
Education and Innovation Theme

Adapting Higher Education to Improve Innovation and Productivity February 2013

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Prepared for the Alliance 21 Education and Innovation workshop,
Washington, D.C., October 17-18 2012

Introduction: a higher education paradox

To understand the need for innovation in U.S. higher education, it helps to first understand the paradox that characterizes the nation's colleges and universities. On the one hand, American higher education has long been viewed as the best in the world - and for good reason. Whether measured by research productivity, by the closely watched global rankings produced each year in Shanghai and London, or by the inventive uses to which newly created knowledge is put, U.S. research universities have an outsized global influence. Within the United States, they have become, in the words of Columbia University sociologist Jonathan Cole, "the engine of our prosperity."

Cole points to a well-known sampling of inventions that originated in American universities, among them the laser, DNA fingerprinting, FM radio, sophisticated public opinion survey techniques, fetal monitoring, Global Positioning Systems, magnetic resonance imaging, and the algorithm for Google searches. In sum, he writes in *The Great American University*, "We are the greatest because our finest universities are able to produce a very high proportion of the most important fundamental knowledge and practical research discoveries in the world."

Along with being a research powerhouse, the United States is also by far the world's biggest magnet for foreign students. In sought-after disciplines such as engineering and computer science, more than 60 percent of PhD students come from abroad. Moreover, the American university, with its norms of free inquiry, merit-based hiring, and competitive research funding, has become the model for governments around the world that wish to foster excellence in their systems of higher education. From China to Saudi Arabia, governments are trying hard to create U.S. style world-class universities. That means spending billions on improving existing universities, or building brand-new ones, as with Saudi Arabia's King Abdullah University of Science and Technology.

Even developments that might suggest that this burgeoning global marketplace will erode U.S. academic excellence are proving to be benign, or even beneficial. Consider a 2010 UNESCO report on the geographical distribution of global scientific research. It found that from 2002 to 2008 the U.S. proportion of articles in the Thomson Reuters Science Citation Index, the authoritative database of research publications, fell more than any other country's. This could sound alarming to an American. But U.S. researchers actually published 46,000 more articles in 2008 than they did six years earlier. That's because the overall number of global research publications grew by more than one third during this period.

In a similar vein, U.S. campus leaders might feel understandable angst that the U.S. share of the global market for foreign students declined from 24 percent to 19 percent from 2000-2008. The drop certainly does reflect an ever-more competitive student recruitment market. But it also reflects the fact that the sheer number of globally mobile students exploded from 2 million in 2000 to 3.3 million in 2008 (and, more recently, 4.1 million). There were in fact 150,000 more foreign students in the United States in 2008 than in 2000, a 31 percent increase. In other words, the U.S. share of the pie is smaller, but the pie has gotten a lot bigger. Whether in research productivity or student mobility, increasing knowledge is not a zero-sum game. That's good news for the continued status of U.S. research universities as the world's gold standard.

Unfulfilled promise

Unfortunately, however, this success story is not the whole story. Most American students don't attend the country's top research institutions. In fact, in many ways the story of American higher education appears to be a tale of two cities – one a shining model for other nations, the other a dilapidated metropolis that is far from fulfilling its enormous promise.

The sector's shortcomings have attracted significant attention from government officials in recent years. The Secretary of Education's Commission on the Future of Higher Education, a blue-ribbon panel of bipartisan experts convened by George W. Bush's education secretary, Margaret Spellings, was blunt in its conclusions:

What we have learned over the last year makes clear that American higher education has become what, in the business world, would be called a mature enterprise; increasingly risk-averse, at times self-satisfied, and unduly expensive. It is an enterprise that has yet to address the fundamental issues of how academic programs and institutions must be transformed to serve the changing needs of a knowledge economy. It has yet to successfully confront the impact of globalization, rapidly evolving technologies, an increasingly diverse and aging population, and an evolving marketplace characterized by new needs and new paradigms.

Nor has the current Democratic administration been reticent about the need to tackle the manifold problems facing the nation's postsecondary institutions. In President Obama's first address to Congress in early 2009, he highlighted the marked decline in U.S. standing vis-a-vis other industrialized countries in the percentage of young adults with postsecondary degree. And he called for an extraordinarily ambitious plan to improve the U.S. degree completion rate from 40 percent to 60 percent in just over a decade: "By 2020, America will once again have the highest proportion of college graduates in the world."

With three-quarters of Americans surveyed saying that college has become too expensive for most people to afford (although, to be sure, college-going rates continue to rise, along with student indebtedness), the Administration has also called on colleges to constrain spiraling tuition. That need not mean compromising quality, U.S. Secretary of Education Arne Duncan insisted in a November 2011 speech. "In the era of the knowledge economy, the urgency of controlling college costs is not at odds with the urgency of increasing college attainment. Both goals are necessary if society is to do all it can to help more Americans succeed and thrive in the global job market." By raising their productivity while improving accountability, he said, "institutions of higher education can boost both quality and access and constrain costs, all at the same time."

Crisitunity

This is a tall order. But in an improbable sense the predicament of U.S. higher education during the economic downturn is reminiscent of a scene from a 1994 episode of *The Simpsons*. After Homer Simpson is banned from his favorite bar, Moe's Tavern, he lies on his couch despondent.

In an effort to cheer him up, his daughter Lisa offers a lesson in Chinese philosophy: “Did you know the Chinese use the same word for ‘crisis’ as they do for ‘opportunity’?” she asks him. Homer brightens up instantly, responding, “Yes! Crisitunity!”

Lisa’s Chinese wasn’t quite right, but the lesson is a good one: Opportunities come out of crisis. Big problems can inspire big solutions. A case in point: the much-discussed MOOCs—Massive Open Online Courses—which have spread quickly in the past year. MOOCs have taken the spotlight at a time when spiraling tuition and state cutbacks mean that the huge national and global demand for postsecondary education must inevitably be satisfied in innovative, unconventional ways. In the United States, undergraduate enrollment, which grew more quickly than usual during the recession, is projected to rise an additional 14 percent, to 20.6 million, by 2021. Worldwide growth will be much, much larger. Already, global postsecondary enrollment has jumped from 100 to 150 million (between 2000 and 2009). It is projected to reach 250 million students by 2025.

The MOOCs are very much works in progress, but they may have the potential to satisfy some of this intense global demand because of their extraordinary reach. These ventures, from the Harvard-MIT collaboration edX to West Coast-based rivals Coursera and Udacity, feature free online classes taught by professors from a range of top universities and open to all comers. Udacity’s inaugural class on artificial intelligence, taught by two star Stanford instructors, Sebastian Thrun and Peter Norvig, who also hold high-profile positions at Google, famously attracted 160,000 students from 190 countries. (There were more students from Lithuania in the class, Udacity likes to point out, than the total enrollment of Stanford University.). Unlike some early online education efforts, the class consisted of more than just YouTube videos. Students could submit homework assignments, take multiple-choice quizzes and exams, and even participate in virtual office hours. Many dropped the class, but 23,000 students passed the final exam (250 with perfect scores). Successful students didn’t receive any Stanford credit, but they did receive a statement of accomplishment signed by Thrun and Norvig themselves.

Udacity students pay nothing for the classes, but, like their edX counterparts, are charged a modest fee if they wish to take proctored exams at one of 4,500 testing centers around the world. At this scale, personal attention is, of course, minimal, grading is automated, and conventional accreditation is likely to be slow.

But a flurry of developments in 2012 and early 2013 suggested that MOOCs may be headed for the mainstream more quickly than observers would have expected. Antioch College, for example, reached an agreement with Coursera in October 2012 to award credit for Coursera classes overseen by Antioch instructors. In January 2013, Udacity announced a pilot partnership with San Jose State University to offer several low-cost, online introductory classes – bearing college credit. Meantime, Coursera announced a steady stream of new university partners in the US and abroad, while also receiving approval for five of its courses from the American Council on Education’s credit recommendation service. Another company, Academic Partnerships, which helps public universities create online degree programs, announced that students could take an initial class as a free MOOC at institutions such as Utah State and the University of Arkansas. Students can then earn full credit upon completion – but will need to pay tuition when they move

on to the remainder of the degree program. Nearly every week, it seems, brings new MOOC-related announcements.

In a sense, these entrepreneurial efforts represent an evolution – the latest development in a 100-year progression that has brought U.S. higher education from elite access in colonial colleges devoted to training ministers, to broader access in the land grant universities created in the second half of the 19th century, to mass access enabled by the G.I. Bill following World War II and expanded with the fast spread of community colleges in the 1960s, to something closer to universal access. At the same time, what Udacity and other MOOCs are doing is a revolution, because they are upending and reinventing higher education to meet the demands of a new era.

Such a reinvention is sorely needed. After all, even as MOOCs and other cutting-edge ventures draw growing attention, for now the vast majority of the 18.1 million postsecondary students in the United States are enrolled in conventional two- and four-year certificate and degree programs. And in many of those institutions, notwithstanding the strengths of our best research universities, significant shortcomings are apparent. As discussed below, there is growing evidence that they need to focus more effectively on improving completion rates, on teaching and learning, on lowering costs, on making much better use of technology, on boosting productivity, on improving delivery of instruction for nontraditional students, and on using better data to measure progress.

Low graduation rates

In 1975, 49 percent of American high school graduates went on to some form of postsecondary education immediately after finishing school. Four decades later, that figure had soared to a record 70 percent. Unfortunately, this impressive increase in access to college hasn't been accompanied by similarly higher success in bringing students across the finish line. Only a little over half of first-time, full-time undergraduates at four-year institutions complete a degree at that institution within six years. Six-year graduation rates are significantly worse for Hispanic students (47 percent) and black students (40 percent), who will make up a growing percentage of the U.S. population and workforce in the 21st century. Completion rates for part-time students and those in community colleges are even worse: Just 20 percent of community college students earn a certificate within three years.

To be sure, the federal data on which these statistics are based are widely understood to have significant limitations. They don't track students as they move from one institution to another, meaning that transfer students who successfully earn degrees are not counted as graduates either at the institution they leave or at the new institution they enter. Nor do federal data count part-time students, who make up a significant and growing proportion of all undergraduates.

Nevertheless, while current measures may be inadequate, alternative graduation and persistence numbers calculated using data from the National Student Clearinghouse, while higher, have shortcomings of their own. Overall, despite differences over methodology, there is consensus that today's retention and graduation rates are far from where they need to be at a time when postsecondary attainment matters more than ever. As a panel of prominent university leaders, the

National Commission on Higher Education Attainment, declared in a January 2013 report about college completion: “The number of Americans attending college is at a historic high, but far too many never make it to graduation... Left unaddressed, [high dropout rates] will hinder social mobility and impede the nation’s economic progress.”

Indeed, some 37 million working-age adults report their highest level of education as “some college, no degree.” As Kevin Carey writes in *Reinventing Higher Education: The Promise of Innovation* (co-edited by this author, Andrew Kelly, and Carey, and the source of several examples and observations in this paper): “This represents a massive loss of human potential at a time when the nation’s social fabric and economic vitality increasingly depend on a well-educated citizenry.”

Insufficient student learning

Even for undergraduates who do receive degrees from U.S. universities, whether traditional or nontraditional, there are significant questions about how meaningful those credentials really are. This is another troubling problem in American higher education – evidence that too many students aren’t learning very much. This issue received significant attention in early 2011 when two sociologists, Richard Arum of New York University and Josipa Roksa of the University of Virginia, published a book called *Academically Adrift: Limited Learning on College Campuses*, to much consternation both inside and outside the academy. Arum and Roksa reported that fully 45 percent of undergraduates experience no improvement in their critical thinking, reasoning, and writing skills during their first two years of college. Even by their final year, more than a third see no statistically significant gains.

To reach their conclusions, Arum and Roksa used an innovative test called the Collegiate Learning Assessment (CLA), an essay exam that measures writing and analytical skills and has been administered at hundreds of colleges around the country for more than a decade. Many institutions keep the results confidential or report them in ways that are hard to decipher (and to compare to those of other colleges). This means that it’s difficult for college applicants and their parents to find out how much learning occurs in the classroom. Preserving schools’ anonymity, Arum and Roksa worked with other researchers to test a representative mix of 2,322 undergraduates at a diverse group of 24 four-year institutions, first as freshmen and then later in their college careers. The authors also studied surveys and transcripts to determine how college culture and expectations influence the undergraduate academic experience.

Arum and Roksa’s methodology has been questioned by scholars such as Alexander Astin of the University of California, Los Angeles, but signs of inadequate learning can be found in other studies as well. A study by the American Institutes of Research showed that more than half of student in their senior year of college couldn’t perform complex literary tasks such as interpreting a simple chart or understanding the arguments of a newspaper editorial.

How can students learn so little? For one thing, they spend scant time on academic activities. Surveys show that full-time students spend about 27 hours a week either studying or in the classroom; in the early 1960s that figure was 40 hours a week. By the authors’ account, students’

devotion to social life, extracurricular activities, and (for many) jobs takes up a lot of their time. Yet 85 percent of those in the study had a B-minus average or better.

Arum and Roksa contend that educational institutions themselves are deeply complicit. George Kuh, a researcher at Indiana University who studies higher education, describes a silent compact that often exists between professor and student: “I’ll leave you alone if you leave me alone.” About one-third of students in the study had taken no course during the previous semester that required more than 40 pages of weekly reading. Half had never taken a class in which they were asked to write more than 20 pages during a semester. At many institutions, faculty members receive slim rewards for concentrating on undergraduate teaching, so it is little wonder that they give undemanding assignments and focus instead on research and other professional activities that will advance their careers.

High costs and a data deficit

While poor completion rates and disappointing academic standards are enormous problems in the American academy, in the public eye the largest and most lamented shortcoming of colleges and universities is no doubt their skyrocketing costs. As noted in a recent report by the U.S. Chamber of Commerce’s Institute for a Competitive Workforce, for several decades tuition has risen at three times the rate of inflation, with particularly steep growth in the past four years. At public institutions in some states, tuition has gone up as much as 50 to 80 percent in just a few years. To some extent, this is attributable to severe state budget cuts: State support for higher education fell 7.6 percent in fiscal 2012, the biggest drop in half a century and the impetus for steep tuition increases in many states. Rising financial aid has mitigated tuition hikes for some students, but student debt has risen to unprecedented levels (thought arguably still manageable for the average student), further fueling public concern.

Despite the role of budget cuts, the persistently high price of college, as the Chamber report notes, “also reflect[s] a model of postsecondary education that is expensive, inefficient, and slow to change.” Reflecting the world view of a growing movement that argues that colleges cannot maintain the status quo while the world changes around them and demand for access grows, the report declares that political leaders “from the state house to the White House ... are telling colleges and universities that they must learn to do more with less and that they will be held accountable when they do not.” In short, calls for better return on investment from postsecondary institutions are growing louder and louder.

But the movement for greater productivity and greater accountability faces a significant barrier: a severe information deficit. To measure productivity – whether it means achieving better results with the same resources, or the same results with fewer resources – it is vital to be able to measure inputs and outputs systematically. But finding better metrics with which to gauge the success of colleges and universities, whether in student learning or labor market outcomes, has been a persistent challenges for higher education reformers. Prospective students and policymakers know too little about which institutions – and which programs within those institutions – offer the best value in terms of learning and future earnings. As in health care, an informed consumer marketplace simply can’t take root without such measures. Data

shortcomings are all the more troubling at a time when, in the words of Grover “Russ” Whitehurst of the Brookings Institution (and former director of the Institute of Education Sciences at the U.S. Department of Education), the United States has come “a high-cost provider of mediocre outcomes.”

Barriers to reform

While there may not be universal agreement about the exact extent and nature of every problem facing American higher education, concerns about costs, degree completion, educational quality, and productivity are widespread. Why, then, is widespread change so elusive? For one thing, campus culture has traditionally been averse to the kinds of productivity improvements that have transformed other sectors of the economy. This is particularly true of undergraduate teaching. As Dominic Brewer and William Tierney of the University of Southern California write in a 2011 essay on barriers to innovation in U.S. higher education, large subsidies from the government “insulate public institutions from market competition, and the enrollment-based nature of those subsidies creates few incentives for colleges to help student learn and earn degrees.” Because of those disincentives, they say, continuing advances in research have not been matched by changes in teaching practice.

Compounding this problem, the balance between teaching and research at many institutions is skewed toward research. Critics like Emory University professor Mark Bauerlein have argued (controversially, of course) that a significant amount of scholarly work in the humanities is of little value – insular, yielding few fresh insights, and rarely cited. Yet professional norms put many professors under significant pressure to publish rather than devote more of their energies to the classroom. This probably is particularly pronounced at second- and third-tier universities, which tend to mimic the norms of first-tier institutions rather than fully embrace the eminently respectable mission of teaching undergraduates.

Powerful regional accreditation systems, administered by consortia of the same institutions that are too often change-averse, constitute another major obstacle to reform. While defenders view accreditation as an important safeguard for academic legitimacy, critics make a persuasive case that the current system perpetuates the institutional conservatism of universities and often says little about quality. Accreditation tends to foster colleges and universities that look like one another, while limiting less conventional models that may have great promise. Thus, entrepreneurial providers starting new ventures built on different models, such as offering a la carte courses, often face accreditors who are focused more on traditional inputs like “seat time” in class and the number of faculty members who hold PhDs, rather than outcomes like academic success or loan default rates.

Beyond accreditation, federal and state regulations can also thwart innovative providers and practices. While technology has made the geographical location of instructors and students largely irrelevant, regulation has yet to catch up with this reality. As Andrew Kelly of the American Enterprise Institute wrote in an essay in *College 2.0: An Entrepreneurial Approach to Reforming Higher Education*, a report published by the Kauffman Foundation : “Higher education regulations are typically place and process based in an era when the system is moving

away from traditional academic calendars and bricks and mortar.” He cites research showing that regulations that create barriers to online and competency-based institutions have grown in the past decade. Indeed, in the same report Brewer of USC described some of the difficulties his university has encountered with state bureaucracies. When the school entered a partnership with 2tor, Inc., a for-profit company that works with universities to take their professional degree programs online, it sought permission to serve students in every state. That effort led USC to encounter what Brewer termed “a slew of obscure and irrelevant provisions, such as needing to submit typewritten applications and specifying the fire rating of file cabinets in which student records were to be stored, as if there were no computer technology.”

Sometimes promising projects can be thwarted or delayed by an unfortunate combination of philosophical opposition and institutional inflexibility. In California, whose higher education system has been particularly hard hit by a long series of state budget cuts, a pilot online course initiative launched two years ago by the University of California has faced tough going. Champions such as former Clinton Administration official Christopher Edley, Jr. dean of UC-Berkeley’s Boalt School of Law at UC-Berkeley, initially emphasized the potential of online classes to improve access and maintain excellence in the face of the funding crisis. But a combination of faculty resistance and start-up fundraising problems has led to disappointingly slow growth: just six classes were offered when the program launched in the spring of 2012 (though another nineteen are in the works).

Even more dismaying are bureaucratic headaches involving credit transfer between the system’s ten campuses. Until these problems are fixed, a student at one campus shut out from an oversubscribed class can’t simply take the online version from a professor at another campus for full credit. This removes one of the core access expanding and money-saving characteristics of e-learning – its ability to reach large numbers of students without regard to barriers of time or space. UC officials say they are working to overcome the barriers. But they will have to move quickly indeed to keep up with the changes that, obstacles notwithstanding, are beginning to take hold in the world of higher education.

From problems to opportunities

Indeed, the good news in the world of U.S. postsecondary education is that many initiatives are underway, in addition to the MOOCs, that are turning problems into opportunities. Some are developing on the margins of existing institutions, some are being created by outside innovators. All are worth taking seriously.

One closely watched model, of particular relevance to improving the number of Americans who complete postsecondary credentials, is Western Governors University. Founded by 18 U.S. governors following a meeting in the late 1990s, WGU has grown quickly in states seeking affordable ways of enrolling and graduating more adult students, particularly so-called partial completers who have some college credits but no degree. WGU shifts the conventional college paradigm by using a competency based approach that requires no seat-time in a traditional classroom. Instead it tests students, gives them credit for subjects they’ve already mastered, then connects with them mentors who help them figure out what kind of independent study they need

to learn the material they need for a degree. Students who make it through can earn a bachelor's degree in just two and a half years for about \$15,000. While attrition rates were high in the early years, over time WGU leaders hope that its streamlined approach will improve retention and graduation rates for older, working students who so often drop out.

Low completion rates are a particular problem at community colleges, where students can easily get lost. Course sequences are often unclear, many nontraditional students are balancing work and family obligations, and huge numbers of students never finish either certificate or associate's degree programs. Writing in *Reinventing Higher Education*, Massachusetts Institute of Technology economist Paul Osterman highlights the success of the Tennessee Technology Centers in overcoming these problems. The network of vocational and technical institutions around the state of Tennessee operates on the principle that less choice, rather than more, is what its practically minded students need. The only significant choices students must make are which program to take, and whether to study full- or part-time. Students are then given a clear road map of the classes they need to graduate. Electives are very limited. Classes are scheduled in blocks of time that allow students to schedule other obligations around them. Full-time programs usually take from four to 20 months, depending on the field. The Technology Centers report a graduation rate of 75 percent, far higher than the 20 percent of community college students nationwide who finish their studies within three years.

Graduate numbers can be improved significantly by making it easier for students to transfer credit they have earned at one college to degree programs at another institution. Students are highly mobile, and they often find that some of their course credits is not eligible for transfer credit. Compounding matters, as the National Commission on Higher Education Attainment report notes, "many are unaware of which classes will transfer and which will not, resulting in wasted time and resources." Fortunately, some states are addressing this problem with policies that provide greater clarity and better value for students and taxpayers. As noted in the same report, Indiana has put into place a statewide general education curriculum, along with a common course-numbering system. This means that, for example, community college students who transfer to four-year colleges know exactly which courses will be eligible toward a degree at their new institution, which in turn means a significant reduction in wasted credits.

Learning and productivity initiatives

What about the problem of student learning and academic productivity? Here, too, many new initiatives are underway. While colleges as a whole too often remain change-averse, more institutions than ever are trying to improve productivity, often by relying on educational technology. Carnegie Mellon University's much-discussed Open Learning Initiative is a case in point. OLI's course modules feature cyber-tutors that walk students through a series of problems, administer quizzes and provide personalized, "adaptive" feedback. Once in the classroom, the real-life instructor analyzes data collected from all the students' online sessions and tailors instruction according to their strengths and weaknesses. A May 2012 study by the research group Ithaka S+R, with former Princeton University president William Bowen as its lead author, administered a randomized test of the teaching software to statistics students at six public universities. The conclusion: This "blended" approach is just as effective as traditional

instruction, takes about one-quarter less time, and might “significantly reduce instructor compensation costs in the long run.”

A related initiative, the National Center for Academic Transformation has worked at campuses around the country (and overseas at institutions like Australia’s James Cook University and the Australian Catholic University) like to redesign large introductory courses in subjects like mathematics. At Virginia Polytechnic Institute, for example, a massive, 60,000-square-foot complex called the Math Emporium is filled with computers where students can engage in self-paced computer instruction, with human tutors available nearby to offer personal assistance when need. Students are learning more than their counterparts in traditional classes, using fewer resources – a solution to the productivity equation that is becoming more and more important in a time of tight state resources and growing demand for college access and better academic outcomes.

Data solutions

While initiatives like these show significant promise, to gain momentum they will require concerted efforts to improve education data on a widespread basis. This includes not just information about the vital matter of student learning, but also on the related question of their post-graduation prospects. One area ripe for innovation is the broader use of available metrics to measure the value of postsecondary credentials in the labor market. Mark Schneider, a vice president of the American Institutes of Research, is one of a number of reform-minded researchers who argue that state-level “unit record” data on individual students’ experience in college should be systematically linked to data kept by states’ labor or workforce agencies.

This data would yield invaluable information on the economic returns of studying particular subjects at specific institutions. But while about half the states in the nation have the ability to link these two data sets, Schneider writes in a 2012 paper commissioned for the Kauffman education innovation conference, “very few have made those linked data available to the public, to individual campuses, or to their state legislatures.” To be sure, state data systems aren’t perfect, he notes: unemployment insurance records don’t include all employers in a state; they include industry rather than occupation; and they don’t track students who leave a state. Nevertheless, they show salaries of covered workers, a crucial measure of success in the labor market, and can also track salary growth over time.

The state of Florida is probably the exemplar of connecting postsecondary information to labor market outcomes. Beginning in 1988, it created a longitudinal data system that tracks students through elementary and secondary school, on to postsecondary education, then into the labor force. The results, as the recent U.S. Chamber report explained, is “a rich trove of information that can be mined by colleges, universities, and state leaders, to better understand the connections between the subject students study, how successful they are academically, at which kinds of institutions, and what kinds of jobs they get, at what salaries.” As in health care, an informed consumer marketplace simply can’t take root without such measures.

Beyond the Model T Syndrome

Automobile pioneer Henry Ford is reputed to have said that customers could have any color of Ford they wanted, so long as the color was black. The line is probably apocryphal, but in many ways it is an apt way to describe the one-size-fits-all nature of the U.S. higher education system. This is not because the country lacks a diversity of institutions – on the contrary. But the conventional view of a college education entails sitting in classrooms for a certain number of hours, listening to professors lecture, taking exams to accumulate course credits, and attempting to include enough of those credits to earn a degree. The activities combined in a single location typically include teaching, development and transmission of a certain curriculum, socialization, creation of personal networks, and sometimes research.

Today, alongside and sometimes overlapping with efforts to improve graduation rates, student learning, and data quality, a growing number of education entrepreneurs are questioning the Model T approach by unbundling many of the activities that typically comprise a university and offering them on an a la carte basis. Their goal: to break down old conventions and to find out whether specialization and innovation can make a college education better, less expensive, or simply very different than what has come before.

A for-profit start-up called StraighterLine is one noteworthy effort that takes advantage of technology's low marginal costs to dramatically drive down tuition. The for-profit start-up focuses exclusively on offering very low-cost online courses in subjects that are typically studied by first- and second-year students in large lecture halls. Students receive unlimited access to a package of classes in the humanities, mathematics, English, business, and sciences for \$99 per month. The concept, including the pricing, is appealing to many students, but StraighterLine faces considerable challenges. Traditional accreditors won't certify freestanding courses, and finding university partners willing to accept StraighterLine classes for transfer credits has proven difficult. Universities rely on revenues from large introductory classes to cross-subsidize other activities, and they also face concerns from accreditors about the legitimacy of accepting credits from nontraditional outside providers.

Nevertheless, a modest number of institutions have awarded credit StraighterLine courses. The company took a major step in September 2012 when it announced a partnership with the University of Maryland University College (UMUC), a major online public university that enrolls more than 90,000 students. Over time, as online classes become more common, colleges that are inflexible and refuse to accept transfer credits from ventures like StraighterLine are likely to lose students. Though its initial offerings could be viewed as a commoditized version of commonly offered college classes, the company recently began offering a new series of online courses, tied to the specialties of individual professors. StraighterLine views this approach as a credit-bearing "eBay" for professors, in which students will bid on classes depending on their appeal.

Practically speaking, the ability to grant educational credentials is arguably one of the most important powers of colleges and universities. Here, too, however, the Model T approach is gradually being challenged by the new "badges" movement, which aims to democratize who should be able to certify a range of skills, from robotics to film editing, that are often studied in

universities. Institutions like the National Association of Manufacturers are giving digital badges that show in really granular detail what subjects or skills students have mastered. These online certifications, which are usually open to anybody, may measure competency using a standardized test – or in some cases simply via students’ participation. Badges of course have limitations, but they offer a very different way of looking at how qualifications should be awarded. As one professor told the *Chronicle of Higher Education*: “We have to question the tyranny of the degree.”

The notion of unbundling goes beyond universities’ purely academic activities. For example, a start-up company called Persistence Plus (which worked with the Kauffman Foundation during its formative phase) has created a technology-driven model for improving student services. To keep students on track to succeed in college, its software sends a series of “nudges” to students via their cell phone or iPads. Undergraduates are reminded about assignment deadlines, asked specifically where and when they plan to study for a particular test, offered advice about dealing with setbacks (they might be given the story of another student who has faced similar problems as a first-year student), and connected to peers in social networks organized around academic goals. Students get the consistent message, both literally and figuratively, that the college cares about them and their success. Persistence Plus likes to call itself “the Weight Watchers of college completion.” While the company is still experimenting with its services, it and other technology-driven student-guidance initiatives suggest the significant potential of non-traditional unbundling to improve the student experience.

For-profits

These examples are far from exhaustive, of course. One of the most noteworthy developments in U.S. higher education in recent years is the rise of for-profit institutions. Once little more than a blip on the radar of U.S. postsecondary education, for-profit college now enroll some 12 percent of the nation’s students. They have become the subject of intense controversy, including government investigations and stepped up oversight, with detractors complaining of dubious recruiting tactics, overblown promises of future employability, and sky-high student-loan default rates. The sector is under heavy pressure from investors for fast growth and profits, and its expansion is hardly a function of pure free markets at work: the sector’s growth has been fueled by the easy availability of a large pool of federal aid.

Nevertheless, as outlined in an *Inside Higher Ed* article by this author, from which this discussion is drawn, the for-profits have innovated in ways that could provide useful lessons to traditional institutions trying to find more nimble and cost-effective ways to serve the growing population of nontraditional students seeking post-high-school credentials. For-profits focus on meeting the practical requirements of students who tend to be working adults with children, many of them racial and ethnic minorities, often first-generation college students. That means offering many courses in fields such as business, health care, and computer science. These institutions also make a priority of building convenient campus locations and creating many online courses that provide the flexibility working adults need. They emphasize data collection and systematically measuring learning outcomes. And they are willing to standardize curriculum

and minimize faculty autonomy to a degree that is much rarer in conventional colleges and universities.

For-profits also do something unusual in many traditional colleges and universities: they evaluate new hires on their teaching skills and give new instructors pedagogical training. Once on the payroll, instructors are evaluated much more systematically than their peers in traditional academics – even those who work at teaching-oriented colleges. Perhaps the biggest appeal of for-profits is that they are so new – works in progress in which trial-and-error is encouraged and inevitable. Entrepreneurial for-profits can move much faster to create new programs, adjust staffing levels, and change curriculums. None of this is to say that critics of this fast growing but beleaguered sector are all wrong. For-profits will need to work hard to prove their worth as they remain in the regulatory and media spotlight for the foreseeable future. But for all their flaws, for all the dismaying practices and bad actors that continue to be associated with the sector, their innovative characteristics are well worth studying.

Looking ahead

Moving forward, the speed with which new practices and ventures in U.S. higher education emerge will inevitably depend not only on the ingenuity of entrepreneurs on and off college campuses, but on the public policy environment. It will be particularly important for policymakers to create a regulatory framework that offers the maximum flexibility to educators who wish to achieve results without necessarily following traditional pathways.

One area ripe for reform is the credit hour system, a classic example of measuring an input – time spent in the classroom or on class work – rather than the much more important output of student learning. The credit hour system is defined by the U.S. Department of Education as the equivalent of one hour of lecture together with two hours of outside work, typically over a 15-week semester. A bachelor's degree usually requires a minimum of 120 credits. As outlined in a recent report from two think tanks, the New American Foundation and Education Sector, the credit hour system was developed by Andrew Carnegie in the early 1900s to measure the work of college instructors (for purposes of calculating pension benefits).

Yet the credit hour has come to be the basic metric used to calculate eligibility for federal financial aid, setting faculty workloads, and more. This stands in the way of more creative approaches, the report notes, for three reasons: credit hours are not always transferable, are difficult to assign to self-paced online courses, and can't easily be used to measure what students have learned through competency-based education, often known as Prior Learning Assessments. While federal law does permit some exceptions to the credit-hour structure, they are not widely known or used. This means that educational approaches focused on learning rather than time risk remaining the exception at a moment when more flexible approaches could meet the needs of many more students.

Even as policy debates continue, new technology is likely to be used to tackle longstanding education challenges in unexpected ways. In September 2012, for example, the Gates foundation announced a new round of grants intended to harness MOOCs, which have thus far been

associated primarily with elite universities, to offer remedial coursework. The 10 relatively modest grants (up to \$50,000) will require participants to use an existing MOOC or MOOC-ready platform – Coursera or Blackboard, for instance – so that each venture can focus on how best to serve students whose academic success is often thwarted by their ability to make it past foundational courses.

Gates's announcement asks for proposals that would use MOOCs in several possible ways: as supplementary study aids for students already enrolled in introductory courses; as a component of blended-learning classroom-based courses; and as stand-alone classes for students who are enrolled solely in a MOOC. As recounted in *Inside Higher Ed*, the foundation calls itself “cautiously optimistic” about the potential of this kind of learning tool. But it's significant that this hugely influential and deep-pocketed foundation is exploring the remedial-learning venture above all in a spirit of experimentation, planning to conduct significant research about which models are more or less effective. As Josh Jarrett, Gates's deputy director for education and postsecondary education, observed: “The jury will be out on MOOCs for at least a couple of years.”

The initiatives discussed here inevitably reflect only a small portion of the new landscape of U.S. higher education. Reformers' hopes for some will no doubt prove to be overblown. Others may be transformational. Certainly, the problems they address are pressing, from low graduation rates and inadequate student learning to poor data systems that in turn make thoughtful cost savings and academic productivity increases harder to measure. The magnitude of these challenges notwithstanding, it seems likely that the United States – and countries such as Australia, too – are moving toward an educational world in which outcomes matter more than process. Policymakers and education leaders ought to be agnostic about how higher education institutions – or brand-new entrants – do their work, so long as they achieve good academic results for students.

When Sebastian Thrun announced the creation of Udacity, he said: “Now that I saw the true power of education, there is no turning back. It's like a drug. I won't be able to teach 200 students again, in a conventional classroom setting.” Thrun's statement is powerful – whatever the fate of Udacity and others MOOCs, we are surely seeing just the beginnings of an online education revolution. At the same time, there is little reason to believe that everything will change all at once. There's reason to be wary of apocalyptic scenarios, either positive or negative, that suggest the changes taking place today will destroy existing institutions and their values. It seems more likely that these innovations, while disruptive, are not fundamentally threatening, but rather an opportunity for traditional institutions to become better: a crisitunity.

Innovation in higher education surely won't mean a single model of change. We are moving toward a world not of either/or, but of both/and. But while a diverse educational landscape seems certain as experiment after experiment takes place on and off campuses, one thing is certain: Institutions of higher education, having stayed remarkably similar over the last half-century, will look remarkably different fifty years from now.