit to students who had earned "certificates of accomplishment" from MOOCs. But this is a challenging prospect in the case of most four-year institutions, at least without further testing by the institutions themselves or some other third-party method of certifying both the content of the course and the achievements of students taking the course. Two-year institutions may be more likely to move in this direction.
- 36 For a discussion of Coursera's thinking with respect to potential business models, including candid comments by Coursera's co-founders (Daphne Koller and Andrew Ng), see the article by Jeffrey R. Young cited earlier ("Inside the Coursera Contract: How an Upstart Company Might Profit from Free Courses," *Chronicle of Higher Education*, July 19, 2012). While Coursera's courses are currently free to students, this may not always be the case; should Coursera start to charge for its courses, colleges that enter into contracts with Coursera might receive a portion of the revenues from those fees. (See Daphne Koller and Andrew Ng, "Log On and Learn: The Promise of Access in Online Education," *Forbes*, September 19, 2012.) With respect to other prominent MOOCs, the leaders of edX have said that, in the near future, they will offer certificates to those who complete its courses for a "modest fee;" the extent to which students will be willing to pay for this certificate, however, remains to be seen. (See "Frequently Asked Questions," edX, available at <https://www.edx.org/faq>.) In addition, see Katherine Mangan, "Massive Excitement about Online Courses," *Chronicle of Higher Education*, October 1, 2012.
- 37 At his installation, MIT's new president, L. Rafael Reif, spoke explicitly about the need to address cost issues. (For the text of Reif's remarks, see "Inaugural Address as Prepared for Delivery," Massachusetts Institute of Technology, Cambridge, MA, September 21, 2012, <http://president.mit.edu/speeches-writing/inaugural-address>.) As Caroline Hoxby has observed (in personal e-mail correspondence, September 21, 2012), it is surprising that many university leaders fail to analyze the cost and revenue implications of approaches to online learning before they invest in them.
- 38 Thus, in the case of Khan Academy, it is hard not to wonder about the viability of Salman Khan's pronouncement: "Our mission statement is a free world-class education for anyone anywhere." (See "Changing the Economics of Education," interview by Walt Mossberg of John Hennessy and Salman Khan, *Wall Street Journal*, June 4, 2012.)
- 39 There is good reason to be extremely cautious in extrapolating even crude findings for the student population that has taken the first MOOCs to mainline student populations. A highly preliminary study of the demographics of the MITx course in "circuits and electronics" found that of those students still around at the end of the course (roughly 5 percent of those who registered initially), four out of five had taken a "comparable" course at a traditional university prior to working their way through the MITx course. Also, adult learners outside the U.S. were present in large numbers, and many of the "survivors" were practicing professionals. The course also had very stiff pre-requisites. Needless to say, the profile of the students completing the circuits MITx course bears almost no resemblance to the student populations on the campuses that are the most interested in using online technologies to reduce costs in large introductory courses while preserving learning outcomes. (See Steve Kolowich, "The MOOC Survivors," *Inside Higher Ed*, September 12, 2012.)
- 40 See the op-ed piece in the *Wall Street Journal* on October 2, 2012 (in the online edition), by the new president of MIT, L. Rafael Reif, entitled "What Campuses Can Learn from Online Teaching." Reif raises the possibility that "online education may improve the financial model of residential education." He envisions a world in which "a university's courses can be offered online for small fees to people around the world" and he suggests that "we might arrive at a sweet spot where high numbers of online learners are getting extremely good value for their fees, and the university that creates the content is using those fees to serve the mission of the university as a whole—part of which is to make education, on and off campus, affordable." In fact, Reif is not suggesting that everyone who registers for such a course be charged—which would contradict the notion that such courses are "free"—but that those who seek credentials certifying that they have mastered the content be charged a "small fee" for such certification. However, no one knows how such a plan would work in practice, and I continue to suspect that fees for institutional use of online courses may be a more viable way of addressing the various economic issues that confront us. Of course, it is conceivable that both individuals and institutions could be charged. Right now, all of this is highly speculative.

- 41 One real problem is that “ranking methodologies” often focus on simple student-faculty ratios as measures of quality, and leaders at both private and public institutions understandably worry that online instruction may affect such ratios—even if it does not affect learning outcomes. Equally deplorable is the exaggerated emphasis on SAT/ACT scores, which can lead to unwise admission decisions.
- 42 A majority (57 percent) of adults said they believed the U.S. higher education system was doing a fair or poor job of providing value for the money spent by students and their families, according to a spring 2011 survey by the Pew Research Center of more than 2,000 adults. The proportion of adults agreeing that most people can afford to pay for college also fell from 39 percent in 1985 to 22 percent in 2011. (See Paul Taylor et al., “Is College Worth It?,” Pew Research Center, May 15, 2011, <http://www.pewsocialtrends.org/2011/05/15/is-college-worth-it/>.)
- 43 While the meaning of this phrase may vary to some extent depending on the context, “flipping the classroom” generally refers to the practice of asking students to complete certain activities online—such as watching videos of lectures or working through modules—before coming to class, and then using the face-to-face time for more active learning activities in which students receive more individualized instruction and/or interact in more meaningful ways with their instructors.
- 44 See I. Elaine Allen and Jeff Seaman, Doug Lederman, *Digital Faculty: Professors, Teaching and Technology, 2012*, Babson Survey Research Group and Inside Higher Ed (August 2012); and Steve Kolowich, “Digital Faculty: Professors, Teaching and Technology, 2012,” *Inside Higher Ed*, August 24, 2012, summarizing the Babson-Inside Higher Ed report.
- 45 Woodie Flowers, a highly regarded teacher at MIT, has encouraged us to distinguish “education” from “training.” There is much in what he says (even as I think he fails to see how blurry the lines are between his categories). Flowers suggests, “Codified knowledge” is susceptible to “training,” whereas “education is much more subtle and complex. . . . Learning spelling and grammar is training while learning to communicate requires education; learning calculus is training while learning to think using calculus requires education. In many cases, learning the parts is training while understanding and being creative about the whole requires education.” (See Woodie Flowers, “A Contrarian View of MITx: What Are We Doing!?” *MIT Faculty Newsletter*, January/February, 2012.)
- 46 I discuss principles of delegation in Chapter 2 of William G. Bowen, *Lessons Learned: Reflections of a University President*, Princeton, NJ: Princeton University Press, 2011. Of course, matters need not be, and should not be, so “black and white”; there is much to be said for nuance and the application of common sense. But I do understand why Fethke and Policano bemoan an “hourglass” power structure in which some kinds of authority are exercised solely by the regents at the “top” and many other kinds of authority are exercised solely by the faculty—with the administration sometimes caught in the middle. (See Gary C. Fethke and Andrew J. Policano, *Public No More: A New Path to Excellence for America’s Public Universities*, Stanford, CA: Stanford University Press, 2012, p. 217.)
- 47 Let me give an example of sometimes troubling experiences JSTOR has had in attempting to explain the economic value of access to its digitized collections of scholarly literature. Sometimes (not infrequently) decisions as to whether to subscribe to a JSTOR collection are vested in the library and are thought about solely in terms of comparisons with the value of traditional acquisitions. This is much too limited an approach in that it does not take account of longer-term space savings (which are, one librarian told us, “no concern of his” since they come out of someone else’s budget) or more complicated notions of the changing role of the library.
- 48 The course re-invention initiatives sponsored by the National Center for Academic Transformation (NCAT) generally focused on departments and thus led to situations in which the departments concerned captured all the savings. (See Ben Miller, “The Course of Innovation: Using Technology to Transform Higher Education,” Education Sector, May 2010, <http://www.icuf.org/newdevelopment/wp-content/uploads/2010/06/Technology-in-Higher-Ed.pdf>, for a summary of several NCAT transformations.) It is easy to understand why this approach makes sense in terms of the desire to enlist support from faculty. But it does not address the more fundamental issue of saving costs for the institution at large or for students and families.
- 49 See the American Association of University Professors, *1940 Statement of Principles on Academic Freedom and Tenure with 1970 Interpretive Comments* (January 1990), available at <http://www.aaup.org/aaup/pubs/policydocs/contents/1940statement.htm>; and the American Association of University Professors, *The Rights and Responsibilities of Universities and Their Faculties* (March 24, 1953).

- 50 Indeed, mistakenly equating “academic freedom” with unbridled faculty discretion, including control over methods of delivering classroom instruction, is dangerous and even self-defeating. The use of overly sweeping “academic freedom” arguments to block reasonable efforts to innovate puts the core principles of academic freedom at risk.
- 51 See my talk at the Lafayette conference on the future of liberal arts colleges: William G. Bowen, “More to Hope than to Fear: The Future of the Liberal Arts College,” April 10, 2012, for personal examples of the power of inspired teaching in intimate settings. (This talk is to be published in *Education for an Uncertain World: The Future of the Liberal Arts College in the Age of Technology, Globalism, and Economic Challenge* (Johns Hopkins University Press, 2013).) We should not, however, exaggerate the distinction between what it is possible to achieve through inspired person-to-person exchanges and the rich interactions that are now possible (though by no means guaranteed) through online teaching. Princeton sociology professor Mitchell Duneier provides an example of a comment from one student who took the Coursera course that Duneier taught earlier this year to 40,000 learners in 113 countries: “It has been an incredible experience for me, one that not only taught me sociology, but the ways other cultures think, feel, and respond. I have many new ‘friends’ via this class.” (See Duneier’s “Teaching to the World from Central New Jersey,” cited in an earlier endnote.) This language is not all that different from what one might expect to hear from a participant in more traditional modes of teaching—and of course the students in this online course represented a wider range of perspectives than one could find in even the most diverse in-person setting. But then we also have to recognize that not all of Duneier’s online students may have had this kind of experience.
- 52 Indeed, Stanford’s medical school, with assistance from Khan Academy, is experimenting with posting video lectures online for some of its classes. Instead of the professor conveying the course content via live lectures (which, according to professors’ estimates, about 70 percent of students do not attend), students watch the video lectures online before coming to class, and the professor devotes the in-person meetings to more interactive activities—such as meeting with patients, holding debating among students, and completing group exercises—that require students to apply what they learned from the video lectures. The professor leading this initiative has expressed hope that these online materials can be shared some day with similar medical schools, which teach essentially the same first- and second-year courses, as well as with medical professionals, both in the United States and around the world. (See “Medical Education at Stanford Gets More Interactive by Going Online,” Stanford University, September 28, 2012, <http://news.stanford.edu/news/2012/september/medical-education-online-092812.html>.)
- 53 As quoted by President Hennessey in prepared remarks for Stanford’s Commencement 2012. (See John Hennessey, Prepared Remarks for Commencement 2012, Stanford University, Stanford, CA, June 17, 2012, <http://news.stanford.edu/news/2012/june/hennessey-commencement-remarks-061712.html>.)
- 54 To this Hutchins added, “Hard intellectual work is doubtless the best foundation of character, for without the intellectual virtues, the moral sense rests on habit and precept alone.” (See Robert Maynard Hutchins, *No Friendly Voice*, Chicago: University of Chicago Press, 1968, p. 93.)
- 55 See Jeff Bezos, “We Are What We Choose,” Remarks by Jeff Bezos, as Delivered to the Class of 2010, Princeton University, Princeton, NJ, May 30, 21010, <http://www.princeton.edu/main/news/archive/S27/52/51099/index.xml>.
- 56 The rush to participate in the “MOOC-movement” no matter what (lest one be left behind) is a bit frightening. As acting president of Purdue University Tim Sands said at a discussion about online learning earlier this month: “There’s talk that if you’re not in the game, you’re going to miss the wave.” Also see the highly publicized debate surrounding the (temporary) ouster of the president of the University of Virginia (UVa), and an even more recent conference at Cornell University. (For the Purdue University article, see Elena Sparger, “President Sands and Panel Discuss Online Courses at President’s Forum,” *Purdue Exponent*, October 2, 2012. For the UVa story, see Andrew Rice, “Anatomy of a Campus Coup,” *New York Times*, September 11, 2012 (online edition) and September 16 (print edition of *New York Times Magazine*). For more about the Cornell conference, see Akane Otani, “Cornell Professors Debate Future of ‘Massive’ Online Classes at University,” *Cornell Daily Sun*, September 28, 2012.) To exaggerate the dangers, but perhaps only slightly, consider this comment by Lawrence S. Bacow, former president of Tufts, after he had listened to one of the many discussions of what some see as the impending transformation of American higher education: “If I went to my board at Tufts and told them that I was purchasing an enterprise software system on which the entire revenue stream depended, and that the vendor had been in business for less than a year and had no track record, revenue, or business model, I suspect I would have been fired. Yet some boards are forcing their presidents to contemplate hugely consequential changes in strategy based on six months worth of experience from a handful of MOOCs” (personal e-mail communication to the author, October 2, 2012).

- 57 For an excellent example of the time it takes to do good work in this field, see the account of Neil Heffernan's work on tutoring models cited in Annie Murphy Paul, "The Machines Are Taking Over," *New York Times*, September 14, 2012. Heffernan has been working for 17 years on what appears to be a highly promising way of using machine-guided tutoring to teach math. James Kemple, executive director of the Research Alliance for New York City Schools, also argues persuasively that "effective, sustainable reform requires persistence and adaptation, which must be informed by the accumulation of evidence, over time, about what seems to be working and what doesn't." (See James Kemple, "Math Innovation Requires Patience," *New York Times SchoolBook* blog, September 21, 2012.) Kemple is critical of two of the original School of One schools for deciding to discontinue the School of One program before they had an opportunity to incorporate ongoing improvement efforts and assess them.
- 58 See NCAT report by Ben Miller, cited in an earlier endnote.
- 59 The Open University's website is <http://www.open.ac.uk/>; David L. Kirp chronicles the development of OU in Chapter 10 of *Shakespeare, Einstein, and the Bottom Line: The History of Higher Education*, Cambridge, MA: Harvard University Press, 2003. See also "Europe Starts to Embrace Online Education," *Science 2.0*, September 28, 2012, http://www.science20.com/news_articles/europe_starts_embrace_online_education-94485.
- 60 See I. Elaine Allen and Jeff Seaman, *Going the Distance: Online Education in the United States, 2011*, Babson Survey Research Group, 2011, which was put together by Babson Survey Research Group with support from the Sloan Consortium and several other organizations. In reading this report, it is important to keep in mind that the data in this report pertain to "online courses" as the Sloan Consortium defines the term. Specifically, Sloan differentiates between traditional, "web facilitated," hybrid, and online courses on the basis of the proportion of content delivered face-to-face vs. online (according to survey respondents); "online courses," by Sloan's definition, are those in which at least 80 percent of the course content is delivered online.
- 61 See Indiana University, "Indiana University Announces IU Online, A Major New Online Initiative," September 5, 2012. The pressures on universities to join the MOOC movement are illustrated well by a recent forum at Cornell University; see the *Cornell Sun* article entitled "Cornell Professors Debate Future of 'Massive' Online Courses at University," cited in an earlier endnote.
- 62 See Candace Thille and Joel Smith, "Learning Unbound: Disrupting the Baumol/Bowen Effect in Higher Education," Forum for the Future of Higher Education, *Forum Futures 2010*, pp. 31-38, for a description of the features of the Open Learning Initiative courses. Also see Chapter 4 of Walsh's *Unlocking the Gates*, cited in an earlier endnote, for a description of the development of the Open Learning Initiative.
- 63 While the examples provided here generally involve prominent institutions, it is not only the big-name universities that have shown an interest in MOOCs. For example, the University of Maine at Presque Isle has announced an initiative that will "allow learners of all ages to participate in online college courses for free, as long as they aren't seeking college credit." Initially, the project will involve a slate of English courses, and care is being taken to avoid copyright issues. (See Jen Lynds, "UMPI OpenU expands access to college-level courses for free," *Bangor Daily News*, August 16, 2012, <http://bangordailynews.com/2012/08/16/news/aroostook/umpi-openu-expands-access-to-college-level-courses-for-free/>.)