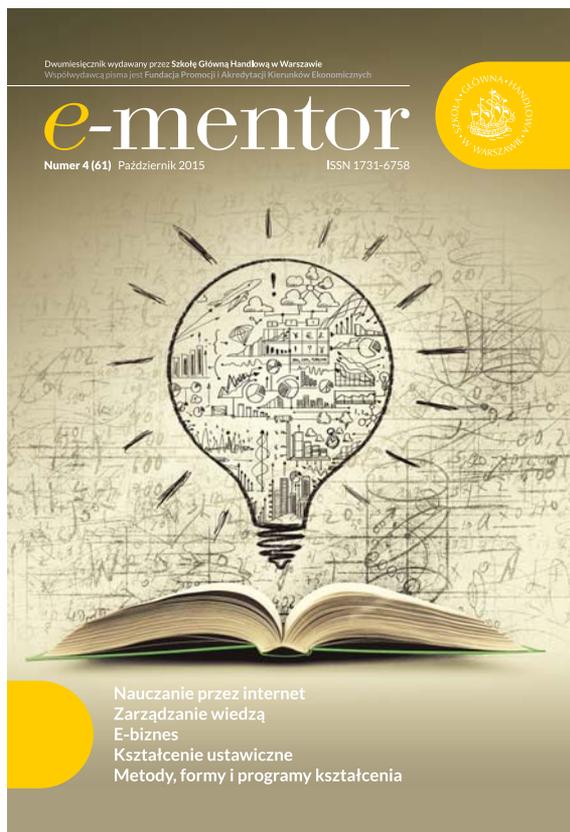


e-mentor

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The quest for demonstrable outcomes

David Schejbal

There is a buzz, even a frenzy, about competency-based education (CBE). Brought together by the Lumina Foundation-sponsored organization C-BEN (the Competency-Based Education Network), 30 institutions and 4 university systems have developed or are developing competency-based programs. About another 600 schools have claimed to be developing CBE programs, though there is no accurate data to substantiate that number. Why and why now?

To understand the reasons for the interest in CBE in the U.S., it is important to understand the broader context that is significantly impacting higher education¹. As with most things, one primary driver is money. In 1971 the tuition for a public 4-year college was \$428 (\$2,456 adjusted for inflation) per year. By 2012 tuition had risen to \$8,646 (\$8,816 adjusted for inflation) per year, a 1,920% (259% for inflation-adjusted numbers) increase. Meanwhile, the median income in 1971 for men was \$6,903 (\$34,898 adjusted for inflation) and for women was \$2,408 (\$12,174 adjusted for inflation), making tuition 6.2% of men's median income and 17.8% of women's median income per year. In 2012, the median income for men was \$33,904 and \$21,520 for women, making tuition 26% of men's median income and 41% of women's median income per year².

Average tuition at private 4-year colleges rose similarly but from a much higher starting point: \$10,515 in 1971 to \$29,557 in 2012³. Money alone, however, is not the only driver of interest in CBE. After all, even if competency-based education is cheaper than traditional education – and the jury will be out on this one for quite some time – there are other ways to reduce higher education costs.

Money is only part of the issue; accountability and evidence of learning are others. As reported by „The Washington Post”, in a recent speech about higher education Secretary of Education Arne Duncan said: *We will work with states, colleges, and accreditors in a shared partnership, with clear responsibilities, to increase accountability for student success in higher education*⁴. In the same speech, however, Duncan noted that the call for accountability isn't new and, putting the responsibility on Congress, said that Congress has yet to successfully address the issue. *In 2006, under a Republican president, the Spellings Commission on Higher Education found – and I quote – „a remarkable absence of accountability mechanisms to ensure that colleges succeed in educating our students”. Over the past decade, quite frankly not much has changed. Congress delegated the role of quality assurance to accreditors. And Congress, with the support of the higher education lobby, has actually barred the federal government from establishing criteria for accrediting agencies to assess student achievement*⁵.

Here we begin to see the allure of competency-based education from the regulatory process. CBE directly addresses the call for accountability because by design CBE programs focus on what students can do with the knowledge and skills that they have learned. This, in turn, gets directly at the outcomes of higher education. In other words, broadly put, the general public expects the outcomes of higher education to be smart, capable people who are both good citizens and productive employees. These broad outputs, however, even if disciplinarily focused, are extremely difficult to measure and verify, so there is broad disagreement and tension over what really are the outcomes of higher education.

¹ European and Australian universities have offered competency-based programs for many years, and there are a few, small universities in the U.S. that have offered competency-based programs since the 1970s. However, the current interest in and development of competency-based programs in the United States is unprecedented there.

² *Median Incomes v. Average College Tuition Rates, 1971–2012*, 2014, <http://college-education.procon.org/view.resource.php?resourceID=005532>, [08.09.2015].

³ *Ibid.*

⁴ N. Anderson, *Duncan Wants More Accountability in Higher Education. Easier Said than Done*, „The Washington Post” 2015, July 28.

⁵ *Ibid.*

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Structuring programs in a CBE format can overcome this challenge.

Regulatory impacts on curricular structure

Credit-hour based programs

The credit hour system in the U.S. is complicated, and its complexity and opacity is due to its evolution over the past century.

Most programs in American higher education that lead to degrees are based on the Carnegie Unit. First established in 1906 by the Carnegie Foundation for the Advancement of Teaching, the Carnegie Unit was a tool to help establish a pension system for college faculty. Andrew Carnegie wanted college faculty to get pensions, so he invested \$10M into a pension fund. However, that amount wasn't sufficient to provide pensions to all college faculty in the nation. Hence, there was a need to establish eligibility requirements for which faculty were eligible for pensions.

Borrowing from other efforts to standardize high school curricula and college entrance requirements, the Foundation defined the standard for high school as a minimum of 14 units, with each unit representing 120 hours of classroom study⁶.

This effort to develop eligibility criteria for pensions is how *time* eventually became a proxy for learning. More commonly known in higher education as the „credit hour”, the Carnegie Unit is the standard time-based metric of student progress used by almost every K-12 and higher education system in the nation. The number of units and credits is not the same everywhere but the formula is simply and routinely applied: a certain number of hours equal a unit, a certain number of units equal a credit, and a certain number of credits produce some sort of credential or degree. The problem is that, while the universal and portable hour may make for a more efficient system, the unit also promotes the false perception that time equals learning, in the same way for all students. This was never the intent when the Carnegie Unit was first created, more than a hundred years ago⁷.

Despite the mismatch of time as a measure of student learning, the credit hour is connected to national higher education policy because it is one of the primary criteria for student eligibility for financial aid.

The Higher Education Act of 1965 *cemented the federal government's involvement in higher education and permanently established a philosophy of higher education as an issue of national interest. The Higher Education Act*

*also established nine titles outlining the administrative structure for a variety of programs in higher education, while also requiring institutions accepting Title IV funds [financial aid] through students to adhere to recognized accreditation standards*⁸.

Accreditation standards stipulate (more or less) how students should progress through a typical credit program. That process centers on accumulating credits by passing courses within a curriculum until the required number of credits is reached for graduation. For each successfully completed course, students get one or more credits. Most classes are worth three credits because most classes meet for three hours per week and (presumably) require twice that many hours of out-of-class work. These numbers are not arbitrary; they are prescribed by the U.S. Department of Education, and any institution that awards financial aid must meet these criteria.

*A typical bachelor's degree program of study on a semester calendar requires at least 120 credit hours to be earned by the student. [...] This roughly translates into at least 30–40 courses (depending on the major subject and thus the proportion of types of credit hours earned) and represents at least 5,400 – and probably more – actual hours of dedicated academic work. [...] A master's degree program requiring at least 33 credit hours and including a research thesis or project represents over 4,000 actual hours of supervised and unsupervised (independent research) study, while a doctoral program can represent 8,000 or more actual hours of advanced study and research beyond the master's degree*⁹.

These requirements for how much time a student spends studying determine whether a student is eligible for financial aid. Students who are enrolled full-time meaning 12 semester hours or 12 quarter hours per academic term in an educational program using a semester, trimester, or quarter system¹⁰ are eligible for full aid if they also meet other eligibility criteria. Analogous requirements apply for half-time study.

In brief, the regulatory process stipulates much of what is required of students: spend the requisite time on the task of learning. The regulatory process is silent about the outcomes of that time spent learning, i.e., whether students actually learned anything or can do anything with the knowledge that they (might or might not have) acquired. It might seem that grades solve this problem.

In theory, colleges supplement the credit-hour count of how much time students have spent being taught with an objective measure of how much they have learned: „grades”. But here again, the

⁶ E. Sylva, *The Carnegie Unit Revisited*, 2015, <http://www.carnegiefoundation.org/blog/the-carnegie-unit-revisited>, [21.10.2015].

⁷ Ibid.

⁸ M. Fuller, *A History of Financial Aid to Students*, „Journal of Student Financial Aid” 2014, Vol. 44, No. 1, p. 53.

⁹ *Structure of the U.S. Education System: Credit Systems*, U.S. Department of Education, <http://www2.ed.gov/about/offices/list/ous/international/usnei/us/edlite-evaluation.html>, [14.08.2015].

¹⁰ *Federal Student Aid Handbook*, 34 CFR 668.2(b), <http://ifap.ed.gov/fsahandbook/attachments/1415Vol1Ch1.pdf>, [25.08.2015].

picture is troubling. Although grades are supposed to objectively reflect learning, it is hard to reconcile today's grades with the research suggesting poor learning outcomes are widespread. Almost half of all undergraduate-course grades are A's (in 1961, only 15 percent of grades were A's). Grade inflation is cited as a „serious problem” in higher education by nearly two-thirds of provosts and chief academic officers at undergraduate institutions in the United States¹¹.

Hence, neither the length of time spent learning nor the grades that students receive are good measures for what students have actually learned and can do with that knowledge. This issue, coupled with public, political, and employer dissatisfaction with learning outcomes, provides a good opportunity for a new model of education that focuses very directly on demonstrable and verifiable learning outcomes. Competency-based education does just that.

Competency-based programs

Competency-based curricula are developed differently from credit-hour curricula, though the processes and approaches vary widely. What CBE programs have in common, however, is that by design the amount of time spent learning is jettisoned as a measure of learning.

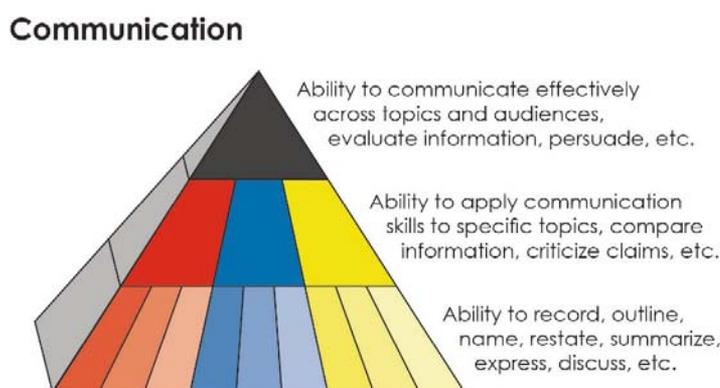
The traditional approach positions enrollment in a degree program as an outcome instead of viewing it as an activity. Conversely, competency-based education focuses on achievement of student learning as an outcome in the form of demonstrated proficiencies. The achievement of competencies can occur at variable speeds instead of in a set period such as a semester. In summary, competency-based education focuses on the demonstration and application of learning, rather than on the time spent taking courses¹².

In this approach, broad learning outcomes are identified first and the curriculum is designed backward.

The program outcomes are unpacked into constituent parts that are further unpacked until a foundational level is reached. This continual focus on outcomes ensures that there are measures of learning and ability at multiple points throughout academic programs. Graphically one might think of a competency-based curriculum as a set of pyramids, each representing one of the program-level learning outcomes. At the apex of the pyramid is the program competency, and each level below the apex represents a more specific set of constituent competencies. The base of the pyramid represents the foundational competencies for that particular program competency. Figure 1 below represents an example of a pyramid for communication competencies. For any particular discipline, this hierarchical set of communication competencies would be adjusted to fit the discipline, but this is a useful example for illustrative purposes.

In addition to the hierarchy of knowledge, students must understand and be able to use that knowledge in more complex and innovative ways. In 1956, Benjamin Bloom and a group of educational psychologists developed a classification system for categorizing educational goals through varying levels of intellectual behavior during the learning process. In the 1990's that system was updated and revised by a new team of educational psychologists and led by one of Bloom's students, Lorin Anderson. In 2001, the team published a revised version of Bloom's Taxonomy under the title *A Taxonomy of Teaching, Learning, and Assessment*. In the new taxonomy, the authors stress the dynamic, progressive nature of the learning by replacing nouns in Bloom's original classification of learning with action verbs. For example, instead of a hierarchy of learning beginning with knowledge and progressing to comprehension, application, analysis, synthesis, and evaluation; the new formulation identifies the stages as remembering, understanding, applying,

Figure 1. A pyramid for communication competencies



Source: author.

¹¹ A. Laitinen, *Cracking the Credit Hour*, New America Foundation Education Sector, http://highereducationwatch.newamerica.net/sites/newamerica.net/files/policydocs/Cracking_the_Credit_Hour_Sept5_0.pdf, [16.08.2015].

¹² *Experimental Sites Concept Paper: Competency-Based Education*, 2014, <http://chronicle.com/blogs/ticker/files/2014/01/Experimental-Sites-Concept-Paper-FINAL.pdf>, [28.08.2015].

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analyzing, evaluating, and creating. This stresses the process of learning and the actual behaviors exhibited in each stage.

Figure 2. The new version of Bloom's taxonomy



Source: *A Guide to Bloom's Taxonomy*, The Innovative Instructor Blog, John Hopkins University, 2015, <http://ii.library.jhu.edu/2015/01/30/a-guide-to-blooms-taxonomy/>, [25.08.2015].

The new version of Bloom's taxonomy dovetails very nicely with competency-based education, because it focuses directly on students' abilities to exhibit behaviors that demonstrate knowledge. In the CBE model, the demonstration of knowledge takes place through assessments, and the more authentic an assessment is, the more representative it is of a student's ability to apply what she knows in real-world contexts.

By combining backward program design with Bloom's Taxonomy, it becomes clear how assessments must be structured to evaluate students' mastery. Assessments should enable students to demonstrate their abilities to use what they know in real-world contexts. For instance, if a constituent part of a communication competency is the ability to write an expository essay in a way that clearly and grammatically conveys a complex set of ideas to an intended audience, then an authentic assessment should test how effectively a student conveys complex ideas through writing to that audience.

The focus on assessing students' knowledge and skills and the jettisoning of time as a measure of learning naturally lead to a self-paced model of education. In that model, a student progresses through a curriculum at her own pace. She takes assessments when she is ready. If she comes to a program with prior, relevant knowledge, then she can sit for assessments without engaging in (redundant) learning. If she does not have the requisite knowledge to pass assessments, then she engages in learning until she is able to demonstrate mastery. In this way, students progress through competency-based programs in fits and starts. Using prior knowledge or natural aptitudes for certain disciplines, most students progress through some parts of program curricula quickly. They slow down and spend more time learning in those areas where they are learning materials for the first time or when a particular subject is especially challenging for

them. Because of the student-to-student differences in natural aptitudes and prior learning, individual students move through curricula at varying speeds.

To signal mastery of competencies, some programs use grades while others designate a single threshold of mastery for any given competency. For example, a program might designate a grade of B as the minimum threshold for mastery. Other programs jettison grades and set a threshold of mastery so that either a student meets that threshold or does not meet it. If the student does not meet it, then she continues to study and practice until she is able to meet it. Students who don't master a competency continue to learn how to master it until they meet the requirements. When they do, they move onto the next competency, and so on. This move away from grades, removes failure from the process, and encourages students to continue to study and practice until they are able to do whatever is being tested at the level required.

In the regulatory environment, trying to move away from the credit hour and time as a measure of learning has proven very challenging. Although competency-based education directly addresses the concerns about student achievement that trouble Secretary Duncan and many others, its rejection of time-based learning has necessitated an array of regulatory machinations that place extraordinary burdens on institutions awarding financial aid. One significant burden, for example, is that institutions that develop CBE programs outside of the credit hour, known as direct assessment programs, must receive approval directly from the U.S. Department of Education in order to be able to award financial aid. This is different from traditional, credit hour programs for which approval is automatic if those programs are offered by accredited institutions. In addition, for CBE programs, approval by the Department of Education is granted at the program level, not at the institutional level, so for each new direct assessment program that an institution develops, it must receive program-specific approval. This extra layer of bureaucracy adds both time and cost to the approval process and slows the development of CBE programs.

Is CBE cheaper?

The answer is that it depends. As noted above, higher education in the U.S. has become very expensive, and little has been done to significantly reduce costs. One problem is that most states have reduced the amount of funding allocated to higher education. As a result, colleges and universities have increased tuition to make up for the reductions in state support. However, it would be too easy to blame the rapid rise in the costs of higher education on public funding alone.

Over the past four decades or so, universities have become bloated. Much of the bloat is due to competition for rankings, students, research dollars, star faculty, and major gifts. To be more competitive, institutions invested heavily in new buildings,

hotel-like dormitories, enormous sports stadiums, state-of-the-art labs, and salaries – especially in the most competitive fields like business, engineering, and medicine – and for administrators who are good at getting money. The challenge with these kinds of investments to gain competitive advantage is that they are never enough; other institutions build nicer dorms, bigger labs, etc., so the race continues to escalate.

Keeping up with the competition is only part of the problem. The other is with outdated academic and administrative structures that are supported by institutional cultures highly resilient to change. For example, higher education continues to function on an agrarian calendar that was designed when most students had to return to their farming communities to help grow crops, leaving campuses fallow in the summers. Today, although less than 1 percent of Americans farm¹³, summer enrollments on campuses are at best thirty percent of fall enrollments, thus continuing to underuse college and university campuses, staff, and faculty one-third of the year. Similarly, most classes continue to be taught face-to-face and duplicated each semester, even though online technology has been proven to be both effective and efficient. Cultural change is difficult, and to date higher education has had the luxury not to change very much. However, the revenue and expense curves on many campuses are dangerously close to each other, and change will have to come.

Institutions have tried to create economies of scale by increasing the number of students in a class. The giant lecture hall taught by one faculty member and staffed by hordes of teaching assistants is one model; the multi-section, online class taught by adjuncts is another. Both reduce the costs of delivering education, but neither has resulted in appreciable reductions in tuition. In addition, the perceived quality of mass instruction is lower than the perceived quality of boutique instruction, so these models have given fodder to critics who argue that quality education can only be delivered in the traditional modality.

The structure of competency-based education is a bit like modern healthcare. In the latter, hospitals and clinics try to focus doctors on those patients that really need their care, while providing good, routine care for routine cases through less expensive providers like nurses and physician's assistants. In CBE, faculty are the experts and the specialists. They decide what students must know and what they must do to demonstrate sufficient knowledge and ability to qualify for a degree. Since most CBE programs are self-paced, faculty do not teach at set times, and students engage with faculty only when they need to. In many cases, tutors or success coaches can help students gain knowledge and move through programs without the

need to repeatedly engage faculty. This enables individual faculty to oversee and support larger numbers of students and to provide one-on-one support when students really need it. All members of the academic team, including faculty, advisors, success coaches, professional tutors, instructional designers, and others pull in the same direction to make the learning and mastery process for students individualized, comprehensive, effective, and efficient.

CBE can be less expensive for institutions and students. For institutions, the specialized, differentiated functions of academic staff can provide more efficient, targeted support to students, thus helping them move through curricula more efficiently. For students, the self-paced nature of the learning process, coupled with the option to take assessments without engaging in learning if students have the knowledge and skills from elsewhere, provides students with opportunities to significantly reduce time to degree and thus to reduce the cost of their studies. In this way, CBE can be a critical part of a broader solution to changing higher education to better reflect the actual outcomes of learning by focusing on students' (behavioral) demonstration of knowledge and skills while also helping to reduce both the financial and time costs of education.

Conclusion

CBE is not a magic cure for all that ails American higher education. However, if done well, it is a scalable model that provides opportunities for students to use prior knowledge and skills to reduce both the time and the costs of higher education.

The primary challenges to implementing competency-based models on campuses are cultural. As Derek Bok, president *emeritus* of Harvard, put it, *no faculty ever forced its leaders out for failing to act vigorously enough to improve the prevailing methods of education. On the contrary, faculties are more likely to resist any determined effort to examine their work and question familiar ways of teaching and learning*¹⁴. However, it isn't only faculty who are resistant to change. Registrars, financial aid directors, bursars, and others who serve as regulatory compliance officers recognize myriad risks and dangers in trying new models, and competency-based education does not fit well into the current regulatory environment. In addition, the technical infrastructures upon which nearly all student information systems and learning management systems are built are based on the credit hour as the measure of student learning and progress. Hence, despite the excitement over CBE and the national call for less expensive, more outcomes-based education, the adoption of CBE or any other new model is likely to be slow and incremental.

¹³ U.S. Census of Agriculture, NAAS, 2007.

¹⁴ D. Bok, *Our Underachieving Colleges: A Candid Look at How Much Students Learn and Why They Should Be Learning More*, Princeton University Press, Princeton 2006.

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