Handbook of Research on Competency-Based Education in University Settings

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Chapter 14
Measuring What Matters:
The UW Flexible Option's Framework to Measure Success from the Student Vantage Point

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ABSTRACT

This chapter demonstrates that competency-based education requires a different set of student success metrics, and introduces the metrics framework developed by and for the University of Wisconsin's UW Flexible Option (UW Flex). UW Flex is a direct assessment competency-based self-paced model for earning degrees and certificates from institutions in the UW System. It was supported by a grant from Lumina Foundation to develop a competency-based education blueprint for success and includes a set of student-centric metrics meaningful to the model, the curriculum, and the students who are being served in Flex programs. The framework defines student success as students moving through programs at their own pace, demonstrating mastery of subject matter, and meeting academic goals. Program-level metrics aggregate each of these three student-level metrics to provide useful information about the success of a program. The authors also build the case that strategic management of resources is required to overcome challenges inherent in implementing the UW Flexible Option metrics framework.

INTRODUCTION

Long-held measures of student success, such as retention and graduation rates, are rooted in the traditional academic term. The credit hour has driven determinations of student success in American higher education for more than a century, deeply affecting the architecture, delivery, and accountability of post-secondary academic programs (Laitinen, 2012). There are powerful reasons why conventional success

metrics are grounded in the credit hour. Factors include the higher education regulatory environment, entrenched academic calendars, and visibility to policy-makers and the general public.

The paradigm of credit hour-based metrics was established in the early 1900s to measure faculty workload, primarily for pension purposes. Over time, the paradigm evolved in imperfect ways to gauge student success, student learning, and a range of other institutional functions from admissions to financial aid. Much of the evolution of the credit hour into a proxy for student learning emerged from the regulatory environment. The U.S. Department of Education ("the Department") adopted the credit hour to standardize the unit of transaction between students and their institutions of higher learning, equating time with learning. Credit hour-based metrics have been particularly well suited for traditional residence-based colleges and universities, with physical classrooms and traditional students in them, as the dominant model for the latter half of the 20th century.

The Department's data center, the National Center for Education Statistics' Integrated Postsecondary Education Data System (IPEDS), tracks student success measures that are determined almost exclusively on the credit hour (https://nces.ed.gov/ipeds/). The IPEDS obtains the required, standardized higher education data from every college, university, and technical and vocational institution that participates in federal student financial aid programs. Chief among their data collection efforts is an annual survey that collects data on time- and cohort-defined retention and graduation rates (Institutional Retention and Graduation Rates for Undergraduate Students, 2014). The Higher Education Act of 1965, as amended, requires institutions participating in federal student aid programs to report data on enrollments, program completions, graduation rates, faculty and staff, finances, institutional prices, and student financial aid. These data are made available to students, parents, researchers, and the public.

The measures that IPEDS gathers tend to be directed toward program and institutional success rather than individual student-level progress and success. Some examples of success as determined by credit hour-based metrics include:

- High first- to second-year retention rate among first-time, full-time students.
- High four-, five- and six-year graduation rates.
- Selectivity represented by various admissions yields.
- High financial aid/low cost to attend.
- Core revenues per full-time equivalent by source.
- Abundant on-campus opportunities for student engagement.
- High percentage of teaching staff with a terminal degree.

Other more public facing college evaluation systems also base their assessments on IPEDS data. In response primarily to state and federal policy-makers, for example, the Voluntary System of Accountability (VSA) is a recent initiative by public four-year universities to supply clear, accessible, and comparable information on the undergraduate experience through a web-based report called "The College Portrait" (http://www.collegeportraits.org/). This report predominantly provides IPEDS data. VSA also includes indirect measures of student learning in critical thinking, which is a step toward bringing student learning into the reporting environment.

Popular media that use IPEDS data, including *U.S. News and World Report,* hold enormous sway over public perceptions of the quality and selectivity of American higher education institutions through rankings of colleges and universities. While largely based on IPEDS data, these rankings also incorporate

student inputs such as standardized test scores, GPA, and socio-economic status. They are not, however, derived from clear measurements of student learning.

In contrast to the traditional practice of awarding credits based on completion of term-based class time, the University of Wisconsin has created its Flexible Option program (UW Flex), a direct assessment competency-based education that awards credits based on competency (i.e., mastery of required knowledge and skills) (Competency-Based Education, 2014). The Code of Federal Regulations defines a direct assessment program thus:

1. *A direct assessment program is an instructional program that, in lieu of credit hours or clock hours as a measure of student learning, utilizes direct assessment of student learning, or recognizes the direct assessment of student learning by others. The assessment must be consistent with the accreditation of the institution or program utilizing the results of the assessment.*
2. *Direct assessment of student learning means a measure by the institution of what a student knows and can do in terms of the body of knowledge making up the educational program. These measures provide evidence that a student has command of a specific subject, content area, or skill or that the student demonstrates a specific quality such as creativity, analysis, or synthesis associated with the subject matter of the program. Examples of direct measures include projects, papers, examinations, presentations, performances, and portfolios. (Electronic Code of Federal Regulations, 2014)*

The question for UW Flex—and other such implementers of educational innovations of major interest in higher education today—is, how can they measure the success of students in programs using innovative delivery methods like direct assessment and CBE when the traditional credit-based and term-based measures do not reflect their educational pathways or represent their achievement (flex.wisconsin.edu)?

THE MISMATCH OF LEGACY METRICS WITH NON-TERM, DIRECT ASSESSMENT, COMPETENCY-BASED EDUCATION

While never the ideal way to reflect actual student learning, credit hour-based metrics—legacy metrics—increasingly stand out as inadequate within the evolving landscape of higher education programs, most notably for direct assessment, competency-based education (CBE) programs such as the UW Flexible Option. UW Flex students and those in similar CBE programs tend to be non-traditional adult students who may or may not be seeking a degree, and who may already have acquired college-level credit or the knowledge expected to earn college-level credit from a variety of sources, including employers, military training, and personal study. Such students have a very different profile from traditional undergraduate students, which legacy metrics (i.e., credit hours) are designed to support. Legacy metrics assume that undergraduate students share the following characteristics:

- They are seeking two-year associate or four-year baccalaureate degrees.
- They are attending full time.
- They will graduate from the institution from which they matriculated.
- They (generally speaking) are traditionally aged 18- to 22-year old students.

Yet this profile is not accurate for the majority of U.S. college-attending populations, as the American Council on Education (ACE), Lumina Foundation, and others have documented (A Stronger Nation, 2015). ACE found that only 15% of those seeking higher education are "traditional" students—younger than 24 years old, attending full time, and living in or around a university (Soares, 2013).

Metrics inspired by the U.S. Department of Education National Center for Education Statistics' Integrated Postsecondary Education Data System (IPEDS) include four-, five- and six-year graduation rates, which are based on all the assumptions above about traditional students: they have similar time-based educational goals; they start and end as a cohort; and they achieve these goals by attending one institution full time. High graduation rates, especially in the four-year category, often serve as a gold standard for institutional, program, and student success. At best, however, this metric describes time-to-degree. It does not describe student learning, and it is not a particularly meaningful measure of program success. In other words, how quickly a student gets to graduation is not a measure of what the student actually knows or can do with that knowledge upon completion, nor of how effective a program is at facilitating and ensuring the student has mastered the program's learning outcomes.

The UW Flexible Option and other direct assessment CBE programs foreground the need for a fresh approach to student success metrics, one grounded in learning outcomes that are integral to the model. CBE forces everyone involved in higher education—students, faculty, administrators, policy-makers, and regulators—to focus directly on how students demonstrate mastery of what they learn and know, i.e., empirical evidence of learning outcomes at the individual student level.

The U.S. Department of Education's renewed interest in new and alternative metrics has been spurred in great part by the recent re-emergence of competency-based education programs in higher education—and particularly direct assessment CBE such as the UW Flexible Option. The Department's call to action—and the challenge to higher education—is to craft a new paradigm for measuring student progress and success, based not on the credit hour but on learning outcomes, actual student work, and more student-level criteria of progress and success.

The credit hour is not well suited to UW Flex and other direct assessment CBE programs because, by definition, the credit hour signifies *time* spent learning. UW Flex programs, by contrast, measure student learning through authentic assessments of students' understanding of the proficiencies, knowledge, and skills in the academic disciplines in which they are enrolled. UW Flex administrators also have developed a set of Flex-specific metrics to capture the key components of student-level and program-level progress, success, and, therefore, quality in CBE.

THE UW FLEX FRAMEWORK FOR CBE METRICS

Because UW Flex operates outside of traditional academic terms and credit hour structures, students have greater scheduling and learning flexibilities. They may start in any month of the year and study at their own pace, engaging in their educational pursuits as it suits their personal and work lives. Students enroll for subscription periods, which are three-month spans of time in which they can access learning materials, complete assessments, and receive academic support. For any given subscription period, students may choose to work on a single competency or enroll in the *all-you-can-learn* option (Two Subscription Period Choices, 2014).

The goal of those working on the UW Flexible Option is to create a system to reliably and validly use student-level metrics to measure student success in such an individualized, self-paced, flexible system

on an individual level as well as program success across multiple students. This requires quantifying not only the objective direct student learning outcomes (demonstrated mastery of competencies through assessments), but also students' perceptions of their educational experience, expectations, goals, and pace, and then aggregating across students to arrive at program-level metrics of success.

In what follows, UW Flex administrators propose a framework to measure achievement in new ways to better capture student and program success for the UW Flexible Option direct assessment, competency-based education programs. The metrics framework centers on how students move through their educational programs along with evidence of learning outcomes. It can be summed up by this statement:

Student success is defined as students moving through their programs at their own pace, demonstrating mastery of subject matter, and meeting their academic goals.

The framework focuses on student- and program-level evaluation, with three essential categories of metrics: *goals*, *pace*, and *academic outcomes*. It deliberately distinguishes program-level metrics from student-level metrics to highlight the novelty of this student-centric perspective.

What is new and different here are the student-level metrics, which describe student success from a personal rather than a program level. The unit of measure is an individual student, measured against his or her own benchmarks and program- and faculty-determined levels of mastery. The purpose of this set of metrics is to effectively capture an individual student's performance (mastery of discipline-specific knowledge and skills and metacognitive skills), as well as perception of the learning experience and his or her educational aspirations. This enables a student to use this information to self-monitor, adjust, and progress, and also provides information that can enable program educators and leaders to assist students in their progress.

Program-level metrics describe how the program is doing. The purpose of this set of metrics is to gauge overall program success against benchmarks important to internal and external stakeholders (e.g., business plan/budgetary goals, faculty, disciplinary and degree requirements, accreditor expectations, etc.). In addition to program-level metrics that aggregate from the student level, the framework also includes program-level metrics that are more traditional in higher education and align with IPEDS data.

This metrics framework is conceived to join two historic needs for evaluation: one to assist students in their progress through the program, and the other to evaluate and document programs to important stakeholders. The metrics framework is a work in progress, with some aspects already defined, measurable, and tracked, and others still to be developed and implemented.

While not the focus of this paper, there are many program inputs—both traditional and CBE-specific—that go into ensuring student success and program quality. These include, but are not limited to: curricular and degree integrity and program design, with clearly communicated learning outcomes and competencies, including broad, metacognitive skills; assessments clearly aligned to program competencies and designed to elicit student work that meets program expectations and performance (mastery) standards; curated content and other learning resources; faculty support and engagement; and strong advising through an Academic Success Coach assigned to each student. Coaches provide personalized mentoring and advising, direct and connect students to academic and other resources and services they need to succeed, and check on students' progress proactively and regularly, supporting them as they proceed in their studies. Programs inputs like these are critical to student success and to ensuring academic and overall program quality and improvement, as well as to receiving accreditation and federal

approval for Title IV funding. UW Flex leadership, faculty, student support, and operational staff work assiduously on all these areas as the foundation for quality and student-centered delivery and success.

Table 1 illustrates the components of the UW Flex metrics framework, built around the three essential metrics of goals, pace, and academic outcomes.

Student-Level Metrics of Goals, Pace, and Academic Outcomes

Measuring Student-Level Educational Goals

The metric of educational goals at the student level introduces a dimension of measuring student success meaningful to the UW Flexible Option's model of CBE delivery and the adult student population for which it is designed. Additionally, it is more multifaceted than the legacy metric of determining whether or not a student has earned a degree in a pre-specified period of time (e.g., four-year graduation rate). This metric refers to identifying—from the student's perspective—the overall personal goal(s) for engaging in Flex, whether those goals have been met, and whether the student is satisfied with his or her educational experience.

Educational research has established that systematic, strategic, and realistic goal setting on the part of students is significantly associated with increased academic success (Reynolds, 2010). Metrics developed to understand the multifaceted construct of educational goals, from a student's perspective, can additionally serve as an intervention to positively influence direct learning outcomes (actual mastery of competencies) by feeding this information back to students as a way of motivating efforts and tracking progress to their own self-set goals. Work is underway within UW Flex to develop dashboard indicators students could access at any point to understand their progress toward achieving their goals. These measures of student-level educational goals may be used within ongoing conversations between a UW Flex student and his or her Academic Success Coach.

Success is measured according to the students' own definition of attaining their educational goals. One nursing student, for example, might be interested in earning a BSN while another might only be interested in developing leadership skills (and therefore only pursue mastering the leadership competency set). The advantages over legacy metrics, such as degree completion, are clear since attaining the degree only meets the goals for the first student above, not the second.

Satisfaction with the educational experience is measured through survey questions about students' ability to attain their educational goals (as defined above), and their satisfaction with various aspects of their educational experience in UW Flex, including their personal, future-education, and professional reasons for seeking higher education.

The UW Flexible Option metrics framework accounts for this nuanced construct of educational goals from a student's perspective and collects data on student goals through a variety of mechanisms and at regular moments throughout a student's program, beginning with admission and culminating in exit and alumni follow-up surveys.

Measuring Student-Level Educational Pace

Pace includes not only the rate at which a student moves through assessments and competencies, but also what the student is doing that represents active engagement with the curriculum, meaning what the student is doing to prepare for and complete assessments.

Table 1. UW flexible option program metrics framework

Focus	A. Goals	B. Pace	C. Academic Outcomes
CBE Student-Level Metrics	Student's overall personal educational goal(s) for engaging in Flex Satisfaction with the educational experience (including professional advancement and acceptance into further educational programs)	Measuring rate of assessment completion within each subscription period to reach personal educational goal(s) Assessing rate against student's planned rate Measuring nature of student's engagement with curriculum	Mastered competencies The personal educational value of mastered competencies (including what the student knows and has learned, personal cost-benefit, or the question of "Was it worth it?") The educational and professional impact of mastered competencies (questions such as "Was the student able to successfully transfer?" "Was the student able to successfully move on to graduate programs?" "Did one receive a job? Did one learn the skills desired to do the job better?") Perceiving that past learning and experience are valued and effectively assessed in Flex
New Use of Aggregated CBE Student-Level Metrics for CBE Program-Level Metrics	Aggregating student-level goals to identify themes or categories of goals Assessment of alignment between student-level categories and program goals as devised by faculty who created program Aggregating to identify average (mean, mode, median) levels of satisfaction Aggregating to identify goals by types of students (by demographics, professional interests, etc.) Aggregating to determine relationship between student effort and meeting of goals	Aggregating average (mean, mode, median) pace through a program This aggregate should be measured from student matriculation to completion (or other reason student leaves program). Aggregate pace can also be measured yearly. Aggregate pace by types of students (by demographics, professional interests, etc.)	Aggregating average (mean, mode, median) numbers of competencies mastered in a 12-month cycle Can measure ratio of competencies attempted-vs.-completed to assess which competencies are "easier" or "harder" from a program perspective Aggregate to identify clusters of students by performance
CBE Program-Level Metrics Relevant to IPEDS	Leads, apps, admits, enrollments Degree completion Revenue generated against business plan projections Access by demographics/equity goals	Time-to-degree *All-you-can-learn* vs. *single* subscriptions Subscriptions per year per student Persistence/retention	Percentage of competencies mastered Time to mastery Average attempts to mastery Usage of rubrics to demonstrate gains in metacognitive skills Value of competencies to industry and employers Strongly articulated competencies with assessments that effectively lead to demonstration of mastery

The first facet of this metric includes measuring the rate at which a student completes his or her assessments within each subscription period. The second facet is to evaluate that pace against the student's planned rate of completion (as captured in a learning plan developed with an Academic Success Coach). The third facet of this metric captures the nature of the student's engagement with the curriculum.

Efforts to develop these facets of student-level pace came about as a result of applying to the U.S. Department of Education to award financial aid on the basis of direct assessment. Standard financial aid is awarded contingent on showing "meaningful work" on the part of students within the first 10 days of a traditional term or semester. UW Flex administrators had to devise a way to measure meaningful work that would not rely on seat time. Efforts focused on quantifying meaningful engagement with the curriculum and incorporated several aspects of self-regulated learning, including capturing several elements of how students planned to tackle the series of competency assessments before them—such as sequencing,

expected pace to complete each assessment, and curricular resources to access. This work began with the development of a survey tool and has evolved to a Goal Setting Assignment for UW Flex students.

Measuring Direct Student-Level Academic Outcomes

The third student-level metric of success captures the student's performance (the actual mastery of competencies) and the student's perceptions of the value and impact of mastered competencies and UW Flex.

At the heart of any CBE program is the demonstration of knowledge and skills—i.e., learning—through successfully completing assessments. UW Flex assessments are created by faculty and graded either by faculty or with faculty oversight. For example, nursing faculty create BSN competencies and assessments, and either grade or oversee the grading for all students assessed in the Flex nursing program. While the strength of UW Flex comes from the quality of the same UW faculty who teach in the UW System's traditional online and brick-and-mortar programs, it also comes from the integrity of Flex curricula. The quality of direct assessment CBE programs like UW Flex are dependent on the comprehensive nature of the competencies that together represent disciplinary knowledge, along with the authenticity of assessments used to demonstrate student mastery. *These same assessments become the foundation to document student-level and program-level success for purposes of accountability.*

UW Flex assessments are created to illuminate student mastery of the competencies for which they are being evaluated. Assessments range from objective tests to rubric-graded papers, projects, and observations. This portfolio of assessments translates into many points of measurement that *directly* capture what a student knows (knowledge) and can do (skills). The set of knowledge and skills associated with a degree is often a point of criticism in reviews and site visits by accrediting agencies because of the difficulty to capture direct evidence of tangible student learning (Fain, 2014).

Further, embedded rubrics not only cover discipline-specific content but also cover the higher-order metacognitive skills—for example, critical thinking or collaborative problem-solving—associated with college degree levels of learning (associate's, bachelor's, master's).

The quantitative measure in this part of the framework is, then, a simple accounting of the competency assessments attempted and completed (i.e., mastered) within each subscription period.

Because the metrics framework includes student satisfaction with academic outcomes—more qualitative measures—surveys and other tools are being developed to reliably and validly quantify students' perceptions of their educational experience. Although challenging to develop and benchmark, this will include the perceived educational value of what is learned through UW Flex and its educational and professional impact.

Program-Level Metrics (Aggregated from Student-Level Goals, Pace, and Academic Outcomes)

In the proposed metrics framework, student-level and program-level metrics are intended to be complementary. Student-level metrics will be aggregated to also serve as program-level metrics; this is a new use of the student-level measures rather than new measures, *per se*.

Like traditional programs, UW Flex generates regular enrollment management reports that aggregate student data to the program level. These reports are critical in all of the traditional ways: overall program evaluation and improvement, financial analysis, marketing and recruitment, registration, etc. For UW Flex programs, however, the guiding metrics focused on student goals, pace, and academic outcomes result

in some very different kinds of data being collected, aggregated, analyzed, and reported. In the process, the traditional metrics—including those for persistence, retention, and completion (graduation)—are reexamined and redefined in order to be relevant to the UW Flex CBE model.

Measuring Program-Level Educational Goals (Aggregated from CBE Student–Level Metrics for CBE Program-Level Metrics)

UW Flex administrators collect data about educational goals that differ from the traditional educational attainment data. As previously described, one UW Flex nursing student might be interested in pursuing the entire BSN, while another might be perfectly happy with only completing competencies related to nursing leadership. For one student, the educational goal, and therefore academic success, means earning the BSN; for the other student, success means mastering leadership in a nursing context.

The student-level metric of educational goals captures students' own definitions of educational attainment. At the program level, Flex administrators will look for patterns among student-level goals, alignment with program goals, levels of satisfaction, and goals by student type. Examples of questions that will be raised include:

- What proportion of students is interested in achieving the Bachelor of Science in Nursing vs. individual competency areas?
- Which competency areas are most sought out? Are there patterns among the students who have different goals? For example, are students pursuing the Bachelor of Science in Nursing more likely to have been in their job for more than seven years or to be seeking a promotion?
- Are there demographic or professional-interest profiles of students who have certain educational goals within a program?
- Are students who pursue certain competencies more (or less) satisfied with their education than others?

Measuring Program-Level Educational Pace (Aggregated from CBE Student-Level Metrics for CBE Program-Level Metrics)

Aggregating across student-level pace allows for an examination of patterns of student pace for each program. How long do students take to complete their academic goals? UW Flex administrators anticipate examining median and mode as well as mean, or the statistical average, and expect to find multimodal patterns of pace. For example, some students are likely to finish quite quickly while others will finish at a slower or stop-and-start pace. Profiles of students who complete faster and slower, based on other demographic and life circumstances, will be identified.

From an institutional and financial perspective, reasonable barometers of pace would include expected number of subscription periods enrolled within a calendar year, and expected number of competencies completed per subscription period. Expectations are determined based on business-model planning and programmatic assumptions of pace as compared to the traditional curriculum (both face-to-face and traditional online).

Of course, it is expected that a nontraditional student will evaluate his or her pace differently from those enrolled in traditional programs. While program-level metrics such as persistence and retention remain relevant, student-level determinations of self-paced progress will augment that information. For

example, brick-and-mortar programs stipulate that students should graduate in four years. Therefore, student pace is evaluated against that standard, and average graduation rates can be used meaningfully to illustrate a program's ability to graduate its students within that timeframe.

In the self-paced programs of UW Flex, however, graduation in a uniform period of time is not assumed. Because of the self-paced nature of the program and its intended working adult audience, some students move through programs much more quickly than four years, and others move in and out of programs as their lives allow.

Program-level average pace, therefore, is described by not only the mean, but also the median and mode, and must be evaluated against an average (mean, median, and mode) of students' expectations and satisfaction with their individual pace. As for the educational goals metric, UW Flex administrators can aggregate across student-level pace to identify patterns among students, ideally identifying, based on demographic and professional-interest profiles, which students may move faster or slower through their programs.

Measuring Academic Outcomes (Aggregated from CBE Student–Level Metrics for CBE Program-Level Metrics)

The third program-level metric aggregated from the student level refers to academic outcomes. At the student level, Flex examines the mastery over competencies that students demonstrate through their completion of assessment activities. This core measure indicates whether or not students are learning. But there are other measures in this category that also are crucial to gauging success.

At the program level, student mastery is aggregated to document patterns of students' progress through each program. For example, which competencies are mastered easily on their first attempt? Which take multiple attempts? Do students progress through competencies using predictable paths, or do they create individual paths predicted by their own prior experiences and backgrounds? When students complete a program and/or competency areas, are they satisfied with what they can actually do on the job? Are their employers equally satisfied? And are all these patterns appropriate from the faculty perspective on program-level competence? All of these questions are important as UW Flex programs undergo continual-improvement processes.

Program-Level Metrics (Relevant to IPEDS)

During the first year of the UW Flexible Option (January 2014 through January 2015), much of the metrics work focused on adapting program-level metrics to the complexities of both CBE as a modality and the multi-institutional delivery of the various programs in the UW Flexible Option format offered by UW System institutional partners. Accreditors, federal regulators, and Flex leadership at the central office and partner institutions all needed broad metrics gauging program-level indices familiar to traditional enrollment management. These top-line metrics are represented by the bottom third of the metrics framework.

The adaptations of the various forms of enrollment management metrics came about as a result of both the nuances of the delivery mode (e.g., 12 potential start dates in a calendar year) and the different data governance policies and systems involved in multi-institutional offerings of UW Flex. Data access (retrieving and combining data from multiple IT systems and institutions) *and* the defining of metrics and their use (e.g., what precisely is the definition of a new Flex student vs. a continuing student and at

what point in a subscription period is this determined) were vital to creating a set of basic program-level metrics for the UW Flexible Option.

Since program launch, this is the area of the metrics framework that is furthest along. UW Flex administrators now have a set of foundational measures for headcount, re-subscription, mastery rates, admissions ratios (e.g., admit rate), subscription type (all-you-can-learn subscription vs. single competency subscription), access rates, demographics of participants, and geographic distribution of participants. Using Tableau software (Tableau Desktop), data from multiple sources can be pulled together to create screens and dashboards for at-a-glance monitoring of key metrics. This part of the UW Flexible Option metrics framework continues to evolve based on feedback about the actionability of the dashboards and on gaining access to more data. UW Flex administrators expect access to expand with the development of new data governance policies suited for a multi-institutional approach to competency-based education.

CHALLENGES IN BRINGING THE UW FLEXIBLE OPTION METRICS FRAMEWORK TO FRUITION

Challenges in implementing the metrics framework are not insurmountable, but they are formidable. Here are several that are at the forefront within UW Flex:

- "Off the shelf" Student Information Systems (SIS) do not exist for noncredit, non-term CBE programs. Current CBE programs are either wrenching together existing systems (like D2L or Banner) that are not ideal or creating their own. UW Flex is doing a bit of both: Specific functional modules have been purchased (such as using Salesforce for recruitment and admissions, and Regent 8 for financial aid) and then modified by UW Flex programmers to work with the Oracle database that underlies the UW System's student record system. One challenge in this approach is the inherent inefficiency of each CBE program across the country creating its own SIS solution. Programs will eventually converge on shared solutions, but until then each institution needs to be ready to spend time and money on their own solution.
- The UW Flex approach—using student-level metrics that capture changes in student behavior (goals and pace) and aggregating student-level patterns to evaluate programs— creates statistical and methodological challenges. Good methods and statistics are available to handle these kinds of analytic questions, but those methods and statistics have typically been used in student learning research, not for institutional program evaluation. In this context, one primary challenge is creating efficient and replicable systems that can be done within institutional research offices, without relying on a team of specialized statisticians. Ideally, a research team is assigned two tasks: creating replicable and efficient methods that become the mainstay for institutional research and continually updating the methods and statistics used through exploration of the big data that is captured by the CBE data systems.
- Another challenge related to the use of student-level methods and statistics at the program-level is the application of sound statistics and designs to ensure that aggregated student-level measures yield program- and institution-level information that is statistically significant, with estimated effect sizes and an ability to account for covariates.
- In addition to making efficient and replicable the methods and statistics required to run student-level-to-program-level analyses, two additional challenges exist:

      ◦   How baselines will reliably be established for student behaviors. UW Flex is capturing students' initial plans for their goals and pace when they develop Individual Learning Plans with their Academic Success Coaches. This process is currently being piloted, and it is expected that a lot will be learned in the course of the coming year.

      ◦   How best to do comparative analyses across modalities. UW Flex will compare its students to students who are enrolled in the corresponding programs (i.e., UW Flex vs. traditional online students enrolled in the Bachelor of Science in Nursing degree-completion program at UW-Milwaukee), but comparisons will be less straightforward as new UW Flex programs without traditional counterparts are developed.

- UW Flex programs are necessarily collaborative in that resources (faculty and staff, operations, student records) are brought together across several UW institutions within the UW System. As in many state higher education systems, data governance and data sharing is complicated. Individual institutions own and bear responsibility for the security and integrity of the data for students enrolled in their programs, and they very often have created databases that are optimized to their own institution and not parallel across institutions. How data are shared and governed is often established for individual cases; for example, to report to regional accreditors or for the allocation of pooled tuition dollars and state general purpose revenue. UW Flex has forced discussions System-wide to standardize data structure and data governance. These discussions are complicated and protracted, often resulting in case-by-case resolution.

For other institutions embarking on the CBE path, the first step to overcome these hurdles involves awareness of the challenges. Accounting for the challenges early in the development of a CBE program will help reduce the time and resources required to create a proactive, realistic, and scientifically grounded approach to devising effective metrics customized to a CBE program. What is required is the strategic management of human and structural resources in order to bring effective analytics to fruition.

Finally, and because current direct assessment CBE programs are tilling new ground, challenges exist as CBE programs benchmark against each other. These challenges will only be worked out as the field matures. For example, important features of each program will need to be clarified and standardized in order to make apples-to-apples comparisons.

CONCLUSION

Non-traditional students can benefit from CBE, which awards credits based not on seat time but on whether students can prove mastery of the knowledge, skills, and abilities required in an area of study, by progressing quickly through coursework that is familiar to them and spending more time on that which is more difficult for them (Competency-Based Education, 2014). UW Flex students access their learning materials and assessments online and progress through CBE by demonstrating mastery of required competencies through rigorous assessments developed by UW faculty and staff. Yet programs like this that are focused on learning outcomes are not well suited for measurement that is based on the completion of credit hours because, by definition, the credit hour signifies *time* spent learning. The data measurement structure created for UW Flex provides one student success and program success model that advances beyond the legacy of the credit hour and is specifically designed for the promise of CBE.

While simple in articulation, the three metrics of goals, pace, and outcomes yield rich opportunities for innovative data collection, analysis, and measurement of direct student learning. Moreover, the framework supports new ways to understand program quality and success. Overall, the framework provides a more holistic and comprehensive picture of both programmatic and student success for competency-based education and for the students served in UW Flex programs.

UW Flex administrators anticipate using these metrics for formative program evaluation—that is, to strengthen programs and strengthen student success—as well as for formal accreditation purposes with accreditors and the U.S. Department of Education.

Accreditors are not the only ones calling for better measures of attainment and advancement of meta-cognitive skills among students. Lumina Foundation, through the Degree Qualifications Profile (DQP), and the Association of American Colleges & Universities (AAC&U), through its employer surveys and initiatives like General Education Maps and Markers (GEMS) and the Multi-State Collaborative to Advance Learning Outcomes Assessment, are working to develop consensus understanding and implementation of shared frameworks for the meaning, quality, and evidencing of student achievement on a set of cross-cutting outcomes important for all disciplines (Adelman, Ewell, Gaston, & Schneider, 2014; General Education Maps and Markers, 2015; MSC, n.d.).

The University of Wisconsin System has partnered with AAC&U on a number of these proficiency and curricular reform initiatives, including two Lumina-sponsored projects, one piloting the DQP (Highlights from a Three Year Nine-State Initiative on Assessment and Transfer, 2014), and the other designed to scale up faculty engagement (Faculty Collaboratives, 2014). Competency-based education takes this work to a whole new level, and with the new set of metrics, the UW Flexible Option enriches other curricular reform efforts in the UW System and contributes to the national effort in novel and disruptive ways in its displacement of the credit hour as the currency for student learning.

The promise implicit in the development of UW Flex, as well as for CBE generally, is the ability to put student learning front and center throughout a program. UW Flex captures the granular assessment of learning and skills normative across an entire discipline (nursing, for example), as well as across an entire degree level (i.e., what a bachelor's degree is expected to yield in terms of broad learning skills like critical thinking). Whereas traditional letter grades and the concomitant grade point average are only symbolic of evidencing learning, direct assessment, in its varied forms, can reveal knowledge and skills in their full breadth and depth. The aspiration for higher education is an advance in accountability, empirically showing what students know and can do, in addition to the value of higher education for students (e.g., evidencing return on investment of students' education dollars), for employers (e.g., in proven skills sought after by industry), and for the government (which has invested considerable funds in the form of grants and loans with the intention of benefiting economic opportunity for society in general). More often than not, traditional educational models reduce to single letter grades and term-based transcripts what students know upon the completion of a course or receipt of a degree. The metrics framework developed for the UW Flex direct assessment model, applied across an entire discipline and degree level, is meant to fundamentally change how *learning, quality, and value* in higher education can be captured.

The UW Flexible Option metrics framework is a groundbreaking approach that includes student-level metrics, deeper examination of academic outcomes (learning and skills) through rich assessments and rubrics, and deliberate balancing of institutional perspectives with student perspectives. Significant work has been accomplished to make the UW Flexible Option metrics framework operational and yielding reliable, valid, and actionable information. Work in this area continues.

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KEY TERMS AND DEFINITIONS

Competencies: Learning outcomes—including knowledge, skills, attitudes, and behaviors—a student is expected to master.

Competency-Based Education: An educational method focused on learning outcomes and the demonstration of knowledge and skills by students rather than on seat time and traditional credit hours.

Direct Assessment: The specific type of competency-based education based on the direct measurement of what a student knows and can do, regardless of the source of that knowledge and skills.

Non-Term: Student enrollment not based on a time period with a set start and stop of academic work for a student cohort.