COMPETENCY-BASED EDUCATION MODELS:
AN EMERGING TAXONOMY

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Competency-based education (CBE) degree programs have grown significantly over the course of the past few years. Within the field of CBE, experts have differing views as to what elements are most critical to a high-quality CBE program. The purpose of this Q methodology study is to determine what models of CBE programs emerge from an investigation of what experts perceive to be the most essential and least essential components of a high-quality program. In this study, 33 experts in the field of CBE sorted 72 statements about multiple aspects of CBE programs.

Data collection included the Q sorts, a demographic institutional survey, follow-up questions and brief biographies of participants. From this research, two primary factors were revealed, one with emphasizes the curricular elements of competencies and assessments as primary, the second of which emphasizes fiscal sustainability and business processes along with competencies. Nine of the study participants demonstrated mixed results, sharing aspects of each factor in their results. This study provides a basis for further research into specifically what components should be universal across CBE programs, and which are dependent upon institutional preference or program design.
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from so many colleagues in the field, in particular the support from other working moms pushed me through those last few months.

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CHAPTER 1

INTRODUCTION

Competency-Based Education (CBE) has once again come into vogue, following a brief period of popularity in the 1970’s (Brower, 2014; EDUCAUSE, 2014; Hall & Jones, 1976; Kamentez, 2010). Several factors have contributed to the expansion and renewed interest in CBE as a plausible model for reform in higher education. Spurred by discussions about the high cost of higher education (Adisu & Caboni, 2004; Brower, 2014), and assisted by theories suggesting the need for the unbundling of higher education (Kamentez, 2010), CBE offers what may be a viable model for degree attainment (Anderson & McGreal, 2012). In particular, many of these conversations have focused on what might assist with post-traditional learner degree attainment in a world of shifting student demographics (Brower, 2014; Hall & Jones, 1976; Soares, 2013). Discussing CBE necessitates discussing the very nature of what the experience of higher education looks like, beginning with clearly defining outcomes (Experimental sites Concept Paper, 2014; Oblinger, 2012).

What is CBE?

What is CBE? Fundamentally, CBE is an educational model wherein the learner successfully demonstrates the achievement of the learning outcomes or “competencies,” independent of “seat time” (Experimental sites Concept Paper, 2014, p. 5). It is a learning model based on student mastery of specific outcomes, rather than student time on task in the classroom. In 1976, Hall and Jones described time as a variable “that is determined by the internal and external needs and capabilities of the learner. Mastery
learning is the goal” (p. 10). Though the model itself is not new, it is also not widespread. Long-standing examples include SUNY’s Empire State College, Excelsior College (formerly Regents College), Charter Oak State College—all established in the 1970s, when there was significant interest in CBE (Billet & Ten Cate, 2014; Book, 2014). Examples of more recently developed CBE programs include the University of Wisconsin’s Flexible Option, Kentucky Community and Technical College’s Learn on Demand, Southern New Hampshire University’s College for America, Capella University’s FlexPath, and Northern Arizona University’s Personalized Learning (Capella University, n.d.-a; KCTCS Online, n.d.; Northern Arizona University, n.d.; Southern New Hampshire University, 2016; UW Flexible Option, 2016). Programs also emerged in the late 1990’s and early 2000’s, including Western Governors University, entirely designed as a CBE university model, and City University of Seattle’s Performance-Based Degree model (Council for Adult and Experiential Learning, 2015a; Western Governors University, 2015). CBE has been present in certain fields—like the medical fields—since the 1970s, and has largely persisted throughout the field (Billet & Ten Cate, 2014).

Why is there so much attention on CBE now? Higher education reform is a daily conversation piece in the news. The need for improved outcomes in post-secondary education, combined with pressure from employers who feel that graduates lack fundamental job skills, (Blocher, Brewer, Cokins, Lawson, Sorensen, Stout & Wouters, 2014; Johnstone, 2013), compounded by the scale of student loan debt, have all contributed to the serious consideration of alternative models of education in colleges and
While state funding for education has decreased, student loan debt recently ballooned beyond $1 trillion nationally (Brower, 2014; Chopra, 2013; National Center for Education Statistics, 2014). Increased rates of loan defaults have accompanied the increased lending—lifetime default rates are projected to be 19.2% from the 2010 cohort (Default rates for cohort years 2007-2011, 2012). The financial challenges are commonly cited as an external pressure advancing the experimentation with alternative learning models like CBE (Brower, 2014; Adisu & Caboni, 2004).

CBE is a model that attempts to clearly define the skills and knowledge of graduates through their demonstration of their mastery of outcomes. There are several characteristics that tend to make up CBE programs, though there are significant differences between the models. A primary component of this study will be codifying models of CBE programs through a Q study designed to utilize expert opinions from the field in the creation of a taxonomy. The generally accepted characteristics of CBE are: (a) self-pacing, (b) modularization, (c) effective assessments, (d) intentional and explicit learning objectives shared with the student, (e) anytime/anywhere access to learning objects and resources (this is specifically enabled by the development of supporting technology), (f) personalized, adaptive, or differentiated instruction, and finally (g) learner supports through instructional advising or coaching (Brower, 2014; Hall & Jones, 1976; Johnston & Soares, 2014; Klein-Collins, 2012). It is important to note that this list is compiled from multiple sources, and that the delineation into specific points is the
The core elements of CBE programs differ from institution to institution, necessitating this course of research. Further examination of this need follows.

CBE has attracted the attention of educational reformers. Expanded interest on the part of major funding organizations operating in higher education like the Bill and Melinda Gates Foundation and Lumina Foundation has supported experimentations and initiatives in CBE (Council for Adult and Experiential Learning, 2015b; Johnstone & Soares, 2014). The Department of Labor, the National Institutes of Health, and the U.S. Department of Education are all supporting various initiatives for implementing CBE, research into CBE, or experimentation with federal financial aid funding for CBE (Bjork, Dilmore & Moore, 2011; Experimental sites Concept Paper, 2014). The support of major educational foundations and the U.S. government has bolstered the groundswell of discussion about CBE and how it might be able to positively impact college completion.

**Statement of the Problem**

The cost and effectiveness of college has many questioning the value of a degree, with the amount of student loans increasing by over 36%, and 10% of college students entering repayment in 2011 defaulting on loans within the year (National Center for Educational Statistics, 2014). The Higher Education Price Index (HEIP) measures inflation for higher education institutions based on goods and services needing them. There was a 39% cost increase for undergraduate tuition, room, and board at public institutions between the 2002-03 school year and the 2012-13 school year, after adjustments were made for inflation (National Center for Education Statistics, n.d.).
As an example, the index rose 5% in 2006, while the overall Consumer Price Index rose only 3.8% (Myer, 2008). Over time, the difference in cost is staggering; “Between 1985-86 and 2001-02, average published tuition and fees increased by 74% in inflation-adjusted dollars in the public four-year sector, by 72% in the private nonprofit four-year sector, and by 52% in the public two-year sector” (College Board, 2015).

Figure 1: Inflation-Adjusted Published Tuition and Fees Relative to 1985-86 to 2015-16 (1985-86 = 1.0)

A college degree also takes far longer than originally designed. It takes the average student well over four years to achieve a bachelor’s degree, and extended time to completion often means greater expense on the part of the student (National Center for Educational Statistics, 2011). The majority of students who graduate with a bachelor’s
degree (60%), need longer than four years to complete it. For nearly 30% of undergraduate college students their degree will take them more than six years to complete (Johnson, 2011). Many reasons have been postulated for this lengthening of the baccalaureate degree, including overcrowded classes, inclusion of internships and co-ops, and changing majors (Luckerson, 2013).

Competency-Based Education (CBE), may be one potential model to lower the cost of a college education and shorten the time to degree completion. However, all CBE programs are not the same. Without a method by which programs can be classified, their comparative effectiveness cannot be analyzed in a consistent manner. A systemic taxonomy with which to categorize and describe programs will enable student outputs to be assessed in a more scientific and valid way.

**Purpose of the Study**

The purpose of this study is to create a comparative taxonomy of CBE programs in order to codify their elements as well as what components are considered critical to all programs across models. This will be accomplished via a Q study that will utilize expert opinions from working professionals within CBE programs or institutions developing CBE programs.

In the future, this taxonomy could be used to compare and contrast CBE programs, determining which models have shorter time to degree, incur less debt, and have the highest graduation rates. This taxonomy could become the basis for determining which types of CBE programs are the most successful for what types of students—for example, a CBE model that uses strong and consistent coaching might be the best option.
for some types of students, whereas a largely self-paced CBE model with little coaching or intervention might be the best option for success for a different type of student. This comparison has the potential to then be a tool for further investigation, and even used in the design of CBE programs. If a higher education institution is looking to support a specific type of student, research subsequent to this taxonomy may be able to inform decisions at that institution as to what type of model to select.

**Assumptions, Limitations, and Delimitations**

There are certain assumptions on which this investigation relies. The Q-Study design is intended to measure the opinions of expert practitioners from the field of CBE. Their honesty in responding is critical to the validity of the resulting taxonomy. Because the study also rests on the expertise of the participants themselves (or the P Set,) the anonymity of the participants cannot be fully guaranteed—the study must preserve its legitimacy by providing some brief biographical and demographic information on the experts themselves to ensure the audience of their expertise. However, the results for the Q-study are not attributed to individual participants, rather they will be reported in aggregate form. In other words, the participants are named in the study, but responses are not connected or connectable with individual participants, preserving a measure of confidentiality in responses. This separation supports the assumption of honest responses to the extent possible. All participation in the study—at every point in the study—was completely voluntary; participants could have removed themselves from the investigation at any point.
A foundational assumption is that the participants were able to separate their perspective about the relative importance of different characteristics, or components, of CBE models from their familiarity with the model that their institution has embraced. In the case of individuals who are not from institutions of higher education, but rather related organizations, this may have been less of a challenge. The directions for participants completing the Q study clearly stated that participants should share their opinions as experts. Related to this is the assumption that those same professionals were authentic as to their own opinions, rather than sharing opinions that are representative of the dominant models in the field of CBE.

Other assumptions rest upon the continued usefulness of CBE itself—that it will continue to be relevant within the field of higher education. The evidence suggests that it will: powerful higher education foundations are backing the effort, including Lumina, the Bill and Melinda Gates Foundation, and the Joyce Foundation (ACT Foundation, 2015a, 2015b; Competency-Based Education Network, 2014a). Additionally, the expansion of experimental sites for federal financial aid for CBE programs indicates increased support from politicians in the national arena interested in higher education reform (U.S. Department of Education, 2014).

This study was limited to sharing the opinions of experts within the field with respect to CBE models. As such, the models that are revealed in the study are from that somewhat confined perspective. This taxonomy does not reveal what the student experience in different models is like; rather it is limited to describing different models of CBE according to the opinions of experts.
There are also elements that define the scope of this investigation. This investigation is delineated by the following characteristics:

- This study examines the opinions of working professionals in the field of CBE at either functioning CBE programs, or at organizations or institutions that demonstrate expertise in the field.
- Only identified experts are used as participants as determined by a snowball sample.
- Opinions are limited to CBE programs, as opposed to higher education or online education as a field.
- Opinions are not requested seeking the overall value of CBE, rather the relative importance of components of CBE programs.

**Research Questions**

The research questions that are asked in the investigation to fulfill the purpose of the study are:

1. How do CBE experts view the core components and relative importance of different components to the quality of CBE degree programs?
2. What factors (or models) are revealed through this process by experts within the field of CBE?
   a. What core components are commonly cited as most critical to quality CBE programs across the models?
   b. What core components are commonly cited as not necessary to quality CBE programs across the models?
3. How are those models described and differentiated?

These questions provide a basis for understanding groups of opinions from experts in the field as to what is most important to quality in CBE programs.

**Definition of Terms**

There is terminology that is specific to the field, as well as acronyms that are used when discussing CBE and other alternative learning models within higher education. There are also several organizations referenced that are actively engaging in work associated with CBE. Before looking at associated terminology, however, briefly reviewing some of the varied definitions of CBE will help frame the similarities and differences of understanding of CBE within the field. The U.S. Department of Education’s Invitation to Participate in Experimental sites Initiative – from the federal register—defines CBE as programs that “measure a student’s academic progress by assessing the student’s learning, typically on the basis of the student’s demonstration of mastery of a defined set of competency standards” (2014, p. 44429). This definition also references time variability, use of online delivery, and a focus on both reducing time to degree completion and cost.

The Council of Regional Accrediting Commission’s (CRAC) definition of CBE includes similar concepts, however it focuses primarily on the demonstration of competency mastery, and does not include explicit reference to modality, affordability or accelerated degree completion as part of the core definition. CRAC also notes that “to pass a competency students must generally perform at a level considered to be very good or excellent” (C-RAC's Framework for Competency-Based Education, 2015, p. 2).
In a report intended to clarify terminology within the field of CBE, it is defined as progress through demonstration of mastery through assessments “and/or through application of credit for prior learning” (Everhart, Sandeen, Seymour, & Yoshino, n.d., p. 4). It also mentions time-variability, and distinguishes CBE from competency-based learning—in CBE the “focus is on academic programs, practices, and policies” (Everhart et al., n.d., p. 4).

An earlier definition, from 1976, adds to those elements modularized learning and “personalization strategies” (Hall & Jones, p. 11). A definition from iNACOL refers to students advancing as they demonstrate mastery, the use of explicit learning objectives and meaningful assessment. It also includes some context, noting that the learning objectives “empower students” and that the assessment is a “positive learning experience for students” (Patrick & Sturgis, 2010, p. 8). A few years later, at a Competency-Based Education Summit, iNACOL expanded that definition to also include “explicit, measurable, transferable learning objectives” as well as differentiated support for the achievement of those outcomes, and finally an emphasis on application “along with the development of important skills and dispositions” (Kennedy, Patrick & Powell, 2013, p. 22).

The Competency-Based Education Network (C-BEN) emphasizes flexibility for students and building upon knowledge and skills that students already possess. This definition also emphasizes multiple methods for assessing learning, and also explicitly notes the modality as self-paced (Competency-Based Education Network, 2015b). The Council for Adult and Experiential Learning (CAEL) explicitly notes time variability
along with a learner-centric focus, noting that CBE programs “focus more on what
students learn, rather than where or how long the learning takes place” (Council for Adult
and Experiential Learning, 2015b, para. 4). CAEL’s definition goes on to note
acceleration of degree completion, and use of technology to support lower-cost programs,
but concludes with an emphasis on quality: “above all, CBE programs are designed to
improve the quality of higher education by putting the focus squarely on demonstrated
learning outcomes” (Council for Adult and Experiential Learning, 2015b, para 4).

EDUCAUSE’s definition includes time variability, prior learning, and frequent and
varied feedback. It, too, explicitly calls out the modality as being learner-centric,
asserting that it “empowers students to take more responsibility for learning than in
conventional models” (EDUCAUSE, 2014, p. 1). Quality Matters again emphasizes time
variability and flexibility in type of mastery demonstration; additionally it emphasizes
demonstration of skills and knowledge through assessment. It does not note affordability
or degree acceleration (Quality Matters, 2014b).

The working definition for CBE that will be utilized is not meant to be exhaustive,
but rather to be representative of the multiplicity of components of CBE, while remaining
somewhat coherent and succinct. The following definitions are intended to define and
clarify the way in which these terms are commonly used, but more importantly, the way
in which they will be used in the context of this study.

Adaptive Learning: Typically in the form of courseware, this type of technical
system supports learning through directing students to resources based on their needs and
progress in response to formative assessments or other prompts of the understanding the
learner has about the topic. Data are also often collected by the adaptive learning system on learner performance to be used for further improvements in the system (Brown, Dehoney, & Millichap, 2015; Everhart et al., n.d.).

Alternative Credentials: These are types of non-traditional credentials, including “certificates, certifications, licenses, digital badges, and other “microcredentials” (Ganzglass & Good, 2012, p. 1).

Assessment: This part of the learning process is used to understand what knowledge and skills a student currently can demonstrate. It involves collecting information about the student’s achievement, often from a variety of sources, and “may effect decisions about grades, placement, instructional needs, and curricula” (Chiheb, El Afia & Faizi, 2011, p. 69).

Carnegie Unit: Commonly referred to as the “Credit Hour,” the Carnegie Unit was originally created as a pension system for college professors. Over time, it became a unit of measurement for progress through a college degree, and a time basis for schedules, requirements, workloads, and federal financial aid (Silva, Toch, & White, 2015). It is a seat time-based system.

Competency: Everhart, Sandeen, Seymour and Yoshino, in their report on Clarifying Competency-Based Learning Terms, refer to “a competency” as: “a specific skill, knowledge, or ability that is both observable and measurable” (n.d.). Different institutions utilize different hierarchies to describe competencies, outcomes and objectives. For example, at Western Governors University, competencies are broader statements of observable skills and knowledge, where “objectives” are more granular.
descriptions that are grouped together in assessments (Staker, 2012). Quality Matters’ Higher Education Rubric (2014b) describes a competency as the “demonstrated mastery” of a knowledge base or skill set. This definition includes that competencies can be narrowly or broadly defined and independently or aggregately described.

Competency-Based Education: Competency-Based Education is an educational model that relies upon the demonstration of skills and knowledge as criteria for achievement and advancement, independent of time spent achieving mastery. Critical to CBE is the creation of clear, assessable competencies and learning objectives. The granting of credentials is therefore tied to demonstrated mastery as opposed to seat time, which often results in self-pacing. CBE is typically modularized and often includes personalized, adaptive or differentiated instruction. Faculty roles in CBE are redefined and often bifurcated into academic or success coaches along with expert faculty. Technology enables both anytime/anywhere access to learning resources and interactions as well as a more sophisticated use of data to track student progress and intervene as appropriate (Brower, 2014; Hall & Jones, 1976; Johnston & Soares, 2014; Klein-Collins, 2012).

Credentials: This term includes a variety of types of documentation of formal learning including “degrees, diplomas, certificates, badges, professional/industry certifications, apprenticeships and licenses” (Everhart et al., n.d., p. 12). Stackable credentials allow students to begin their careers with shorter-term educational opportunities that can be built upon as they progress through their careers, leading to more advanced jobs (Austin, Mellow, Rosin, & Seltzer, 2012). Microcredentials refer to
smaller components of education that are designed to update or build new skill sets (Straumsheim, 2015).

Credit Conversion: Also known as “Credit Hour Conversion,” this refers to the mapping of competencies back to Carnegie credit units, thereby facilitating the ability of students to transfer between college programs that are traditional or competency-based. This has, in the past, enabled institutions to utilize federal financial aid under normal rules, as opposed to utilizing the “direct assessment” program by approval as an Experimental site through the Department of Education (Klein-Collins, 2013).

Credit Equivalency: This type of CBE program is one wherein competencies are mapped to courses. Even though students progress at their own pace, their achievement of competencies allows them to obtain formal “credits” as Carnegie units on their transcripts (Book, 2014; Johnstone & Soares, 2014). This type of CBE program is different from the Direct Assessment model.

Curriculum Map: Also known as an “alignment matrix,” such a matrix, common in general education outcomes, organizes the course outcomes and content to general education or other outcomes such as the Degree Qualifications Profile competencies (Ewell, 2013, p. 9).

Direct Assessment: This type of CBE program – different from Credit Equivalency—enables the demonstration of mastery of proficiency online wherein competencies are entirely divorced from courses and Carnegie credits. They take assessments when they feel they are ready and use the support of faculty and academic coaches, when they determine that they are needed (Book, 2014; Brower, 2014.)
ePortfolios: ePortfolios are individual websites or online formats that house digital collections of artifacts and reflection. They are designed to demonstrate student learning, skills, knowledge and achievements as well as create a professional presence (Dinneen, Feuer, Plack, Posey, Snyder & Wiss, 2015).

Evaluation: This type of review of learner performance has a judgement attached to it that “focuses only on the actual level of quality with no interest in why that level was attained” (Baehr, 2000, p. 441). It is not designed to provide feedback to the learner in the same way that assessment is, though it can also provide feedback.

Experimental sites: These sites are postsecondary institutions where certain regulatory requirements are waived in order to test the effectiveness of certain “experiments” to determine if the resulting data indicate that changes should be made in the overall regulations (Federal Student Aid, 2015).

Formative Assessment: This type of assessment is designed to provide feedback to learners on their progress throughout their skill and knowledge development. Its primary function is to provide information to the learner so that the learner can improve their performance over time (Chiheb et al., 2011). This type of assessment is in contrast to summative assessment.

Mastery: When a competency can be demonstrated by a student, that student has met the level of mastery. It enables the student to progress through the educational process—when a competency is “mastered,” the student then moves on to the next competency (Everhart et al., n.d.).
Mastery Learning: Mastery learning, originally designed for at-risk learners and those with mild disabilities, has been studied and extended to apply effectively to all learners. This type of learning is both philosophical and methodological. It relies on criterion-referenced assessment, with each student’s individual performance related directly to instructional objectives independent of other students. It incorporates spiraling (or continually revisiting prior concepts or content) in increasingly higher-order thinking levels. It enables learners to learn at their own pace and requires learners to achieve at a consistent minimum standard on the curriculum (Gentile, 2005; Malan, 2010).

Objective: There is some conflation between the terminology of outcomes and objectives, (and even competencies.) Typically, if both terms are used to describe learning within a program, “outcome” refers to a large or broader description of skills and knowledge, whereas an “objective” refers to a more granular description of skills and knowledge. Western Governors University has a hierarchy that includes domains, competencies and objectives:

WGU’s academic model revolves around domains, competencies, and objectives. Each WGU program specifies several domains of study, similar to a series of courses, which the student has to master to earn a degree from the program. To complete a domain, students must demonstrate mastery of specific skills and knowledge, called competencies. Each competency subdivides into a set of objectives—the building blocks of assessment. (Stacker, 2012, p. i)

Quality Matters describes objectives as existing within the context of a specific learning experience, that objectives are: “A statement of the specific and measurable
knowledge, skills, attributes, and habits learners are expected to demonstrate as a result of their educational experiences in a program, course, or module” (2014b, p. 7).

Outcome: Addressed at multiple levels, an outcome is a description of what a student should know or be able to do following some component of the learning process (Everhart et al., n.d.). Everhart et al, refer to outcomes at the level of institution, program, course or module. “Learning outcomes are generally at the same level of granularity of competencies, and sometimes the terms are used interchangeably” (n.d., p. 5). Quality Matters (2014b) describes an outcome as the learners’ demonstration of the ability to meet a learning objective.

Post-Traditional Learners: This term refers to learners who are of the working age population, ages 25 to 64; it can refer to current or future students (Soares, 2013).

Prior Learning Assessment (PLA): An assessment strategy that allows students to obtain college credit for previously uncredentialed skills or knowledge, including that obtained through informal learning, work experiences and military service. There are several methods by which institutions grant credit for prior learning, and they are generally some combination of direct assessment, evaluation of portfolios, and equivalencies for military experience or other industry credentials (Book, 2014; Klein-Collins & Tate, 2012).

Proficiency: The terms proficiency and mastery are often conflated. Christensen and Weise (2014) refer to students in CBE programs demonstrating “proficiency and mastery of each learning objective” (p. 12). Everhart et al. describe the distinction between the two terms within the context of CBE: “In competency based education,
“proficiency” is sometimes used in conjunction with “mastery,” where proficiency is the level of achievement that is considered “passing” (e.g., 60%) but a higher level of achievement (e.g., 85%) is required for mastery and progression through the program” (n.d., p. 9).

Summative Assessment: A type of assessment that summarizes the learner’s skills and knowledge as an overview of learning over time. This type of assessment is different from formative assessment—it is not designed to provide feedback to the learner on their own learning process in order to make adjustments along the way, rather it is a snapshot learner performance of skills and knowledge (Chiheb et al., 2011).

Unbundling: The unbundling of higher education refers to breaking out of a traditional “package deal” of a degree into its component parts and offering those individually to students. For example, some students may not need residence or dining halls, counseling services, or workout facilities. Unbundling higher education enables students to select the component parts that they need, and pay only for those components, not the other services that they do not need or want (Hess & Kelly, 2013).

Descriptions of Relevant Organizations

American Association of Collegiate Registrars and Admissions Officers (AACRAO): This non-profit professional association has more than 11,000 higher education members from 2,600 institutions in 40 countries. Their mission is to “provide professional development, guidelines, and voluntary standards to be used by higher education officials,” specifically in the areas of registration and enrollment management, as well as associated IT and student services (American Association of Collegiate
Registrars and Admissions Officers, n.d.-a, para 1). AACRAO is involved in the Comprehensive Student Record Project whose aim is to create multiple models in order to provide more comprehensive transcript options to colleges that more fully represent student learning (American Association of Collegiate Registrars and Admissions Officers, n.d.-b).

ACT Foundation: With a vision to create a National Learning Economy, the Foundation’s mission supports the development of “employment, education, workforce and economic development systems collaborate to intentionally design next-generation work and learn options for low-income working learners” (ACT Foundation, 2015, para. 3). They call this new paradigm the creation of a “National Learning Economy.” Their activities include supporting the design, development and implementation of new models of learning while gathering data and testing prototypes and pilots for ability to scale solutions (ACT Foundation, 2015).

American Institutes for Research (AIR): This not-for-profit, non-partisan organization conducts and applies research to improve peoples’ lives, particularly focused on the disadvantaged in the areas of education, health, and workforce (American Institutes for Research, 2015). AIR conduct research studies on the effects of CBE on student outcomes (CompetencyWorks, 2014).

Association of American Colleges & Universities (AAC&U): The AAC&U is a national organization with 1,300 member institutions from all types of higher education institutions in the U.S. Their core areas of work include (a) LEAP (Liberal Education and American’s Promise), (b) Quality, focusing on 21st Century needs, (c) Equity, and (d)
Social Responsibility (Association of American Colleges & Universities, n.d.-a). Liberal Education and America’s Promise, also known as LEAP, delineates Essential Learning Outcomes, which are broad and categorical (Association of American Colleges & Universities, n.d.-b).

American Council on Education (ACE): This advocacy organization represents 1,700 accredited institutions in the U.S. ACE interacts with policymakers and additionally supports a wide range of initiatives (American Council on Education, 2015, 2016).

Bill and Melinda Gates Foundation: A foundation that is a major donor to innovative educational projects, the Bill and Melinda Gates Foundation supports several CBE initiatives including the Next Generation Learning Challenges initiative through EDUCAUSE that funds the Breakthrough Models Incubator in CBE (EDUCAUSE, 2015b, 2015c). Additionally, the foundation supports GEMs and VALUE through the AAC&U (Bill & Melinda Gates Foundation, n.d.; Bill & Melinda Gates Foundation, 2015.)

Competency-Based Education Network (C-BEN): A group of colleges and universities that are advancing CBE-based initiatives and are “working together to address shared challenges to designing, developing and scaling competency-based degree programs” (Competency-Based Education Network, 2014a, para. 1). They are supported by the Lumina Foundation among others.

Council for Adult and Experiential Education (CAEL): An organization that was founded in the 1970s in order to connect learning to work through initiatives including
attaining college credit through a variety of means including PLA, CBE and career paths as well as conducting research and policy advocacy for post-traditional learners (Council for Adult and Experiential Learning, 2015c).

EDUCAUSE: This nonprofit association supports the needs of IT leaders in higher education, including 1,800 colleges and universities and over 300 corporations (EDUCAUSE, 2015a). EDUCAUSE partners on the Next Generation Learning Challenges that seek to accelerate “educational innovation through applied technologies to dramatically improve college readiness and completion in the United States” (EDUCAUSE, 2015c, para. 1). One of their programs is the Breakthrough Models Incubator, designed to support institutions developing CBE programs.

IMS Global Learning Consortium: Focused on the IT infrastructure and architecture behind learning systems, this non-profit organization is membership-based and enables “plug & play architecture and ecosystem that provides a foundation on which innovative products are rapidly deployed and work together” (IMS Global Learning Consortium, 2015b, para. 7). They are involved in the creation of a LTI (Learning Technologies Integration) standards that will enable integration across learning systems with CBE characteristics in five “solution use cases” which are: (a) manage competencies, (b) evaluation results, (c) program information, (d) measures of interaction, and (e) eTranscripts (IMS Global Learning Consortium, 2015b).

Joyce Foundation: Education and employment are two of the concentration areas of the Joyce Foundation, which focuses on policy change, particularly at the state level. They funded the Shifting Gears initiative, which increased access for low-income adults
to credentials (The Joyce Foundation, 2015.) The Foundation also supports community college improvement through the Aspen Prize and workforce partnerships (The Joyce Foundation, 2015). Additionally, the Joyce Foundation funded—in partnership with the Lumina Foundation—an initiative by the National Network of Business and Industry Associations to invest in 12 projects designed to identify competencies and promote relevant credentials while working with employers to advocate for the use of competency-based hiring practices (ACT Foundation, 2015).

Lumina Foundation: With the goal of increasing educational attainment, Lumina Foundation supports the development of new models including CBE, supporting initiatives by Public Agenda, the Competency-Based Education Network (C-BEN,) and the Credential Transparency Initiative (Lumina Foundation, n.d.; Connecting Credentials, 2015). The Foundation also funded and supported the creation of the Degree Qualifications Profile (DQP,) a “learning-centered framework for what college graduates should know and be able to do to earn the associate, bachelor’s or master’s degree” (Lumina Foundation, 2015b, para. 1). They also support other higher education initiatives, including projects related to IT infrastructure and effectiveness in higher education (EDUCAUSE, 2013). They are one of the funders supporting the work of NILOA (National Institute for Learning Outcomes Assessment, 2012).

National Institute for Learning Outcomes Assessment (NILOA): This organization’s mission centers on supporting institutions in the effective use of assessment data in order to improve undergraduate education and inform public policy and other stakeholders. Based out of the University of Illinois and Indiana University, it
conducts online surveys of college assessment projects and releases reports and commissioned papers focused on “the use of assessment data to improve student learning and approaches to public reporting of assessment data” (National Institute for Learning Outcomes Assessment, 2012, para. 6).

National Network of Business and Industry Associations: Also known as “National Network,” this organization’s mission is to bridge the skills gap between business and education. Activities include efforts to bring together those two core stakeholder groups, align competencies and skills as well as evolving hiring and business practices (National Network, n.d.).

Public Agenda: Founded in 1975, Public Agenda is a “nonprofit, nonpartisan organization that helps diverse leaders and citizens navigate divisive, complex issues and work together to find solutions” (Public Agenda, 2015a, para. 1). Focus areas include K-12 and higher education as well as energy and climate change, health care, and the national debt.

Quality Matters (QM): A national non-profit whose mission is to “promote and improve the quality of online education and student learning” through a variety of activities including the use of their peer review process with the QM Rubric (Quality Matters, 2014a). QM has over 900 subscribing institutions and has certified over 4,000 courses for quality instructional design (Quality Matters, 2014c).

Knowing the players in the CBE movement is key to understanding the ongoing projects and the future directions that institutions are taking. The terminology of CBE is often confusing, and every effort will be made to align the language of this investigation
to the previously interpreted explanations within the Definition of Terms. The definition
of CBE itself is, of course, somewhat positionally dependent, and is a key component of
this research.

Conclusion

Just as no two traditional courses are the same, and no two types of bachelor’s
degrees at different institutions are the same, CBE degrees are not all the same. One
degree program cannot represent the entirety of the model, or its effectiveness.
Examining the effectiveness of the CBE model is only the beginning of analyzing the
potential impact to students. How CBE programs are designed and implemented vary
significantly from institution to institution. Discovering which CBE program designs are
most effective could further codify which degree programs are best options for traditional
and non-traditional learners alike. As federal financial aid begins to become more widely
available for CBE degree programs, determining CBE program design effectiveness
could impact the prevailing model used to best support student degree acceleration and
attainment.

The following chapter situates the current work within the field of CBE,
reviewing literature on the subject as well as current initiatives that are ongoing within
higher education. Following a review of the literature, the methodology for the research
is discussed and addressed with an explanation of the Q study as well as how this specific
research will be designed and undertaken.
CHAPTER II
A REVIEW OF THE LITERATURE

The purpose of this review of the literature is to examine the current state and historical usage of Competency-Based Education (CBE) in higher education, as well as define the scope of the topic as related to this research. The literature review addresses the calls for educational reform that have opened the door to the discussion of CBE as an expanding educational model, and examines events impacting the adoption of CBE by higher education institutions.

An Introduction to CBE

CBE has generated significant interest and no small amount of controversy. This explanation of its place in the U.S. educational landscape describes the general response to CBE:

At the moment, about all any sizable group of educators can agree on with regard to CBE is that:

- It has something to do with competence as an objective of education - a goal few seem to find fault in.
- It appears to be a relatively new movement; and, as a movement, it seems to be growing rapidly.
- It has a catchy name.
- The name is value-laden, for when it is mentioned discussion follows quickly and loudly.
• It has divided the education into armed camps of Pro and Con. (Hall & Jones, 1976, p. 1-2)

Though this description of CBE was written in 1976 in Hall & Jones’ *Competency-based Education: A Process for the Improvement of Education*, it describes much of the current state of discourse within institutions today regarding CBE.

Though CBE programs did not always utilize online learning (or “distance learning” as it has previously been called,) the clear majority of current CBE programs are either wholly or partially online. The rapid advancement in technology in higher education through online learning modalities has enabled CBE to be implemented in more personalized ways, and scaled in more sustainable ways than ever before. The “type” of CBE which this investigation focuses on is predicated on the common understanding that it is leveraged by online delivery and engagement methods. A brief history of distance learning and the effectiveness of online learning will assist in grounding the discussion of CBE within the context of the increased access brought about by distance learning.

**A Brief History of Distance Learning**

The origination of modern distance learning is not unlike the mission of many community colleges – most distance learning programs began with a mission of increasing educational access (Casey, 2008). Though formalized distance learning through a university began in the U.S. in 1892 when the University of Chicago created a college-level program that could be completed at a distance (Crotty, 2012); in fact, by that time correspondence courses for training secretaries had been ongoing for
approximately 40 years (Mathews, 1999, as cited in Casey, 2008). Correspondence courses were largely taken by women, who at the time had little access to higher education (Casey, 2008).

As technology developed in the twentieth century, it was exploited for distance education. In the 1920’s, lectures were broadcast from famous academics including those from Wisconsin School of the Air (Prewitt, 1998). Television was next, with fully televised courses being broadcast beginning in the 1970s, with the first college course created and delivered by Coastline Community College in Orange County, California through KOCE-TV. These courses were named ETV, for Educational Television (Casey, 2008).

In 1972, the Open University in Great Britain was established (Prewitt, 1998). Instead of limiting the learning opportunities to a largely “broadcast” pedagogy of information delivery which had been seen up until that time, the Open University sought to develop a system that instead facilitated networked learning amongst students, with “students as nodes in a network offering individualized instruction and assessment” (Prewitt, 1998, p. 189).

As the development of new technology exploded during the latter half of the twentieth century, the limitation of a largely one-way information delivery model was removed with the increasingly ubiquitous use of the computer, which was the “missing piece of the educational puzzle that would facilitate the free flow of information between teacher and learner as well as introduce the previously absent interpersonal aspects of
communication” (Casey, 2008, p. 47). This interpersonal component—also referred to as engagement—is addressed further along in relation to quality in online courses.

The use of computers enabled interactivity in distributed learning. In community colleges, online and hybrid courses are now the norm rather than the exception. Online learning expanded in the K-12 sector as well. Florida Virtual School (FLVS), which was founded in 1997, became the first state-wide, online public school in the nation. The school was designed to build a new type of education for students who were not being well-served by the public school systems. The growth was tremendous. “In the first year, there were only 77 students enrolled in online courses. FLVS enrolled more than 70,000 middle and high school students during the 2008–09 school year” (Horn & Mackey, 2009, pg. ii).

Much of the growth of online learning in the 2000s was at the community college level; nearly all two-year institutions offered online-only courses in 2008 (97%), whereas only 66% of all post-secondary institutions across higher education offered such courses (Community College Research Center, 2013, p. 1).

**The Benefits and Challenges of Online Education**

Many, but not all of the CBE programs developed outside of the medical, IT and manufacturing fields within the last 20 years are either fully online or in a blended/hybrid environment. The benefits and challenges of online education are therefore highly relevant in the discussion of CBE as in most programs online delivery is a central component.
The quality of online courses—as well as student success metrics—indicate that the same or similar outcomes are reached by students regardless of face-to-face versus online delivery (Bailey & Smith Jaggars, 2010; U.S. Department of Education, 2010). The U.S. Department of Education’s national meta-analyses study of success in online courses in 2010 concluded that “When used by itself, online learning appears to be as effective as conventional classroom instruction, but not more so” (U.S. Department of Education, 2010, p. xviii). The majority of Chief Academic Officers (CAOs) of institutions agree with this assessment in the recent report by the Babson Research Group, *Grade Level: Tracking Online Education in the United States*, a yearly, national survey of academic leadership in higher education institutions. Of CAOs, 74.1% rated the learning outcomes of online education as the same or superior to outcomes in face-to-face instruction (Allen & Seaman, 2015).

Both face-to-face learning and online learning are unique educational modalities and have benefits and challenges for learners. Face-to-face learning has the cited advantages of the immediate human connection with improved ability to synchronously seek clarification for ambiguity. Online, however, requires far more specific design components to avoid confusion, though contemporary synchronous communication technologies including virtual meetings and chat features have become ubiquitous in businesses, and common in online education. Online learning also has the benefit of providing additional time with resources (Castano-Munoz, Duart & Sancho-Vinuesa, 2013). Relating to student outcomes, technology native to the online format has built-in advantages. The Office of Educational Technology notes that an advantage of online
learning is the measurement of learning: “when assessments are embedded in digital learning systems, learners are assessed in the course of learning. Time no longer must be taken away from instruction to stop and measure how much has been learned” (U.S. Department of Education Office of Educational Technology, 2013, p. 54).

Student success and retention rates in online courses have been a source of much discussion for researchers—particularly at the community college level. The Community College Research Center conducted a comparison study between two states, a southern state and a western state, and withdraw and failure rates were higher for online courses in both states by between 8-12% (2013). According to these data, taking online courses was also “negatively associated with college persistence and completion” (Community College Research Center, 2013, p. 4). In stark contrast, however, a major national meta-analysis conducted by Bidjerano and Shea in 2014 indicated that students who took one or more online courses (in particular early in their degree path) boosted degree completion, leading the authors to the conclusion that “Ongoing investment in online learning as an alternative form of access to a college degree is thus supported by this data” (Bidjerano & Shea, 2014, p. 110).

Despite the success of online education for increasing degree completion, 44.6% of academic leaders believe that retaining students in online courses is a greater challenge than for face-to-face courses (Allen & Seaman, 2015). This concern initially seemed to be founded. Smith Jaggars and Xu (2013), in a study of degree-seeking community college students in Washington State’s community and technical colleges, found that male students, black students, and students with “lower levels of academic preparation
experienced significantly stronger negative coefficients for online learning compared to their counterparts, in terms of both course persistence and course grade” (p. 23). This study was limited to Washington State, and it is important to note that the at-risk groups mentioned typically have lower outcomes in community colleges in general.

Bidjerano and Shea’s national study more recently found that “early participation in online learning and distance education predicts higher rates of degree attainment even when self-selection bias is controlled for” (2014, pp. 110-111). Their results of a large meta-analysis indicated that increased graduation rates among students who took online courses held true regardless of academic preparation, and that those learners “still have a better chance of graduating college than students who do not take distance education courses” (Bidjerano & Shea, 2014, p. 110-111).

Additionally, a meta-analysis that examined twenty years of research in the differences in academic performance in students in online courses versus those in face-to-face courses concluded that online learning was more effective than face-to-face learning, even indicating that the difference in outcome was increasing over time (Neumann & Shachar, 2010).

All online courses, however, are not identical in effectiveness. Swan (2003), in her review of related literature on quality in online learning environments, identified a series of domains that impact student learning online: (a) interaction with course interfaces and content, (b) interaction with instructors, and (c) interaction with classmates and vicarious interaction. Findings included the conclusion that student learning is connected to both the amount and quality of interactions with instructors, and that learning occurs socially.
Another finding that may be particularly relevant to CBE is that "there is greater variability in sense of community ratings among online courses than in F2F courses" (Swan, 2003, p. 26). In CBE programs, which are often self-paced with less student-to-student interaction, a lack of a sense of community could have implications for student learning or retention.

There is a documented retention gap between face-to-face and online courses, with rates of dropout or withdraw in online courses being reported at up to six to seven times higher than face-to-face courses (Patterson & McFadden, 2009, as cited in Gaytan, 2013). Much has been assumed as to why students are retained at lower rates in online courses. A study of students who withdrew from online courses at Monroe Community College revealed their reasons. Of the top 10 reasons, the three highest rated were related to general organization and/or issues that seemed to be unrelated to the learning occurring within the course. The subsequent four could arguably be related to the course modality, with 7.3% not liking the online format, 7.3% not liking the instructor's teaching style, and 6.8% reporting too many difficulties. An additional 6.2% felt that the course was taking too long. However, a majority of these students (52.5%) reported being either "somewhat" or "very" likely to take another online courses (Fetzner, 2013).

Experts in the field provide additional insight into this retention gap. A Delphi study of 15 experts in online education revealed themes around expert opinions as to the retention gap between online courses and face-to-face courses. This study found that three main factors were perceived as impacting student retention in online courses:
student self-discipline, quality of faculty and student interaction, and institutional support to students (Gaytan, 2013).

The debate over the effectiveness of online learning will be sure to continue for some time, despite the fact that the "The proportion of chief academic leaders that say online learning is critical to their long-term strategy is at an all-time high" (Allen & Seaman, 2015, p. 4). Another modality, blended or hybrid learning, has been the subject of much research as well. There is evidence to suggest that blended or hybrid learning is the best of both worlds in terms of student success (Bailey & Smith Jaggars, 2010; U.S. Department of Education, 2010). Blended or hybrid learning preserves the face-to-face engagement while enabling students to access additional resources and learning time that improves interaction (Baki, Means, Murphy & Toyama, 2013).

The majority of large-scale, national meta-analyses studies indicate that online learning is as effective as face-to-face learning (Bailey & Smith Jaggars, 2010; Bidjerano & Shea, 2014; Neumann & Shachar, 2010; U.S. Department of Education, 2010; ).

**Elements That Impact Quality in Online Learning**

Much has been written about elements that impact effective learning in online environments, and what constitutes “quality.” All online courses are not the same, and a critical examination of pedagogy and design, as well as academic and other student supports, is needed to enable colleges and universities to effectively create systems and processes for instructional design and institutional support to enable students to have a quality learning experience online (Bailey & Smith Jaggars, 2010).
A variety of tools have emerged throughout the field, including those specifically focused on the instructional design of online courses (some of which also include guidelines for delivery), those focused on designing instruction for students with diverse needs, and those focused on, or including, elements of institutional strategy and student support services (Blackboard, n.d.; CAST, 2011; eCampusAlberta, 2013; iNACOL, 2011; Online Learning Consortium, n.d.; Quality Matters, 2014b). Within a course-specific context, Smith Jaggars and Xu (2013) organized these into four primary themes “(1) the extent to which the course interface is well organized and easy to navigate; (2) the clarity of learning objectives and performance standards; (3) the strength and diversity of interpersonal interaction; and (4) the extent to which technology is effectively used” (p. 7).

A wide variety of evidence supports each of these components, however social engagement in the online environment was heavily supported in being a critical component to student success—both learner-to-faculty (e.g., Arbaugh, 2001; Picciano, 2002; Young, 2006) and learner-to-learner (e.g., Bangert, 2006; Matthew, Felvegi, & Callaway, 2009; Balaji & Chakrabarti, 2010) (as cited in Smith Jaggars & Xu, 2013, p. 10). The authors noted that

While it is difficult to draw definitive conclusions due to our small sample size, it seems that courses in which the instructor posted frequently, invited student questions through a variety of modalities, responded to student queries quickly, solicited and incorporated student feedback, and (perhaps most importantly) demonstrated a sense of “caring” created an online environment that encouraged
students to commit themselves to the course and perform stronger academically.

(Smith Jaggars, & Xu, 2013, p. 26)

Lack of interaction has been correlated with student perception of quality. In a comparison study of a marketing math course with data collected over four years in a variety of domains (overall evaluation, perceived competencies, perceived communication and perceived challenge,) students still viewed the traditional class more positively over all dimensions. Authors of the study Ganesh, Paswan, and Sun, suggest this may be because of the need for robust communication; social needs—the authors felt—were not perceived to have been filled effectively in the online course (2015). The authors suggest that “if the instructor uses the technology to ensure similar levels of perceived communication and perceived challenge across face-to-face and online classes, it is likely to result in similar enhancement of perceived competence” (Ganesh et al., 2015, p.10). As there are a variety of models for support in CBE programs, and as many of them disaggregate the faculty role, this component is a key consideration for program design.

Quality tools used in the field prioritize engagement as a critical piece for online courses: learner to learner, learner to faculty member, and learner to content. Other essential factors like course navigation, alignment of instructional components (including objectives, assessments and activities,) use of instructional technology, and academic and institutional supports are holistically viewed as impacting student success (Blackboard, n.d.; CAST, 2011; eCampusAlberta, 2013; iNACOL, 2011; Online Learning Consortium, n.d.; Quality Matters, 2014b).
Quality concerns are widely discussed in CBE. In October 2015, Western Governors University released the *CBE Course Quality Improvement Rubric*. The rubric contains six categories: (a) Competencies and Objectives, (b) Course Organization, (c) Learning Experience, (d) Content and Depth, (e) Course Design, and (f) Assessment (2015). Individual items within each category are worth 1, 2, or 3 points, which are awarded on either an “all” or “none” basis. Due to the self-paced nature of many CBE programs, student-to-student engagement is often not required, or even structured into courses. Aptly, the rubric released by Western Governors University does not require or address student-to-student interaction. Instead, the rubric focuses on elements more commonly associated with CBE models such as individualized or adaptive learning, frequent, varied, and formative assessment, and the use of authentic learning experiences. These practices are recommended in other rubrics for online course quality, though they are rarely required as necessary elements of a quality online course.

**The Need for CBE**

The current landscape of higher education is in flux. The discussion about CBE has been resurrected due to a confluence of factors, not least among them questions about the true purpose of higher education and the university (Blackmore, 2012). Pressures from within higher education—and those imposed upon higher education from without—have led even the U.S. Department of Education to fund new experiments in the use of federal aid in CBE programs (U.S. Department of Education, 2014).

The rationale for these less traditional models of learning include the need to improve student persistence, academic success, minimize student loans, improve
graduation rates, and in general graduate better prepared, less debt-laden students ready for workforce and life (Book, 2014; Brower, 2014; Competency-Based Education Network, 2014a).

Higher education costs in the U.S. have increased as state funding for education has diminished, and student loan debt has reached beyond $1 trillion nationally, with a 30% increase in student loan debt over the past 11 years (Brower, 2014; Chopra, 2013; National Center for Education Statistics, 2014). Students are also defaulting on their student loan debt in higher numbers and percentages than before. Three-year default rates for the 2010 cohort are now at 14.7%, with lifetime default rates projected to be 19.2% for the same cohort (Default rates for cohort years 2007-2011, 2012). Some 10% of students entering repayment in 2011 had already defaulted by the end of fiscal year 2012 (National Center for Education Statistics, 2014, p. 7). The financial challenges of higher education enable other, lower-cost educational options to become legitimate disruptors within higher education. The cost structure of higher education, and the lower cost implications present in some new learning models that are technology-leveraged, challenge public and non-profit institutions to adapt before for-profit institutions force them to (Anderson & McGreal, 2002).

There is a large gap between the number of postsecondary degrees awarded and those needed. Over 60% of the U.S. will need such a degree within the next four years. With current degree attainment at 38%, a significant gap remains to be filled (Brower, 2014). Future jobs that will require post-secondary education are growing faster than higher education is preparing qualified candidates (The White House, n.d.). President
Obama issued the “2020” challenge—that by the year 2020, the United States would once again lead the world in post-secondary degree attainment, necessitating a dramatic improvement over the country’s current standing as 12th in the world (The White House, n.d.; U.S. Department of Education, n.d.). There is also a misalignment between the expectations of employers, and the actual skills and knowledge that students graduate with from college (Blocher et al., 2014; Book, 2014).

Corporations have embraced versions of CBE to conduct their internal training, with results so successful for General Electric’s management training that other companies have started recruiting from their internal graduates (Soares, 2013, p. 11). In K-12, the widespread adoption of Common Core Standards has increased the national conversation about certification exams that could provide students with an alternative route to demonstrate readiness for college and career (Collins & Pea, 2011; U.S. Department of Education, Office of Educational Technology, 2013).

The concept of assessment-driven credentials is not new in higher education, and there is considerable overlap between the models of CBE and that of Prior Learning Assessment (PLA). PLA is often incorporated into CBE programs in one form or another. It has developed a fairly consistent definition. It includes a variety of methods that grant students college credit for learning they have already completed in a diversity of environments. Methods for PLA include student portfolios, evaluating prior military training or professional development in corporate settings, evaluation of programs locally, custom exams created by individual colleges and/or the use of standardized exams like College Level Examination Program (CLEP) or the Advanced Placement
Examination Program (AP) (Council for Adult and Experiential Learning, 2010). A national study of 48 institutions who utilize PLA reported that the degree-attainment rates for students with PLA credit were more than double that of students without PLA credit. Of students who earned PLA, 56% graduated within seven years. Of the comparison group of students who did not earn PLA, only 21% graduated within the same time period (Council for Adult and Experiential Learning, 2010).

Another significant factor setting the stage for the expansion of non-traditional models like CBE is a disconnect between the structure of higher education designed to serve a traditionally-aged college student and that needed for the “new normal” student. With nearly a third of all undergraduate students older than 24, post-traditional learners are demographically set to be a large disruptors in higher education (Klein-Collins & Tate, 2012; Soares, 2013). These post-traditional leaners represent an opportunity for experimentation with innovative alternative models like CBE that could shorten their time to degree (Book, 2014, p. 2). Western Governors University, one of the largest and most well-known CBE programs in the country, is representative of this new demographic, with an average student age of 39 and a majority female student population. About 70% of Western Governors University students work full time and 25% come from racial minority groups. These students are not limited in their attendance by geography—they attend from all 50 states and a few foreign countries (Johnstone, 2005).

The Experimental sites Concept Paper (2014), submitted in response to a request from the U.S. Department of Education by a group of colleges and universities interested
in becoming experimental sites for Federal financial aid for CBE programs, sums up the pressing need for genuine experimentation with CBE programs;

Colleges and universities need to significantly lower costs and do a better job of graduating students. The best options for achieving these outcomes are to recast business and delivery models. Competency-based education offers promise for achieving these aims while better meeting the academic needs of many students.

(Experimental Sites Concept Paper, 2014, p. 4)

Though there is little comprehensive empirical evidence of the widespread and/or relative effectiveness of these models, the ability to conduct additional research rests on a common set of definitions and an understanding of CBE within a larger framework.

The discussion of competencies in higher education is not limited solely to CBE programs. Widespread discussions about a lack of clarity in what college graduates are expected to know and be able to do—across fields of study—has resulted in the creation of several proposed standardized competency frameworks for higher education (Blocher et al., 2014; College Learning for the New Global Century, 2008; Lumina Foundation, 2011; National Postsecondary Education Cooperative Working Group on Competency-Based Initiatives in Higher Education, 2002). Two of the major frameworks are the American Association of Colleges and Universities Liberal Education and America’s Promise, and the Lumina Foundation’s Degree Qualifications Profile.

The American Association of Colleges and Universities proposed a new set of comprehensive competencies for higher education, named Liberal Education and America’s Promise (LEAP) in 2008, seeking greater coherence on what college graduates
should demonstrate. They identified four primary essential learning outcomes, each with more detailed subsets. They are (a) Knowledge of Human Cultures and the Physical and Natural World, (b) Intellectual and Practical Skills, (c) Personal and Social Responsibility, and (d) Integrative Learning (College Learning for the New Global Century, 2008).

The Lumina Foundation’s Degree Qualifications Profile’s Executive Summary begins with the statement that "The student, not the institution, is the primary reference point" (Lumina Foundation, 2011, p. 2). The Degree Qualifications Profile (DQP) groups student competencies into five categories “(1) Specialized knowledge; (2) Broad, integrative knowledge; (3) Intellectual skills; (4) Applied learning; and (5) Civic learning" (Lumina Foundation, 2011, p. 3).

Part of the discussion of the need for some overarching outcomes in higher education is the current lack of curricular coherence present in many institutions, where students take a collection of courses that have unclear linkages and little integration (National Postsecondary Education Cooperative Working Group on Competency-Based Initiatives in Higher Education, 2002). In addition to curricular coherence, financial models are being re-examined to make college more affordable.

With the self-paced nature of many CBE programs, new tuition models are being explored and embraced. Western Governors University—a college based on CBE from its inception—uses a flat tuition fee each semester in a subscription-based format. Students can take as many courses as they choose to within that time frame, putting the cost of their education squarely within their financial control (Western Governors
University, 2015). This cost structure also motivates students to complete degrees sooner. Throughout higher education, time to degree is a concern. Nationally, almost 30% of students graduating with bachelor’s degrees take longer than six years to do so, with the majority—over 60%—taking longer than four years (Johnson, 2011).

Though there is a paucity of empirical studies around the results of CBE programs as a whole, there is evidence that Prior Learning Assessment (PLA) accelerates degree completion (Council for Adult and Experiential Learning, 2010). A study by the Council for Adult and Experiential Learning evaluated data for over 62,000 students at 48 institutions. Students who had PLA credit had better outcomes, specifically for persistence and graduation rates, and—depending upon the PLA credits achieved—also had shortened time to degree (Council for Adult and Experiential Learning, 2010). As PLA requires students to demonstrate their attainment of knowledge, skills and abilities through a variety of assessment means, CBE and PLA share the common philosophy that competency is demonstrated via assessments, independent of the time or methodology of attaining that competency.

**Federal Financial Aid for CBE Programs**

Federal financial aid has historically only been available to students at institutions who use traditional Carnegie credits. As noted in the Dear Colleague letter, GEN-13-10, from 2013, the majority of CBE programs currently operating are “offered in credit or clock hours and can be accommodated under the current title IV, student financial aid regulations as non-term programs” (para. 2). Programs that fall into this “credit conversion” category, whereby Carnegie credits are used to track progress towards
degree, do not need to do anything additional to make their programs eligible for financial aid beyond the requirements of their regional accreditors. In this model, students gain credits in a competency-based, often time variable manner, however those credits are correlated with courses and tied to a transcript. An example of this type of program is that offered by Western Governors University, which has been operating under this “credit conversion” model since its inception in the late 1990s.

In 2005, Section 8020 of the Higher Education Reconciliation Act (Pub. L. 109-171) for the first time enabled direct assessment CBE programs to be eligible for Title IV funding. This type of program is characterized by students progressing upon completion of assessments, with progress tracked solely by achievement of competencies “in lieu of measuring student learning in credit hours or clock hours” (Dear Colleague Letter, GEN-13-10, 2013, para. 3). For programs that wish to be considered as Direct Assessment programs, in order to receive federal financial aid (Title IV funding,) they must utilize a provision made available in the 2005 HERA, and apply to be approved as an experimental site for CBE which enables additional disbursement flexibility divorced from the credit hour conversion methodology.

**Experimental sites**

The federal government recently expanded federal financial aid eligibility to institutions that use solely CBE as a select number of experimental sites. Specifically, there are four types of experimentation: (1) entirely CBE programs, (2) hybrid programs with a blend of CBE and traditional credits, (3) PLA programs, and (4) work study for near-peer counseling (Competency-Based Education Network, 2014b).
In a Dear Colleague letter from 2013, the U.S. Department of Education invited colleges and universities to apply to participate as an experimental site in one of these programs. In order to apply for this status, colleges must, in their application for experimental site status, provide an equivalency for how many credits the competencies represent and how it determined the equivalencies. The Department then uses these to determine eligibility and award funding.

Before the Department will approve such a program, other criteria must also be met, including approval of the program by the institution’s accreditor, which must also have reviewed and approved the equivalencies. Certain types of learning are expressly not eligible for funding through this CBE-based program, including PLA, programs at foreign schools, any coursework completed prior to the program admittance that would be considered prerequisite, programs related to teaching credentials at the K-12 level, and remedial coursework (Dear Colleague Letter, GEN-13-10, 2013).

As applications followed, Southern New Hampshire University’s College for America program became the first university to be formally approved as an experimental site for direct assessment; additional colleges applying at the time including Capella University, Northern Arizona University, and Brandman University (Fain, 2013a). Each of these schools was on the preliminary list of participants for experimental site status as of April 2015 (Preliminary List of Participants, 2015).

For the subsequent two years, however, there were few developments from the U.S. Department of Education (Laitinen, 2015). Colleges and universities formally asked for guidance from the department on how to proceed. Months later than originally
promised, the *Competency-Based Education Experiment Guide* was published by the U.S. Department of Education in September of 2015 in order to give colleges specific requirements, policies and procedures with which to plan the implementation of their programs.

The decision for an institution to proceed either with “credit conversion” or full direct assessment is one that requires analysis, as the requirements for experimental site status enable the institution to gain flexibility around disbursement and direct/indirect cost, but still require the institution to design the program with credit equivalencies. Those credit equivalencies are used to justify the robust nature of the program to both the accreditor and the U.S. Department of Education (Dear Colleague Letter, GEN-13-10, 2013). Figure 2 provides a decision tree that illustrates the situations wherein experimental site status would be necessary.

Another experiment that may have implications for CBE is the Education Quality through Innovative Partnerships (EQUIP) program whereby higher education institutions submit for approval to be Experimental sites for partnerships with non-higher education content providers. Colleges and universities collaborate with these third-party providers, who contribute program content and learning experiences (U.S. Department of Education, 2015). Currently, programs are not eligible for federal financial aid if more than 50% of the degree program is delivered by a third-party provider. These Experimental sites will not be subject to that restriction, and it will enable experiments with alternate educational providers that are emerging, particularly in Information Technology (IT) fields. The pilot program would also utilize third-party quality
assurance entities to monitor the quality of these programs, a departure from the traditional use of accreditors to ensure quality. It is thought that this program will support access to boot camps, Massive Open Online Courses (MOOCs), and other short-term certificates (Field, 2015).

Figure 2. Title IV Federal Financial Aid CBE Decision Tree
Defining Competency-Based Education

Though there are many definitions of CBE, they all contain similar elements. The most important of these component parts is that CBE has “methods to validate that student learning has occurred and competencies have been achieved, rather than merely assuming that such learning has taken place if a student has taken a certain number and series of courses” (Klein-Collins, 2012, p. 6). A 2011 meeting of iNACOL, the Council of Chief State School Officers, and 100 educators and advocates resulted in the following definition—focusing on the K-12 educational environment:

- Students advance upon demonstrated mastery.
- Competencies include explicit, measurable, transferable learning objectives that empower students.
- Assessment is meaningful and a positive learning experience for students.
- Students receive timely, differentiated support based on their individual learning needs.
- Learning outcomes emphasize competencies that include application and creation of knowledge, along with the development of important skills and dispositions (Bristow & Patrick, 2014, p. 5; Freeland, 2014, p. i).

In the higher education space, there is a less codified understanding of CBE. The basic tenets are centered on demonstrations of achievement of competencies, often contextualized as knowledge, skills and abilities. There is therefore variability in the amount of time students spend developing those competencies. Implications include the long-discussed dismantling of the Carnegie unit as the sole building block of higher
education degree attainment (Experimental sites Concept Paper, 2014; Oblinger, 2012). Johnston and Soares (2014) articulate their perspective on the principles of a CBE-based degree; it incorporates rigorous, appropriate competencies, is both self-paced and supported, includes the use of effective anytime/anywhere digital learning materials, provides clear information as to which competencies relate to which courses and assessments, and utilizes assessments that are “secure and reliable” (para. 17).

Spady (1977) described five components of CBE in reference to K-12 education. These components of CBE are: (a) the focus of competencies are real-life and role-based; (b) the essential competency is adaptability; (c) some competencies are apparent, others invisible; (d) the integration of knowledge and skills is of primary importance; and (5) affective characteristics, essential for role-based success, are also included. Finally, it requires the actual performance of those competencies, not just independent knowledge or skills (Spady, 1977). This definition of CBE is highly role-based and acknowledges both the presence of affective competencies and their importance as intangibles within CBE. Spady notes that:

Successful role performance is at least equally facilitated by the attitudes, values, feelings, expectations, motivation, independence, cooperation, endurance, and intuition people possess. Affective capacities cannot be left implicit in a life-role oriented program as they are now in so many schools. In many life situations, these affective capacities may be both "the medium" and an essential component of "the message" itself. (Spady, 1977, p. 17)
The controversy about the value of CBE programs, and what can and cannot be measured in competencies, is sure to continue for quite some time. However, there is some consistency in the types of CBE programs that are currently present within higher education. There are layers within these models. First there are those institutions who embrace the concept of CBE, and use competencies as an institutional internal assessment or alignment tool—like the use of general education outcomes. In contrast, there are also those institutions that use competency-based frameworks in newer and more disruptive ways (Klein-Collins, 2012). Of this latter group, Porter and Reilly (2014) note three types of CBE programs (a) a more traditional course and credit system, with capstone-type portfolios and a range of other integrated assessments; (b) time-independent programs where the educational process is truly self-paced and students can accelerate their learning; and (c) Prior Learning Assessment. Other definitions also separate them into two subsets: (a) programs with credit equivalency for CBE programs, and (b) direct assessment models (Book, 2014; Johnstone & Soares, 2014).

Other, fusion examples are present within the range of CBE programs. One such example is DePaul University’s School for New Learning where students can demonstrate their competencies by either taking coursework or by creating portfolios to demonstrate their learning. The process occurs in partnership with faculty mentors. Students are enabled to use competencies that they acquire in work and life towards their credential, and they work at their own pace (Klein-Collins, 2012).

This disaggregated form of contextualized learning is also used by Western Governors University. There, students can learn in online courses or even take
commercially available learning modules, as long as they are able to success fully demonstrate their achievement of the competencies (Johnstone, 2005). Recently, Western Governors University shared its model with 11 institutions through funding from the U.S. Department of Labor and through the Bill & Melinda Gates Foundation. Among the participating institutions were: Austin Community College, Bellevue College, Broward College, Ivy Tech Community College at Fort Wayne and Lafayette, Lone Star Community College; Sinclair Community College; and Valencia College (Johnstone & Soares, 2014).

University of Wisconsin’s Flexible Option has a similarly holistic view of curriculum, made up of the bookends of competencies and assessments, with curated content in the middle. This embraces more of the philosophy of direct assessment, where curriculum is not simply mapped to convert courses to competencies. Direct-assessment is considered a more pure form of CBE—it is truly mastery-based and time-independent; “in this model, instead of learning being variable and time constant, learning is constant and time is variable” (Brower, 2014, para. 12). However, the definition of direct assessment CBE as related to federal financial aid is largely semantic, as credit equivalencies must still be delineated for approval for experimental site status after having been approved by the college’s accrediting body. Approval by regional accreditors again involves mapping competencies to course equivalencies (Council of Regional Accrediting Institutions, 2015).

In 2015, Public Agenda released a series of 10 core design principles that were supported by funding from the Bill & Melinda Gates Foundation and Lumina Foundation
in collaboration with the Association of American Colleges and Universities, the
These design elements “represent the fullness of a CBE program, from organizational
viability to the learning experience” (Public Agenda, 2015b, p. 1). The 10 core design
principles are:

- Clear, cross-cutting and specialized competencies
- Coherent, competency-driven program and curriculum design
- Embedded process for continuous improvement
- Enabling and aligned business processes and systems
- Engaged faculty and external partners
- Flexible staffing roles and structures
- Learner centered
- Measurable and meaningful assessments
- New or adjusted financial models, and
- Proficient and prepared graduates. (Public Agenda, 2015b, p. 2).

Some institutions have specialized in CBE programs through partnerships with
corporations. One example of this is College for America’s partnerships with a variety of
large, national corporations. College for America is a part of Southern New Hampshire
University—a not-for-profit university. College for America was built to have entirely
CBE degrees designed for working adults (Arizona State University News, 2014, para. 1). Employer funded, or partially funded degrees, in direct partnership with colleges, are
only part of the changing financial landscape of higher education. Southern New
Hampshire University’s College for America was also the first CBE program to be approved as an experimental site through the U.S. Department of Education for a direct assessment program (Fain, 2013b).

Despite this burgeoning interest, a void exists in the research surrounding student outcomes from CBE programs as compared to traditional college programs. There is a plethora of formal reports, case studies of colleges engaged in CBE, and current and prospective structures for CBE. The research on CBE that does exist is largely in clinical settings—specifically the medical field wherein time is not always variable (Ahmad, De Rossi, Frank, Horsley, Mungroo & Wang, 2010). Lumina (2011), notes this when stating the argument for the Degree Qualifications Profile (DQP). Specific disciplines have created consistent objectives and assessments for learning through the engagement of stakeholder parties. Industry-specific accreditation bodies and associations have also worked together to create more flexible, robust credentials based on clear objectives. Within these various levels and discussions of CBE by stakeholder groups, the issue of the actual learning and teaching methodologies is also present, though often seen through a lens of fiscal sustainability, scalability, and faculty roles.
The Various Pedagogies of CBE

Alongside calls for reforms in higher education that have birthed renewed interest in CBE have come calls for more modern educational methodologies for learning and teaching. Andragogy and pedagogy alike have been called insufficient in order to meet the needs of the 21st century post-traditional college student; rather a need exists for educators to “teach learners how to teach themselves,” (Blaschke, 2012, p. 57). Though the term “self-directed” is used often to describe learners in a CBE model, little effort is made to distinguish the self-determination typified by the methodologies of heutagogy with the self-directed learning that is closely associated with andragogy. There are CBE programs that more clearly utilize andragogical methods and those that more clearly utilize heutagogical methods, and still more that utilize some combination thereof.

Andragogy as a learning theory was an outgrowth of research in the 1960s into how adults learn (Knowles, 1988). Knowles (1988), originally described the term as “the art and science of helping adults learn” as a counterpoint to pedagogy being the art and science of helping children learn (p. 43). As he further developed his theory, he conceptualized of andragogy as simply another model of assumptions about learners and how they learn. He noted that in andragogy, learners moved from “dependency toward increasing self-directedness, but at different rates for different people” (Knowles, 1988, p. 43). The “self-directed” learner is often referenced in CBE. DePaul University’s School for New Learning describes their CBE program as one that “lets students combine the practical and imaginative to satisfy their goals and dreams in an education that is self-directed” (DePaul University, 2015, para. 1-3).
Heutagogy, originated and defined by Hase and Kenyon in 2001, is “the study of self-determined learning” (p. 2). The methodologies of this learning paradigm can be traced back to andragogy and are described as an “optimal approach to learning in the twenty-first century” (Hase & Kenyon, 2001, p. 2). Heutagogy identifies the learner as an individual who indeed knows how to learn; this description of self-determined learner is well-matched to a distributed and open learning environment that is possible in online learning (Beaven, Comas-Quinn, Hauck & Lewis, 2014). Eberle (2009) describes the purpose of educators in online environments as one disassociated with the dissemination of information. The purpose of education in this paradigm is one wherein students are challenged to become “capable problem solvers, effective leaders, and community participants” (Eberle, 2009, p. 185).

Blaschke (2012) describes components of CBE programs that align with heutagogy including the use of PLA and contract learning. The author writes that heutagogy is well positioned for distance learning “in part due to the ways in which heutagogy further extends the andragogical approach and also due to the affordances it offers when applied to emerging technologies in distance education (such as Web 2.0)” (2012, p. 57). Personalized learning contracts are one such example described by Blaschke. Learning contracts are agreements scoped with mentors at some institutions within CBE programs that define what will be learned, what the proof of learning will be (i.e. assessment,) and how it will be learned (Blaschke, 2012).

If the philosophy Knowles used to reconceptualize the aptness and utility of andragogy can be applied to heutagogy, it matters less if a CBE program is more codified
and structured and therefore best matches a “self-directed” learner, or if a CBE program is more distributed and open with learning contracts and PLA and therefore best matches a “self-determined” learner. It is far more important to know the difference between them, and which methods would be appropriate for which subset of students and which type of program.

When new paradigms of learning and teaching are embraced, the concept of unbundling is introduced—disaggregating various parts of the educational experience. It was originally conceptualized in the mid-1970s by Wang (1981), who thought that the structure of higher education amounted to violating the Sherman Antitrust Act through the “bundling” of the various components that make up college including advising, credentialing, “membership,” and delivery of information. In the late 1970s, Trout conceptualized the community college as falling into three primary roles: (a) instruction, (b) assessment, and (c) advising (as cited in Paulson, 2002, p. 124). The unbundling of education was reintroduced in the common vernacular as a way to describe disaggregating costs connected to the different components of the college experience (Paulson, 2002). The changes in costs of components of the educational experience have necessitated this discussion—some have dramatically increased while others have nose-dived. Kamenetz describes this: “Increasingly, some of these resources (e.g., faculty time) are strained, while others (like written course content) are approaching a marginal cost of zero” (2010, loc. 199 of 336). Within CBE, one of the components of the learning experience that has been the subject of many different models and experimentation is that of faculty roles. The role of learners necessitates this conversation: a self-directed (or
even self-determined) learner requires a different type of instructional support through
the learning process.

**Faculty Roles**

The primarily online nature of CBE programs, as well as the “break” from
traditional course-based structures supports the bifurcation of faculty roles; at many
institutions two or more disaggregated roles have emerged. One primary role involves a
faculty member focusing on subject-matter expertise to teach within the virtual
classroom. A second role involves a faculty member coaching the student to guide their
overall progress throughout the entirety of the program (Porter & Reilly, 2014). Some
colleges also have an “assessor” role, like Southern New Hampshire University’s College
for America, where a third expert does not engage with the student in the course or in a
support role, but rather blind assesses student work (Cini, Ford, Mulherrin, & Vignare,
2013). Book (2014) notes that “Different faculty, or other qualified professionals, may
play the role of content developer, pedagogical designer, student mentor or advisor,
and/or assessment designer and evaluator” (Book, 2014, p. 5).

In EDUCAUSE’s *7 Things You Should Know About Competency-Based Education*, the authors note that “As CBE gains currency, colleges and universities might
place a greater dependence on mentors, coaches and tutors to direct students across a
diverse curriculum” (EDUCAUSE, 2014, p. 2). This separation of faculty roles has the
potential to enable a more sustainable and scalable educational model as faculty are no
longer the “deliverers” of knowledge and therefore can support more students (Porter &
Reilly, 2014).
The disaggregation of faculty responsibilities into different roles has been well-documented at Western Governors University. Curriculum development has been separated from course delivery whereby faculty are engaged in the process of selecting instructional resources and activities, but they do not create those courses themselves (Oblinger, 2012). Students have course mentors who have subject-matter knowledge, and student mentors, who follow the student throughout their program and provide non-instructional support (Oblinger, 2012; Staker, 2012).

This disaggregated faculty role has significant implications for the eligibility of such programs—even credit conversion programs—for federal financial aid. CBE programs applying for federal financial aid approval must meet specific standards. For the colleges and universities selected as Experimental sites, an important requirement of the learning process is “regular and substantive interaction between students and instructors” (Title VI of the Higher Education Act of 1965 as Amended, 2014, p. 44434). The U.S. Department of Education released a letter to the Accrediting Agency Executive Directors on June 9, 2015 that provided those agencies with more specific information on what they needed to do in order to ensure the quality of the CBE programs included in the Experimental sites program. A more detailed description of what is considered to be “regular and substantive interaction” was provided (Bounds, 2015). The Director of Accreditation in the Office of Postsecondary Education noted that the phrase “regular and substantive interaction” translated to: “Students must have access to qualified faculty; and programs must be designed to ensure regular and substantive interaction between students and those faculty members” (Bounds, 2015, p. 2).
Qualified faculty must have experience within their field and appropriate academic credentials as determined by the accrediting agency (Bounds, 2015). The letter emphasized “access” throughout—though the student may not be required to meet with a faculty member, they must have access to a qualified, credentialed and experienced faculty member in the appropriate subject matter. Students should be supported should they need help with a concept, assessment, assignment, for extension activities or even for career advice. The letter further acknowledged that learning coaches and online tutoring could be utilized for the majority of student-to-faculty interaction, but programs must “include access to an academically qualified faculty member at least when students need or want it” (Bounds, 2010, p. 3). The letter seemed to support the unbundling of faculty roles, noting that if it is not the faculty member’s responsibility to monitor student progress, then the institution needs some other staffing structure (and software) to monitor and provide support to students. The letter also notes that the burden of proof is on the schools to demonstrate that students are not left “to educate themselves” (Bounds, 2015, p. 3). If students are “left to educate themselves,” the program would not meet the criteria for an online or blended degree program, but instead a correspondence program.

In September of 2015, the independent Office of the Inspector General (OIG) of the U.S. Department of Education released its final audit report documenting its evaluation of the Higher Learning Commission’s approval process for CBE programs. The OIG was critical of the approval process used by colleges to demonstrate that students were engaging in “regular and substantive interaction” with faculty members (U.S. Department of Education, Office of the Inspector General, 2015). The OIG
recommended that Higher Learning Commission (HLC) be required to “reevaluate competency-based education programs previously proposed by schools to determine whether interaction between faculty and students will be regular and substantive, and, if not, determine whether the programs should have been classified as correspondence programs” (Office of the Inspector General, 2015, p. 3).

The emphasis on “regular and substantive interaction” illustrates a heightened concern about faculty roles in CBE, and the disaggregation of those roles can be controversial. The nature of faculty roles is one of the many “cons” that is noted by those critical of CBE.

**Arguments for and Against CBE**

The movement toward expansion of CBE in higher education does not have universal support. One aspect of the ongoing controversy surrounds the nature of learning assessment; perhaps all learning cannot be adequately measured by pre-determined competencies. Some valuable learning may not be categorically linked to pre-determined competencies (Billet & Ten Cate, 2014, p. 326). The increasing focus on competencies for the workforce make some in higher education uncomfortable as to the potential implications for narrowing the once broad objectives of higher education—certainly a liberal arts education.

Hickey (2013) notes that some resistance to CBE models is based on perspectives about the nature of learning. For some, constructivism, inquiry-based learning and problem-based learning are considered anathema to the concept that "complex knowledge and skills can be readily broken down into more specific elements while still maintaining
their essential meaning and educational value" (para. 5). Many advocates of liberal education agree with the concept that a rich education cannot be distilled into atomized competencies. Christopher B. Nelson, president of St. John's College in Annapolis, argued in a blog post that the pursuit of truth and the community of learners is necessary within liberal education, and that this can only be accomplished in class amongst other learners, led by a teacher. He argues that education is not simply about information, and states that "it is now becoming fashionable to claim that the mode of acquisition is irrelevant" (December 2, para. 5). Still other arguments have been made that CBE reinforces stratification by enabling less affluent students to receive a "product" of less value. Slaton argues that "Budget versions of education, like surgery or car repairs, are no bargain" (2013, para. 6.)

Can CBE coexist within an educational environment that acknowledges, and even prizes, the knowledge and skills that cannot be clearly defined, assessed, or sometimes even seen? As far back as 1977 it was acknowledged that not all learning can be adequately measured or evidenced:

Some of these capacities are, of course, quite apparent and measurable; others are extremely subtle or even invisible to many people. The essential point, however, is that competency requires tapping this reservoir of individual capacities, integrating them in complex ways, and applying them based on the competencies present in specific social contexts. (Spady, 1977, pp. 16-17)

On the other side of the argument, in an interview with Rebecca Klein-Collins, Ralph Wolff, president and CEO of the Western Association of Schools and Colleges
(WASC), the accrediting body for California and Hawaii, said that “the word “competency” is not a pejorative, even though some people use it that way. It is about knowing and doing” (Cini et al., 2013, p. 28).

Gallagher (2014), notes that some contemporary CBE programs—like that of Southern New Hampshire University’s College for America—are still fundamentally (if not functionally,) “an individualized approach to education in which students demonstrate the acquisition of predetermined competencies, typically in a self-paced manner and through performance assessments,” (p. 18). If the model proves effective for students—particularly students not well-served under the dominant model of higher education—perhaps the tangible and intangible can coexist within CBE.

Another criticism of CBE is that the students for whom it is most typically intended, post-traditional learners and those underserved by traditional higher education institutions, may have the most challenges with a self-directed model (Gaertner & McClarty, 2015; Klein-Collins, 2013; Laitien, 2012). Gallagher (2014) refers to this as “self-authored learning” and cites the study conducted by Peter Elbow in 1979 which found that disadvantaged students were the first to drop out of CBE programs. The evidence cited by Gallagher was from 1979, before the advent of online learning and the proliferation of digital technology.

Some critics point to the lack of reliable studies that support the effectiveness of CBE programs. Gallagher (2014) writes of Johnston and Soares’ analysis of Western Governors University that “they present no data, comparative or otherwise, on students’ learning” (p. 20). The significantly shortened time to degree completion would seem to
contradict this statement. At Western Governors University, the average time to bachelor’s degree completion is 30 months, versus an average time to completion of 60 months throughout higher education (Mendenhall, 2012).

In addition to acceleration of student degree completion, institutions that create CBE programs and modularize learning may themselves have an edge. The modularization of learning resources, activities, assessments and even interactive engagement can “can be easily arranged, combined, and scaled online into different programs for very different industries” (Weise, 1997, p. 30). Institutions that can provide students with a coherent, segmented degree program that is self-paced and largely under the students’ control may attract more and different types of students.

A Brief History of CBE

The dominant model of higher education—and the model by which students receive federal financial aid—utilizes the Carnegie Unit as a proxy for student learning. The Carnegie Unit was created in the early 20th century when Andrew Carnegie established the first pension system for college professors through a donation of $10 million to the Carnegie Foundation for the Advancement of Teaching. In order to determine what colleges and professors were eligible to participate, institutions needed to meet specific criteria, one of which was that admitted students had completed an appropriate and full high school course of study (Silva et al., 2015). The Carnegie unit was born of the effort to codify what the completion of a high school course of study would entail, thereby setting the criteria for college (Freeland, 2014). One Unit was determined to be a year of study in a field for five days a week (or 120 hours of contact...
time.) Fourteen units was determined to be the minimum preparation encompassing four years of English and foreign language, and three years of history, science, and mathematics (Silva et al., 2015).

As a result of this, time itself inadvertently became the core metric for the measurement of learning in secondary education; this became known as “seat time” (Freeland, 2014; Ordonez, B. 2014). The interpretation of time as equivalent to learning became the default system in higher education as well. The Carnegie Unit in colleges and universities is dependent upon the number of “contact hours” per week per semester. For a typical, four-year bachelor’s degree this translates to a student earning fifteen credit hours per semester for around 120 total credits (Silva et al., 2015).

Criticism of the analogy of the equivalence of time and learning came within decades of the creation and implementation of the Carnegie Unit by none other than the Carnegie Foundation itself. The Carnegie Foundation conducted a study on the results of an assessment given to college students at the conclusion of each year of study in college. It indicated that students’ level of knowledge remained constant throughout the four years of education, rather than increasing each year (Laitinen, 2012.) In response, the then-president of the Carnegie Foundation Walter A. Jessup wrote that “the passing of the system of units and credits, which, useful as it was … is not good enough for American education today” (Laitinen, 2012, p. 5). This critique from the Carnegie Foundation about the Carnegie Unit came in 1938. Nearly 80 years later, the Carnegie Unit is still the overwhelming mechanism serving as a proxy for learning in higher education and in high schools, despite Walter A. Jessup’s excoriating that colleges should base student
development on “the attainments of minds thoroughly sorted and competent” (Laitinen, 2012, p. 5).

Even before that study, in 1934 the then-president of the Carnegie Foundation, Henry Suzzallo, wrote in the annual report that educational systems should allow for more flexibility and individualism in learning while being more transparent about the standards of performance to be achieved in as little time as possible (Silva et al., 2015). The usefulness of the Carnegie Unit as a mechanism for the improvement of “administrative efficiency of schools and colleges,” aligning to the focus on the historical development of “scientific management” during the early 1900’s, entrenched the use of the Carnegie Unit in the administration of colleges and universities (Silva et al., 2015).

Previous U.S. Secretary of Education Arne Duncan, in his remarks delivered at the American Enterprise Institute, stated that “A century ago, maybe it made sense to adopt seat-time requirements for graduation… But the factory model of education is the wrong model for the 21st century” (U.S. Department of Education, 2010, para. 22). The report The Carnegie Unit, published by the Carnegie Foundation, noted that “American education’s reliance on the Carnegie Unit is indeed an impediment to some of the solutions sought by today’s reformers” (2015, p. 11). The authors specifically note the challenges to innovation in educational systems based on the use of the Carnegie Unit by the federal government for financial aid for students.

Though gaining ground in discussions, experimentations, programs and policy, CBE itself is not a new concept. Some of this interest can be traced back to the Higher Education Act of 1965 when college became accessible to a wider student audience
(Gaetner, Larsen & McClarty, 2015; Klein-Collins, 2013). CBE—and also Outcomes-Based Education (OBE)—can pedagogically trace its background further into the first half of the 20th century to behaviorism based on the work of Watson, Pavlov, Thorndike and Skinner (Dornan, Eika & Morcke, 2013). This emphasis on observable behaviors can be seen in current CBE programs, where students need to prove what they know and can do through demonstration on assessments. Many of the characteristics of these newly developed CBE programs are the same as programs originally developed and implemented in the 1970’s. The U.S. Department of Education, through the Fund for the Improvement of Postsecondary Education (FIPSE), funded the creation of many CBE programs in an attempt to serve the needs of post-traditional, adult learners who were not well served in the typical college structure. Simultaneously, these grants researched the effects of these models (Gaertner & McClarty, 2015; Klein-Collins, 2013). Mastery learning gained interest and momentum during this time, and education refocused around the individual (Hall & Jones, 1976).

Some of the rationale behind those initial experiments will sound familiar to those aware of the contemporary expansion of CBE programs. Hall and Jones (1976) reference four unrelated factors in the original development of CBE, particularly related to the field of teacher education: (a) a surplus of available K-12 teachers; (b) questions about the need for, and value of, a college degree; (c) taxpayer calls for accountability in educational spending; and (d) research and development efforts supported by the federal government. Funding for educational research included not only teaching methodology, but also instructional media. Twenty educational laboratories and 11 research and
development centers were built from the mid 1960’s forward and supported some of these efforts (Hall & Jones, 1976).

A consortium of Minnesota community colleges received one of these FIPSE grants in 1973. The evaluation of student performance determined that those educated in the CBE program demonstrated “improved performance for beginning teachers, and higher levels of teacher and student satisfaction” (Gaertner & McClarty, 2015, p. 1). Other initial recipients of FIPSE grants for CBE included Alverno College, DePaul University’s School for New Learning, Empire State College and Regents College (since renamed to Excelsior College); the work of these institutions was instrumental in the development of CBE (Book, 2014; Brower, 2014; Council of Adult and Experiential Learning, 2013; Council of Independent Colleges, 2015; Klein-Collins, 2013).

Alverno College began developing CBE programs in the late 1960s, introducing their first CBE degree program in 1973 (Council of Independent Colleges, 2015; Gaertner & McClarty, 2015; Klein-Collins, 2012). Alverno College is a Catholic women’s college founded by the School Sisters of St. Francis in 1887 (Alverno College, n.d.-a; Council of Independent Colleges, 2015). In the late 1960s, a survey was sent out that solicited feedback from faculty on what learning outcomes were seen as the most critical for both departments and courses (Gaertner & McClarty, 2015; Klein-Collins, 2012). Initially, four global learning competencies were created (Klein-Collins, 2012); these were expanded through further discussion to eight core competencies (Alverno College, n.d.-c; Gaertner & McClarty, 2015; Klein-Collins, 2012). The language used by Alverno College for these competencies is “abilities.” It calls the approach an “Ability-
Based Curriculum” (Council of Independent Colleges, 2015). These eight core “abilities” are (a) communication, (b) analysis, (c) problem-solving, (d) valuing, (e) social interaction, (f) developing a global perspective, (g) effective citizenship, and (h) aesthetic engagement (Alverno College, n.d.-c). The abilities have been revisited over 13 times since the creation of the original four competencies (Gaertner & McClarty, 2015; Klein-Collins, 2012).

The progress of students in their achievement of the abilities “is articulated as a series of developmental levels through which individual students progress over the course of their college careers” (Klein-Collins, 2012, p. 17). Alverno College does not award grades, rather they provide students with a “narrative transcript.” This transcript provides a descriptive and holistic picture of student accomplishments (Alverno College, n.d.-b). An illustration of how Alverno College communicates their unique approach can be found in Figure 3 (Alverno College, n.d.-c).

Figure 3. Alverno College’s Description of the Use of the 8 Abilities
Empire State College—part of the State University of New York (SUNY) system—was established by the SUNY Board of Trustees in 1971 (SUNY Empire State College, 2015). Heavily influenced by the desire to serve underrepresented groups in higher education, the pedagogy of the College from its conception has been highly individualized, enabling students to design their own degree programs in partnership with faculty mentors in one of 12 broad areas (Benke, Davis, & Travers, 2012; Laitinen, 2012; SUNY Empire State College, 2015).

This learning paradigm was significantly different than that embraced by the vast majority of higher education institutions. At Empire State College, “co-developed learning contracts presumed that learners had unique goals and interests and were active partners in the design of their own learning” (Benke et al., 2012, p. 145). Though not yet developed as a learning science at the time, this foreshadowed the formalization of heutagogy, rooted in andragogy and supported by the advances in distance learning technologies. Learners self-determine their own education with a great amount of autonomy; individualized learning contracts are indicative of this process (Blaschke, 2012; Hase & Kenyon, 2001).

Empire State College also has a defined process for implementing Prior Learning Assessment (PLA) in order to enable students to obtain credit for prior learning (Laitinen, 2012; SUNY Empire State College, 2015), which can account for up to 75% of their bachelor’s degree (Benke et al., 2012). This personalization is now more commonly referred to as “mass customization” whereby “students can approach the degree programs entrepreneurially, designing their own degrees and taking advantage of different methods
of instruction and content delivery” (Council for Adult and Experiential Learning, 2013, p. 9).

Empire State College has offered online courses since the 1980s (Laitinen, 2012), and is currently “redefining and repositioning the college as an “open university” in a digital age” (Benke et al., 2012, p. 146). Most recently the college has innovated through the use of Massive Open Online Courses (MOOCs), further expanding on their “open” philosophy. Students can gain college credit for MOOCs after paying the college a fee for the credit (Benke, et al., 2012).

Also established in the 1970s was Thomas Edison State College (Council of Independent Colleges, 2015; Laitinen, 2012). The college’s focus is on meeting the needs of adult learners “whether it is for professional advancement or personal fulfillment” (Thomas Edison State College, 2015, para. 2). They employ a variety of methods for structuring, enabling, and documenting learned knowledge and skills including PLA, credit transfer and credit by exams (Laitinen, 2012; Thomas Edison State College, 2015). They were also early adopters of online courses, piloting their use in 1987 (Laitinen, 2012); they are highlighted currently on the college’s website (Thomas Edison State College, 2015). In addition to online courses, Thomas Edison State University has an independent study program called “FlashTrack” wherein students receive course materials on a flash drive along with exam software. Students can currently engage in a fully online degree program at the college (Klein-Collins, Sherman, & Soares, 2010).
Excelsior College was also established during this previous investment period in CBE in 1971. It was founded by the New York State Board of Regents under the name of Regents External Degree Program or REX. The Ford Foundation and the Carnegie Corporation originally funded the creation of the college, which in 1998 became a separate functioning private, non-profit college. In 2001, it changed its name to Excelsior College (Excelsior College, 2015).

Charter Oak State College was established by the Connecticut legislature in 1973 (Brower, 2014). “Degrees Without Boundaries” was designed to meet the unique needs of women who were returning to college. Credit-by-exam and PLA enabled these underserved women to successfully complete degrees, with instruction added in 1998. With approximately 2,000 students, most now utilize online courses (Laiten, 2012). Charter Oak State College is among the institutions that require a three-credit portfolio review course (Klechen, 2015).

DePaul University’s School for New Learning (SNL) was established in 1972 as a liberal arts-focused institution for working adults, age 24 and older (DePaul University, 2015; Klein-Collins, 2012). The largest degree area at the SNL is the Bachelor of Arts with Individualized Focus Areas. It enrolls about 2,000 students. Their framework includes 50 competence (or “competency”) statements in three main areas: (a) Lifelong Learning Area, (b) Liberal Learning Area, and (c) Focus Area (Klein-Collins, 2012). DePaul University’s School for New Learning utilizes a mix of modalities including both competence-based (their terminology) and course-based learning experiences in multiple modalities, including hybrid programs (DePaul University, 2015). A segment of the
DePaul School for New Learning Bachelor of Arts program grid can be found in Figure 4.

<table>
<thead>
<tr>
<th>LIFELONG LEARNING AREA</th>
<th>LIBERAL LEARNING AREA (26 competencies)</th>
<th>FOCUS AREA (12 competencies)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(12 competencies)</strong></td>
<td><strong>Art &amp; Ideas</strong></td>
<td><strong>The Human Community</strong></td>
</tr>
<tr>
<td>L1 Learning Assessment Seminar: Can assess one’s strengths and set personal, professional, and educational goals.</td>
<td>Competence in Interpreting the Arts (A-1-.)</td>
<td>Competence in Communities and Societies (H-1-.)</td>
</tr>
<tr>
<td>L2 Foundations of Adult Learning: Can use one’s ideas and those of others to draw meaning from experience. (5 hrs)</td>
<td>Competence in Creative Expression (A-2-.)</td>
<td>Competence in Institutions and Organizations (H-2-.)</td>
</tr>
<tr>
<td>L3 Foundations of Adult Learning: Can design learning strategies to attain goals for personal and educational development. (5 hrs)</td>
<td>Competence in Reflection and Meaning (A-3-.)</td>
<td>Competence in Individual Development (H-3-.)</td>
</tr>
<tr>
<td>L4 Academic Writing for Adults: Can use writing for college-level learning, thinking, and communicating. (4 hrs)</td>
<td>Any competence in Arts and Ideas (A-4-.)</td>
<td>Any competence in The Human Community (H-4-.)</td>
</tr>
<tr>
<td>L5 Critical Thinking: Can analyze issues and reconcile problems through critical and appreciative thinking. (4 hrs)</td>
<td>Any competence in Arts and Ideas (A-5-.)</td>
<td>Any competence in The Human Community (H-5-.)</td>
</tr>
</tbody>
</table>

**Figure 4.** DePaul School for New Learning BA Program Grid (Klein-Collins, 2012, p. 26).

Little within the confines of CBE programs occurred beyond these first adopters until the mid- to late-1990s, when Western Governors University was founded. It is important to note that other fields did continue to implement formalized models of education that also embraced the term “competency-based.” There are distinct differences between those efforts and the contemporary programs that are explored in this dissertation. These will be discussed in brief in a further section.

Western Governors University (WGU) was established in the mid-1990s by the nonpartisan Western Governors Association, made up of the governors of 21 Western states. Originally called the Western Virtual University (Meyer, 2005), it was created to
address concerns about the need for increased access to higher education in the West for both high school graduates and post-traditional learners at a time when there was limited state funding (Mendenhall, 2012; Meyer, 2005; Paulson, 2002). WGU degree programs are one of the foundational examples of direct assessment whereby students progress through their education by proving their skills and knowledge on competency-based assessments independent of time. Students utilize curated online content and are supported by faculty coaches in order to successfully complete their assessments (Klein-Collins, 2013). WGU was conceptualized as a way to scale higher education utilizing online learning while focusing on demonstrable skills as the founders believed that “the credit hour was not sufficiently measuring what graduates know and can do, and that their new university would have to be competency-based to measure those skills” (Mendenhall, 2012, p. 115).

Currently, WGU has more than 50,000 graduates, 55,000 current students, and boasts an average time to degree of less than three years for an undergraduate program, far below that of typical universities (Western Governors University, 2015). WGU has received external validation of the quality of their programs, including their secondary teacher training program, which, along with Lipscomb University, were the top programs nationally as rated by the National Council on Teacher Quality (NCTQ, 2014).

Why the resurgence of CBE? Some of the recent momentum in CBE can be attributed to a combination of loud calls for reform of higher education, suspicion about the value of higher education, the financial support of programs by influential funding agencies in higher education reform, and finally by the technology catching up with the
philosophy of the model (Gallagher, 2014; EDUCAUSE, 2014). Additionally, the growing focus on student outcomes and knowledge that led to the expansion of Prior Learning Assessment contributed to the advancement of the CBE movement (Gaertner & McClarty, 2015).

The 2005 reauthorization of the Higher Education Act enabled colleges to use “Direct Assessment” through acceptance as an experimental site for federal aid (Porter & Reilly, 2014). In 2013, Southern New Hampshire University (SNHU) became the first college approved for this Direct Assessment provision (Klein-Collins, 2013). Capella University was the second to be approved (Fain, 2013b); Brandman University was another experimental site approved early (Fain, 2014); Walden University’s Tempo program and Texas State College System followed (Fain, 2015b).

CBE in K-12 Systems and Schools

There have also been developments and interest in CBE at the K-12 level, which faces many of the same challenges related to the Carnegie Unit. There has been growing acknowledgment that a time-based educational system may not be appropriate for an increasingly complex, information-based world (Bristow & Patrick, 2014).

CompetencyWorks is an online resource and initiative through the International Association for K-12 Online Learning (iNACOL.) The purpose of CompetencyWorks is to advance knowledge about CBE in K-12 through sharing information, best practices, state policies, and research (CompetencyWorks, 2012). Sturgis (2015) in the publication through CompetencyWorks entitled Implementing Competency-Based Education in K-12 Systems: Insights from Local Leaders reported that almost 90% of all states have some
support for competency-based educational innovations at the K-12 level, with states New Hampshire, Maine, Vermont and Colorado emerging as leaders in designing more personalized, less time-constrained learning for students.

CompetencyWorks hosts a wiki for K-12 involved schools and districts. As of November 8, 2015, they note case studies from a wide array of schools including Boston Day and Evening Academy, Carpe Diem, Cornerstone Charter School, several schools in the Michigan’s Education Achievement Authority, Phoenix Multicultural Academy, Barack Obama Charter School, the Lindsay Unified School District, Sanborn Regional High School, and Virtual Learning Academy Charter School (CompetencyWorks, retrieved November 8, 2015).

Despite the experimentation that is ongoing, the vast majority of programs at the K-12 level are teacher and school-driven, with significant challenges for school-wide CBE. District restrictions surrounding assessments, grading, finances, school autonomy, student grade promotion and staffing as well as teacher evaluations, all impact the ability of K-12 schools to effectively implement CBE (Sturgis, 2015).

**PLA and CBE Connections**

CBE shares a historical connection with PLA; both are also connected through a common philosophy, that through effective assessment, what a student knows and can do should and can be counted for college credit.

Several colleges that were created as CBE institutions in the 1970s also embraced the use of PLA. Thomas Edison State College, Excelsior College, Empire State College and Charter Oak State College all utilized PLA and were even referred to as “credit
aggregators” which allowed students to assemble degrees through proof of applicable skills and knowledge (New American Foundation, 2015). At a philosophical level, both PLA and CBE are connected through assessment and the belief that credentials should be reflective of what students can prove in terms of skills and knowledge regardless of where or how those competencies were gained, and irrespective of the amount of time it took to acquire and demonstrate them (Klein-Collins & Tate, 2015).

There are challenges with the implementation of PLA systemically, as the cost for assessments in order to gain college credit is not covered by allowable student financial assistance like Pell grants and student loans. These expenses may still be substantially less than taking the competencies or credits as a learning experience through the institution. However, as PLA cost is “out of pocket,” it may be out of the reach of some of the very students most in need of it (New American Foundation, 2015). Despite these challenges, many state-wide systems and affiliated institutions have begun the process of creating consistent procedures and determining which assessments are valid for the granting of PLA within their groups. Examples of these initiatives include those at the University of Wisconsin System (Rusk, 2014), and the community colleges in Pennsylvania, who built a College Credit Fast Track system with funds from Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant from the U.S. Department of Labor (College Credit Fast Track, n.d.). Other states are in various stages of promotion and implementation of PLA, including those where statewide governance of higher institutions have less control over institutional implementations like Ohio (Ohio Board of Regents, n.d.).
Recommendations for the success of CBE, the promotion of degree completion, and acceleration of time to degree include the reduction of institutional barriers between credit and non-credit programs (Bird, Ganzglass & Prince, 2011). Among these recommendations introduced in the Center for Law and Social Policy’s (CLASP) *Giving Credit Where Credit Is Due* is to create improved and simplified processes for PLA while aligning competencies between non-credit and credit bearing programs (Bird et al., 2011).

In a 48-institution study conducted by CAEL of PLA outcomes indicated that students who earned credit through PLA graduated at a higher rate than those who did not at both the associates and bachelor’s degree level. Students graduated with associates degrees at a rate of 13% versus 6% of those who did not earn PLA, and a bachelor’s degree at a rate of 43% versus 15% (Council for Adult and Experiential Learning, 2010). The study was conducted at 48 institutions that self-selected to participate in order to compare the degree completion rates, time to degree, and other variables amongst students who took PLA versus those who did not. The authors of the study acknowledged that these results may not be a causal relationship, as students who pursue and utilize PLA may be “already highly motivated or academically successful” and that those characteristics may increase their likelihood to complete their degree (Council for Adult and Experiential Learning, 2010).
Current CBE Programs

There are many currently functioning CBE programs, and hundreds more that are in various stages of development. The ones highlighted here are some of the larger programs not previously mentioned. Previously described programs include those at Alverno College, Empire State College, Charter Oak State College, Thomas Edison State College, Excelsior College, DePaul University’s School for New Learning, and Western Governors University.

Another CBE program that has been operational for some time is offered by the City University of Seattle. Its CBE programs focus on teacher certification preparation programs at the graduate level (Competency-Based Education Network, 2015a). Its first performance-based degree exploration began over 14 years ago in this area (Council for Adult and Experiential Learning, 2015a). Graduate programs are offered in CBE formats for teaching, curriculum and instruction, literacy specializations, special education and adult education. It also has programs at the undergraduate level with a B.A. in Management and a B.S. in Information Technology (Competency-Based Education Network, 2015a).

Capella University was the second provider approved as a direct assessment experimental site for CBE (Silva et al., 2015). Its self-paced program, FlexPath, enables students to move as quickly as they can through the learning process as long as they can demonstrate their skills and knowledge through assessments (Capella University, n.d.-a). The program utilizes a subscription-based cost structure, with students paying a flat quarterly fee to complete learning modules and assessments at their own pace.
(Christensen & Weise, 2014). This subscription cost structure also motivates the acceleration of degree completion.

A program that was more recently developed is the CORE program at Lipscomb University. CORE is an acronym for Customized, Outcome-based, Relevant Evaluation (Lipscomb University, 2015). Their program measures 15 competencies using a badging system based on the Polaris® Competency Model, which is a recognized, work-based competency model utilized by corporations. The learning materials and assessments are validated through statistical studies and psychometrics (Lipscomb University, 2015).

Using the Polaris® model, the University reached out to businesses and stakeholders and determined that 15 of the 41 Polaris competencies were appropriate for the undergraduate degree; consequently the program requires students to demonstrate mastery of these 15 competencies for successful completion (Gaertner & McClarty, 2015).

Brandman University is a founding member of C-BEN, with Laurie Dodge co-chairing the Steering Committee (Competency-Based Education Network, n.d.). Brandman University separated from the Chapman University system to focus on adult learners and their specific needs. Following two years of study and discussion, Brandman launched its framework in 2011 (Klein-Collins, 2012). The university has five specific degree qualification areas as well as overall integrated knowledge and a disciplinary skills requirement. The five qualification areas have aligned rubrics based on the Valid Assessment of Learning in Undergraduate Education (VALUE) rubrics developed through the American Association of Colleges and Universities (AAC&U),
(Klein-Collins, 2012). The bachelor of business administration at Brandman University enables learners to move through self-paced online courses with faculty mentors that have 55-60 competencies which are cross-walked to 120 credit hours (EDUCAUSE, 2014).

Another operational, national CBE program is Northern Arizona University’s Personalized Learning Program. Students can accelerate their time to degree completion through the use of competency-based assessments in specific areas including liberal arts, computer information technology and small business administration (EDUCAUSE, 2014). This initiative began in late 2012, and first enrolled students in Spring 2013 (Council for Adult and Experiential Learning, 2013). Students pay for their tuition in six-month subscriptions (Kelchen, 2015). Though Northern Arizona University’s program had been approved by its accreditor, the university was informed in 2015 by the U.S. Department of Education’s Office of the Inspector General that its program did not meet the requirements to be classified as a direct assessment program (U.S. Department of Education, Office of Inspector General, 2015).

Broward College offers an associate of science in Accelerated IT Training that leads to technical and industry certifications. Academic coaches support students by assisting in their goal development process and supporting their timeline and progress, as well as intervening if challenges arise (Myers, 2014). Broward College utilized a five-step development process to create the curriculum within Brightspace by D2L, their Learning Management System (LMS). As of 2014, 170 students were enrolled in the program (Myers, 2014).
Westminster College offers RN to BS programs in competency-based degree formats, which include project-based and self-paced online components (Council of Independent Colleges, 2015). Westminster College is participating in curriculum mapping initiatives in order to examine alignments between current student learning outcomes and competencies from Lumina’s Degree Qualifications Profile (Ewell, 2013).

C-BEN and CAEL

The national discussion of CBE has spawned the creation of new partnerships. One of these groups is the Competency-Based Education Network, or C-BEN. C-BEN is “a group of colleges and universities working together to address shared challenges to designing, developing and scaling competency-based degree programs” (Competency-Based Education Network, 2014a, para. 1). It originally was founded by 17 member institutions and two public systems. Funded by the Lumina Foundation, the goal is “to provide an evidence-based approach to advancing high-quality competency-based education capable of serving many more students of all backgrounds” (Competency-Based Education Network, 2014a, para. 2). It has since expanded its membership to additional institutions.

Another important group in the CBE space is the Council for Adult and Experiential Learning, or CAEL. CAEL has been heavily involved in PLA for the past 40 years. They have recently received funding from the Lumina Foundation to provide professional development to institutions on-site, to assist with developing faculty and staff about CBE programs (Council for Adult and Experiential Learning, 2015c). This further highlights the deep connections between PLA and CBE. CAEL’s focus is the
alignment of education and employment; their tagline is "Linking Learning and Work." They support a variety of PLA-related initiatives, including attaining college credit, degree completion, PLA, CBE, career paths, consulting, and serving as a liaison between workforce, the public sector and higher education. They also conduct research and work on public policy to support their efforts. CAEL was founded in the 1970s, decades after the origination of PLA in the 1940s by the American Council on Education’s military credit service (Book, 2014).

Digital technology now allows portfolio-based assessments in a more engaging, interactive, and robust way than previously possible. PLA often utilizes standardized tests, like the College Level Placement Exam (CLEP), and the Advanced Placement Exam (AP) as proof of a student having mastered a competency (Klein-Collins & Tate, 2012). There is some overlap between the concepts of CBE and PLA; as noted previously, some definitions of CBE include PLA as one of its component parts. Porter and Reilly (2014) note:

Clearly, there is little difference between assessing the student at entry, and allowing a student to take an assessment only a couple of weeks after entry: The central issue is whether the student can demonstrate mastery of a competency, regardless of where the competency was mastered. (Porter & Reilly, 2014, p. 3)

**Initiatives in the Field**

There are many ongoing initiatives in the field of CBE that have supported and accelerated the development of CBE programs. Some are government funded, like the U.S. Department of Labor TAACCCT grants, while some are funded by large and
influential foundations including the Bill and Melinda Gates Foundation and Lumina Foundation (Competency-Based Education Network, 2014a; Johnstone & Soares, 2014). Several of these large initiatives are highlighted here to provide some context surrounding the important projects that have received both support and attention nationally. Though there are many ongoing initiatives that could have been included here, such as ACE’s CREDIT initiative, those selected here cover a wide array of concerns related to systemic implementation of CBE outside of more traditional methods like credit transfer or PLA. Described initiatives include TAACCCT grants, EDUCAUSE’s Breakthrough Models Incubator, Connecting Credentials, the Credential Transparency Initiative, and Instructional Management Systems (IMS) Global’s Technical Interoperability Pilot (TIP).

**TAACCCT Grants**

The Trade Adjustment Assistance Community College and Career Training Grant Program (or TAACCCT grants as they are commonly known,) was signed into law by President Barack Obama as part of the Health Care and Education Reconciliation Act (U.S. Department of Labor, Employment and Training Administration, 2011). These large grants focused on community colleges and other higher education programs that could train workers in less than two years in order to enter the workforce in “high-wage, high-skill occupations” (para. 2). The TAACCCT grants announced in September of 2014 included 270 community colleges with a total award amount of $450 million. The grants were targeted to colleges that provide training in high-demand careers like
“information technology, health care, energy, and advanced manufacturing” (U.S. Department of Labor, 2014, para. 4).

Many early adopters of CBE in this second wave of popularity utilized TAACCCT funding to design and develop their programs, including Broward College (Myers, 2014). Other TAACCCT grant recipients which implemented programs with CBE models included West Virginia Community and Technical College System, Vincennes University Logistics Training and Education Center, Cape Cod Community College, Texas State Technical College, Bossier Parish Community College, Delgado Community College, Eastern Gateway Community College, and a project made up of Polk State College, Santa Fe College and Seminole State for the “Training for Manufactured Construction” or TRAMCON Consortium, (The Policy and Research Group, 2015).

**EDUCAUSE Breakthrough Models Incubator**

EDUCAUSE’s Breakthrough Models Incubator (BMI) was created to build on the concept of Breakthrough Models in higher education (EDUCAUSE, 2015b). EDUCAUSE, The Bill and Melinda Gates Foundation, and the League for Innovation in the Community College created the Breakthrough Models Incubator as a way to support the leadership teams of institutions in exploring and launching new learning models using student-centered design, exploiting technology, and emphasizing sustainability (EDUCAUSE, 2015d). The second and third cohorts of the initiative (2014 and 2015) are focused on developing CBE programs in colleges and universities (EDUCAUSE, 2015d). Participating colleges in the 2014 and 2015 cohorts include University of
Maryland University College, the University of New England, Ivy Tech Community College, Central Arizona College, Rio Salado Community College, Austin Community College, Empire State College, Cuyahoga Community College, and Excelsior College (EDUCAUSE, 2015d).

**Connecting Credentials**

Connecting Credentials is an initiative sponsored by 80 organizations including the Lumina Foundation, Corporation for a Skilled Workforce, and CLASP (Connecting Credentials, 2015; Connecting Credentials, 2015). The initiative was designed to create a credentialing system that is more “student-centered and learning-based” (Connecting Credentials, 2015, para. 1). The impetus for this initiative comes from the fragmented nature of credentials throughout higher education, industry, and professional certificates and licenses. The wide array of invested parties involved represent the actual producers and users of the credentials; convenings and summits were hosted in order to start the conversation (Connecting Credentials, 2015).

From this initiative, a Beta Credentials Framework was created (Connecting Credentials, 2015). The Beta Credentials Framework organizes competencies into two domains: knowledge and skills. The second domain—skills—is then further divided into three sub-domains of specialized skills, personal skills and social skills (Lumina Foundation, 2015a). In order to describe the level of mastery of a competency, or the “relative complexity, breadth and/or depth of learning achievement, rather than subject matter,” eight levels are described for these skills (Lumina Foundation, 2015a, p. 2). As
of November 2015, next steps in the further refinement of the Beta Framework are
categorized into four components:

I. Credentials will be mapped using the framework in order to validate it and/or
make improvements.

II. A technical team will review the Framework’s internal structure as compared
to international qualification frameworks along with other industry experts,
human resource professionals, and educational psychologists.

III. The framework will be applied in real-world situations to determine proof-of-
concept.

IV. The framework will continue to be improved through conversations to obtain
thorough stakeholder feedback. (Lumina Foundation, 2015a)

Figure 5 illustrates the complexity of the current credentialing system as described in
CLASP’s *Call for a National Conversation on Creating a Competency-based
Credentialing Ecosystem* (C2014, p. 4).

**Credential Transparency Initiative**

The Credential Transparency Initiative is another Lumina-funded project, a
partnership between George Washington University’s Institute of Public Policy,
WorkCred, and Southern Illinois University (Credential Transparency Initiative, n.d.).
The outcome of this project will be a national, searchable registry that will allow
stakeholders to transparently determine what the bearer of the credential should know and
be able to do as a result of having achieved it. Additionally, the project will include the
development of technology applications and a common set of terms with which to
describe credentials. The project is designed to accommodate all types of credentials, from formal degrees conferred by institutions of higher education to micro-credentials awarded by third-party providers (Credential Transparency Initiative, n.d.).

![Credentialing System in the United States](image)

**Figure 5. Credentialing System in the United States**

**IMS Global’s Technical Interoperability Pilot (TIP)**

IMS Global is working on several initiatives related to the integration of learning technology systems, including several related to CBE. In partnership with C-BEN, IMS Global is creating a set of open standards to enable interoperability around the many technology systems necessary for a robust ecosystem that can support CBE. These open technical standards will support the use of outcomes within the technical infrastructure that makes up the back-end of students’ online learning experiences in a CBE program.
including the Student Information System (SIS), the Learning Management System (LMS), online instructional materials, assessments, financial aid, data, and support services (IMS Global Learning Consortium, 2015a).

The Technical Interoperability Pilot (TIP) created five “solution use cases” including (a) managing competencies, (b) evaluating results, (c) managing program information for use in systems that support institutional needs like financial aid, (d) measuring interaction (through a new data standard Caliper Analytics,) and (e) CBE eTranscript publishing (IMS Global Learning Consortium, 2015b). Initial results were shared in Fall 2015. Figure 6 delineates the complex systems involved in student information and learning for which IMS Global is creating open standards (IMS Global Learning Consortium, 2015b).
Figure 6. IMS Global Reference Education Enterprise Architecture
Other Types of CBE

The use of competencies for assessment or as the basis of a curriculum is also present in a wide range of other subject-specific fields, including information technology, business, accounting and intercultural studies. Each of these fields has a particular, subject-specific way of utilizing competencies. Though the scope of this research will not be examining this type of CBE program, they are briefly addressed here to provide more complete context to the many interpretations of CBE.

CBE within the Medical Field

CBE has also been referred to as Outcomes-Based Education—or OBE—within the medical field. It also traces its origins to the work of behavioral psychologists of the early twentieth century—Skinner, Pavlov, and Watson; a resurgence of interest in this methodology occurred at the end of the twentieth century (Dornan et al., 2013). Harden (1999) wrote in support of OBE as an approach because it focused on what the doctor actually did, “rather than the process of education” (Harden et al, 1999, as cited in Dornan et al., 2013). The development of CBE curriculum was essentially described as a Backwards Design process, with the outcomes determined first, then the development of assessments mapped to those outcomes, and finally the selection of content and learning activities to support successful performance on assessments.

A review of the literature on CBE in medical education identified four themes surrounding the 173 definitions of CBE, which were described as (a) organizing framework, (b) rationale, (c) contrast with time, and (d) implementing CBE (Ahmad et al., 2010). The authors also identified six subthemes (a) outcomes defined, (b)
curriculum of competencies, (c) demonstrable, (d) assessments, (e) learner-centered and (f) societal needs. Interestingly, only 20% of these definitions included an element whereby CBE was contrasted against time-based education, indicating that within the medical field, the time-variable aspect of CBE is less emphasized and not seen as a core component of the approach (Ahmad et al., 2010). This analysis also noted rationale for embracing CBE that is markedly different than the calls for reform in higher education. Among the stated needs was an increasing focus on patient-centric care as well as the ability to fulfill societal needs. The final definition described by the authors was:

Competency-based education (CBE) is an approach to preparing physicians for practice that is fundamentally oriented to graduate outcome abilities and organized around competencies derived from an analysis of societal and patient needs. It de-emphasizes time-based training and promises greater accountability, flexibility, and learner-centredness. (Ahmad et al., 2010, p. 636)

The Carnegie Foundation’s Flexner centenary report, which explored the future of medical education in the U.S., advocated for CBE as the central and most effective approach, recommending specific, progressive and defined outcomes for the education of medical professionals (Dornan et al., 2013). However, there have been differing opinions of the appropriateness of CBE for the task of educating medical professionals (Billet & Ten Cate, 2014, p. 326). Some criticism of CBE centers on the workman-like focus on tangible displays of skills, and the perceived inability of CBE to address affective elements necessary for professionalism (Dornan et al., 2013).
In an asynchronous conversation between medical doctors Dr. Billet and Dr. Ten Cate, Dr. Billet wrote that historically, preparing students for a working world was always one of the primary goals of higher education, in particular liberal arts education in 19th and 20th century universities. Dr. Ten Cate illustrated the challenge clearly, that “Where the problem starts is when qualities of graduates cannot easily be translated in clear and measurable outcomes” (Billet & Ten Cate, 2014, p. 326).

Also unresolved with respect to CBE in the medical profession is the challenge of promoting excellence above and beyond the basic accepted levels of competency; this was also noted in the Flexner recommendations (Dornan et al., 2013). An additional objection noted by Hudges (2010) was that the concept of CBE is predicated on a highly production-based focus in education, similar to that embraced by professional education and in industry because it reduces training time by improving efficiency (as cited in Dornan et al., 2013). The issue of time-bound versus time-variable training in medical education typically leans towards time-bound training in practice. Additional time has been added to the typical 36-month training for internal medicine students for the purposes of remediation (Weinberger, Pereira, Lobst, Mechaber, Bronze, 2010). The Alliance for Academic Internal Medicine Education Redesign Task Force II advised against shortening the 36-month timeline, instead recommending that students enrich their education towards further development along their career path if they reach competency levels in advance. These third-year students are expected to teach the first-year students (Weinberger, Pereira, Lobst, Mechaber, Bronze, 2010).
Frameworks for CBE continue to be developed within the medical field. A recent grant research project funded by the National Institutes of Health (NIH) through the National Center for Research Resources (NCRR), designed a theoretical model for the development of a CBE program. It includes the steps involved in the creation of a program as well as its iterative development nature. The steps in their process began with a literature review, the development of a theoretical competency framework, a program specific-model and then a curricular framework. Subsequent steps included aligning to multiple other frameworks and finally to courses after which teaching and assessment methods were created (Bjork, Dilmore & Moore, 2011).

**Intercultural Competencies**

Much like the language of CBE itself, the use of intercultural competencies is plagued by overlapping and indistinct terms utilized by professionals within the field in different ways (Fantini, 2009). Three facets of intercultural competencies have emerged as important in creating effective intercultural communication: language, behaviors, and interactional strategies. Fantini (2009) defines intercultural competence as "complex abilities that are required to perform effectively and appropriately when interacting with others who are linguistically and culturally different from oneself" (p. 458). One proposed framework for intercultural competence centered around four core dimensions of intercultural competency: (a) knowledge, (b) positive attitude, (c) skills, and (d) awareness. There is interplay between the four dimensions in this model, with enhanced awareness sparking development of the other three dimensions, and those three dimensions also promoting increased awareness (Fantini, 2009). One of the complicating
factors in assessing the presence and level of intercultural competence is the progressive nature of the development of competencies. In assessing intercultural competencies, Fantini notes that multidimensional assessments like "portfolios, logs, observation, interviews, performative tasks and the like are generally more valuable" (2009, p. 462).

**Business and Accounting Competencies**

The Institute of Management Accountants (IMA) and the Management Accounting Section (AMS) of the American Accounting Association (AAA) formed a Task Force in 2010 in order to address the lack of defined competencies necessary for all accounting students to develop in their long-term careers. A framework for accounting competencies was created out of four recommendations that emerged from the Taskforce efforts; accounting education should (a) focus on long-term career competency development, (b) include a variety of organizational settings currently not adequately addressed, (c) include objectives that reflect the value accountants bring to an organization, (d) utilize educational competencies that are integrated (Blocher et al., 2014).

The resulting framework joined other existing frameworks, the Pathways Commission Compilation in 2012, CPA Canada developed in 2013, and those from Europe including the Association of Chartered Certified Accountants in 2013 and from the Institute of Chartered Accountants in England and Wales (Lawson et al., 2014). The framework created by the Taskforce included three categories along a continuum of career development—undergraduate education, early career and/or additional education, and long-term career. Here, the emphasis for competency development was
contextualized within the continuing career and professional development of the individual. Within this continuum, three main categories of competencies emerge: (a) foundational competencies, (b) competencies specific to accounting, and (c) general management competencies. These competency categories parallel those being developed in many newer CBE programs, with broad competencies as well as subject-matter specific competencies.

**Defining Scope: The Types of CBE Models Addressed Here**

The types of CBE programs that are addressed in this investigation are those outside of field-specific initiatives such as in medical education or intercultural studies. They are programs that self-identify as CBE models and are technology-leveraged, with some or all of their program offered online. These programs were originally embraced in the 1970s through FIPSE grants and other governmental initiatives to support college for post-traditional learners. This research will focus on programs that are from institutions that are involved in constituent groups within the field of higher education like C-BEN, CAEL, ACE, EDUCAUSE, and those programs originating from TAACCCT grants.

**Why Here Why Now**

Current models of CBE owe a debt to the pioneers of CBE in higher education, including Alverno College, Charter Oak State College, Empire State College, Excelsior College, Thomas Edison State College and others (Book, 2014). These trailblazers began and fostered CBE programs, but a combination of new factors are impacting the rapid expansion of CBE—including financial aid experimental sites (Experimental sites Concept Paper, 2014).
One such factor is the unbundling of higher education. Rather than paying tuition as a “package deal” for what has traditionally become known as “The College Experience,” new higher education models have broken down the degree into its component parts. Kamenetz’s (2010) description of the The Great Unbundling describes how the historical tendency of bundling a variety of benefits into one higher education package does not match the contemporary cost or value of those components, particularly with content in written form becoming widely accessible and cheap. While the concept of written course content being readily available at no or extremely low cost might be intimidating to some, the concept of increasingly modularized learning is gaining traction particularly for post-traditional learners. These modularized learning opportunities are not limited to traditional institutions of higher education. Other providers—disruptors into the space of higher education—can provide modularity in learning which presents a new competition for higher education institutions in the form of alternative credentials from third-party providers (Kamenetz, 2011; Thornton, 2013; Weise, 2014).

Technology has contributed to the rapid expansion of CBE. Online learning itself, which is present in most if not all CBE models, is a disruption that allows a reconceptualization of what higher education can be (Christensen & Eyring 2011). This contributes to the concept of “mass customization”—allowing students to take ownership and design their own degrees and determine how they want to engage with content, a clear example of heutagogy in action (Cini et al., 2013). These programs defy what might some assume is a technology-centric experience that diminishes the human interaction critical to education. Weise (2014) writes that these providers are
redefining what it means to be high-touch. They are developing technology to ensure that learning is fixed and that time is truly the variable factor: assessments are built in to the system to verify students' proficiency...instructors can rely on an analytics dashboard and, like a personalized tutor, can cater to students' needs when necessary. (Weise, 2014, p. 32)

Ultimately the pull of digital technology and its enabling power for individuals will have a place in higher education. "As it has with industries from music to news, the logic of digital technology will compel institutions to specialize and collaborate, find economies of scale and avoid duplications" (Kamenetz, 2010, loc. 199 of 336).

**Conclusion**

The disruption of CBE has arrived at higher education’s doorstep. CBE has caused quite a stir twice—once when it appeared originally in the 1970s, and again now that external and internal pressures have enabled more dramatic experimentation, and digital technology has the ability to scale and track new models of learning. The potential for shaking up higher education seems almost unavoidable.

The important question missing from this discussion is the one most critical to meeting the needs of students. The important question is “Does it work?” The lack of empirical evidence—comprehensive in nature, and coherent in comparison—indicates a still maturing model without enough codified implementation models for appropriate comparison. This investigation into CBE models seeks to contribute to that body of work so that institutions—and more importantly students—can make informed choices about the models of learning that they embrace.
Chapter III

RESEARCH METHODOLOGY

The purpose of this Q study is the creation of an evidence-based taxonomy of CBE models based on expert opinions from working practitioners in the field. This chapter provides a review of the research design and analysis that were utilized in this investigation. Research questions are addressed, along with the rationale for choice of methodology and a brief description of what the methodology entails.

CBE Models: Defining Program Designs

This study employed Q methodology as a mechanism for answering the following research questions:

1. How do CBE experts view the core components and relative importance of different components to the quality of CBE degree programs?
2. What factors (or models) are revealed through this process by experts within the field of CBE?
   a. What core components are commonly cited as most critical to quality CBE programs across the models?
   b. What core components are commonly cited as not necessary to quality CBE programs across the models?
3. How are those models described and differentiated?

Choice of Methodology

Q Methodology is the optimal choice for an organized procedure by which to create a taxonomy based on expert opinions in the field. Stenner and Watts (2005) describe the method as “qualquantological research,” representing the merging of
methodology from the two primary types of research generally regarded as distinct and separate. Q Methodology was developed by William Stephenson beginning in the 1930’s (Baker, 2013; Brown, 2010; Thomas & Watson, 2012). It provides the researcher with a “systematic and rigorous quantitative way of examining human subjectivity” (Thomas & Watson, 2002, p. 141). The participants (P set) categorized the level of importance of specific components of CBE programs. Q Methodology does this by correlating people through the factor analysis by providing “information about similarities and differences in viewpoint on a particular subject,” in this case, the relative importance of specific components of CBE programs (de Graaf & Van Exel, 2005, p. 1). McKeown and Thomas (2013) refer to the core purpose of using Q methodology as being able to “discern people’s perceptions of their world from the vantage point of self-reference” (p. 2). The sample population used for this Q study is indicative of an effort to gain expert opinions from working professionals in the field of CBE. There are several highly codified steps involved in Q methodology, including: “(1) definition of the concourse; (2) development of the Q sample; (3) selection of the P set; (4) Q sorting; and (5) analysis and interpretation” (de Graaf & Van Exel, 2005, p. 1).

**Data Collection Procedures**

Four types of data was collected for this analysis: Q sorts, institutional demographic questionnaires, responses to interview questions, and brief biographical sketches by the respondents. In order, the steps in data collection were: (a) completing the institutional demographic survey that included the consent for participation in the research; (b) conducting the Q sort activity, the results of which were then sent back to
the individual participants, who had the opportunity to confirm or adjust their choices; (c) responding to five follow-up questions to help the researcher interpret the Q sorts, and (d) writing brief biographies of the participants. Participants were provided with the opportunity to clarify their choices and participate in the process—through the confirmation process for the actual sort, through the follow-up questions, and through the editing or creation of their professional biographies.

Tools used in data collection were: (a) SurveyMonkey for the institutional demographic questionnaire, (b) Qsortware for the web-based sorting, (c) individual Excel spreadsheets for participants to review their results and to answer the follow-up questions along with Word files for brief professional biographies, and finally (d) PQMethod software, which was used to conduct the statistical analysis.

The Q sort consisted of participants sorting 72 statements, first into three general piles, and then further refining their responses into a modified bell curve distribution. The conditions of instruction asked participants to rate the statements according to their level of agreement with the statements within the Q set as Most Important to Most Unimportant according to the participant’s subjective viewpoint. The statements were all components of CBE programs. The series of statements all refer back to the phrase “When considering a high-quality CBE program…”

Brief biographical sketches were written about each participant in the study, and made available to participants for editing; some participants elected to provide their own professional biographies. Those biographical sketches are included in Appendix E. The expertise of the respondents is a necessary component upon which the usefulness of the
taxonomy relies; it is the informed and yet subjective opinions of these experts that will determine the taxonomy.

**Q Methodology Procedure**

The procedures for Q methodology include the definition of the concourse, the selection of the Q sample and the P set, the actual Q sorting by participants, and finally analysis and interpretation.

**Definition of the Concourse**

The concourse is a collection of all applicable statements or aspects of the focus of the study. It endeavors to be comprehensive but not repetitive. "The concourse is thus supposed to contain all the relevant aspects of all the discourses. It is up to the researcher to draw a representative sample from the concourse at hand" (de Graaf & Van Exel, 2005, p. 4).

For this study, statements were drawn from several places and are intended to present the “range of perspectives” about which the subjects that compromise the P set will then respond to (Stafford, 2012). Several methods were used to gain statements for the concourse. Statements were:

1. Extracted from web-based artifacts from websites of existing, established CBE programs.
2. Selected from related publications and reports by leading organizations.
3. Created from a variety of sources including previous research, notes from conference proceedings and conversations from individuals within the field.
The concourse comprises all of the possible, nonduplicative statements available on the topic, and the Q statements are those chosen from the concourse as representative to be utilized in the analysis (McKeown & Thomas, 2013).

Selected statements were extracted from websites that articulated components of CBE programs. Specifically, they were drawn from websites of colleges and universities with clearly established programs in CBE. These same programs were used as the basis to identify the sample population for the P set, among other methods for recruiting participants. The following institutions were utilized as leaders within the field of contemporary CBE models as defined by being the first programs approved as Experimental Sites for receiving Title IV funding for CBE: College for America (Southern New Hampshire University), FlexPath at Capella University, Flexible Option at University of Wisconsin System, MyPath at Brandman University, the University of Texas System and Tempo Learning Walden University. Western Governors University was also included as a scaled CBE program.

Statements were not taken verbatim from individual websites, but rather generalized in order to represent the concept rather than the granularity of language that might be indicative of a single institution’s description. This method of gathering the concourse is one of many including "Collecting statements from personal interviews and questionnaires, asking experts, drawing quotations from relevant literature" in addition to an investigator’s thoughts (Thomas & Watson, 2002, p. 142). This method is somewhat of a modified artifact analysis, collecting data to create the concourse, having the advantage that it “does not influence the social setting being examined" (Hatch, 2002, p.
Statements were also taken from leading publications within the field, including reports from a variety of authors and institutions released by invested organizations like Public Agenda, EDUCAUSE, C-BEN and others.

Finally, statements were created based on notes taken at field-specific conferences, from conversations with professionals in the field, and based on ongoing discussions from listservs in the field as needed to fill in any gaps to ensure that the concourse is fully representative of the component parts of CBE in a comprehensive manner. Used for extraction for these purposes were notes from the following conferences, which the researcher attended: CBExchange 2015, WCET’s 2015 Annual Meeting, CBE4CC 2015, and CBE4OH 2015.

Pilot Study and Development of the Q Sample

The Q sample was then selected from among the available Q statements in the concourse. This Q sample is therefore a limited number of statements (typically between 40 and 70 statements) that are “representative of the wide range of existing opinions about the topic (de Graaf & Van Exel, 2005, p. 5). This study used 72 unique statements that represent the range of component pieces within the CBE model in order to enable the participants to rank the relative importance of those components. Though typically fewer numbers of statements are used, more statements can be effectively used. The complexity of the research questions required the large number of statements; potential implications are discussed in more detail in Chapter 5.

Selecting the Q statements from the concourse required an analysis of the individual statements. Throughout the investigation, common categories were revealed
of the core structure of the program (curriculum design and institutional policies) and the innovative nature of the model (more traditional and more divergent,) resulting in a 2x2 block format. Though factorial designs are commonly used as the underlying structure of the Q statement sampling from the concourse, unstructured sampling is also used, “particularly with concourses for which theory is nonexistent or underdeveloped” (McKeown & Thomas, 2015, p. 10).

It was a challenge to adequately represent the wide range of discourse in the field, and thematic elements appeared in across and within quadrants: curriculum (learning resources), curriculum (competencies), direct assessment and credit equivalency, legitimate assessments, Prior Learning Assessment, distributed faculty and support roles, cost and sustainability, self-pacing, workforce connections, equitable access, policies and procedures, targeted student population, technology (learning environment), and technology (institutional integrations.) Eighteen statements from each combination of structure of the program and innovative nature of the program were selected, for a total of 72 statements.

The instrument was pilot tested, with three colleagues from the field based on convenience sampling. Two of the three pilot participants currently directly lead CBE programs, and the third pilot participant did so previously. Feedback was sought from these individuals. The feedback resulted in the clarification of the wording of three statements, as well as adding verbiage specific to Regular and Substantive Interaction (RSI.) The second draft of the instrument was finalized before proceeding. When the instrument was originally sent out, two respondents emailed back about difficulty in
interpreting the conditions of instruction (a concern which had not been revealed in the pilot.) A revised set of instructions was drafted, and the majority of study participants utilized the revised instructions. The 15 participants who utilized the original conditions of instruction were resent their results, and asked to review them and edit with the new conditions of instruction in mind. Two participants provided feedback that they had interpreted the original instructions the same way as the adapted instructions; no participants elected to make changes in the sort based on the change in conditions of instruction, however not all participants returned the sort with responses to the follow-up questions. Details of these interactions are included in Chapter 4.

**Selection of the P Set**

The sample population was selected in a purposeful manner. The opinions sought required applicable expertise that the professional participants bring to the topic of CBE. For this reason, the instrument was sent to specific individuals who have extensive experience in the field of CBE in these types of organizations: non-governmental organizations involved in educational policy, granting organizations, colleges and universities with functional CBE programs, educational technology consultants and product vendors, and professional reporters. In Appendix F, biographical sketches of the participants can be found in order to demonstrate their expertise.

Snowball sampling was employed in order to recruit participants. As a working professional in the field of CBE, the researcher was also able to utilize an existing professional network. Inquiries were sent out via two main industry listservs—the WICHE Cooperative for Educational Technologies (WCET) listserv and the Lumina
listserv on CBE. Personal communications were sent out to individuals from relevant organizations identified in Chapter I.

The small number of experts in the field limited the pool from which to draw qualified participants. Baker (2013) indicates that 40-60 participants is typical. De Fraaf and Van Exel (2005) indicate that around four to five individuals that define each of between two and four anticipated viewpoints, with no more than six, being sufficient, which would equate to between 8-30 participants. Additionally, it is more important to have a diversity of participants represented than a certain number of participants (Brown, 1980). The P sample had significant diversity, with both for-profit and non-profit institutions represented, as well as community college administrators, professionals from for-profit educational technology companies, field consultants and writers.

Thirty-three respondents participated in the study, of those 15 provided further context via the follow-up questions. The analysis is based on the entire thirty-three participant Q sorts. Some interpretation may be limited by lack of additional context from those participants that did not provide responses for the follow-up questions.

**Q Sorting**

After the generation of the Q sample and selection of participants, a web-based sorting application that enables drag and drop sorting of statements—Qsortware—was utilized for the Q sorting. Participants sorted statements to one of three designations: *Most Important*, *Neutral*, and *Most Unimportant* referring to the importance of that component statement when referring to a high-quality CBE program according to the participant’s subjective viewpoint. The participants then further sorted the Q statements,
refining them to more fully describe their relative importance to a high-quality CBE program on a +5 to -5 continuum (de Graaf & Van Exel, 2005), though -4 to +4 is also typical of this methodology (Thomas & Watson, 2002). This sorting provided slots that approximated a bell curve—with more spaces available for placement of statements in the more neutral center assignments, and fewer spaces toward the less neutral, end assignments. The grid utilized in the Q sorting can be found in Figure 7.

**Figure 7. Q Sort Distribution Grid.**

Though this sorting was conducted electronically via web-based software, sorts are conducted both online and face-to-face (Thomas & Watson, 2012; Brown, 2010). “Using an Internet survey and administering it online has been discussed extensively in the literature” (Nesbary, 2000; Sue & Ritter, 2012 as cited in Creswell, 2014, p. 157).
Data from the Q sorts was then inputted into PQMethod software for analysis, which performed the calculations and facilitated the rotation of factors.

**Data Management**

Data that was gathered included: (a) results of the institutional demographic survey, (b) the results of the Q sorting, (c) responses to follow-up questions, and (d) biographical sketches. These data are being kept in a private virtual location (OneDrive), accessed only by the researcher. All data were shared solely in de-identified formats.

The specific tools for gathering these data included SurveyMonkey for the collection and management of the results of the institutional demographic survey. These files were then uploaded into the secure OneDrive and deleted from the survey tool. Qsortware was utilized for the drag and drop sorting. PQMethod Software was used for the analysis of the Q sort results, which was installed locally by the researcher, however the files are hosted in OneDrive. Excel files and Word files were utilized for the follow-up responses and the biographical sketches.

For incremental analysis, OneNote was utilized for researcher progress throughout, a format that is cloud-based, allows syncing across multiple devices, requires a secure login for access, and is also fully searchable and automatically tagged by date for efficiency.

**Analysis and Interpretation**

These data were analyzed first using factor analysis. The use of factor analysis is predicated on appropriate Q study design and sorting protocols. Its aim is to reveal patterns and themes among the responses provided by the Q sorters (Stephenson, 1979;
Brown, 1980 as cited in Thomas & Watson, 2002). The analysis resulted in the creation of specific factors—in this case, specific models of CBE programs.

**Analysis Procedures**

A correlation matrix was created out of all of the Q sorts, which represents the difference in viewpoints of the various Q sorts (de Graaf & Van Exel, 2005). Factor loadings determine the strength of each individual Q sort’s correlation with each factor (de Graaf & Van Exel, 2005; McKeown & Thomas, 2013). These can be positive or negative. If they are negative, they indicate a “reversal of the values that positively define a factor” (McKeown & Thomas, p. 12, 2013) at whatever pre-determined level is needed to support statistical significance (typically \( p < .05 \) or \( p < .01 \)). Once the factor loadings that are significant are determined, the factors themselves are examined for statistical significance.

There are several ways in which to determine a factor’s significance. These methods can be purely statistical, as in Principal Components Analysis (PCA), whereby Eigenvalues are used as a determining factor, centroid factor analysis, or the use of Humphrey’s rule. PCA with the use of Eigenvalues relies on the determination of a factor’s significance based on the sum of its squared factor loadings; in Q methodology this translates to the number of Q sorts, thereby illuminating the percentage of total variance that can be attributed to each factor (McKeown & Thomas, 2013). Resulting Eigenvalues greater than 1.00 are considered significant, which determines what factors to keep for rotation. This method has some drawbacks. In most cases, the use of statistical criteria alone limits the emergence of factors, and one “must take into account
the social and political setting to which the factor is organically connected” (Brown, 1980, p. 42 as cited in McKeown & Thomas, p. 54, 2013).

Common sense may be relied upon on the part of the researcher to take into account the various dimensions of the study in order to find the most appropriate factors that fully illuminate the subject of the research within context (McKeown & Thomas, 2013). Relying exclusively on the criteria of factors with Eigenvalues of greater than one are “quite arbitrary and substantively meaningless and occasionally meaningless in a statistical sense as well” (Brown, 1971, p. 40).

Another method for determining factor significance is Humphrey’s rule, stating that significance is equal to the cross-product of the two highest loadings that exceeds twice the standard error (Brown, 1971).

Centroid factor analysis is the third of three primary types of methods for determining a factor in Q methodology; it is the method most preferred by Stephenson and Brown (Brown, 1971). Centroid preserves indeterminacy, and enables the researcher to explore options for factor rotation that are not supported by PCA followed by varimax rotation (Brown, 1971). Centroid factor analysis was employed in this study.

After centroid factor analysis, the factors were then rotated. As many factors as possible should remain in the analysis through the rotation of factors in order to preserve variation (de Graaf & Van Exel, 2005). Rotating factors shifts the perspective from which the factors are viewed (de Graaf & Van Exel, 2005; McKeown & Thomas, 2013). Rotation can occur by a number of methods including varimax or theoretical/judgmental,
whereby a preconceived idea or an idea that emerged during the study can be used to shift the perspective from which the factors are being observed.

Most Q methodologists do not use rotation based on the statistical calculations exclusively, rather they prefer theoretical/judgmental rotation because it is more aligned to the concept of Q methodology as a whole (McKeown & Thomas, 2013). Rotating factors results in final factors which should be distinct from each other. The views that make up each factor should be similar with other views also designated to that factor, but different from those designated for other factors. In this research, hand rotation was used to minimize the correlation between the two factors and to provide clarity.

Factors that had two or more sorts at the level of significance of .30 (calculated by 2.58 times the standard error (SE) with N equaling 72 statements at \( p < .01 \)) are considered to be defining sorts for this study, and were incorporated into the creation of the factors.

Factor loadings are helpful in determining distinguishing and consensus statements. When factor loadings are greater than a pre-determined limit (\( p < .01 \) in the case of this study), that variable then becomes a “defining variable,” which facilitates the determination of the difference score. The difference score enables both distinctive and consensus statements as well as characterizing statements, all of which can be of use in interpreting the factors themselves (de Graaf & Van Exel, 2005).

Factor interpretation then commenced. In Q, “interpretations are based primarily on the factor scores” (McKeown & Thomas, p. 60, 2013). Due to the small P set size, factor scores are more meaningful than factor loadings (McKeown & Thomas, 2013).
Factor scores are the “normalized weighted average statement score (z-score) of respondents that define the factor” (de Graaf & Van Exel, 2005, p. 9). The reliability of significant differences among factor scores ultimately can be traced back to the reliability of the individual Q sorts (McKeown & Thomas, 2013).

**Summary**

This chapter provided a review of the methodology that was utilized in this investigation. Specifically, four types of data were collected for use in analysis: (a) an institutional demographic survey, (b) the Q sort, (c) follow-up questions for clarification and (d) biographical sketches of study participants. The use of Q methodology enabled the creation of a comparative taxonomy based on subjective opinions of experts in the field of CBE.
CHAPTER IV
RESULTS

This chapter presents the factors and corresponding interpretations that emerged from the examination of perceptions about the comparative importance to high-quality Competency-Based Education (CBE) programs of specific programmatic elements. The analysis revealed two factors: “Eliminating Proxies for Achievement” and “Structures for Sustainability.” The organization of this chapter begins with the discussion of the participants’ factor loadings along with some background and institutional demographical information about the participants. In addition, this chapter will outline the two factors and provide interpretations of those factors, consensus statements, conflicted responses and implications of those responses, and some additional items for consideration including participants’ responses to the action of engagement in the study.

Factor Loadings and Institutional Demographics of Participants

Thirty-three participants engaged in the study. These professionals have functional expertise in the field of CBE. Brief professional biographies are provided in Appendix E to establish their engagement with and knowledge of the field. Of those participants, 15 also provided responses to follow-up questions, which assisted in the interpretation of the Q sorts.

There was a diverse set of participants. Of the 33, 19 work at a college or university, with five working at for-profit universities, seven working at private, non-profit universities, four working at public universities, and three working at public, two-year colleges. The other 14 participants work at a combination of for-profit educational
technology vendors, as consultants, as writers, and at non-profit organizations involved in the field of CBE. In parts of this analysis, the latter 14 participants are grouped together, as identifying them more closely by type of institution may inadvertently contribute to the identification of the participant; these data are intentionally de-identified.

The participants have many years of experience in higher education: nine have more than 26 years of experience in higher education, 11 have 16-25 years of experience, and another 12 have 1-15 years of experience. Of those years in higher education, 13 participants have 1-5 years of experience working with CBE. Fourteen participants identify themselves as “closely involved” with national efforts in the field of CBE like the Competency-Based Education Network and initiatives championed by EDUCAUSE and the Lumina Foundation among others; another 12 identify themselves as “moderately involved” in these initiatives. The other participants considered themselves to be rarely involved. One participant did not provide demographic data.

The Q sorts were analyzed using centroid factor analysis, which is more aligned philosophically to the methodology, and is the method preferred by Stephenson and by Brown (1980). The factors were then rotated by hand at -22 degrees to deliver clarity and reduce correlation between the factors. Sorts were considered significant at the \( p < .01 \) level if they exceeded .30 on one and only one factor (with 72 statements, \( N = 1/\sqrt{72} \) multiplied by 2.58). A solution with two factors emerged.

The factor loadings and demographic characteristics of participants can be found in Table 1. Participants with significant loadings on multiple factors were considered to have confounding or mixed results, and not included as defining sorts. Defining sorts
were those sorts that loaded significantly on one and only one factor. Factor arrays were created from these defining sorts. When participants load on a sort together, it indicates that they share a set of opinions based on their subjective responses to the statements.

Table 1  
*Factor Loadings and Demographic Characteristics*

<table>
<thead>
<tr>
<th>Factors</th>
<th>Institutional &amp; Experience Demographics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rs 1</td>
<td>2</td>
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<tr>
<td>1</td>
<td>65</td>
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<td>2</td>
<td>16</td>
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<td>3</td>
<td>40</td>
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<td>4</td>
<td>41</td>
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<td>5</td>
<td>38</td>
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<tr>
<td>6</td>
<td>68</td>
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<tr>
<td>7</td>
<td>66</td>
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<td>8</td>
<td>46</td>
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<tr>
<td>9</td>
<td>65</td>
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<tr>
<td>10</td>
<td>(56)</td>
</tr>
<tr>
<td>11</td>
<td>56</td>
</tr>
</tbody>
</table>

1 | (65) 17 Non-governmental organization, 21+, closely involved
2 | 16 001 Non-profit private university, 11-20, moderately involved
3 | 40 39 Independent, 11-20, rarely involved
4 | 41 30 For-profit university, 21+, rarely involved
5 | 38 53 Non-profit private university, 21+, closely involved
6 | (68) 16 Independent, 21+, closely involved
7 | (66) 21 Independent, 11-20, moderately involved
8 | (46) 22 Independent, 21+, moderately involved
9 | 65 56 Public college or university, 11-20, closely involved
10 | 03 (56) Independent, 21+, moderately involved
11 | 56 53 Independent, 21+, moderately involved
<p>| | | | |</p>
<table>
<thead>
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</thead>
<tbody>
<tr>
<td>12</td>
<td>70</td>
<td>13</td>
<td>Public college or university, 11-20, rarely involved</td>
</tr>
<tr>
<td>13</td>
<td>59</td>
<td>18</td>
<td>Non-profit private university, 11-20, closely involved</td>
</tr>
<tr>
<td>14</td>
<td>74</td>
<td>04</td>
<td>Non-governmental organization, 21+, moderately involved</td>
</tr>
<tr>
<td>15</td>
<td>10</td>
<td>44</td>
<td>Public college or university, 21+, moderately involved</td>
</tr>
<tr>
<td>16</td>
<td>74</td>
<td>16</td>
<td>Non-governmental organization, 21+, rarely involved</td>
</tr>
<tr>
<td>17</td>
<td>66</td>
<td>-02</td>
<td>Non-profit private university, 21+, moderately involved</td>
</tr>
<tr>
<td>18</td>
<td>61</td>
<td>08</td>
<td>For-profit university, 11-20, closely involved</td>
</tr>
<tr>
<td>19</td>
<td>83</td>
<td>-14</td>
<td>Independent, 21+, closely involved</td>
</tr>
<tr>
<td>20</td>
<td>67</td>
<td>13</td>
<td>Independent, 21+, rarely involved</td>
</tr>
<tr>
<td>21</td>
<td>54</td>
<td>46</td>
<td>For-profit university, 11-20, moderately involved</td>
</tr>
<tr>
<td>22</td>
<td>66</td>
<td>05</td>
<td>Non-profit private university, 21+, closely involved</td>
</tr>
<tr>
<td>23</td>
<td>26</td>
<td>54</td>
<td>Public college or university, 1-10, closely involved</td>
</tr>
<tr>
<td>24</td>
<td>41</td>
<td>21</td>
<td>Non-profit private university, 21+, moderately involved</td>
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<td>25</td>
<td>62</td>
<td>10</td>
<td>Non-governmental organization, 1-10, closely involved</td>
</tr>
<tr>
<td>26</td>
<td>66</td>
<td>-15</td>
<td>Non-profit private university, 21+, highly involved</td>
</tr>
<tr>
<td>27</td>
<td>73</td>
<td>-16</td>
<td>Public college or university, 21+, highly involved</td>
</tr>
</tbody>
</table>
Loadings in bold are significant at .01 level, loadings in parenthesis are significant on one factor only.

Factor 1 was defined by 20 participants, Factor 2 was defined by three participants; nine participants loaded on both Factors 1 and 2, and one participant did not load on either factor. Factors 1 and 2 correlated at .22, indicating a weak correlation between the factors as typically defined by under .30. This indicates that the factors were distinct from each other. Figure 8 displays the scatterplot of participant loadings on each factor.
Figure 8. Scatterplot of Participant Loadings on Factors 1 and 2

Factor scores enable the interpretations of the factors, and are the $z$-score of the participants that define the factor (de Graaf & Van Exel, 2005; McKeown & Thomas, 2013). The factor scores are used to create the factor arrays. The factor array represents the corresponding factor and it is the “best-estimate Q sort” which is then interpreted (Stenner & Watts, 2016, p. 82). Q methodology enables interpretation of these factors via a “series of summarizing accounts, each of which explicates the viewpoint being
expressed by a particular factor” (Stenner & Watts, 2016, p. 82). These interpretations follow.

A matrix was created to observe if any of the institutional demographic information collected appeared to have any relationship with presence on a given factor. Typical statistical tests for correlation were not available for use as these data do not meet the requisite assumptions for statistical analysis. The following associations were noted observationally: six of the nine independent participants (which encompasses consultants, writers, and vendors) loaded significantly on Factor 1. All five participants from Non-Governmental Organizations (NGOs), loaded significantly onto Factor 1. Of the seven participants from non-profit private universities, five loaded significantly onto Factor 1.

There did seem to be a pattern revealed when examining the level of involved in field initiatives and loading onto factors. A greater percentage of those reporting that they were closely involved in initiatives and organizations within the field such as the Competency-Based Education Network (C-BEN) and EDUCAUSE’s Breakthrough Models Incubator loaded onto Factor 1. Of those who identified as being closely involved in national initiatives, 10 loaded significantly on Factor 1. Of those 12 who identified as being moderately involved in such initiatives and organizations, six loaded significantly onto Factor 1, two loaded significantly onto Factor 2, three had mixed results, and one did not load significantly onto either factor. Finally, from the group rarely involved in such initiatives, three of six loaded significantly onto Factor 1, and three indicated mixed results, loading significantly onto both factors.
While no strong conclusions can be drawn from these results, it does appear that those participants who identified as being more closely involved in initiatives were more highly represented on Factor 1. It may be that individuals involved in these national initiatives and organizations including C-BEN, EDUCAUSE, Lumina Foundation initiatives and others, are more likely to share common beliefs about CBE that contribute to their involvement in such organizations. Alternatively, it could be that those organizations advocate for certain components of models that therefore are more highly valued in the perspectives of participants. Another potential explanation is the sampling for the P set—the Competency-Based Education Listserv that is managed by C-BEN and the Lumina Foundation was one of the methods utilized for recruiting participants. Table 2 displays these results relating to field involvement and factor loading.

Table 2

*Participant Factor Loadings and Involvement in Organizations*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Mixed Loading</th>
<th>No</th>
<th>Field Involvement in National Organizations and Initiatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>Closely</td>
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<tr>
<td>31</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>Closely</td>
</tr>
<tr>
<td>6</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>Closely</td>
</tr>
<tr>
<td>19</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>Closely</td>
</tr>
<tr>
<td>1</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>Closely</td>
</tr>
<tr>
<td>25</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>Closely</td>
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<tr>
<td>5</td>
<td></td>
<td>x</td>
<td></td>
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<td>Closely</td>
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<td>13</td>
<td>x</td>
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<td>Closely</td>
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<tr>
<td>22</td>
<td>x</td>
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<td></td>
<td></td>
<td>Closely</td>
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<tr>
<td>26</td>
<td>x</td>
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<td></td>
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<td>Closely</td>
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<tr>
<td>9</td>
<td>x</td>
<td></td>
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<td>Closely</td>
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<tr>
<td>23</td>
<td>x</td>
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<td>Closely</td>
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<tr>
<td>27</td>
<td>x</td>
<td></td>
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<td>Closely</td>
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<tr>
<td>32</td>
<td>x</td>
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<td></td>
<td>Closely</td>
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<tr>
<td>21</td>
<td>x</td>
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<td></td>
<td></td>
<td>Moderately</td>
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<tr>
<td>7</td>
<td>x</td>
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<td>Moderately</td>
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<tr>
<td>8</td>
<td>x</td>
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<tr>
<td>10</td>
<td>x</td>
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<tr>
<td>11</td>
<td>x</td>
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<td>30</td>
<td>x</td>
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<td>Moderately</td>
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<td>14</td>
<td>x</td>
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<td>2</td>
<td>x</td>
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<td>Moderately</td>
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<td>17</td>
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<td>24</td>
<td>x</td>
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<td>Moderately</td>
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<td>15</td>
<td>x</td>
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<td>Moderately</td>
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<tr>
<td>28</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>Moderately</td>
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<tr>
<td>33</td>
<td>x</td>
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<td>NR</td>
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<td>Rarely</td>
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<tr>
<td>16</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>Rarely</td>
</tr>
<tr>
<td>12</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>Rarely</td>
</tr>
</tbody>
</table>
When observing the patterns between those participants with a highest degree attainment of Ph.D., Ed.D., or other terminal degree, there is less diversity in loadings. Of the 19 participants with terminal degrees, none loaded significantly onto Factor 2. Only four of the 19 had mixed results, loading significantly onto both Factors 1 and 2. Of those, three of the four had over 21 years of experience in higher education. Sixteen of the 33 participants reported as having 21 or more years of experience in higher education. The full table of institutional demographic characteristics and participant loadings onto factors can be found in Appendix D. Critically, however, correlation with demographic variables is not always salient. Brown (1971) notes that Q methodology was created to handle “phenomenological aspects” (p. 103).

The elements of CBE programs that were included in the Q sample were sorted on the spectrum of most important and most unimportant in reference to “When considering a high-quality CBE program.” The full comparative factor array can be found in Appendix G.

**Factor Interpretations**

The characterizing statements, along with the responses to the follow-up questions facilitated the interpretation of the factors. Two dominant factors emerged: Factor 1 is entitled Eliminating Proxies for Achievement, and Factor 2 is entitled Structures for Sustainability.
Factor 1: Eliminating Proxies for Achievement

Factor 1 emphasizes the importance of the learning model first. Though the concourse was organized into a design that focused on both curricular components and on administrative components (as categorized by “More Traditional” and “More Divergent”) six of the nine most important items in Factor 1 focused on the curricular elements of the learning models. Several themes emerged from this factor array. They are discussed here in rough approximation of emphasis based on their placement in the descending array of factor scores: (a) primacy of competency definition and assessment quality, (b) financial access and sustainability, and (c) minimization of administrative components and absolutes. The descending array for Factor 1 can be found in Table 3.

Primacy of competency definition and assessment quality. A strong common theme throughout Factor 1 was the importance put on competencies and assessments as the most important components of a high-quality CBE program. The three most highly rated statements from the factor array were statements 11, 10, and 21 respectively:

11. Clearly define the criteria for mastery of competencies (+5)
10. Utilize competencies that include knowledge, skills, abilities, attitudes, beliefs, or similarly structured categories (+5)
21. Utilize clear and transparent rubrics (+5)

This opinion is most clearly articulated by comments from Participant 27, who, in response to explaining the response for what is considered “Most Important,” wrote:

CBE should strive above all else to eliminate as many proxies for achievement as possible. Clear demonstration of skill developed or lessons learned, therefore, is
the singular characteristic that makes CBE a more dependable assessment of student learning. Training in use of rubrics, development of high-quality rubrics that stand up to validity- and reliability-testing, demonstrated ability to show and do as measured by qualified assessors—these and similar attributes are the most important differentiators between CBE and grade-based, seat-time assessments.

This description led to the title for Factor 1: *Eliminating Proxies for Achievement*. In alignment with those comments, the next items rated as most important also emphasized both competencies and assessments:

20. Utilize authentic assessments that leverage real-world scenarios to best illustrate their competencies (+4)

12. Have competencies that are for a specific field of study as well as broad-based, cross-cutting competencies regardless of specialization (+4)

22. Support students progressing upon demonstrating their competencies on a range of different types of assessments (+4)

A sense of purity of learning model and legitimacy of the CBE program was captured in this theme; the emphasis of curricular components (and de-emphasis of administrative elements) indicated the primacy of importance placed on the usage of clear competencies and assessments. Participant 8 referred to institutions that were utilizing the label of CBE for programs while “making superficial and cosmetic changes to their traditional programs.” Participant 13 commented on what is most critical to a CBE program, writing that “Defining the competencies and aligning the assessment criteria are essential for a CBE program to exist.”
Another indication of the emphasis of competencies and the proof of achievement of competency can be found in the most unimportant placement referring to Statement 33:

33. Enable students to transfer in credit from other institutions in a course-based format regardless of grade in the course (4)

Enabling students to transfer in credit that they attained at a grade of “C” or “D” would generally not be considered to be at the achievement level for a competency. This closely aligns with the focus on the curricular design of quality competencies and assessments found in Factor 1. Graduating students who have brought in credit at what would be considered less than a level of mastery espoused by a CBE program diminishes the value and effect of a CBE program. This could impact both the individual student’s achievement of knowledge, skills, and abilities, and the legitimacy of the CBE program as a whole.

Both participants 8 and 27 articulated the primacy of competencies and assessments in relationship to other components of CBE. Participant 27 rated items as most unimportant that would limit the way in which a CBE program could be implemented, indicating separation between the essential components of competencies and assessments from both the mechanisms of implementation of those curricular elements, and the administrative mechanisms that support the learning modality.

Participants 8, 27, and 30 all emphasized the use of appropriate, aligned assessments, specifically mentioning authentic assessments. Participant 27 articulated
that “of paramount importance is authentic assessment using quality rubrics.” Statement 20 was present in the most important statements for Factor 1.

20. Utilize authentic assessments that leverage real-world scenarios to best illustrate their competencies (+4)

Authentic assessments provide a clear connection to the world of work. This concept of demonstrated knowledge, skills, and abilities within context is considered important to CBE, and supports “real world” validation, according to Participant 30.

This theme of the primacy of competency definition and assessment quality is the dominant interpretation of Factor 1: Eliminating Proxies for Achievement. A sub-component of this theme is the emphasis placed on continual improvement, and on data collection to support that improvement. Statement 66 articulates this:

66. Utilize data collection and analysis to support continuous improvement of the CBE program from both an operational and a curriculum design perspective (+4)

Given the strong emphasis on the curricular components of CBE program design, it could be interpreted that the emphasis on this aspect of continual improvement is primarily emphasized for the curriculum design perspective, as opposed to an operational perspective—both components are present in the single statement. The continual improvement from an operational perspective could be secondary, or perhaps even ancillary, to the primary focus of data-informed improvement in curriculum design.

Apart from the emphasis on curriculum design, other underlying themes in Factor 1 that deserve discussion are: (b) financial access and sustainability, and (c) minimization of administrative components and absolutes.
Table 3

Descending Array of Factor Scores and Statements for Factor 1

<table>
<thead>
<tr>
<th>No</th>
<th>Statement</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Clearly define the criteria for mastery of competencies</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>Utilize competencies that include knowledge, skills, abilities, attitudes and beliefs or similarly structured categories</td>
<td>5</td>
</tr>
<tr>
<td>21</td>
<td>Utilize clear and transparent rubrics</td>
<td>5</td>
</tr>
<tr>
<td>20</td>
<td>Utilize authentic assessments that leverage real-world scenarios to best illustrate their competencies</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>Have competencies that are for a specific field of study as well as broad-based, cross-cutting competencies regardless of specialization</td>
<td>4</td>
</tr>
<tr>
<td>22</td>
<td>Support students progressing upon demonstrating their competencies on a range of different types of assessments</td>
<td>4</td>
</tr>
<tr>
<td>66</td>
<td>Utilize data collection and analysis to support continuous improvement of the CBE program from both an operational and a curriculum design perspective</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Have learning resources that are available anytime/anywhere for students to access</td>
<td>4</td>
</tr>
<tr>
<td>1</td>
<td>Use a business model that promotes sustainability.</td>
<td>4</td>
</tr>
<tr>
<td>24</td>
<td>Implement a &quot;Pass&quot; or &quot;Not Pass&quot; rubric for mastery of competencies</td>
<td>-4</td>
</tr>
<tr>
<td>33</td>
<td>Enable students to transfer in credit from other institutions in a course-based format regardless of grade in the course</td>
<td>-4</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Score</td>
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<tr>
<td>---</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>40</td>
<td>Be offered primarily in directly career-related degrees</td>
<td>-4</td>
</tr>
<tr>
<td>5</td>
<td>Utilize subscription-based cost models</td>
<td>-4</td>
</tr>
<tr>
<td>61</td>
<td>Be offered fully online, or in blended environments, but not fully face-to-face</td>
<td>-4</td>
</tr>
<tr>
<td>16</td>
<td>Be entirely divorced from the credit hour (aka direct assessment)</td>
<td>-4</td>
</tr>
<tr>
<td>15</td>
<td>Have a course or credit-based approach</td>
<td>-5</td>
</tr>
<tr>
<td>64</td>
<td>Utilize totally new and different technology infrastructure to succeed</td>
<td>-5</td>
</tr>
<tr>
<td>4</td>
<td>Participate as an experimental site for Title IV funding in order to improve disbursement options for students</td>
<td>-5</td>
</tr>
</tbody>
</table>

**Financial access and sustainability.** Fiscal sustainability is also present as a theme in Factor 1, both from a business model perspective and from an accessibility perspective. The primary statement that supports this is 1:

1. Use a business model that promotes sustainability (+4)

Participant responses on follow-up questions further articulated this. Participant 1 noted that: “I also prioritize accessibility of programs, which makes access to Title IV critical.” Access to CBE programs through availability of funding, through Title IV funding in particular, is also noted by Participant 12, though interestingly the affordability of such programs was not present in the most important categories. Participant 12 wrote that: “The quality and success of any program is determined by how students can access them.” He referred to federal financial aid being important to this access, in addition to the level of quality of the program.
There was, however, another statement not present in the top factor array for Factor 1 which directly addressed affordability:

2. Be significantly less expensive than a traditional degree (-3)

This may indicate that the cost of the CBE degree need not necessarily be less than a traditional degree, but rather access to that degree through available funding is what is prioritized in this secondary theme within Factor 1, a fascinating distinction.

**Minimization of administrative components and absolutes.** A third theme found in Factor 1 is the consistent minimization of the importance of administrative components of CBE programs, along with the minimization of the importance of specific program design constraints upon the model (again, principally administrative in nature.) Participant 1 explained sorting choices as being focused on “what constitutes or signals attention to quality in the design and delivery of programs, so I focused on elements that speak to quality.” It was clear that in this perspective that the most important attention to quality in design and delivery refers to the curricular components, and not the administrative components of the program. In alignment with that, the most unimportant to a high-quality CBE program was:

16. Participate as an experimental site for Title IV funding in order to improve disbursement options for students (-5)

Participants articulated that their ratings for most unimportant were based mainly on elements that had little impact on the quality of the program. This was illustrated in the comments of Participant 12: “a program being subscription based really has no impact on its quality.” Indeed, that statement was also rated as most unimportant:
5. Utilize subscription-based cost models (-4)

Participant 27 illustrated the thinking behind particular choices that were rated as most unimportant that those elements—specifically those about the operationalization of programs—focused on “details about a way to do something when perhaps a wider range of possibilities exist.” Participant 12 likewise articulated that lower levels of importance were assigned to absolute statements, noting that there are many ways in which institutions can design CBE programs. Because of the emphasis on the primacy of competency and assessment design, here “design” is interpreted as the operational design of the program on elements of administration of the program. Indeed, this interpretation is further supported by the rating of several other statements, listed here in descending order:

61. Be offered fully online, or in blended environments, but not fully face-to-face (-4)
16. Be entirely divorced from the credit hour (aka direct assessment) (-4)
64. Utilize totally new and different technology infrastructure to succeed (-5)
4. Have a course or credit-based approach (-5)

Each of these elements is a very specific (mostly administrative) component of CBE programs. They are here de-emphasized, both as subservient to the focus on competencies and assessments, and also as too specific and potentially limiting to how CBE programs might be implemented. Participant 6 articulated this reasoning:

It should not be interpreted that my ranking as most unimportant meant a college/university should not do what the statement says. It was more that the
item described something that in my opinion that was completely optional and
discretionary. I have witnessed many of these programs and they incorporate
various bedrock principles but also each one is different as they emphasize
different aspects of program design.

There were also other administrative elements noted in this factor. Two other statements
were on the extreme most unimportant end of the spectrum.

24. Implement a "Pass" or "Not Pass" rubric for mastery of competencies (-4)
40. Be offered primarily in directly career-related degrees (-4)

These again fall into the theme of minimization of administrative components and
absolutes. They are both specific elements to the structural or administrative design of
CBE programs. A pass/not pass rubric is a one binary type of rubric for implementation
in determining mastery. This type of assessment precludes the use of multiple levels of
mastery for student achievement of competencies. This de-emphasis does not minimize
the overall importance of assessment in Factor 1; rather, it represents the lack of
emphasis placed on particular use cases that could be considered as elements of choice
for CBE programs, rather than necessary for CBE programs.

This theme also ties back to the first theme—primacy of competency definition
and assessment quality. Throughout Factor 1—Eliminating Proxies for Achievement—
there is a focus on curricular components being most important and administrative
components and model constraints being “Least Important,” with the additional emphasis
of fiscal sustainability through the focus of student access.
Within responses to follow-up questions, participants articulated why they placed elements as most unimportant. One of the two strongest responses to the questions was from Participant 8, who was critical of many CBE programs, indicating that they are CBE in name only, referring to them as “warmed over traditional programs” or those programs that focus on “technology or other reforms that have no direct relationship to CBE, such as OER.” Another explanation for sorting choices that provides a further lens into the de-emphasis of administrative components is that illustrated by Participant 30. This individual indicated that although many items were important, they were not specific to CBE students, those statements applied to all students as “base support systems that all students . . . will need.”

Factor 1, Eliminating Proxies for Achievement, incorporates three distinct and yet related themes: (a) primacy of competency definition and assessment quality; (b) financial access and sustainability; and (c) minimization of administrative components and absolutes. Of these, (a) and (c) are most closely aligned and consistent, and (b) financial access and sustainability, while important, is not as comprehensively addressed or present in the factor array.

This factor represents the majority view of the participants. Twenty participants were represented in this factor, whereas three participants loaded significantly on Factor 2, and nine had mixed or confounded results.

**Factor 2: Structures for Sustainability**

Factor 2 is distinct from Factor 1 in a number of key ways; most important among these is the emphasis on institutional structures and sustainability versus the nearly
wholly curricular model focus in Factor 1. Emerging from the factor array for Factor 2 are a series of themes that unite in a common focus on the effective operations of a high-quality CBE program. The four themes that characterize Factor 2 are: (a) fiscal sustainability, (b) core components over divergent options, (c) mechanisms of administering a program, and the (d) rejection of credit-based constraints. These themes are presented in an approximation of their emergence from placement in the factor array.

**Fiscal sustainability.** The single statement that participants found most important to a high-quality CBE program was:

1. Use a business model that promotes sustainability (+5)

This emphasis on fiscal sustainability first is further reinforced by the participants’ comments. The importance of a business model that enables the continuation of the CBE program was influenced by the participants’ direct experiences. Both participants that responded to the follow-up questions contextualized their answers in reference to their institutional situation. Some of the particulars of those comments cannot be articulated here without having the inadvertent consequence of identifying study participants, so direct quotations will in some cases be generalized. Participant 15 noted that “Sustainability is the most important in the lifecycle stage we are at. Financial aid is critical as 70% of our traditional students are on financial aid.” Participant 10 noted that the lens of the business model was essential to the continuation of CBE programming. The importance placed on one specific cost model further substantiates this concept:

5. Utilize subscription-based cost models (+4)
Many CBE programs employ subscription-based cost models; however, the importance attached to this specific student-facing pricing model emphasizes the importance of sustainability. Subscription-based cost models involve students registering for a block of time—for example, a six-month term—and then achieving as many credits as possible within that timeframe. This has been used in order to incentivize acceleration of degree completion and to focus on the achievement of competencies as opposed to seat time, corresponding to the collection of credits.

Though this emphasis of sustainability is notable because of the placement of statement 1 as well as the follow-up responses from the participants, Factor 2 does not deny the curricular model of CBE. The second theme within Factor 2 supports a competency-first perspective.

**Core components over divergent options.** The second most important component to a CBE program, as interpreted by Factor 2 and revealed in the factor array, is time variability.

19. Be time-variable, with students able to progress at their own pace throughout the program (+5)

Time variability is often associated with CBE programs. In *Clarifying Competency Based Education Terms*, the authors write that

In competency based education programs, time is the variable and student competency mastery is the focus, rather than a fixed-time model where students achieve varying results. In competency based education, as distinct from
competency based learning, the focus is on academic programs, practices, and policies. (Everhart et al., n.d., p. 4).

However, some definitions relating to CBE programs do not mention time variability (C-RAC's Framework for Competency-Based Education, 2015).

This importance placed on time variability is in alignment with the emphasis on the importance of subscription-based cost models, which necessitate time variability in order to function. These three statements therefore articulate together in Factor 2; time variability enables subscription-based cost models, which, in the perspective of the participants whose sorts define Factor 2, then support sustainable business models.

Another statement that supports a “core” curricular element of CBE programs is:

11. Clearly define the criteria for mastery of competencies (+4)

Interestingly, this statement is the only one that explicitly references competencies in the nine most important statements that define Factor 2. This further supports the overall Factor 2 point of view—Structures for Sustainability—that a combination of some curricular, and perhaps mostly structural CBE elements are most important to a high-quality CBE program. Here, the definition of mastery is emphasized, as opposed to other statements also available during sorting that focused on what competencies contain, what levels at which they should be articulated, and how they should be summatively and formatively assessed.

Another element often associated with operational CBE programs is the use of distributed faculty roles. It is of note that neither Factor 1 nor Factor 2 highly emphasize faculty roles or models as a variety of statements were available surrounding this theme.
Statement 42 is the only one among both factors that is perceived as most important for a high-quality CBE program.

42. Utilize distributed faculty roles, with support, coaching, assessment, and subject-matter expertise distributed among various program faculty and staff (+5)

Distributed faculty roles also align with the emphasis on the structure and sustainability of CBE programs found in Factor 2. Typically, disaggregating the faculty model is thought to enable a greater faculty-to-student ratio, which can either drive down cost of attendance for students, improve fiscal sustainability for colleges and universities, or both. The point of view of Factor 2 explicitly calls out the elements of CBE needed for structural sustainability.

This perspective is further supported by the de-emphasis of optional elements. In the original factorial design for the study, these statements were categorized as more divergent, representing a less traditional look at components of a CBE model. Three statements, 34, 6 and 24 illustrate this. All were rated towards the most unimportant end of the spectrum.

6. Allow learners to find and select their own learning resources, and should view the institutionally-provided resources as optional (-5)

34. Enable the use of non-traditional learning experiences like micro-credentials and MOOCs (-4)

24. Implement a "Pass" or "Not Pass" rubric for mastery of competencies (-4)

It is not surprising, then, that the perspective of Factor 2 de-emphasizes the use of established frameworks for competencies. The utilization of common competency
frameworks is less important to a high-quality CBE program from the perspective of Factor 2. The essence of Factor 2 is sustainability.

13. Utilize established frameworks for competencies like Lumina Foundation's Degree Qualifications Profile, AAC&U's LEAP, and industry standards (−4)

Likewise, a specific mechanism for co-creating and tracking student progress was rated as most unimportant. Viewed in the lens of the primacy of structure and sustainability, this could be due to the narrow and specific use case delineated in the statement.

45. Include intentionally crafted learning plans co-created with coaches or advisors (−4)

This specific method for planning student progress also aligns with the emphasis on sustainability. If learning plans are “co-created with coaches or advisors,” the implication is that the process of creating those plans could be either time-consuming or resource-intensive, both of which the perspective of Factor 2 rejects in favor of sustainability. Other themes within Factor 2 continue to support this perspective.

**Mechanisms of administrating a program.** Several of the most important components of high-quality CBE programs in Factor 2 are structural in nature, and continue to point back to an emphasis on the business sustainability and operational efficiencies. These include, in descending order in the factor array:

35. Enable students to start at frequent intervals during the year (i.e. weekly, monthly, or quarterly start dates) (+4)

70. Automate enrollment and financial aid processing, as well as other administrative functions, with the existing college systems (+4)
57. Have clear university policies around the program, tuition, fees, and participation expectations (+4)

Though these elements may seem overly mechanistic, they align closely with the continued emphasis on sustainability that is reinforced throughout the results of the analysis.

Enabling students to start frequently during the course of the year would both facilitate students’ access to the program and support a sustainable business model: the sooner students can begin the program, the more robust program enrollment could become. Here, structures are also being created to support access and not simply sustainability. The emphasis on structure and sustainability throughout Factor 2 could in fact belie a more central focus on access; without a sustainable business model, the CBE program will eventually not function, and therefore not be able to assist students.

Also mechanistic and operational, statement 70 concerning the automation of enrollment, financial aid, and other administrative functions, is viewed as most important to a high-quality CBE program. Likewise statement 57, focusing explicitly on institutional policies and procedures, is also viewed as comparatively most important. These again serve to underscore and support the perspective that administrative systems, policies, and procedures are critical to the overall success and sustainability of a CBE program.

The use of data collection for continual improvement was also noted towards the most important end of the spectrum.
66. Utilize data collection and analysis to support continuous improvement of the CBE program from both an operational and a curriculum design perspective (+4)

The importance placed on this mechanism for operational and curricular improvements can further support the primacy of sustainability that Factor 2’s viewpoint espouses.

**Rejection of credit-based constraints.** There were common themes through the most unimportant categories for Factor 2. Some administrative components of CBE were perceived to be less important to the quality of the program. Three of these referred to credit-based constraints.

16. Be entirely divorced from the credit hour (aka direct assessment) (-5)

17. Provide for a combination of both traditional, course-based credit hours and direct assessment (-5)

The type of CBE program—direct assessment or course-based—seemed equally unimportant in this perspective, and were, in fact, the two statements rated overall as most unimportant to a high-quality CBE program for Factor 2.

An interesting distinction between Factors 1 and 2, which further supports the prevailing perspective of Factor 2 as focused on business sustainability to enable access, is the removal of limitations on transfer credit. Statement 32 is one of those rated most unimportant, indicating that the student grade that transfers in is relatively irrelevant, supporting a focus on student access and progress, perhaps even at the expense of fully defensible levels of mastery among students.
32. Enable students to transfer in credit only if it has been transcripted at a grade which would equate with the institution's definition of mastery within the CBE program (-4)

Factor 1’s interpretation was supported by the nearly opposite assertion. There, the inverse of statement 32 (statement 33) was viewed as heavily weighted on the most unimportant part of the spectrum. Statement 33 was placed at (-4) in Factor 1, whereas for Factor 2 it was placed at (-2.) Interestingly, statistically this is a consensus statement between the factors, indicating that there is agreement between both factors that it is less important than other components to a high-quality CBE program:

33. Enable students to transfer in credit from other institutions in a course-based format regardless of grade in the course

Here is illustrated one of the core differences between Factor 1 and Factor 2:

philosophically, Factor 1 supports the purity and legitimacy of the assertion of mastery, and Factor 2 emphasizes student access and program sustainability. It may seem, then, somewhat conflicted that statement 40 was ranked towards most unimportant, that these programs

40. Be offered primarily in directly career-related degrees (-4)

This does align, however, with the continuing thread of access that runs through Factor 2. Business and operational sustainability are the mechanism through which access for students can be achieved.
Table 4

Descending Array of Factor Scores and Statements for Factor 2

<table>
<thead>
<tr>
<th>No</th>
<th>Statement</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Use a business model that promotes sustainability.</td>
<td>5</td>
</tr>
<tr>
<td>19</td>
<td>Be time-variable, with students able to progress at their own pace throughout the program</td>
<td>5</td>
</tr>
<tr>
<td>42</td>
<td>Utilize distributed faculty roles, with support, coaching, assessment and subject-matter expertise distributed among various program faculty and staff</td>
<td>5</td>
</tr>
<tr>
<td>11</td>
<td>Clearly define the criteria for mastery of competencies</td>
<td>4</td>
</tr>
<tr>
<td>35</td>
<td>Enable students to start at frequent intervals during the year (i.e. weekly, monthly, or quarterly start dates)</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Utilize subscription-based cost models</td>
<td>4</td>
</tr>
<tr>
<td>70</td>
<td>Automate enrollment and financial aid processing, as well as other administrative functions, with the existing college systems</td>
<td>4</td>
</tr>
<tr>
<td>57</td>
<td>Have clear university policies around the program, tuition, fees, and participation expectations</td>
<td>4</td>
</tr>
<tr>
<td>66</td>
<td>Utilize data collection and analysis to support continuous improvement of the CBE program from both an operational and a curriculum design perspective</td>
<td>4</td>
</tr>
<tr>
<td>40</td>
<td>Be offered primarily in directly career-related degrees</td>
<td>-4</td>
</tr>
<tr>
<td>45</td>
<td>Include intentionally crafted learning plans co-created with coaches or advisors</td>
<td>-4</td>
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</tr>
<tr>
<td>13</td>
<td>Utilize established frameworks for competencies like Lumina Foundation's Degree Qualifications Profile, AAC&amp;U's LEAP, and industry standards</td>
<td>-4</td>
</tr>
<tr>
<td>24</td>
<td>Implement a &quot;Pass&quot; or &quot;Not Pass&quot; rubric for mastery of competencies</td>
<td>-4</td>
</tr>
<tr>
<td>32</td>
<td>Enable students to transfer in credit only if it has been transcripted at a grade which would equate with the institution's definition of mastery within the CBE program</td>
<td>-4</td>
</tr>
<tr>
<td>34</td>
<td>Enable the use of non-traditional learning experiences like micro-credentials and MOOCs</td>
<td>-4</td>
</tr>
<tr>
<td>6</td>
<td>Allow learners to find and select their own learning resources, and should view the institutionally-provided resources as optional</td>
<td>-5</td>
</tr>
<tr>
<td>17</td>
<td>Provide for a combination of both traditional, course-based credit hours and direct assessment</td>
<td>-5</td>
</tr>
<tr>
<td>16</td>
<td>Be entirely divorced from the credit hour (aka direct assessment)</td>
<td>-5</td>
</tr>
</tbody>
</table>

The participants whose sorts made up Factor 2 were a diverse group—one each from two different types of colleges, and one from outside of an educational institution. These themes of (a) fiscal sustainability, (b) core components over divergent options, (c) mechanisms of administering a program, and the (d) rejection of credit-based constraints all further support the viewpoint that these structures for sustainability are not important in their own right; those elements are comparatively critical to maintain and sustain a program for access for students.

Participant 15 noted some limitations to his choices, articulating that he would have preferred a bimodal distribution: “If possible, I would have put some things—like
valid assessments or unbundled faculty roles—into the most important category. I would have put others—like new technology and performance expectations—in the least important.”

Consensus Statements

Of the 72 statements, 31 were considered consensus statements and have no significant difference between the factors on those statements at $p < .01$. Though some of those statements are in the center range of the spectrum, there are some statements that were heavily loaded on the most important end, including statement 66, focused on continual improvement based on data, and statement 14, focused on scaffolding students to success on summative assessments through formative pathways:

14. Provide specific learning paths with built-in formative assessments that guide the learner to success on summative assignments (+3)

Statement 14 was not previously highlighted, principally because it was placed at (+3) and therefore not within the range of statements that were used at the extreme ends of the spectrum for the interpretation of Factors 1 and 2.

Though statistically it was not listed as a consensus statement, it is important to note that statement 11, focused on clear definitions for the mastery of competencies, was ranked towards the most important end of the spectrum by both Factor 1 and Factor 2.

Considered most unimportant across both factors were some specific program design elements: implementing a pass/not pass rubric for the mastery of competencies, CBE programs that are direct assessment only, and CBE programs offered primarily in career-related degrees. Full consensus statements can be found in Table 5.
Table 5

*Consensus Statements for Factors 1 and 2*

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>Factor Array</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>*Be able to offer students federal financial aid</td>
<td>2 3</td>
</tr>
<tr>
<td>7</td>
<td>*Have built-in learning resources that are available to students at no extra charge</td>
<td>1 0</td>
</tr>
<tr>
<td>14</td>
<td>*Provide specific learning paths with built-in formative assessments that guide the learner to success on summative assignments</td>
<td>3 3</td>
</tr>
<tr>
<td>16</td>
<td>*Be entirely divorced from the credit hour (aka direct assessment)</td>
<td>-4 -5</td>
</tr>
<tr>
<td>23</td>
<td>Utilize proctoring or other authentication for summative assessments in order to maintain legitimacy</td>
<td>-1 1</td>
</tr>
<tr>
<td>24</td>
<td>*Implement a &quot;Pass&quot; or &quot;Not Pass&quot; rubric for mastery of competencies</td>
<td>-4 -4</td>
</tr>
<tr>
<td>25</td>
<td>*Implement grading schemas that enable students to pass competencies at different levels of mastery that are described as long as that level of mastery is captured and documented, such as at an 80% or 90% achievement of the competency</td>
<td>-1 -1</td>
</tr>
<tr>
<td>26</td>
<td>*Norm assessments closely in order to prove their validity</td>
<td>2 2</td>
</tr>
<tr>
<td>31</td>
<td>*Enable students to gain credit through transfer credit, military training, and other life experiences</td>
<td>2 1</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Score1</td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>33</td>
<td>Enable students to transfer in credit from other institutions in a course-based format regardless of grade in the course</td>
<td>-4</td>
</tr>
<tr>
<td>40</td>
<td>*Be offered primarily in directly career-related degrees</td>
<td>-4</td>
</tr>
<tr>
<td>41</td>
<td>*Partner with employers to provide internship opportunities as well as post-graduation employment opportunities</td>
<td>1</td>
</tr>
<tr>
<td>44</td>
<td>*Utilize separate assessors for student work to ensure consistent application of rubrics</td>
<td>0</td>
</tr>
<tr>
<td>46</td>
<td>*Provide tutors, writing centers, librarians and other academic supports to surround the student with applicable resources</td>
<td>3</td>
</tr>
<tr>
<td>47</td>
<td>*Not necessarily support distributed faculty roles; a traditional faculty role can also be utilized within a CBE model</td>
<td>-1</td>
</tr>
<tr>
<td>48</td>
<td>Include regular, planned interactions between students and CBE program faculty and staff</td>
<td>1</td>
</tr>
<tr>
<td>49</td>
<td>*Utilize Subject-Matter Experts that are not traditional college or university faculty, rather they should come from workforce, industry, or other professional backgrounds</td>
<td>0</td>
</tr>
<tr>
<td>50</td>
<td>*Utilize Subject-Matter Experts that are traditional college or university faculty</td>
<td>-1</td>
</tr>
<tr>
<td>51</td>
<td>*Utilize instructional designers, content developers and quality assurance professionals</td>
<td>3</td>
</tr>
<tr>
<td>54</td>
<td>Enable students the opportunity to physically meet with their faculty member (or other distributed faculty role,) if they desire</td>
<td>-2</td>
</tr>
<tr>
<td>55</td>
<td>*Prioritize the accessibility of the program to students regardless of ability, race, income or gender</td>
<td>2</td>
</tr>
</tbody>
</table>
56  *Include normed assessments to protect students from inadvertent bias in assessment strategy  0  -1

57  *Have clear university policies around the program, tuition, fees, and participation expectations  3  4

58  *Utilize admittance tests or other criteria to admit only self-directed students  -3  -2

59  *Be designed for a diverse audience in terms of age and preparation  -2  -3

62  Utilize appropriate LMSs that enable the tracking of success on competencies  -1  0

63  *Include learning in other physical places, such as the workplace, clinical sites, through internships, and experiential learning  0  -2

66  *Utilize data collection and analysis to support continuous improvement of the CBE program from both an operational and a curriculum design perspective  4  4

67  *Utilize dashboards, real-time reports and automated alerts to surface student progress to students, faculty, advisors, coaches, deans, analysts and other internal stakeholders  2  2

71  71-Have regular and substantive interaction which can be fulfilled by a coach, tutor, or assessor role  0  -2

72  *Have regular and substantive interaction which should be fulfilled at least partially by a faculty with expert qualifications  1  2

*Statements that do not distinguish between any pair of factors at p < .01. Those flagged are also non-significant at p < .05.*
The U.S. Department of Education’s requirement for CBE programs to have Regular and Substantive Interaction (RSI) with faculty has been a source of much consternation for CBE program advocates. Attempting to define what RSI is, and how to fulfill it adequately and effectively within CBE programs continues to be a challenge within the field. The two statements that attempted to elicit responses on perceptions about how to fulfill RSI were statements 71 and 72. They are both listed as consensus statements. Statement 71 states that RSI can be fulfilled by “a coach, tutor, or assessor role” whereas statement 72 requires that RSI be fulfilled “at least partially by a faculty with expert qualifications.” Though both were consensus statements, they were both ranked somewhat in the neutral range—statement 71 was ranked at (0) and (-2) for Factors 1 and 2 respectively, and statement 72 was ranked at (+1) and (+2) for Factors 1 and 2. This may indicate some ambivalence towards what RSI actually is, as much as it may indicate the relative neutrality of opinion towards its relative importance.

From a financial sustainability and accreditation standpoint, RSI must indeed be fulfilled or the program would potentially be considered a “correspondence program” instead of a CBE program, which has significant financial aid implications. Participant 5—who was a conflicted response, indicating alignment with parts of both Factor 1 and Factor 2, noted that “It was difficult. There are a lot of similar choices so for example in the 71 and 72 choice that was not captured in the first round, I see regular and substantive interaction to involve faculty using the ED definition. So RSI is not solely coach tutor or assessor role.”
Conflicted Responses

Nine participants had sorts that loaded significantly on both Factor 1 and Factor 2, indicating that they had elements of both sets of perspectives. Of those nine participants, five provided responses to the interview questions, and those comments have been utilized to gain some clarity on the conflicts. Interestingly, the follow-up responses of these five participants were among the lengthiest provided for the process.

Though these do not fit into one of the two factors, the responses of participants are analyzed and interpreted here, as some of the feedback was well articulated and reflected what might be considered additional multiple viewpoints. Though these perspectives are unique and are explicitly combinations of both Factor 1 and 2, examining these comments reveals further subtleties in how elements of high-quality CBE programs are prioritized and valued. Some of the themes emerging from these comments are addressed below: (a) existential needs, (b) transferability and communicability, (c) distinctiveness and optional, (d) counterproductive elements, and (f) new technology challenges.

Existential needs. Participant 9 provided a concise justification for what might be a unique factor in and of its own right, aside from this statistical analysis:

CBE programs simply won't survive if they a) do not have sustainable business models and b) can't demonstrate regular and substantive interaction (and thus can't qualify for federal financial aid, but perhaps more importantly, I think, won't be able to fulfill long-held standards of quality). Finally, since competencies are the bedrock of a CBE program they must be clearly defined. If I could have added
one more to the most important list, it would have been about well-designed, diverse assessments, which are equally crucial to well-defined competencies. Without both of those, one doesn't have a CBE program.

This perspective reveals an interesting combination of both fiscal sustainability and administrative processes along with competencies and assessments as the dual components that are most essential to a high-quality CBE program. Along with effective faculty models as indicated by the emphasis on RSI, these are considered by Participant 9 to be the existential elements of a CBE program; the very survival of CBE programs is predicated on those three things.

Similarly, Participant 11 noted two critical elements as most important to a high-quality CBE program; each of these elements aligns with one theme each from Factor 1 and Factor 2. He writes “Time and time again I come back to two central issues that should be at the top of the list for assuring the success of CBE programs—sustainability and quality.” These echo the comments of Participant 9, that a sustainable business model and quality, defensible learning experiences are both core to a CBE program.

Participant 11 went on to write more specifically about the importance of sustainable business models to the existence of CBE programs:

Many of the recent experiences in CBE have been driven by the desire to provide lower cost educational pathways for students that leveraged promises of improved efficiency. But because startup costs are often high, most institutions are artificially subsidizing CBE programs in order to keep student costs low. That
may be a necessary short term strategy, but if an institution has not truly calculated development and ongoing costs, it won't last.

Participant 11 works for a for-profit entity, whereas Participant 9 works in a non-profit public institution. Their perspectives are similar, whereas their institutional demographics are disparate. This was relatively consistent throughout the analysis. Perceptions were diverse across levels of experience and types of institutions.

**Transferability and communicability.** One participant focused largely on something generally not highlighted in Factors 1 and 2: the necessity to have the learning and value of the CBE programs translatable into more traditional programs. There were several statements around transferability of credit and the use of Prior Learning Assessment (PLA). The theme of transferability as a focus area did not emerge in either Factor 1 or 2. Participant 4 wrote that:

> One of the biggest challenges for academic innovation is to have learning be translatable and transferable to traditional programs. Not because it improves them, but because it is necessary for acceptance (for the foreseeable future) so things that help that are important. Also, efficiency in counting prior learning are a big deal and same the student time and money. Not having that ability hurts the student.

This emphasis on transferability relates to transportability of learning within higher education. The transfer of credit, PLA, and even the importance of transcripting in various forms did not emerge as strong themes in either Factor 1 or 2, indicating that they are the middle of the curve—not considered either most important or most unimportant.
Participant 11 also focused on the ability to translate the competencies to a workforce audience. He notes that it is “necessary to be able to demonstrate to potential employers that the students coming out of CBE are as qualified, if not more qualified, than students coming out of traditional programs.” Employer relationships and engagement were not perceived as critical or unnecessary to CBE programs. Some of the consensus statements referenced employers and workforce relationships. These ratings were in the middle of the curve (with positions noted for Factors 1 and 2 respectively):

31. Enable students to gain credit through transfer credit, military training, and other life experiences (+2 and +1)
33. Enable students to transfer in credit from other institutions in a course-based format regardless of grade in the course (-4 and -2)
41. Partner with employers to provide internship opportunities as well as post-graduation employment opportunities (+1 and 0)

This perspective on transfer credit and workforce relationships indicates that both factors may perceive those elements to be necessary components, but not more important than either the curricular factors indicative of Factor 1, or the emphasis on business sustainability in Factor 2.

**Distinctiveness and optional.** Some responses further made explicit the mixed nature of the results—that participants in this category loaded significantly on both Factor 1 and 2. Participant 3 noted most important answers to be what he considered as “non-negotiables” which included adjustment to timescale and providing resources (both emphasized in Factor 2) and a clear definition of competencies (most emphasized in
Factor 1) along with the program being a “cheaper option.” Participant 5 noted that some institutions are now utilizing the term CBE for programs with learning outcomes, retrofitting such programs into typical semester patterns and even eliminating time variability. Participant 3 noted that his point of view was to avoid the “problem of CBE-washing.”

Consistently, within Factors 1 and 2 and through the mixed responses, elements of CBE rated as most unimportant were interpreted as peripheral. Participants 5 and 11 both referred to participation as an experimental site for federal financial aid to not be an essential component. Participant 11 noted that “Most CBE programs have found ways to work from within the existing financial aid regulations and have not needed the flexibility” that can be employed as an experimental site.

**Counterproductive elements.** Participant 4, in response to a question as to why this individual rated certain items as most unimportant noted that those elements were not necessary, and that while in some cases those elements might be “attractive attributes,” in some circumstances those same elements “may even be counterproductive.” Participant 9, likewise referred to sorting choices for most unimportant to be related to elements that could be detrimental to CBE programs and their students. The statements that Participant 9 considered harmful were statement 6, in reference to enabling learners to find their own resources, viewing the institutional learning resources as optional; statement 16, which refers to direct assessment only, and statement 54, which refers to enabling students to physically meet with faculty.
New technology challenges. Another interesting perspective found within the mixed responses included opinions about the use of technology platforms to support CBE programs. Participant 11 rated new technology infrastructure as closer to most unimportant noting that:

This is closely related to sustainability in my opinion. Very few institutions have the human or fiscal resources to invest in the development and maintenance of new technologies and infrastructures. In the end, insisting that CBE must use new technologies and infrastructures runs the risk of either damaging the sustainability of a program or of preventing an institution from ever developing a CBE program. Indeed, statement 64—to which he refers—is rated on the lower end of the spectrum by all but one of the nine participants who are characterized as mixed responses on both Factor 1 and Factor 2:

64. Utilize totally new and different technology infrastructure to succeed (-2, -5, 2, -4, -5, -2, -2, -2, -5)

This perspective—though present among the participants who loaded on both Factors 1 and 2—is not pervasive enough to become a consensus statement.

Participant 2

One participant did not load significantly on either factor, nor did this participant’s sort have mixed components. There were some elements wherein there were aligned perspectives between this participant and other consensus statements. For statement 3 on the ability of institutions to offer students federal financial aid, Participant 2 sorted that as identical to both Factors 1 and 2 at +3. Likewise, for statement 16
emphasizing direct assessment, Participant 2 aligned with Factors 1 and 2, rating the statement towards most unimportant (-4). One interesting divergence from the consensus statements was on statement 50, which was significant as a consensus score with placement at -1 and 0 for Factor 1 and Factor 2, respectively.

50. Utilize Subject-Matter Experts that are traditional college or university faculty (-5)

The interpretation of any patterns from Participant 2 is limited, as he did not complete the follow-up questions. In order to draw no erroneous conclusions about the importance of this unique viewpoint based solely on the statement sorts alone, further discussion of this sort will be eschewed.

**Additional Elements for Consideration**

There are several additional elements that are presented here to provide additional contextual information on the research. Several participants provided feedback on the process of participating in the research, and that feedback contributed to further hone the conditions of instruction. The researcher’s point of view is also presented here in the interest of transparency.

**Responses on the Process**

Engaging in the process of the study elicited direct responses from participants. The first set of conditions of instruction (which were utilized by the first sort for 14 participants,) caused some confusion for three participants. The initial conditions of instruction asked participants to sort the statements which were all meant to complete the phrase “To be a high-quality CBE program, it must...." The corresponding grid was
labeled from *Most Strongly Agree* to *Most Strongly Disagree*. This use of language was perhaps too absolute for some participants. One recruit responded via email with feedback including “I think you would get better results if instead of an agree/disagree scale, you took the “must” out of the initial statement and made it part of the judgment.”

This feedback, though it did not emerge during the pilot, was incorporated. The adapted conditions of instruction asked participants to rate from most important to most unimportant. Additionally, instead of having the statements complete the phrase “In order to be a high-quality CBE program it must…” they were instead asked to consider the relative importance of the statements in reference to a high-quality CBE program.

Editing the conditions of instruction for clarity increased the potential for misalignment between earlier and later responses. In order to avoid this, participants were sent their own sorts back, and asked explicitly to consider the revised conditions of instruction and make any necessary adjustments. Participants did not change their responses as a result of the language change for the conditions of instruction. Two participants provided feedback on the change, however. Participant 6 wrote that “I did not change my sort based upon the shift from MUST to Most. I actually thought about the descriptions in those terms all along.” Participant 27 noted that “The spreadsheet did not need any adjusting based on changing Agree/Disagree to Most-/Least-Important, and I filled in answers to the five questions.”

One participant who found the original conditions of instruction confining was able to successfully complete the sort with the new conditions of instruction. She wrote “This was much better—but still hard! I would still prefer if there were a few extra
slots for each grading category—would make it much easier, I think, given the number of factors you are asking people to rank at the same time. It’s a hard assignment!”

There was also feedback regarding the statements. In particular, two recruits expressed concern around statements referring to the validity of assessments and norming assessments:

56. Include normed assessments to protect students from inadvertent bias in assessment strategy

26. Norm assessments closely in order to improve their validity

The concern expressed by these individuals focused on the use of the terminology and its imprecise nature. The intention of statement 56 was that assessments would need to be normed across assessors in order to protect students from inadvertent bias. However, the language was imprecise and could cause confusion. One individual wrote that “Norming is necessary if you want valid evidence for comparing what different students know about something. This is a massive problem across the entire CBE community.” Indeed, confusion about terminology with regards to competencies and assessments is pervasive in CBE community to the point that multiple efforts have been made to clarify the usage of terms. In the subsequent email conversation resulting from this exchange, the use of terms such as validity and validation were mentioned, with the individual concluding with “I think you are right in not shying away from that debate. But you need to acknowledge that the CBE community needs to confront the way that assessment and measurement professionals use the term and the notion of validity.” In the recently released *Quality Dimensions for Connected Credentials*, different dimensions of validity
are noted “Validity concerns both everyday characterizations of “valued” such as industry-recognized or accredited, as well as how it is used by measurement specialists as it relates to evidence” (Casilli, Ganzglass, Hickey, Everhart & Muramatsu, 2016, p. 24).

As indicative of this confusion as any, though it was noted by a couple of recruits it was not mentioned in the follow-up answers by any study participants. The statements were uniquely interpreted by each participant. The very notion of operant subjectivity indicates that there is no clear and quantifiable common understanding of a single statement, and so efforts to ensure all participants understand the same statement the same way are futile. Rather, the statements should be viewed in relationship to each other, as part of a whole. “This gestalt emphasis means it can never ‘break-up’ its subject matter into a series of constituent themes (which immediately distinguishes Q from various forms of discursive or interpretative phenomenological analyses)” (Stenner & Watts, 2016, p. 70).

The final follow-up question to participants asked if there were any elements they thought were missing from the sorting activity, and, if so, how would those elements have related to their choices. Responses provided by participants illustrated some other ongoing conversations and considerations within the field of CBE. Participant 4, whose sort loaded significantly on both Factor 1 and Factor 2, illustrated the conflict: “My biggest challenge was deciding what to move to lower importance ratings.” Participant 4 did note that “I like the technique for this purpose though, so not a criticism!” Likewise, Participant 13 (who aligned with Factor 1) found it difficult to rank some elements for the
same reason, “some ended up lower on the scale due to the numerical limits placed on each category.”

One participant noted that the process did not enable him to “register my skepticism that we will see many genuine CBE programs.” This theme, noted here by Participant 8, echoes some of the earlier analysis regarding workforce engagement and yet goes further, writing “I also do not believe we have solid evidence as yet that employers, in general, prefer CBE graduates or that these employers really know what they are looking for in a new employee.”

One of the most comprehensive reflections on the process by a participant comes from Participant 11, whose sort was conflicted, loading significantly on both Factor 1 and Factor 2. The three core components that Participant 11 addresses align to two perspectives: academic and policymaker. These are roughly equivalent to the original factorial design which categorized elements as being related to either curriculum and assessment or to institutional policies.

I found this to be a very interesting process. I think a lot of the conversations we've had about CBE have tended to focus on pieces of successful program development but haven't really looked at it holistically. So this was one of the few opportunities I've had that has forced me to think about a wide range of parts and decide what pieces I believe are the most important. In terms of my mechanics, I started on both ends of the spectrum—looking at most and least important and then worked towards the middle. Philosophically, my background as both an academic and a policymaker significantly influenced my choices. For example,
my three most important qualities were sustainable business model (policymaker perspective), component parts of competencies (academic), and criteria for mastery (academic and policymaker).

These comments by Participant 11 illustrated the core tension between the perspectives of Factor 1: Eliminating Proxies for Achievement and Factor 2: Structures for Sustainability.

**Researcher’s Point of View**

As a researcher within the field of CBE it is important to note that I am also a practicing administrator of an accelerated learning model program that is competency-based in my role at Southern New Hampshire University. CBE is both a professional interest and a personal passion. I previously worked for over six years at a community college, and both my current and previous positions have been at non-profits and at institutions that emphasize the transformative nature of education as open access institutions. Additionally, I am a non-traditional student myself, and this also impacts my own perspective on CBE programs. Indeed, as a working mother and student, I could be identified as the target student population for some CBE programs. In order to approach the research as transparently as possible, it is necessary to illustrate some of the core perspectives of the researcher about the topic of CBE programs, and what constitutes a high-quality CBE program.

I completed the Q sort and the results revealed a conflicted or mixed case—I loaded significantly on both Factor 1 (.56) and Factor 2 (.39). I found my selections were supported mainly by my own experiences with CBE, and in some ways the sorting
clarified my own opinions about what is essential to the model. Like many others I emphasized both the importance of an effective business model (statement 1) and the time variable nature of CBE programs (statement 19), which were identical to two of the three statements placed at (+5) in Factor 2. I also rated statement 11, concerning clear criteria for mastery of competencies in the (+5) position.

On the most unimportant end of the spectrum, I sorted the statement regarding direct assessment (statement 16) into the extreme most unimportant (-5) position, which interestingly was a consensus statement, with Factor 1 at (-4) and Factor 2 at (-5) respectively. I also rated statement 4, about experimental site participation for Title IV funding, and statement 24, about implementation of pass/not pass rubrics in the (-5) position; statement 24 was in the (-4) position for both Factors 1 and 2.

I aligned statement 64 towards the most unimportant end of the spectrum. That statement is:

64. Utilize totally new and different technology infrastructure to succeed

Similarly, I rated highly a technical element that did not emerge as a consistent theme:

62. Utilize appropriate LMSs that enable the tracking of success on competencies

Part of my rationale for rating those elements is that, in the field of academic technology, the platforms that support the implementation of CBE for students are most likely to be either an established LMS (which likely was not designed to be competency-focused,) or a custom-built LMS (which likely is not sustainable or full-featured). This interacts with the business sustainability of CBE programs. There are practical dependencies between financial sustainability and technology sustainability. Having led a competency-based,
accelerated learning program, it was both the financial model and the technical platforms that were the most challenging to the overall scalability and even effectiveness of the program. Likewise I placed emphasis on clear university policies (statement 57) as the development of procedures and policies as specific use cases arose was time and resource-intensive.

Unlike both Factor 1 and Factor 2, where the statements regarding Regular and Substantive Interaction (RSI) were both consensus statements and rated closer to neutral, I placed statement 72 towards the most important end of the spectrum at (+4) due to my personal beliefs about the importance of highly qualified and credentialed faculty.

71. Have regular and substantive interaction which should be fulfilled at least partially by a faculty with expert qualifications (+4)

The importance of students having access to highly qualified professionals in their field is necessary to the learning process, and this was something that I would not have separately articulated in that way had I not engaged in the sorting process and made decisions about the relative importance of various components. In Table 6, the positional factor scores for the researcher can be found.

Table 6

*Factor Scores and Statements for the Researcher*

<table>
<thead>
<tr>
<th>No</th>
<th>Statement</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Use a business model that promotes sustainability.</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
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</tr>
<tr>
<td>19</td>
<td>Be time-variable, with students able to progress at their own pace throughout the program</td>
<td>5</td>
</tr>
<tr>
<td>11</td>
<td>Clearly define the criteria for mastery of competencies</td>
<td>5</td>
</tr>
<tr>
<td>72</td>
<td>Have regular and substantive interaction which should be fulfilled at least partially by a faculty with expert qualifications</td>
<td>4</td>
</tr>
<tr>
<td>66</td>
<td>Utilize data collection and analysis to support continuous improvement of the CBE program from both an operational and a curriculum design perspective</td>
<td>4</td>
</tr>
<tr>
<td>62</td>
<td>Utilize appropriate LMSs that enable the tracking of success on competencies</td>
<td>4</td>
</tr>
<tr>
<td>57</td>
<td>Have clear university policies around the program, tuition, fees, and participation expectations</td>
<td>4</td>
</tr>
<tr>
<td>14</td>
<td>Provide specific learning paths with built-in formative assessments that guide the learner to success on summative assignments</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>Utilize competencies that include knowledge, skills, abilities, attitudes and beliefs or similarly structured categories</td>
<td>4</td>
</tr>
<tr>
<td>69</td>
<td>Provide transcripts that represent the specific competencies attained</td>
<td>-4</td>
</tr>
<tr>
<td>64</td>
<td>Utilize totally new and different technology infrastructure to succeed</td>
<td>-4</td>
</tr>
<tr>
<td>54</td>
<td>Enable students the opportunity to physically meet with their faculty member (or other distributed faculty role,) if they desire</td>
<td>-4</td>
</tr>
<tr>
<td>47</td>
<td>Not necessarily support distributed faculty roles; a traditional faculty role can also be utilized within a CBE model</td>
<td>-4</td>
</tr>
</tbody>
</table>
Engaging in the sorting process myself revealed my perspective on CBE programs to be one wherein the academic and workforce-related success of the program is dependent upon its existence. In order to exist, sustainable business models (and supporting technology) need to be structured thoughtfully and iterated for continual improvement. I found my perspective to mirror that of the existential theme from the conflicted participants who also loaded on both Factor 1 and Factor 2.

**Summary**

Thirty-three professionals in the field of CBE completed the Q sorting process, revealing two factors: Eliminating Proxies for Achievement and Structures for Sustainability. Factor 1, Eliminating Proxies for Achievement, heavily emphasized the primacy of competencies in all forms—from definition and usage to assessment criteria. Additional themes in Factor 1 were financial access and sustainability, and minimization of administrative components and absolutes. Factor 2, Structures for Sustainability,
leaned heavily towards the importance of an effective business model, with additional themes being core components over divergent options, mechanisms for administering a program, and rejection of credit-based constraints.

Of the 72 statements, 31 were considered to be “consensus statements” and have no significant difference between the factors on those statements at $p < .01$. Nine participants loaded significantly on both factors, and therefore were considered conflicted or mixed responses. Within the interview responses, individual themes (rather than those emerging from factors) were found: (a) existential needs, (b) transferability and communicability, (c) distinctiveness and optional, (d) counterproductive elements, and (f) new technology challenges.

Finally, additional elements for consideration were discussed, including the responses on the process from those who participated, and the point of view of the researcher for transparency.
CHAPTER V

DISCUSSION

The purpose of this chapter is to review the information presented in the previous chapters, and to further articulate the implications of the revealed factors. This investigation focused on the perspectives of experts within the field of Competency-Based Education (CBE) on the relative importance of different components of CBE programs. The results of the analysis are discussed, along with implications and recommendations for further research.

Summary of the Study

CBE programs have re-emerged in recent years as a result of increasing pressure on higher education institutions with regards to cost, time to completion, and relevance of knowledge gained during a degree program to the workplace (Blocher et al., 2014; Johnstone, 2013). The sheer scale of student loan debt (beyond $1 trillion nationally,) and the default rates on student loan debt, are some of the major factors that have set the stage for further experimentation in alternative models of higher education (Brower, 2014; Adisu & Caboni, 2004).

Context

There are many and varied definitions of what defines a CBE program, including these elements which are addressed in the study: self-pacing, effective assessments, explicit learning objectives, anytime/anywhere access to learning objects and resources, personalized, adaptive, or differentiated instruction, and finally learner supports through...
coaching or advising (Brower, 2014; Hall & Jones, 1976; Johnston & Soares, 2014; Klein-Collins, 2012). There is still not a common understanding of what elements are critical to a CBE program.

Recent quality efforts have been made towards clarifying what elements should be in place for a high-quality CBE program including the CBE Course Quality Improvement Rubric through Western Governors University (2015), and the Quality Standards for Competency-Based Educational Programs through the Competency-Based Education Network (2016). Though many elements are present in both tools, neither addresses the relative importance of different components by experts from the CBE field.

CBE experts come from a variety of types of institutions and serve in a variety of roles. Only by going to those professionals who regularly interact with CBE programs can the opinions be revealed about what components of programs are more or less important to CBE program quality. Understanding the perspectives of experts from within the field enables a more nuanced understanding about what different types of programs, prioritizing different elements, are thought to be high-quality. Additionally, revealing what elements are commonly cited as important to a high-quality program across perspectives could inform which elements of a CBE program should be present regardless of model.

Purpose Statement

The purpose of this study is to create a comparative taxonomy of CBE programs based on perceptions of importance by experts in the field of CBE. This will enable CBE program models to emerge illuminating differences of opinion as to what constitutes
quality. It will also illuminate what components are considered critical to all programs across models. Q methodology was utilized to accomplish this.

**Research Questions**

The research questions that precipitated this investigation are:

1. How do CBE experts view the core components and relative importance of different components to the quality of CBE degree programs?
2. What factors (or models) are revealed through this process by experts within the field of CBE?
   a. What core components are commonly cited as most critical to quality CBE programs across the models?
   b. What core components are commonly cited as not necessary to quality CBE programs across the models?
3. How are those models described and differentiated?

In order to address these questions, a Q study was employed, along with an institutional demographic survey and follow-up research questions.

**Methods**

This study utilized experts in the field of CBE in order to examine perspectives about what are more or less critical components of a high-quality program through Q methodology. Q methodology is an appropriate methodology to discover the opinions and perspectives of participants from the “vantage point of self-reference” (McKeown & Thomas, 2013, p. 2). It enables researchers to systematically investigate the opinions of participants (Thomas & Watson, 2002).
Four types of data was collected in this study, including (in order of execution,) demographic questionnaires, Q sorts, responses to interview questions, and brief biographical sketches of the participants. Two samples are utilized in Q methodology: the Q statements, and the P set, or person sample. From the concourse of possible statements, 72 statements were selected to make up the Q statement sample. The statements were drawn from: (a) web-based artifacts from websites of existing, established CBE programs; (b) related publications and reports by leading organizations; and (c) statements drawn from a variety of sources including previous research, notes from conference proceedings, and conversations from individuals within the field. Additional statements were generated from the pilot. A two-by-two design was employed. It structured more traditional and more divergent practices across curriculum and assessment design and administrative components. Eighteen statements from each quadrant were utilized for Q statements.

The person sample was recruited via snowball sampling and outreach on two industry listservs: the listserv for Western Interstate Connection for Higher Education’s WCET (WICHE’s Cooperative for Educational Technology) and Lumina Foundation’s CBE listserv. Thirty-three participants were utilized in the study, of which 15 responded to the follow-up questions. First, participants completed the survey instrument, which included informed consent and questions about the type of institution, as well as years of experience in higher education and other salient characteristics. Then participants engaged in the Q sort online. Finally, they were sent back their Q sort and asked to respond to follow-up questions for clarification. Participants were also sent brief
professional biographies to edit, or provided their own for use in the study. Thirty-three Q sorts were completed as part of the study and utilized in this research.

PQMethod software was utilized in the analysis of the Q sorts. Centroid factor analysis was followed by hand rotation. This method of analysis, followed by hand rotation, was selected because it preserves a certain amount of indeterminacy, as opposed to Principal Components Analysis, or PCA, which has one distinct mathematical solution (Ramlo, 2011). Both Brown and Stephenson preferred centroid because it “best fits the idea of seeking operant subjectivity and offering Q as a methodology for subjective science” (Ramlo, 2011, p. 76). With 72 statements, N = 1/√72 multiplied by 2.58 indicated that sorts exceeding .30 were significant at p < .01. Hand rotation was used to examine multiple perspectives on the data. A rotation of (-22) degrees revealed a solution with two factors. Factors 1 and 2 were weakly correlated at .22.

Participants were considered to have loaded significantly onto a factor if their Q sort exceeded .30 on one and only one factor. Of the 33 participants, 20 loaded on Factor 1, and three loaded on Factor 2. Nine were mixed cases, loading significantly (above .30) on both Factors 1 and 2, and one participant loaded on neither factor.

**Major Findings**

Factor 1, Eliminating Proxies for Achievement, emphasizes the importance, and in some ways, curricular purity of the learning model, focusing on competencies and assessments. Of the most important items in Factor 1, six of nine focused on the curricular elements of the learning models. Three themes emerged from the Factor 1 array as well as the follow-up comments from participants: (a) primacy of competency
definition and assessment quality, (b) financial access and sustainability, and (c) minimization of administrative components and absolutes. This emphasis of curricular components also largely indicated a de-emphasis of administrative elements.

Factor 2, Structures for Sustainability, focuses on effective operations for program sustainability, also addressing competencies and criteria, though they are not as heavily emphasized. Four themes can be found within Factor 2: (a) fiscal sustainability, (b) core components over divergent options, (c) mechanisms of administering a program, and the (d) rejection of credit-based constraints.

Nine participants loaded significantly on both Factors 1 and 2, indicating mixed results wherein their perspectives contained elements of both factors. Through a review of the Q sorts as well as participant comments, some disparate themes emerged here as well. These themes should not be interpreted as indicative of the nine participants who had mixed results, rather they are individual threads of themes that were teased from one or multiple participants’ loadings and comments. They are: (a) existential needs, (b) transferability and communicability, (c) distinctiveness and optional, (d) counterproductive elements, and (f) new technology challenges.

Results of the Research Questions

The results of the research questions are highly interdependent, but they will be addressed here in the order in which they were presented. The first research question seeks to discover how CBE experts view core components of CBE and their relative importance to the quality of CBE programs. CBE experts view the core components and relative importance of those components distinctly, but with some groupings of
perspectives. Of the 33 participants, 10 of them loaded onto Factor 1, which represented a group of opinion, three loaded onto Factor 2, a group of opinion distinct from that of Factor 1, and nine participants loaded significantly onto both factors, indicating agreement with elements of both. One participant did not load significantly onto either factor.

Both groups rated as most important or most unimportant elements of CBE focusing on curriculum and assessment practices as well as on financial models; the emphasis upon which of those practices is a critical difference between the two factors. Other elements were less controversial, typically arrayed towards the middle of the spectrum. Details about the core components and their relationship to factors and interpretations will be discussed in more detail in the subsequent research questions.

The solution that emerged has two factors and indicates that there is diversity in the beliefs of the relative importance of component elements necessary for high-quality CBE programs. There is diversity in the P set itself, which was designed to incorporate a variety of different perspectives. Participants from non-profit and for-profit four year public and private universities participated, as well as from two-year colleges, non-profit organizations involved in higher education quality and advocacy, for-profit educational technology providers and consultants participated in order to provide a diverse set of perspectives.

The second research question seeks to discover what factors emerged from this investigation and analysis. Two primary factors were revealed through the Q methodology: Factor 1: Eliminating Proxies for Achievement, and Factor 2: Structures
for Sustainability. Factor 1 emphasizes the competency and assessment elements, whereas Factor 2 emphasizes business models and administrative structures. Table 7 provides a brief synopsis of those views, which are discussed in further detail in the response to Research Question 3.

Table 7

*Synopsis of Distinctions between Factor 1 and Factor 2*

<table>
<thead>
<tr>
<th>Factor 1: Eliminating Proxies for Achievement</th>
<th>Factor 2: Structures for Sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Themes</strong></td>
<td></td>
</tr>
<tr>
<td>(a) Primacy of competency definition and assessment quality</td>
<td>(a) Fiscal sustainability</td>
</tr>
<tr>
<td>(b) Financial access and sustainability</td>
<td>(b) Core components over divergent options</td>
</tr>
<tr>
<td>(c) Minimization of administrative components and absolutes</td>
<td>(c) Mechanisms of administering a program</td>
</tr>
<tr>
<td>(d) Rejection of credit-based constraints</td>
<td></td>
</tr>
<tr>
<td><strong>Most Important</strong></td>
<td></td>
</tr>
<tr>
<td>11. Clearly define the criteria for mastery of competencies (+5)</td>
<td>1. Use a business model that promotes sustainability (+5)</td>
</tr>
<tr>
<td>10. Utilize competencies that include knowledge, skills, abilities, attitudes and beliefs or similarly structured categories (+5)</td>
<td>19. Be time-variable, with students able to progress at their own pace throughout the program (+5)</td>
</tr>
<tr>
<td>21. Utilize clear and transparent rubrics (+5)</td>
<td>42. Utilize distributed faculty roles, with support, coaching, assessment and subject-</td>
</tr>
</tbody>
</table>
matter expertise distributed among various program faculty and staff (+5)

Most Unimportant

4. Participate as an experimental site for Title IV funding in order to improve disbursement options for students (-5)

16. Be entirely divorced from the credit hour (aka direct assessment) (-5)

64. Utilize totally new and different technology infrastructure to succeed (-5)

17. Provide for a combination of both traditional, course-based credit hours and direct assessment (-5)

15. Have a course or credit-based approach (-5)

6. Allow learners to find and select their own learning resources, and should view the institutionally-provided resources as optional (-5)

The second research question also sought to uncover which core components were commonly cited as most critical to quality CBE programs across models. Several elements of both Factors 1 and 2 were noted towards the most important end of the spectrum. Statement 11, regarding clear definitions of master of competencies, was rated highly by Factor 1 (+5), and Factor 2 (+4):

11. Clearly define the criteria for mastery of competencies

Likewise, business models was rated at the high end of both factor arrays, Factor 1 (+4) and Factor 2 (+5):

1. Use a business model that promotes sustainability

There was an emphasis on the use of data for continual improvement, both placed at (+4):

66. Utilize data collection and analysis to support continuous improvement of the CBE program from both an operation and a curriculum design perspective
Another element that received agreement was statement 14:

14. Provide specific learning paths with built-in formative assessments that guide the learner to success on summative assessments (+3)

This statement was an interesting point of specificity in agreement between the two models. It supports the dominant themes of both Factor 1 and Factor 2—Factor 1 from the perspective of the heavy emphasis on the curricular components of competencies and assessments, and Factor 2 from both a curricular and fiscal sustainability standpoint. Formative assessments built into learning paths can intentionally scaffold learners to prepare them for summative assessments. Utilizing these types of learning paths could reduce the number of resubmissions of summative assessments, making the cost for assessors less substantial.

Other elements of agreement that were closely aligned across the factors—though not as strongly indicated as most important include, with factor scores listed for Factor 1 and then Factor 2:

3. Be able to offer students federal financial aid (+2, +3)

26. Norm assessments closely in order to prove their validity (+2, +2)

67. Utilize dashboards, real-time reports and automated alerts to surface student progress to students, faculty, advisors, coaches, deans, analysts and other internal stakeholders (+2, +2)

These elements of agreement are both structural, administrative and curricular in nature.

Of note was a lack of clarity around opinions about faculty roles. Though several statements about faculty roles were consensus statements, they landed firmly around the
center of the placement of scores, indicating a level of agreement, but not one that rose to a level of importance to be rated towards the most important end of the spectrum. These will be discussed shortly.

In general, elements of agreement between both factors as most important for a high-quality CBE program included elements that can be loosely categorized by curricular focus and administrative focus, which are presented in Table 8.

Table 8

*Most Important Components with Consensus*

<table>
<thead>
<tr>
<th>Curricular Components</th>
<th>Administrative Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Clearly define the criteria for mastery of competencies (+5, +4)</td>
<td>1. Use a business model that promotes sustainability (+4, +5)</td>
</tr>
<tr>
<td>14. Provide specific learning paths with built-in formative assessments that guide the learner to success on summative assignments (+3, +3)</td>
<td>3. Be able to offer students federal financial aid (+2, +3)</td>
</tr>
<tr>
<td>26. Norm assessments closely in order to prove their validity (+2, +2)</td>
<td>66. Utilize data collection and analysis to support continuous improvement of the CBE program from both an operational and a curriculum design perspective (+4, +4)</td>
</tr>
<tr>
<td></td>
<td>67. Utilize dashboards, real-time reports and automated alerts to surface student progress to students, faculty, advisors, coaches, deans, analysts and other internal stakeholders (+2, +2)</td>
</tr>
</tbody>
</table>

Another part of the second research question sought to uncover which component parts were regarded as not as necessary to high-quality CBE programs. There were more consensus statements that loaded towards the most unimportant end of the spectrum than the most important end of the spectrum. These include statements about direct
assessment (statement 16), use of pass/not pass rubrics for mastery of competencies (statement 24), and the degree fields that CBE programs should be offered in (statement 40). To a lesser extent, other elements were also agreed upon as most unimportant, including providing students with the opportunity to physically meet with their faculty member (statement 54), the use of admittance tests (statement 58), and being designed for a diverse audience (statement 59).

These statements, together, paint a picture wherein elements of limitation to the diversity of CBE programs—that might be considered to be less universal and therefore less important to a CBE program being a CBE program program—were elements of agreement between the factors. In particular, the rating of statement 16 regarding the direct assessment model was rated strongly towards most unimportant for both:

16. Be entirely divorced from the credit hour (aka direct assessment)

Factor 1 placed this at (-4), where for Factor 2 it was in the (-5) position. Both of these placements are indicative of the relative unimportance of direct assessment. Participant 30, in response to the final follow-up question relating to any elements that might be missing from the sorting process, wrote that:

In addition I would like to see attention to career/course guidance to help the learner not have to take unnecessary courses—this will address time/costs concerns and help create clear pathways for completion especially for direct assessment programs.

This brings a previously unconsidered element into the discussion regarding direct assessment. Could the minimization of the importance of direct assessment within CBE
programs be related to concerns about completion and/or misalignment between courses taken and those needed from a career or workforce perspective? While this interpretation was not expressed by others explicitly in comments, it is an additional dimension to the rating of this statement, and may put another level of complexity upon the understanding of the rating.

The agreement surrounding statement 24, concerning the use of a pass/not pass rubric for the mastery of competencies has some implications for CBE programs. First, it indicates a lack of emphasis placed on elements that are more specific curricular components, again supporting the interpretation of optional items that could vary widely from program to program. Secondly, it is the only curricular element in the most unimportant consensus statements, indicating that there is wider agreement as to what is most unimportant on administrative or structural components, and less agreement on what is most unimportant on curricular design components.

Both factors unified on the perspective that limitations on the types of degree fields in which CBE programs were offered were unimportant (statement 40). This is important to note because many active CBE programs are, in fact, offered in business-related or technology-related fields. Though those types of degrees are a more common starting point for developing CBE programs, the perspectives of experts from across the fields do not believe that is a necessary restriction.

Two statements’ presence on the most unimportant loading for consensus statements belies some conflict. Many CBE programs utilize admittance criteria or tests in order to restrict the use of the program model to more prepared students. Capella
University, for example, utilizes a learner-directed online quiz in the domains of experience, learning style, and self-direction (Capella University, n.d.-b). Results are provided immediately online, along with a recommendation for program choice.

University of Wisconsin’s Flexible Option analyzes several preparation components to admit learners including records from high school and other colleges, test scores, GPA, work experience, and “your potential for success,” though the website also notes the admission requirements are the same for Flexible Option as for on-campus or online programs (University of Wisconsin Flexible Option, 2017, para. 7). Students may also be required to take placement tests. Brandman University requires specific prerequisites for students with 0-11 transferrable credits including admissions tests, cumulative GPA requirements, and high school transcripts; students with 12 or more credits need a 2.0 GPA in prior coursework. Despite this, the statement was placed towards most unimportant for both Factor 1 (-3) and Factor 2 (-2):

58. Utilize admittance tests or other criteria to admit only self-directed students

The distinction here may be the stated emphasis on measuring the self-directed nature of learners. Whereas objective criteria can be utilized for previous coursework or placement tests, the use of instruments to measure self-management may be less precise.

Cumulative GPA has been shown to be a predictor of college GPA in prior studies (Elias & MacDonald, 2007). The presence of admittance criteria throughout CBE programs aligns with that finding; how to capture the relative self-directed nature of a potential student may be more difficult to measure in perspective students.
Another point of consensus was the relative unimportance of programs being designed for a diverse audience in terms of age and preparation. This is supported by the consensus found on statement 59. This point of view takes the perspective that CBE programs are a better option for some students than for others. This is further supported by the admittance criteria discussed above.

Another common perspective between the factors was the lack of need for students to be able to physically meet with their faculty member (statement 54) which was present in the factor array for Factor 1 at (-2) and for Factor 2 at (-3). This perspective is not surprising as the vast majority of newly developed CBE programs are delivered online. These commonalities are delineated in Table 9.

Table 9

<table>
<thead>
<tr>
<th>Curricular Components</th>
<th>Administrative Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>24. Implement a “Pass” or “Not Pass” rubric for mastery of competencies (-4, -4)</td>
<td>16. Be entirely divorced from the credit hour (aka direct assessment) (-5, -4)</td>
</tr>
<tr>
<td></td>
<td>40. Be offered primarily directly career-related degrees (-4, -4)</td>
</tr>
<tr>
<td></td>
<td>58. Utilize admittance tests or other criteria to admit only self-directed students (-3, -2)</td>
</tr>
<tr>
<td></td>
<td>59. Be designed for a diverse audience in terms of age and preparation (-2, -3)</td>
</tr>
</tbody>
</table>

The consensus statements rated as most unimportant focused more on the administrative policies than on the curricular components, which further supports the differences between the factors in perspectives on the importance of such elements.
The third and final research questions seeks to explain how the models are described and differentiated. The result of this investigation revealed two factors with significant differences between the groupings of thought surrounding what elements are most important to high-quality CBE programs. In particular, Factor 1 emphasized the importance of measurable competencies and a variety of assessment components as most important and de-emphasized administrative components, viewing those as optional. Factor 2, in contrast, emphasized elements of business models and administrative components set up to ensure the sustainability of the CBE program, and minimized some of the more specific and particular components of both curricular and administrative elements.

Factor 1 is titled based on the comments of Participant 27, who wrote that “CBE should strive above all else to eliminate as many proxies for achievement as possible.” This emphasis can be found throughout Factor 1, whose themes were: (a) primacy of competency definition and assessment quality, (b) financial access and sustainability, and (c) minimization of administrative components and absolutes.

In support of this perspective—that the curricular components unique to CBE are the most important to a high-quality CBE program—six of the nine statements rated as most critical focused on curricular design elements including statement 11 (also a consensus statement among factors,) focused on the clear criteria for mastery of competencies; statement 10, regarding the knowledge, skills, abilities and similar components of competencies; statement 21 concerning clear and transparent rubrics; statement 20 which focused on the use of authentic assessment; statement 12, which
included the need for both field specific and cross-cutting competencies; and statement 22, regarding student progression through competencies after demonstrating mastery on a range of assessments. There is indeed a sense of clarity of curricular and instructional design that is of primary importance to this perspective. This interpretation is further supported by some of the statements rated as most unimportant that could be perceived as watering down or calling into question the legitimacy of prepared graduates, namely statement 33:

33. Enable students to transfer in credit from other institutions in a course-based format regardless of grade in the course (-4)

Factor 2 still did rate statement 33 towards the most unimportant end of the spectrum at (-2), indicating that, while there was an emphasis on enabling students to transfer in credit, this would not have been at the expense of students graduating with demonstrable competencies. Factor 2, meanwhile, sees limitations on alignment with what constitutes mastery, wherein statement 32 is rated as most unimportant:

32. Enable students to transfer in credit only if it has been transcripted at a grade which would equate with the institution’s definition of mastery within the CBE program (-4)

The precise alignment between the grades associated with transfer credits and competencies may be significantly less important to Factor 2 than it is to Factor 1.

Throughout Factor 1, Eliminating Proxies for Achievement, the more administrative processes or financial concerns are secondary to the curricular elements, which are regarded as essential. The second theme within Factor 1, financial access and
sustainability, notes the necessity of sustainable business models (which is heavily emphasized in Factor 2,) however these elements are significantly subverted to the depth of the focus on the curriculum design and legitimacy of assessments. Statement 1 regarding the use of sustainable business models is rated towards most important for a high-quality CBE program, though Factor 2 emphasized financial sustainability more, with the same statement being present as the most important, statistically noted in the descending factor array.

Factor 2, Structures of Sustainability, also focused on business models, with statements associated with more divergent structural options that support accelerated learning being most strongly placed towards most important. These included time variability (statement 19), subscription-based cost models (statement 5). Neither of these statements was emphasized as comparatively more important than other components in Factor 1, with placements of time variability at (+1), relatively neutral, and (-4), indicating a strong de-emphasis of the necessity of subscription-based cost models.

Other strong areas of disagreement in perspectives included the utilization of technology systems. Statement 65 concerns the use of existing technology systems:

65. Utilize existing technology systems, but how such systems are used may be significantly different to support CBE

This was placed more towards the unimportant end of the spectrum by Factor 1 (-3), again supporting a de-emphasis of the underlying structures—both administrative and technical or physical—as opposed to Factor 2, wherein such elements are considered more important from a sustainability perspective (+2). Both factors held the perspective
that the utilization of totally new technology infrastructures were less important, rating statement 64 concerning the use of new and different technology infrastructure at (-5) for Factor 1, and at (-2) for Factor 2. Factor 1 here illustrates the relative lack of emphasis on the actual structures that support sustainability, placing both statements about different types of technology needs as less important, whereas Factor 2 makes a distinction between the two types of technology infrastructure, preferring the use of current technology systems but in new ways. Again here the perspectives become illuminated—the way in which the program is supported administratively is less important to Factor 1, whereas to Factor 2, it is critically important to the sustainability of the program itself.

This is further supported by the placements of statement 35, regarding the ability for students to start the program at frequent times throughout the year; statement 57 regarding the importance of clear university policies; and statement 70, concerning the automation of enrollment, financial aid, and other administrative functions within existing technical systems, all of which were placed at (+4) in the factor array for Factor 2.

Another strong distinction between the two factors is that some of the elements noted as most unimportant for Factor 2 focused on more divergent, less common, practices related to learning resources and non-traditional learning experiences. Both statement 34, focused on the use of non-traditional learning experiences like MOOCs, and statement 6, focused on enabling learners to find and use their own learning resources, were placed at (-4) towards most unimportant. Both of these statements were
also rated towards the most unimportant end of the spectrum by Factor 1, however less strongly at (-1) and (-3) respectively.

One important element to discuss that is a more complicated nuance of distinction between the factors is that of the role of faculty. Both factor arrays place statement 47 in the (-1) position, indicating agreement of relative neutrality in terms of its importance:

47. Not necessarily support distributed faculty roles; a traditional faculty role can also be utilized within a CBE model (-1, -1)

While both factors believe that the role of a unified, singular faculty member in a traditional format is relatively less important to a high-quality CBE program, they diverge on some elements of the faculty model, illustrated by statement 42:

42. Utilize distributed faculty roles, with support, coaching, assessment and subject-matter expertise distributed among various program faculty and staff (-1, +5)

The explicit use of distributed faculty models is embraced by Factor 2, it is placed at (+5) indicating that it is considered one of the most important elements for a high-quality program. This aligns with Factor 2’s focus on sustainability. Factor 1, meanwhile, is less invested in any particular faculty model. Most statements referring to types of faculty models are ranked somewhere in the middle of the spectrum. However Factor 1 more highly emphasizes the importance of instructional designers and developers as referred to in statement 51 (+3).

A common note of ambivalence—or confusion—appeared in the results of statements focused on Regular and Substantive Interaction (RSI). Both statements were
consensus statements—statement 71 states that RSI can be fulfilled by “a coach, tutor, or assessor role.” Statement 72, however, notes that RSI should be fulfilled “at least partially by a faculty with expert qualifications.” For both factors these statements were ranked relatively in the neutral range.

One particular note of difference between the factors was the use of experimental site status. Statement 4 focuses on this element:

4. Participate as an experimental site for Title VI funding in order to improve disbursement options for students

Factor 1 ranked this statement at the (-5) placement, whereas Factor 2 ranked it at (+3). This placement aligns with the core philosophies and distinctive natures of both sets of perspectives. The use of experimental site status enables institutions to have greater flexibility in the use of federal financial aid, potentially contributing to greater sustainability and financial options for students. Factor 1, meanwhile, ranked this at the extreme end of most unimportant. This further supports the most basic thematic difference between the perspectives—the elemental tension between the efficacy and defensibility of the curricular design model, and the structures that inevitably support its existence, and which can potentially cause a CBE program to end.

Conclusions

This study reveals a central tension between two schools of thought surrounding the necessary elements of a high-quality CBE program. Factor 1—Eliminating Proxies for Achievement—emphasizes clear competencies and legitimate assessments as of primary importance, whereas Factor 2—Structures for Sustainability—emphasizes both
fiscal sustainability and administrative support processes. A number of participants (nearly a third of the study participants,) significantly loaded on both factors, embracing elements of each perspective.

There is much work to be done within the CBE community to determine what constitutes the necessary components of a high-quality CBE program. Going into the research, an assumption was made that a variety of curricular and administrative elements would be combined in each factor, outlining distinct types of CBE programs that could be considered high-quality. An examination of perspectives instead illuminated a core tension between the importance of curricular distinctions in competencies and legitimate assessments, and financial models and administrative structures. Ultimately this reveals the need for programs to grapple with both issues. The intention of CBE programs, with clear criteria for achievement of competencies, and authentic assessments must be balanced with the necessity for business sustainability and effective administrative support. However, the difference in the prevailing perspectives as revealed by the factors may ultimately be observable in the marketplace of higher education. As certain programs are sustained and others fail to reach sustainability, will the criteria for what a high-quality CBE program is, and how it should be structured, adapt?

Some elements of the study preclude a clearer picture of these perspectives. In an attempt to comprehensively address all elements of a CBE program, the number of Q statements was lengthy—72 statements—which may have presented some challenges for participants. The statements originated from web-based artifacts, literature, and presentations and conversations, and the resulting component elements were diverse.
Isolating components of these into separate Q sorts may enable a more subtle and comprehensive understanding of perceptions surrounding their relative importance to a CBE program.

Ultimately, however, the study revealed an existential tension between the two dominant perspectives. The tension between these two perspectives is also evident in the number of participants that had conflicted or mixed responses—loading significantly on both Factors 1 and 2. Participant 11 explicitly noted this tension, and this comment aptly describes the existential nature of the two core components to the success of a CBE program:

Time and time again I come back to two central issues that should be at the top of the list for assuring the success of CBE programs—sustainability and quality. In a period of ever scarcer resources, programs that are not economically self-sufficient are not going to survive regardless of how innovative they are. Many of the recent experiences in CBE have been driven by the desire to provide lower cost educational pathways for students that leveraged promises of improved efficiency. But because start up costs are often high, most institutions are artificially subsidizing CBE programs in order to keep student costs low. That may be a necessary short term strategy, but if an institution has not truly calculated development and ongoing costs, it won't last.

These dominant themes need to both be addressed in order to create and sustain high-quality CBE programs.
Recommendations for Future Study

There are complexities in this research that could be addressed in future studies to gain further clarity. One option would be to conduct two separate Q studies: one to ascertain differences in perspectives as to what constitutes high-quality in CBE models specific to curriculum and instructional design, and one to discover differences in perspectives as to what constitutes high-quality from a business sustainability and administrative structural capacity. This type of investigation may be more functionally useful in the creation of CBE programs, as it would enable a more clear look at each of those core themes individually.

Since this investigation began, additional discussions surrounding what constitutes quality in CBE programs have been engaged in, and additional recommendations have been published. Most notable among these is the *Quality Standards for Competency-Based Educational Programs*, the draft of which was released by the Competency-Based Education Network in October of 2016. This publication was reviewed, and statements from it were utilized for the concourse, from which the Q statements for the Q sample were selected. It contains eight standards which address the necessary multiple levels of competencies, social engagement, transparency of competencies, faculty and SMEs, access for learners from different backgrounds and abilities, varied types of engagement, flexibility for personalization, and proactive student support services.

Another tool that one participant specifically used to guide her decisions is *Quality Dimensions for Connected Credentials* (Casilli et al., 2016). Two quality tools
that have been available for CBE are the fifth edition of the *Quality Matters Rubric*, (Quality Matters, 2014b), which addressed CBE in reference to courses, and the *CBE Course Quality Improvement Rubric* (Western Governors University, 2015).

In addition to these contributions to understanding the dimensions of quality in CBE programs, a report released by rpk Group on four CBE programs entitled *Competency-Based Education: A Study of Four New Models and Their Implications for Bending the Higher Education Cost Curve* looks at quality from the perspective of fiscal sustainability (Desrochers & Staisloff, 2016).

Further research into these components of CBE could also enable a more nuanced understanding of the various related models and issues in the field, including micro-credentials and the credentialing of non-traditional learning experiences as well as the portability of such credentials and their relative value to employers.

**Recommendations for Practice**

When examining the current status of CBE programs, the balance of focus for educators—and indeed the emphasis of Factor—is on the curricular components of the learning model as being of primary importance when considering the quality of a CBE program. Johnstone and Soares (2014) note that “CBE’s greatest strength is that it provides a means for helping quality and affordability co-exist in higher education” (para. 5). However, in the attempt to address the rising costs of higher education, many CBE programs developed tuition price points without having developed business models that would enable accurate projections of costs (Desrochers & Staisloff, 2016). To achieve high quality CBE programs that can be solvent, institutions must wrestle with, and
resolve, issues around student affordability and real institutional cost through intentional implementation of business processes and technology tools that will enable the scaling of CBE programs. Factor 2 emphasizes some of these elements as being most important to high-quality CBE programs including distributed faculty roles and subscription-based cost models, among others.

When examining the consensus statements between the factors, a pattern emerges that is somewhat pragmatic. Sustainable business models gained agreement as an important component of a high-quality CBE program. Offering federal financial aid was also agreed upon; in many cases, the ability to utilize federal financial aid would be a necessary component for students to be able to afford the educational program. Enabling students to use federal financial aid expands the number of students who can afford the program; as a side effect, it also improves access and enables a program to scale.

Two other primary areas of agreement were the use of dashboards and real-time reports to track student progress as well as the utilization of data for continuous improvement. Both of these statements are fundamentally about technology systems and business processes. Their importance should not be underestimated. When developing a quality CBE program, the technology systems should be set up to be as automated as possible. Effective technology is not an end in and of itself, but rather should be viewed as a critical means to an end. The more manual processes are, from enrollment to advising to assessing, the higher the cost to the institution and eventually to the student.

This emphasis on creating a realistic and sustainable price point, and implementing that through the use of automation and effective business processes, should
not minimize the necessary focus on the competencies themselves. Indeed, the overall value of a CBE program credential to a student will diminish if it is viewed as substandard. The success of the CBE model is predicated on students actually being demonstrably competent on the intended outcomes and that requires “high-quality competency assessments linked to meaningful labor market outcomes” (Gaertner et al., 2015, p. 3).

Practitioners seeking to initiate or revise a CBE program should do so with transparency on two fronts: first, on the competencies and assessments that prove the mastery of those competencies, and secondly—and of equal importance—on a sustainable business model. The sustainability of a lower-cost degree program must be dependent upon a high-tech, high-touch model wherein certain functions are automated to scale the program to the point of sustainability without sacrificing quality.

Recommendations for practice follow:

- Create a business model and curricular model in an interdependent and iterative fashion, acknowledging the impact that one has on the other.
- Define competencies and utilize authentic assessments that are relevant and transparent to all stakeholder groups.
- Provide technology-supported formative assessment opportunities to appropriately scaffold students to competency achievement.
- Utilize well-designed distributed faculty roles that best supports RSI and leverages technology tools.
- Design business processes that are efficient and automated.
▪ Create university policies and implement them in alignment with efficient business processes.
▪ Set reasonable tuition costs that can sustain the high-quality program and still remain a value for students.
▪ Build into both the curriculum design and the business processes efficient opportunities to implement continuous improvement.

These recommendations will enable institutions to experiment with programs and continuously improve as curriculum design and administrative structures evolve. Approaching the creation and continuation of CBE programs in this way will enable a more flexible approach to achieve both sustainability and quality.

**Summary**

This investigation was an effort to bring further clarity to what professionals in the field of CBE prioritized as most important to high-quality CBE programs. The purpose was to create a comparative taxonomy of CBE programs that would codify the elements considered most important to each group of opinion. The expertise of the participants was a necessary component of the research. The methodology utilized—a Q study—revealed the perspectives of these professionals from within the field. Two primary factors emerged: one model which prioritized the use of measurable competencies and authentic assessments, and one model which prioritized fiscal sustainability and business processes. The central framing of the elements of the study did not imply that certain components of CBE were de-valued, simply that the need for certain elements were prioritized over others. The tension between these two views was
also noted by the participants who held components of each viewpoint; nine participants loaded significantly onto both factors. The responses to follow-up questions provided more insight into the perceptions of quality, and how those were prioritized by participants.

This research can be a starting point for the development of a taxonomy of CBE models. Here, two primary models were revealed, however each held some elements of the other. Overall, the components of CBE programs that were placed at both extremes of the spectrum from most important to most unimportant revealed themes within each factor.

Factor 1, Eliminating Proxies for Achievement, contained three themes: (a) primacy of competency definition and assessment quality, (b) financial access and sustainability, and (c) minimization of administrative components and absolutes. Factor 2, Structures for Sustainability, contained four themes: (a) fiscal sustainability, (b) core components over divergent options, (c) mechanisms for administering a program, and (d) rejection of credit-based constraints.

Ultimately, in the creation of a high-quality CBE program, both perspectives are of utmost importance. CBE programs will not be effective if they do not have competencies with clear criteria for student achievement, and they will not be able to survive to provide access for students without sustainable business models and administrative practices. This existential crisis of the balance of these two perspectives is yet to be resolved for many CBE programs, however the transparent discussion of the
need for both will assist in that balance. Yet to be determined is how these programs will
survive or thrive in comparison to more traditional, time-based degree programs.
APPENDIX A

LETTER OF INFORMED CONSENT
Appendix A

Letter of Informed Consent

Informed Consent to Participate in a Research Study

Study Title: Competency-Based Education Models: An Emerging Taxonomy

Principal Investigator: Dr. Mark Kretovics
Co-Investigator: Sasha (Alexandera) Thackaberry

You are being invited to participate in a research study. This consent form will provide you with information on the research project, what you will need to do, and the associated risks and benefits of the research. Your participation is voluntary. Please read this form carefully. It is important that you ask questions and fully understand the research in order to make an informed decision. You will receive a copy of this document to take with you.

Purpose:

The purpose of this study is to create a comparative taxonomy of Competency-Based Education (CBE) programs in order to codify their elements as well as what components are considered critical to all programs across models. It is anticipated that there may be multiple opinions as to what core components of CBE are integral or “critical” to a CBE program, whereas other elements may not be necessary. This study will engage experts in the field to obtain their opinions about those components, and compare them to reveal “groups” of opinions about components of CBE that will then become models of CBE.

Procedures

Four types of data are being collected in this study:
1) Q Sorts,
2) Demographic questionnaires,
3) Interview question responses, and
4) Brief biographical sketches of participants.

Participants in this study will be asked to conduct a Q sort. In this study, the Q sort consists of a series of statements that participants place on a likert scale, from “Critical”
to “Not Necessary.” The statements that will be sorted describe components of Competency-Based Education (CBE) programs. There are a certain number of slots at each point on the likert scale, so participants will need to make subjective decisions about what components of CBE they find more or less necessary. The Q sort will be conducted via web-based software and can be completed at a distance with no in-person requirement. The Q sorting should take approximately 45-55 minutes per participant.

Secondly, a brief demographic questionnaire will accompany the Q sort. This short questionnaire will ask some general questions about the participant’s role within higher education and other professional information such as the type of institution the participant works at, etc. The demographic survey should take approximately 5-10 minutes.

Following the submission of the Q sort and the demographic questionnaire, a brief interview will be conducted virtually with some follow-up questions after the researcher has reviewed the Q sort. This is designed to elicit a more thorough understanding of why the participant made the choices that they made in sorting and will assist in the interpretation of the data. The follow-up interview questions should take between 10 – 30 minutes depending upon the length and detail of participant responses.

All of the above data will only be shared in de-identified form within the context of the study (Q sorts, demographic questionnaires, interview responses.)

Finally, brief biographical sketches will be asked of participants. These will be written by the researcher and sent to the participant for confirmation of accuracy. The biographical sketches will be included in the research, and the participants will be identified as having participated, but their responses (data collected via Q sort, demographic questionnaire, and interview responses) will not be connected with their names. Biographical sketches are being included in order to support the resulting taxonomy – the expertise of the participants is of importance in this respect. Therefore study participants will be named as having participated, but their responses will not be attached to their identity within the study. Confirming the content of the brief biographical sketches should take approximately 10 – 15 minutes.

Study participation is expected to take between one and a half to two hours. The only required follow-up would be to confirm the accuracy of the biographical sketch.

**Benefits**

This research may not benefit you individually. However, your participation in this study will help us to better understand what models of CBE emerge in order to compare program efficacy in the future. Additionally, as a professional in the field of CBE, the
resulting taxonomy from this study may be used as a basis for further research or practice.

**Risks and Discomforts**

There are no anticipated risks to participation in this study. All responses to the Q sort, the interview questions and demographic surveys will be de-identified. Biographical sketches will be included, so participants should be aware that the fact that they are participating will be shared, though any details of that participation, or data of their responses, will not be. Participants are being asked to share their professional opinions, not an official stance on CBE in the context of their current job position or role. It is to mitigate any potential challenges to this that data sources are de-identified in their use in the study.

**Privacy and Confidentiality**

Research participants will only be identified as having participated in the study to establish their expertise in the topic through the inclusion of biographical sketches in the Appendix. These biographical sketches will not be correlated with the results of the Q sort, demographic questionnaire or follow-up interview question responses in any way. The responses to the Q sort, demographic questionnaires and follow-up interview question responses will be analyzed and reported in aggregate, deidentified formats. As they are analyzed as groups of opinions and groups of demographics, answers will not relate to any individual participant.

Your research information may, in certain circumstances, be disclosed to the Institutional Review Board (IRB), which oversees research at Kent State University, or to certain federal agencies. Confidentiality may not be maintained if you indicate that you may do harm to yourself or others.

**Voluntary Participation**

Taking part in this research study is entirely up to you. You may choose not to participate or you may discontinue your participation at any time without penalty or loss of benefits to which you are otherwise entitled. You will be informed of any new, relevant information that may affect your health, welfare, or willingness to continue your study participation.

**Contact Information**

If you have any questions or concerns about this research, you may contact Dr. Mark Kretovics at (330) 672-0642. This project has been approved by the Kent State University
Institutional Review Board. If you have any questions about your rights as a research participant or complaints about the research, you may call the IRB at 330.672.2704.

**Consent Statement and Signature**
I have read this consent form and have had the opportunity to have my questions answered to my satisfaction. I voluntarily agree to participate in this study. My completion and return of this Q sort and survey will be indicative of my consent to participate in this research study. I understand that I may print a copy of this consent for future reference.

__________________________  ______________________
Participant Signature        Date
APPENDIX B
RECRUITMENT SCRIPT
Appendix B

Recruitment Script

Competency-Based Education Models: An Emerging Taxonomy

Alexandera (Sasha) Thackaberry, Kent State University

Hello! I am writing to invite you to participate in a research study being conducted as part of a dissertation into different models of Competency-Based Education (CBE) in higher education. As part of this research project, I am recruiting individuals who have demonstrated expertise in the field of CBE, as expert opinions will be used in the creation of a CBE taxonomy.

I am seeking accomplished, established professionals in the following groups:

➢ Administrators directly leading, or leading components of, a currently operational CBE program.
➢ Administrators directly leading, or leading components of, a CBE program that is far along in the planning stages and will soon be operational.
➢ Leaders at non-governmental agencies involved in competency-based education, either from a research or advocacy-based perspective.
➢ Leaders at granting organizations who fund CBE-based programs or research (including members of agencies of the federal government who fund or manage grants.)
➢ Writers in the field of edtech or higher education models that work for professional publications.

Multiple administrators within the same CBE program or agency may participate. As the study relies upon expert opinions, career professionals are specifically targeted for this study. Experts who have published professionally about CBE programs and models, who have started, continued or grown CBE programs, or who have collaborated with the various CBE-related initiatives are particularly encouraged to participate. This study is deep rather than broad, and therefore 30-50 experts in the field will make up the study participants.

The purpose of this study is to create a comparative taxonomy of Competency-Based Education (CBE) programs in order to codify their elements as well as what components are considered critical to all programs across models. It is anticipated that there may be multiple opinions as to what core components of CBE are integral or “critical” to a quality CBE program, whereas other elements may not be necessary. This study will engage experts in the field to obtain their opinions about those components, and compare
them to reveal “groups” of opinions about components of CBE that will then become models of CBE.

This study will involve participating in a Q sort (similar to a likert scale, but with a forced distribution curve,) some follow-up questions on the choices you made in that Q sort, a demographic questionnaire focused on the type of institution you work in, and the type of role that you own at that institution, and finally a brief biographical sketch (2 paragraphs) which will be included in the Appendix to demonstrate your expertise to participate in the study. Your study responses will be de-identified from your biographical sketch. (In other words, the responses to the other components of the study will not be able to be connected to you as the respondent.)

Please review the attached consent form or contact Sasha Thackaberry at athackab@kent.edu to participate and with any questions.

With thanks!

Sasha Thackaberry
Kent State University Doctoral Candidate
AVP, Academic Technology, Course Production and Alternative Learning Models
Southern New Hampshire University
APPENDIX C
INSTITUTIONAL DEMOGRAPHIC SURVEY
Appendix C

Institutional Demographic Survey

Competency-Based Education Models: An Emerging Taxonomy

Alexandera (Sasha) Thackaberry, Kent State University

Instructions: As you complete the following demographic survey, answer from the perspective of your primary role. As many academics and professionals wear many hats and are involved in many organizations, for the purposes of this survey, please focus solely on your primary career role.

1) What is the primary purpose of the institution that you work at in your primary role?
   a. Non-governmental organization involved in educational policy
   b. Grantor (provide funds to colleges, universities, or non-governmental agencies for the purposes of educational programming or research)
   c. College or university
   d. Professional publication (national magazine, peer reviewed journal, etc.)

2) These series of questions are dependent upon respondents’ answers to question #1. They will receive the question that corresponds to their previous selection. If they answered…

   a. Non-governmental organization involved in educational policy
      i. What title most appropriately captures your role?
         1. Director or other leadership of educational programs related to the use of or research in alternative educational models
         2. Director or other leadership involved primarily in advocacy related to governmental policy, laws, or similar with respect to alternative educational models
         3. Director or other leadership of programs related to the use of or research in workforce development or workforce-related programs with respect to alternative learning models
         4. Director or other leadership involved primarily in advocacy related to governmental policy, laws, or similar in workforce development with respect to alternative learning
models

b. Grantor
   i. What title most appropriately captures your role?
      1. Director or other leadership involved in determining what programs to award grants to at colleges, universities, or non-governmental organizations
      2. Director or other leadership involved in implementing programs related to grants awarded at colleges, universities, or non-governmental organizations
      3. Director or other leadership involved primarily in measuring and/or reporting on the effectiveness of grant programs
      4. Director or other leadership involved primarily in advocacy related to governmental policy, laws, or similar

c. College or University
   i. If you are at a college or university, what type of college or university do you work at?
      1. Public university
      2. Public 2-year college
      3. Nonprofit, private university
      4. For-profit university
   ii. What title most appropriately captures your role?
      1. Provost/VP of Academics in charge of programs that include a CBE program
      2. VP or Director directly overseeing the operations of an existing CBE program
      3. VP or Director directly overseeing the creation of a new CBE program

d. Professional Publication
   i. What type of publication do you work at?
      1. National newspaper or online news journal focused on publishing news
      2. National industry blog
      3. Peer-reviewed journal
   e. Professional Services (consulting company)
   f. For-profit edtech vendor related to CBE tools or technologies

3) How many years of experience do you have in…
a. Education in total
   i. 1-5
   ii. 6-10
   iii. 11-15
   iv. 16-20
   v. 21-25
   vi. 26-30
   vii. 31-35
   viii. 36-40
   ix. 41-45

b. CBE or alternative learning models (i.e. MOOCs, PLA, etc.)
   i. 1-5
   ii. 6-10
   iii. 11-15
   iv. 16-20
   v. 21-25
   vi. 26-30
   vii. 31-35
   viii. 36-40
   ix. 41-45

4) What is your highest level of educational attainment:
   a. Associates degree
   b. Masters degree
   c. PhD, EdD, or other terminal degree

5) Which statement most closely describes your involvement in inter-institutional initiatives in support of CBE programs?
   a. I am closely involved in the work of various groups within the CBE space, such as C-BEN, EDUCAUSE’s Breakthrough Models initiatives, Lumina Foundation initiatives, Connecting Credentials, etc.
   b. I am moderately involved in the work of these groups and collaborate as possible.
   c. I am rarely involved in the work of these groups, though I stay connected on what is going on with these initiatives and groups.
   d. I am rarely involved in the work of these groups.

6) Which of the following educational models is your institution (A) currently involved in, or (B) not currently involved in? For each model, select either A or
B. Select A if your institution is currently involved in the educational model, and B if your institution is not.
   a. Prior Learning Assessment (PLA)          A  B
   b. Micro-Credentials                        A  B
   c. Stackable Certificates                   A  B
   d. Massive Open Online Courses (MOOCs)      A  B
   e. CBE                                      A  B
   f. Digital Badges                           A  B
APPENDIX D

RESPONSES FROM INSTITUTIONAL DEMOGRAPHIC SURVEY
## Appendix D

### Responses from Institutional Demographic Survey

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*Participant 2 did not load significantly on either factor.*
APPENDIX E

PROFESSIONAL BIOGRAPHIES OF PARTICIPANTS
APPENDIX E
PROFESSIONAL BIOGRAPHIES OF PARTICIPANTS

Jeanna Abromeit, Associate Vice President for Academic Affairs, Alverno College

Jeana Abromeit is Associate Vice President for Academic Affairs. She is a professor of sociology at Alverno College and holds a doctorate in sociology, with specializations in sex and gender studies, peace and conflict studies, and organizational development. An expert in the design of performance assessment and institutional and program assessment in higher education, she has provided consultation services to a variety of organizations in the United States and internationally over the past 25 years. She is also a peer reviewer for the Higher Learning Commission, which is a regional accrediting body. Dr. Abromeit has taught at all levels, from beginning-level to upper-division undergraduate students, as well as graduate students in Alverno’s Master of Arts in Education program. She has taught a wide variety of courses, including research methods, action research, organizational change, understanding terrorism, and social movements and social change. Locally, she is a board member and officer of the Arab and Muslim Women’s Research and Resource Institute, roles she has held since co-creating this nonprofit in 2009. (J. Abromeit, personal communication, February 1, 2017)

Christine Amato, Program Manager for Competency-Based Education, Sinclair Community College

Christina Amato, Program Manager for Competency-Based Education, has been with Sinclair Community College for 9 years. Her work at Sinclair has focused on
project management, implementation and sustainability for change initiatives, development of student support and case management models, and includes projects dedicated to competency-based education, online learning, and military student programs. She is the architect of the SinclairOnline student coaching model, which won the 2012 ITC Outstanding Student Services Award, and the 2013 League for Innovation’s Innovator of the Year award. Additionally, she designed and led the implementation of the Accelerate IT student coaching model, which was recognized as a positive practice by the Department of Labor in 2014. Upon successful closeout as Program Director of the TAACCCT Grant National Office, Christina transitioned to her current role, managing the scaling, development, and implementation of new CBE projects at Sinclair. Christina has a bachelor’s degree in English literature, and a master’s degree in administration. (C. Amato, personal communication, February 13, 2017)

Thomas Boyd, Vice President and Dean of the School of Business and Information Technology, Kaplan University

Dr. Boyd serves as Vice President and Dean of the School of Business and Information Technology at Kaplan University. He leads competency-based initiatives that are technology-supported and recently launched two competency-based programs, which help fulfill strategic university objectives. He has also led programs to implement the inclusion of career skills across the curriculum and the modularization of the curriculum to facilitate articulations that more accurately represent prior learning to benefit students (Kaplan University, 2017).
Previous to joining Kaplan University, Dr. Boyd was an Associate Dean of Academic Programs and Professor of Marketing at CSU Fullerton and an Associate Professor of Marketing at Miami University (Ohio). Prior to his academic career he was a product planning manager at Motorola, Inc. He has taught courses on consumer behavior and business to business marketing. Research interests include sport sponsorship and promotions, consumer adoption of innovations, and service recovery. Among other professional accolades, he was awarded the 2010 Faculty of the Year award from Mihaylo College of Business and Economics at California State University, Fullerton. Dr. Boyd’s PhD is from the University of North Carolina at Chapel Hill. His MBA is from Florida Atlantic University, and his bachelor’s degree in management is from Oakland University (Kaplan University, 2017).

**Van Davis, Associate Vice President of Higher Education Research and Policy, Blackboard Inc.**

Van Davis is Associate Vice President of Higher Education Research and Policy at Blackboard. Davis works extensively on competency-based education and higher education policy issues as well as distance education, learning technology, workforce alignment, and college affordability. Before joining Blackboard in January 2015, Davis was Director of Innovations in Higher Education at the Texas Higher Education Coordinating Board (THECB). While there Davis led the Texas Affordable Baccalaureate (TAB) project. This project, funded through a Next Generations Learning Challenges Wave IIIb grant, resulted in the development of the first competency-based bachelor’s degree in Texas and one of
the first multi-institutional CBE programs in the nation. Additionally, Davis directed the state's adult degree completion project, Grad TX, as well as the state’s course redesign grant program, online faculty professional development program, annual Reinventing Instruction and Learning Conference, and the development of the state's digital learning objects repository. Davis speaks extensively around the nation on competency-based education, adult degree completion, and higher education trends and also serves on the editorial board of the new Journal of Competency Based Education. Davis served as a history professor and an academic administrator and holds a M.A. and Ph.D. in 20th Century U.S. History with an emphasis in civil rights history from Vanderbilt University as well as a B.A. in History from Southwestern University.

(Blackboard, 2017, para. 1)

**Deborah Everhart, Vice President of Design and Innovation, Learning Objects**

Dr. Deborah Everhart is a strategist and innovator focused on empowering organizations that are envisioning, creating, and implementing holistic learning and education solutions. She is VP of Design and Innovation at Learning Objects, where she provides strategic leadership for competency-based learning solutions. Advancing the work of national organizations, she has served as a Strategic Advisor for the American Council on Education's Alternative Credit Project. She is currently a contributing member of the IMS Global working groups defining standards for competency-based education, extended transcripts, and digital
credentials. She chaired the Badge Alliance working group that defined a conceptual framework and technical standards for badge endorsements.

As a thought leader, she has led the collaboration of research groups comprised of nationally-recognized experts, authoring works on critical topics such as "Quality Dimensions for Connected Credentials," "Communicating the Value of Competencies," and "Clarifying Competency Based Education Terms: A Lexicon." Recent publications include white papers and book chapters on strategic innovations in higher education, including extended transcripts, open badge ecosystems, and badge endorsement. She has written and presented extensively on medieval literature, emerging technologies, portfolios, learning engagement, badges and other digital credentials, competency-based learning, and the future of learning and teaching.

As a teaching practitioner, she is an Adjunct Assistant Professor at Georgetown University, most recently teaching a competency-based medieval studies course in Liberal Studies. (EDUCAUSE, 2017b, para. 1-4)

**Paul Fain, News Editor, Inside Higher Ed**

Paul Fain is news editor at *Inside Higher Ed*, where he has worked since 2011. He writes about low-income students, college completion and emerging models of higher education. From 2004 to 2011, Fain was a senior reporter at *The Chronicle of Higher Education*, where he wrote about college leaders, finance and governance. Fain has contributed chapters to two edited volumes on innovation in higher education, published by the Harvard University Press and the Stanford

**Michael Feldstein, Partner, MindWires Consulting**

Michael is a Partner at MindWires Consulting, Co-Publisher of e-Literate, and Co-Producer of e-Literate TV. Previously, he has been the Senior Program Manager of MindTap at Cengage Learning and Principal Product Strategy Manager for Academic Enterprise Solutions (formerly Academic Enterprise Initiative, or AEI) at Oracle Corporation. Prior to that, Michael was an Assistant Director at the SUNY Learning Network, where he oversaw blended learning faculty development and was part of the leadership team for the LMS platform migration efforts of this 40-campus program. Before SUNY, he was co-founder and CEO of a company that provided e-learning and knowledge management products and services to Fortune 500 corporations, with a special emphasis on software simulations. He has also been the interim CLO at The Otter Group, a Senior Partner at Christensen/Roberts Solutions, and a Senior Instructional Designer at RaymoKarsonsan Associates. In previous lives, Michael has been a freelance writer, an English PhD student, a middle school and high school
teacher, a tire wrangler at a Yokohama Tire warehouse, and a professional loafer at Schooley’s Mountain County Park.

Michael has been a member of the Sakai Foundation Board of Directors, a participant in the IMS, and a member of eLearn Magazine’s Editorial Advisory Board. He is a frequent invited speaker on a range of e-learning-related topics having been invited to speak on topics including e-learning usability, the future of the LMS, ePortfolios, and edupatents for organizations ranging from the eLearning Guild to the Postsecondary Electronic Standards Council, and has been interviewed as an e-learning expert by a variety of media outlets, including The Chronicle of Higher Education, the Associated Press, and U.S. News and World Report.

Michael was a very early participant in Open Source Learning Management Systems projects, having been one of the early participants (and the only non-technologist participant at the time) of the OpenACS community in early 2000—the community that would eventually spawn the GPL-licensed dotLRN Learning Management System. (e-Literate, n.d., para 1-3)

**Brian Fleming, Deputy Director of Research, Sandbox Collaborative at Southern New Hampshire University**

Brian Fleming is the Deputy Director of Research at Sandbox. In his role, he supports research related to strategic planning and university initiatives. Prior to joining the Sandbox, Brian was a Principal at Tyton Partners, a strategy consulting and investment banking firm focused exclusively on education and
human capital management markets. Brian also served as a Senior Analyst in the Online and Continuing Adult Education research practice at Eduventures, a Boston-based research firm supporting the higher education community. Brian earned a Bachelor of Arts degree from Texas A&M University and a M.Ed. from Boston College, graduating Summa Cum Laude and with high distinction for his research on the intersection of student development, pedagogy, and employment. (Sandbox Collaborative, 2017, para. 1-2)

**Jeff Grann, Academic Director, Assessment & Learning Analytics, Capella University**

Jeff Grann leads competency-based innovations that help adults reach their personal and professional goals. He has been instrumental to several of the university’s award-winning offerings, such as its fully-embedded assessment model, student learning dashboard—competency map, and its direct assessment offering—FlexPath. Technically, Grann chairs the IMS Global workgroup on competency-based data exchanges, such as item-level results reporting and a student-controlled extended transcript. Academically, he holds a Ph.D. from the University of Minnesota in educational psychology with a minor in gerontology and has several years of experience publishing research and teaching adult students. (J. Grann, personal communication, February 3, 2017)

**Phil Hill, Partner, Mindwires Consulting**

Phil Hill is Co-Publisher of the e-Literate blog, Co-Producer of e-Literate TV, and Partner at MindWires Consulting. As a market analyst, Phil has analyzed the
growth of technology-enabled change for educational institutions, uncovering and
describing the major trends and implications for the broader market. His unique
graphics and visual presentations have been widely used in the industry. As an
independent consultant, Phil helps educational institutions, technology and
content vendors, and policy makers as they consider and implement new
initiatives. He is often found to be wearing eclectic leather belts to the point of
wondering if he has the best leather sewing machine. Phil’s clients have included
Western Governors University, California Community College System, Iowa
State University, Bournemouth University, Pearson Education, Coursera, and
others.

Previously Phil was an independent consultant through HBO Systems and
Delta Initiative. In addition to e-Literate, Phil has also written for EDUCAUSE
Review and Inside Higher Ed, and he has been interviewed and quoted at National
Public Radio, Inside Higher Ed, the Chronicle of Higher Education, Buzzfeed

Fred Hurst, Vice President for Institutional Advancement at Western Governors
University

Fred Hurst is vice president for institutional advancement at Western Governors
University. Established in 1997 with a mission to expand access to high-quality,
affordable higher education, WGU now serves over 70,000 students nationwide
and has more than 63,000 graduates in all 50 states. Prior to moving to WGU, he
was senior vice president at Northern Arizona University (NAU) in Flagstaff
Arizona, executive director of the Florida Public Postsecondary Distance Learning Institute and was a founding member of the University of Maine System’s Education Network of Maine. Hurst has degrees in Telecommunications, Education, Public Administration, and Higher Education and Philanthropic Studies. (CBExchange, 2016, para. 1)

Kathe Kacheroski, Academic Director for Direct Assessment, Capella University

With more than 15 years of experience in online higher education with positions in areas such as academic advising, learning assistance, and curriculum design, Dr. Kathe Kacheroski currently holds the role of Academic Director for Direct Assessment at Capella University. She brings an expertise for combining traditional higher education best practice with innovative delivery models. She has been recognized by the International Center for Supplemental Instruction for starting and scaling the first online Supplemental Instruction programs and by the Online Learning Consortium for a hybrid framework that creates a structure for creativity yet insures consistency and quality in hybrid program and course delivery.

Kathe has led the development of competency-based curriculum frameworks and the implementation of CBE programs and participates in the Competency-Based Education Network. Her doctoral dissertation in Education Leadership and Management from Capella University explored improving cross-institutional collaboration in the curriculum and course development process with appreciative inquiry, and would tell you that the most important thing she has
learned from her doctoral program is the power of the combination of authenticity and accountability. (EDUCAUSE, 2017e, para. 1-2)

**Alison Kadlec, Senior Vice President, Director of Higher Education and Workforce Engagement, Public Agenda**

Alison Kadlec leads the design and implementation of Public Agenda’s higher education and workforce development research and stakeholder engagement work. She and her team have worked with dozens of colleges and universities across the country to support the capacity of institutional leaders and faculty at every level to effectively engage members of their communities as constructive partners in the hard work of change on behalf of student success. Alison and her team also work with the U.S. Department of Education, state policymakers and system leaders in more than half the states in the U.S. to help improve the quality of policy development and implementation around higher education and workforce issues. Before joining Public Agenda in 2005, Alison was a visiting professor in the political science department at Macalester College and an adjunct professor in the political science departments at the University of Minnesota, Baruch College and Hunter College.

Alison is the author of a book on the democratic theory of John Dewey, Dewey's Critical Pragmatism. She is also the author or co-author of a number of articles on subjects related to stakeholder engagement and public deliberation both within and outside of higher education including: “Putting it All Together: Strengthening Pathways Between Comprehensives and Community Colleges”;
"Deliberative Democracy and the Problem of Power"; "Changing the Conversation About Productivity"; and "Play and Public Life." She holds a Ph.D. in political science from the University of Minnesota and B.A.s from Michigan State University in Political Theory, Constitutional Democracy and English Literature. (Public Agenda, 2017, para 1-2)

**Jeff King, Executive Director, Center for Excellence in Transformative Teaching and Learning at the University of Central Oklahoma**

Jeff King, Ed.D., is Executive Director of the Center for Excellence in Transformative Teaching and Learning at the University of Central Oklahoma in Edmond, Oklahoma. His research and application interests have long focused on what college faculty can do to help their students learn, to be motivated toward deep learning strategies, and to persist in their educations. Jeff is the Project Director for a large Title III grant that is enabling UCO to implement, track, and assess Transformative Learning (TL) in both the curriculum and the co-curriculum via its Student Transformative Learning Record (STLR) project. STLR helps faculty and staff design activities, assignments, and environments more likely to prompt TL than leaving this chance, and whether in the classroom or outside it, STLR is having dramatic results in helping shrink the achievement and retention gaps between underrepresented, low SES, and first-generation students compared to other students. Before moving to UCO’s Transformative Learning-focused environment in January 2012, Jeff was the Director of Texas Christian University’s Koehler Center for Teaching Effectiveness, and before that
he worked in higher education in faculty development since 1994 and as a faculty member since 1990. No matter his location, though, his work over the years both as college faculty member and in faculty professional development matches passion to position in helping students learn. His Ed.D. in Higher Education with a cognate in Adult and Continuing Education is from the University of North Texas. (EDUCAUSE, 2017d, para. 1)

Becky Klein-Collins, Associate Vice President for Research and Policy Development, Council for Adult and Experiential Learning (CAEL)

Becky Klein-Collins is the Associate Vice President for Research and Policy Development for CAEL with responsibilities in conducting new research to benefit adult learners and developing new approaches for policy change at both the federal and state levels. Since 1995, Becky has overseen a range of projects during her time with CAEL, from the integration of public and private funds for worker education and training to the administration of employer-funded tuition assistance programs. Her research projects have focused on the impact and value of prior learning assessment (PLA), competency-based degree programs, state indicators for adult learning, best practices in serving student veterans, mature workers, innovations in nursing education, exemplary practices of employers in workforce development, and system-transforming practices in workforce development. Becky has a bachelor’s degree from Grinnell College and master’s degrees from Indiana University and the University of Chicago Harris School of Public Policy. (Council for Adult and Experiential Learning, 2017, para. 3)
Ron Legon, Executive Director Emeritus and Senior Adviser for Knowledge Initiatives, Quality Matters, Inc.

Dr. Ron Legon served as Executive Director of Quality Matters from 2006 until early 2016. While President of MarylandOnline in 2005-2006, Dr. Legon led the evolution of QM from grant support to self-support. Subsequently, he led the growth of QM from its MarylandOnline base to the more than one thousand member institutions it has today.

In his 10 years as Executive Director of Quality Matters, Dr. Legon broadened QM’s focus on quality online course design in higher education by leading the development of online design rubrics for secondary school, continuing and professional education, MOOCs, and publisher provided courses. Under his guidance, QM began to spread internationally, and QM’s scope in quality assurance grew to include program design, online teaching, learner outcomes, and support for the online learner. In 2008, the U. S. Distance Learning Association recognized Dr. Legon for Outstanding Leadership in Distance Education. In the past several years, he represented QM as a Thought Partner in the CBE Landscape Project sponsored by the Bill and Melinda Gates Foundation.

Dr. Legon also holds the title of Provost Emeritus from the University of Baltimore (UB), where he was Provost from 1992 to 2003. At UB he also served as Director of the Helen P. Denit Honors Program and Director of the MBNA e-Learning Center, where, in 1998, he led the development of the first AACSB accredited fully online MBA program.
Prior to joining UB, Dr. Legon taught Ancient History at the University of Illinois at Chicago (UIC) and served in a range of administrative positions from Department Chair to Associate Provost. Ron received his B.A. from the City College of New York, his master’s and doctoral degrees from Cornell University, and studied as a Fulbright Scholar at Oxford University. Ron has taught history and humanities at Brooklyn College, Illinois-Chicago, the University of Chicago, and, most recently, at Baltimore, where he taught online and face-to-face. He has published widely in the fields of Greek History and, more recently, online education.

In retirement, Dr. Legon has been named Executive Director Emeritus by the QM Board of Directors, and named the first recipient of the Quality Matters Ron Legon Leadership Award for Quality Assurance in Online Education. He continues his commitment to the growth and success of online learning as Senior Adviser to Quality Matters for Knowledge Initiatives. (R. Legon, personal communication, January 25, 2017)

Mark Leuba, Vice President, Product Management, IMS Global Learning Consortium

Mark Leuba is a technology leader in education, with particular expertise in online higher education. Through his former firm, Pathway Technology Partners and affiliates Mark provided advisory and strategy services for leading institutions, foundations, non-profit and for-profit education organizations. A recent engagement was TIP—Technology Interoperability Pilot project sponsored
by the Bill and Melinda Gates Foundation. Mark also consulted to BMGF and others assessing innovations in digital courseware and personalized learning products, competency-based education, strategic program management and product selection, organizational due diligence and education technology market analysis.

Prior to forming his consultancy Mark served as Chief Technology Officer for Moodlerooms, a leading provider of open source learning management solutions where Mark led their transition to cloud-based platform services - at the time the largest migration of its kind in online education. As the Chief Information Officer for American Public University System from 2005-2009 Mark developed and executed a five year plan laying the technology foundation for unparalleled growth in the University’s online programs. Before joining APUS, Mark held leadership roles in corporate IT, including nine years as Vice President of Applications for Random House, the world’s largest consumer trade publisher.

Mark’s role in IMS Global is to guide its product management strategy and execution, building on the substantial success of the IMS team. Mark received his B.A. in Business Administration/Finance from the University of Baltimore. (IMS Global Learning Consortium, 2017, para. 1-3)
Charles McClintock, Doctoral Faculty and Dean Emeritus, Fielding Graduate University

Charles McClintock, PhD, is Doctoral Faculty and Dean Emeritus at Fielding Graduate University. He served as President of The Santa Barbara and Ventura Colleges of Law, accredited by the California State Bar and WSCUC, from 2014-2015. He served as Dean of the School of Human and Organizational Development from 2011 to 2012 and founded the Institute for Social Innovation in 2002. Dr. McClintock is Professor Emeritus at Cornell University, where he taught and held academic administration positions from 1975 to 2001. He was a visiting professor at Stanford University in 1981 and University of California, Santa Cruz in 1989.

Dr. McClintock’s scholarship focuses on graduate education, online learning, program evaluation, and evidence-based organizational development. He has worked with colleges and universities, social sector organizations, government agencies, businesses, and philanthropic organizations. His work has been published in Administrative Science Quarterly, Adult Education Quarterly, OD Practitioner, Administration and Society, Policy Sciences, Organization, and Evaluation Review. He has consulted for the United States Senate Committee on Labor and Human Resources, colleges and universities, federal, state and local government agencies, as well as nonprofit, and business organizations.

Dr. McClintock earned a PhD in social psychology from the State University of New York at Buffalo. He serves on the Substantive Change
Committee of the Western Association of Schools and Colleges (WASC), and various social sector advisory committees. He also serves on the advisory board for KCLU, the central coast public broadcasting affiliate. Dr. McClintock is active in various academic and professional groups including Council of Graduate Schools, American Evaluation Association, Academy of Management, Organizational Development Network, American Psychological Association, and American Educational Research Association. (Fielding Graduate University, n.d., para. 1-3)

**Kara Monroe, Vice President for Academic Innovation and Support, Ivy Tech Community College**

Dr. Kara Monroe serves the state of Indiana as the Vice President for Academic Innovation and Support at Ivy Tech Community College – Indiana’s community college system. The Ivy Tech Community College is comprised of 32 degree-granting locations and serves more than 100,000 students per year. Ivy Tech is the largest singly-accredited statewide community college system in the U.S. In her role as Vice President, Kara provides leadership in the areas of academic technology, alternative delivery models, academic support services (library, learning support services, etc.), online learning, and faculty and student development appropriate to supporting these areas.

Kara has a wide array of experience and interests in higher education including new pathways to credentials, alternative delivery methods, increasing
and improving professional development opportunities and experiences for all faculty, and improving academic support services for students.

She began her career as a high school mathematics teacher at Lakeland Senior High School in Lakeland, FL. Kara has taught in the community college as well as masters and doctoral programs – teaching and developing courses in multiple delivery formats. Teaching is where her passion continues to find the best voice. Kara earned her Doctorate in Higher Education Leadership from Capella University. (K. Monroe, personal communication, January 28, 2017)

**Nina Morel, Dean of the College of Professional Studies, Lipscomb University**

Nina Jones Morel is the Dean of the College of Professional Studies in addition to being an associate professor of Education. At Lipscomb University, she leads a team dedicated to creating a personalized learning experience for adult students (Lipscomb, 2017). She leads competency-based education initiatives along with adult degree programs and the master degree programs in Coaching, Strategic Leadership, Aging Services Leadership, and Global Leadership. Her professional experience includes positions as an administrator for federal programs, English Language Learning and district-wide coaching at Sumner County Schools. She has also served as a lobbyist and a Title III consultant (LinkedIn, 2017).

Dr. Morel is a published author focusing on coaching teachers. She wrote “Learning from Coaching: How do I work with an instructional coach to grow as a teacher?” published by ASCD, and “How to Build an Instructional Coaching Program for Maximum Capacity” with Corwin Press (Lipscomb, 2017). She has written numerous
articles on collaboration and coaching, and was awarded the 2005 Milken Foundation National Educator Award for excellent teaching. Her doctoral and master’s degrees are both from Tennessee State University, and her bachelor’s degree is from Lipscomb University (Lipscomb, 2017.)

Cali Morrison, Director of Alternative Learning, American Public University

Cali M.K. Morrison is director of alternative learning at American Public University System and a doctoral (Ed.D.) candidate in higher education administration at Montana State University. Previously Cali was the assistant director, communications and analysis at the WICHE Cooperative for Educational Technologies (WCET) and project director of Transparency by Design at WCET, where she became interested in studying adult learners and accountability. Current research interests include competency-based education and its practical and policy implications for higher education. Morrison holds a B.A. in Public Relations from Western Kentucky University, a M.Ed. in Adult & Higher Education from Montana State University, an online graduate certificate in Women's Studies from Western Kentucky University. Cali lives near Bozeman, MT with her husband, two daughters, and dogs where she is active in the community, especially with the Girls for a Change and CAP mentoring programs. (EDUCAUSE, 2017a, para. 1)
Michelle Navarre Cleary, Associate Professor and Senior Director for Innovation, DePaul's School for New Learning

Michelle Navarre Cleary, Ph.D., is an Associate Professor and Senior Director for Innovation at DePaul's School for New Learning (SNL). SNL has been offering competency-based education to adult learners since 1972. At SNL, Navarre Cleary created a writing program, served as Associate Dean of Curriculum, Instruction and Assessment, and currently leads new program development. Prior to DePaul, Navarre Cleary taught at the Chicago City Colleges and Northwestern University. She has been a team leader in the Competency-Based Education Network (C-BEN) and is a founding member of the International Working Group on Competency-Based Learning in Higher Education. Her research and publications focus primarily on adult learners, writing instruction, and competency-based education. (M. Navarre Cleary, personal communication, January 31, 2017)

Stella Porto, Learning and Knowledge Management Specialist, Inter-American Development Bank

Stella Porto is a Learning and Knowledge Management Specialist at the Inter-American Development Bank, a position she has held since 2014. This follows ten years as Director of the Master of Distance Education & ELearning program at the University of Maryland University College, where she also held a number of other managerial roles in the Graduate School and has been working as a faculty member and staff since January 2001.
Porto also has extensive work experience in the development, delivery and quality assurance of online programs and e-learning initiatives, having worked with different institutions and agencies world-wide.

Porto received a BS in Electrical Engineering in 1986 from the Pontifical Catholic University of Rio de Janeiro (PUC-Rio). She obtained her master's and doctoral degrees in informatics (CS at PUC-Rio) in 1991 and 1995, respectively, from the same institution. In 2008, she also completed master’s degree in distance education from UMUC. (The EvoLLLution, 2017, para. 1-3)

Matthew Rascoff, Vice President, Office of Learning Technology and Innovation,
University of North Carolina

Matthew Rascoff serves the 225,000 students and 17 institutions of the University of North Carolina system as the first Vice President for Learning Technology and Innovation in the UNC General Administration.

Rascoff previously launched JSTOR’s first international office in Berlin, where he was also a Fellow of the Bertelsmann Foundation and a strategic advisor to the Robert Bosch Foundation. Rascoff previously led product management teams at Wireless Generation, an education technology company (acquired by News Corporation in 2010 and renamed Amplify). In 2011, Rascoff built and launched Wireless Generation’s product development center in Durham, North Carolina.

Earlier in his career Rascoff co-founded the strategy group at Ithaka, an incubator of higher education technology ventures. Rascoff’s experience includes
Google, where he worked on the Book Search operations team, and Katzenbach Partners, a strategy consulting firm.

After undergraduate studies at Columbia University he did graduate work at Bogazici University in Istanbul on a Fulbright Scholarship. He also earned an MBA from Harvard Business School and represented the state of North Carolina as a German Marshall Memorial Fellow in 2013. (The EvoLLLution, 2017, para. 1-4)

Carlos Rivers, Operations Research Analyst, Institution of Competency-Based Education

Carlos Rivers serves as the Operations Research Analyst for the Institute for Competency-Based Education. He focuses primarily on historical data collection and analysis for Texas A&M University-Commerce's Affordable Baccalaureate Degree and establishing and tracking program specific metrics that can potentially serve as a framework for universities planning to launch similar competency-based programs. In this position, Rivers has provided baseline data to the Texas Higher Education Coordinating Board (THECB) that has served as a starting point for grant applications to fund additional sites. Rivers also has provided data and analytic insight for university-wide enrollment and retention initiatives for the Enrollment Management Division both in online and offline applications.

Before this position, Rivers worked as a Sales and Operations Manager in a leading technology organization in the international marketplace. Working in the IT industry has given him an extensive understanding of the power of data
analytics and how to transform raw data into actionable insights that provide business impact and benefits for organizations. In this position he was awarded Manager of the Year at a national scale in Nicaragua.

Rivers earned an M.B.A from Texas A&M University-Commerce, ranking in the top 10 percentile of his graduating class. He obtained his B.A. in International Business with minors in Economics and Asian Studies from Mercyhurst University, where he graduated magna cum laude. Rivers won the Lions Business Innovation Showcase for his site Doctrip.com. His idea also made it to the Top 50 Internet businesses in Baylor University’s New Venture competition. Rivers has received numerous awards including the National Engaged Leadership Award and an award from the Hispanic Education Consortium for Hispanic leaders in Education & the community. (The Evolllution, 2017, para. 1-3)

William J. Ryan, Principal Consultant, Ryan Consulting

William J. Ryan, PhD is the Principal Consultant with Ryan Consulting, LLC providing strategic and technical guidance to organizations connecting performance to learning. He has a 360 skill set including academic, private industry, and government experience in positions as VP of Education, VP of Technology/CIO, National Leader of Curriculum & Technology Solutions and, most recently, at a state wide system level as the Executive Director of the CBE initiative, Learn on Demand. Dr. Ryan has led performance support and instructional design teams globally in including government contracts
Dr. Ryan is involved in the Competency-Based Education Network (C-BEN) and has published a number of articles centered on competency-based design and delivery on The evoLLLution online journal. In his role as Executive Director of Learn on Demand, Dr. Ryan was actively involved in a successful TAACCCT grant with six community colleges with new STEM degrees and stackable certificates. In his CBE projects he has collaborated with state agencies and national groups including the American Health Information Management Association (AHIMA), the ESE Group, the National Retail Services Industry, the ACT Foundation and others.

Dr. Ryan holds a M.S. from Ithaca College focused on Instructional Design, and a Ph.D. in Computing Technology in Education from Nova Southeastern University. (W. Ryan, personal communication, December 22, 2016)

Judith Sebesta, Executive Director, Institute for Competency-Based Education, Texas A&M University-Commerce at Rockwall

Dr. Judith Sebesta serves as the founding Executive Director for the Institute for Competency-Based Education at Texas A&M University-Commerce. Prior to this position she worked in a variety of capacities at the Texas Higher Education Coordinating Board (THECB), including as Director of Innovation as well as a policy analyst and program director. In these positions she was honored to serve as the agency expert on competency-based education; provide support for the
development of the state’s new strategic plan for higher education; organize two statewide symposia on the future of higher education; write white papers, reports, and policy briefs on both innovation and marketable skills; engage in legislative analysis; and provide support for the development of TAMU-C’s Affordable Baccalaureate Degree. Dr. Sebesta is a certified facilitator for the DACUM occupational analysis process and her publications on CBE have appeared or are forthcoming in such venues as the new Journal of Competency-Based Education, the EvoLLLution, the EDUCAUSE Review, and WCET Frontiers.

Before entering the broader landscape of higher ed policy, Dr. Sebesta was a professor of theatre at the University of Missouri, University of Arizona, University of Evansville, and Lamar University, as well as department chair at the latter. Dr. Sebesta earned a Ph.D. from the University of Texas at Austin, an M.S. from the Florida State University, and a B.A. from Austin College. She also holds a certificate in Nonprofit Management from UT Austin. (J. Sebesta, personal communication, January 2, 2017)

Jim Selbe, Selbe Consulting

Jim Selbe is the founder of Selbe Consulting, specializing in online, competency-based education. Previously he served as the System Director for Distance Learning Initiatives and Special Assistant to the Chancellor at Kentucky Community and Technical College System (LinkedIn, 2017). He has led a college as the President and CEO of Hopkinsville Community College, and has served in other executive positions at
community colleges, including as Provost at West Kentucky Community and Technical College, and as Vice President for Academic and Student Affairs at Jackson State Community College (LinkedIn, 2017).

**Burck Smith, CEO and Founder, StraighterLine**

Burck Smith is CEO and founder of StraighterLine (StraighterLine, 2017).

“Started in 2009, StraighterLine has helped over 50,000 students lower the cost and risk of earning a college degree by offering affordable, online, competency based general education courses” (B. Smith, personal communication, January 26, 2017). Additionally:

Ten years before launching StraighterLine, he co-founded SMARTHINKING, the largest online tutoring provider for schools and colleges. Burck has written chapters for three books on education policy for the American Enterprise Institute (AEI). He is a member of the American Enterprise Institute's Higher Education Working Group. Prior to starting SMARTHINKING, Burck was independent consultant and journalist whose clients included the Gates Foundation, Microsoft, Computer Curriculum Corporation, the CEO Forum on Education and Technology, the Milken Exchange on Education and Technology, Teaching Matters Inc., Converge Magazine, Wired Magazine, Wired News, University Business, the National School Boards Association and more. In the early 1990's, he wrote articles on a variety of subjects including creating community telecommunication networks, electronic access to political information, telecommunications deregulation and the ability of utilities to serve as telecommunications service providers. Burck holds a master's degree in public
policy from Harvard University's John F. Kennedy School of Government and a bachelor’s from Williams College. (StraighterLine, 2017, para. 1)

**Steve Smith, Director of Distance Learning and Instructional Technology, Linn-Benton Community College**

Steve Smith is the Director of Distance Learning and Instructional Technology at Linn-Benton Community College in Albany, Oregon. As part of his responsibilities, he is responsible for the LB iLearn Campus. The LB iLearn campus has 7 competency-based degree and certificates. These were developed under a TAACCCT 3 grant and have been offered for the last 3 years. He has worked in distance learning, curriculum development and instructional technology for the last 20 years. He has a master’s in adult education and is working on his dissertation in community college leadership focusing on improving completion rates in distance learning. (S. Smith, personal communication, January 27, 2017)

**Dorothy Wax, Associate Vice President for Operations, Council for Adult and Experiential Learning**

Dorothy Wax is the Associate Vice President for Operations at the Council for Adult and Experiential Learning, where she has served since 2002. In her position, she works to create and deliver career programming for clients in telecommunications, finance, and healthcare. She supports higher education institutions through the delivery of advising services designed for adult learners as well as conducting training (Council for Adult and Experiential Learning, 2017).
She received her master’s degree in human resource administration from Temple University, and her bachelor’s degree in journalism is from Moravian College. Additionally, Dorothy Wax holds a certificate in human resources from Cornell University (Council for Adult and Experiential Learning, 2017).

Ward Wesolowski, Dean of Operations, Center for Competency-Based Education, University of Phoenix

Ward Wesolowski is the Dean of Operations at the Center for Competency-Based Education for the University of Phoenix. In that position he designed a new service model in order to support CBE, and leads work streams in order to develop and deploy CBE programs including recruitment, faculty hiring and training, technology and curriculum (LinkedIn, 2017). Ward has had extensive experience at the University of Phoenix, previously serving as the Senior Director for the Office of Student Experience, Senior Director of Student Services, Director of Student Services, and Counseling Services Manager.

Ward has a master’s degree in counseling from the University of Phoenix, and a bachelor’s degree in business administration and management at Northern Arizona University (LinkedIn, 2017).

Heidi Wilkes, Chief Academic Officer, College for America, Southern New Hampshire University

Dr. Heidi Wilkes is the Chief Academic Officer, College for America (CfA) at Southern New Hampshire University. CfA is an innovative, competency-based, online, regionally accredited, low-cost degree program for working adults. The
Chief Academic Officer is responsible for the academic quality of the competency-based curriculum and assessments and leading the Curriculum and Assessment Development Team. Prior to joining CfA she was the Dean of the Innovations Group and a Senior Lecturer at Granite State College. As Dean of innovations she leveraged expertise in the design and delivery of online programs to support new initiatives and college partners. Before joining Granite State College she served as Assistant Dean for Academic and Faculty Affairs and Senior Lecturer at Northeastern University's College of Professional Studies. At CPS Heidi had academic oversight for undergraduate business and international programs including the Global Classroom programs in Finance and Accounting and Leadership. She marketed new programs, developed curricula, and coordinated services and support for international undergraduate students in collaboration with NU Global. Heidi worked closely with the D'Amore-McKim School of Business and was responsible for AACSB accreditation compliance at the College of Professional Studies. Prior to assuming the role of Assistant Dean she served as Director for the Doctor of Education program. She has also held account executive positions focused on consultative sales and marketing at several U.S. firms. She holds a BA in International Relations from Boston University, MBA in International Business from Bentley University, and Doctorate in Law and Policy from Northeastern University. (EDUCAUSE, 2017c, para. 1)
## APPENDIX F
### FACTOR ARRAYS

<table>
<thead>
<tr>
<th>Statement</th>
<th>Factor 1</th>
<th>Factor 2</th>
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<tbody>
<tr>
<td>1. Use a business model that promotes sustainability.</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Be significantly less expensive than a traditional degree</td>
<td>-3</td>
<td>1</td>
</tr>
<tr>
<td>3. Be able to offer students federal financial aid</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4. Participate as an experimental site for Title IV funding in order to improve disbursement options for students</td>
<td>-5</td>
<td>3</td>
</tr>
<tr>
<td>5. Utilize subscription-based cost models</td>
<td>-4</td>
<td>4</td>
</tr>
<tr>
<td>6. Allow learners to find and select their own learning resources, and should view the institutionally-provided resources as optional</td>
<td>-3</td>
<td>-5</td>
</tr>
<tr>
<td>7. Have built-in learning resources that are available to students at no extra charge</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>8. Have learning resources that are available anytime/anywhere for students to access</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>9. Leverage the use of OER</td>
<td>-2</td>
<td>1</td>
</tr>
<tr>
<td>10. Utilize competencies that include knowledge, skills, abilities, attitudes and beliefs or similarly structured categories</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>11. Clearly define the criteria for mastery of competencies</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>12. Have competencies that are for a specific field of study as well as broad-based, cross-cutting competencies regardless of specialization</td>
<td>4</td>
<td>-3</td>
</tr>
<tr>
<td>13. Utilize established frameworks for competencies like Lumina Foundation's Degree Qualifications Profile, AAC&amp;U's LEAP, and industry standards</td>
<td>1</td>
<td>-4</td>
</tr>
<tr>
<td>14. Provide specific learning paths with built-in formative assessments that guide the learner to success on summative assignments</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Number</td>
<td>Statement</td>
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</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>15</td>
<td>Have a course or credit-based approach</td>
<td>-5</td>
</tr>
<tr>
<td>16</td>
<td>Be entirely divorced from the credit hour (aka direct assessment)</td>
<td>-4</td>
</tr>
<tr>
<td>17</td>
<td>Provide for a combination of both traditional, course-based credit hours and direct assessment</td>
<td>-2</td>
</tr>
<tr>
<td>18</td>
<td>Based on competencies; quality CBE programs do not need to be time-variable and can exist in a traditional, paced learning experience; quality CBE programs should not need to be self-paced</td>
<td>2</td>
</tr>
<tr>
<td>19</td>
<td>Be time-variable, with students able to progress at their own pace throughout the program</td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td>Utilize authentic assessments that leverage real-world scenarios to best illustrate their competencies</td>
<td>4</td>
</tr>
<tr>
<td>21</td>
<td>Utilize clear and transparent rubrics</td>
<td>5</td>
</tr>
<tr>
<td>22</td>
<td>Support students progressing upon demonstrating their competencies on a range of different types of assessments</td>
<td>4</td>
</tr>
<tr>
<td>23</td>
<td>Utilize proctoring or other authentication for summative assessments in order to maintain legitimacy</td>
<td>-1</td>
</tr>
<tr>
<td>24</td>
<td>Implement a &quot;Pass&quot; or &quot;Not Pass&quot; rubric for mastery of competencies</td>
<td>-4</td>
</tr>
<tr>
<td>25</td>
<td>Implement grading schemas that enable students to pass competencies at different levels of mastery that are described as long as that level of mastery is captured and documented, such as at an 80% or 90% achievement of the competency</td>
<td>-1</td>
</tr>
<tr>
<td>26</td>
<td>Norm assessments closely in order to prove their validity</td>
<td>2</td>
</tr>
<tr>
<td>27</td>
<td>Include formative assessments that provide automated feedback</td>
<td>-1</td>
</tr>
<tr>
<td>28</td>
<td>Utilize pre-assessments or diagnostics to enable students to focus on the gaps in their skills and knowledge</td>
<td>3</td>
</tr>
<tr>
<td>29</td>
<td>Utilize adaptive courseware to personalize the students' learning experience</td>
<td>-3</td>
</tr>
</tbody>
</table>
30. Include the use of Prior Learning Assessment (PLA)

31. Enable students to gain credit through transfer credit, military training, and other life experiences

32. Enable students to transfer in credit only if it has been transcripted at a grade which would equate with the institution's definition of mastery within the CBE program

33. Enable students to transfer in credit from other institutions in a course-based format regardless of grade in the course

34. Enable the use of non-traditional learning experiences like micro-credentials and MOOCs

35. Enable students to start at frequent intervals during the year (i.e. weekly, monthly, or quarterly start dates)

36. Only allow students to take one or two courses at a time in order to improve student success

37. Be focused on the acceleration of degree completion

38. Utilize close partnerships with employers to provide students with relevant curriculum

39. Provide learning experiences that can be used immediately in students' work environments

40. Be offered primarily in directly career-related degrees

41. Partner with employers to provide internship opportunities as well as post-graduation employment opportunities

42. Utilize distributed faculty roles, with support, coaching, assessment and subject-matter expertise distributed among various program faculty and staff

43. Provide students with a coach that stays with the student throughout the course of their program

44. Utilize separate assessors for student work to ensure consistent application of rubrics

45. Include intentionally crafted learning plans co-created with coaches or advisors
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Count 1</th>
<th>Count 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
<td>Provide tutors, writing centers, librarians and other academic supports to surround the student with applicable resources</td>
<td>3</td>
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</tr>
<tr>
<td>47</td>
<td>Not necessarily support distributed faculty roles; a traditional faculty role can also be utilized within a CBE model</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>48</td>
<td>Include regular, planned interactions between students and CBE program faculty and staff</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>49</td>
<td>Utilize Subject-Matter Experts that are not traditional college or university faculty, rather they should come from workforce, industry, or other professional backgrounds</td>
<td>0</td>
<td>-2</td>
</tr>
<tr>
<td>50</td>
<td>Utilize Subject-Matter Experts that are traditional college or university faculty</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>51</td>
<td>Utilize instructional designers, content developers and quality assurance professionals</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>52</td>
<td>Implement clear performance expectations for faculty and staff, and the achievement of those performance criteria should be measured with reference to how they support students through their learning experience</td>
<td>2</td>
<td>-2</td>
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<tr>
<td>53</td>
<td>Provide opportunities for students to connect with each other, faculty, and program staff and create social support networks</td>
<td>2</td>
<td>-1</td>
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<tr>
<td>54</td>
<td>Enable students the opportunity to physically meet with their faculty member (or other distributed faculty role,) if they desire</td>
<td>-2</td>
<td>-3</td>
</tr>
<tr>
<td>55</td>
<td>Prioritize the accessibility of the program to students regardless of ability, race, income or gender</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>56</td>
<td>Include normed assessments to protect students from inadvertent bias in assessment strategy</td>
<td>0</td>
<td>-1</td>
</tr>
<tr>
<td>57</td>
<td>Have clear university policies around the program, tuition, fees, and participation expectations</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>58</td>
<td>Utilize admittance tests or other criteria to admit only self-directed students</td>
<td>-3</td>
<td>-2</td>
</tr>
<tr>
<td>59</td>
<td>Be designed for a diverse audience in terms of age and preparation</td>
<td>-2</td>
<td>-3</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Score 1</td>
<td>Score 2</td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------------------------------------</td>
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<td>---------</td>
</tr>
<tr>
<td>60</td>
<td>Be designed primarily for working adults</td>
<td>-3</td>
<td>-1</td>
</tr>
<tr>
<td>61</td>
<td>Be offered fully online, or in blended environments, but not fully face-to-face</td>
<td>-4</td>
<td>2</td>
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<tr>
<td>62</td>
<td>Utilize appropriate LMSs that enable the tracking of success on competencies</td>
<td>-1</td>
<td>0</td>
</tr>
<tr>
<td>63</td>
<td>Include learning in other physical places, such as the workplace, clinical sites, through internships, and experiential learning</td>
<td>0</td>
<td>-2</td>
</tr>
<tr>
<td>64</td>
<td>Utilize totally new and different technology infrastructure to succeed</td>
<td>-5</td>
<td>-2</td>
</tr>
<tr>
<td>65</td>
<td>Utilize existing technology systems, but how such systems are used may be significantly different to support CBE</td>
<td>-3</td>
<td>2</td>
</tr>
<tr>
<td>66</td>
<td>Utilize data collection and analysis to support continuous improvement of the CBE program from both an operational and a curriculum design perspective</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>67</td>
<td>Utilize dashboards, real-time reports and automated alerts to surface student progress to students, faculty, advisors, coaches, deans, analysts and other internal stakeholders</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>68</td>
<td>Provide transcripts that are traditional in nature</td>
<td>-2</td>
<td>2</td>
</tr>
<tr>
<td>69</td>
<td>Provide transcripts that represent the specific competencies attained</td>
<td>3</td>
<td>-3</td>
</tr>
<tr>
<td>70</td>
<td>Automate enrollment and financial aid processing, as well as other administrative functions, with the existing college systems</td>
<td>-2</td>
<td>4</td>
</tr>
<tr>
<td>71</td>
<td>Have regular and substantive interaction which can be fulfilled by a coach, tutor, or assessor role</td>
<td>0</td>
<td>-2</td>
</tr>
<tr>
<td>72</td>
<td>Have regular and substantive interaction which should be fulfilled at least partially by a faculty with expert qualifications</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
APPENDIX G

PUBLICATIONS FROM WHICH CONCOURSE STATEMENTS WERE DRAWN
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