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Competency-based Education: Driving the Skills-measurement Agenda

Jackie Pichette and Elyse K. Watkins



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1 Yonge Street, Suite 2402
Toronto, ON Canada, M5E 1E5

Phone: (416) 212-3893
Fax: (416) 212-3899
Web: www.heqco.ca
E-mail: info@heqco.ca

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Executive Summary

In the context of a rapidly changing global economy and frequent charges of a “skills gap,” our education system faces more pressure than ever to prepare students for the future of work. Competency-based education is gaining traction internationally as a model for graduating students with the knowledge, skills and characteristics needed to succeed in a given career. This paper explores the development of competency-based education in North America and its applicability in Ontario, summarizing expert interviews as well as an extensive literature review. It outlines what competency-based education is, provides practical examples and offers considerations for decision makers in Ontario.

As the name implies, competency-based education, or CBE, is structured around competencies, and is primarily concerned with what students know and can do. Students in CBE programs work through material and assessments, usually online and at their own pace with support from faculty advisers and assessors. While traditional programs often aim for a pre-specified distribution of achievement among students (i.e., by grading on a curve), CBE embraces a philosophy that, with appropriate resources, all students can eventually master required competencies. The time it takes to complete a CBE program depends on an individual’s prior learning, ability and motivation, but the outcomes are consistent: Anyone holding the credential has demonstrated mastery of all defined learning outcomes or competencies.

CBE programs offer the potential to graduate students with prior learning relatively quickly, cost-effectively and with the skills needed to meet employer demands. This potential has garnered a great deal of interest in the United States where the number of CBE programs has grown exponentially over the past decade, particularly in fields with specific labour shortages such as business, nursing, teaching and information technology. CBE has been slower to take off in Canada and to date has been concentrated in professions where mastery is seen as essential for public health and safety (e.g., medicine). That said, we see particular utility and promise for CBE programs to meet the needs of Ontario students with family and work responsibilities, or Ontarians with previous education and work experience who require retraining to pivot or advance in the labour market — a group of students that is currently underserved in Canada.

In addition to considering the potential for the CBE model to better serve lifelong learners, Ontario policy makers and institutions should consider embracing elements of the CBE model in the context of traditional programs. In our view, the most transferable elements of CBE that Ontario students would benefit from are: (a) a stronger focus on competency development, (b) a belief that teaching and assessment can be structured to support all students to master essential knowledge and skills, and (c) a transparent credential that gives graduates a clear picture of what they know and can do, and gives employers evidence that a prospective hire has mastered the entire set of competencies reflected in a degree.

Introduction

A central purpose of higher education is to prepare graduates for success. Students investing their time, energy and money to obtain a postsecondary credential expect to develop competencies that will serve them in their personal and professional lives. And there is general agreement about what those competencies include: discipline-specific knowledge and abilities; basic cognitive skills such as literacy and numeracy; higher-order cognitive skills such as problem solving and an ability to communicate; and transferable life skills such as determination and emotional intelligence. These are the competencies we know employers are looking for and they are the same ones the Ontario government expects institutions to impart.¹ But as suggestions of a “skills gap” continue to dominate headlines, it raises the question: Are students, in fact, acquiring essential competencies?

Competency-based education models are designed with this question in mind and are garnering attention internationally from governments, institutions and students. This paper explores the development of competency-based education in North America and its applicability in Ontario. It is intended as a primer for those involved with higher education policy, planning and implementation in Ontario. The paper begins by outlining what competency-based education is and how the model differs from traditional programs, it then provides examples of competency-based programs in North America and offers considerations for education in Ontario.

“Competency-based education is a more direct way of looking at student outcomes over inputs.”
— University of Wisconsin

The paper summarizes information gleaned from an extensive literature review as well as semi-structured interviews with 16 key informants, identified using purposive expert sampling. Interviewees included eight representatives from seven American postsecondary institutions offering CBE programs, two from American educational research organizations, three from Canadian universities, and one representative each from the Council of Ontario Universities, the Royal College of Physicians and Surgeons, and the Competency-Based Education Network (C-BEN). See Appendix A for a full list of interviewee affiliations. While we have kept the names of individual interviewees anonymous, we have included their affiliation alongside direct quotes.

Competency-based Education

Competency-based education (CBE) is all about outcomes, focusing on what students know and can do. Students in CBE programs advance or earn a credential when they demonstrate mastery of clearly defined learning outcomes and are provided with the resources to get there at their own pace.

¹ The Ontario government has outlined the Essential Employability Skills required of college graduates and the Ontario Council of Academic Vice-Presidents has outlined the Undergraduate/Graduate Degree Level Expectations for universities graduates. The government has also developed the Ontario Qualifications Framework that describes the main purposes and features of all postsecondary credentials and apprenticeship certificates.

While there are many programs that integrate elements of a CBE approach,² true CBE programs include all five of the following qualities:

The US government defines **competencies** as the **knowledge, skills or characteristics demonstrated by a student** (Committee on Education and the Workforce, 2017).

1. **Competencies embedded in the curriculum:** Graduate expectations (i.e., competencies) are clearly defined and reflected in the program curriculum.
2. **Robust assessments:** Competence is assessed using valid and reliable tools. Students receive recursive feedback as part of the assessment process and advance only when they have met a benchmark signifying mastery.
3. **Recognition of prior learning:** Competence is recognized regardless of where, when or how knowledge, skills or characteristics were developed.
4. **Fixed outcomes, variable timelines:** Learning is student-centred and self-paced, meaning that the time it takes a student to meet defined benchmarks is variable.
5. **Credential signifying mastery:** Graduates who have earned the program credential possess a minimum standard level of competence across all required learning outcomes.³

The logic underlying CBE — that students should meet a standard benchmark for success before they move on to the next task or earn a degree — is nothing new. In 1968, Benjamin Bloom wrote an article titled *Learning for Mastery* in which he argued that “most students (perhaps over 90 percent) can master what we have to teach them, and it is the task of instruction to find the means which will enable our students to master the subject under consideration” (Bloom, 1968, p. 1). Bloom argued an instructor’s role is to define what constitutes mastery and provide the “methods and materials” students need to meet that benchmark. Proponents of CBE today have carried forward Bloom’s thinking, powered it with advances in technology, and added the notion that mastery should be demonstrated through an authentic assessment of learning (i.e., project or performance-based assessments) and at the learner’s own pace. In many cases, depending on the extent of knowledge and experience gained outside the classroom, these programs can end up being shorter and more affordable for students.

In many ways CBE is an idea whose time has come. In its 2017 Agenda for Leaders to Shape the Future of Education, Gender and Work, the World Economic Forum predicts that 35% of the skills demanded by employers in the major industrialized countries will change by 2020, and claims that at least one in four workers is already reporting a skills mismatch (World Economic Forum, 2017). Meanwhile, the skills-gap narrative continues to dominate media headlines, underscoring Canada’s concern that institutions are graduating students who have not mastered essential skills. In 2013, the Conference Board of Canada surveyed 1,500 employers; 70% of them believed that their employees’ critical-thinking and problem-solving skills were insufficient (Institute for Competitiveness, 2017). CBE programs offer a model to help address

² Our interviewees referred to programs that embody some elements of CBE as competency-based learning (CBL) programs.

³ This list of qualities is informed by our interviews, as well as sources such as Klein-Collins (2013) and Public Agenda (2015).

these perceived skill deficiencies and specific labour shortages. The model provides outcome-based curriculums and flexible learning platforms that allow students to learn at their own pace, recognize prior learning, and focus on mastering the knowledge, skills and characteristics needed to contribute to a modern, dynamic economy.

“You can imagine the attraction of a place that says bring everything you know, pay a subscription fee and get out of here quickly. It’s compelling for workers, policy makers, and if the transcript can make competence transparent, it’s attractive to employers as well.”

— *American Institutes for Research*

CBE and the Status Quo

To understand the applicability of a competency-based approach in the Ontario context, it helps to consider how the approach differs from traditional programs. At a general level, CBE models are distinct from traditional higher education programs by their structure, approach to pedagogy and assessment, faculty roles and student interaction. Some of these differences highlight areas of opportunity, by which Canadian institutions might transfer positive elements of CBE to traditional-style programs. We describe each of the distinguishing features in turn below.

Structure

In a traditional college or university program, students enrol in courses that begin in either September or January. They attend lectures or seminars, usually on a physical campus. And, in most cases, students earn a credit through a mix of class attendance, assignments and a final assessment. Students repeat this until they have enough credits to graduate — a process that typically takes anywhere from two to five years.

Within a CBE program, students are often able to determine the structure of their learning. There are typically variable starting points throughout the year and, once enrolled, students earn credits as soon as they prove mastery of a particular competency set. In the 2015 report, *The Student Experience: How CBE providers serve students*, the author describes the contrasting CBE and traditional structures well:

The most clearly defined components of traditional higher education programs (like schedule and timing of classes, time to degree, course materials, course requirements, and the number of credits that must be earned at the institution) are much less structured in CBE programs. In contrast, the components of traditional higher education programs that are typically the most flexible and able to be personalized (like choice of major, choice of classes within majors, and learning objectives within individual courses) are often fixed in CBE programs. (Baker, 2015, p ii).

The structure of CBE programs attracts a particular type of learner: generally mature students who have clear career goals. We discuss this idea of the CBE target market in more detail throughout the following sections.

Pedagogy and Assessment

The approach to teaching and assessing is one of the areas where we see tremendous potential to learn from and transfer elements of CBE for the benefit of students in traditional programs. Traditional programs tend to be structured around *content*. Generally speaking, instructors teach content deemed important, evaluate the extent to which students have absorbed this content and assign a corresponding grade. The result is typically a normal distribution of achievement (or bell curve of grades) within a cohort.

Competency-based education programs are structured around intended outcomes and the assumption that all students have the potential to achieve them. Programs are typically, but not necessarily, developed with employer involvement to ensure the content and assessments are clearly aligned with labour market needs; assessments are often project-based and reflect professional expectations (accounting students, for example, might be asked to analyze a balance sheet). The assessment process relies on criterion-references, meaning students are assessed against a pre-determined set of standards, rather than norm-references, where students are compared with each other (Spady, 1977). It also includes opportunities for feedback and improvement with the goal of enabling all students to eventually master all required competencies.

By structuring course content and assessments around competencies and setting mastery benchmarks along the way, the CBE model enables more consistent graduate outcomes. In a traditional program, a student might earn a credit for a course despite failing certain tasks or subjects. Meanwhile, their classmate might fail the same course (and have to re-take the entire thing), despite having mastered a significant portion of the material. Employers can rest assured that graduates of CBE programs have mastered the entire competency set reflected by their credential, and the graduates have a transcript allowing them to speak confidently about that.

Faculty Roles

Faculty at Ontario colleges and universities are responsible for some mix of curriculum and course development. Faculty and course instructors typically decide how course content and the curriculum will be taught, evaluated and graded.

CBE programs tend to have more specialized or “deconstructed” faculty roles. These roles, identified in the literature and our interviews, often include the following, taken on by multiple staff members (though in some cases, one faculty member may play multiple roles):

- **Content specialists** who create competency frameworks and map them to curriculums and assessments;
- **Advisers** who tend to be either subject matter experts that offer tutoring and feedback on assessments, or academic coaches who work with students to develop and stick to academic plans;
- **Assessors** who apply valid and reliable tools to assess students’ applied competencies. The assessors’ interaction with students tends to be limited to substantive assessment feedback.

CBE faculty also tend to be available to students remotely and this is especially true for the many CBE courses offered online.

Student Interaction

Traditionally, students move through their degrees as a cohort. They learn together, take tests at the same time and graduate as a class. Student interaction is a key part of the curricular and co-curricular experience in a typical college or university program.

Given the self-paced nature of CBE programs, interaction with other students is not a necessary feature. That said, a number of CBE programs emphasize team-learning competencies and many online CBE programs encourage dialogue through course discussion boards as well as online communities where students can network and connect about issues.

Table 1: How CBE Models Compare to Traditional Higher Education Program Models

	Traditional	CBE
Structure	Seat-time	Self-paced
Pedagogy	Content-focused	Outcomes-focused
Assessment	Norm-referenced	Mastery-based
Faculty Role	Comprehensive	Deconstructed
Student Interaction	Cohort learning	Independent learning
Credential	Signals completion	Signals competence

Examples of CBE

American Competency-based Programs

In 1997, a group of 19 US governors joined together around a mission to expand access to higher education. Two years later, they opened the virtual doors to Western Governors University, a non-profit institution offering online, competency-based degrees designed to be flexible and affordable. The institution has since served more than 95,000 students with career-focused programs that are organized around learning outcomes and developed with input from industry (Etherington, 2018).

By 2012 there were roughly 20 institutions offering CBE programs in the US, and by 2016 more than 600 American postsecondary education institutions were either designing or implementing CBE programs (Nodine, 2016).

Why is CBE taking off in the US?

CBE programs offer the potential to graduate students quickly, cost-effectively and with the skills needed to meet employer demands. This is particularly appealing in the US where the percentage of adults earning a college degree is lagging behind other OECD countries (OECD, 2015) and where exceptionally high education costs are burdening students with debt and often preventing degree completion. In 2013, then-President Barack Obama issued a call to American institutions to improve the affordability of a college degree; in the three decades leading up to his call, the cost of tuition at an American public, four-year college had increased by more than 250% (The White House Office of the Press Secretary, 2013), and more than 35 million Americans had dropped out of a higher education program before earning a degree (Kamenetz, 2013).

American institutions interviewed:

- ✓ Alverno College
- ✓ American Institutes for Research
- ✓ Brandman University
- ✓ Northern Arizona University
- ✓ Southern New Hampshire University
- ✓ University of Wisconsin Flex Program
- ✓ Western Governors University
- ✓ Westminster College

The Obama administration recognized the potential of “new and creative program models in which students are provided with the means to acquire knowledge and skills at an individual pace” and invited institutions to submit competency-based education programs for student financial aid eligibility (Office of the US Department of Education, 2013). Meanwhile, institutions saw an opportunity to increase revenue by accessing an underserved market: mature students with some higher education and work experience, but without a recognized educational credential. CBE programs, designed to address specific labour shortages or employer needs, are ideal for the self-motivated student looking to earn a low-cost, short-term credential that allows them to advance or pivot in the labour market.

“I don’t see CBE as undermining the academy as we know it. It attracts a group of students who are underserved by the traditional format.”
— Northern Arizona University

CBE’s growth in the US was powered by technological innovation and what one interviewee referred to as “strategic philanthropy.” As virtual classrooms remove constraints of time and place, technology has also opened the door to “new kinds of embedded assessment and adaptive curriculum, allowing instructors and students to discern with greater accuracy a student’s mastery of material or skills” (Mitchel, 2015). At the same time, donors such as the Bill and Melinda Gates Foundation, the Lumina Foundation and the William and Flora Hewlett Foundation have provided funding to experiment with technology and develop high quality, viable programs.⁴ Philanthropic dollars have also been instrumental in establishing a network of

⁴ See, for example, the Breakthrough Models Incubator program: <https://www.educause.edu/visuals/shared/events/BMI13/Breakthrough%20Models%20Incubator%20Background%20and%20Context.pdf>

service providers called the Competency-Based Education Network (C-BEN), formed to facilitate collaboration, overcome challenges and enhance the quality of CBE programs.

What does CBE look like in the US?

A number of institutions in the US offer programs that meet the full definition of CBE and even more incorporate elements of that definition. Most examples of CBE in the US aim to graduate students quickly and cost-effectively, primarily in vocational programs tied to clear labour market need. In the context of a nationwide nursing shortage (Grant, 2016), a number of CBE programs are designed to speed registered nurses (RNs) through an online Bachelor of Science in Nursing (BScN) program. At the University of Wisconsin, for example, RNs can sign up through the university's Flexible Option for three-month "all-you-can-learn" subscriptions. Students work through 17 projects that incorporate the skills and knowledge expected of a BScN graduate at their own pace, usually over the course of several subscriptions. Tied to growing labour demands in the business and IT sectors, a similar range of CBE programs cover these skill areas. Brandman University, for example, offers a variety of programs in both IT and business through its MyPath arm, and the cost is on average about a third of that charged by equivalent cohort-based programs. Western Governors University, one of the longest standing CBE program providers, has four program areas, each designed to meet labour market shortages: health professions, education, business and IT.

Curriculums for these programs are designed with mastery in mind. In several cases, the institutional representatives we spoke with described CBE curriculums as adapted versions of traditional programs. Some institutions took what they called a "deconstruct/re-construct" approach, pulling out the competencies being taught and then rebuilding the program to ensure those competencies are mapped across lessons and assessments. Northern Arizona University, for example, used this approach to model its Personalized Learning Program (C-BEN, 2017). We also heard from institutions where essential competencies were identified and then embedded into the curriculums of existing programs. Some institutions like Westminster College, Southern New Hampshire University and the University of Wisconsin have gone a step further and designed CBE programs from scratch, starting with the competencies employers are looking for, and building the curriculum and assessments around those. In every case, curriculum design is a collaborative effort with faculty and employer involvement.

*"Doesn't it make sense to start at the outcome and ask what our students should actually be able to do?
I don't know why this isn't taking off faster."
— Westminster College*

The credentials that students obtain from the institutions we interviewed are comparable to those they would obtain from traditional programs. Interviewees explained that most employers would have no way of knowing the credential was obtained through a CBE program. On a résumé, employers would see the degree type — for example, a BA — and the year it was obtained. That said, depending on the institution, the actual transcript may be quite unique. Western Governors University's transcript, for example, has no grades or course codes, and lists instead the competencies a student has completed. If a student needs to transfer

between institutions or wants to attend graduate or a professional school, the competency transcript can be converted to one that aligns with the credit-hour system.

“The reaction I’ve had from employers about [the CBE transcript] has been really favourable. It’s a tool that allows students to talk about what they know and can do.”

— Northern Arizona University

An example of CBE in practice

A mature student (a parent who works full time) enrolls in an online business administration program to advance her career. The program she’s chosen is structured around 10 competency sets she must demonstrate to earn a degree.⁵ Once admitted to the program, the student pays a monthly or term subscription fee and gains access to a library of online material selected to help her master the required competencies. She is also connected with a learning coach who offers support and guidance as she works through the material.

Advancement in this program is based upon mastery. A competency is considered mastered when the student earns 90% or higher on the associated project-based assessment. If she does not master an assessment, she incorporates feedback from the assessor to improve her next submission. Depending on how much knowledge and experience she entered the program with, how quickly she can learn and how receptive she is to feedback, the student could progress through the material and earn her degree relatively quickly saving time and money.

This hypothetical example is informed by our conversations with representatives at the University of Wisconsin Flex, Brandman University, Western Governors University and Westminster College.

Canadian Competency-based Programs

Competency-based education has taken off at a slower pace and on a smaller scale in Canada. This is in part because two of the primary drivers behind the CBE movement in the United States — low completion rates and high student debt — are not as problematic in the Canadian context. On average, tuition for a Canadian undergraduate degree costs C\$6,571 a year (Statistics Canada, 2017) versus an average in the US of US\$9,970 for state residents at public colleges and US\$34,740 at private colleges (First Financial Bank USA, 2018). And Canada’s percentage of working adults with a postsecondary degree is one of the highest among OECD countries (OECD, 2017).

⁵ Competencies might include: project management, supply chain management, marketing, financial accounting, business law and ethics, leadership, data analytics, sales and business communications.

That said, there are elements of CBE that are alive and well here. Ontario colleges and universities recognize the need to equip students with foundational skills such as communication, critical thinking and problem solving.⁶ And authentic assessments — assessments that measure students’ knowledge or skill(s) that are directly aligned with tasks they would perform in a work environment— are becoming a prominent feature of professional programs, particularly in medicine.

What does CBE look like in Canada?

In Canada, we are gradually seeing institutions embrace elements of CBE (our interviewees would call these examples of competency-based learning, or CBL, because they do not meet the full definition of CBE). In most cases, the underlying goal motivating the development of CBE-style programs in Canada has been to ensure students meet a high benchmark of competence, whether that means a slower or faster progression toward mastery.

For example, the University of British Columbia’s draft strategic plan includes a goal of moving “toward competencies as the primary metric of program structure and completion,” (University of British Columbia, 2017) and Royal Roads University has outlined a set of 14 competencies as part of a strategic direction to embrace core values, including communication, teamwork and future thinking/innovation (Royal Roads University, 2017). And, since 2017, La Cité, the largest French-language college in Ontario, has been systematically transforming all of its postsecondary programs according to a CBE approach. The process is scheduled to finish in 2023.

Competency-based Medical Education

Some of the best and potentially most comprehensive examples of CBE-style programs to emerge in Canada are in our post-MD residency programs. As Canadians increasingly worry about the quality of our health care system (Montague et. al. 2017), accreditors and institutions are focusing their accountability frameworks on ensuring health professionals meet the highest standards of applied knowledge and skill.

“A pilot that can answer multiple choice questions about how to land an airplane, wouldn’t fill me with a great deal of confidence.”

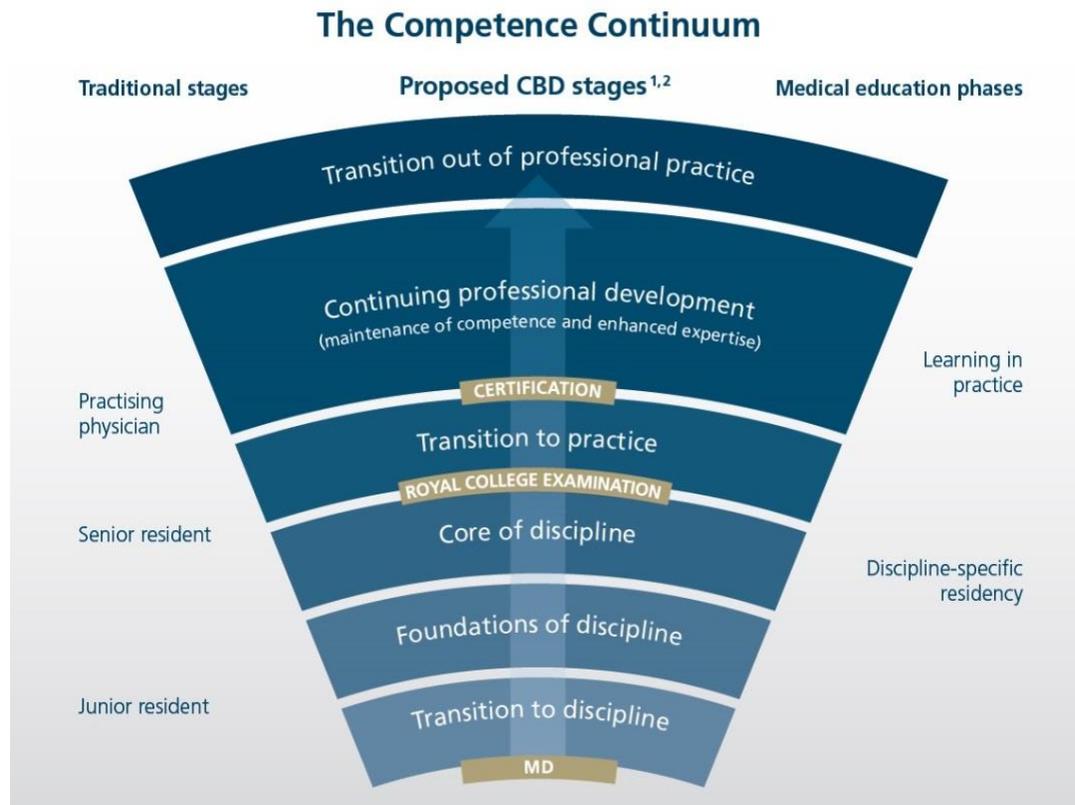
— *Royal College of Physicians and Surgeons of Canada*

The Royal College of Physicians and Surgeons of Canada, which accredits the residency programs at 17 Canadian university medical schools, launched a Competence by Design (CBD) pilot in July 2017, which breaks down specialist education into a series of integrated stages depicted below in Figure 1, starting with the transition into the discipline and moving into practice, each with explicit competencies embedded. The

⁶ Ontario College graduates must demonstrate Essential Employability Skills (EES), while university graduate skills are articulated in the Undergraduate and Graduate Degree Level Expectations (UDLES/GDLES).

plan also includes a move toward more frequent and meaningful assessments. The intention is to roll out the CBD change initiative to all post-MD residency programs by 2022. It is instructive that CBE has not been incorporated in medical school curriculums to the same extent.

Figure 1: CBD Competence Continuum



Notes: ¹Competence by Design (CBD); ²Milestones at each stage describe terminal competencies
 Source: Royal College of Physicians and Surgeons of Canada, 2015a

In the lead up to this sweeping change to post-MD training, the Faculty of Medicine at the University of Toronto started a two-track experiment in the orthopedics residency program, with the conventional program running alongside the competency-based medical education (CBME) version. With frequent testing, the faculty began noticing CBME residents outperformed the conventional group on a consistent basis. They eventually began hearing complaints from residents in the non-CBME track that they were being disadvantaged and decided to end the experiment after three years, changing the whole program to be competency-based (Ferguson et al., 2013).

The School of Medicine at Queen’s University was one of the first to embrace the CBD initiative and has since converted all 29 of its specialty residency programs to a CBME model. Speaking about Queen’s

experience implementing CBME on a large scale, one interviewee shared six positive effects that CBME is having in Canada:

- Forcing instructors to take a critical look at curriculums;
- Making criteria for advancement explicit;
- Augmenting engagement between faculty and learners;
- Enhancing assessment practices and tools;
- Employing available technology;
- Making the financial cost of teaching explicit.

*“It’s a system designed to have more accountability, more learner centeredness and more flexibility.”
— The School of Medicine at Queen’s University*

Canadian examples of CBME embrace many elements of CBE as defined earlier. It is important to note, though, that a key feature of true CBE programs is variable timing, meaning learners can progress through material faster or slower than their peers depending on their demonstrated competency. In CBME, which is considered a hybrid model of CBE, learners are not necessarily provided the opportunity to graduate sooner than their peers. If students master all of the required competencies earlier than expected, they are directed to supplementary learning experiences (e.g., sub-specialization experiences). Learners may also take more time to demonstrate competence if needed.

Considerations

The emergence of CBE in North America is timely given its potential to address existing and anticipated skills shortages and its inherent accountability mechanism — ensuring all graduates meet explicit competency benchmarks. As we consider the applicability of CBE in our provincial context, there are a number of important lessons and unanswered questions that Ontario educators and policy makers should bear in mind.

Target Market

CBE appears to have been most exploited for certain student target audiences, specifically students with clear career aspirations and goals. In addition, one of the more appealing features of the CBE model is its ability to meet the needs of mature students looking for a lower-cost and shorter-term credential and who require flexibility in their learning journey. As such, the structure of CBE programs appears to be ideally suited to benefit adults with family and work responsibilities, students who might need to stop and start school at irregular times. It also benefits mature students who, because of previous education or work experience, can demonstrate prior learning that overlaps with course competencies (Parsons, Mason & Soldner, 2016). These characteristics suggest CBE programs have utility and promise for mature students or workers who have been displaced from their jobs and require upgrading or upskilling (American Institutes for Research, 2018). This group of students is currently underserved in Canada and the demand can only be expected to grow if predictions of job displacement due to automation or anticipated skills gaps in a knowledge-based economy prove true. This also suggests that education providers attuned to the needs of

such workers may better exploit the opportunities of CBE than traditional postsecondary institutions in Canada.

While the idea of working through material independently may suit the self-motivated learner, it is also “potentially dangerous for students who could benefit greatly from social learning and support” (Baker 2015). Indeed, some interviewees cautioned against offering a self-directed style of program to the

“CBE is an opportunity for students who think, “I don’t have the time or the money.”
— C-BEN

traditional postsecondary student, fresh out of high school with no postsecondary or labour market experience. One interviewee from the University of Toronto explained why the CBE approach works better for students in vocational programs, saying “CBE works when you have a very clear target behaviour that is highly measurable ... Our [undergraduate] program is more about practising an interconnected set of skills and abilities.” While there are some examples of undergraduate, liberal arts CBE programs (and the Association of Faculties of Medicine of Canada recommended undergraduate medical education in Canada adopt a competency-based approach⁷), the vast majority are designed for mature students in vocational programs. With this in mind, our interviewees suggested the CBE model could be easily expanded to a graduate or professional degree like law or civil engineering, but would be difficult to put in place at the undergraduate level.

While the market for CBE is relatively narrow, the market for skills development includes almost everyone. There are elements of CBE that would appeal to all students, and we describe these in more detail below as part of our discussion on transferability.

Cost

Another attractive feature of CBE programs is the potential for cost savings: Can CBE programs actually deliver quality credentials to students at a lower price than traditional programs? Unfortunately, there is relatively little empirical research available on the costs of these programs, either from the student or institutional perspective.

Student Perspective

Although there are no large-scale analyses of CBE costs from the perspective of a student, the American Institutes for Research (AIR) conducted a comparative research study that looked at student costs across six CBE programs. It found that average cumulative tuition (regardless of whether the cost structure was based on courses, competencies or a set pay period) was substantially lower for students in CBE programs. AIR

⁷ The medical degree program is “undergraduate” in name only. It is second-entry everywhere in Canada with the exception of Quebec.

noted that the study was predominantly based on students who accelerated through their programs (Parsons et al., 2016).

These findings align with the theory that if the price per credit between traditional and CBE programs is similar, then CBE programs should reduce costs (including opportunity costs) for those students who are able to apply prior learning and progress through material and assessments quickly. In the case of programs offering an “all-you-can-learn” subscription fee, where students earn as many credits as they can during a set pay period, competent students should be able to drive the price per credit down with each one they acquire. On the other hand, students who lack prior learning or self-motivation, for example, could progress relatively slowly through a CBE program, leading the price of the credential to exceed that of an equivalent credential from a traditional program (Kelchen, 2015).

“We offer a six month flat rate including textbook, graduation fee and enrollment fees for \$3,000 — all you can learn. Students tend to complete about 10–15 credits per subscription, making our price point less than a traditional program’s”
— Northern Arizona University

Institutional Perspective

While we cannot say with certainty what the cost of implementing a CBE program is, we can share that multiple interviewees said implementing CBE programs was a wise financial decision for their institution. One interviewee said that their institution had broken even and had begun raising revenue from its CBE programs years sooner than expected.

A note about cost and quality

We heard from interviewees that while institutions should strive to take advantage of cost-savings offered by technology, they should not do so at the expense of a “humanized” learning experience. CBE programs that work well offer wraparound support services including proactive learning coaches who check in with students and in some cases counsel them out of a self-directed program and into a traditional cohort-based one.

At the same time, almost all our interviewees warned of high start-up costs. They cautioned that a shift to mastery-based learning requires substantial faculty and staff development and may necessitate new learning management technology.⁸ This advice is consistent with the literature; a group called Public Agenda surveyed higher education institutions offering CBE programs in the US and found that the cost of data systems was the biggest barrier to implementing CBE programs. Meanwhile the rpk Group cautioned that, “although [CBE program] investments might ultimately yield returns in terms of increased net revenue and enhanced service delivery, institutions must recognize the potential costs associated with a switch to non-term based learning programs when considering institutional capacity to support CBE models,” (Desrochers & Staisloff, 2016).

⁸ Technological infrastructure for traditional programs often does not support programs that do not follow the standard academic term.

More research needs to be done to understand the short- and long-term costs of implementing CBE programs from the perspective of an institution as well as the actual cost of obtaining a credential from a student perspective.

Quality

At the outset of this paper, we acknowledged that a central purpose of higher education is to prepare graduates for success. Of central importance then, is the question of whether CBE programs equip students with the knowledge and skills they need to lead successful personal and professional lives. Here again, there is limited empirical research.

Drawing on survey responses of WGU alumni who graduated between 2013 and 2017, Gallup examined the outcomes (including labour market outcomes and life outcomes such as well-being) for WGU students. They compared the outcomes with data from the Gallup-Purdue index, specifically survey responses from US college alumni aged 18 and older who graduated between 2013 and 2016. They found that WGU graduates' full-time employment rate exceeded that of graduates nationally by almost 20 percent on average. They also found WGU students were more likely to report thriving socially and financially and were "more likely than their comparison group peers to work in jobs completely related to their undergraduate studies, be engaged at work and believe they have the ideal job for them" (Gallup, 2018).

The Texas Public Policy Foundation compared reported outcomes of graduates from CBE programs in teaching, nursing and organizational leadership to graduates from equivalent non-CBE programs. While the demographics of CBE programs make comparison with traditional programs difficult (students in CBE programs tend to be older and have more work experience than those in traditional programs), the study found graduates of CBE programs reported being at least as work ready, if not more so. The CBE graduates also reported higher average salaries than their counterparts who graduated from non-CBE programs (Lindsay, Goldman, Long & Leone, 2018). In another study, CBE students expressed a consistent belief that they are held to a higher standard than their peers in traditional programs and felt the rigour of the assessment process and incorporation of authentic, work-related tasks positioned them to achieve better employment outcomes (Wang, 2015).

Student success will also hinge on employers' perspectives. Do CBE graduates possess the skills needed to succeed in their chosen professions? McClarty and Gaertner argue the answer depends on the quality of assessments CBE programs use to decide who earns a credential (McLarty & Gaertner, 2015). This drives home the importance of valid and reliable assessment tools and appropriately benchmarked performance levels that map to real-world mastery — something that requires engagement with employers as partners in program development.

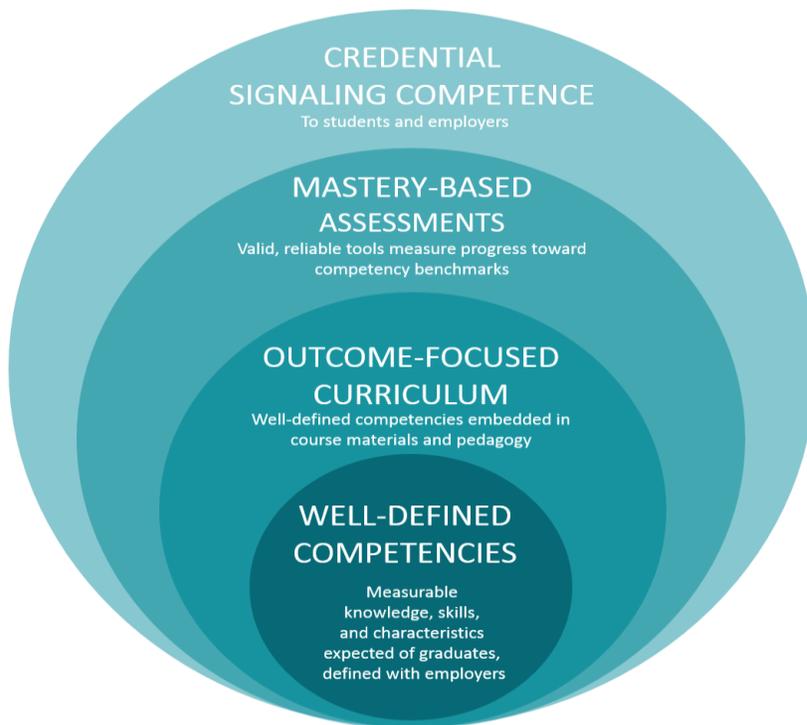
A greater understanding of how students experience the day-to-day elements of CBE — learning, assessment and advancement — is required. Research on how students actually navigate these models will be particularly important as institutions take them to scale.

“Employers have seen value-add and improvement in work calibre. Students see direct alignment between what they’ve learned and what they’re doing in their jobs.”
— Southern New Hampshire University

Transferability

CBE programs are structured so as to help students develop clearly defined competencies at their own pace and provide them with regular feedback. Graduates of CBE programs have a clear picture of what they know and can do. And employers have evidence that a prospective hire has mastered the entire set of competencies reflected in a degree. These are desirable features in an education model; regardless of whether Ontario institutions should strive to meet the full range of criteria that qualify a program as CBE, there is no doubt that students in Ontario’s higher education system would benefit from elements of this approach, in particular a stronger focus on competency development.

Figure 2: Transferable elements of competency-based education



“There’s nothing mystical about CBE. It is usable in most education settings.”
— *The School of Medicine at Queen’s University*

As illustrated in Figure 2 (above), we consider the most transferable elements of CBE to be the articulation of competencies, teaching and assessing for mastery, and a transparent credential that signifies competence.

The Ontario government has outlined the Essential Employability Skills required of college graduates and supports the Undergraduate/Graduate Degree Level Expectations for universities graduates. In addition to articulating how students will develop these skills through their programs, institutions should consider working with employers to integrate workplace skills relevant to the discipline. Our interviewees suggest employers are keen to be involved in program design processes and their involvement helps to build familiarity and comfort with the idea of hiring graduates of particular programs.

In addition to clearly articulating and embedding competencies in curriculums, we encourage educators to think about what it means to facilitate mastery. Recall Benjamin Bloom’s thinking that most students are capable of mastering what we have to teach them provided they have the right resources and support. Bloom invited instructors to structure assessments and feedback in ways that support individual learners to succeed, saying “if we are effective in our instruction, the distribution of achievement should be very different from the normal curve. In fact, we may even insist that our educational efforts have been *unsuccessful* to the extent to which the distribution of achievement approximates the normal distribution” (Bloom, 1968, p. 2).

Finally, we see great opportunity to transfer the concept of a transparent credential. Alan Harrison describes the issue with the status quo well: “The graduating student’s credential and associated transcript indicate the extent of the student’s knowledge of content, but neither directly conveys any information to employers about the level of the student’s skills.” Nor does the traditional transcript provide students with any tool to speak confidently about the knowledge or abilities gained throughout their education (Harrison, 2017). One example to draw from is Alverno College’s narrative transcript, which describes student achievement across the college’s eight core abilities (e.g., problem solving and communication).

There are multiple ways of “signaling competence,” such as using alternative transcripts or digital reporting (e.g., digital badges or ePortfolios) and we see tremendous value for students and employers in doing so.

Conclusion

Competency-based education programs award credit on the basis of demonstrated knowledge and ability. With fixed outcomes tied to employer expectations, recognition of prior learning and flexible learning schedules, CBE programs are particularly appealing to career-focused students looking for a short-term, low-cost credential. CBE differs from traditional approaches to education in its self-paced structure as well as its mastery-based approach to teaching and assessing students.

The emergence of CBE programs in North America is timely given changing global economic realities. Many workers are looking to skill-up and shift career paths, and many more can be expected to do so as new opportunities arise and more routine tasks are taken over by machinery. Meanwhile, employers are increasingly looking for staff with technical knowledge and abilities as well as foundational and transferable skills such as problem solving, an ability to communicate and emotional intelligence. CBE programs offer an approach to addressing perceived skill deficiencies and specific labour shortages by focusing on the knowledge, skills and characteristics needed to succeed in a given field. Ontario policy makers and institutions should consider embracing elements of these programs to better meet the needs of a growing and underserved market of adult learners looking to advance or pivot in the labour market.

While the market for programs that meet the full definition of CBE provided in this paper is relatively narrow, the market for skills development includes everyone. We believe there are a number of transferable elements of the competency-based model that all students stand to benefit from including clearly articulating employability skills and embedding those in curriculums, structuring learning and assessments in ways that enable all students to master defined competencies and providing students with a record of their achievement that makes competence explicit.

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Appendix A: Interviewee Affiliations

Alverno College
American Institutes for Research
Brandman University
Competency-Based Education Network
Council of Ontario Universities
National Institute for Learning Outcomes Assessment
Northern Arizona University
Queen’s University School of Medicine
Royal College of Physicians and Surgeons of Canada
Southern New Hampshire University
University of Toronto Faculty of Medicine and Innovations in Undergraduate Education
University of Wisconsin Flex Program
Western Governors University
Westminster College



Higher Education
Quality Council
of Ontario

An agency of the Government of Ontario