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Productivity Implications of a Shift to Competency-Based Education: An environmental scan and review of the relevant literature

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Executive Summary

Project Context and Objectives

The expansion of public, postsecondary education and the attendant additional costs associated with that expansion are significant concerns to governments everywhere. Ontario is no exception. Innovation in the delivery of academic programs holds the potential to contain costs, improve quality, and enhance accountability. This project is intended to assist the Higher Education Quality Council of Ontario (HECQO) to better understand how a shift to competency-based education might affect the cost and quality of higher education programs, institutions and systems and to investigate how competency-based education might enhance the productivity and accountability of public higher education systems and institutions.

Literature Review

To explore the impact of competency-based education on the cost and quality of postsecondary education, *Directions* conducted a review of the theoretical and empirical literature investigating the development and implementation of competency-based education programs at the postsecondary level. We also reviewed the empirical literature on cost efficiency and productivity changes in postsecondary education.[1]

The review of the literature makes clear that there is no consensus about key aspects of competency-based education. For example, there is the definition of competency itself, especially as it should be applied in a model of competency-based education. Although the terms *competence* and *competencies* have been widely used by educational institutions and employers and have been discussed in the research literature, the meanings associated with these terms vary greatly. The majority of the existing definitions represent competencies from one of the three perspectives:

- Input approach: competencies are seen as underlying characteristics of an individual;
- Output approach: competencies are linked to observable performance/behaviour;
- Standards approach: competencies are understood in reference to the quality of, or the standard of, the outcome of the individual's performance

While the input competency definitions aim to describe the knowledge, skills and abilities (i.e., the inputs) that an individual would require in order to produce efficient and competent performance, the output and standards approaches focus on tasks that a "competent individual" should be able to perform to demonstrate his/her competency and/or obtain accreditation as competent.

There are also differing views on how to move from "competency" as a principle underlying an academic delivery system to competency as a feature in an actual academic delivery system. Our review goes on to identify several key characteristics of competencies that establish the underpinnings of competency based education models.

Of particular interest are the characteristics that are generally agreed upon as distinguishing competency-based education as an academic delivery system from traditional (or structure- or process-based) delivery models.

[1] "The Economics of Productivity in Post-Secondary Education: A review of the theoretical and empirical literature." This may be found on the *Directions* website at www.directions-eprg.

- CBE programs are founded upon precisely stated student outcomes or competencies that specify exactly what the student will be able to do upon completion of the program. In contrast, the outcomes of traditional programs may not be specified precisely or at all.
- CBE programs are organized around carefully designed student learning activities; permit students to stop, accelerate, or repeat instruction; and afford multiple opportunities for students to receive feedback and alter their performance. In contrast, traditional programs are highly dependent upon instructor-delivered instruction; afford students little, if any, control over the pace of instruction; and provide comparatively little feedback when compared to competency-based programs.
- CBE programs often allow students to fully master one task prior to moving to another while traditional programs typically allocate approximately the same amount of time to each instructional unit or block, requiring student groups to move from one unit or course to another as a group.
- CBE programs require individuals to perform tasks at a high level of proficiency against a fixed standard in a "joblike setting before receiving credit " while traditional programs allow students to progress to the next unit even if they have only marginally passed some threshold assessed using pencil and paper tests.
- CBE programs provide extensive workplace opportunities in the form of a practicum, cooperative learning, and workshops and implement a variety of real-world, work-like assessments. While some elements of university-workplace partnerships might also be present in traditional programs, this link is explicitly inherent in CBE.
- CBE programs can be differentiated by the roles competencies play in the institution's curriculum: while some CBE institutions use competencies in the context of their course-based system, in other CBE institutions the overall curriculum is driven by the competency frameworks.

The literature identifies a number of the perceived benefits of CBE to students and institutions. These include transparency and accountability, possible transfer of credits from one CBE program/institution to another, relevance to the needs of the labour market, focus on the individual students' needs, and acknowledgment of prior experiences and knowledge students bring to the programs. However, the CBE approach also drew some criticism from educators and researchers, including concerns over (1) variations and lack of coherence in the conceptualization of competence; (2) increased pressure on institutions to graduate students in a timely fashion even though they might not demonstrate the required competencies; (3) the difficulty of capturing in a CBE program the complexity and diversity of the professional activities; (4) the reductionist nature of the competency profiles and curricula; (5) an over-reliance on standardization of competences; (6) the difficulty of designing learning activities to address competencies; (7) concerns that instructors lack knowledge regarding the pedagogical practices suitable for this new context; and (8) the labour-intensive and time-consuming nature of assessment design in CBE.

One noteworthy aspect of the literature is the limited research regarding the efficacy of CBE as a model for delivery of academic programs. While competency-based education has been explored at the level of individual courses, few researchers attempted to examine CBE outcomes from the wider perspective of the program, the institution, or the postsecondary sector. We find studies that offer anecdotes about the benefits of a CBE initiative, but there is little empirical evidence on the performance, or costs, of competency-based education as a mode of delivery for academic programs. Our survey is a step towards a more comprehensive empirical study.

What is equally clear from the literature, and from our case studies, is that as competency-based programs move to the university sector, it is not useful to describe them as either CBE or non-CBE. A more appropriate approach is to recognize that there is a continuum and that what may be identified as a CBE program can contain elements associated with traditional, non-competency-based education. To express this we have

developed a matrix that captures seven features that are associated with competency-based education. Any particular program (e.g., those in our case studies) can be distinguished by where it sits, for each of the seven features, on the continuum between a CBE program and a non-CBE program. Using information from public documents, the survey, and the interviews we constructed a table which locates, for each institution and for each of the seven features, where the program sits in the continuum between CBE and non-CBE. By assigning scores for each point on the continuum, we were also able to construct an average "CBE score" for each institution.

Productivity and Efficiency

A literature review was also conducted to consider the potential for an academic delivery system such as competency-based education to generate "efficiencies" or "productivity gains" in the postsecondary sector. As noted previously, a comprehensive review of the theoretical and empirical literature on the economics of productivity and efficiency, and studies of productivity in the postsecondary sector is presented in a separate, companion study to this review of competency-based education. There we offer a more detailed look at production theory and its significance in understanding productivity for the postsecondary sector and guiding the econometric work on efficiency in the sector. Economic theory, by locating the main sources of productivity growth, offers an approach to evaluating the potential for CBE to lead to gains in efficiency. Appendix B discusses how our survey instrument was constructed so as to provide information on whether productivity gains were realized.

From the institutions surveyed, eight responses were received (and follow-up interviews conducted). A number of conclusions stood out:

- Competency-based education affects productivity primarily in the areas of program planning and curriculum development, program delivery and student assessment.
- In the areas where CBE was said to offer the greatest potential for greater productivity the survey responses indicated that the main sources of productivity gains were, in order, emulating best practices, improving the quality of graduates, and making better use of existing technologies.
- By and large, the costs of competency-based education programs were said to be about the same as for traditional programs. CBE costs were reported as lower for costs related to course instructors, including direct instruction costs, instructor time (e.g., communications, online discussions), and student supervision. On the other hand, the costs of course maintenance (keeping course materials up-to-date, course redesign) were reported as higher for CBE programs.

Environmental Scan

To supplement the literature review on competency-based education and to obtain specific information about postsecondary programs that use the CBE approach, *Directions* undertook an environmental scan of a sample of CBE programs. In addition to publically available material about programs, we created a survey instrument that would allow a comparison between academic delivery modes in competency-based education and traditional programs, and would provide information on whether more or fewer resources are required in CBE programs. The survey canvassed five dimensions that we have identified as present in academic program delivery systems in postsecondary education. These are: (1) Program and Curriculum Creation and Development; (2) Program Delivery and Instructional Practices; (3) Student Assessment; (4) Support Services for Students and Faculty; and (5) Administration, Resources, and Institutional Funding/Finance. Follow-up interviews were conducted after the initial survey results had been obtained. The programs responding to the survey were:

- Western Governors University
- College for America at Southern New Hampshire University (SNHU)
- Southern New Hampshire University (SNHU) Business School. Its hybrid CBE model is a CBE program option embedded in a traditional business school.
- Alverno College
- The Personalized Learning Program at Northern Arizona University (NAU)
- The social work program at King's College University, London, Ontario
- Excelsior College in Albany, New York, which offers online, competency-based associate and baccalaureate degrees in nursing.

Even across the eight institutions surveyed we find considerable variety in some of the key parameters that distinguish a CBE program. These include such things as (1) Institutional architecture of competency-based education***;*** (2) Program size; (3) Target audience*;* (4) Degrees offered*;* (5) Modes of instruction; and (6) Program areas. This suggests there is flexibility if a jurisdiction wished to promote or establish CBE-type programs. On the other hand, the surveys suggest that this flexibility is a consequence of the fact that the borders between competency-based programs and traditional programs are dissolving. Adjustments to traditional programs may achieve the desired objectives without the need to introduce new academic delivery structures.

Conclusions

The paper concludes by offering some cautions in considering public policy about competency-based education.

- While the entire genetic structure of competency-based education leads to the expectation that competency-based education can be relied upon to provide job-ready skills and competencies, there is no comprehensive evidence that this is the case.
- There are structural differences between the US and Ontario which suggest that the target audience for CBE in the US is, for Ontario, either not sizeable or already served. This is important when considering the fixed costs associated with initiating and operating a CBE program.
- For competency-based education to have a significant impact upon productivity and costs in the postsecondary sector, competency-based education programs would have to be available to the traditional postsecondary age cohort and in the areas of liberal arts, humanities, social sciences, and physical and natural sciences.
- There are likely to be challenges in introducing competency-based education on the broad scale needed.

Given the above, attention might be better directed towards developing means to demonstrate to stakeholders the competencies that are embedded in the baccalaureate.

Productivity Implications of a Shift to Competency-Based Education: An environmental scan and review of the relevant literature

Project Description

The expansion of public, postsecondary education and the attendant additional costs associated with that expansion are significant concerns to governments everywhere. Indeed, the Ontario Ministry of Training, Colleges and Universities (MTCU) has observed that "postsecondary education (PSE) systems around the world are rapidly transforming in response to evolving economic, social and student learning realities."[2] Ontario is no exception. Expanded credential options, year-round learning, credit transfer, technology-enhanced learning, high-quality entrepreneurial and experiential learning, and outcomes-based credentials are among the innovations addressed in a discussion on making the Ontario university and college system stronger. Further, the MTCU document points to one of the crucial benefits expected from innovation by noting that "in light of the current fiscal climate, and as we continue to recover from the recession, it is necessary to lead the province's publicly funded higher education system towards lower rates of spending growth" (p. 8).

One such innovation that offers the possibility for greater efficiency in the delivery of academic programs by colleges and universities is competency-based education. This project is intended to assist the Higher Education Quality Council of Ontario (HEQCO) to better understand the underpinnings of a competency-based model of postsecondary education, to examine competency-based education in practice, and to consider what competency-based education might imply for institutional and sector accountability. To explore these issues *Directions* reviewed the theoretical and empirical literature and research on the development and implementation of competency-based education programs at the postsecondary level.[3] Supplementing this review is an environmental scan of models of competency-based education in current practice in the postsecondary sector. Further, to investigate the potential for competency-based education to enhance the productivity of public higher education systems and institutions, and to inform our environmental scan, we reviewed the economic literature on costs, efficiency, and productivity in post-secondary education.[4] The project will advance our understanding of how a shift to competency-based education (CBE) might be effected and how CBE could affect the cost and quality of higher education programs, institutions and systems.

[2] "Strengthening Ontario's Centres of Creativity, Innovation, and Knowledge," Ontario Ministry of Training, Colleges and Universities, 2012, p. 4.
[3] The review includes academic publications available through online databases (i.e., ERIC, CBCA, Academic Search Primer, EBSCO Full text), websites, and publications produced by government, universities, and research organizations (grey literature) published after 1995. A detailed discussion of the literature review parameters and processes is provided in Appendix A.
[4] Our review and analysis of the economics – theoretical and empirical – of productivity in postsecondary education is provided in a separate companion piece, "The Economics of Productivity in Post-Secondary Education: A review of the theoretical and empirical literature." This may be found on the *Directions* website at www.directions-eprg.ca.

Literature Review Results

Key Concepts

Our examination of the literature devoted to competency-based education has found that there is a wide range in the definition and interpretations of the concepts of "competence" and "competencies," and in the understanding of the objectives for competency based education. As well, we found that little information is available regarding the productivity of the CBE approach.

Defining competence and competencies

Discussions of competence are not new, and can be traced back to Plato's work and even to the Code of Hammurabi (Mulder, Gulikers, Biemans & Wesselink, 2009). Discussions of competence and especially competencies appear in the scholarly and professional literature in the 20th century when writers began to identify the competencies required for different professions (e.g., behavioural sciences, law, management sciences, public administration, etc.) (Mulder et al., 2009). Although the terms "competence" and "competencies" have been widely used by educational institutions and employers and have been discussed in the research literature, the meanings associated with the terms competence and competencies vary greatly.

Generally we find that the terms "competence," "competencies," and "competency" are used interchangeably. However, this is not always the case. For example, Mulder et al. (2009) differentiate between "competence" and "competency." The authors' definition of competency is that it is "the integrated set of capabilities (or competencies); consisting of clusters of knowledge, skills, and attitudes; necessarily conditional for task performance and problem solving; and for being able to function effectively (according to certain expectations or standards); and in a certain profession, organisation, job, role and situation" (p. 757). Mulder et al. define competencies as situated elements of competence, "which can be behaviour-oriented and/or task-oriented and meaningful in a specific context and at a sufficient level of specification" (p. 758).

Other authors define "competency" more simply as an ability that an individual possesses or a skill that a person learns. For example, Boyzatis defined competency as "'an underlying characteristic of a person . . . motive, trait, skill, aspect of one's self-image or social role, or a body of knowledge" (Boyzatis, 1982, p. 21, cited in Irwin, 2008, p. 63). Similarly, Carraccio, Wolfsthal, Englander, Ferentz, and Martin (2002) refer to competency as "a complex set of behaviours built on the components of knowledge, skills, attitudes and ''competence'' as personal ability" (p. 362). Albanese, Mejicano, Mullan, Kokotailo, and Gruppen (2008) describe competencies as knowledge, skills, attitudes and personal qualities essential to practice, while Frank (2005) talks about competencies as *important observable* knowledge, skills and attitudes. Still other sources emphasize the link between competency and performance, suggesting that skills, knowledge and attitudes enable an individual to perform his/her occupational activities effectively. For example, Whitcomb (2002) talks about effective performance of the activities of a given occupation, while others (e.g., the National Center for Education Statistics (NCES) of the U.S. Department of Education, 2002) refer to "specific tasks" that a competent individual would be able to perform. In their review of the literature related to competency-based education in dentistry, Yip and Smales (2000) also suggest that an individual should be able to apply these competencies (knowledge and professional attitudes, and reliable performance) "in natural settings without assistance" (p. 324), by which they seem to mean *realistic practice settings*.

A third approach to competencies focuses on standards of performance an individual would need to meet. For example, in the field of medicine, Whitcomb (2002) describes competency as the ability of practitioners to "provide medical care and/or other professional services in accord with practice standards established by members of the profession and in ways that conform to the expectations of society" (p. 359).

In her review of competency-related literature, Hoffmann (1999) concludes that the majority of the existing definitions represent competencies from one of the three perspectives:

- Input approach: competencies as underlying characteristics of an individual
- Output approach: competencies as observable performance/behaviour
- Standards approach: competencies as quality of, or the standard of, the outcome of the individual's performance

While the input-oriented competency definitions aim to describe the knowledge, skills and abilities (i.e., inputs) that an individual would require in order to produce efficient and competent performance, the output-oriented and standards approaches focus on tasks that a "competent individual" should be able to perform to demonstrate his/her competency and/or obtain accreditation as competent. In a more recent article, Chyung, Stepich and Cox (2006) argue that "a competency includes both means and an end" (p. 307), with *means* referring to knowledge, skills and abilities of an individual and the *end* referring to the effective performance of the tasks or functioning to the standards expected in a workplace. Chyung et al. go on to argue that "the term *competency* loses its true meaning if the end is ignored" (p. 307).

In their review of the literature on CBE, Boritz and Carnaghan (2003) have identified six continua to illustrate the differences among various definitions of competency. According to the authors, the definitions can represent competencies as:

1. skills/abilities alone versus also including personal attributes or traits;
2. solely outcome based versus also including knowledge;
3. activities/skills versus the results of activities/skills;
4. necessary qualities for effective performance versus superior performance;
5. generally holistic versus atomistic; and
6. observable qualities versus hidden and inferred qualities (p. 10).

Mulder et al. (2009) differentiate between "competence" and "competency." The authors define competency as "the integrated set of capabilities (or competencies); consisting of clusters of knowledge, skills, and attitudes; necessarily conditional for task performance and problem solving; and for being able to function effectively (according to certain expectations or standards); and in a certain profession, organisation, job, role and situation" (p. 757). In contrast, Mulder et al. define competencies as situated elements of competence, "which can be behaviour-oriented and/or task-oriented and meaningful in a specific context and at a sufficient level of specification" (p. 758).

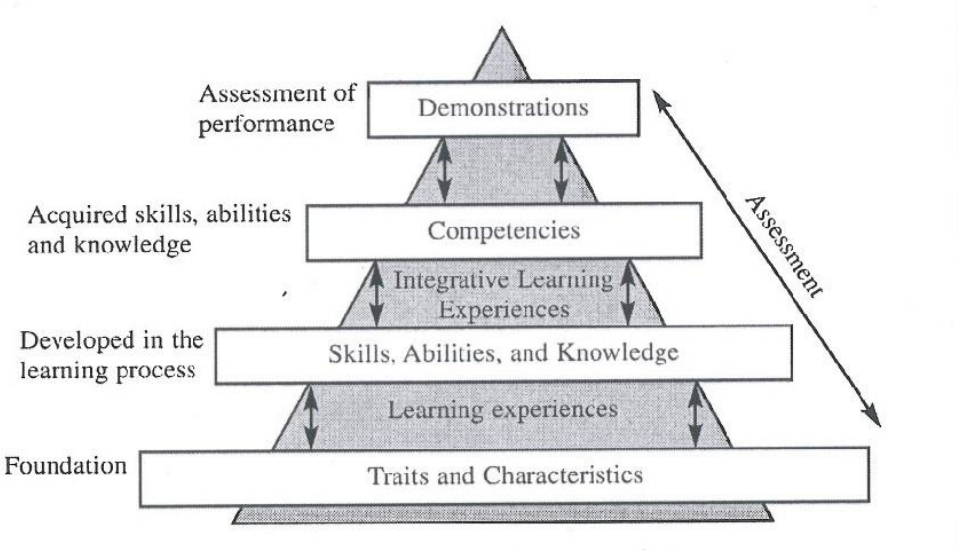
The discussion above illustrates the complexity of interpretations of the term "competency" in the literature. Depending on the goals and beliefs of the institution/organization, the developers of the training and programs might emphasize the behavioural or task-oriented nature of the competency concepts or focus more on the individual attributes of learners. The choice of the definition might also influence the rationale for the program or curriculum:

> If competency means performance, then the rationale for using the approach is to improve, or in some way change human performance. Where competency means standards or quality of performance, then the rationale is to standardise skills, raise standards, introduce change or set minimum standards of performance. Where competency means the underlying attributes of individuals, then the rationale is to determine the syllabus or content of learning that will lead to competent performance. (Hoffmann, 1999, p. 277)

In practice, at least insofar as our survey revealed, institutions understood their competency based programs to offer a mixture of development of task-oriented and individual attributes. The majority of respondents spoke of their programs as focusing on acquisition and application of occupation-specific skills. Development of individual attributes was an important objective of the program, but at the same time the goal was to ensure that students could effectively perform particular tasks and apply the skills learned from the program in practice.

It is evident from the literature that some of the terms are used interchangeably, including the terms competency, outcomes, domains, characteristics, and skills. To address one dimension of this issue, the National Center for Education Statistics (2002) has proposed a framework to differentiate and clarify the terminology related to outcomes of postsecondary education (p. 8) (see Figure 1). The report differentiates between: (a) traits and characteristics; (b) skills, abilities, and knowledge; (c) competencies; and (d) demonstrations. The framework suggests that competencies are "acquired skills, abilities and knowledge" that are developed through integrative learning experiences and are based on the characteristics and traits that an individual possesses.

Figure 1: A Hierarchy of Postsecondary Outcomes



Source: Adapted from NCES (2002)

Another term that is often used as a synonym of competencies is "learning outcomes." While some of the articles use these terms interchangeably, we believe that these terms are quite different and should not be confused. While learning outcomes summarize knowledge and skills students are expected to gain by the end of the course or a program, they are not necessarily linked to the professional context and professional practice and may be quite generic in nature. The assessment of these learning outcomes may vary and does not have to be performance-oriented. In other words, competency-based education involves learning outcomes, but a program or curriculum that embodies learning outcomes does not necessarily encompass or reflect a CBE approach. Below is a summary of the key characteristics of competencies:

Competencies are complementary. They consist of complementary procedural and declarative knowledge that an individual needs to possess to perform certain tasks and activities (NCES, 2002).

Competencies can be used in different ways. The same competency can be used for different tasks, in different contexts, and in different ways (Klein-Collins, 2012).

Competencies are context-dependent. While some authors call for developing a general set of competencies that can be used in a variety of settings, this approach might not agree with the context-specific nature of competencies (Biemans et al., 2009). When used in different contexts, competencies might require different sets of knowledge and skills. Such skills as leadership, communication, and teamwork might require individuals to possess different procedural and declarative knowledge for different contexts (NCES, 2002; Yip & Smales, 2000). Thus, as Biemans et al. (2009) argue, "competencies and contexts should always be seen in coherence – without a context, competencies are too generic" (p. 268).

Competent vs. expert. Chyung et al. (2006) differentiate between "experts" and "competent individuals," suggesting that while universities need to strive to help students become competent in their areas of practice, the students may have to continue learning to become experts. Students may also demonstrate different levels of competence (Klein-Collins, 2012).

"Means and ends." As discussed above, the outcome of competency-based education is the ability to perform tasks and activities in a real-life professional context.

Competencies as objective measurement. Klein-Collins (2012) argues that competencies can be measured objectively, unlike more generic and less concrete learning outcomes or other indicators such as "credit hours" that can have different meanings at different institutions. Thus, as suggested by Klein-Collins (2012, p. 9), "competencies . . . do have inherent meaning or objective value. For that reason, competency frameworks provide a meaningful description of what a postsecondary degree means in terms of actual student learning."

Competency-Based Education

Competency-based education, according to W.E. Blank (1982, p.vi), a leading CBE proponent, is underpinned by two principles. One is that human competence is the ability to perform: "Knowledge, attitudes, and effort are of little value without results." The other principle is that "most anyone can learn most anything well if given quality instruction and sufficient time" (p. vi).

Blank, whose interest was training programs and who, in 1982, reviewed the prior 20 years of work in the field, distinguishes between competency-based and traditional training programs in relation to four characteristics: (1) what students learn; (2) how students learn; (3) when students proceed from task to task; and (4) if students learned each task (Blank, 1982, p. 5). According to Blank, competency-based programs are founded upon precisely stated student outcomes or competencies that specify exactly what the student will be able to do upon completion of the program.[5] In contrast, the outcomes of traditional programs may not

[5] The similarity between "competencies" and "learning outcomes" will not go unnoticed. Learning outcomes traditionally define what students should be able to do upon completion of an activity. Often they are not linked to a specific context or profession and are stated in a more generic format.

be specified precisely or at all. The sub-components of traditional programs – course, units, blocks, etc. – "have little meaning within the occupation."

According to Blank, traditional programs are highly dependent upon instructor-delivered instruction. Traditional programs afford students little, if any, control over the pace of instruction and provide little feedback when compared to competency-based programs. The latter, Blank argues, are organized around carefully designed student learning activities that permit students to stop, accelerate, or repeat instruction, affording multiple opportunities for students to receive feedback and alter their performance.

Traditional programs typically allocate approximately the same amount of time to each instructional unit or block and expect that students will move from one unit or course to another as a cohort. In contrast, competency-based programs often allow students to master one task fully before moving to another; the concept of a cohort is not particularly relevant. Competency-based education is greatly influenced by the notion of 'mastery learning' and the assumption that almost all learners are capable of acquiring competency or mastering a particular body of knowledge despite the evident differences among learners. Consequently, time-to-completion is a variable set by the student rather than the institution.

Key to competency-based programs is the requirement that individuals perform tasks at a high level of proficiency against a fixed standard in a "joblike setting before receiving credit." Traditional programs allow students to progress to the next unit even if they have only marginally passed some threshold assessed using pencil and paper tests. In a sense, in its emphasis on learning that is applied to work, competency-based education has often been viewed as separate from liberal education. But as competency-based programs have moved to the university this separation no longer need be the case. Programs such as Alverno's and DePaul's School for New Learning explicitly incorporate competencies that are grounded in a liberal arts education. These programs, for example, require demonstrated competencies in the ability to communicate, to reason and to analyze, to interact with others, and to be an effective citizen.

The important characteristic of CBE, highlighted in almost all summaries of CBE programs and initiatives, is the link between university and workplace settings. To ensure that students are learning competencies required in a specific professional context, programs provide workplace opportunities in the form of a practicum, cooperative learning, and workshops. In addition to learning opportunities in workplace contexts, CBE programs are encouraged to develop and implement a variety of real-world, work-like assessments (Calhoun, Vincent, Calhoun & Bransen, 2008). The authors specifically highlight the use of reflective observations and evaluations, group and team projects, and case-based simulations that are "in line with the work environments and challenges that the students will be immediately facing upon graduation" (Calhoun et al., 2008, p. 30); however, the paper does not provide more detailed descriptions of these assessment methods. While some elements of university-workplace partnerships might also be present in traditional programs, this link is explicitly inherent in CBE.

Klein-Collins (2012) differentiates between types of CBE programs based largely on the roles competencies play in the institution's curriculum. Specifically, she differentiates between institutions that use competencies in the context of their course-based system and institutions where the overall curriculum is driven by the competency frameworks. In the former, students take instructor-led and credit-hour-based courses. When the competencies are defined at the institution, program, and course levels, students tend to demonstrate these competencies by completing the required number of courses using a variety of competency-based and non-competency-based assessments (including prior learning assessments). On the other hand, Klein-Collins argues, some institutions use "competency frameworks as a tool to disrupt the traditional college curriculum in new and innovative ways" (p. 14). Instead of traditional courses (or in some cases in addition to the course

offerings), students might be required to engage in independent learning and integrating experiences that are organized around competencies.

Caraccio et al. (2002) believe that in order to understand the characteristics of a CBE program, it is best to compare it with a more traditional structure- and/or process-based educational program. Table 1 (adopted from Caraccio et al., 2002) presents a comparative summary of the CBE and non-CBE educational programs in the field of medicine. While these authors focus on medical education, similar results can be observed in other fields.

Table 1: A Comparison of the Elements of Structure- and Process-Based versus Competency-Based Educational Programs

	Educational Program	
Variable	**Structure- and process-based**	**Competency-based**
Driving force for curriculum	Content – knowledge acquisition	Outcome – knowledge application
Driving force for process	Teacher	Learner
Path of learning	Hierarchical (teacher => student)	Non-hierarchical (teacher ⇔ student)
Responsibility for content	Teacher	Student and teacher
Goal of educational encounter	Knowledge acquisition	Knowledge application
Accountability	Program is accountable for offering proper clinical and educational resources	Program is accountable for the learner‘s final performance
Teaching and learning experiences	Discipline-based and time-based preset experience	Attention paid to relevance and coherence, and relationship to future practice Adaptation to each learner, according to monitoring of progression
Typical assessment tool	Single subjective measure	Multiple objective measures (‘evaluation portfolio’)
Assessment tool	Proxy	Authentic (mimics real tasks of the profession)
Setting for evaluation	Removed (gestalt)	‘‘In the trenches’’ (direct observation)
Evaluation	Norm-referenced	Criterion-referenced
Timing of assessment	Emphasis on summative	Emphasis on formative
Program completion	Fixed time	Variable time

Note: Adapted from Caraccio et al. (2002), Tannenbaum et al. (2011), and Weinberger et al. (2010)

Similarly, Biemans et al. (2009), citing Wesselink, Mulder, and Van den Elsen (2007), identify eight principles that underlie comprehensive CBE programs. These include:

- Definition of the core competencies
- Learning and assessment (curriculum) based on a set of professional core problems
- Assessment of competencies as an ongoing process.
- Learning activities involving various authentic situations.
- Integrated assessments that examine knowledge, skills and attitudes.

- Students engaged in self-responsibility and (self-) reflection.
- Teachers playing roles of coaches and experts.
- Lifelong learning attitude that is being promoted among students

Taber, Frank, Harris, Glasgow, Lobst and Talbot (2010) also examined the key characteristics of CBE to identify key policy implications of the transition from traditional to CBE programs. The authors have identified a number of implications that institutions need to consider in such transitions – implications that would need to be addressed at the program, instructional and system levels. For example, in order to implement programs that are flexible and student-centered, institutions will need to consider issues related to training rotation (practicums), as well as allocation of required staff, time, and resources to meet the needs of the students. Also, with the focus on outcomes and competencies, institutions and organizations responsible for licensing and accreditation would need to reconsider their evaluation and accreditation procedures. Table 2 summarizes the potential policy implications of the transition to CBE.

Table 2: Key Policy Implications of the Transition to CBE

CBE core principles	Policy implications	Program/institutional versus system level
Flexibility/learner-centredness	Logistics of training rotations and delivery Alternative funding models of education Workforce/ human resource implications	Program/institutional System System
Outcomes focus – from design through program evaluation	Lack of valid and reliable standards – work needed to identify and define knowledge and competencies Implications for program evaluation and accreditation	Program/institutional Program/institutional
New roles for teacher and student	Greater involvement from faculty Greater emphasis on faculty development	Program/institutional Program/institutional
New approaches to assessment	Need for valid/reliable yet pragmatic approach to assessment	Program/institutional
New definition of ‘‘competence’’	Reductionism versus excellence – balance between individual competencies and overall competence Calls for greater accountability – defining competence versus excellence Contextual competence, and implications for practice and licensure	Program/institutional System System

Note: Adopted from Taber et al. (2010)

Benefits of CBE

The literature also identifies some of the benefits of CBE to students and institutions. The benefits we have identified through the review of academic and grey literature are summarized below:

Portability (transfer between institutions). Klein-Collins (2012) refers to CBE curricula as an approach that uses learning as "a form of currency." According to the author, the focus on competencies would allow students to transfer from program to program or from institution to institution if the credentials are assessed in the form of competencies. Furthermore, this approach, Batterman et al. (2011) argue, can enhance the transparency of the educational systems (also see Boritz & Carnaghan, 2003).

Meeting the needs of individual learners. Some authors argue that CBE would allow institutions to better meet the needs of individual learners. According to Bell and Mitchell (1995), CBE programs engage students in the identification of their learning needs, identify learning experiences that meet those needs, and allow students to explore the curriculum at their own pace. In fact, most of the CBE programs reviewed by Klein-Collins (2012) engaged students in discussion of competencies required in their chosen field and provided flexibility in terms of how those competencies can be learned and demonstrated. Evaluation strategies were also varied and linked to the needs of the students.

Value of prior experience. CBE acknowledges and values prior experiences and knowledge students bring to the programs (Batterman et al., 2011; Bell & Mitchell, 1995).

Transparency and accountability. Although some authors agree that CBE might be narrow and overly mechanistic in its implementation, others argue that introduction of the CBE approach "has caused a re-examination of learning in, and from, the workplace" (Abbott & Huddleston, 2000, p. 221). For example, Batterman et al. (2011) argue that competencies have been formalized and used in the US in the accreditation process in different occupations for a number of years. According to Calhoun et al. (2008), in the 1990s the U.S. Departments of Education and Labor started to work with various industries and occupations to develop skills standards describing competencies required by professionals in those occupations. The National Skills Standards Board, developed later in the 2000s, continued to work with the industries and occupations to develop skill standards created in partnerships with business, trade associations, education and community organizations and stakeholders.

It is suggested as well that detailed description of the competencies provides students and instructors with a list of specific measurable outcomes that can be evaluated and compared at the individual, course, program and university levels. Further, the increased transparency of the education and qualification processes increases professions' accountability (Boritz & Carnaghan, 2003; Brumm et al., 2006). For example, Brumm et al. (2006) and Chyung et al. (2006) note that CBE's benefit is in the clear description of the learning outcomes/competencies that provide a transparent "roadmap" and clear navigation tools that students can use to develop their learning trajectories and that the employers and institutions can employ to evaluate student performance.

Our surveys found general support for these views. Respondents definitely agreed that CBE provided a roadmap for the students learning trajectories. There was no sense, however, that the employers used the tools to evaluate student performance. In addition, because of the ongoing contact with employers, respondents felt that the learning process was more transparent and collaborative and that, as a result, the perception of accountability with governments (federal and state) and the public improved.

Addressing the needs of the markets. The CBE approach is also seen as a way to reduce the gap between education and the labour market by helping students develop skills required in practice settings (Biemans et al., 2009; Boritz & Carnaghan, 2003). Furthermore, CBE programs can be developed to address some of the market needs, specifically targeting areas with labour shortage. This approach might be beneficial both for the organizations seeking employees with sufficient levels of knowledge and skills and for universities trying to attract new students.

Accountability

For U.S. colleges and universities a key component of accountability is the accreditation process. Accreditation is intended to signify that an institution meets basic, minimum acceptable standards of quality. The accreditation process itself is carried out by accrediting agencies. These agencies are voluntary associations of institutions that have agreed to criteria for determining quality and are willing to submit to an evaluation.

There are a variety of accrediting agencies. For universities the significant accrediting agencies are regional associations. There are six regional accrediting agencies, covering the New England states, the Middle states, the Southern, the Western, the Northwestern and the North Central states. There are also national accrediting bodies. These tend to be agencies for the accreditation of for-profit institutions that offer particular programs of skills training or vocational training. There is, for example, an Accrediting Council for Continuing Education, and an accreditation body for health education schools. There are also a large number of specialized accrediting agencies that assess professional training programs in (1) the arts and humanities (e.g., dance or music programs), (2) education, (3) law, (4) community and social services, (5) personal care services, (6) healthcare, and (7) faith-based education.

The U.S. Department of Education does not itself accredit institutions. It does, however, maintain and publish a list of some 100 accreditation agencies that it recognizes as reliable assessors of the quality of education. The Department also publishes data on some 6,900 postsecondary institutions that have been approved by the recognized accrediting agencies. There is a much larger list of accrediting agencies that have not been approved by the Department of Education. In this regard, the results of the accrediting process are transparent.

Recognition by the Department of Education is significant because only institutions that have been accredited by a recognized accrediting agency are eligible for federal funds (such as research funding). In particular, only recognized institutions are eligible for access to federally funded and administered programs for student financial aid, and only in recognized institutions can students use federally acquired student assistance funding. To our knowledge, the only competency-based program that has been recognized is the College for America program associated with Southern New Hampshire University. This is open to considerable change in the near future, however, as the Department of Education has acknowledged the potential for competency-based education to provide skills development, shorten the time to completion, and reduce costs.

The difficulty in acquiring accreditation and recognition for competency-based education programs (also known as direct assessment programs) dates back to the Higher Education Act (HEA) of 1965. Under that Act student financial aid (from federal funding) was limited to programs in which credit hours or clock hours of instruction were the determinants of the degree or credential. Programs that required students to demonstrate competencies were not ineligible, so long as the program was offered in the format of credit hours or clock hours of instruction. However, competency-based programs that were grounded in self-paced student study were not eligible for federal funding.

In 2005 the HEA was amended to allow for programs in which direct assessment of competencies instead of credit/clock hours was the basis for the degree or credential to be eligible for recognition. The assessment criteria for such programs had to be consistent with the institution's accreditation, and approval was required from the Department of Education. To gain approval the institution was required, among other things, to demonstrate the equivalency between credit hours and the direct assessment program. In order to be eligible for approval, the amended HEA regulations also require that the entire program be a direct assessment program; hybrid models that combine direct assessment and credit hours are not eligible for recognition and federal funds. It would appear, however, that few institutions actually applied for recognition of CBE programs, either because they were unaware of the 2005 amendments or assumed the amendment did not apply to them. Consequently, in March of 2013 the Department issued a letter to institutions reminding them of the opportunity to have competency-based programs approved for eligibility under the guidelines for direct assessment programs, setting out the requirements for program eligibility, and encouraging applications.

Criticism of CBE

In 2007, Mulder, Weigel and Collins published a critical analysis of the concept of competence in the context of vocational education and training among selected member states of the European Economic Union. Tracing the etymology of competence to Plato and even to the Code of Hammurabi, the authors assert that the primary concern of the concept is with the "meaningful objectives and content of learning that will engender the personal development of students and position them within the domain of knowledge that can best prepare them to function effectively in society" (Mulder et al., 2007, p. 68). Despite the focus of the article, many of the critical comments they make about vocational education, arguably the arena in which CBE is most highly developed, apply to CBE more generally.

As noted above, there are numerous definitions of competence. For Mulder et al., the definitions can be located within three principal traditions or approaches: the behaviourist, the generic, and the cognitive. The former places primacy on "the importance of observing successful and effective job performers and determining what differentiates them from their less successful counterparts." The generic approach focusses upon "identifying the common abilities that explain variations in performance." The cognitive approach focuses upon the "mental resources of individuals that are used to master tasks, acquire knowledge and achieve a good performance" (Mulder et al., 2007, p. 69). Although not confined to these approaches, the conceptualization of competence exhibits considerable variety.

One of the consequences of the variety of conceptualizations is that it is difficult to achieve coherence. Mulder, et al. depart from their focus on vocational education to refer to the European Credit Transfer System in Higher Education. They specifically examine the Tuning Project's effort to conceptualize programs based upon learning outcomes that are described in terms of subject-specific and generic competences to facilitate program comparability. They argue that, "by mistakenly equating learning outcomes and competences," Tuning gives competences a "false objectivity" and raises the question of whether there is any coherence in the concept of competence (2007, p. 72; c.f. Lumina Foundation, n.d.).

Another criticism of CBE is that institutions might be pressured to graduate students in a timely fashion even though they might not demonstrate the required competencies (Cornford, 1997). While this might occur in any educational program (CBE or not), institutions using the CBE approach typically warrant that their graduates possess competencies required to operate in the professional context effectively. Failure of the graduates to demonstrate such competencies might lead to concerns regarding the credibility and the worth of the program and the certificate.

Others question the ability of the competencies to capture the complexity and diversity of professional activities. For example, Grant (1999) argues that:

> Behavioural objectives, or competences, can never describe complex human behaviour. The sum of what professionals do is far greater than any of the parts that can be described in competence terms. . . . The application of a corpus of knowledge with judgment to an individual client situation is the essence of professionalism. To replace it with prescriptions for behaviour, whether derived from academic debate, management teams, or randomized controlled trials undermines the core of the profession. (p. 273)

While Grant acknowledges that the competency-based approach might be appropriate for trades and vocational education, in his view, it is not suitable for "professions" such as medicine, presumably because they call for higher-order judgments and inferences. Another criticism of competency-based education lies in the attempts of the CBE to identify measurable units and tasks, which some authors consider to be artificial and reductionist (Blunden, 1996; Grant, 1999).

Mulder et al. (2007, p. 81) assert that their analysis confirms the critiques of Biemans et al. (2004) that:

- there are many conceptual definitions of competence and competency;
- there is an over-reliance on standardization of competences, whereas the power of competence-based education lies in its context-embeddedness;
- it is hard to integrate learning in schools with learning in the workplace, the concept of competence does not solve this automatically;
- specifying competences to be acquired by students does not automatically result in the design of effective learning activities;
- assessment of competences, especially in work situations, is a labour-intensive and time-consuming exercise;
- the extent to which the role of teacher (and student) changes can easily be overlooked when competence-based education is implemented; and
- in developing competence-based education, it is essential that structural attention is paid to the competence development of teachers and school managers.

To these criticisms Mulder et al. (2007) add a compendium of additional problems with CBE organized under the headings of competence and performance, competence and knowledge, competence and the curriculum, competence and instruction, and competence and the organization that, although focussed upon vocational education and training, apply in good measure to CBE in the context of professional preparation as well as to liberal studies. The points made include that: the connection between competence and performance is not direct; teachers of general subjects find it challenging to integrate those subjects with a CBE approach; it is challenging to determine whether competence has or has not been achieved (Mulder et al., 2007, pp. 81-82).

Other researchers suggest that the CBE approach can be "overly mechanistic and bureaucratic in its implementation" (Abbott & Huddleston, 2000, p. 221; also see Biemans et al., 2009; Boreham, 2002; Delamare, Le Deist & Winterton, 2005; Hyland, 2006; Frank et al., 2010). Such a detailed and atomistic approach might be difficult or unfeasible to implement (Boritz & Carnaghan, 2003). Moreover, Frank et al. (2010) caution that CBE might lead to students trying to fulfill the minimum requirements of competency to pass the program rather than trying to achieve excellence in their profession.

Efficacy of Competency-Based Education

Table 5 suggests a number of the implications of moving to a competency-based academic delivery model. These implications are likely to be reflected in costs associated with program set-up and/or ongoing operation. And while the CBE approach has been around for several decades, limited research is available regarding its efficacy, particularly with respect to costs. Although in this literature review we aimed to identify studies that examine the outcomes of the CBE programs, the results suggest that, while this topic has been explored at the level of individual courses, few researchers attempted to examine the outcomes of CBE initiatives at the system, university-wide or program-wide level.

In their study The MCH Certificate Program: A New Path to Graduate Education in Public Health, Bernstein et al. (2001) examine the impact of the program on 45 students who were in the first two cohorts of the program. Upon completion of the program, 50% of the students reported changing jobs or job responsibilities and moving to more advanced positions and job activities. Approximately one-third of the students enrolled in master's programs chose to continue their education. In interviews after graduation, graduates listed a number of benefits they gained, such as receiving higher salaries, finding a job, increased knowledge of professional issues, increasing confidence levels and self-esteem, and receiving more trust from the management in the organizations they work for. The study, however, does not provide any information as to how this information was obtained, the number of students who experienced the benefits listed above, and whether the benefits could be attributed to competency based education.

Another study from the medical field has examined the impact on students of the competency-based residency at Johns Hopkins Hospital (Long, 2000). Long reports that students in the CBE program master their key procedural skills twice as fast as students in a traditional program (in 18 months compared to 36 months).

While some authors talk about more general benefits, such as increased motivation of students and creation of inspiring environments, little empirical evidence is available for university- and program-wide initiatives (Bernstein et al., 2001; Litzelman & Cottingham, 2007; Ruiz et al., 2012; Smits, Sluijsmans & Jochems, 2009).

At the same time, although a number of authors indicated that little is known about the efficacy of the CBE approaches, many have speculated that the implementation processes might be costly and ineffective (Boritz & Carnaghan, 2003; Kamesh, Clapham & Foggensteiner, 2012).

With respect to institutional management, the transition from a credit-based system to a more flexible one, in which students move through the program by demonstrating the required competencies rather than completing a certain number of credit hours, provides logistical challenges to institutions. Frank et al. (2010) refer to this situation as "logistical chaos", questioning how and whether programs would be able to manage thousands of students moving through their programs at different speeds and through different pathways.

Calhoun, Vincent, Calhoun and Bransen (2008) highlight another challenge of the transition from a traditional approach to CBE: instructors and faculty members might lack knowledge regarding the pedagogical practices suitable for this new context and have limited knowledge of alternative assessment methods. The authors conclude that transitions of this nature might require new investments, both human and financial.

For instance, Brumm et al. (2006), who describe a CBE program implemented by the Agricultural and Biosystems Engineering Department at Iowa State University, report that implementation of their program required investments of additional resources in the form of professional development opportunities and time for teachers to develop and grade assessments. Costs and time are also identified as issues by Calhoun et

al. (2008), who reviewed literature on CBE and outcome-based education. The authors emphasize that institutions working on the development of new CBE programs will need either to adopt practices and approaches developed by others (which might not meet their needs) or make new development investments to create a program for their specific needs and contexts. However, Calhoun et al. (2008) do not provide any additional information regarding the potential costs and investments that might be required.

The subject of costs has also been discussed by Dath and Iobst (2010). They focus on the faculty development that should be established for CBE programs to function effectively. The authors argue that faculty development should be an integral part of the CBE programs and can be carried out in a number of ways, including faculty orientations, train-the-trainer opportunities, and workshops.

In the field of medicine, Dath and Iobst (2010) suggest that in order for CBE to become accepted and implemented, work at three levels is required: systems, institutional and individual. At the systems level, professional competencies can be developed by professional organizations responsible for licensing and accreditation. Schools can then provide workshops and professional opportunities and resources for develop CBE programs, as well as work with individuals to assist them in their transition to CBE. Other supports can be provided in the form of release time and mentoring activities to support individual instructors (Goldstein, 2005; Hardy & Deppe, 1995; Holmboe, 2011). All of these elements would be associated with increased costs.

The literature has also identified the development of assessments as a time and resource consuming process (Calhoun et al., 2008; Dath & Iobst, 2010). At the same time, all the publications that mention assessment components of the CBE have indicated that a reliable and valid assessment is crucial to the success of the CBE programs (Iobst et al., 2010)

Litzelman and Cottingham (2007) provide an overview of the Indiana University School of Medicine's initiative aimed to develop and implement a CBE program. The approach taken by IUSM was quite comprehensive and involved identification of competencies; development of assessments and experiences for all the competencies across courses; introduction of new teaching methodologies; incorporation of competency data in student transcripts and dean's performance appraisal letters; and development of new electronic system to track competencies and activities. While the authors do not provide much information about the cost of the program, they report that the program was internally funded. The main expenditures associated with the CBE initiative were the administrative support, infrastructure and leadership costs. The operational budget of the new office responsible for CBE across nine campuses was close to $1.3 million annually. An additional grant of $1 million was received to fund internal leadership, administrative support, and various special events. The paper also provides some anecdotal evidence regarding the impact of the CBE initiatives on students. Litzelman and Cottingham (2007) report that students (and faculty) expressed "full support" of the CBE concept. Student satisfaction with the overall quality of their medical education increased from 77% to 96%. Students also indicated that the CBE curriculum was one of the reasons they chose IUSM. However, the paper does not provide evidence beyond anecdotal stories to support these claims.

Summary

Although the number of studies that examine the efficacy and productivity of the CBE initiatives is rather small and the information is often limited to anecdotal descriptions, the review of the literature was helpful in identifying some of the key indicators and questions that can be asked to gather information about CBE initiatives. The review of the literature makes clear that there is no consensus about key aspects of competency-based education. There are differing views on (1) the definition of competency itself, especially as it should be applied in a model of competency-based education; (2) what distinguishes a competency-

based program from a more traditional one; (3) how to move from "competency" as a principle underlying an academic delivery system to competency as a feature in an actual academic delivery system; and (4) the relative costs and benefits of a competency-based education program or system.

It was of interest that we also found an evolution in the literature that considers the theoretical foundations for competency-based education models. Where traditional CBE programs were rooted in the acquisition of "hard" skills (e.g., those required for specific occupations), the newer literature suggests that programs should incorporate more of the "softer" or generic skills (e.g., literacy, numeracy) so that graduates will have greater ability to progress through their workplace over time and more flexibility to move across employers (or employments).

What is equally clear from the literature and from our case studies is that as competency-based programs move to the university sector it is not useful to describe them as either CBE or non-CBE. A more appropriate approach is to recognize that there is a continuum and that what may be identified as a CBE program can contain elements associated with traditional, non-competency-based education. By the same token, programs that we might think of as based upon traditional academic delivery models may contain elements of competency-based education. To express this notion and to make it operational, we have developed a matrix that can be used to differentiate, in a more nuanced way, among academic delivery systems with respect to where they place on the spectrum between CBE and non-CBE.

Table 3 illustrates the basis of this matrix, which captures seven features that are associated with competency-based education. Three are facets of how competencies are understood and employed in an academic delivery system; two refer to how the learning activity is understood; and two refer to the assessment of learning. We have also identified the end points of the spectrum for each of those seven features; that is, what would describe or characterize a CBE program and a non-CBE program. For any particular program (e.g., those programs surveyed in the case studies) we can determine where it sits on the spectrum with respect to each of the seven features. In this way we can convey what we might call the "CBE-ness" of a program. We apply this methodology to the case studies. In theory, if sufficient data were available it would then be possible to relate costs and productivity to "CBE-ness."

Table 3: CBE Continuums

Competency-based education	Not competency-based education
Specifically defined competencies	General performance outcomes
Competencies that are context dependent	Competencies that are context independent
Learning that is self-regulated	Learning that is regulated by others
Learners proceed on their own	Learners proceed in groups
High levels of proficiency (mastery) required	Threshold levels of proficiency required (minimum proficiency)
Assessments determined by stakeholder communities	Assessments that are determined by faculty who are the subject matter experts
Competencies defined in terms of knowledge/technique applied to work settings	Competencies construed as broad mastery over a body of knowledge

Productivity

A literature review was also conducted to consider the potential for an academic delivery system such as competency-based education to generate "efficiencies" or "productivity gains." This review of the theoretical and empirical literature on the economics of productivity and efficiency, and studies of productivity in the postsecondary sector, is presented in a separate, companion study to this review of competency-based education[6]. There we offer a more detailed look at production theory and its significance in understanding productivity for the postsecondary sector and in guiding the econometric work on efficiency in the sector.

What we find from this literature review is that the economic theory of production, costs, and productivity does not address questions of productivity and productivity growth from competency-based education. The theory establishes a framework by identifying technical efficiency, allocative efficiency, technological change, and economics of scale and scope as sources for productivity gains. To our knowledge, however, there are no studies that directly or indirectly examine the productivity of CBE (or, for that matter, any other specific method of delivering teaching and learning). The unit of analysis in studies of efficiency in postsecondary education is generally at the level of the institution or department, and the relative efficiency of particular modalities of teaching and learning are not evaluated. However, the framework provided by economic theory offers an approach to evaluating the potential for CBE to lead to gains in efficiency, as do the empirical studies. Appendix B provides a review of our approach through the environmental scan and survey of CBE programs.

Environmental Scan: Case Studies

To supplement information gathered through the literature review and to help contextualize that literature, our investigations turned to considerations of the actual practice of competency-based education. An environmental scan, employing case studies, was developed in order obtain specific information about postsecondary programs that use the CBE approach. For these studies a sample of CBE programs, selected in collaboration between *Directions* and HEQCO were considered. The programs to be surveyed and investigated in these case studies were those officially designated as "CBE programs." Our environmental scan focussed on a comparison of competency-based education with traditional methods of course development, delivery, and pedagogy. We were interested in whether the core differences between the two models of academic delivery from the theoretical context were sustained in practice. We were also interested in determining the scope for increasing institutional efficiency or productivity through the use of competency-based education (e.g., Kelly, 2009; Rowley, 2000; Rhoades, 2001; Sharma, 2011; Swift, 2012).

To implement the environmental scan *Directions* created a survey instrument. The substance and format for the survey were based upon a framework we have developed for the purpose of comparing academic delivery systems; in this case comparing competency-based education with traditional methods. The survey was also designed to collect information on whether more or fewer resources are required with competency-based education.

The survey canvassed five dimensions that we have identified as present in academic program delivery systems in postsecondary education. These are: (1) Program and Curriculum Creation and Development; (2) Program Delivery and Instructional Practices; (3) Student Assessment; (4) Support Services for Students and

[6] "The Economics of Productivity in Post-Secondary Education: A review of the theoretical and empirical literature." This may be found on the *Directions* website at www.directions-eprg.ca.

Faculty; and (5) Administration, Resources, and Institutional Funding/Finance. In turn, each dimension has a number of facets (or indicators) that, when actually realized by practice, give shape to that dimension. For competency-based education indicators were developed for each dimension and subsequently transformed into survey questions. Table 4 presents the five dimensions and associated indicators. The full survey is included in Appendix C of this report.

Table 4: Dimensions of Education Delivery Model

Dimension	Sample indicators
Program and Curriculum	Program objectives Definition of the core competencies Process of competency profile development/implementation Integration of CBE in units and courses Stakeholder groups responsible for curriculum/competency profile development Role of vocational/professional core problems in the curriculum
Program Delivery and Instruction	Mode of program delivery Factors determining the duration of a course Professionals responsible for program delivery Modes of incoming student orientation to the program Assistance available to students Teachers' role (coaches versus experts) Students' role Instructors' workload Available teaching assistance Assessment of fees
Student Assessment	Ways for students to demonstrate competency Role of Prior Learning Assessment Typical assessment tools Timing of assessment Stakeholders involved in the development of assessments Accountability Types of final projects used (work placements/practica/ capstones) Rights to appeal competency assessment
Faculty and Student Support Services	Financial Aid Supports provided to learners Advising services Registrarial services
Administration, Resources and Funding	Staff training and development Administrative resources Record keeping Library resources Financial planning procedures Sources of funding

The survey instrument also looks for information, for the various dimensions in the academic delivery system of CBE, about the potential for efficiency through CBE (relative to other modes of delivery) and the sources of efficiency gains. Two set of questions related to efficiency. One was to probe the potential for competency-

based education to enhance productivity and efficiency. The second was to explore the potential for competency-based education to reduce costs.

With respect to productivity, the survey identified ten possible means through which the introduction of a new mode of teaching such as competency-based education might lead to an improvement in efficiency and productivity. These sources for productivity were based upon the literature on the economics of production. The ten sources are:

- Allowing new, previously untried, technologies to be introduced into the institution.
- Allowing better use of existing – known – technologies or techniques.
- Allowing the institution to emulate best-practice methods that are found in other institutions.
- Allowing the institution to substitute less costly resources into the teaching/learning process.
- Allowing the institution to make more effective use of their current resources.
- Higher quality graduates, with no change in the resources used.
- Improvements in the accountability tools.
- Improvements in the administration, organization, and management of the teaching/learning processes.
- Allowing the institution to take advantage of potential economies of scale that result from larger size.
- Spreading costs by diversifying the range of degrees/diplomas/certificates offered.

For each of five main categories of teaching/learning activities noted in Table 4 the respondents were asked to indicate the extent to which each of the sources of productivity was relevant. The survey results with respect to productivity and costs are provided in the summary section below.

Programs at institutions that had been targeted for the sample were invited to complete the survey and, after a review of their response to the survey, to participate in an interview with one of the members of the *Directions* team. The survey responses and interviews, augmented by available print material about the institution, were transformed into case studies. Unless otherwise indicated, the information in this section was obtained through documentary evidence about the institution or program, a survey completed by an institutional representative and a subsequent interview with the institution's representative. Additional information was gathered through the institutions' websites, annual reports and other media.

Western Governors University[7]

Western Governors University (WGU) was established in 1997 by 19 U.S. governors as a stand-alone institution to deliver online competency-based education. WGU indicates that it is the only accredited, non-profit university offering online CBE programs. WGU has expanded to include three state universities: Indiana (established 2010), Texas (2011) and Washington (2011). In 2013 WGU Missouri and WGU Tennessee were added to the network.

At its founding, it was decided that WGU would not deliver humanities or social science disciplines since these were readily available through other institutions. It was also the opinion of the Western Governors that the disciplines of teaching, health, information technology and business were the most critical areas needed by employers and by society. General education courses are included in the curriculum but it is viewed that the skills primarily necessary for success in the workplace – e.g., cross-cultural competency, adaptive thinking, virtual collaboration – can be acquired through the study of each discipline.

As of June 30, 2012, there were 33,804 undergraduates and 7,984 graduates enrolled in the following programs: Business, Teachers College, Information Technology, and Health Professions. The university offers more than 50 bachelor, master's and post-baccalaureate programs. The average age of the student population is 37, with 68% working full-time and 13% part-time. 42% of registrants are first-generation university students.

Western Governors University is regionally accredited by the Northwest Commission on Colleges and Universities. The Northwest Commission is also responsible for the accreditation of other universities including the University of Washington, University of Oregon, Gonzaga University, University of Utah, University of Idaho, and Brigham Young University. Other accreditation for WGU includes the National Council for the Accreditation of Teacher Education, the Commission on Collegiate Nursing Education, and the Commission on Accreditation for Health Informatics and Information Management Education.

According to WGU, the primary mission of the institution is to "to improve quality and expand access to post-secondary educational opportunities by providing a means for individuals to learn independent of time and place and to earn competency-based degrees and other credentials that are credible to both academic institutions and employers" (WGU, 2013a). The institution was designed around five key themes:

[7] Other documents that were used to develop the section below include:

- Higher Education Coordinating Commission. (2012). HB 4059: Western Governor's University Report. Retrieved from https://ccwd.oregon.gov/studentsuccess/SSdocs.aspx?p=8
- Partridge, P. (2006). Western Governors University: Achieving greater competency and improved student outcomes. Career Education Review. Retrieved from *www.wgu.edu/about_WGU/1-07_career_education_review.pdf*
- Mendenhall, R. (2012). Western Governors University. In D. Oblinger, (Ed.), *Game Changers: Education and Information Technologies*. EDUCAUSE.
- Staker, H. (2012). The engine behind WGU: Configuration of a competency-based information system. An education case study. INNOSIGHT Institute. Retrieved from http://www.christenseninstitute.org/publications/the-engine-behind-wgu-configuration-of-a-competency-based-information-system/
- Contact North (n.d.). The game changers in online learning series. The Western Governors University. Retrieved from http://www.contactnorth.ca/game-changers
- Western Governors University. (2012). Annual report 2012. Retrieved from http://www.wgu.edu/about_WGU/annual_report_2012.pdf
- Lorenzo, G. (2007). Western Governors University: How competency-based distance education has come of age. *Educational Pathways*, *6*(7), 1-4.

responsiveness to employment and societal needs, a focus on competency-based education, expanding access, cost effectiveness, and development of a technology infrastructure (WGU, 2013b).

According to the Game Changers In Online Learning Series (Contact North, n.d.), WGU is characterised by a number of features, including:

- monthly admission
- online, individualized study tailored to the needs of each student
- courses developed around, and assessed by, specific competencies
- use of only external online materials
- individual, on-demand, regular, high quality mentoring
- accelerated tracks for students with existing competencies
- affordable
- self-financing through tuition fees
- nation-wide accreditation
- annual enrollment growth
- corporate partnerships
- focus on “underserved” students (above average proportions of first-generation, low-income, ethnic minority, rural students).

The section that follows describes the WGU’s delivery model using information from the document review, survey and the interview with an administration representative.

Program and curriculum development, planning and review

The program initiative and curriculum development is undertaken by curriculum councils consisting of experts in the private sector and academia who are responsible for identifying skills, knowledge and competencies required of graduates. For example, the Nursing Curriculum Council includes representatives from hospital chains and leading nursing educators. The council develops a set of high-level competencies that are passed to the working group of subject matter experts who then break the high-level competencies down into a set of 30 more detailed and specific competencies describing what graduates would be supposed to know and be able to do as professionals in occupation (Contact North, n. d.). This information is then provided to another group to develop program materials. Typically, this group would be comprised of instructional designers, program development managers, Courses of Study editors, product vendors, and assessment/project designers. The curriculum councils meet regularly to review the performance assessments of students. In addition, the councils are charged with confirming the validity and currency of competencies and adding or removing topics to be covered in the curriculum.

Program delivery and instruction

Enrolment into WGU is open monthly, with new students being accepted at “a rate of 2,000-3,000 per month” (Contact North, n.d., p. 2). To complete a program, students must master all competencies specified for their degree. Although students pay a fixed rate per term, they can take as many courses as they want (with a minimum of 12 courses per year being required). The courses are always open and allow for continuous enrolment; students can enrol in a course at any time. All courses are online and are flexible and personalized.

Assessment

According to the survey, WGU uses a wide range of assessments including exams, portfolios, practical demonstrations, and performances. In order to successfully complete a course, a student must satisfactorily complete all assessments and demonstrate mastery of the competencies (which can be demonstrated at any time during the course at the student's instigation). Students may also retake the competency assessments up to four times, with the third and fourth retake requiring faculty permission. At the end of the program students complete a final capstone project.

Faculty and student support services

In contrast with universities that appoint faculty to tenure and tenure-track positions, WGU faculty members are not tenured but employed on the basis of renewable contracts. In addition, there is no requirement for faculty to maintain a workload encompassing teaching, research and service (typically 40%/40%/20% or 33%/33%/33% in the traditional university context). Student performance (i.e., success) is a significant factor considered in the faculty renewal evaluation. Faculty members at WGU are not expected to do research in their field but may apply for internal support for pedagogical research projects. Faculty members serve as either course mentors or student mentors in the delivery of the curriculum.

All new faculty members are required to complete a three-month training program (pedagogy, assessment, technology) and, upon completion, are assigned to a team with a mentor. If a disproportionate number of students are not doing well in a course, intervention by a team leader may occur. Faculty are provided with a range of assistance including but not limited to tutorial leaders, graders, demonstrations built into learning resources, mentors and coaches.

Course mentors

Student support services are provided primarily through the course mentor and/or the student mentor. The course mentor is a faculty member who holds a doctoral degree. Course mentors help students with specific questions that arise and offer specialized instruction on challenging topics. Course mentors do not develop WGU courses, construct tests, or grade assessments independently but may contribute subject matter expertise to a larger course design effort that includes national directors, instructional designers, program development managers, COS editors, product vendors, assessment/project designers, and others who are primarily responsible for developing the online curriculum and assessment tools.[8]

The primary focus of a course mentor is, therefore, on the student (rather than course content). In instances where students appear to be having difficulty with the material, the course mentor will provide webinars and tutorials similar to traditionally delivered courses that equate to in-class tutorial sessions for groups of students. Course mentors are also available to meet with students. The regular monitoring of students by the student and course mentors provides the opportunity to identify students who are not progressing, to initiate an intervention to determine reasons for the lack of progress and to recommend a course of action.

Student Mentors

Upon admission to WGU each student is assigned a student mentor, a faculty member with a minimum of a master's degree. There are currently 650 student mentors, for an average student to student mentor ratio of

[8] http://www.wgu.edu/about_WGU/employment/1801-417_course_mentor_ed_leadership

60:1, although the ratio could vary by course and program. The student mentor monitors the progress of students in each course and maintains regular weekly/bi-weekly individual contact with students by phone or e-mail. While student mentors do not teach courses, they are the primary source of information about the program, its policies, procedures and expectations for students.

Student mentors are selected from individuals who are experts in the academic area selected by the student. Mentors are expected to be committed to student academic success and to be able to answer questions that students might have about the program and its content. They are also expected to assist students with time management and schedule benchmarks, and to help students identify and address their strengths and weaknesses. Mentors are required to possess good communication skills and be able to communicate effectively interpersonally, technologically, and in writing.[9]

In addition to academic advising and supervising, students also have access to a wide range of other support services such as counselling (including career counselling), identification of work placement opportunities, work placement supervision, library resources, and technological support. These support services are provided both through the student mentor and through university offices. The academic advice from student mentors often comes in a form of online counselling, degree audit report, mentorship opportunities, and tutorial, via web and email. By serving as the primary point of contact for each student for whom they have responsibility, the student mentor in effect becomes the face of the institution and diminishes or eliminates the need for the student to come into contact with many offices, e.g. registrar, financial aid, academic advising.

WGU asserts that it is aggressively seeking and implementing technologically-mediated approaches that bring students and faculty closer together by providing frequent, regular contact with each student through student mentors and course mentors. The mentors provide individualized support to students through webinars, online activities and tutoring. As a result of the broad scope of information WGU is able to gather on the progress of each student, it is piloting a model that would reduce student mentor contact to once per month. If a student appears to be performing adequately, mentor resources may then be deployed to focus on those students in difficulty. The goals of these initiatives include both retention and student success.

Examples of the measures that WGU has used, either through the introduction of new technology or better use of existing technologies, to assist in the admission, advising, monitoring and assessment of students, include:

- Following admission, and at each enrolment, students complete a pre-assessment to determine their level of knowledge in the subject area. By means of computerized testing, student and course mentors are able to determine a student's "point of departure" in each course.

- The WGU learning systems track the online activity of students every 15 seconds to create an audit trail that is then accessed by both the course and student mentors when reviewing a student's progress. This includes the frequency of access, participation in discussions, on-time and late course assignments.

- WGU negotiated aggressively with the publishers of e-textbooks to contain student costs. The tuition fee of $5,800 per year includes access to all e-text material – a significant advantage for WGU students. A recent survey of students in the US, Denmark, Germany and the Netherlands by e-

[9] Descriptions of the duties and responsibilities for course and student mentors are provided in Appendices D and E.

textbook publisher bookboon.com indicates that students in the United States spend on average $655 per year on textbooks, with 76.3% choosing not to purchase all required texts because of cost (Nawotka, 2012). In addition, Stanford University found that more than $100,000 was being spent, mostly by students, on course materials that could be found in the 1,200 databases in which the university had already invested significant financial resources to acquire and make readily available to its students (Rivard, 2013).

- E-publishers have agreed to provide analytics on each student's engagement with the material, frequency of accessing material, quiz/tutorial completion and results. When combined with other information on students (e.g., not meeting deadlines, pre-assessment quiz results), course and student mentors are able to essentially have a dashboard for each student for each course in which the student is enrolled. Students are advised of the collection of this information through the initial online orientation prior to beginning courses at WGU as well as through regular contact with their student mentors discussing problem areas in each course.

- For some math course but not yet across the entire curriculum, WGU has adopted the Carnegie Mellon Open Learning Initiative to guide the development of the courses. The courses are developed by a wide range of professionals including faculty, scientists, computer and software specialists. A computerized system plays the role of a tutor, providing ongoing feedback and instruction to students. The courses include assignments and other tutoring opportunities, and the information about student performance is "fed back into the system" and is used to improve the program and provide help to the student, instructor and the course development team.[10]

- Although WGU administration believes that the university performs well on the National Survey of Student Engagement, it is looking for ways to improve upon the online learning experience to create opportunities for students to become more engaged in civic activities – either with fellow students or community initiatives. They have now added a civic engagement expert to their National Advisory Board to identify opportunities to incorporate this into course curriculum.

The interactions between a student and course/student mentors are very important at WGU. According to WGU surveys, students consider their experiences to be positive. Mendenhall (2012) compared the measures of support and mentor interaction at WGU and other institutions, reporting that the "WGU scores compare well to peers and all other universities for questions about support and mentor interaction" (p. 122) (see Table 5 below).

[10] http://www.americanprogress.org/issues/higher-education/report/2012/06/07/11680/a-disruptive-look-at-competency-based-education/

Table 5: Measures of Support and Mentor Interaction

Measure	Component	WGU	Private non-profit universities	NSSE 2011
Student-Faculty Interaction	First Year	39.3%	34.4%	34.8%
	Senior	37.7%	41.8%	42.8%
Supportive Campus Environment	First Year	71.2%	63.4%	63.8%
	Senior	67.6%	60.0%+	60.1%
Quality of Academic Advising*	First Year	3.64	3.11	3.13
	Senior	3.64	2.96	2.98
Rating of Entire Educational Experience*	First Year	3.62	3.25	3.28
	Senior	3.58	3.23	3.27

*Mean National Study of Student Engagement (NSSE) scores on a four-point scale
Note: Adopted from Mendenhall (2012, p. 123)

Administration, resources, and funding

WGU is a non-profit university that receives no state funding. It states that "it is self-sustaining on a tuition fee of $5,800 per 12 month year for most programs" (WGU, 2012, p. 2). WGU also notes that tuition fees have not increased since 2008.

Providing affordable postsecondary education is one of the public policy objectives generally cited by US observers. Another is system capacity. The Lumina Foundation has defined one of the critical productivity outcomes of enhancements to the U.S. educational system to be expanding the capacity of postsecondary education within existing budgets while maintaining academic quality (Lumina Foundation, n.d.). This is based on the projection that the United States in the near future will require an additional 23 million graduates and the belief that it is unlikely that the current system can be scaled up to meet this demand.

WGU's own reports suggest that it is helping to meet the goal of increasing capacity and graduation rates. According to WGU's 2012 annual report, it has experienced an enrolment growth rate of 33% in each of the past five years, moving from an enrolment of 10,600 in 2008 to 33,800 in 2012. Over that same period, there has been a 53% per year increase in the number of students graduating, from 3,200 in 2008 to 16,900 in 2012. Information published by WGU also states that the average time to complete a bachelor's degree is 35 months, resulting in reduced financial and time commitments for graduates (WGU, 2012).

In an interview with a WGU administrator, the reduction in time to completion was attributed to a three key factors: (1) prior learning assessment and transfer credit assignment at the time of admission; (2) individual assessment at the beginning of each course; and (3) the ability of students to enrol in as many courses as they wish in each six-month term. Unlike universities where prior learning assessment or challenge for credit examinations are employed to determine whether full credit for a course may be granted, the WGU model employs personal assessment at the beginning of each course to determine partial or full competency, thus permitting students to accelerate through courses. The separate contribution of these three factors is not

estimated. WGU sees each of these factors as nested variables within a pedagogical model that enables accelerated learning, and does not attempt to track the impact of each variable.

While there is no independent or third-party assessment of the quality of its programs or its graduates, WGU asserts that it has met the goal of increasing capacity and output while maintaining academic quality. Further, in support of this claim WGU cites one of the precepts of CBE. Western Governors takes the position that CBE changes the model of traditional educational delivery, where instructional time is constant and mastery variable, to a model where time is variable and there is consistency of mastery across all students deemed to have successfully completed each course. WGU attempts to demonstrate its achievement of this goal through the following:

- WGU's performance on the NSSE survey indicates that its students are having better relationships with faculty (with average ranking of 6.14 for WGU seniors compared to 5.60 for national average), spending more time on academic work (4.84 and 4.43 for WGU and national averages respectively), applying more higher-order thinking skills, and feeling higher overall satisfaction than the national average (3.60 and 3.28 for WGU and national average respectively) (WGU, 2012).

- WGU points to the comparison of results of a 2011 Harris Poll Online survey of 508 new college graduates nationwide with a survey of WGU graduates to demonstrate the higher level of satisfaction of WGU graduates and their employers (WGU, 2012). For example, 94% of WGU students reported being satisfied with their experience compared to 87% of graduates nationally. 82% of WGU students indicated that the majority of competencies were related to work compared to 59% of college graduates nationwide. More WGU students reported benefits resulting from the degree including salary increase (42% for WGU versus 33% nationally), new position (34% versus 29%), and promotion (20% versus 9%) (WGU, 2012).

- WGU reports that on the Collegiate Learning Assessment examination for critical thinking, written communication and problem solving WGU seniors scored higher than 78% of seniors in participating institutions (WGU, 2012).

Accountability: Aligning stakeholder and institutional goals

WGU states that its curriculum was designed to meet the needs of adult learners – those already in the workforce who are attempting to improve their skills to be more competitive and advance their careers. The student profile of registrants appears to be meeting that objective; 81% of registrants are working full- or part-time and an average age of students is 37. It is also noteworthy that 76% of students fall into socioeconomic and ethnic groups viewed as being underserved by postsecondary education (WGU, 2012).

The development and regular review of the curriculum through the inclusion of experts from the private sector and industry reflects a desire to ensure that the curriculum is current and that required skills have been incorporated. The approach by WGU takes the position that its model of CBE achieves the alignment of stakeholder and institutional goals through:

- an outcomes based curriculum;
- transparent and assessable learning;
- student-centric approach via regular contact with course and program mentors;
- a curriculum open to acceleration on the basis of prior learning and self-pacing; and
- an innovative, affordable delivery model for customizable learning at scale.

Cost savings

WGU maintains that its delivery of academic instruction and services is cost effective. A key factor in this assertion is the role played by faculty in the WGU academic delivery model. Table 6 below, taken from Mendenhall's review of the WGU model (2012), summarizes the differences that Mendenhall found in WGU's approach compared to a more traditional delivery model.[11] Mendenhall suggests that because the faculty role at WGU is disaggregated (with different people performing different roles), this model allows the institution to serve more students at a lower cost and is effective and scalable.

Table 6: Educator Responsibilities at WGU

Faculty role	Alternative approach at WGU
Delivery of instruction	Technology delivers instruction
Course design	WGU does not create its own courses or content but rather uses third-party curriculum
Selecting learning materials	Specialized role where faculty search and select the best online learning resources for each assessment
Assessment design	WGU's Assessment Department meets with councils in each college to determine competencies, then designs assessments to measure each competency
Content help or office hours	Subject-specific mentors (called course mentors) are available for one-on-one and one-to-many sessions reviewing content with which students need more help than can be had through independent learning
Mentoring	Student mentors communicate regularly with students to counsel, advise, coach, organize, and motivate remotely
Grading	Part-time faculty are hired only to grade student assessments and are trained to grade based upon a specific rubric

Note: Taken from Mendenhall (2012, p. 121)

The table points to a number of cost drivers that could result in lower costs: (1) technologically-mediated instruction; (2) specialized roles for faculty (thus allowing increased productivity by concentrating on a limited number of tasks); (3) centralization and specialization of some tasks that would otherwise be provided by individual faculty members; and (4) substitution of lower-cost faculty resources for higher-cost ones. No systematic analysis of whether such cost savings have been realized is available.

In addition, review of WGU documents and reports and the insights from the interview indicate that the costs and potential savings vary across different components of the program. Because it is an online delivery

[11] We should note that our review suggests one difference from Mendenhall's table. In the area of course design WGU would claim that while they may involve third parties in creating curriculum, they do create their own curriculum through their curriculum councils. The councils are drawn from private sector and academia, and are responsible for identifying the skills, knowledge and competencies required of grads. This information is passed along to instructional designers, program development managers, vendors and assessment/project designers. The course mentor may or may not have a role in developing the material to be delivered or in determining how the assessment is to be undertaken.

system, significant savings on capital expenditures for classroom space is possible. On the other hand, because of self-pacing and the student-initiated determination of when final assessment in a course will occur, the investment required to develop flexible curriculum and assessment tools appears to be substantial. As well, costs will be incurred for providing the necessary pedagogical training for faculty and for the information systems required to deliver course material and monitor students' progress. Ongoing training of both course and student mentors in pedagogical and advising functions should also be considered in evaluating the productivity of the WGU model. WGU appears to be a very centralized model from the perspective of curriculum and course development while the functions of academic advising and the dissemination of administrative information is decentralized and brought closer to the student through student mentors.

Southern New Hampshire University: College for America & SNHU School of Business[12]

Southern New Hampshire University (SNHU) is a private institution founded in 1932. It has an undergraduate enrolment of 7,351 and its 2012/13 tuition fees were $28,050. U.S. News College Rankings (http://colleges.usnews.rankingsandreviews.com/best-colleges/southern-new-hampshire-university-2580) provides the following information on SNHU:

> The student-faculty ratio at Southern New Hampshire University is 21:1, and the school has 63.0 percent of its classes with fewer than 20 students. The most popular majors at Southern New Hampshire University include: Business, Management, Marketing, and Related Support Services; Psychology; Social Sciences; Communication, Journalism, and Related Programs; and English Language and Literature/Letters. The average freshman retention rate is 71.0 percent.

In January 2013, SNHU established College for America, a fully online institution offering CBE programs to those wishing to complete an Associate Degree (the only degree offered by CFA). College for America is a stand-alone, separate from other faculties and departments. College for America has adopted many of the course delivery and staffing models used by Western Governors University, such as student mentors/coaches and competency assessments. According to the president of the Southern New Hampshire University, the mission of College for America is to implement a “new approach to college for a new American work force: accessible, affordable, relevant” (LeBlanc, n.d.).

As noted earlier, in March 2013 the U.S. Department of Education reminded institutions that an amendment had been made to the Higher Education Act, allowing accredited instructional programs that use direct assessment of student learning, in lieu of measuring student learning in credit hours or clock hours, to be eligible to receive federal funds, including student assistance. In April 2013, College for America announced that it had "obtained approval from the U.S. Department of Education (DOE) to be eligible for Title IV, Higher Education Act (HEA) funding. College for America’s competency-based model is the first in the nation to be approved by the Department of Education under direct assessment provisions that pay for actual learning

[12] In addition to the survey and interviews, other sources used in this section include:

- Kazin, K. (2012). Bringing Higher Education to Where Students Live and Work. Retrieved from http://net.educause.edu/ir/library/pdf/NG1228.pdf
- College for America. (2013). Website. http://collegeforamerica.org/
- LeBlanc, P. (n.d.). College for America at Southern New Hampshire University. Retrieved from http://collegeforamerica.org/site_images/College_for_America_Presentation.pdf\

versus seat time".[13] Students enrolled at U.S. colleges and universities included under Title IV are eligible to receive federal financial assistance. College for America has set its tuition fees at $2,500 per year, significantly lower than those of SNHU.

College for America is still at the nascent stage but it has aggressive enrolment targets. Dr. K. Kazin, Chief Academic Officer of College for America, stated in her article "Bringing Higher Education to Where Students Live and Work" (2012) that College for America anticipated a first-year enrolment of 500 but projected that it will serve 100,000 students in the first five years. The author also projected that 5,000 low-income students will have graduated by 2017. According to the article, the College planned to target working adults with little or no college education and partner with employers in the community where mentors would support students in the workplace. College for America aimed to reduce the cost of delivery to below $5,000 for a student completing a two-year Associate of Arts degree.

Kazin (2012) identified the following characteristics of the College for America delivery model:

- competency-based;
- flexible (time variable, learning defined);
- extremely low cost;
- self-paced and self-directed, student-centered;
- year-round enrolment;
- use of open educational resources;
- community mentors and peer networks for student support;
- e-portfolios to demonstrate and document competencies;
- Dynamic Knowledge Map to track students' progress. This is an accessible, real-time, online transcript that provides details on a student's success in mastering the required competencies;
- An algorithm for mapping competencies to traditional course credits, enabling students to carry credits to traditional universities.[14]

In her article Dr. Kazin provides the following details regarding the CBE model for College for America:

> With the help of a coach, each student charts a path through the 90 competencies, accessing curated learning resources that accompany each task. Once a student has satisfactorily completed a task, his or her progress is immediately reflected in a dynamic, online Knowledge Map. Evidence is key. An e-portfolio contains all student artefacts along with the rubrics used to score them. The result is a clear picture of a student's capabilities in terms defined not by course numbers but by skills employers understand. After graduation, those competencies can be mapped to traditional course credits for students who wish to transfer to a four-year institution.
>
> The model hinges on the assumption that students can and will take control of their own learning. To ensure their success, SNHU has designed a multilayered student support model.

[13] http://collegeforamerica.org/latest/entry/a-milestone-for-competency-based-higher-ed

[14] While it is still too early to comment on 'transfers out' at College for America, it might be noted that the algorithm was developed because CFA anticipates that students will move to a college/university to pursue their baccalaureate after they complete their Associate Degree. In contrast, WGU has not developed an algorithm for transfers out. Rather, WGU would work directly with other institutions to resolve problems for students who do transfer. WGU may also see the demographic they are serving (i.e. adult working students looking for credentials for the labour market) as less likely to transfer to other institutions.

> Students can interact with peers using social media tools and virtual networks; an SNHU coach helps hold them accountable to their individual mastery plan; and each learner identifies an accountability partner from the family or community as well as a workplace mentor.

The first graduate of College for America was awarded his degree in August 2013, having completed his program in just three months.[15]

SNHU Business School hybrid CBE model

The SNHU Business School has been identified in the literature as one of the exemplary CBE programs. SNHU has been offering a hybrid CBE program in its business school for several years. This program permits students to accelerate and graduate with an honours degree in three years, saving the equivalent of one year of the SNHU tuition fee. A school representative interviewed for this study describes their program as being in the middle between a traditional model and a full CBE, such as one would find in the College for America.

The three-year honours degree program began in 1997 with a grant from the Department of Education. The goal was to develop a curriculum that was more cost effective and provided more applied learning. The move to a competency-based curriculum was initially championed by the then-dean of the SNHU Business School, Martin Bradley, co-author of *Saving Higher Education: The Integrated, Competency-Based Three Year Bachelor's Degree Program.*

Dr. Bradley's approach (2011) is outlined in the following excerpt from the book:

> To successfully rethink traditional measures such as seat time or contact hours, an appropriate substitute must be used, such as competencies. It is remarkable what can happen when the bond is broken between credit and seat time. Now, credits can be based upon learning outcomes rather than hours spent in the classroom. An integrated, competency-based program that is predicated upon achieving certain knowledge and skills allows the redesign of a four-year curriculum so that it can be delivered in three years without any dilution of academic quality and at a cost savings for both students and the institution.
>
> While this is easier said than done, nevertheless, data supports the notion that an integrated three-year program based on competency and learning outcomes can deliver a high-quality education to students in six semesters without additional semester, summer, or weekend courses. The challenge is to identify the set of competencies and to organize and deliver a curriculum that aligns learning activities with these competencies. Moreover, robust assessment procedures are needed to assure that all the learning goals are properly met. (Bradley, Seidman & Painchaud, 2011, p. 6)

Program and curriculum development, planning and review

The mission of the business school is to develop and implement "high quality, innovative, leading edge, competency-based business curricula that meet the changing needs of students, business, government and society" (SNHU, 2013). The program and curriculum design is guided by ten sets of competences including:

[15] See http://www.insidehighered.com/news/2013/08/16/new-form-competency-based-learnings-first-batch-graduates

- Communication;
- Information technology;
- Problem solving;
- Teamwork;
- Analytical skills;
- Global orientation;
- Legal and ethical practices;
- Research;
- Strategic approaches;
- Leadership.

The list of competencies was initially developed in consultation with employers in 1997 and there has been regular consultation with employers since. Systematic contact with alumni regarding their preparation for employment also provides feedback on the relevance of competencies. According to the survey, the development of competency profile is reviewed and improved continuously, on an annual basis.

Program delivery and instruction

The three-year honours face-to-face program consists of six semesters, with no courses offered in the summer or evening. Students do not have the option of enrolling in elective courses, since the elements of many electives are incorporated into the curriculum and assessed through assignments, such as weekly presentations. Students earn credits based on competencies completed.

Of the 1,250 students enrolled in the business school, 105 are enrolled in the three-year honours competency-based program. The program is expanding by 66 students in the fall of 2013 to offer a three-year non-honours stream.

Students in the three-year honours program complete their classes in the Fall and Spring terms one week earlier than their counterparts in the four-year program. After writing examinations, the students participate in a week-long case analysis (three credits in weight) that is tied to the material covered in the term. Faculty members determine the cases to be studied and assess the performance of students during the week. Assessments focus on competencies including teamwork, communication skills and leadership.

Faculty and student support services

According to the survey, the courses are taught primarily by full-time faculty, with some teaching by part-time faculty. Faculty are responsible for presenting the content of the program, and students are primarily recipients rather than presenters. The school is very selective when assigning faculty to teach courses in the three-year honours program. Being chosen is viewed as a privilege. Faculty are assigned on the basis of their commitment to the pedagogy and their ability to relate to students. Good relationships with students and fellow faculty members are necessary to create a supportive learning environment. Each course typically enrols 11 to 20 students, and faculty members are expected to teach seven to eight courses in a twelve-month period. Faculty members are provided with support, including classroom and teaching spaces, offices for course instructors and mentors, library resources, computer labs and other teaching-technology resources and teaching materials.

While training is optional, faculty members are encouraged to participate in training opportunities which tend to focus on development of competency profiles, student assessment tools, program evaluation, pedagogy,

and use of technology. All new faculty members are encouraged to read *From Teaching to Learning: A New Paradigm for Undergraduate Education* by Barr and Tagg (1995).

The faculty and program provide a range of assistance to students. Faculty members act as a team throughout the year, scheduling regular contact with students and providing feedback. At the beginning of each week students “huddle” with faculty to identify activities, events and other initiatives students will undertake in the coming week to engage with the community within and outside of the business school. Participation in these activities earns an additional six credits towards the degree. Credits earned in this manner are graded as Satisfactory/Unsatisfactory, while academic courses receive a specific grade.

Students are regularly interviewed to determine their understanding and progress. Their feedback about course work is solicited by faculty members who take those comments into account in course revisions. Students are also encouraged to undertake self-assessment. Similar to the practice at Alverno College (described below), the feedback and self-assessment has helped to reduce the likelihood that students will be unsuccessful.

Other assistance available to students includes office hours (or other regularly scheduled opportunities for students to meet with instructors); faculty members holding consultations outside of office hours; special consultations before and/or after students undertake an assessment; online consultations and meetings (e.g., e-mail, teleconferencing, video conferencing, social media), and mentor groups led by senior-level students

Assessment

Students pay fees for each term in which they are registered. In order to complete a course successfully, students must demonstrate minimum proficiency on the competencies. The program employs a range of assessment strategies including written and oral examinations, portfolios, observations, self-evaluations, employer evaluations, and formal presentations to clients/board members. If a student cannot demonstrate a required competency, they have to complete an alternate experience, course or activity and complete another competency assessment. As a final project, students are required to complete the senior honours capstone experience with their graduation depending upon successful completion of all course and course competencies.

SNHU does not have a “narrative transcript”.[16] SNHU made the decision early in the development of the program that students would receive a transcript that would mirror traditional programs. This was done to facilitate portability of credits to other institutions and application to graduate programs. For example, the weekly 'huddling' activity is recorded on the student's transcript as the course "Social Environment of Business", which carries a three-credit weight.

Student Affairs has acquired software to begin offering SNHU students a co-curricular record that tracks their participation in activities and clubs. Using the same software, students may also record their reflections on learning and skills acquired through their experiences.

Administration, resources and funding

We have briefly described some of the program support provided to the students by the faculty. Further support services are available and include counselling, including career counselling, identification of work

[16] See the section on Alverno College for a description of the narrative transcript.

placement opportunities, workplace supervision, library resources, computer labs, student learning spaces, technological support, and program advising and mentoring. The program uses different media to communicate and support students, from online advising to face-to-face workshops and individual sessions to degree audit reports.

Accountability and cost-effectiveness of the model

The representative of the program interviewed for this study believed that the accreditation agencies have significantly increased the university's reporting requirements. The SNHU Business School has had a positive relationship with their regional, national and European business accreditation bodies who, according to the interviewee, described SNHU as a model of good practice. From the perspective of the Business School, European accreditation represents international recognition and portability of credential in a global business environment.

The interviewee expressed the view that the activities undertaken to deliver and support their hybrid program likely are more expensive than a traditional program. A number of areas for which marginal cost per student was "somewhat higher" compared to a non-CBE program were identified, including: course maintenance; provision of the course materials; instructor time; instructor training and professional development; IT; delivery and assessment; marking; enrolment tracking and management; registrarial systems; recruitment and admissions (including transfer credit assessment); and space planning and allocation. However, the program representative believed that the hybrid CBE program has given SNHU state-wide and national exposure as a forward thinking institution that (a) introduced a program that achieved the objectives of reducing tuition costs for students, (b) is seen by its state legislature as more efficient, and (c) produces graduates that were well prepared for the workplace.

Alverno College[17]

Alverno College is a Roman Catholic, four-year, (self-described) independent, not-for-profit liberal arts college located in Milwaukee, Wisconsin. It was founded by the School Sisters of St. Francis in 1887 (Alverno College, 2012). It is primarily a women's college but does offer a co-educational graduate program. In fall 2011 enrolment was 2,605. Alverno reports that a high percentage of its students are first-generation, low-income individuals who work many hours part-time (some full-time) to meet educational costs. Alverno has 120 full-time faculty and 125 adjunct faculty, as well as a number of contract faculty. Tuition fees range from $7,980 to $13,224 per semester depending upon program. The College representative interviewed for this study provided the following information on Alverno's programs:

> Alverno refers to its curriculum as ability-based and has been offering it since 1973. The impetus to move to this type of program came from within the faculty. It took 1.5 years prior to the initial offering to develop learning outcomes, course and program curricula and approaches to assessment. In the early stages, every Friday afternoon of the year was committed by faculty to curricular or discipline work. When adopted, not all faculty were supportive or receptive to CBE and a number chose to leave. The faculty of Alverno undertake research primarily in the field of education and pedagogy so CBE fits with their interests.

[17] In addition to interview and survey, additional information for this section was obtained from the Alverno College website.

Alverno is said to have modeled its introduction of an ability-based curriculum on the experiences of the Catholic University of Temuco in Chile. There, CBE was introduced gradually by having 10 to 12 departments across the university serve as the original innovators. Building upon the experiences with successful and unsuccessful applications, the CBE curriculum was phased in across the university. This approach, championed by Alverno faculty at the departmental level, was central to developing and implementing the curriculum across the university

The College identified the following of key characteristics of their delivery model:

- Ability-based;
- Focused on student outcomes integrated in liberal arts approach;
- Flexible;
- Affordable (Alverno College, 2013).

Program and curriculum development, planning and review

The survey respondent describes Alverno's programs as competency-based educational activities leading to a degree, diploma or credential. The curriculum is described by Alverno as "ability-based" (Alverno's rubric for CBE) and focused on student outcomes integrated in a liberal arts approach. The eight abilities are: communication, analysis, problem solving, valuing, social interaction, developing a global perspective, effective citizenship, and aesthetic response. The goal of the program is to develop broad-based general knowledge and skills as well as acquisition and application of disciplinary and employer-specific and/or occupation/profession-specific knowledge and skills.

Several sets of outcomes have been developed: general outcomes at the institutional level and program/major outcomes that are specific competencies. In addition, a competency profile has been developed for the program as a whole and for each of the experiences or courses included in the program. Competencies were developed by the faculty with input from and consideration of a variety of sources (e.g., employers, outside experts, accrediting bodies, literature reviews, needs of society). College faculty and administration are responsible for program structure and content and the curriculum is reviewed and revised on a continual basis.

According to the interviewee, the learning outcomes of traditional and CBE programs are similar, e.g., development of communication, analytical skills and ability to function effectively in a diverse environment. However, learning outcomes of CBE college programs are more aligned and responsive to the community. CBE institutions bring in representatives from the communities that have been hiring their graduates, e.g. non-profit organizations, to comment on the learning outcomes of courses and programs. Specific training is also provided to the representatives to help them better understand the learning process. These same 'experts' are called upon to assist in program evaluation. Experiential learning opportunities are also incorporated into the curriculum with the community, assisting in the assessment of the student's integration of their learning. These initiatives create a greater engagement of both the faculty and the community.

Program delivery and instruction

The courses are delivered face-to-face through classroom instruction, with most courses being taught by full-time faculty and some by part-time faculty. Each program begins with an introduction to program objectives and competencies, with discussion of how the objectives and competencies are linked to professional context. The typical number of students for a course is approximately 20-30. The Colleges offers a wide range of majors and minors as well as pre-professional programs designed to prepare students "for entry to graduate

professional schools in law, medicine, veterinary medicine, pharmacy, physician's assistant and dentistry" (Alverno College, 2013).

Assessment

To complete a course successfully, students must complete all assessments and demonstrate mastery of the competencies. Depending on the program and course, work placement may be required. Across courses and programs a range of assessments is used, including written and oral examinations, portfolios, observations, performances, prior learning assessments self-evaluations, and evaluations by employers and external assessors.

Students are allowed to demonstrate competencies throughout the course as part of the course expectations/assignments/requirements. If they were not successful in demonstrating mastery of the competencies, students can retake the competency assessment (with typically 2 or 3 retakes being allowed). At the end of the program students complete a final capstone project.

Alverno employs a "narrative transcript" – a 1- to 1.5-page document that is organized by major program of study – to explain how each learning outcome is accomplished, with specific examples provided by the individual student to personalize the narrative transcript. Faculty members in each department write the narratives that are then combined by administrative assistants. Prior to being submitted to the Registrar the narratives are reviewed by the Provost's office. Faculty members are expected to prepare narratives within 60 days of a student's graduation. Narratives are only prepared for senior level courses as determined by the department.

Alverno also uses a grading system of Satisfactory and Unsatisfactory. The final transcript produced after graduation only reflects courses with a Satisfactory evaluation, plus the narrative transcript. The narrative transcript from Alverno provides students with a document that can be given to employers. The concept of providing a more traditional transcript along with a competency report has also been adopted by Northern Arizona University (see below).

Student self-assessment, reflecting on learning that has occurred, is built into the curriculum. Students gain an understanding of self-assessment within the context of specific criteria and subsequently develop personal plans for improvement. At Alverno, students are employing these techniques not only within the classroom but in other aspects of managing their life. The development of the self-assessment, combined with regular feedback from faculty, has served to minimize the number of academic appeals at the end of term – a significant savings in administrative overhead. According to the interview, students are better prepared to enter the workforce, thus providing a higher return on investments in education to offset university costs.

The College representative also felt that "once you have the outcomes and assessments in place you can better allocate your resources." An example of this was how they examine the performance of students in first year, utilizing their assessments/faculty feedback protocol. They analyze the difficulties students are encountering and make changes to courses at the classroom level. Alverno College's protocol of modifying programs to help students encountering difficulty is unusual. Most retention programs focus on identifying the students who are experiencing academic difficulties and providing those individuals remedial assistance. This assistance is typically either tied to study skills (time management, reading effectively) or additional assistance in the course (peer mentoring, supplemental instruction groups), rather than adjusting the course itself.

Faculty responsibilities and support

The average teaching load at Alverno is 12 credits with most courses taught by full-time faculty; there is some teaching by part-time faculty. Faculty time is also devoted to evaluating and enhancing existing curricula and to the introduction of new courses. The effort required for faculty collaboration on developing a cohesive curriculum that has been mapped against institutional, degree and program learning outcomes is significant and costly. It is dependent upon faculty goodwill, with incentives such as course release if required.

To assist in course delivery faculty members are provided with offices, classroom and teaching spaces, teaching assistants (depending on course enrolment), library and computer labs, IT resources, teaching materials and funding for research projects. Mandatory additional training is required and covers such topics as development of competency profiles, curriculum development and assessment, program evaluation, pedagogy, and use of technology.

In addition to providing regular fora for faculty within programs to meet and discuss curriculum and assessment, the university is committed to faculty development through their "institute sessions." The sessions occur over two to three days in August, January and May. All faculty meet to review curriculum and assessment concerns. These sessions also serve to orient new faculty into the pedagogy.

The criteria for tenure and promotion of faculty emphasize student learning, with a focus on the faculty member's role in curriculum development and student feedback. A copy of Alverno's *Criteria for Academic Rank* is attached as Appendix F.

Student support and resources

Alverno offers considerable resources and supports for students. Faculty and mentors provide a wide range of assistance and support to students throughout the program. Included would be such things as online and face-to-face meetings and consultations, regular office hours, special consultations before and/or after students undertake assessments. Assistance is also available from faculty who are members of a college-wide Instructional Services Department.

Students have access to library resources and computer labs, student learning spaces, technological support, work placement supervision, identification of work placement opportunities, academic advising and supervising, peer mentoring and support from Instructional Services Department.

Accountability and retention

Seven years ago the regional accreditation agencies included a requirement of defined learning outcomes and methods to demonstrate achievement of those outcomes. However, the agencies have not been prescriptive about the assessment tools to be employed. In addition, agencies have not attempted to assess the merit of the assessment tools; they only require that an institution demonstrate that it has implemented tools. The Alverno interviewee was concerned about the use of standardized tools such as the Collegiate Learning Assessment because they do not address the achievement of learning outcomes at the course level and it is difficult to interpret results at the program level.

Information regarding retention rates of the program was only available via the interview with the College representative. Alverno is satisfied with first-year retention rates but is concerned about attrition in the sophomore year. This matter is now under study by the College.

Northern Arizona University[18]

Northern Arizona University (NAU) is a public university located in Flagstaff, Arizona. It is accredited by the North Central Association of Colleges and Schools and has 36 satellite campuses in the state of Arizona. The university offers both undergraduate and graduate degrees. 26,002 students were enrolled as of fall 2012. In 2013, the annual tuition fees for first-year students in the traditionally delivered degree programs were $8,871 (in-state) and $21,226 (out-of-state).

Northern Arizona University (NAU) has just launched its competency-based Personalized Learning degree. As of July 2013 it had been operating for five weeks with eight students registered. NAU's Personalized Learning option offers degrees in computer information technology, liberal arts and small business administration.

Fred Hurst (n.d.), Senior Vice President of Extended Campuses, identifies the following characteristics of the NAU program:

- Competency-based;
- Personalized;
- Multiple instruction options;
- Mentoring;
- Interdisciplinary;
- Low cost;
- Self-based.

Program and curriculum development, planning and review

The NAU program is described by the respondents as a series of competency-based educational activities leading to a degree, diploma or credential. The program aims to help students develop a broad range of skills and knowledge, including acquisition and application of general, disciplinary, and employer or occupation/profession-specific skills and knowledge.

NAU's Personalized Learning program has created a competency profile for the program as a whole and for each of the experiences or courses included in the program. The competency profile was developed by the faculty and administrators. According to the University representative, they found it difficult to develop the curriculum for the liberal arts degrees. They mapped the competencies, identified learning outcomes and translated these into the competencies. In a discussion of the semantics of "learning outcomes" and "competencies" the interviewee agreed that it was difficult to differentiate between them and that any differences would likely be subtle. One consideration was that a competency-based approach provided more concrete benefits, as students would be evaluated on having achieved, or being able to duplicate, specific

[18] Other documents used in this section include:

- Hurst, F. (n.d.). Competency based learning at Northern Arizona University (& New USDOE rules). Retrieved from http://wcetblog.wordpress.com/2013/03/19/northern-arizona-university/
- Fain, P. (2013). Competency-based transcripts. *Inside Higher Ed*. Retrieved from http://www.insidehighered.com/news/2013/08/09/northern-arizona-universitys-new-competency-based-degrees-and-transcripts
- Northern Arizona University's Personalized Learning. (2013). EDUCAUSE Review ONLINE. Retrieved from http://www.educause.edu/ero/article/northern-arizona-universitys-personalized-learning
- Northern Arizona University website

competencies. It was also felt that in a competency-based approach faculty are challenged to think about the curriculum in new ways.

Program delivery and instruction

NAU has hired a number of faculty and staff from Western Governors University to assist in the development and administration of the curriculum.[19] They have also adopted a number of the policies and practices of WGU. For example, students enrol in six-month terms at a fixed cost of $2,500 per term, and may enrol in as many courses as they wish in each term. NAU has a very aggressive enrolment target of 8,000 students in two years. Federal aid for the program has not yet been approved but they have 700 prospects on file that could become registrants once aid has been approved.

The program is delivered entirely online. While there is no 'teaching' in a traditional sense for the courses, mentors are available to guide students through the curriculum. At the beginning of the program, an introductory unit in the program introduces students to the program objectives and competencies, and explains how the objective and competencies are linked to professional context.

The program is self-paced and students can receive credit for formal learning obtained elsewhere (e.g., courses from other institutions, examinations). Before being admitted, students complete a readiness assessment to determine their fit with the program.[20]

Faculty and student support services

Faculty are selected on the basis of several criteria. Faculty should have an ability to interact with students and a desire to work in a CBE environment. In addition to academic qualifications, it is preferable for faculty to have practical experience in their area. For example, in the CIT program prior work as a computer information technologist would be important. Faculty in the liberal arts program are expected to employ an interdisciplinary approach. The normal teaching load is two courses per term.

To assist with the delivery of the program, faculty members are provided with a variety of resources, including classroom and teaching space, library and IT resources, teaching materials, and professional development and funding for research projects.

Similarly, the university provides a number of support services to students, such as academic supervision and mentoring, library resources, learning spaces and computer labs, technological support, and identification of work placement opportunities.

According to the survey, faculty members are expected to conduct research, for which some funding is available. NAU believes that CBE provides an opportunity for the university to protect research-focussed faculty because they can be released from teaching a traditional course. Their efforts can be devoted to developing courses to be delivered online, while mentors take over the work of liaising with the students.

[19] Given their history and rapid growth, WGU is seen as a leader in the field and a model for development. Southern New Hampshire University also hired WGU staff to assist in the development of College for America.
[20] For more details, see Northern Arizona University's Personalized Learning, 2013, at http://www.educause.edu/ero/article/northern-arizona-universitys-personalized-learning

Assessment

The program employs a range of assessments including portfolios, self-evaluations, written and oral examinations, prior learning evaluation and observations and performances. In order to successfully complete a course, students must demonstrate mastery of the competencies. Students can demonstrate their competency at any time during the course at their instigation. If a student was not able to demonstrate the competency the first time, they can retake the assessment as any times as needed. At the end of the program students are expected to complete a work or practicum placement and/or capstone project.

Like Western Governors, students must achieve 86% proficiency (letter grade A recorded) in a course in order to complete the course. Students, in concert with advice from their mentors, determine when they wish to complete the final competency assessment in each course. Students may attempt the assessment as often as required to meet competency standards and there is no fee for multiple attempts. NAU issues a transcript indicating the courses that have been completed with an “A proficiency,” along with a report of competencies acquired.[21]

NAU believes that CBE gives students the capacity to reproduce a skill set in an employment setting. Through self-assessment – "coming to know yourself" – students learn how to learn and how to analyze and apply that learning, e.g., understanding how to develop and transfer skills to a business setting through the study of Shakespeare. All assignments contain elements of self-assessment that is reinforced through contact with mentors.

Administration, Resources and Funding

Much like Southern New Hampshire University, the Personalized Learning degree program at NAU is administered by a separate department within the university. This department has its own aggressive enrolment and revenue targets. Significant resources have been invested in curriculum and systems development to deliver the curriculum. NAU's financial plan projects full cost recovery within two years in order to generate profit for investment in the program and in other areas of the university. NAU also believes that there will be lower administrative costs as there are no scheduling responsibilities, i.e., time, space, exams (final competency assessment). It was also noted, however, that a significant up-front cost was incurred because a new protocol for accreditation of the program was required that was onerous to develop. Part of the challenge was documenting assessment before they had any data. NAU indicated that the accreditation body gave significant attention to their financial model, in order to ensure that the new CBE program was financially sustainable and would not affect the quality of the current on-campus degree programs.

King's College University – Social Work Program

King's College University is an affiliated college of Western University in London, Ontario. Its social work program admits 40 undergraduate and 20 graduate students each year. Approximately 100 students participate in a compulsory field education course that provides them an opportunity to practice and further develop skills and knowledge acquired through their course work.

[21] For a sample of the NAU Competency Report, see: http://www.insidehighered.com/sites/default/server_files/files/Competency%20Transcript%20Draft%20v12.pdf

Program delivery and instruction and assessment

The program is taught face-to-face and aims to help students develop general and profession specific knowledge and skills. Courses are scheduled to begin at pre-determined times during the year, and students need to wait for the course to be available before enrolling. Only one course in the program is competency-based: the field education (student practicum) course. Students identify their learning goals related to pre-established competencies and are assessed at three stages of the course. As the competencies are considered developmental, full attainment of the competencies is not required to pass the course. However, if a student cannot demonstrate a competency, they are required to complete an alternate experience, course or activity and complete another competency assessment.

As with other CBE programs, in which there can be variation in the time taken to completion of a course, students having difficulty with their field practicum are permitted additional time to complete. However, the administration may set a limit on the amount of time available to a student to meet minimum competency standards.

Program and curriculum development, planning and review

Faculty members are responsible for developing individual course content to support the program curriculum. The curriculum is developed and reviewed by faculty, students and field instructors plus representatives from each of the social work professional organizations, e.g., Ontario College of Social Workers, Canadian Association of Social Workers, etc. King's social work program has recently completed a curriculum review – the first in over six years – that included an environmental scan and a literature review. While a number of significant changes have been introduced, the core of the curriculum remains intact.

Although competency is now defined primarily through the field placement experience in the King's social work program, many faculty members are including competencies on outlines distributed to students at the beginning of each course. These competencies are linked to learning outcomes. Adoption of this practice varies across the program, however, because it is done at the prerogative of the faculty member. In addition, the program is still in the early stages of developing assessment tools to verify competencies. Some faculty are beginning to include experiential activity in the classroom, such as videotaped role play that can be reviewed and critiqued.

According to the University representative who was interviewed for this study, the identification and evaluation of competencies in social work programs has not been without controversy. Human Resources and Skills Development Canada funded a project that would identify and develop competencies for social work programs across Canada. The purpose of this project was to assist in the adjudication of new Canadians with international credentials. Because licensure in one province permits licensure in all provinces it was designed to ensure comparability of social work programs across Canada. This move to create measurable competencies has not been well-received and many social work programs have declined to participate.

There is a view that competency only reflects what students can do, rather than how knowledge is assimilated and applied to a variety of situations in a profession. Resistance has also arisen because of the feeling that the introduction of competencies is a managerial intrusion by government and employers into the education sector.[22]

[22] Background on this perspective can be found in “Criticisms of the Competency-based Education Model” (December 12, 2012) by Dr. Nelida Ramirez Naranjo; at http://cbeandsocialworkeducation.wordpress.com/

The interviewee has reviewed a comparison of elements of the structure- and process-based versus competency-based educational program (Table 4 in this report). Overall, she is in agreement with the variables and the distinctions identified. She does not agree that the program is accountable for the learner's final performance since this is the student's responsibility and that of the provincial licensing body. She also indicated that the path of learning in CBE (Field Placement) requires the field instructor to take on the role of a coach – a view similar to the view expressed by WGU, i.e., "not a sage on the stage, but a guide on the side."

The King's College social work program does not offer challenge-for-credit or prior-learning portfolio assessment but does offer transfer credit. Although the instructors appreciate the potential to accelerate a student's progress towards graduation as offered by WGU, the approach might take away from the collaborative learning that occurs in a course when different experiences and level of knowledge are shared. Repetition of previously acquired knowledge also helps to reinforce and expand understanding while developing an appreciation for different perspectives and differing levels of knowledge that others bring to the discussion.

Faculty and student support services

The field education course is dependent upon the unpaid services of professionals in the field who observe, provide feedback to students, and determine whether students have demonstrated a minimum level of competency in order to continue their practice following graduation. Field instructors meet with each student at the beginning of the field placement to ask students to undertake self-reflection of their knowledge and to identify their learning goals for the placement. Each student has a learning contract to identify areas for improvement. Field instructors meet individually with students two or three times per session.

Field instructors are not paid but the program does provide some benefits, such as library access and continuing education discounts. It was noted that it would be very difficult to sustain the program financially if compensation were required. Instructors of larger classes are provided teaching assistants and/or demonstrators. A minimum number of 40 students per class is required for King's to hire an assistant.

DePaul University – School for New Learning[23]

DePaul University is a private university founded in 1898 and is the largest Catholic university in the United States with an enrolment over 25,000. The distribution of students across the university is 75% undergraduate, 15% graduate and 10% in law.[24] DePaul operates on the quarter system, with ten-week terms – fall, winter, spring, and summer. Academic programs are delivered on five campuses in the Chicagoland area. DePaul offers both a traditional university program and a competency-based education program targeted at adult learners.

DePaul is accredited by the following agencies: North Central Association of Colleges and Schools, The Higher Learning Commission; American Bar Association, Council of the Section of Legal Education and Admissions to the Bar: Law (LAW) – Professional schools; American Psychological Association, Committee

[23] In addition to interview and survey, other document used in this section include:

- DePaul University. (2013a). The foundations of adult learning: Resource book. Retrieved from snl.depaul.edu/WebMedia/StudentResources/FALbook.doc
- DePaul University (2013b). Program components MSAT Retrieved from http://www.snl.depaul.edu/WebMedia/StudentResources/MSAT_Components.pdf
- DePaul University website

[24] See http://www.depaul.edu/about/Pages/key-facts.aspx

on Accreditation: Clinical Psychology (CLPSY) – PhD doctoral programs; Commission on Collegiate Nursing Education: Nursing (CNURED) – baccalaureate and master's degree levels; Council on Social Work Education: master's degree program in social work; National Association of Schools of Music, Commission on Accreditation, Commission on Community/Junior College Accreditation: Music (MUS) – Institutions and units within institutions offering degree-granting and/or non-degree granting programs; and Association to Advance Collegiate Schools of Business – International: AACSB – baccalaureate and graduate programs in business, baccalaureate and graduate programs in accounting.

In the parent university, courses at DePaul are normally valued as three credit hours. Students classified as part-time (11 credit hours or fewer) are assessed $550 per credit hour per term. Tuition fees for those enrolling as full-time students (12-18 credit hours) vary by faculty. For example, full-time students newly enrolled in the College of Liberal Arts and Social Sciences, in science, or in education in 2013 pay an annual tuition of $33,390. For new students in the faculties of theatre and of music the annual fee is $34,440. Students whose course enrolment exceeds 18 credits hours are assessed $550 for each additional credit hour.

Competency-based education at DePaul is delivered through the programs offered by the School for New Learning (SNL), a faculty established in 1972 specifically to meet the needs of adult learners. The average age of the student body is 36. Enrolment in the School is over 2,300. Competency-based programs offered by the SNL represent 2% of the programs offered at DePaul University. Students in the School for New Learning enrol part-time and are assessed $550 per credit hour.

According to the Faculty Handbook, the DePaul University School for New Learning is "a college designed particularly for adults, who bring rich experience to their desire to advance, enhance, or change their careers and personal lives. . . . SNL provides highly personalized opportunities and emphasizes the integrity, individuality, and responsibility of each student to develop competence and put learning to ever-new use" (DePaul University, 2013a, p. 10). Some of the characteristics of the CBE model at DePaul University are[25]:

- Flexible;
- Personalized;
- Competence-based;
- Liberal arts learning;
- Online and on-campus courses.

SNL's target audience of adult learners are building their university program upon their previous employment experience and knowledge. Accordingly, SNL degrees are designed to develop broad competencies aligned with the students' professional aspirations. Considerable effort is undertaken prior to admission and in the early stages of a student's academic career to ensure that the student's degree/program aspirations are compatible with the broad, professional development nature of SNL. Students who wish to undertake specific discipline studies (e.g., economics or history) in a more traditionally structured program are encouraged to enrol in the parent university.

The School offers four undergraduate and three graduate competency-based programs: Bachelor of Arts with an Individualized Focus Area (Leadership Track, Pre-Law, International, Health Care Studies, Environmental Sustainability, Organization Development, Applied Business, Creative Arts), Bachelor of Arts in Computing, Bachelor of Arts in Early Childhood Education, Bachelor of Arts in General Business, Master of Arts in Applied

[25] http://www.snl.depaul.edu/Programs/UgradDegree/BA_Focus_Area.asp

Professional Studies (MAAPS), Master of Science in Applied Technology (MSAT), and Master of Arts in Educating Adults (MAEA). Although all of the programs target the needs of adult learners, the B.A. Individualized Focus area is restricted to those 24 and older.

Program delivery and instruction

The program is delivered through a mix of face-to-face and online courses. The undergraduate degrees share a common template, requiring students to meet 50 requirements defined by competency statements. Some of the competencies are met by courses or projects, while others can be satisfied through transfer courses, projects, transfer credit, or experience.

Two introductory courses – Learning Assessment Seminar and Foundations of Adult Learning – acquaint students with the program objectives and competencies. These courses also help students identify prior learning and learning goals and to develop a plan for meeting their goals. The courses also focus on how the individual students learn, the learning processes and how to become effective and versatile learners. Included in the courses is a discussion of how to demonstrate prior knowledge and to recognize that not all prior experience is equivalent to college level studies.

Students are encouraged to clarify their learning needs through self-reflection and through interaction with the faculty. Upon completion of the Foundations of Adult Learning course students have written a learning plan and identified an area of focused studies. According to the SNL representative, credit for Foundations of Adult Learning cannot be transferred to other degree programs at DePaul. In those instances where a student transfers early in the program to a more traditional program, a refund or tuition credit for that course is issued to the student.

Program and curriculum development, planning and review

SNL has developed a menu of competencies for each of its programs and courses, including writing and liberal arts, and has identified the criteria to demonstrate competencies. This is available for critique by faculty and students. Periodically, employers are invited to meet with SNL faculty to identify and discuss competencies required in the workplace. In discussion with their academic committee, students may create their own list of the competencies – an opportunity unique to SNL – that they wish to attain and demonstrate in their programs. A formal review of the competencies occurs every six to seven years.

According to the DePaul website,[26] the number of competencies varies from program to program. For example, at the undergraduate level, they are divided into three sections:

- The Lifelong Learning Area consists of 12 competencies satisfied by nine required SNL courses, approved transfer courses or proficiency exams. This is the academic core of the SNL program.
- The Liberal Learning Area consists of 26 competencies which vary from program to program. These competencies can be satisfied by SNL courses, relevant transfer courses of C- or better, and documented college-level learning from experience. For example, the Bachelor of Arts in Early Childhood Education includes the Literal Arts Area competencies related to the topics of Arts and Ideas, Human Community, and Scientific World, while the BA in Computing includes CDM computing competencies. In some programs these 26 competencies also include between two and six advanced electives focusing on competencies specific to their subject area.

[26] http://www.snl.depaul.edu/Programs/index.asp

- Focus Area consists of 12 competencies satisfied by SNL courses, relevant transfer courses of C- or better, and documented experiential learning or Advanced Project from SNL. This area reflects the student's individualized focus of study that results from establishing their personal and professional goals. The twelve competencies are defined by the student with the advice and approval of their academic committee.

Assessment

Although each course may have several competency objectives, a student does not have to successfully achieve all of the competencies in a course to complete the course. For example, a student might only achieve competency in two of three competencies in a course but still be granted a pass in the course. However, in order to attain a degree, the student would have to enrol in another course that offers the unattained competency as one of its course objectives. A minimum grade of C- is required in each competency.

Self-assessment is an aspect of all courses. Midterm assessments of students by faculty provide feedback and align the personal and professional assessments. Students receive a traditional transcript with grades, along with a narrative assessment prepared by each faculty on the competencies attained in the courses completed. This narrative is provided only to the student and is not available to be paired with an official transcript requested by the student in future years. Although not mandatory for faculty, many are now incorporating the use of e-portfolios by means of which faculty and students may reflect on the learning and competencies demonstrated.

As noted by the SNL interviewee, because of the flexible nature of SNL programs additional challenges and costs have been incurred by DePaul Information Technology Services, such as the time and money spent to track competencies completed by a student across a number of different courses.

Faculty and student support services

SNL has 40 full-time faculty and six full-time core mentors who support faculty and students. However, many classes are taught by part-time adjunct faculty. The average workload for faculty teaching in traditional DePaul programs is seven courses per year, while SNL faculty course workload is five or six courses per year. The lower course load in the SNL program is offset by the student mentoring assumed by each faculty member. The distribution of responsibility for a faculty member in SNL is 30% research, 15% services and 55% teaching and student mentoring. Faculty are on 12-month contracts in order to ensure that courses may be offered during all quarters.

Faculty are expected to have academic expertise in their field and to have studied other fields as well, in order to bring an interdisciplinary approach to the classroom. Promotion and tenure portfolios must speak to student learning in the classroom as well as student mentoring and advising. Mandatory training is provided for each faculty member and instructor in SNL. Topics include pedagogy, the use of technology such as Desire2Learn, and development and assessment of competencies.

Funding is provided for faculty to pursue professional development of their choosing, if it is offered and/or approved by the university. According to the survey, the faculty also engage in research for which some funding is available. Other resources available to the faculty include classroom and teaching space, offices, library and IT resources, and teaching materials.

Each student is assigned an academic committee that consists of a faculty mentor (usually a professor who leads one of the two introductory courses), a professional advisor who is an expert in the student's area of interest, and, often, a peer mentor. The program materials emphasize the role of each student in developing their own learning plan and suggest that students will play a role of the committee chair (see for example the BACEC handbook). The student will meet frequently with the academic committee over the course of their academic program to assist in self-reflection and discussion of competencies. The committee develops a personalized learning plan for the student that corresponds to their academic goals, career goals and the requirements of the program.

This same approach is employed in graduate programs. The following description provided by the SNL describes the process for students in the Masters of Science in Applied Technology (MSAT):

> Early in your MSAT Program, you will be assigned a Faculty Mentor (drawn from the University's resident faculty) who possesses expertise in facilitating adult learning in a student-centered interdisciplinary manner. In addition, you will be guided through a process to identify Project Assessors who will support learning in Independent Work-Based Projects related to your work, organization, or other aspects of your professional development. Project Assessors are accomplished practitioners in your area of specialization drawn from the faculty or local, national and/or international professional communities. (DePaul University, 2013b)

According to the survey, the faculty provide assistance to students in person, by phone or online, with online consultations and meetings (e.g., e-mail, teleconferencing, video conferencing, social media) being a popular method of communication.

Similar to other universities described earlier, SNL students are offered a wide range of support services including academic advising, counselling, library resources and computer labs, student learning spaces and technological support.

The SNL representative interviewed in this study believed that SNL is meeting the educational goals and objectives of their students through its personalized approach to designing programs with competencies that complement their prior knowledge, experiences and competencies.

SNL credits the importance of self-assessment as essential to helping students better understand the learning that has occurred in the program, especially the learning from others in the cohort. Although the SNL has not undertaken employer surveys to assess the success of its graduates, alumni surveys indicate that 25% of graduates are promoted within six months of graduation.

Excelsior College

Founded by the New York State Board of Regents in 1971, Excelsior College was originally known as Regents College (Excelsior College, 2013). According to the College's website, until 1998, Regents College was operated under the authority of The University of the State of New York and the Board of Regents. In April 1998, the College became a private, non-profit, independent institution and later on January 1, 2001, changed its name to Excelsior College. It is accredited by the Middle States Commission on Higher Education, the Accrediting Commission for Education in Nursing, the International Assembly for Collegiate Business Education and by the Engineering Technology Accreditation Commission (Excelsior College, 2013).

Excelsior offers online associate, baccalaureate, master's, and post-graduate degrees and certificates. In the summer of 2013, Excelsior College enrolled 36,779 students.[27] Approximately 60% of Excelsior's students are enrolled in associate degrees, out of which 86% are in the Nursing stream. Like Western Governors University, Excelsior focuses on serving the needs of adult students providing "innovative educational solutions to non-traditional students, enabling busy students around the world to earn college degrees, advance their careers, and improve their income potential" (Excelsior College, 2013). It reports that the average student age is 38.4[28] and that 77% of students are employed full-time. Excelsior's students come from across the US and include a large number of military personnel who may be stationed abroad. They are taking advantage of academic and financial support available to military personnel.

4,690 students graduated in 2013 to join an alumni body of 151,046. Tuition fees are $425 and $565 per credit for undergraduate and graduate degrees (Excelsior College, 2013).

Characteristics of Excelsior's programs:

- Online;
- Aimed for adult learners/non-traditional students/military ;
- Flexible;
- Individualized;
- Prior learning.

Excelsior College offers flexible, online degree programs in more than 30 disciplines (Excelsior College, 2013) including nursing, health sciences, public service, liberal arts, business and technology. However, competency-based education is delivered only in the associate and baccalaureate nursing programs. Thus, the discussion that follows will focus on the nursing programs. Excelsior offers online learning in a more traditional sense in the faculties of business, humanities, natural sciences/mathematics and in social sciences/history. The College is exploring CBE in mathematics and biology.

Program and curriculum development, planning and review

As mentioned above, competency-based education is delivered only in the associate and baccalaureate nursing program, which is described on the College website as a successful program employing a competency-based curriculum. CBE at Excelsior in nursing originated with the proficiency examinations administered by New York State in the 1960s to assess qualifications – a recognition of prior learning.

The nursing programs at Excelsior are open to individuals with "significant experience in clinically oriented health care disciplines" (Excelsior College, 2013). Only students with a practical nurse designation, a paramedic, military medical corps, therapists, physicians, midwives or individuals with comparable experience may be admitted to the nursing program. The nursing programs are currently not eligible for federal student aid under the terms of Title IV. However, Excelsior has applied for a change to this regulation (see below).

The program features an overall competency profile as well as lists of competencies for each of the experiences or courses included in the program. The profile includes specific competencies reflecting occupation/profession-specific situations or contexts (e.g., an ability to run an MRI machine). While the profile

[27] http://www.excelsior.edu/about/fast-facts
[28] Summer of 2013 enrollment data

is jointly developed by faculty and/or administrators in the institution and employers/outside experts, it is faculty and administrators who are responsible for the content and structure of the program.

The curriculum framework is organized around nine areas, including "four metaparadigms of nursing, client, health and environment, supported by concepts of critical thinking, communication, research, role development, and caring/ cultural competence" (Excelsior College, 2012, p. 2).[29]

At Excelsior, course development is also very centralized, similar to Western Governors. Courses are designed to be as interactive as possible using a variety of techniques including brief video clips. Courses are developed by instructional designers and content experts. Faculty members delivering the course are required to teach to the design.

Program delivery and instruction

The survey describes the EC nursing program as a combination of course-credit accumulation and competency-based educational activities leading to a degree. The program consists primarily of independent study with online study guides, on-site, two-day, in-person workshops and online study groups. Courses have a well-defined structure and schedule, and the course outlines, readings, notes, assessments, discussion boards and grade books are available online.[30]

Each course is taught by an instructor or faculty member who has experience in the topic of the course. Students can communicate with inductors via email, chats, online discussions etc.[31] Faculty are available to respond to student inquiries and to assist them in addressing deficiencies in their background. For instance, a student with no prior experience with intravenous injection would work with a faculty member to find a location where simulated experience could be obtained.

An eight-week course normally carries a three-credit weight. Students need to obtain at least 67 credits for an associate degree and at least 121 credits for a bachelor's degree (Excelsior College, 2013). The students work closely with their academic advising teams which help the students to refine their goals and learning objectives and develop a learning plan.

Excelsior is now piloting a program for 100 students in the associate degree program that provides the students with the option of completing eight online courses instead of the current self-study in eight areas followed by an examination. The College partnered with the Tata Group in India to develop course delivery.

Assessment

To gain credit for a course, students need to successfully complete all the assignments and assessments and demonstrate minimum proficiency in the competencies. Over the course of the program students need to complete a number of examinations. At the associate level, there are eight Excelsior College Examinations (ECEs):

[29] Excelsior College. (2012). School of nursing catalogue. Retrieved from http://www.excelsior.edu/c/document_library/get_file?uuid=0ffa0936-d08c-4554-9892-15825da5db81&groupId=12408
[30] Excelsior College. General information guide. Retrieved from http://www.excelsior.edu/c/document_library/get_file?uuid=a3f009e6-cc6b-43b0-8ad5-1635b0f76e70&groupId=78666
[31] Excelsior College. General information guide. Retrieved from http://www.excelsior.edu/c/document_library/get_file?uuid=a3f009e6-cc6b-43b0-8ad5-1635b0f76e70&groupId=78666

- Transition to the Registered Professional Nurse Role
- Essentials of Nursing Care: Chronicity
- Essentials of Nursing Care: Health Differences
- Essentials of Nursing Care: Health Safety
- Essentials of Nursing Care: Reproductive Health
- Health Differences Across the Life Span 1
- Health Differences Across the Life Span 2
- Health Differences Across the Life Span 3

At the bachelor's level, the two Nursing Theory ECEs are Research in Nursing and Community-Focused Nursing. Once students complete the Nursing Theory exams and have ten credits in the General Education Area, they are eligible to take the Focused Clinical Competencies Assessment® (FCCA®). This is a pass/fail, online, simulated clinical assessment aimed to assess competencies related to elements of nursing practice including: head-to-toe assessment; nursing process; and managing multiple patients; and working with interdisciplinary teams.

Once the aforementioned assessments have been completed, students must successfully pass the Clinical Performance in Nursing Examination (CPNE), "a skill-based assessment designed to measure a student's ability to demonstrate the expected behaviors and skills of a beginning-level associate-prepared nurse" (Excelsior College, 2013). The assessment (a) tests the application of the nursing process and nursing-practice technical components, (b) evaluates students' critical thinking and diagnostic reasoning skills, (c) examines their ability to use knowledge from nursing and related disciplines, and (d) considers competencies related to the effectiveness of interventions and standards of care. A fee of $2,000 is assessed for this examination.

Students determine when they are prepared to write each competency test and may graduate at any time. In addition, students may accelerate their studies through prior learning assessment (PLA). Approval by an academic advisor is required and students must enrol and pass an online course called Prior Learning Assessment Theory and Practice. Students are then required to contact an external group, LearningCounts.org, to assess their work and to recommend credits.

Excelsior used to provide an in-house portfolio assessment service but it was outsourced to LearningCounts.org. Separate fees are assessed by this organization for its service. Upon completion Learning Counts provides a transcript with credits recommended to Excelsior for final evaluation. LearningCounts.org website provides a list of universities with which it is affiliated, including Southern New Hampshire University. As noted by the EC representative, the participation rate in PLA is quite low because most students decide that it is easier to enrol and complete a course rather than develop a portfolio and then pay for additional assessment services.

Excelsior also offers credit by examination in a computer-based format through test centres. Examinations are offered in business, humanities, natural sciences and mathematics, nursing and social sciences/history. Once students have registered and are authorized to take a test they have six months to schedule and complete the examination. Excelsior provides content guides, online practice exams and access to online study groups.

Faculty and student support services

As of the summer of 2013, Excelsior had 1,024 instructional faculty (47% with doctorates) and 203 clinical examiners and clinical associates in the nursing program (Excelsior College, 2013). Most courses are taught by part-time faculty. Faculty deliver the courses as well as provide online consultations and meetings (e.g., e-

mail, teleconferencing, video conferencing, social media). The College provides faculty members with a range of supports including tutors and markers, library resources and teaching materials. Faculty members are expected to participate in professional development, including sessions on the development of competency profiles, student assessment, program evaluation, use of technology, and curriculum development.

In addition to their teaching responsibilities, the faculty members are encouraged to undertake research; however, research is not required.

Although a competency-based approach is not employed in programs outside of nursing, Excelsior does use a number of strategies similar to Western Governors to support all its students. For example, faculty members are expected to post material on discussion boards at least three times per week and to monitor/contribute to discussions. Blackboard and other software tools are used to mount quizzes, to provide information regarding students' engagement with content, and to monitor the frequency with which students access the course material. Information gathered is employed to identify students who need further assistance.

Administration, resources and funding

The college provides a wide range of resources and supports to assist students with their programs. These include academic advising, an ombudsperson (an individual from the College's Ombudsperson Office who provides students information on fee and policy matters and resolves customer service and student issues and discrepancies), career services, disability services, online training and tutoring, writing resources, and exam study resources.[32] Access to library research material is provided to students through an agreement between Excelsior and Johns Hopkins University. However, the College still runs a bookstore where students may purchase texts. E-textbooks have been employed, but because of the worldwide locations of their registrants (e.g., soldiers in Afghanistan), some of the students have found that access may be challenging.

As noted previously, until recently direct assessment programs such as Excelsior's nursing program have not been eligible for federal student financial assistance programs authorized by Title IV of the Higher Education Act. Competency-based education programs (direct assessment) employing models offered in credit or clock hours can now be accommodated under title IV as a result of an amendment to the Act. Excelsior College has applied for this federal eligibility. This is the same status recently received by College for America at Southern New Hampshire University.

Excelsior College believes that their use of a competency-based education in nursing, combined with their use of prior learning assessment and credit by examination in other disciplines, has permitted them to take advantage of technology and best practices to increase their productivity, the scalability of their programs, and to create a learning environment that permits their target students to meet their educational needs at their own pace at a reasonable cost.

Application of the CBE Ranking Methodology

As noted earlier in our discussion of the literature review, the literature on competency-based education provides some guidance for developing a framework that can identify and locate a particular program on the continuum between CBE and not-CBE. Table 3, above, sets out seven features associated with a CBE program and indicates, for each, what would characterize a CBE program and a not-CBE program.[33] From

[32] http://www.excelsior.edu/c/document_library/get_file?uuid=a3f009e6-cc6b-43b0-8ad5-1635b0f76e70&groupId=78666

[33] We should note that this same conceptual framework could be adapted and applied to analyze productivity, productivity gains, and costs for CBE compared to traditional academic delivery models. Such a framework would focus on the key determinants of productivity:

the survey results, supplemented by interviews with key informants and available documentary evidence, we located each program/institution on the continuum for each of the seven features. A score of five indicates that a particular feature is closest to "competency-based education" and a score of one that it is closest to "not competency-based education." A score of three on any dimension indicates that the feature is equidistant between "CBE" and "not-CBE." We assigned scores to each feature for each of the eight programs. The results are presented in Table 7. A more detailed look at the scores for each institution, and for all eight, is shown in Appendix G.

Comparison of the dimensional rankings is presented in Figure 4 of Appendix G, illustrating the similarities and differences across the programs with regards to the CBE implementation. As can be seen, most of the models had a somewhat similar approach to the definition of competencies (which were defined in terms of knowledge/technique applied to work setting). The exception here was Alverno College, which scores 1 on this dimension. The models ranged in their requirements regarding the mastery of the competencies with only three models (WGU, NAU and Excelsior) scoring 5 on this dimension.

Table 7: Program Rankings on CBE Continuums

Criterion	College rankings					Criterion
	5	4	3	2	1	
Specifically defined competencies	Western Governors College for America Alverno College Northern Arizona U Excelsior	DePaul (SNL) SNHU Business		King's College (SW)		General performance outcomes
Competencies that are context dependent	Excelsior	Western Governors U Northern Arizona U SNHU Business/ College for America DePaul			King's College (SW) Alverno College	Competencies that are context independent
Learning that is self-regulated	Western Governors U Alverno College SNHU College for America NAU	DePaul (SNL) Excelsior		King's College (SW) SNHU Business		Learning that is regulated by others
Learners proceed on their own	Western Governors U SNHU College for America	Excelsior		SNHU Business	King's College (SW)	Learners proceed in groups

technical efficiency, allocative efficiency, and economies of scale and scope. However, we did not have sufficient information from the surveys to allow us to implement this type of productivity analysis.

Criterion	College rankings					Criterion
	5	4	3	2	1	
	Alverno College Northern Arizona U DePaul					
High levels of proficiency (mastery) required	Western Governors U Northern Arizona U Excelsior	Alverno College	King's College (SW) DePaul (SNL) SNHU Business & College for America			Threshold levels of proficiency required (minimum proficiency)
Assessments determined by stakeholder communities		Western Governors U Alverno College Excelsior SNHU College for America	NAU DePaul (SNL) SNHU Business	King's College (SW)		Assessments that are determined by faculty who are the subject matter experts
Competencies defined in terms of knowledge/technique applied to work settings		Western Governors U SNHU Business & College for America King's College (SW) Northern Arizona U DePaul (SNL) Excelsior			Alverno College	Competencies construed as broad mastery over a body of knowledge

Summary of Case Studies

Even across the eight institutions surveyed we find considerable variety in some of the key parameters that distinguish a CBE program. On the one hand, this suggests that there is flexibility if a jurisdiction, such as Ontario, wished to promote or establish CBE-type programs in order to meet certain objectives. On the other, the surveys suggest that this flexibility is a consequence of the fact that the borders between competency-based programs and traditional programs are dissolving. As such, adjustments to traditional programs may achieve the desired objectives without the need to introduce new academic delivery structures.

Institutional architecture of competency-based education

In practice, there would appear to be several options open in considering how a CBE program might be introduced into an existing system. One is to establish a stand-alone, dedicated CBE institution. Of the eight cases, we find only two which we might describe as a stand-alone CBE institution in which the institution's entire academic program is delivered as competency-based education. These would be Western Governors University and Alverno College. The former was established as a CBE-oriented university; the latter moved from a more traditional pedagogy to CBE in the early 1970s.

More common is to find a CBE program attached to or associated with an institution's previously existing academic structure. Two models appear. The less common approach is where a CBE program (or, in one case, a course) is embedded within an existing curriculum. This would be the case with the field education course at King's College and the CBE program in the business school at Southern New Hampshire University. At SNHU the traditional course and examination oriented business program stands alongside of a CBE program option. Fewer than 10% of the students enrolled in the business school are in the CBE program; however, this may be due to restrictions that have been placed on the program's enrolment rather than a lack of interest on the part of students and/or faculty.

The second model is that of a stand-alone division or faculty that has been created (or adapted) by the institution for the purpose of delivering CBE programs. This would be the case at DePaul University (where the CBE program grew out of the faculty that had responsibility for adult education), Northern Arizona University, USNH's College for America, and Excelsior College. The first three offer traditional, in-class programs as well as online instruction; Excelsior offers all of its programs (CBE and non-CBE) online only. This structure would appear to offer the advantage that a new academic delivery system could be developed and implemented free from some of the constraints that might arise where existing faculties or departments have to mediate between CBE and their traditional academic delivery modalities.

Program size

The survey results suggest that, for all practical purposes, there is no minimally efficient scale of operations for a CBE program, and that it is feasible for CBE programs to be scaled upwards. No one model exists with respect to the size of the CBE program. In general the programs tend to be relatively small. WGU and Excelsior are exceptions to this, with some 34,000 and 20,000 students in their CBE programs. However, some caution is needed in interpreting these numbers. Students are self-paced and may stay enrolled for many years as they complete their competencies. In the other programs surveyed we find considerably lower enrolments. College for America and Northern Arizona University are not well established (enrolment levels of 500 for College for America and 8 for NAU) and each plans to grow aggressively, although not to the levels of WGU. Alverno and DePaul have CBE-based degree enrolment of 2,300 to 2,600 students.

Target audience

The eight institutions were evenly split between those where the target group for the CBE programs was working adult learners (WGU, College for America, DePaul, Excelsior) and those where the CBE programs were directed towards the more traditional undergraduate cohort. But in the latter four, King's College contains just one CBE course, SNHU Business School is a CBE program embedded in a much larger traditional undergraduate program, and Alverno is a special case of an institution that transformed its entire undergraduate program to CBE. Generally speaking, then, we would expect CBE programs to be oriented towards older, working adults who are looking to acquire credentials and skills to advance their employment opportunities.

Degrees offered

Our survey suggests that institutions offering CBE programs recognize that the baccalaureate is the dominant credential. Seven of the institutions surveyed offered some version of an undergraduate baccalaureate degree, with some (Alverno, NAU, and Excelsior) also offering a range of diplomas and certificates. SNHU's College for America was the exception, as the only degree it offers is a two-year Associate of Arts degree. However, College for America provides its students with transcripts that enable them to translate their associate degree credits into traditional course credits, in order to assist them in moving to a four-year

baccalaureate institution. Excelsior offers an associate degree in addition to the baccalaureate; the associate degree requires slightly more than half the course credits as the bachelor's degree.

One interesting note is that the building blocks for the degree in CBE programs remain the traditional discipline-oriented type of course. The courses themselves have been modified to fit within the competency-based model, but the degree is structured within a more traditional discipline orientation. There are cases where special courses, designed to acquaint the student with the CBE approach, are part of the curriculum, but these are not prevalent. The exception here is College for America: their Associate of Arts degree consists of a specialized program of competencies that stand outside the traditional disciplines.

Modes of instruction

Online courses were the predominant form of course delivery, with five of the institutions reporting the use of online instruction. Alverno, King's College, and SNHU's Business School reported using face-to-face classroom instruction. Given their history, this is not unexpected. The DePaul program combines face-to-face classroom instruction with online instruction, and Excelsior offers a small number of face-to-face workshops as part of the nursing curriculum.

Where online course delivery pertains, the function of the faculty member changes from the more traditional role of faculty as instructors to that of a mentor, guide, or coach.

Productivity

Keeping in mind that we are working with only eight responses, there would seem to be two conclusions that we could draw from our survey. The first is that competency-based education affects productivity primarily in the areas of program planning and curriculum development, program delivery and student assessment. Those are the only areas where we find, for one or more of the sources of productivity gains, over 70% of the responses indicating that CBE enhances productivity "a lot." Further, the greatest potential for productivity gains appears to be in the area of program planning and student assessment. Interestingly, CBE seems to have much less of an impact on facilities planning and academic administration and management. It is also worth noting that while it was not unusual to find respondents indicating that CBE did not affect productivity at all, in very few cases did we find it reported to have a negative effect upon productivity.

The second conclusion concerns the source for productivity gains. In the areas where CBE was said to offer the greatest potential for greater productivity - program planning and curriculum development, program delivery and student assessment – the survey responses indicated that the main sources of productivity gains were, in order, emulating best practices, improving the quality of graduates, and making better use of existing technologies. In fact, looking over all of the main areas of teaching/learning activities, the emulation of best practices was most often cited as the source for productivity gains. The potential for competency-based education to enhance productivity through the introduction of new technologies, while generally cited as important, was seen to be less significant than making better use of existing technologies. Economies through diversification were the least-cited source or productivity through competency-based education.

In the areas we might term academic administration – student services and support, academic program administration and management, and facilities planning and use – the results were more mixed. Competency-based education was said to have a negligible impact on facilities planning and use, and then only in the potential to make more effective use of existing resources. On the other hand, in the area of administration and management, CBE was seen as a source for improving accountability and improving course management. With respect to student support and student services, the greatest potential for CBE was said

to lie in technological changes: either making better use of existing technology or allowing for new technologies to be used.

Costs

A separate set of survey questions were designed to explore the impact of competency-based education upon costs. The survey asked respondents to compare the costs of introducing and operating a CBE model versus a traditional type of system for delivery of academic programs and services. The survey looked at costs from a number of perspectives. From a functional point of view, the survey asked institutions to compare the costs of a CBE program with those of a more traditional program for several areas:

- Student services and support with respect to: (1) Library services/resources; (2) Course-ware support (computer labs, IT services); (3) Central advising and counselling services; and (4) Financial aid systems.
- Facilities planning and management with respect to physical space.
- Administration and management with respect to: (1) Enrolment tracking and management; (2) Financial systems and management; (3) Registrarial systems (including timetabling, space allocation, student records); (4) Recruitment and admissions; and (5) Reporting (to government; accreditation bodies; community).

The survey also considered three broad types of costs.

- Central overhead costs: costs associated with any additional central (institution-wide) infrastructure and activities, such as management systems for enrolment tracking; financial management systems; registrarial systems; recruitment and admissions; instruments or processes for reporting to government, accreditation bodies, or other stakeholders; changes in physical plant; library services and resources; course-ware support (e.g., computer labs and IT systems) that might be required for a new program; student advising and counselling services.
- Program-specific overhead costs: overhead costs associated with the initial development and start-up of a new program, such as program and course design; development of course materials; systems for course management, student supervision, or faculty training; IT support services; design and development of assessment materials.
- Program operating costs: costs associated with the on-going operation of the program, such as provision of course materials; instructor time and costs; instructor professional development; course management; facilities planning and management; ongoing costs of program administration, including enrolment tracking, reporting, recruitment, registrarial costs; reporting.

With respect to central overhead costs, the respondents indicated that, generally speaking, the costs of introducing a new CBE program were about the same as the costs of introducing a new traditional, non-CBE program. Where CBE costs were reported as somewhat higher they were in expected areas: computing services to provide course-ware support and registrarial systems for timetabling, space allocation, and student records. Again, we should keep in mind the small number of responses.

Likewise, for program-specific overhead costs respondents reported that the costs of a new CBE program would be about the same as for a non-CBE program. There were relatively few instances where competency-based education was reported to require fewer resources than traditional modes of delivery. As we might predict, where CBE costs were reported as lower it was in relation to instructor time and costs, and where CBE costs were indicated to be somewhat higher it was in respect of the costs for development of course materials and assessment materials, and in computing and IT-related costs.

Finally, the results for on-going program operating costs are similar to the previous. It does not appear, from these responses, that running a CBE program generally requires either more or fewer resources than a non-CBE program. CBE costs were reported as lower for costs related to course instructors, including direct instruction costs, instructor time (e.g., communications, online discussions), and student supervision. On the other hand, the costs of course maintenance (keeping course materials up-to-date, course redesign) were reported as higher for CBE programs.

Overall, of the 70 responses (seven institutions over the ten indicators; SNHU provided one report for both its programs) we find that the costs of CBE and traditional programs were reported to be about the same for 57. Of the 13 activities where cost differences were reported, in nine cases the respondents indicated that the costs of CBE were higher than traditional programs. Where higher costs were reported, in almost all cases it was in the dimension of administration and management. It would appear from the survey that in practice CBE has not driven down the costs of operations.

A more nuanced response was provided by the post-survey interviews. Two points are worth noting. One is that a higher capital cost is likely to be required to establish a CBE delivery system (and this was not limited to program development costs). Second, the ongoing costs of program delivery and institutional academic management may be higher for CBE, but that lower faculty costs can offset this. These observations are consistent with the findings from, among others, Brumm et al. (2006) and Dath and Iobst (2010), cited earlier.

Program areas

Traditional CBE programs are based on skills-acquisition and vocational training, where competencies could be readily identified and assessed. In large measure, what we found where universities have adopted a CBE approach is that the programs offered are in disciplines where there is a presumption that the competencies required for employment can be known. Consequently, there are CBE programs in nursing (WGU, Excelsior), education (WGU, DePaul), social work (the field education course at King's College), business (WGU, SNHU Business School, NAU, DePaul), and computing/information technology (WGU, NAU, DePaul). And, of course, although we did not survey them, there are various competency-based programs in medicine.

However, it is by no means the case that CBE programs are confined to disciplines where work-based competencies are associated with a particular occupation. Alverno offers a traditional liberal arts program, and DePaul's School for New Learning offers degrees that draw upon the liberal arts (but do not mirror the liberal arts disciplines). Northern Arizona University also plans programs in the liberal arts.

This raises the question of how a liberal arts program can work within a competency-based perspective. In the classical model of competency-based education a program is highly context dependent, where curriculum, content, pedagogy, and assessment are oriented towards the requirements of specific labour markets. A liberal arts program has, on its face, no such close or immediate connection to specific occupations, skills, or knowledge. The other hallmark of the classical CBE program is that third parties that are adept at identifying the specific labour skills and knowledge required for the labour market are brought into the decision-making on curriculum design, delivery, and assessment. But what we find from our case studies is that where universities have adopted a CBE approach to a liberal arts education they have modified both these features of the classical CBE. On the one hand the liberal arts CBE program looks to address generic competencies or labour market skills rather than specific, context dependent, competencies. Programs develop in their students tools for communication and aesthetics, analytical reasoning, social interaction (within and outside of the workplace), and ethical and effective citizenship. These are competencies that help students go beyond the immediacy of their initial employment. Second, employers and other third parties have a reduced role in

the academic delivery model. They are asked for advice on the generic abilities needed for success in the labour market, and asked to assess graduates' competencies and the institution's performance, in light of these considerations. For the liberal arts-based CBE programs the role of third parties has become descriptive rather than prescriptive.

CBE scores

We developed a methodology for both the characterization of CBE and of productivity in the postsecondary education sector that could be applied to programs/institutions. The methodology requires detailed site-based information on CBE practices and detailed financial information about the operations associated with CBE. The latter was not available to us. With the information we acquired on CBE practices, and using the conceptual distinctions described above, we were able to distinguish among programs along seven dimensions associated with CBE, and demonstrates the feasibility of applying the conceptual distinctions to specific situations. The CBE scores are presented in Appendix G and placed on a continuum from lowest (King's College with a CBE score of 2.1) to highest (Western Governors University and Northern Arizona University with a CBE score of 4.6).

Figure 2: Continuum of CBE Scores

Conclusions

There is no dearth of enthusiasm for competency-based education programs. To take just two recent examples, in August of 2013 President Obama, in a speaking tour on college affordability, made reference to College for America as a model for innovation in postsecondary learning and called attention to its core precept of mastery of competence rather than "seat time" as the basis for earning the College credential. More recently, the Chronicle of Higher Education (December 20, 2013) reported on a new publication by the Centre for American Progress which speaks to the need for alternative models such as competency-based education.

Our review of the literature, our survey, and our case studies lead us towards a more cautious appraisal of competency-based education as a model for academic delivery. In saying this, we want to be clear that our conclusions are not intended to speak to the whole landscape of competency-based education.

- Our appraisal is limited to a particular portion of the CBE landscape; we have concentrated upon competency-based programs in the context of postsecondary education that has traditionally been in the domain of colleges and universities. We are not drawing conclusions about CBE as practiced in vocational and skills-training programs.
- In particular, our interest is in comparing competency-based education with the more traditional modes of academic delivery.
- Most models of CBE in practice in the university sector are programs for professional studies: business, education, nursing, information technology, medicine, and engineering. We are most

interested in the efficacy of competency-based education programs for the liberal arts, social sciences, humanities, and physical and natural sciences.
- An evaluation of competency-based education should also be appropriate to the target cohort. Programs that are directed towards older adults who are in the workforce are likely to have goals and objectives different from programs where the primary audience is the traditional university-age cohort.

The strength of a competency-based education program, according to its proponents, can be distilled down to one main point: the acquisition of job-related skills. Compared to traditional models for the delivery of baccalaureate education, competency-based education is said to lead to better and faster acquisition of skills directly relevant to employment so that graduates are more job-ready. Competency-based education is perceived as a more reliable model for academic delivery in two respects: the CBE program itself is more likely to impart job-related skills, and employers have more confidence that graduates of CBE programs will in fact have those skills.[34]

From our review, this is certainly a plausible hypothesis. The philosophy, the core pedagogical elements, and the processes that underlie the CBE model suggest that it could well be a more reliable model for delivering job-related skills. In particular, we would note:

- The explicit articulation of competencies provides programs, students, and employers with clearly defined job-related objectives that the program is designed to cultivate.
- The role of third parties in program development and delivery, and in defining and assessing competencies, introduces parties with, presumably, knowledge of the needed job-related skills.
- Courses are designed with relevance to the competencies to be acquired, so that there may be a clearer alignment of program activities with competencies.
- The requirement that competencies have to be demonstrated before students can move to the next levels of the program.
- The learning process is driven by the learner (and his/her needed pace) rather than the teacher or by credit or clock hours.
- The self-paced speed of the learner in deciding when to be assessed.
- The concept that demonstrating “mastery” of competencies (as opposed to getting a passing grade in a course) requires that the student be able to apply the learning rather than just “acquire” knowledge.

We remain cautious in our appraisal of competency-based education for a number of reasons. First, and perhaps most importantly, we could find no evidence to support the argument that competency-based education provides a better platform for student success. There are no studies of the success of graduates in the labour market, particularly a comparison between competency-based education graduates and those from traditional programs. There is no evidence that employers, if faced with the choice between hiring a graduate of a CBE program and comparable graduate of non-CBE program, would choose the former. There are no studies where student performance (measured as, perhaps, graduation rates or quality of graduates, or performance in the labour market) is seen as a dependent variable, with the mode of academic delivery as an independent variable. If we step outside the field of medicine, there is no evidence that students of CBE programs are better prepared or that they acquire learning in a faster time. There are claims about how students like the CBE experience, and there are anecdotes about success in job hunting and promotion. But there is no systematic, comprehensive, study that offers evidence that this satisfaction and the purported skills from a CBE program translates into performance, either in graduation results or in the labour market.

[34] Our interviews found that institutions did not track the labour-market outcomes of their graduates. They did, however, maintained contacts with employers to review whether their graduates were meeting expectations, whether the programs were meeting expectations, and whether revisions in program competencies were necessary.

This is not to say that CBE does not improve student performance (graduation rates; job market success); it may well, but we could not find any evidence that it does. In our review of the empirical literature on productivity in postsecondary education we have made some suggestions on how such a comprehensive study might be carried out.

Second, we believe there are grounds for caution when considering the introduction of competency-based education into Ontario's postsecondary framework as a public policy measure. Here we would offer a number of observations. One is that the postsecondary environment is different in the US than in Ontario. The most recent report by the OECD (2013) indicates that in Canada 51% of the 25 to 64 age group has attained some postsecondary education, the highest percentage of all OECD countries. The comparative percentage for the United States is 42%. The strong interest in CBE in the US is a response to this low participation rate and the ensuing demand for the system to respond to the needs of adults to earn postsecondary credentials, and to do so in a way that meets the practical needs of working adults. This is a very large market niche in the US that can be filled by CBE, even when CBE programs are concentrated in the areas of business, education, nursing, and information technology. In Ontario it is not clear that there is a sizeable market niche of this sort that is unserved by existing institutions and thus requires a public policy initiative.

This suggests that if competency-based education is to have a significant impact on productivity and efficiency in Ontario's postsecondary sector (an outcome that we believe is yet to be demonstrated) it would have to be introduced on a broad scale. That is, CBE programs would have to be options available to the traditional age cohort for postsecondary education as opposed to oriented to working adults. And CBE programs would have to be introduced in the discipline areas that attract the majority of students: liberal arts, humanities, social sciences, natural and physical sciences. To be sure, individual institutions might look to take advantage of opportunities to offer a limited number of competency-based education programs in specialized areas and directed to a niche target audience, but this is not likely to have major implications for the sector.

What might be said about competency-based programs in the areas of liberal arts, humanities, and the sciences? In theory competency-based education is a package defined by characteristics such as competencies that are specifically defined and context dependent, learning that is self-regulated, and so forth (see Table 3, above). In practice this is not the case. Our review and survey shows that in most cases the CBE programs embodied features and practices that would be associated with non-CBE programs. For the seven key dimensions that are associated with competency-based education most programs sat somewhere on the spectrum between CBE and not-CBE. In particular, the case studies suggest that competency-based education programs in the liberal arts were more likely to be located towards the end of the spectrum identified with traditional modes of academic delivery. Two points stood out. One was that competencies in CBE liberal arts programs were defined in generic terms rather than context dependent or "job-defined." The competencies to be developed were described, for example, as communications skills, problem solving and analytical skills, social interaction and effective citizenship. The second is that the role of third parties (especially employers) is far more circumscribed than might be expected from the perspective of CBE theory. Third parties were not described as hands-on participants in setting the curriculum, or course materials, or assessment instruments. Rather, third parties were seen as sources of advice on the generic skills that graduates should have.

If a government were to consider introducing competency-based education on a broad scale to cover the traditional postsecondary age cohort and extending programs to the liberal arts, humanities, and sciences it would be challenging for a number of reasons. To mention a few, for example:

- Universities in Ontario have a culture and practice of institutional autonomy. Further, there is a strong culture of faculty independence in matters associated with program and course design, delivery, and student assessment that runs counter to the CBE paradigm.
- There are unique initial and ongoing overhead costs associated with CBE programs that would have to be managed.
- The organizational architecture – where the CBE programs fit within the institution's administrative structures – could prove to be complicated. Embedding a CBE program within the existing academic structures, where departments are the basic unit for curricular decisions) would likely be problematic, for reasons alluded to above. One alternative would be for institutions to create Faculties, Divisions, or ancillary units to manage competency-based education. However, the size of the potential market, and the economics of operation suggest instead that a free-standing, dedicated institution for competency-based education (much like Western Governors University) should be studied.
- The composition of the teaching faculty for CBE programs (and the nature of the teaching itself) are not the norm for Ontario universities. This could be challenging to navigate, especially if the cost savings from CBE are expected to be realized by reducing teaching costs.
- Funding mechanisms would have to be reappraised. For instance, allowing self-paced study where progression is not determined by credit hours would suggest a revision of how student aid is provide (much like the reviews taking place in the US). Systems of enrolment-based funding for institutions would have to be revisited.

Given the challenges that would be presented by a broad-scale introduction of CBE programs, given that we are unable to find evidence that competency-based education would reduce costs and/or improve outcomes, and given that for the liberal arts the differences between competency-based education and traditional delivery of the undergraduate degree are not pronounced, especially with respect to the competencies that are developed, our review and case studies suggest that a different route might be worth considering. This route would acknowledge that studies in liberal arts, humanities, and the sciences do instill competencies, but that this is not readily recognized because these competencies are "buried" inside the degree studies rather than being pulled out and directly assessed as they would be in a competency-based education program. The CBE package is oriented towards providing students with evidence of the competencies they have developed: students are shown what they already know about a subject through pre-assessment; the competencies they will develop by taking a course/program are described; and students are tested to prove to themselves that they have achieved a level of competency. All of which speaks to students, government, employers and the public about the quality of the learning experience. Universities tend to leave it to students to realize that the skills acquired through degree studies are in fact competencies and provide "job-readiness." Universities need to develop the means to better assess and communicate to students, employers, and other stakeholders the connection between the program/course syllabus and the competencies that are generated through completion of the degree program.

A discussion of instruments that might be used to demonstrate the connection among degrees, competencies, and job-readiness is beyond the scope of this project. Nevertheless, we conclude with a brief mention of some possibilities.

- Student self-assessment might be incorporated as a component of courses. This is an instrument that has been used by institutions with competency-based education programs in the liberal arts. The purpose of the self-assessment process is to bring the students more directly into the learning activities and thereby make them more aware of the skills and competencies that will be developed and evaluated in the course.
- The Ontario Quality Assurance Framework speaks to the need for programs to articulate the learning outcomes expected. Consideration might be given to developing a narrative transcript

that specifies the learning outcomes achieved through completion of the course. The narrative transcript could describe the learning outcomes in the language of (generic) competencies to inform both students and employers.

- Creation of an assessment tool that graduates would be able to take upon completion of their degree. As an example, the assessment could consist of two parts. One would be to consider the mastery of generic competencies, such as the ability (a) to understand (and express) information provided in prose and in numbers; (b) to seek and use evidence in the process of making judgments; (c) to reason and to offer reasons. A second part could be designed to demonstrate, in the context of the student's discipline, the ability to apply the generic competencies and to think critically using the standards of the discipline.

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