



University Ventures Letter

Volume II, Holiday Edition

Online Education Whitepaper

Since establishing University Ventures nearly two years ago, we have written and spoken on many aspects of higher education and online education in particular. With nearly 15% of U.S. students enrolled in higher education studying entirely online and earning degrees without ever setting foot on campus, and with online education in the headlines and popular consciousness like never before, this holiday season we thought it would be a nice gift (to ourselves, primarily) to organize our views on the evolution of online education and its impact on higher education more broadly in a handy whitepaper format.

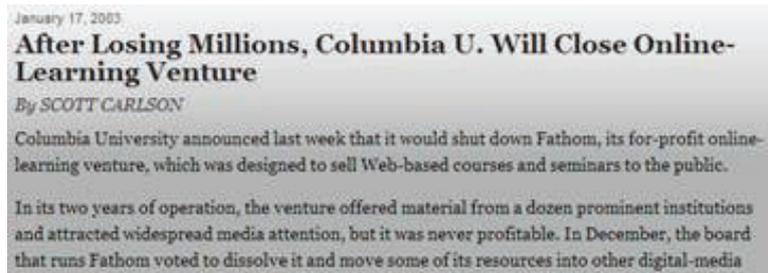
Have a very happy (and offline) holiday season.

TABLE OF CONTENTS

MOOCs	3
Role of online education in solving affordability crisis	4
Student outcomes	5
Connection to employment and the new digital divide	7
Traditional-age market	8
International market	10
Regulation of online education	11

MOOCs

Let's begin with the headlines. Last week the UK received its own MOOC platform in the form of the Open University-organized (or as they say in the UK, "organised") FutureLearn. With a stated business model of creating a large learning community and directing learners to online degree programs from institutions like the OU that are willing to offer such programmes, we have definitely seen this movie before (i.e., the Columbia University-backed Fathom project from 1999 – 2003, which also involved UK partners).



To further your sense of déjà vu, take a look at this excerpt from a dot-com era New York Times article with the headline “**BoolaBoola, E-Commerce Comes to The Quad,**” which anticipates MOOCs by a dozen years:

We always thought our new competition was going to be ‘Microsoft University,’ the president of an elite eastern university ruefully remarked to a visitor over dinner recently. “We were wrong. Our competition is our own faculty.” Welcome to the ivory tower in the dot.com age, where commerce and competition have set up shop... Distance learning sells the knowledge inside a professor’s head directly to a global on-line audience. That means that, just by doing what he does every day, a teacher potentially could grow rich instructing a class consisting of a million students signed up by the Internet-based educational firm that marketed the course and handles the payments. “Faculty are dreaming of returns that are probably multiples of their lifetime net worth,” said Kim Clark, dean of the Harvard Business School. “They are doing things like saying, ‘This technology allows someone who is used to teaching 100 students to teach a million students.’ And they are running numbers and imagining, ‘Gee, what if everyone paid \$10 to listen to my lecture?’ ”

It was a heady time in higher education, and many really believed the hype that brand-name institutions would grow to hundreds of thousands of students and that “rock star” faculty would get rich teaching millions of students online. Twelve years later, the only universities with hundreds of thousands of students are private sector institutions whose brands were dreamed up by marketers in the past 30 years, and **the only educator who has become a rock star through the Internet is in K-12**, not higher education.

Higher education should learn from its history, and its history has been the provision of degrees that provide a **clear economic benefit to recipients**. Despite various announcements over

the past few months from Coursera and Udacity that seem to begin to square the MOOC circle, MOOCs are still circles and degrees are still squares. It's hard to see a business path for the MOOC providers themselves (although a number of companies and providers will undoubtedly emerge that take advantage of MOOC content in order to bestow an economic benefit to students).

What MOOC madness illustrates more than anything else is the remarkable divide between the chattering classes and the tens of millions of individuals for whom higher education accessibility is a critical concern. Elites love the idea of taking a Stanford course for free. It recalls their youthful days at similar elite universities. But they don't need degrees. They already have them. On the other hand, you have the much, much larger group of non-elites who need a degree. **The United States, once the global leader in the number of 25-34 year-olds with college degrees, now ranks 12th** while approximately **half of U.S. employers have trouble filling job openings because they cannot find qualified workers.** The outsized importance of the degree itself over the university granting the degree or the faculty member teaching the course is the simplest explanation for the explosion in enrollment at private sector universities.

But MOOCs have already made two key contributions to higher education. The first is that it is no longer acceptable for any college or university to avoid or defer an online strategy. This is incredibly important. Many universities will play in the MOOC sideshow for a few years before developing a real strategy. Others will see straightaway that they need to take advantage of technology to develop innovative new programs that address social and economic needs, and that are accessible and affordable in a way that is difficult to imagine today.

This is where the second contribution comes into play. Reading the Ithaca S&R report released in May 2011 on **Barriers to Adoption of Online Learning Systems in U.S. Higher Education** – a report co-authored by William Bowen and Larry Bacow, the former President of Tufts – it's clear that "machine-guided learning" is emerging. According to Bowen and Bacow, machine-guided learning has the potential "to greatly expand the reach of the nation's colleges and universities to populations currently not served, while at the same time helping to bend the cost curve in higher education... It also has the potential to benefit students by allowing them to have more targeted and personalized learning experiences."

Many of the technologies that are and will be deployed by companies like Coursera, Udacity and edX will be instrumental in helping to test and prove the concept of machine-guided learning. By deploying these technologies in the politically safe MOOC format, elite universities will provide air cover (with accreditors, regulators and with prospective students) for new digital community colleges and state university systems to deploy them in the context of degree programs.

Role of online education in solving affordability crisis

Perhaps the most remarkable aspect of the rise of Open Courseware and MOOCs and online learning generally is that aside from a few examples, **technology has not yet had a material impact on the affordability of degree programs.** (MOOCs and content, sure – but not degrees.) Heretofore, higher education has managed to resist the technology-driven cost reductions that have swept through the communications and media sectors. Fortunately, this will change in the next five years.

The primary driver of this change will be the aforementioned advent of machine guided learning. Machine-guided learning will have two key elements in its initial forms: First, self-paced delivery (as opposed to delivery through cohorts); Second, competency-based learning.

Returning to MOOCs for a moment, here is what Udacity founder Sebastian Thrun had to say in his announcement that he was leaving Stanford:

We really set up our students for failure. We don't help students to become smart. I started realizing that grades are the failure of the education system. [When students don't earn good grades, it means] educators have failed to bring students to A+ levels. So rather than grading students, my task was to make students successful. So it couldn't be about harsh, difficult questions. We changed the course so the questions were still hard, but students could attempt the multiple times. And when they finally got them right, they would get their A+. And it was much better. That really made me think about the education system as a whole. Salman Khan has this wonderful story. When you learn to ride a bicycle, and you fail to learn to ride a bicycle, you don't stop learning to ride the bicycle, give the person a D, and then move on to a unicycle. You keep training them as long as it takes. And then they can ride a bicycle. Today, when someone fails, we don't take time to make them a strong student. We give them a C or a D, move them to the next class. Then they're branded a loser, and they're set up for failure. This medium has the potential to change all that.

So when Anant Agarwal, one of the leaders of the edX effort, notes that “human productivity has gone up dramatically in the past several decades due to the Internet and computing technologies, but amazingly enough the way we do education is not very different from the way we did it a thousand years ago,” the major advance he has in mind is not **rock star professors lecturing to millions**, but rather that the **online medium lends itself perfectly to a competency-based approach**.

A century from now, it is likely that we will look back at the advent of online delivery as interesting in and of itself, but historically most important because it gave rise to a new model for delivering higher education. Online delivery is the foundation for competency-based models. In time, the **shift from “clock hours” or “seat time” to competency-based education** will significantly reduce time-to-completion and increase completion rates and return on investment. More important, it will ensure students actually have mastered the set of capabilities represented by the degree they have earned.

Student outcomes

With each passing year, online education (and online degree programs) gain further acceptance from employers, universities and students. But current efforts have not done nearly enough on the question of learning outcomes (or quality) to quiet critics.

The answer to this question stems from the key difference between online and onground learning: Ongoing, your focus is controlled by the environment; online, you focus by choice. That means if

you're not engaged, you walk away from the machine. This results in lower persistence online than onground, and questionable student outcomes.

Online educators have three answers to these questions. The first is to make the online environment more like the onground environment via synchronous learning. 2U (formerly 2Tor) is the pre-eminent proponent of synchronous learning. 2U courses include a mandatory weekly synchronous classroom discussion where every student is present and visible on the screen (a la Brady Bunch). The same off-the-shelf technology (Adobe Connect) is utilized by students in breakout sessions and interactive whiteboarding for group projects. We believe the next step will be deploying synchronous technology outside the scheduled classroom time, providing online students with some of the intellectual splendor that comes from spending time on a university campus.

The second answer is very different. Don't try to replicate the campus environment. Rather, instructional designers should pay heed to the example of Michelangelo, who painted the ceiling of the Vatican's Sistine Chapel for days at a time without stopping for food or sleep. Such stories caught the attention of the positive psychologist Mihaly Csikszentmihalyi, former head of the Department of Psychology at the University of Chicago. Csikszentmihalyi developed the **theory of Flow**, which describes the mental state in which a person – working alone – is fully focused and immersed in work. Csikszentmihalyi's work demonstrated that the three key criteria for entering flow are:

- 1) Highly challenging work;
- 2) Individual has the sense that his or her skills are above average and more than adequate to succeed with the work; and
- 3) Goals are clear, and feedback is consistent.

Flow is achieved by artists, musicians, baseball players, and, of course, **students**. If and when students enter "flow," research has demonstrated that their brain is so fully engaged that focus is no longer a matter of choice, it is effectively controlled.

The good news is that two of the most exciting areas of development in online learning relate directly to flow.

Gamification: In videogames, goals are clear and feedback is immediate. Focus is the result of interactivity and competition. If you've ever tried to pry a teenager from a videogame console, you've borne witness to the power of flow. Gamification, or the inclusion of game-like elements into online learning experiences, also employs rewards and recognition to provide students with the sense they can succeed. Well-designed simulations include these elements.

Adaptive Learning: Emerging adaptive learning systems attempt to meet students where they are, for example, by serving up more challenging learning objects as a result of high performance on formative assessments. As such, adaptivity is a nearly a prerequisite for the "highly challenging work" required to enter flow. And when students struggle, adaptive systems throttle back until the student is ready for more. Adaptivity helps students build and maintain confidence. And with the advent of tablets and the immersive (non-browser-based) app environment they enable, adaptivity will become even more powerful. Tablets know if a student is moving the tablet, touching the screen, ambient noise levels, if there is a human facing the screen, location, or change in focus

(switching from one program to another) – all coming under the umbrella of “telemetry” data. Telemetry data will be instrumental in determining which learning objects and sequences are conducive to flow and which are not. The third answer is data. Today, higher education remains focused on what’s easy to measure. We call these the 3Rs: research, rankings and real estate. Each of these areas is easily quantified or judged: research citations or number of publications in Nature and Science; U.S. News ranking (or colleges choose from a plethora of new entrants to the ranking game, including the international ranking by Shanghai Jiao Tong University); and in terms of real estate, how much has been spent on a new building and how stately, innovative and generally impressive it appears.

Unfortunately, the 3Rs correlate poorly to student outcomes. Universities that continue to focus on the 3Rs are either not serious about improving student outcomes, or they’re like the fellow who loses his car keys in the parking lot at night: Where does he look for them? Not where he lost them, but under the light because that’s where he can see.

Online programs will lead the charge in tracking and analyzing persistence and other student outcome metrics. All their data is already online, waiting to be analyzed. New “big data” entrants like Civitas are first targeting online universities to deploy their data models and analytics in order to improve outcomes. This will absolutely contribute to improving the outcomes of students enrolled in online programs.

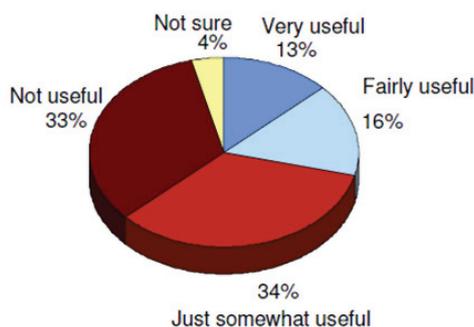
Connection to employment and the new digital divide

A final way in which online education will improve quality will be to make a better, more direct connection to employment and employers. We address this opportunity separately, as it is likely to be accompanied by real challenges for traditional onground institutions.

Give some thought to the poor, neglected transcript. While many employers today request college transcripts, particularly for entry-level positions, transcripts are used for degree verification, not as indicative of capabilities that may or may not match the employer’s needs. This is because transcripts are opaque to employers. No HR or hiring manager is equipped to decipher a particular transcript from a particular institution. No employer is able to forecast from a student’s transcript his or her likely job performance, in part or in aggregate.

Employers Find College Transcripts Of Limited Use In Evaluating Potential

How useful do you find the college transcript in helping you evaluate job applicants' potential to succeed at your company?



This will change as some universities will develop degrees that employers will be able to “double click” and understand capabilities in a language they themselves utilize.

One of the major innovations we expect to see over the next few years is a much tighter connection between some higher education programs and some employers. It won't be in the form of workforce training programs at community colleges, although these will continue to receive ample government support. Rather, it will be a technological connection. Specifically, we expect some employers and universities to adopt a common “taxonomy of capabilities.” Employers will use the taxonomy to tag their job descriptions. Universities will do the same for their curricula, degree programs, and student transcripts. The result could unlock huge efficiency gains in the labor market.

Job Trends

Example: HTML5 Job Trends

“HTML5” is the #1 job trend - the fastest growing keyword found in online job postings - ahead of “MongoDB” in second place and “iOS” in third place. The top 10 trends are to the right or you can see the trend for any words or phrases by entering them in the search box above.



If you buy this vision, you'll probably also agree with the following statement: the connection is likely to happen sooner for online programs and students. Online programs already have documents in digital format, and **online competency-based programs** like Western Governors and University Now point the way to capabilities metadata tagging.

As a result, we will see capability alignment between online students and employers before students learning on campus or through blended models. This will be the new digital divide: students learning online will have the ability to select more efficient and effective paths to transforming their actual capabilities to the target capabilities required by employers, and then to track their progress.

Job Postings Per Capita

For the 50 most populous metropolitan areas in the United States. The bigger the dot, the more job postings per capita.



Rankings Third Quarter 2012

50 most populous metro areas ranked by job postings per capita.

Rank	Location	Metropolitan Area	Job Postings Per 1000 People
1 (n)	San Jose	CA	153
2 (n)	Washington	DC	120
3 (n)	Raleigh	NC	117
4 (n)	Hartford	CT	103
5 (n)	Boston	MA	96
6 (n)	Baltimore	MD	96
7 (n)	Denver	CO	86
8 (n)	San Francisco	CA	77
9 (n)	Austin	TX	76
10 (n)	Seattle	WA	75
11 (n)	Columbus	OH	73
12 (n)	Charlotte	NC	72
13 (n)	Salt Lake City	UT	72
14 (n)	St. Paul	MI	70
15 (n)	Richmond	VA	70

Online students will also have an advantage in being able to document their capabilities – not only in terms of the capabilities metadata attached to their online transcripts, but also in terms of online portfolios. As assessments and assignments will also be tagged with capabilities metadata, online students will have developed portfolios of work that demonstrate exactly the capabilities employers are seeking. So employers won't have to take universities' word for it. They'll be able to see it for themselves. (Of course, this also help opens the door to new providers of education – it won't have to be a brand-name or even accredited university if the capabilities-tagged work is visible to employers via an open portfolio.)

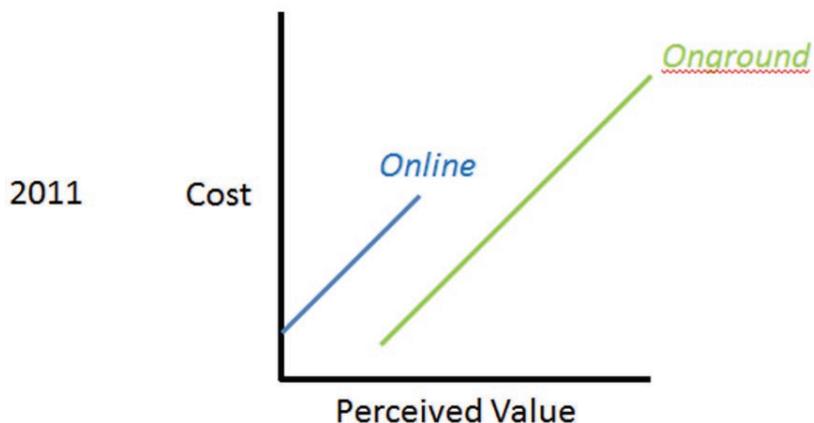
The new digital divide will segment higher education providers into jobs-focused and employer-friendly institutions (i.e., online) and traditional campus-based institutions. It will also further accelerate the adoption of online learning and result in online taking additional market share from campuses for both adult learners and traditional age students. Such is the transformative price higher education will pay to do a better job of transforming students into capable employees.

Traditional-age market

As “the singularity” connotes the moment at which artificial intelligence will exceed human intelligence, the “online education singularity” might indicate the point at which online programs displace onground programs as the default medium for traditional-age students. When this happens will depend on the student profile: there is no single singularity for online education.

Students who view higher education as an instrument to a better economic future are one group. They value higher education in terms of the employment they are able to attain post-degree and the concomitant impact on income and future opportunity. We'll call these students non-elites, in contrast to elite students who have a view of higher education that is more ethereal and close to what America's leading educational thinker John Dewey believed: that education is not simply a process of gaining knowledge, but of learning how to learn, how to realize one's full potential, and how to live – not only as an employee, but as a contributing member of society, as a citizen.

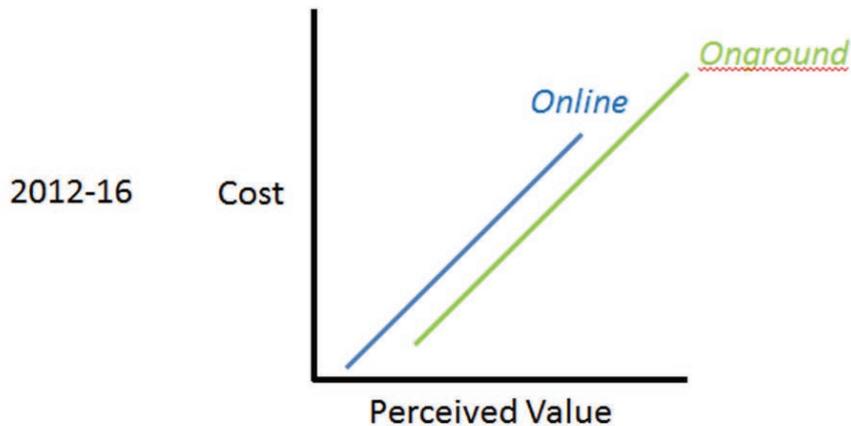
Non-elites will determine whether to enroll in an onground or online program based on a set of options that fall along perceived value curves. Last year, the curves looked like something like this:



At every tuition level, online programs had significantly less perceived value for traditional-age non-elites. At the same cost level as the lowest cost onground programs, the perceived value of online programs was probably near zero. And there were no high-cost, high-perceived value online programs for undergraduates.

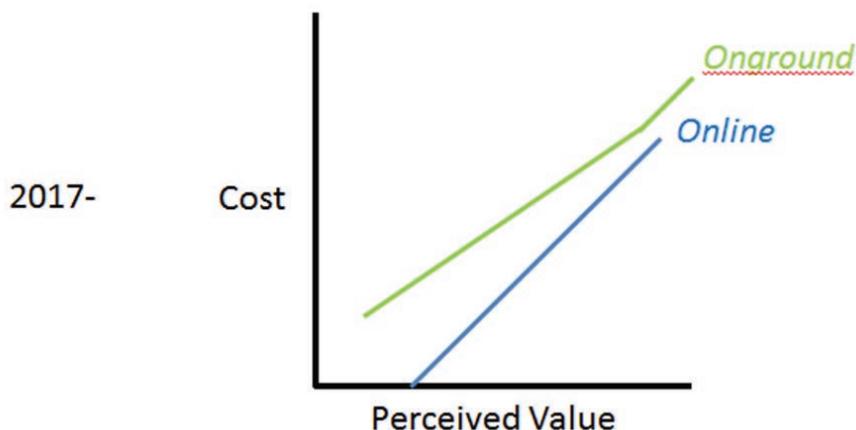
Starting this year, and for the next few years, non-elites will see three changes to their online curve:

- 1) Introduction of lower cost online programs than even the lowest cost onground programs.
- 2) Introduction of higher cost online programs, with higher perceived value
- 3) Shift of the curve to the right, as online programs gain greater perceived value at every tuition level.

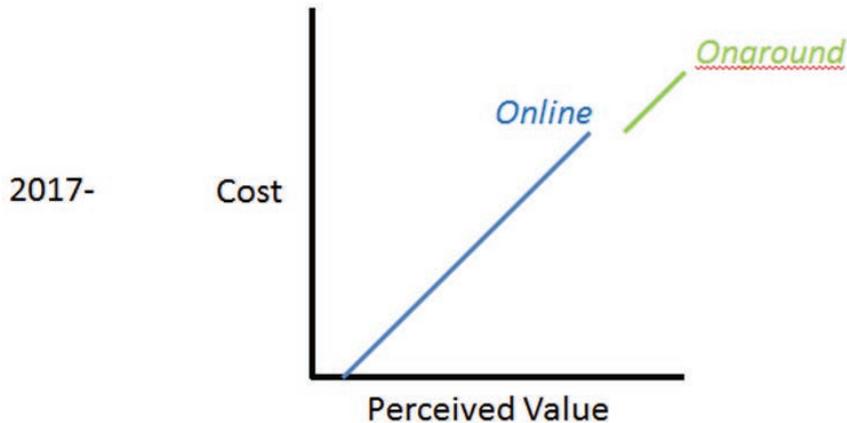


This shift to the right will be partly due to the aforementioned innovative new technologies that will be incorporated into online programs, enhancing engagement, persistence and student outcomes. But much of the shift will be due to MOOCs making online a respectable medium for higher education.

We believe that for non-elites, the singularity will happen in the decade after 2017. The online curve will continue to shift to the right for the same reasons including – critically – increasing MOOC activity by elite universities. Meanwhile, the onground curve will be hinging left below the elite level due to continued reductions in governmental support. Also note online programs of real perceived value being offered virtually for free.



It will be a different story for elite students. This social importance of higher education for elites will retard the rightward shift of the online perceived value curve for many years, perhaps decades. Equally important, elites' overwhelming focus on the value they believe can only be derived from an intensive residential experience leads to myopia, limiting consideration of higher education to the most elite institutions. The result is an onground consideration set that starts at a very high cost and perceived value level: elite colleges and universities.



As a result, elites and their families, a group that doesn't like to be behind the curve, may be literally behind the curve in adopting online learning. This could lead to important issues in terms of elites' views on, comfort and capability with technology, as well as further social division between elites and non-elites.

International market

Online education has progressed much more quickly in America than any other market, including the UK. As noted, **nearly 15% of U.S. students are studying without ever setting foot on campus** and we can expect to see exciting new technology to boost student outcomes. So while universities like Yale, NYU and Duke are right to expend time and energy creating new campus-based programs in Asia, these programs are designed as corollaries to their U.S. operations to serve the local elite. Meanwhile, online will be where the rubber hits the higher education road for millions and it won't be long before U.S. (and UK) universities begin launching online programs for export to emerging markets.

What's the size of the opportunity for American higher education? Consider the following: Education is **Australia's largest services "export" sector**, contributing A\$16.3 billion to the Australian economy in 2011, or roughly 1.5% of GDP. Australia leads the world in higher education exports not because its universities are world-renowned, but because it is **closest to Asian markets**.

Fast forward to a world of synchronous and adaptive online learning where recognized U.S. universities (if not the Ivy League) offer online degrees for export, where online programs are accepted in China and India as equivalent in quality, and where geographic proximity is meaningless. If the U.S. were able to generate 1.5% of GDP from export of online programs, that would be \$220 billion

– or 10 times the current U.S. “export” market (i.e., international students studying in the U.S.). In theory, in an online world, the potential could be much larger than Australia’s 1.5%, as American universities could compete with every Asian university for every Asian student – not simply for those willing to travel abroad. In practice, as average tuition per online student will be much lower than what Chinese students are paying today in Australia, 1.5% is a reasonable target and still dwarves the export potential of America’s current top export industries: agriculture and entertainment. And in human terms, we know of no other innovation likely to impact the lives of so many people so fundamentally over the next generation. The international market is bound to be an area of focus over the next decade for virtually everyone involved in online education.

Regulation of online education

Nothing worthwhile comes without challenges. All this promise will only be achieved if we are able to successfully surmount barriers that conservative forces have been busy erecting.

Resistance to innovation (or what we call the “ μ Factor”) may be higher in higher education than any other sector. Resistance comes from many sources: traditional colleges and universities, faculty, state regulators, accreditors, and the Department of Education itself. The Department of Education has been particularly active in establishing new rules that are well-meaning, but that could stop online learning in its tracks.

The first of these is its affirmation of the credit hour rule. Today, the “Carnegie Unit” remains the backbone input in American higher education. However, as part of its recently concluded rulemaking process, the Department of Education decided to bottom the entire system on this one input. It did so in a **“Dear Colleague” letter** from Eduardo Ochoa, Assistant Secretary for Postsecondary Education, that stated that the Department would require that institutions participating in the Title IV financial aid programs follow the original Carnegie credit hour formulation, which is based on “minimum amount of student work... in accordance with commonly accepted practice in higher education.”

The Department’s logic was that “a credit hour is a proxy measure of a quantity of student learning.” But this is incorrect. A credit hour is an input – the amount of work a student does. **Student learning is an output.** The point of competency-based learning is to produce more learning for less work.

The result is that the U.S. government has created an indelible equation between the amount of student time that must be directed to the learning process and access to Title IV. Any attempt to innovate and increase productivity could be met with dire consequences. As such, the unintended consequence of this action is to limit increases in productivity. For online education to realize its promise, this rule needs to be revisited.

The second Department action concerns state licensing. The 2009-10 NPRM process led by the Department of Education yielded a number of controversial rules, including a new rule covering online programs: 34 C.F.R. § 600.9(c) (2011). The rule set forth that in addition to meeting the requirements of their own state, online providers would have to meet the requirements of all states where students reside.

Prior to the passage of this rule, states and online providers co-existed in mutual ignorance. States that required authorization for any institution enrolling a student from the state were not considering enforcement against online providers. And states without authorization requirements were not considering enacting them.

The new federal rule awoke a sleeping giant. Suddenly states with authorization requirements began enforcing them. And states without them began moving to enact them. For example, **Maryland's proposed rule** imposes scrutiny comparable to an accrediting agency, requiring that universities enrolling students in the state meet defined criteria for curriculum design, faculty resources, library resources, and market demand (new programs outside of the liberal arts and sciences require submission of Maryland government and private survey data). **Nevada's proposed rule** defines education levels for instructors, requires a submission of coursework and dictates that if the regular instructor is replaced by a substitute, the substitute must possess the same qualifications. In the name of consumer protection, states like Maryland and Nevada have enacted what are effectively protectionist rules – either to generate revenue from fees or to literally protect their own public universities from competition.

There have been three developments since the federal rule was enacted. First, in response to complaints from traditional colleges and universities now offering programs online, the Department delayed enforcement to 2014. Second, bills that would repeal the rule began moving through Congress. And then on June 5 the DC Circuit Court of Appeals affirmed a district court decision that struck down the rule on a technicality: violation of the Administrative Procedure Act (APA) for failure to provide adequate notice of the rule to regulated parties.

Unfortunately, none of this matters because the horse has left the barn. Neither the DC Circuit action nor Congressional repeal will have any impact on the new state rules and zeal for enforcement. So large, resource-rich universities like USC report that in order to offer their new online M.A. in Teaching in partnership with 2Tor, they have had to comply with “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.” On the other end of the spectrum, given the time and expense associated with complying with new state authorization rules, Troy University, an Alabama public institution with one online degree program, is waiting to review the geographic composition of online cohorts before deciding to comply with authorization, or reject students.

In the President's second term, the Department needs to do whatever it can to get the horse back in the barn. How can we expect our higher education institutions to attack the multi-hundred billion dollar international market opportunity if we can't establish a single domestic market here at home?



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