Measuring Student Success in Postsecondary Competency-Based Education Programs
TOWARD A STUDENT OUTCOMES METRICS FRAMEWORK

Kelle Parsons and Carlos Rivers

If the field of postsecondary competency-based education (CBE) is to continue growing, researchers and CBE program leaders will need to demonstrate that CBE programs fulfill core value propositions for students, including access, success, quality, and affordability. Building evidence through rigorous program evaluation can be challenging under the best of circumstances, but evaluation is even more challenging in CBE contexts because these programs disrupt traditional notions of measuring learning and using time and credit hours as currency, so researchers and practitioners lack a shared measurement vocabulary from which to begin.

This *CBE Student Outcomes Metrics (SOM) Framework,* created by American Institutes for Research and the Institute for Competency-Based Education at Texas A&M University–Commerce, defines a set of measures that support descriptive and evaluative research on CBE programs.

The *Framework* articulates common metrics that researchers and practitioners can use as a starting point to build the research base around CBE and identifies challenges that require further inquiry and ongoing consensus-building across the field to address. The *Framework* includes three levels of metrics, each with different uses:

1. **Within-CBE Program Metrics,** which can be tailored to any CBE program model and used for internal tracking and continuous improvement efforts.

2. **Across-CBE Program Metrics,** which apply broadly across CBE programs of different models and designs to uncover trends and, when metrics are disaggregated, begin to answer questions about equity in CBE.

3. **Across-Field Metrics,** which, with appropriate caveats concerning comparability, can be applied across CBE and traditional programs to facilitate rigorous research comparing outcomes of students in CBE programs and students in traditional programs. Rigorous designs could, for example, compare students using randomization, natural experiments stemming from wholesale changes from traditional models to CBE models, and matching based on student characteristics.

The *SOM Framework* advances the emerging conversation on measuring student outcomes in CBE programs and builds on early metrics and frameworks used in early multi-program and single-program studies and in the work of a recently-formed research collaborative.[1] As such, it should be considered preliminary, particularly in terms of the type of progression metrics that might be relevant to predictions of student success. Ongoing research, discussions with program leaders and stakeholders, and feedback from the wider education research and evaluation community can inform continued refinement of the *Framework.*

The proposed *SOM Framework* focuses exclusively on student-focused metrics: student enrollment, progression, pricing/cost to students, and outcomes. It does *not* incorporate metrics related to the program's business model, including efficiency or institutional costs, topics that are addressed elsewhere.[2] The *Framework* emphasizes (1) defining measures of progression and price that are equally applicable to CBE programs that map to credit hours and to those that are approved to use direct assessment; and (2) moving toward quality metrics that are aligned with CBE's focus on mastery (i.e., what students know and can do).

Challenges of Measurement in an Emerging CBE Field

As CBE programs and researchers refine the *SOM Framework* and begin building a research base using common metrics, a particular challenge they encounter is the considerable diversity of current program designs. As different institutions design new programs, they find new ways of structuring competencies and offering flexibility in terms of pacing, content, and sequencing based on the student's prior learning, current preferences, and future goals. While the process of rethinking postsecondary education as a student-centered endeavor has generated new and creative models to study, it also raises two issues for measuring and comparing programs:

- **Contrasting progression across CBE programs and across the field (i.e., between CBE and non-CBE programs).** Credit hours—proxies for time spent taking specific courses—are the building blocks of traditional degree programs and the heart of existing progression metrics. The "size" of a credit hour is so well-understood that most educators can instantly assess a student's progress toward degree completion by knowing nothing more than how many credits he or she has earned. For example, a student who has completed 30 credits in an academic year typically is considered on-track to graduate on-time, and a student who has earned 90 credits has completed approximately 75 percent of a bachelor's degree program.

---

[1] See, for example, Brower, A. (2016, July). *Navigating the CBE frontier: A new metrics framework for student and program success* (Webpage). Retrieved from http://evolllution.com/technology/metrics/navigating-the-cbe-frontier-a-new-metrics-framework-for-student-and-program-success/; Mayeshiba, M., & Brower, A. (2017, February). Student success and retention using new definitions created for nonterm, direct assessment CBE. *The Journal of Competency-Based Education, 2*(1). Retrieved from http://onlinelibrary.wiley.com/doi/10.1002/cbe2.1039/full; Parsons, K., Mason, J., & Soldner, M. (2016). *On the path to success: Early evidence about the efficacy of postsecondary competency-based education programs.* Washington, DC: American Institutes for Research. Retrieved from http://www.air.org/sites/default/files/downloads/report/Path-to-Success-Postsecondary-Competency-Based-Education-Programs-Oct-2016.pdf; and Rivers, C. (2016, August). *Competency-based education: The importance of metrics and data collection* (Webpage). Retrieved from https://evolllution.com/programming/program_planning/competency-based-education-the-importance-of-metrics-and-data-collection/

[2] For information on CBE business models, see Desroschers, D. M., & Staisloff, R. L. (2016, October). *Competency-based education: A study of four new models and their implications for bending the higher education cost curve.* Annapolis, MD: rpk Group. Retrieved from http://rpkgroup.com/wp-content/uploads/2016/10/rpkgroup_cbe_business_model_report_20161018.pdf; and National Center for Higher Education Management Systems. (n.d.). *Competency-based education cost model* (Website). Retrieved from http://www.nchems.org/projects/cbe-cost-model/

Measuring Student Success in Postsecondary Competency-Based Education Programs
Toward a Student Outcomes Metrics Framework

2

Many CBE programs map to credit hours, but *competencies*—not credit hours—are the fundamental building blocks of CBE programs. Any count of earned competencies, however, indicates little about progression because they do not necessarily measure the same "amount" of learning from program to program. That is, there is no current standard for what elements compose a unit of competency. For example, one institution's bachelor's degree program might include 30 competencies, while a similar program taught elsewhere might include 100 credit hours. Even within a single program, one competency might be relatively granular (e.g., solving linear systems through substitution), while another might be quite broad (e.g., effective communication across cultural differences). Similarly, competencies bear no necessary relationship to a course. In some cases, many competencies may be packaged into a structure that looks like a course; in other cases, broader competencies might build across a series of modules.

Given these different building blocks, metrics that educational researchers and practitioners often take for granted (e.g., full-time versus part-time enrollment status; meeting academic progress milestones such as earning 30 credit hours in the first year, and a student's cost per credit) suddenly become unclear. Many programs crosswalk to credit hours as a current solution. Researchers can continue to rely on credit hours when making comparisons for now, but there is broad interest in finding other, better standards to use as the field matures.

- **Making appropriate comparisons and interpreting results across program designs.** Given the diversity of program designs and models, researchers and program leaders should be cautious about interpreting the results of metrics representing success, quality, and affordability. Pricing models provide one example of a design component that affects potential results, particularly around the total cost students pay. Policymakers and advocates frequently cite CBE as a faster and cheaper option because, in many models, students can accelerate—and, if the program uses a subscription pricing model, accelerating students can experience a lower total cost for their degree. But this experience may not hold true for all students or in all program designs or models. In the same subscription-based program, for example, students moving more slowly might experience a higher total cost for their degree than they would in a traditional program. Or, in programs that do not use a subscription model—instead charging a per-unit price like traditional programs—students would experience the same total costs as do students in traditional programs.

  To begin addressing this challenge, AIR maintains a descriptive rubric that can help researchers and programs identify the key characteristics of their respective programs and consider how those characteristics may affect expected results, particularly when comparing CBE with traditional programs.[3]

These challenges cannot be directly resolved by the *SOM Framework.* Addressing them will require ongoing consensus-building and work by CBE program leaders and researchers. We expect that the *Framework* will continue to evolve and adapt as researchers and program leaders identify new issues and questions to consider.

---

[3] Access the descriptive rubric at http://www.air.org/resource/key-characteristics-postsecondary-competency-based-education-cbe-programs-descriptive

Measuring Student Success in Postsecondary Competency-Based Education Programs
Toward a Student Outcomes Metrics Framework

3

The CBE *SOM Framework*

Metric	Description	Level 1: Within-CBE Program Metrics	Level 2: Across-CBE Program Metrics	Level 3: Across-Field Metrics
ACCESS				
	Enrollment by Demographics Race/ethnicity; age; Pell eligibility; veteran status; marital status; first-generation status; preparation, placement, or remedial status. *Should be used throughout to disaggregate other metrics.*	●	●	●
	Enrollment by Prior College Experience Previous credits or credentials; institution type of prior enrollment. *Can be used throughout to disaggregate other metrics.*	●	●	●
	Enrollment by Student Goals for the Program Professional advancement, skill development, and personal accomplishment. *Can be used throughout to disaggregate other metrics.*	●	●	
PRICE/AFFORDABILITY				
Price	**Students' Cost per Unit** Charges per unit.[1] *Calculated at completion (median and quartiles).*	●		
	Students' Annual Cost Total charges to students each year. *Calculated at completion (median and quartiles).*	●		
	Students' Total Cost of Degree Total tuition and fees charged to students. *Calculated at completion (median and quartiles; disaggregate metric by incoming credits).[2]*	●	●	●
Debt	**Cumulative Debt Post-Graduation** Students' cumulative debt upon completion. *Median and quartiles; disaggregate metric by incoming credits.[2]*	●	●	●
	Cohort Default Rate or Repayment Rate Standard federal definitions of cohort default or repayment rates.	●	●	●
SUCCESS AND QUALITY				
Progression	**Retention** Reenrollment in second period.[3]	●	●	●

Measuring Student Success in Postsecondary Competency-Based Education Programs
Toward a Student Outcomes Metrics Framework

Metric	Description	Level 1: Within-CBE Program Metrics	Level 2: Across-CBE Program Metrics	Level 3: Across-Field Metrics
	Pace Units[1] completed per period.[3] *Median and quartiles.*	●	●	●
	Time to Milestones Time to 25%, 50%, and 75% of program completion.[4] *Median and quartiles; disaggregate metric by incoming credits.[2]*	●	●	
	Competency Completion Ratio Percent of attempted units[1] students complete per period.[3]	●	●	
	Academic Engagement Program-specific measures of (1) frequency of log-ins or contact with materials or discussions, and (2) depth of engagement with academic content.	●		
	Attempts per Unit Median number of attempts students make before passing a unit.	●		
Quality	**Student Satisfaction** Percent of students who are satisfied with their experience. *Local measure.*	●	●	●
	Competency Attainment/Mastery Attainment of program-level competencies (varies by program); field-wide definition requires further consideration. *Comparison to non-CBE is typically inappropriate because grade point average is a measure of average performance, rather than of mastery of each competency.*	●	●	
Completion and post-completion outcomes	**Completion Rate** Rate of completion within 100% and 150% of expected time based on degree type.	●	●	●
	Time to Degree Calendar time from entry to completion of degree. *Median and quartiles; disaggregate metric by incoming credits.[2]*	●	●	●
	Earnings Gain Change in earnings from program entry to one year following program completion. *Median and quartiles.*	●	●	●

Measuring Student Success in Postsecondary Competency-Based Education Programs
Toward a Student Outcomes Metrics Framework

5

Metric	Description	Level 1: Within-CBE Program Metrics	Level 2: Across-CBE Program Metrics	Level 3: Across-Field Metrics
Licensure Pass Rates	Percent of completers who pass related licensure examinations, when applicable.	●	●	●
Employment or Continuing Education Rate	Percent of students employed or pursuing further education six months after graduation (programs may also compare before-/after-program employment rates if known).	●	●	●
Career Advancement Rate	Percent of completers who advance in their careers within one year of completion.	●		
Employer Satisfaction	Percent of employers who indicate they are satisfied with graduates.	●		
Goal Accomplishment	Percent of completers who agree that the program helped them achieve their goals.	●	●	●

Notes:

[1] Units may vary by program due to lack of standardized unit substitutes for credit hours. Many programs currently map back to a credit hour equivalent, but programs are beginning to sever ties to the credit hour.

[2] To address the problem of accounting for students' incoming credits, we suggest that researchers explore calculating metrics separately for students who enter the program with previously earned credits representing 0–25%, 26–50%, 51–75%, and 76–100% of the program's total requirements. We note that this issue is not unique to CBE but is particularly pronounced in that context because many current CBE programs cater to students who have earned some college credit but have not earned degrees.

[3] CBE programs' use of terms and subscription periods varies. Ongoing work will be needed to reach consensus around a particular definition of period for cross-program comparison purposes.

[4] Many CBE programs do not have clearly defined milestones identified; using this metric in cross-program comparisons will require additional guidance.

Measuring Student Success in Postsecondary Competency-Based Education Programs
Toward a Student Outcomes Metrics Framework

6

Refining and Advancing the SOM Framework

As program leaders and researchers begin using the *SOM Framework,* we offer specific questions and considerations to guide its improvement:

- Do the current specifications of these metrics apply across the programs of interest? For example, research investigating students' median time to milestones in two programs must ensure that program leaders can similarly identify those milestones in each program.

- How do we account for students' transfer credits or prior learning assessment (PLA) credit in metrics that vary by time? A student population with substantial incoming credits and PLA credits, for example, could lower the time to milestones, time to degree, or total cost of the degree, thereby making comparisons difficult or invalid.

- Are there other progression metrics that could predict future student success in most models?

We anticipate the *SOM Framework* will continue to evolve with the CBE field as it continues to mature. We invite interested program leaders or researchers to join us in refining and testing the *Framework.*

Acknowledgments

AIR®
AMERICAN INSTITUTES FOR RESEARCH®

1000 Thomas Jefferson Street NW
Washington, DC 20007-3835
202.403.5000 | **www.air.org**

TEXAS A&M UNIVERSITY COMMERCE
INSTITUTE FOR **Competency-Based Education**

2200 Campbell Street
Commerce, TX 75428
903.468.8235 | **www.tamuc.edu/icbe**