

## **ABSTRACT**

FLOWERS, CHRISTOPHER CULLEN. Faculty and Administrator Attitudes Toward Competency-Based Education: A Q Methodology Approach. (Under the direction of Dr. James Bartlett).

Competency-based education (CBE) has gained popularity over the course of the past several years, and the North Carolina Community College System is now working to develop its first CBE degree path. Though a number of institutions have implemented CBE on the national scale, only minimal research has been conducted regarding faculty and administrator attitudes toward CBE as a valid educational construct. This study uses Q sort to assess faculty and administrator attitudes at the four pilot institutions that are part of the North Carolina CBE Project. This study will determine what groups exist among faculty and administrators involved in the development of CBE efforts at the colleges in question; these results could help guide college leaders as they consider how best to engage faculty who may have negative perceptions of CBE.

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Faculty and Administrator Attitudes Toward Competency-Based Education: A Q  
Methodology Approach

by  
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A dissertation submitted to the Graduate Faculty of  
North Carolina State University  
in partial fulfillment of the  
requirements for the degree of  
Doctor of Education

Adult and Community College Education

Raleigh, North Carolina

2017

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## **DEDICATION**

This study is dedicated to my wife, Erica, and our two children, Jonah and Henry. Thank you for sacrificing every other weekend for three years so I could complete my classes, and thank you for carving out time for me to work on this dissertation in the time since. I love you all!

## BIOGRAPHY

Christopher Cullen Flowers was born in Jacksonville, North Carolina and grew up in nearby Richlands, North Carolina. After finishing high school, he attended East Carolina University, where he obtained his B.A. in English and Anthropology, as well as an M.A. in English. In 2006, he moved with his wife, Erica, to the Charlotte area and soon began teaching as an adjunct instructor at both the University of North Carolina at Charlotte and Central Piedmont Community College. In 2010 Christopher and Erica's first son, Jonah, was born.

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In 2014 Christopher and Erica's second son, Henry, was born. Christopher and Erica reside in Huntersville, North Carolina. He continues to serve as a Discipline Chair and teach courses in the English Division at Central Piedmont. His interests include spending time with his family, reading, playing video games, and higher education.

## ACKNOWLEDGMENTS

There are a number of people that I would like to thank as I've pursued this journey toward an Ed.D. First and foremost, I want to thank my wife and children for the time they have sacrificed in allowing me to work toward this goal. I'd also like to thank my parents for their lifelong support of my educational endeavors. I want to extend my gratitude and thanks to my colleagues at CPCC, too, for their encouragement throughout this process.

Dr. James Bartlett, my Dissertation Chair, has served as a mentor and guide from the first day that I joined the Adult and Community College Ed.D. cohort. Thank you for your support and leadership. My committee members—Dr. Michelle Bartlett, Dr. Diane Chapman, and Dr. Cameron Denson—have also provided feedback and guidance that have helped me work through this study.

I would also like to thank my cohort classmates for their encouragement and feedback over the past four years. Dr. Jessica Kiser, thank you for your help as I've worked through this Q study. Jennifer, thank you for your friendship and reassurance as we worked through our classes and our dissertations. Erica and Randy, thank you for your friendship and for serving as a sounding board as we shared our successes and struggles with one another. Dr. Katie Kandalec, thank you for your input and guidance as I have approached the finish line.

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## CHAPTER 1: INTRODUCTION

### Background

Competency-based education (CBE) is a course delivery method that has the potential to radically transform how colleges design class offerings (Ordonez, 2014). In higher education, the challenges associated with a diverse student body—including traditional and non-traditional students and the hurdles they encounter in pursuit of their degrees—suggests that curriculum design and delivery must be assessed in order to ensure that student needs are being met (Sullivan & Downey, 2015). The desire of CBE is to direct educational processes toward real-world application and demonstration of content mastery, which allows institutions to forge connections between academics and employers, and, ultimately, helps foster a better understanding of the skills necessary in order for students to be successful as citizens and members of an ever-evolving workforce (Johnstone & Soares, 2014).

Many universities and college systems have emerged as pioneers in the ever-expanding curriculum paradigm shift toward CBE, including the Kentucky Community and Technical College System, The University of Wisconsin, and Western Governors University (“Competency-Based Learning,” 2016; “Kentucky Technical and Community College System,” 2016; “U.W. Flexible Option,” 2016). In fact, a recent review revealed that 52 colleges have been identified as having already implemented CBE programs (or have them in development in the United States) (Nodine, 2016). Though many institutions have managed to successfully implement a CBE approach either at the program or general education level, there is still much scrutiny associated with CBE. For example, Western Governors University—a college considered by many to be the front-runner in terms of CBE innovation

(Kinsler, 2002; Zane et al., 2010)—has recently been audited by the Department of Education in an effort to determine whether or not it is truly offering distance education courses as opposed to correspondence courses; this is important because it impacts the distribution of federal aid (the term “substantive interaction” has been central to the audit, and stands out as a primary consideration of institutions focused on CBE pursuits) (Fain, 2016). At its inception in 1997, the intention of WGU was to reinvent traditional approaches to higher education by focusing squarely on reigning in the rising cost of postsecondary education, while also addressing the needs expressed by business and industry partners—in addition, the institution sought to respond to the lack of action on the part of state systems to the aforementioned concerns (Johnstone, 2005). As indicated, issues surrounding the instructor role amid certain CBE structures have now endured fresh scrutiny, a point that causes many in teaching positions to raise questions about the efficacy of the CBE approach.

The term “disruptive innovation” is one that is frequently associated with CBE, and for good reason; it “requires a deep exploration and often significant re-design of administrative, financial, and academic systems within institutions” (Johnstone & Soares, 2014, p. 14). These changes and the atypical nature of competency-based education—when coupled with a widening spotlight that requires colleges to very carefully evaluate the merits of a CBE redesign—warrant continued research in order to identify potential barriers that could impede student and institutional success.

### **Nature of the Problem**

Existing literature surrounding perceptions of competency-based education is scant. In the medical field, some research has been done to evaluate and assess perceptions

regarding the CBE approach and the appropriateness of competencies (Frank et al., 2010; Gruppen, 2015; King, 2015); for example, a study by Hopmans et al. (2013) found that medical students and surgeons-in-training did not find the competencies by which they were being assessed to be reliable or appropriate. A publication by Dath and Iobst (2010) indicates that medical school faculty members lack a depth of understanding in regards to competency-based assessment. Dath and Iobst assert that working to build acceptance of CBE—especially when a traditional approach is what instructors may otherwise be comfortable with—is crucial to organizational change.

Another recent publication indicates that many instructors within a vocational education training program that employs a CBE model were not necessarily accepting of the assessment and grading methods contained therein (Richards, 2014). In fact, Richards notes that, “strong teacher support for grading within CBT [competency-based training] even with the use of a criterion reference model cannot be assumed” (p. 190).

The trend, then, is that the available literature regarding competency-based education is often tied to specific vocational fields, with little attention paid to general education students and faculty. The limited literature available to explore CBE from a faculty perspective makes it difficult to ascertain contemporary perceptions, which suggests that development and implementation of competency-based education programs at both community colleges and four-year institutions is lacking a crucial component that, if present, may result in lasting organizational change and acceptance.

## **Statement of Problem**

Though administrators are sometimes open to the concepts associated with CBE, not much is known about faculty (particularly those in General Education and liberal arts areas) viewpoints toward CBE. In fact, much of the scholarship available regarding CBE is rooted squarely in the area of medicine and skills-related fields; a review of the available literature indicates that the majority of the discussion is focused on how CBE impacts students pursuing careers in pharmaceuticals, emergency medicine, and comparable areas (Bandiera & Lendrum, 2011; Kelley & Demb, 2006; Parikh, 2008). An in-depth understanding of the benefits associated with CBE will help underscore its potential for generating student success in ways that traditional approaches to education may not be capable of. To integrate an approach such as CBE, it is critical to have faculty involved in the formation and execution. However, if the viewpoints of faculty toward CBE are unknown, it is not possible to create the best strategic approach to creation and implementation. It would be very difficult to address faculty resistance as an obstacle that should be measured and addressed in order to help encourage ease of transition for colleges pursuing a CBE model; however, gaining information in regards to these concerns is important for increasing retention and completion. If not implemented effectively, many students will not receive credit where credit is due. This will be a cost not only to students in the time it takes them to complete their degree, it will be real financial cost to the student, state, and local counties.

Having an accurate sense of instructor perceptions of competency-based education is critical: If we do not understand how faculty and administrators view CBE, how can colleges determine appropriate outcomes for integration and change? Given that CBE is often

synonymous with the notion of “disruptive innovation” and significant course redesigns are necessary in order to effectively implement a CBE approach (Johnstone & Soares, 2014), it is important that institutions fully understand the underlying concerns and hesitations that may be harbored by faculty (conversely, engaging with instructors regarding CBE will help make them more aware of the challenges associated with its development). The views of administrators involved in CBE development are important, too, and will also be included in this study.

The successful implementation of a competency-based education program will directly impact student learning and academic progress (Johnstone & Soares, 2014). One of the key tenets of CBE is that it is often designed with learning outcomes specific to a certain sector of business and industry (and, in some instances, a specific job) so that students enrolled in the program experience a smooth transition into the workforce for which they have prepared (Clerkin & Simon, 2014). Completion, equity—the need to provide an opportunity for those who may have relevant experience as a result of their employment history but are lacking a degree—and labor market outcomes are all important factors. As noted by Rieckmann (2012) in his discussion of the relevance of identifying key competencies, the interplay between ecosystems, societies, and economies is growing quickly, and the complexity of that interplay is increasing at a near exponential rate. Thus, being cognizant of these challenges and consciously designing programs that are able to identify competencies related to these concepts is crucial.

If we do not implement CBE successfully, what will be the impact in terms of student success, which includes learning (CBE could potentially have better learning outcomes that



transfer to the workplace), completion, equity (some groups would be excluded from jobs; though they have the skills needed, they lack the formal degree (i.e., the military)), and labor market outcomes?

There is also the potential for impacting students by having them pay for what they already know while not receiving credit where it is due. There is not only a monetary cost, but also a “time” cost. Therefore, pursuing methods to better understand faculty and administrator attitudes toward CBE will help potentially avoid issues that could greatly decrease student success and completion.

### **Purpose Statement**

The purpose of the study is to understand the viewpoints of faculty and administrators serving in a curriculum development and/or teaching capacity in the NC-CBE Project. The NC-CBE Project—a partnership between Central Piedmont Community College, Wake Technical Community College, Forsyth Technical Community College, and Stanly Community College—will serve as the sample population by which to determine faculty and administrator perceptions in preparation for a CBE pilot in specific IT programs of study and the associated general education courses. The study will examine the participating institutions collectively.

### **Theoretical Framework**

The Technology Acceptance Model (TAM) emerges as an important consideration for the implementation of competency-based education, mainly because colleges will have to develop a consensus regarding how best to encapsulate (typically in an online format) the course content reflective of mastery at both the vocational and general education levels. The

online component can also impact assessment, social learning, and a variety of other factors (NC-CBE Project, 2015). The TAM operates on one primary notion: namely, that a faculty member's willingness and behavioral intentions toward various technological applications and Actual Use (AU) of that technology are influenced by Perceived Usefulness (PU)—how helpful someone believes the technology will be in completing a specific task—and Perceived Ease of Use (PEoU) (Money et al., 2015, p. 4).

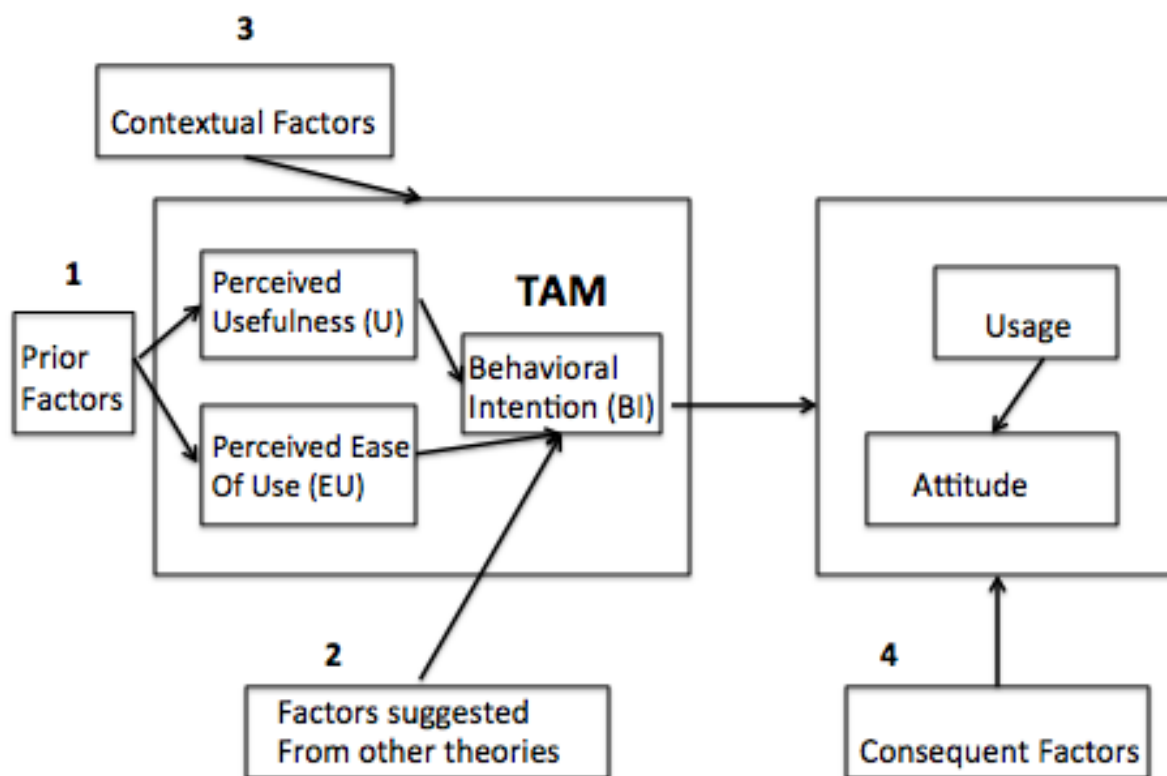


Figure 1: The Technology Acceptance Model and Four Categories of Modification

Adapted from "A Meta-Analysis of the Technology Acceptance Model," by W.R. King and J. He, 2006, *Information & Management*, 43(6), 741. Copyright 2006 by Information Management.

Developed by Fred Davis in 1986, “The TAM was derived from the psychology-based theory of reasonable action (TRA) and theory of planned behavior (TPB)” (Marangunić & Granić, 2015, p. 81). These theories identified assumptions about the attitudes of individuals as a key component that would influence how they respond to technology; Marangunić and Granić also note that these theories were amended with the addition of “perceived behavioral control” to help account for those who felt they had little (or varying degrees) of control over their behavior and/or attitudes.

Additionally, King and He (2006) elaborate on what they label the four categories of modification that pertain to the model. King and He note that in recent years the number of publications pertaining to the use of TAM have increased dramatically, which has unveiled insights as to the outside forces that explain a user’s interaction with technology in a more in-depth manner than the original TAM indicated. Specifically, four items—as indicated in Figure 1—have an impact on technology adoption per King and He: “The inclusion of external factors (prior factors) such as situational involvement, prior usage or experience, and personal computer self-efficacy”; “the incorporation of factors suggested by other theories that are intended to increase TAMs predictive power; these include subjective norm, expectation, task-technology fit, risk, and trust”; “the inclusion of contextual factors such as gender, culture, and technology characteristics that may have moderator effects”; “the inclusion of consequence measures such as attitude, perceptual usage, and actual usage” (p. 741). These considerations all tie into the subjective assessment approach that will be employed in this study (Q methodology), thus allowing for an important layer of CBE implementation—the technological aspect—to be explored in depth.

Given the heavy reliance on technology that characterizes most CBE programs and the blended learning modality of the NC-CBE Project, it is important to note the role of digital learning. As explained by Trujillo Maza et al. (2016), the use of this blended approach creates opportunities “to transform pedagogical approaches, thus allowing students to create knowledge in collaboration with others” (p. 2).

Understanding the basic tenets of the TAM will be important for any institution seeking to adopt a CBE approach for programs or courses. Again, because competency-based structures often rely heavily on technology to help with assessment and can sometimes factor into the unbundling of the faculty role (for example, some institutions may choose to have content “coaches” that serve a different function than that of a traditional instructor, which may also include those who focus primarily on assessment tools, etc.), vendors who represent a growing number of LMS applications and other digital tools will approach colleges with their products. Familiarity with the TAM and being able to readily apply it to any given faculty member or administrator can help colleges make the most beneficial decision when it comes to the adoption of new learning technologies.

Organizational change is also a key aspect regarding the successful integration of competency-based education at colleges and universities who have typically maintained a traditional structure. The Kotter Change Model stands out as being particularly helpful when institutions work toward organizational change; it helps provide a roadmap for creating and maintaining both participant (faculty and administrator) engagement and continuous organizational improvement (Calegari et al., 2015). An overview of the Kotter Model can be found in Figure 2:

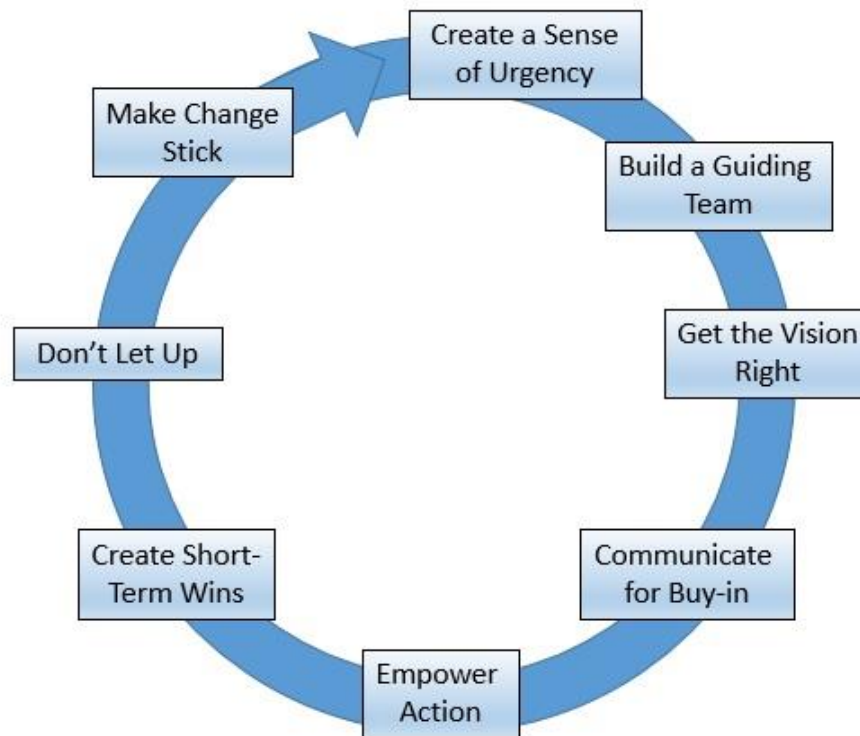


Figure 2: The Kotter Change Model

Adapted from “A Roadmap for Using Kotter’s Organizational Change Model to Build Faculty Engagement in Accreditation,” by M.F. Calegari et al., 2015, *Academy of Educational Leadership Journal*, 19(3), 34. Copyright 2015 by Academy of Educational Leadership.

First published in 1995, the model was primarily based on Kotter’s personal business and research experience (Appelbaum et al., 2012). In fact, Appelbaum and his colleagues are somewhat critical of the model given what is perceived as a lack of credible external research that might otherwise support its major tenets. However, a comparison of Kotter’s approach with similar organizational change models developed by Kanter et al. and Luecke reveals striking similarities and suggests that Kotter’s design is very much in step with other

researchers who have researched effective change methods—it is noted, too, that the emergent change approach (to which Kotter subscribes) is suitable to dynamic and unpredictable environments, a characteristic of many (if not most) organizations (By, 2005). Pollack and Pollack (2015) note that “The efficacy of Kotter’s process has been broadly supported in the literature” (p. 55).

The eight steps included in the Kotter Model—and the level of specificity associated with each (Calegari et al., 2015)—makes it an especially appealing implementation model for institutions to lean on as they attempt to pursue the development of competency-based programs and courses. The eight steps are formally noted as including: “Establishing a sense of urgency”; “Creating a guiding coalition”; “Develop a vision and strategy”; “Communicating the change vision”; “Empowering broad-based change”; “Generating short-term wins”; “Consolidating gains and producing more change”; “Anchoring new approaches in the culture” (Pollack & Pollack, 2015, p. 53)—the consideration of all eight components of the model is necessary for lasting change to occur. Appelbaum et al. (2012) note Kotter’s recommendation that successful change efforts are achieved in part by ensuring that the need for change is understood; if this understanding does not occur, the change agents will not have enough “power and credibility to initiate the required change program” (Kotter, 1997 as cited in Appelbaum et al., 2012, p. 766).

Though Kotter’s model does generate some tension among change scholars, it is recognized as a comprehensive and efficient way to effectively implement change, and is thus applicable for institutions seeking to develop competency-based programs.

The dual nature of the theoretical framework will help provide a more holistic, all-encompassing overview of barriers and catalysts associated with faculty and administrator attitudes toward competency-based education.

### **Conceptual Framework**

Since this study utilizes Q methodology in order to determine the various groups that emerge as a result of a Q sort, the conceptual framework employed has resulted in multiple (Ramlo, 2015) grouping categories that reflect the consensus of instructors and administrators who have been involved in curriculum development in the NC-CBE Project. The general approach when employing Q methodology can be visualized in this manner:

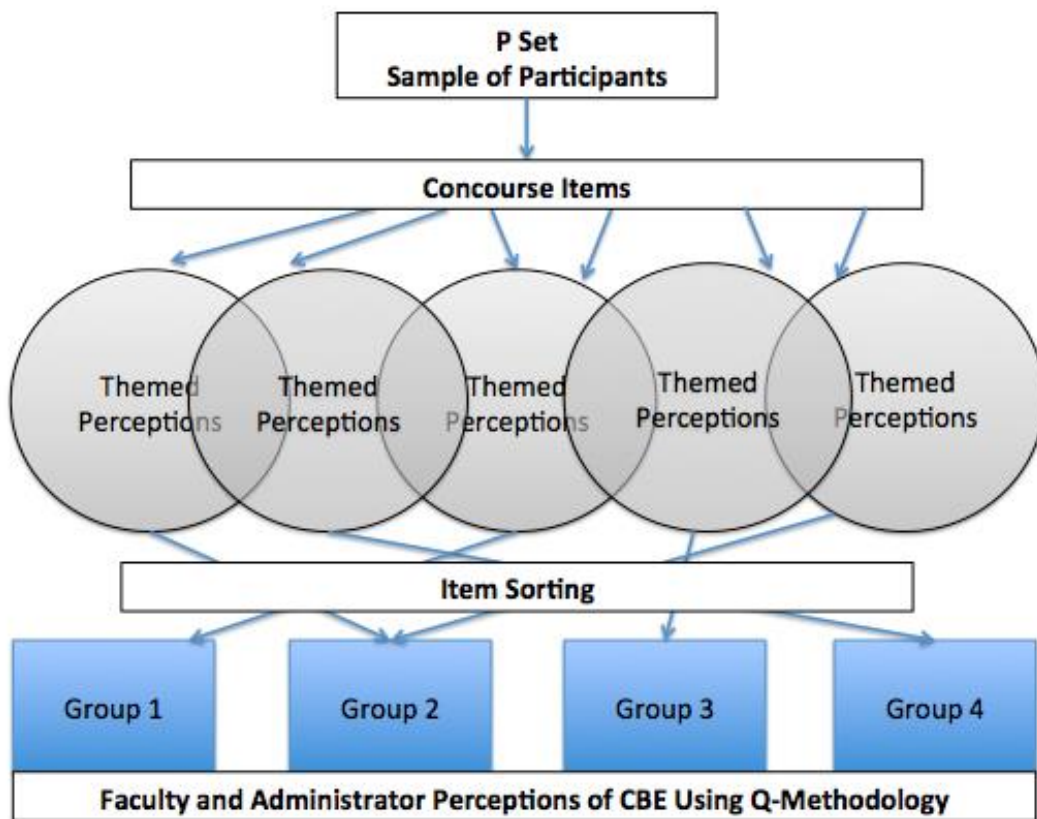


Figure 3: Conceptual Framework

This framework was used to determine the various categories represented in the literature that was examined, and an appropriate list of statements was developed which participants sorted in relation to their level of agreement with the statement as it pertained to an overall condition of instruction (these statements, or concourse items, serve as the “backbone” for the study). The overall structure of the conceptual framework, then, is designed around the goal of collecting existing beliefs and perceptions surrounding CBE so they can be grouped into appropriate categories.



### **Research Question**

The following research question was used to develop the study:

1. What are the viewpoints of community college faculty and administrators toward competency-based education and why?

### **Significance of Study**

Competency-based education has seen some growth at the community college level. Still, it has not been fully implemented in most U.S. states, and is in the process of being developed for several community colleges in North Carolina. As institutions prepare for a Spring 2018 CBE pilot, understanding faculty and administrator perceptions (and how the CBE model impacts existing cultures) is vital for fostering buy-in and understanding of its many merits. The findings of this study could impact the implementation not only at CPEC and in the State of North Carolina, but also at institutions nationwide (and, potentially, abroad).

CBE is significant because it can serve as a means to help alleviate barriers to student success, whether these are monetary or based on a lack of formal credentials for prior learning experiences. Research conducted by Milligan and Morris (2012) indicates that a large percentage of English faculty reported distressed or negative emotions as they approached the end of a semester; conversely, Behavioral and Social Sciences faculty did not report the same level of emotional distress. This example illustrates the need to be aware of faculty attitudes, as it could be prudent to dedicate additional resources to work with faculty who may have negative perceptions of CBE.

Research conducted by the Aspen Institute also provides a great deal of insight regarding learning, completion and transfer, equity, and labor market outcomes (*Crisis and Opportunity*, 2013). Fostering partnerships with employers is a key aspect of CBE design—this market input helps institutions design competencies that clearly address employer concerns, which, in turn, helps shape learning (and assessment) for students who are very much in need of authentic preparation ahead of joining the workforce (*Crisis and Opportunity*, 2013). Completion and transfer rates “are commonly below 50 percent” (*Crisis and Opportunity*, 2013, p. 6); CBE, then, offers an alternative to traditional education means that, given its flexible structure, could help drastically improve these numbers at the community college level. Again, labor market outcomes are a primary consideration as well—the research conducted by Aspen suggests that institutions should proactively design objectives so that students are primed for success in their career (*Crisis and Opportunity*, 2013, p. 21).

It is evident that continuous improvement and overall community college excellence—as detailed in reports such as that produced by Aspen—are directly related to CBE and its successful implementation.

### **Overview of Research Method**

Q methodology emerged as an especially appropriate research method for this study. Developed by psychologist William Stephenson in 1935, it affords researchers the ability to conduct a systematic examination that sheds light on participants’ subjectivity (Bartlett & DeWeese, 2015; Simons, 2013; Stephenson, 1980). Petit Dit Dariel et al. also note that Q is most frequently employed when researchers are interested in attitudes (as cited in Simons,

2013); given the goal of assessing faculty perceptions, Q stood out here as being tailor-made for the research question that was developed. Attitudes can be difficult to define, as there are varying understandings of what is meant by the term (Cross, 2005), so one of the primary challenges lies in developing items to be sorted.

In general, a Q study involves five main phases: development of concourse items; identification of the Q sort; undertaking of the Q sort; factor analysis; interpretation of factors (Simons, 2013). Simons explains, too, that Q methodology straddles the line between a qualitative and quantitative approach, as it does employ factor analysis so as to “group” similar responses as a result of the sorting process that participants undergo.

The process of developing concourse items—the “perceptions” that will be collected through the literature review process—gives the researcher the ability to explore what is present not only in scholarly publications, but also in social media applications and other resources. Relying on this holistic and broad approach to gauging popular perceptions toward CBE will result in a comprehensive set of concourse items.

### **Limitations**

The use of Q methodology provides certain limitations; in general, the use of Q sorts is dependent on subjectivity, which often proves difficult to measure and quantify as opposed to more traditional quantitative techniques (Militello & Benham, 2010). The fact that a pre-defined concourse set—which characterizes a Q study—will be used also imposes its own limitation; the finite options force participants into a decision that may or may not characterize their perceptions of a subject (Watts & Stenner, 2005).

The sample used in the study will be drawn from faculty—both program-specific and those who teach general education courses, as well as those who are involved in curriculum development—and administrators, and is linked to the NC-CBE Project. All curriculum development team members in the NC-CBE Project have been given the opportunity to participate in the study. Given that the NC-CBE Project pilot will begin very soon, the time constraints associated with data collection prior to the rollout of CBE-centered courses was a concern and may have impacted participation; timely development of concourse items and distribution of the finalized Q sort was crucial to collecting responses that are valid and applicable to successful completion of the study.

### **Delimitations**

In order to address the challenges associated with the NC-CBE Project, the associated colleges, and the programs relevant to the implementation of a competency-based design, this study does not draw data from faculty or administrators outside of Central Piedmont Community College, Wake Technical Community College, Forsyth Technical Community College, and Stanly Community College. The narrow population that the study has concentrated on allows it to accurately measure responses that pertain to the NC-CBE Project.

Because a relatively small amount of publications are available about the implementation of CBE in community college classrooms, a large amount of literature regarding the challenges of developing such programs in the two-year setting has been consulted. Much of the existing literature stems from the use of CBE in various medical fields, and this will be helpful in better understanding the various challenges associated with

CBE structures; however, due to its carefully focused lens on the aforementioned field, medical CBE literature will be consulted somewhat sparingly (and only when appropriate in helping provide a more in-depth sense of CBE structures, concepts, and perceptions).

### **Definition of Terms**

*Behavioral Intentions.* “The probability that I will use this facility’s services again”; “The likelihood that I would recommend this facility’s services to a friend”; “If I had to do it over again, I would make the same choice” (Cronin et al., 2000, p. 213).

*Competency.* A specific knowledge, skill, ability, and/or attitude that is both observable and measurable (NC-CBE Project, 2015).

*Competency-based education.* A method of instruction and learning that transitions students “away from seat time, in favor of a structure that creates flexibility, allows students to progress as they demonstrate mastery of academic content, regardless of time, place, or pace of learning” (Department of Education, 2016).

*Concourse.* Refers to items or statements representative of the topic about which a researcher has focused his or her study (Kampen & Tamás, 2014).

*E-learning.* “An approach to teaching and learning, representing all or part of the educational model applied, that is based on the use of electronic media and devices as tools for improving access to training, communication and interaction and that facilitates the adoption of new ways of understanding and developing learning” (Sangra, 2012, as cited in Colbran & Gilding, 2013, p. 202).

*Kotter’s Change Model.* A model for explaining how to navigate and maintain organizational change based on eight primary steps, each of which summarizes key points at

which actors within the organization will respond to the change (Appelbaum et al., 2012; Calegari et al. 2015; Pollack & Pollack, 2015).

*Q set (Q sample)*. The Q-sample is drawn from the developed discourse, and an appropriately large number of items must be included (Brouwer, 1999). The overall goal of the Q-sample is to provide a concentrated, laser-focused version of the larger Q methodology process in the form of the selected discourse statements (Valenta & Wigger, 1997).

*P set (P sample)*. Refers to respondents in a Q study, and is typically much smaller than the Q sample of discourse items (Brouwer, 1999; Van Exel & De Graff, 2005).

*Q methodology*. is “the gathering of data in the form of Q sorts and their subsequent intercorrelation and factor analysis” (Watts & Stenner, 2012, p. 4).

*Q sort*. is a process by which participants typically express their views by sorting discourse statements using a scale of “most agree” to “most disagree” (Brown, 1993; Zabala & Pascual, 2016).

*Social Learning*. is characterized by communication and collaboration (Yang et al., 2010), "social learning as a process of social change in which people learn from each other in ways that can benefit wider social-ecological systems" (Reed et al., 2010, p. 2). In the context of CBE, this is often characterized by the use of digital networks/LMS tools to foster the aforementioned communication and collaboration.

*Technology Acceptance Model*. A faculty member’s willingness and behavioral intentions toward various technological applications and Actual Use (AU) of that technology are guided by perceptions of Perceived Usefulness (PU)—how helpful someone believes the

technology will be in completing a specific task—and Perceived Ease of Use (PEoU)

(Money et al., 2015, p. 4).

### **Summary**

Even though a number of colleges and universities have implemented competency-based courses into their curriculum, it is still a relatively small number when compared to the more traditional organizational standards that continue to drive higher education. By more carefully examining the challenges associated with CBE and the faculty expected to help develop the competencies and outcomes students must demonstrate proficiency in, any challenges or barriers—both expected and unexpected—can be identified and discussed so as to suggest methods for removing obstacles and more smoothly implementing a CBE program.

## CHAPTER 2: LITERATURE REVIEW

This section will provide an overview of competency-based education by exploring its history, implementation in various programs across a variety of colleges, and place within the larger context of educational movements. More specifically, context will be provided regarding the NC-CBE Project and the competency-based approach being implemented by four North Carolina community colleges. Research regarding faculty and administrator attitudes toward change initiatives will be discussed, too, in order to provide insight as to how instructors developing and implementing CBE programs may respond to the markedly unique structure of a competency-based format.

### **History of CBE**

The concept of competency-based education is not new, though it has enjoyed resurgence in a post-recession era in which government agencies and other funding sources expect colleges to make extended efforts to be self-sufficient from a monetary perspective. As noted by Gallagher (2014), CBE—though a recently popular trend in several higher education settings—dates as far back as the “acceleration movement” of the late nineteenth century (p. 18). This period saw the rise of “utility-minded administrators” who, according to Collins and Rudolph, “attacked the 4-year curriculum as a useless tradition inherited from the medieval universities, and they introduced reforms to allow students to move through college at their own pace, acquiring training on an individual basis” (as cited in Gallagher, 2014, p. 18). The 1920s saw “educational reform linked to industrial/business models centred on specification of outcomes in behavioural objectives form” (Burke, 1989, p. 11). These could now be recognized as the seeds of modern competency-based educational design. In



referencing the “Standards for Teacher-Education Programs in Modern Foreign Languages,” Andersson (1974) highlights the presence of CBE in the 1950s and 1960s as a method for certifying foreign language teachers who were able to demonstrate the requisite personal qualities, knowledge, and skills, regardless of how they were acquired; shades of prior learning assessment, a concept deeply entrenched in modern CBE design, can be seen here. During this period, Bloom’s taxonomies for cognitive domains were developed, which have arisen as key components to mastery-based learning approaches (Nodine, 2016).

Regarding the work of Bloom, Guskey (2007) notes the researcher’s pioneering efforts, including a focus on “mastery” learning—which was suggested by Bloom in 1968—in which teachers generate formative assessments that can be used to guide students down a corrected path of learning that evolves based on their responses. This variation in instruction afforded more students the opportunity to “learn well, master the important learning goals in each unit, and gain the necessary prerequisites for success in subsequent units” (Guskey, 2007, p. 13). Interestingly, the formal creation and initiation of CBE in U.S. higher education is often recognized as having occurred that same year—1968—when 10 colleges and universities received funding by the U.S. Office of Education to develop training programs for elementary school teachers (Nodine, 2016).

It should be noted, too, that the growth and evolution of CBE educational design in the 1950s, 60s, and 70s has been perceived as tied to political catalysts within the United States; more specifically, “the American reaction to perceptions about Soviet Union technological progress that came to a head in the launch of Sputnik” (Hodge, 2007, p. 182). Hodge goes on to explain that though it is feasible that an unexpected technological

advancement impacted the American psyche and provided additional motivation for a re-evaluation of the U.S. education system, there were a number of more tangible factors that can be identified as having also contributed to the boom in CBE at the end of the 1960s.

Growing concern that students did not possess necessary life skills led to an upswing of support for CBE; one of the key features of the discussion centered on a flexible timeframe for students to demonstrate mastery of these skills (Robbins, 2014). In the 1970s, CBE gained huge momentum, mostly thanks to the allocation of federal funds (Gallagher, 2014, p. 18) and as recognition as models that helped serve the growing number of adults returning to college (Klein-Collins, 2012). Even with its growing prominence, though, there was great difficulty associated with pinning a definition to CBE; Spady (1977) notes that both descriptive and in-practice definitions for competency-based education existed, and there was division about which was more accurate.

A number of institutions in the 70s—including Empire State College, Regents College (Excelsior College), Thomas Edison State College, Alverno College, and DePaul University’s School for New Learning (Klein-Collins, 2012)—stood out as CBE leaders and helped pave the way for other institutions who were interested in exploring CBE.

Understanding the relatively recent historical reappearance of competency-based education is crucial to understanding its application today and for the future:

The CBE movement of the 1970s, heavily supported by the US Department of Education (FIPSE), was an attempt to make higher education more efficient, economical, and relevant to students’ lives, particularly their work lives. The idea was to identify the competencies required for certain professions and develop education

programs that required students to demonstrate their ability to meet minimal criteria for each competency. (Gallagher, 2014, p. 19)

With this in mind, the similarities regarding the recent relevance and re-emergence of CBE can be more easily understood.

In the modern higher education setting, CBE design has been mainly attributed to profit-based institutions such as Capella University, though non-profit colleges such as Western Governors University, Southern New Hampshire University, Northern Arizona University, and the University of Wisconsin have adopted the CBE mantle and have managed to roll this out to an increasingly larger population of students (Ordonez, 2014). The popularity of this approach and its myriad benefits has allowed CBE to gain a foothold at an increasing number of traditional universities and community colleges.

For example, Nodine and Johnstone (2015) cite an ever-growing group of two-year institutions that have decided to advance competency-based education initiatives: in Indiana, the Ivy Tech and Fort Wayne/Lafayette Districts are actively developing CBE programs, as are Broward College and Valencia College in Florida; Austin Community College and Lone Star College in Texas are exploring competency-based education opportunities, too (p. 62). These examples illustrate the ballooning popularity of CBE in areas of the country where the continued decline of education funding has spurred administrators and faculty to look more carefully at CBE frameworks.

### **CBE in Community Colleges and Other National Efforts**

A number of community colleges have recently embraced competency-based education as a means for increasing retention and success. For example, Lord Fairfax

Community College (LFCC) was able to launch a CBE program with grant funding in the fall of 2015 (Heggoy, 2015). LFCC's efforts are especially noteworthy, as they were—as of 2015—the only institution accredited by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) to receive approval for the program (Heggoy, 2015). At the time of implementation, Heggoy notes that LFCC offered seven CBE programs, including AAS degrees in Health Information Management and Information Systems Technology.

Similarly, Salt Lake Community College (SLCC) utilized a \$2.5 million Department of Labor grant—in conjunction with existing college resources—to develop and begin a CBE model at its School of Applied Technology (SAT) (“SLCC Pilots Competency-Based Education,” 2015). The justification for a shift from a traditional approach to a CBE model comes down to the perception that it was simply “the best move for our students” (Heiser, 2015). Heiser explains that the need to assign prior-learning credit for students who had been involved in the workforce (which constitutes a large portion of SLCC SAT students, whose average age is +/- 35) was identified as key to helping increase completion rates and overall success. Given the demographics of the learners enrolled in the program where CBE took hold at SLCC, the shift toward a competency-based approach can be understood.

The Kentucky Community and Technical College System implemented a CBE approach called “Learn on Demand” in 1999 when the Kentucky Virtual University (KYVU) was generated (McCall, 2013). From the outset, McCall explains, Kentucky's Learn on Demand model was a statewide initiative that pursued the goal of offering entire program tracks—such as business administration and nursing—in an online format. Central to

Kentucky's approach are characteristics that are shared by the NC-CBE Project: self-pacing (for students), competency-based assessment, and quality assurance measures (McCall, 2013; NC-CBE Project, 2015). In many ways, the KCTCS model has served as a guide for North Carolina's journey into the waters of CBE.

Other two-year institutions that have embraced the CBE mantra include Delaware County Community College and Rio Salado College, which promote a very clear learning outcomes checklist format for students to follow in their progression toward degree and transfer opportunities (Klein-Collins, 2012).

Southern New Hampshire University's College for America is another noteworthy example of CBE at the postsecondary level. In 2011, Paul LeBlanc, President of SNHU, sought to establish an educational model designed to shirk traditional measures such as credit hours in favor of competencies while also increasing affordability for learners (Clerkin & Simon, 2014). Among other things, Clerkin and Simon explain that LeBlanc allowed four SNHU online learning experts to envision radical changes to how courses were delivered, the structure of curriculum, the role of faculty, student recruitment, and student support (key features for institutions seeking to successfully develop competency-based education). The umbrella under which the CBE model was developed at SNHU was called The Innovation Lab, which ultimately gave birth to College for America (CfA) in 2012; its primary focus was on "working adults who may not be comfortable in a classroom, can't afford the tuition for traditional college programs, and can't travel to campuses because of work and family" (Clerkin & Simon, 2014, p. 7). In redesigning its business administration bachelor's degree around competencies and focusing on demonstrated mastery, the college was able to reduce

redundancies in course content and provide educational streamlining in such a way that all bachelor's level competencies could be mastered in three years instead of four (Klein-Collins, 2012).

### **The NC-CBE Project and NC Community Colleges**

The NC-CBE Project has a similar focus and target population to that found at SNHU for its pilot tracks within the Information Technology program at CPCC. In an effort to respond to the aforementioned challenges associated with reducing costs, increasing completion rates, maintaining access, and ensuring that all students have the skills required in the modern work place, the State of North Carolina has actively pursued research centered on the design of a CBE framework, technology, and implementation plan that will help address each of these concerns at the community college level (NC-CBE Project, 2015). More specifically, the North Carolina Competency-Based Education Project was initiated as “a design experiment within the existing [NCCCS] system, giving participating colleges (NC-CBE Colleges) the freedom to co-invent solutions and define a new learning and business model that is sustainable and scalable to all community colleges” (p. 4).

A study recently published sought to provide insight regarding college and university commitment to competency-based education (Fusch, 2016). The study cited by Fusch contains a survey that was distributed by Eduventures/Ellucian to a large number of institutions—261 of which have responded, 51% being public, 42% private, and 7% for-profit—and found that 90% of institutions were interested in some aspect of CBE. Further elaboration on the results indicates that 71% of colleges said they hoped it would expand opportunities for non-traditional students; 55% hoped it would improve learning outcomes

and completion rates; 54% indicated they want to better address workforce needs; 41% are seeking to enhance student employability; 38% have a desire to decrease tuition rates for non-traditional students; and 21% are hoping to decrease tuition for all students (Fusch, 2016). Another interesting finding noted by Fusch is that even though there is general interest in CBE, most institutions do not have a desire to scale it across the entirety of the college; this approach is representative of the design currently driving the NC-CBE Project, as the upcoming Pilot—and future phases—are only intended to target specific programs as opposed to all sections of a particular course (this is especially true of the general education classes required of the selected programs) (NC-CBE Project, 2015). With that in mind, there are striking similarities between the goals of the NC-CBE Project and what has occurred in Kentucky, as the partner colleges in North Carolina are coordinating efforts across institutions and within the NCCCS structure.

Understanding the purpose and direction of other institutions that have successfully implemented CBE is important for the NC-CBE Project. One thing that tends to be lacking in the literature surrounding the development of such programs, though, has to do with faculty perceptions of competency-based education; therefore, this study will focus a good deal of its attention on instructors participating in the Pilot phase of the NC-CBE Project in an effort to shed light on resistance or acceptance of CBE curricular redesign. All instructors working toward curriculum development for the project or teaching general education and major-specific classes in the CBE Format during the Fall 2017 semester at each of the four community colleges involved will be given the opportunity to participate in the survey.

## **CBE Standards**

A number of documents are characteristic of contemporary best practices and approaches when it comes to the implementation of CBE and the measurement of competencies in both community colleges and universities.

The *Degree Qualifications Profile* (DQP), a 2014 framework document published by the Lumina Foundation, stands out as a central reference point and a national “best practices” reference guide that many colleges pursuing CBE reforms have come to derive philosophies and frameworks from (Adelman et al., 2014). A more specific definition provided by the Lumina Foundation indicates that the DQP is “a learning-centered framework for what college graduates should know and be able to do upon completion of an associate’s, bachelor’s, or master’s degree” (as cited in Jankowski & Marshall, 2015, p. 3). The DQP is especially important in relation to competency-based education because it is tailored to address employer concerns about graduates’ skills. For example, questions centered on what a college degree actually represents, how student learning is validated en-route to a college degree, and whether or not a degree is merely a certificate awarded after an arbitrary number of credit hours are obtained (Jankowski & Marshall, 2015).

The worth of the DQP is often specified in part through its utilization by higher education institutions; as of 2013, the National Institute for Learning Outcomes Assessment (NILOA) has identified more than 300 institutions and organizations in 44 states and Puerto Rico working with the DQP in some capacity (the majority of these have embraced the DQP via Lumina Foundation funding, though some of have decided to experiment in independent ways) (Jankowski et al., 2013, p. 9).



Another important reference in the CBE literature comes in the form of the work produced by the Association of American Colleges and Universities (AAC&U)—more specifically, the guidelines known as Liberal Education and America’s Promise (LEAP). These guidelines are similar to the DQP in that it provides colleges with a roundabout method for highlighting core competencies that employers expect of graduates; Campbell (2010) emphasizes the strong data points within LEAP that “decry a startling lack of the new basic skills necessary for today’s workforce” (p. 24). It is easy to see, then, why LEAP has become such a common resource for community colleges to use in development of competencies, as it is backed by tangible evidence that directly connects to labor market outcomes.

The Department of Labor (DOL) building blocks model is another prominent reference point for colleges seeking to enter the world of CBE. In fact, the DOL model was selected by the NC-CBE Project as the primary framework within which to develop competencies; the “tiered” nature of the framework and breadth of competencies contained therein—including industry-specific and management competencies (Building Blocks, 2016)—caused it to stand out as an especially robust starting point.

### **Non-traditional Education Movements and other Considerations**

This section provides an overview of several movements that have emerged in higher education. These movements are noteworthy because of their non-traditional nature, each being characterized by components that shirk norms and work toward the concept of disruptive innovation.

**Economic realities.** Perhaps not surprisingly, educational reform and institutional change is often spurred on by developments in the external market in order to foster improved entrepreneurial behavior (Sporn, 1999)—this is the case both abroad and within the U.S. The economics of any given area have a direct impact on institutional change, a reality that is felt around the world, including in countries such as Montenegro, Egypt, Italy, Mongolia, and, of course, the United States (Holmes, 2008; Jacimovic & Karadzic, 2014; Lemke & Shughart, 2016; Tavoletti, 2010; Walters et al., 1999). For example, Sum and Jessop (2013) note the influence of the recession on educational reform in terms of an increased need for “design-intensive or otherwise creative industries and services” as a method for economic development (p. 30). Whissemore (2013) underscores the dramatic reduction in funding that colleges had to contend with in the throes of the Great Recession: “From 2009 to 2010, spending at U.S. colleges declined by 8 percent” (p. 10). Whissemore goes on to explain that, in 2011, the then record-high enrollment numbers that community colleges enjoyed began to decline; the cost of college increased even though public support for higher education was reduced. The implication, then, is that a shift toward practical and contextualized education for the sake of economic benefit achieved greater importance, and that expectation—even in what many deem a post-recession society—has not wavered.

Conversely, CBE helps fill in job gaps as economies improve and workers are needed (Nodine & Johnstone, 2015). In fact, the Barack Obama White House called for a more affordable, high quality educational experience that would result in increased completion and job placement rates upon graduation (as cited in Ordonez, 2014). Yasinski (2014) provides an example of the job-preparedness opportunities afforded via CBE by highlighting the

work-site experience and technical training associated with the Apprenticeship in Alberta program, which prepares students for immediate entry into trade-specific jobs (students are, in fact, compensated as they progress through coursework due to journeyman positions and roles they occupy, emerging with credentials that allow them to transition quickly into the workforce).

Carefully considering the economic climate that impacts the prevalence of competency-based efforts is important, as programs with a CBE design are impacted accordingly.

**Considerations and commonalities with CBE.** Though a wide variety of educational movements have occurred over the course of the past century, the goal here is to touch on a handful of such events in the hopes of highlighting trends that will help with considering how to approach competency-based education. A careful review of the literature resulted in a narrowed focus on three such movements that are appropriate for discussion.

Malcolm Knowles coined the term “andragogy” (referring to instruction tailored to meet the needs of an adult learner) as the field of adult education sought to define itself in the 1960s (Chesbro & Davis, 2002). In that regard, the concept of andragogy signaled a shift within the discipline that saw a transition from notions of pedagogy (which were often viewed as geared toward the instruction of children) to the idea of a “self-directed” learner (something adults were more potentially more capable of) (Chesbro & Davis, 2002).

Knowles (1979) himself clarifies that viewing pedagogy and andragogy on a continuum is a more appropriate method for engaging with these concepts, though exploration of the impact of the andragogy concept on adult education is undeniable. In this instance, Knowles

illustrates that the need for reimagining the assumptions about learners was necessary, which resulted in a sea-change perception of how to approach adult education. Similarly, the rise of CBE has occurred due to similar circumstances; in order to foster greater success—in the form of engaging learners and producing authentic, competent graduates—the goals are strikingly similar.

The quality movement in higher education had as its focus the idea of quality improvement (as the name implies) regarding changing student demographics, a plan for tuition increases that rose more quickly than the national inflation rate, and a decline in student performance, among others (Buchanan, 1995). Adopted from quality improvement processes that had been identified in business and industry, colleges in the 1990s sought to address the above-referenced issues by leaning on accrediting agencies as a method for increasing institutional effectiveness (Buchanan, 1995).

The progressive education movement came to prominence in the early twentieth century, partly due to the influence of Dewey and the notion that students should not only be taught about how democracy functions, but also how to protest accordingly (Conner & Bohan, 2014). This brief description helps clarify the relation of the progressive movement to what is seen today with competency-based structures; that is, the growth of CBE as a response to tightening economic conditions. Regarding progressive education, this was directly related to a retaliation against big business and corporations; Hawkes and Hawkes (2013) describe Dewey's influence and the presence of progressive education as emphasizing that the "individual has little or no meaning apart from the active process of working with others to advance the common good" (p. 24). It is noted, too, that another impetus for the

development of the progressive movement came from a desire to “provide greater opportunities for democratic living” (Generals, 2000, p. 389). Again, CBE efforts have gained a following due to their goal of reaching students with some work experience who are hoping to acquire a living wage within a reasonable time frame. The connections between this core component of CBE and the progressive movement are apparent.

These examples share the common thread of economic influencers impacting curriculum, instruction, and design. As previously mentioned, these factors have helped drive the rise to prominence that CBE has experienced over the past several decades.

### **Perceptions towards Educational Movements and CBE**

In general, the concept of change in educational organizations can be complex and multifaceted. As defined by Tuncay et al. (2016), change can be viewed as existing in the present condition and relying on a specific condition—it is also noted that change can be planned or unplanned, and that it transforms the existing state of the institution.

The term “innovation fatigue” (Gallagher, 2014, p. 17) is often characteristic of the perceptions of faculty who are confronted with the notion of redesigning courses and curriculum with a CBE approach in mind. Similarly, “innovation fugue,” as defined by Gallagher, suggests a “dissociative state in which sufferers forget their own histories”; it also “leaves us unable to distinguish what is new from what is not; everything seems new” (p. 18).

Hachtmann (2012), when referencing faculty perceptions in the midst of general education reform, notes that pronounced support from faculty and administrative leadership is vital. Specifically, this support is in reference to changes implemented by a large

Midwestern research university that sought to make its undergraduate course offerings for students who wished to transfer in from other institutions more appealing by adopting an outcomes-based approach; Hachtmann was interested in whether or not faculty at the institution were even aware of the change, and, for those who were, how they would respond to such a shift in thinking and curriculum design. The results of Hachtmann's qualitative study indicated five primary categories that are especially important in determining perceptions during educational reform: process, environment, influencers, feelings, and effects.

Each of the above-referenced variables stand out as points of consideration in the literature pertaining to faculty perceptions of educational movements. For example, the process of instituting change at a community college can be seen as a niche effort. As noted by McClenney (2013), "Typically, though, as in most educational settings, innovations are arrayed on the margins of institutions, led by heroic individuals or small, committed cadres of faculty and staff" (p. 27). The process, then, is frequently confined, and—perhaps unintentionally—veiled from the view of the greater faculty majority. Such change initiatives and the implicit nature of their development prohibit larger swathes of the instructional population at an institution to be fully informed about the goings on that, in time, could impact their instructional role; this, in turn, creates an environment (or culture) that could lead to an unintentional toxicity.

Valencia Community College (VCC) sought to change its prevailing culture in regards to developmental advising (Nelson, 1998). VCC was awarded a Title III grant to help students "become more self-directed in learning and in educational, career, and life planning"

(Nelson, 1998, p. 73). In describing the faculty advising culture at VCC, Nelson says, “As is typical of many community colleges, faculty members at Valencia did not advise students as a contractual duty. Rather, a limited number of educational advisers on all campuses furnished initial advising, and a very effective telephone registration system permitted students to register for subsequent semesters without seeing an adviser” (p. 75). Thus, the culture of VCC actually encouraged non-intrusive advising efforts, which was something that the college realized—through research published at the time regarding how best to guide their student population’s academic and career goals—needed to change.

As is evident in the review of change efforts at a variety of colleges, responses to educational movements are influenced greatly by those who provide funding for such change. Some names commonly associated with higher education reform include Bill Gates and William G. Bowen; the latter has a background as a successful college president (at Princeton University) and has served as president of the Andrew W. Mellon Foundation, one of the “largest and most influential grant-making organizations in the country,” while the former has shaped educational change from the perspective of technological innovation (“External Influencers,” 1998). This reliance on grant-funding and external contributions towards reform is reinforced by the realization that post-secondary education is no longer able to rely on the monetary backing from state legislatures to the same extent as was possible in decades prior (Kallison & Cohen, 2010).

What is required to implement and sustain a movement in higher education is often perceived as being difficult, requiring “strategic thinking, many champions pulling in the

same direction, and a comprehensive suite of tools, resources, and support, upon which its leaders can draw” (Elder, 2008, p. 319).

Abroad, Denmark stands out as an interesting example of how sweeping reform at the leadership level of colleges and universities has been responded to. In 2003, a law was instituted that mandated college leadership be appointed from outside the institution (previously, academic leaders were elected within colleges) (Carney, 2007). As explained by Carney, the goal in this instance was to streamline the university system in the face of economic pressures (again, a common catalyst for educational reform). What is referenced as an “opaque” leadership model is presumed to directly contradict the notion of a “heroic” leader within the organization, and Carney notes the stalemate that can occur within institutions as a result (p. 184).

Associated with the concept of feelings and their impact on sustained change movements is the research of Lewin and the notion of reducing barriers (Levasseur, 2001). As described by Levasseur, “The first step of Lewin’s model tells us how to minimize barriers to change and increase the odds of a successful change effort” (p. 73); more specifically, it is explained by Levasseur that “the first step in the process of changing behavior is to unfreeze the existing situation” (p. 71). This directly parallels Kotter’s Organizational Change model (Calegari et al., 2015), and further reinforces the notion that, in order for CBE efforts to be successful, an accurate perception of preexisting feelings and their subsequent effects must be present.

Considerations associated with the feelings of faculty and administrators toward higher education is important: clearly understanding how these groups feel about change



initiatives—such as CBE—and the method by which such changes are implemented will help foster the buy-in (especially at the faculty level) required for success.

### **Faculty Attitudes and Administrative Considerations**

Given the central role that the concept of “faculty attitude” will play in this study, it is important to have a sense of how community college instructors perceive their roles within the larger organization.

Kozeracki (2002) highlights the unique role of faculty in the community college setting: “the time and effort spent in the service of student learning are greater for community college faculty than for faculty at institutions with research requirements, which includes virtually all four-year colleges and universities” (p. 47). It is also explained by Kozeracki that community college faculty often feel that their students are unprepared for college-level coursework, a fact that is likely not surprising given the open-access nature of the two-year institution.

In a survey of 1,725 community college faculty at 92 institutions, it was explained by Brewer (as cited in Fleming, 2002) that, in general, faculty tend to operate as independent entities with only minimal intercommunication and that the pursuit of multiple institutional missions can result in a lack of clear purpose and, ultimately, stunted effectiveness on the part of the college as a whole. Add to this the research conducted by Kim et al. (2008), which indicates that community college faculty often feel that they play a virtually non-existent role in institutional decision making, and a snapshot emerges of faculty members who may perceive themselves as only having the role of teaching instructor (and that even within that capacity bureaucratic influences allow for minimal faculty autonomy).

Another important consideration pertaining to faculty attitudes ties back to the discussion of the TAM and effective online engagement. Because CBE design typically calls for a heavily utilized web component/LMS of some kind, understanding faculty attitudes toward technology and its implementation is key. From the point of view of faculty, perceptions of technology are often negative, with many instructors suggesting that technology is ultimately an intrusive and ineffective means of engaging students (Otter et al., 2013). This information helps highlight the chasm that frequently exists between student and faculty perceptions, and suggests that in many instances the very faculty who are facilitating online courses (or courses with a web component) are innately skeptical about the benefits of such a delivery method. Another important point in this discussion is one of access, a concern centered on determining whether or not students have sufficient access to the computer technology required to be successful in a course with a hefty online component (Haber & Mills, 2008), something typical of competency-based education offerings.

Research conducted by Tabata and Johnsrud (2008) further highlights barriers associated with technology adoption: “Faculty concern about the amount of time it takes to learn technology, the effect on their workload, and the lack of release time and instructional support for developing course materials” are noted as obstacles that are especially difficult to circumnavigate (p. 627). These obstacles mesh with the tenets of the Technology Acceptance Model (King & He, 2006). Again, having a sense of faculty responses to technology—especially since the expediency of course completion within CBE is so reliant on these evolving applications—is vital.

Student course evaluations have also been examined to determine perceptions of online course offerings. For example, a study by Lowenthal et al. (2015) accessed course evaluations at a postsecondary institution that were collected between 2007 and 2013. Using a Likert scale survey, Lowenthal et al. determined that in five areas—course, instructor, grade fairness, workload, and learning experience—online classes were universally rated lower by students when compared to their traditional counterparts.

Similarly, another study followed a qualitative approach and interviewed fifteen online students “to determine their perceptions related to critical factors affecting student retention in online courses” (Gaytan, 2015, p. 59). The findings reveal much about characteristics that influence a student’s decision to proceed with virtual learning. Faculty recognized to be experts in the field of online instruction were also interviewed by Gaytan. Themes identified in interviews with these faculty members noted that student self-discipline, quality of faculty and student interactions (as previously noted, an important topic in CBE), institutional support provided to students, the last grade received in an online course, and no transfer credit received by the student were all factors that impact retention (Gaytan, 2015). Students reported that increased faculty instruction, meaningful feedback, transfer credits received, maintaining an adequate GPA, and institutional support were all central to their decision to remain in an online course (Gaytan, 2015).

These findings suggest that there is a disparity between student expectations and faculty expectations. For example, students and faculty differed in regards to the importance of learner self-discipline; there were also differing opinions regarding the importance of the quality of faculty and subsequent student-faculty interactions (Gaytan, 2015). With that in

mind, Gaytan's work highlights the need for additional research to try and help improve online course characteristics for the sake of overall student satisfaction. It is truly a problem when faculty members are not aware of students' perceptions of the online courses they are teaching (in terms of what makes them effective or not), as this impacts satisfaction and, in turn, overall achievement. Another important consideration here is the concept of connectivism, "the idea that learning takes place across networked learning communities and information technologies" (Dunaway, 2011, p. 675). Because substantive interaction is currently such a hot topic in the CBE world, understanding how to best foster connectivism is key.

As previously stated, understanding attitudes toward technology—from both faculty and student perspectives—is important given how integral this component is to CBE models. Gaining insight into faculty attitudes and perceptions toward their roles as community college instructors helps us work toward a better conception of how competency-based design might be received.

### **Summary**

The literature indicates that CBE has a rich and diverse history, one that has existed in an "ebb and flow" pattern through much of the twentieth (and into the twenty-first) century. Of key significance to this pattern are economic considerations; competency-based education tends to gain traction when an economic need is present, either in a broader, societal sense or within the institution offering a CBE program. The sheer number of higher education institutions now offering CBE programs suggests that the trend is more popular than ever, especially as employers demand work-ready graduates who possess the soft skills necessary

to immediately excel. Understanding community college faculty attitudes stands out as important, too; a survey of the literature as it pertains to two-year instructors helps provide a picture of the perceptions held by many faculty members, which can offer insight as to the notions they may bring when presented with new or changing institutional projects.

### CHAPTER 3: METHODOLOGY

This study focused on the perceptions of faculty and some administrators involved in the NC-CBE Project Spring 2018 Pilot at Central Piedmont Community College, Wake Technical Community College, Forsyth Technical Community College, and Stanly Community College. In total, 30 participants provided survey responses that could shape the rollout of the upcoming Pilot; the results of the survey highlight the characteristics of those who will teach and develop CBE classes and administrators who will oversee the business of the Pilot from a broader organizational perspective. The concourse items included in the study were adapted from the available literature regarding competency-based education.

#### **Overview of Q methodology**

Watts and Stenner (2012) summarize Q methodology as “the gathering of data in the form of Q sorts and their subsequent intercorrelation and factor analysis” (p. 4). Stephenson (1993), the originator of Q, describes its purpose as “a mathematical-statistical key to what everyone calls ‘mind’,” and further elaborates by noting “our objective is with a methodology for subjective science” (p. 1-2). Q seeks to categorize the various perspectives that emerge from a study into typologies (Steelman & Maguire, 1999). In the end, the goal of a Q study is to provide a holistic sense of participants’ viewpoints with a great level of qualitative detail (Brown, 1996; Ramlo, 2015; Watts & Stenner, 2012).

More specifically, Q methodology “follows a systematic process of card sorting across a forced normal distribution” (Kampen & Tamás, 2014; Plastow, 2010, p. 334). Developed by William Stephenson in 1935, the intent of Q was to provide a way to reveal the subjectivity involved in any given situation; in other words, it could be viewed as uncovering

information related to the perspective of the individual experiencing the topic in question (Cross, 2005). The items contained in the sort—referred to as the “concourse”—are understood to be representative of the topic about which a researcher has focused his or her study (Kampen & Tamás, 2014). As noted by Bartlett and DeWeese (2015), one of the benefits of Q methodology is that it helps identify the similarities and differences in subjective perceptions across a sample group while also describing the viewpoints contained therein. Another important point is that, given the relatively small size of respondents to be included in this study, Q is especially fitting; as noted by Watts and Stenner (2005), “Large numbers of participants are not required for a Q-methodological study” (p. 79).

### **Data Collection**

Two data collection options were explored for use with this study. The first was the use of a PowerPoint slideshow that contained all necessary elements for the study, including the Q grid, concourse items, and post-survey questions. The attractiveness of employing PowerPoint as a survey tool had much to do with participants’ familiarity with the software; it could be used to complete the sort and return it to the researcher in a quick and convenient manner. The use of QSortWare, an application that allows for Q sort completion via online questionnaires across institutions (McLain et al., 2015), was also explored as a potential data collection option. A noteworthy feature of QSortWare is its ability to allow users to “design an entire procedure by adding any number of questionnaires,” while also enabling researchers to insert direction boxes at any time in order to “introduce, explain, and debrief participants about the nature of your study” (“Welcome to Q software.net,” 2015). Ultimately, it was decided that distribution of the aforementioned PowerPoint presentation

would be the most expedient and convenient tool for data collection. Using a password-protected Google Drive available through North Carolina State University, participants were assigned individual folders in which they uploaded the completed PowerPoint file.

Demographic data regarding job title and institution of employment was also collected via the available list of NC-CBE Project participants. Information pertaining to the school size (in terms of student population), type (rural, urban, or other), and the job roles of the various participants (administrative, career and technical faculty, or academic faculty) were obtained from the college's official website and NC-CBE Project directory. In order to create a more comprehensive set of demographic information, gender was also recorded as part of the study. As explained by Watts & Stenner (2005), the inclusion of demographic information may or may not highlight trends.

The information collected from respondents was not anonymous, though it is confidential. Being able to identify certain pieces of demographic information will allow the study to produce an accurate picture of the overall factors that characterize the cross-college NC-CBE Project initiative.



## Research Design

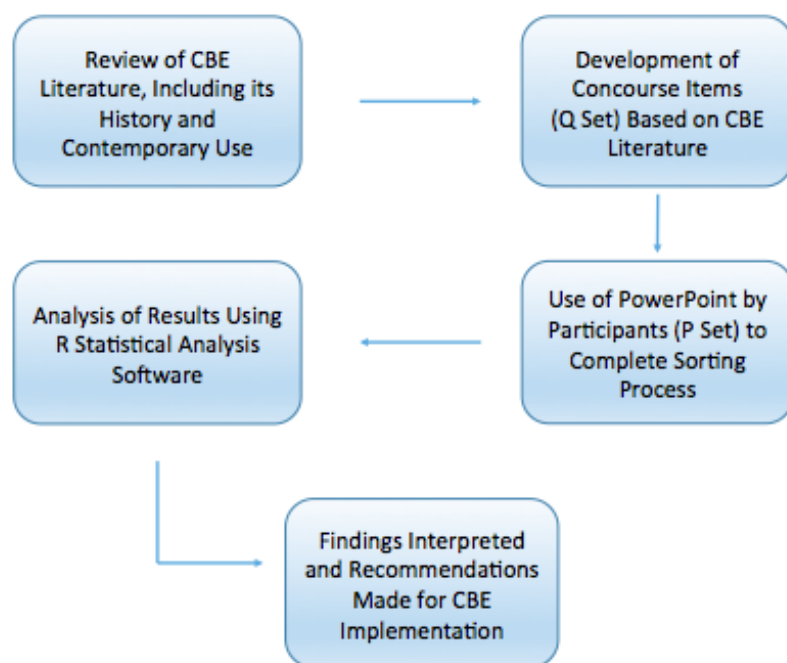


Figure 4: Research design for Q study measuring curriculum development participant attitudes

This study consisted of five steps, which included the following: 1) a thorough review of the literature related to CBE was conducted in order to determine the appropriate concourse items; 2) the concourse items—the Q set—were finalized and an adequate number of items (60) were included for sorting within the Q grid; 3) the concourse items were distributed to the faculty members—the P set—who used the PowerPoint file to “rank” their perceptions of the statements as it related to the condition of instruction; 4) the results of the Q sort were analyzed using the R Statistical Analysis Software (through factor analysis) in order to determine which thematic groups are present; 5) the results were interpreted and

recommendations were made for institutions seeking to implement a CBE model (Brouwer, 1999; Gottschalk, 2002; Kraak et al., 2014; Van Exel & De Graff, 2005).

### **Concourse Development and Theory**

One of the more overwhelming components of Q methodology is the virtually endless possibilities pertaining to the concourse items that can be included in a study (McKeown & Thomas, 2013). In some instances, concourse items have included more than just statements regarding the topic in question; they have also included television viewings, advertisements, political posters, and a variety of other mediums (McKeown & Thomas, 2013; Stephenson, 1980). In short, making every effort possible to best understand the nature of the topic in question and how to engage the participants of the Q sorting process are central to developing an appropriate method for response collection.

The concourse utilized in a Q study represents the “universe of communications on the topic” (Ramlo, 2015, p. 76). As noted by Stephenson (1980), what is unique and innovative about Q methodology is the aforementioned “universes or populations of statements as a primary source of statistical data in mental measurement” (p. 882). It is also important to note the difference between subjective and objective statements when forming a concourse—the former implies self-reference, with the latter does not (Stephenson, 1980).

Concourse theory and its application can be explained in this way:

Concourse is the very stuff of life, from the playful banter of lovers or chums to the heady discussions of philosophers and scientists to the private thoughts found in dreams and diaries. From concourse, new meanings arise, bright ideas are hatched, and discoveries are made: it is the wellspring of creativity and identity formation in

individuals, groups, organizations, and nations, and it is Q methodology's task to reveal the inherent structure of a concourse—the vectors of thought that sustain it and which, in turn, are sustained by it. (Brown, 1993, p. 95)

Another prominent scholar of Q methodology highlights the notion that “a concourse is arrived at empirically: it constitutes a Q universe; Q samples are drawn from it; Q sorts are performed with these samples; these are factor analyzed; the factors are interpreted” (Stephenson, 1986, p. 44). Stephenson goes on to suggest that it is enough to say of concourse theory that “a method now exists for pinning down” the self in regards to a theory of communication; the importance of concourse theory lies “in what a person identifies with” (p. 58). It is also noted that the natural structure of the concourse is revealed by way of statistical analysis and subsequent interpretation of how respondents rate or organize according to their perspectives (Klaus et al., 2010). Thus, concourse theory represents both a qualitative and quantitative approach—one that results in a multilayered, holistic view of participants' feelings and attitudes toward a given topic.

Typically, the statements included in the concourse items are gleaned from interviews conducted with the target population to be sampled (Brown, 1996; Valenta & Wigger, 1997). In this instance, reviewing the body of literature associated with CBE allows us to arrive at an accurate picture of the various statements that characterize the breadth of competency-based perspectives.

Focus groups are discussions designed to explore a specific set of issues; the group is “focused” in that it involves some sort of collected activity, which could simply be debating a particular set of questions (Kitzinger, 1994). Typically, 8-12 people participate in a focus

group from the target population, and a moderator helps promote free discussion in regards to the topic in question (Khan et al., 1991). Khan et al. go on to say that because focus groups frequently act as an idea generation tool; the use of focus groups as a method for engagement among faculty associated with CBE research, instruction, and classroom management, then, was promising as it relates to the creation of appropriate concourse items for this study. With this in mind, the literature reviewed to develop the initial list of 68 concourse items was refined to a 60 item Q set that clearly underscored what has informed CBE for the past several decades; these findings were the impetus that allowed the researcher to arrive at an appropriately in-depth concourse, and it was deemed unnecessary to follow the focus group protocol for concourse generation.

Surveys can be employed in order to further strengthen the validity and relevance of the concourse statements. For example, Gottschalk (2002) developed a survey to help pare down the issues covered in their Q study of IT managers in Norway in order to ensure that the focus of their research was directly related to key issues.

It is the case, too, that post-sorting surveys or interview questions are often employed (Watts & Stenner, 2005). Frequently referred to as a sorting questionnaire, Watts and Stenner explain that this step can provide insight regarding “how the participant has interpreted the items given especially high or low rankings in their Q sort, and what implications those items have in the context of their overall viewpoint”; “if there are any additional items they might have included in their own Q-set (what they are, why they are important, and so on)”; and, lastly, “if there are any further items about which the participant would like to pass comment, which they have not understood, or which they simply found confusing” (p. 78). Watts and

Stenner explain that such open-ended feedback is important because it will help during the interpretation process when attempting to understand the various viewpoints that emerge from the factors. Post-sorting questions were vital to understanding the various perspectives represented in this study.

### **Q Set**

The Q set (or Q sample) is drawn from the developed discourse, and an appropriately large number of items must be included (Brouwer, 1999). The overall goal of the Q sample is to provide a concentrated, laser-focused version of the larger Q methodology process in the form of the selected discourse statements (Valenta & Wigger, 1997). As described by Watts and Stenner (2005), the purpose of the Q set, constituted of the individual statements, is that each make different—but recognizable—assertions regarding the subject being studied. In this case, the subject—and condition of instruction—centers on the validity of CBE as an educational modality. Another key component when considering the development of a Q set is that it should force a researcher to “clarify distinctions and ambiguities that are more easily glossed over in designing rating scales. A well designed Q set is thus a powerful tool for transferring theoretical and behavior sophistication to new observers” (Waters & Deane, 1985).

As noted by Watts and Stenner (2012), there is no single correct way to create a Q set; it is specified, though, that, “a Q-set must be tailored to the requirements of the investigation and to the demands of the research question it is seeking to answer” (p. 57).

Watts and Stenner also explain that it is often the case that development of the Q set takes up

the most time as part of a study because of the critical importance assigned to including carefully vetted statements.

Survey and interview results—in conjunction with the prominent literature pertaining to competency-based education and faculty and administrator perceptions of its validity educational construct—can serve to inform the Q sample. Again, the body of literature available regarding CBE defined the Q sample for this study.

### **P Set**

Respondents in a Q study are referred to as the “P sample” (or “P set”) and are asked to rank/order concourse items based on their individual point of view, according to some preference or their general feelings or attitudes toward the statements (Van Exel & De Graff, 2005). The P sample is usually much smaller than the Q sample of concourse items (Brouwer, 1999). Watts and Stenner (2005) note that a number between 40 and 60 individuals is likely ideal for a Q sort, though this is only a “rule-of-thumb”; “highly effective Q studies can be carried out with far fewer participants” (p. 79). At the time the survey for this study was distributed, there were 53 curriculum participants in the NC-CBE Project who were highly engaged in the work being completed ahead of the Spring 2018 Pilot. This number—even without a 100% response rate—indicated that a Q approach would work well for this particular study.

### **Q sort**

When completing a Q sort, participants typically express their views by sorting concourse statements using a scale of “most agree” to “most disagree” (Brown, 1993; Zabala

& Pascual, 2016). The general alignment of the rated concourse items in this study followed this structure:

Most Disagree						Most Agree						
-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6

Figure 5: Q sort grid

Per Watts and Stenner (2005), participants in the Q study will assign each concourse item a ranking position in a fixed, quasi-normal distribution (illustrated in Figure 5); an 11 or 13 point scale is typically used. This study adopted a 13 point scale.

Serfass and Sherman (2013) conducted research regarding sorting tendencies for those involved in a Q study; the results are interesting and worth noting here, as they suggest that the order in which the concourse items are presented to participants does impact the placement of the items within the matrix. Serfass and Sherman's findings indicate that:

Items presented near the end of a Q sort rating have lower variance and are more likely to be placed in the middle categories. Moreover, the lack of variance for those items appearing later in the Q sort may result in those items showing lower average absolute associations with other measures. This is important because these later occurring items may have smaller relationships with other variables of interest not because they are irrelevant to the dependent measure, but because item order affects their placement. (p. 856)

These findings suggest, then, that a researcher using Q methodology may benefit from purposely presenting the concourse items in such a way as to balance statements that are perceived—due to the research conducted during the process of developing the statements—as more “absolute” or “distinguishing” in nature in a more evenly distributed manner. In other words, randomly including the concourse items with no sense of their overall relevance as it pertains to the topic could result in the issue explained by Serfass and Sherman.

### **Data Analysis**

A Q methodology application (R Statistical Data Analysis Software) was used to analyze the data obtained through the sorting process. The approach taken by Kraak et al. (2014) in their study of stakeholders’ perspectives about the promotion of healthy food environments was used as a reference when entering the completed Q sorts via the software; in addition, the various factors that emerged were analyzed in order to determine the most and least dominant perspectives (Kraak et al., 2014). R was used for the purposes of factor analysis and identifying the thematic groups that result from the study; it is also designed specifically to analyze the ranked datasets and streamline the analysis process as opposed to what would be necessary through the use of SPSS or other statistical software.

The study also examined which concourse items were ranked “high,” “low,” and “neutral” so as to generate a more holistic overview of perspectives that are desired from the research.



## **Factor Analysis and Interpretation**

Factor analysis was born out of research pertaining to the structure of the human intellect (Pohlmann, 2004). It seems appropriate, then, that factor analysis is the driving force behind the Q methodology that will be employed in this study.

As described by Klami et al. (2015), factor analysis is “the tool of choice for capturing and understanding linear relationships between variables” (p. 2136). In this instance, the variables in question are the completed sorts.

Q methodology is most often associated with quantitative research due to its reliance on factor analysis (Brown, 1996). It is also worth noting that the Q approach can be viewed as an inversion of traditional factor analysis in that Q correlates persons instead of tests (Van Exel & De Graff, 2005). Stephenson elaborates on this by saying, “whereas previously a large number of people were given a small number of tests, now we give a small number of people a large number of test-items” (as cited in Van Exel & De Graff, 2005, p. 1).

Stephenson notes that factor analysis often begin with 2, 3, or 4 factors (as cited in Watts & Stenner, 2012), which are then examined by eigenvalue and percent of variance explained to determine the appropriate number of factors. Varimax rotation was employed so as to result in a simple structure with maximized eigenvalues (Using Q Methodology, 2010); using varimax rotation also allows the researcher to find “a solution where an original variable loads highly on one particular factor and loads as low as possible on other factors” (Wang et al., 2005, p. 211).

Bartlett and DeWeese (2015) provide a clear, easily understandable explanation of the interpretation process:

The rotation of factors provides the investigator a method to examine the respondents' opinions and views from different perspectives. Rotation is performed to shift the perspective from which the factors are viewed and analyzed and provides a method to make the output easier to understand. On completion of the rotation, factor scores and differential scores are calculated. These calculations, otherwise known as  $z$  scores, define a given factor. Once attained, a  $z$  score can be added back to the distribution resulting in a composite Q sort for each factor. Once interpretation begins, statements need to be considered within the context of the portion of the conversation from which they were taken. The particular configuration of statements together creates the nuanced meaning for each factor. (p. 79)

A crib sheet was used to document the correlation between each factor, as well as to identify the average ranking score of each factor (Collins & Hopson, 2014).

Another important consideration when utilizing factor analysis is determining how many factors to retain (Larsen & Warne, 2010). As mentioned previously and explained by Larsen and Warne, the Guttman rule is a common standard, which indicates that eigenvalues over 1.00 will be used as the cut off (this will be the initial approach used for this study, though not all factors with  $EV = 1.00$  will be retained; additional examination will be needed in order to determine the most appropriate number of factors).

Watts and Stenner (2005) clearly explain how factor analysis is utilized in a Q study: The initial correlation matrix duly reflects the relationship of each (Q sort) configuration with every other (Q sort) configuration (not the relationship of each item with every other item). To subject this matrix to factor analysis is to produce a

set of factors onto which participants load on the basis of the item configurations they have created. Hence, two participants that load onto the same factor will have created very similar item configurations. Each factor duly captures different item configuration which is nonetheless shared (and which is characteristic of) the participants who load onto that factor. (p. 80)

In this way, it is clear how factor analysis (and Q methodology) are appropriate for assessing the subjective viewpoints of the faculty and administrators participating in this study.

As explained by Watts and Stenner (2005), “Q methodology employs a by-person correlation and factor analytic procedure. Hence, it is the overall configurations produced by the participants that are intercorrelated and factor analysed” (p. 80). The two primary issues associated with employing factor analysis have to do with the concept of “dimensionality” (number of factors) and “interpretability” (assigning meaning to the factors) (Pohlmann, 2004, p. 15).

As explained by Barry and Proops (1999), “The significance of a factor can be determined statistically by employing the eigenvalue criterion. By convention, factors with eigenvalues greater than 1.00 are considered significant” (p. 341); this determining factor is sometimes referred to as the Kaiser-Guttman rule (Pohlmann, 2004). The use of a scree test, too, provides a visualization of what an appropriate number of factors may be (Watts & Stenner, 2012).

Adhering to these carefully refined best practices of factor analysis helps ensure that the study has been conducted in accordance with recognized norms and guidelines.

**Consensus items.** The consensus items (statements) that do not distinguish between any pair of factors are included in the study and discussed in detail (Watts & Stenner, 2012). Watts and Stenner elaborate on the worth of identifying consensus items by indicating that they help highlight the factors that were ranked or valued by respondents in “pretty much the same way” (p. 218). For the purposes of this study, clearly indicating consensus statements has helped establish what the four participating institutions have in common in terms of faculty and administrator perceptions of CBE, which could serve as a starting point for professional development and additional considerations regarding institutional change.

**Distinguishing statements.** The concourse items that emerged as distinguishing for each factor were itemized and discussed in depth (Watts & Stenner, 2012). It is further noted by Watts and Stenner that while it is important to identify the highest rated and lowest rated statements from the concourse, there is often an increased level of temptation on the part of the researcher to focus only on these items, which risks abandoning the more holistic viewpoint of the participants. More specifically, Watts and Stenner explain that, “Attention to the whole configuration is the only means of delivering on Stephenson’s promise of holism and it is the best way, in our opinion at least, to make Q methodology stand out from the methodological competition” (p. 149-150). In other words, if individual viewpoints are the primary focus of the researcher, then Q methodology may, in fact, not be the most appropriate or effective methodological approach. Again, given the nature of this study, it is clear that the Q approach is fitting, especially given the limited population from which responses are being collected.

### **Validity and Reliability**

Q methodology has no requirement for a high response rate (Gottschalk, 2002), so there are inherent limits in terms of the generalizability of the findings from such an approach. With that said, there are a number of benefits associated with the Q approach, as explained by Waters and Deane (1985):

The primary advantages of the Q sort method are that observers can be kept unaware of the constructs that will be scored from the data they provide; that observers are not required to have detailed knowledge of norms for each item, as they are for conventional rating methods; that responses biases are reduced by sorting items into a fixed distribution; that the significance of a behavior is clearly distinguished from the frequency with which it occurs; that each item is explicitly scored in the context of a well-defined set of other items; and that data from different samples can be compared directly because sample norms do not enter into the scoring. In addition, description of subjects in terms of an array of scores on items with highly specific content affords a wide range of analytic possibilities that are not available when rating procedures are employed to summarize a wide range of information in a single score. (p. 53)

Because Q is a small-sample investigation of subjectivity—and because the concourse items are sorted with an unknown level of reliability—the overall results from Q studies have, according to a 1992 publication by Thomas and Baas, been “criticized for their reliability” (as cited in De Graff & Van Exel, 2008).

**Subjectivity Statement**

I am directly involved with curriculum development as it pertains to the NC-CBE Project. As an English Instructor at Central Piedmont Community College, I was selected due to my background in instruction and student engagement—my role as a Discipline Chair within the English Division of the college gave me leadership skills that were also desirable for the Project. The combination of management, instructional, and leadership experience prompted the administration tasked with overseeing the Spring 2018 Pilot of the NC-CBE Project to request my assistance in helping steer the work of defining and developing various levels of competencies for the project.

Because of this, my role as Curriculum Improvement Project Co-Lead for the initiative gives me a vested interest in working toward the successful implementation of competency-based education for two IT degree tracks not only at CPCC, but also at Wake Technical Community College, Stanly Community College, and Forsyth Technical Community College. The time, effort, and research that I have poured into this endeavor over the past year is an indicator of the level of commitment I have to the Project.

As an academic faculty member, my experiences working with a wide variety of both students and other instructors has shaped my perceptions of competency-based education. I have faith in its ability to afford students an opportunity to pursue both academic and career goals at an accelerated pace while also maintaining high quality instruction and interaction, and I believe the correct teacher can make the experience both expedient and beneficial for students.

## **Ethical Issues**

The research design for this study has been vetted by North Carolina State University's Institutional Review Board (IRB) in order to protect the participants. As is the case with any research study, it is important to balance the risk and benefit in designing a research protocol (Decker et al. 2011).

NCSU makes it clear that all studies conducted by researchers must adhere to a strict ethical code. Among other things, it is specified that: "All research procedures must minimize the risk to subjects"; "Any risk must be reasonable in relation to the potential benefits from the study"; "Informed consent must be obtained from the subject before participation. This consent must be in writing unless exempted by the committee"; "Subject must be provided with adequate detail regarding the study to make an informed decision regarding the participation. This information should be included on the consent form and should be written in lay language, so that the subjects can make an informed decision regarding participation"; "Subjects privacy must be maintained"; and "Subjects need to be made aware that they participate of their own choice and are free to withdraw from the study at any time" ("REG 10.10.03," 2002).

In developing a survey and Q sort intended for distribution to faculty members and administrators participating in development of the NC-CBE Project pilot, I have carefully considered each of these points as it relates to maintaining appropriate ethical standards. Of particular note is the need to reduce risk to respondents; there may exist a perception that any negative thoughts or attitudes pertaining to the NC-CBE Project could result in punitive

action on the part of the researcher given his leadership role within the Project. It will be explicitly stated that no such response is intended or will be taken.

The potential benefits from the study can be said to reasonably outweigh any potential risks. Given the desired outcome of identifying faculty and administrator attitudes toward CBE, it is possible that trends will emerge that will help shape the roll-out, content, training, and professional development related to the CBE pilot during the Spring 2018 semester and in the future at other NC community colleges.

The consent form used for this study was constructed in plain language that clearly explains the procedures involved with the study and the risks (though minimal) associated with participation. As a current Curriculum Improvement Project Co-Lead for the NC-CBE Project, I am well suited to craft a description that is easily understandable. Likewise, it has been made clear for respondents that they are free to decline participation, and they can request removal from the study at any time. It will also be noted for participants that their privacy will be maintained throughout the research process.

As noted by the NCSU IRB website, “The purpose of the IRB is to protect the rights and welfare of human subjects in research” (“IRB Basics”). The NCSU IRB must approve any study that will be conducted in association with the college. As further outlined in the “IRB Basics” document, it is important for a researcher to fully consider all aspects of a research study before submitting it for IRB approval; in other words, a researcher must clearly outline all procedures and guidelines that will frame the study, and it is crucial that absolutely no deviation occur from the submitted form for IRB review/approval and what is actually carried out during the research process.



Careful examination of the components that constitute the IRB guidelines reveals that a grasp of the definitions associated with the process is essential. The key word that is perhaps most important for any study, “research,” is given special attention by NCSU. It is defined as, “A systematic investigation” intended for “testing and evaluation, designed to develop or contribute to generalizable knowledge” (“REG 10.10.03,” 2002). With that in mind, it is certainly the case that this study will contribute to the development of competency-based education in the community college setting. Also, the systematic nature of inquiry that will be employed for the study demonstrates its alignment with core IRB practices.

In submitting my study for review, I have noted my “Faculty point of Contact”—Dr. James Bartlett—and have included any/all relevant supplemental forms (“Basic Introduction to the eIRB”). Also, per eIRB guidelines, the researcher specified the “additional personnel” that will be involved in the study; specifically, Dr. Diane Chapman, Dr. Michelle Bartlett, and Dr. Cameron Denson. All appropriate documents were attached and labeled according to the eIRB guidelines specified by NCSU. In this instance, a copy of the concourse items and post-survey questions were included, as was a copy of the Informed Consent document.

There are a multitude of forms needed in order to obtain IRB approval. Given the relatively straightforward nature of the study that will be conducted for my dissertation, my goal was to approach the Preliminary Questions Sheet—a document which helps members of the review board determine the speed with which research approval can be obtained (“REG 10.10.03,” 2002)—in such a way that expedited review can be achieved (in other words, it will be made clear that only minimal risk is involved with the study).

The Proposal Narrative contains seven sections—Introduction, Subject Population, Experimental Procedures, Potential Risks, Compensation, Collaborators, and Additional Information (“REG 10.10.03,” 2002)—that were fully addressed. Here, an outline of the survey that was distributed (as well as the methodology that was be utilized) was included with the submission.

The Informed Consent form was also crafted with great care so as to meet the aforementioned requirement of making sure that participants are aware of what is involved with the study, as well as their ability to withdraw at any time (“REG 10.10.03,” 2002).

When all necessary documents and materials were prepared, I navigated to the eIRB submission webpage. From there, I followed the guidelines for creating a new protocol/application, which included entering the title of the study, the funding source (“None” will be entered), as well as the aforementioned Faculty point of contact (“Basic Introduction to the eIRB”). No investigators involved in the study have a financial stake in the findings, and this was clarified per eIRB guidelines. Once all of this was entered—including the necessary supporting documents—the information was saved.

I also specified that that my document is a “Human Subjects Document,” and I appropriately categorized each supporting document (“Basic Introduction to the eIRB”). As further discussed by the eIRB, I continued through the submission process by providing an in-depth description of what my study is about.

The population associated with the study (which includes potential participants) was detailed for the review board as well; all questions were answered so as to make it clear who

my target population is (“Basic Introduction to the eIRB”). Likewise, the “Consent” information was provided for review via the “Consent” tab on the eIRB submission form.

Moving forward, I provided a detailed account of the specific methodology/procedures that were employed to complete the study (“Basic Introduction to the eIRB”). Per the eIRB website, the next tab, “Risks and Benefits,” was completed, and information pertaining to “Data Security” was entered—I noted that the information that I collect will not be anonymous but is confidential. I specified, too, that I am not receiving any compensation for the study.

Once all areas were completed these were submitted by the Committee Chair to the IRB for review and approval. IRB approval was obtained on April 10, 2017.

Careful planning and review of the ethical considerations surrounding my research was necessary in order to produce a complete and responsible study of faculty and administrator attitudes toward CBE. With the guidance of the NCSU IRB guidelines document and my committee members, worthwhile findings have been discovered that benefit all parties involved.

### **Research Plan**

The entirety of the research plan was carried out between November 2016 and July 2017. This involved (1) development of the concourse items, (2) distribution of the Q sorting activity to curriculum participants of the NC-CBE Project, (3) collection of the completed Q sorts, (4) analysis of data, and (5) interpretation of findings.

Given the relatively tight window during which research was conducted, the researcher had to maintain regular contact with participants in order to maximize the response rate and ensure timely submission of results.

### **Summary**

This chapter provides an in-depth description of the various steps involved with the Q methodological approach that was utilized for this study. Each of the most relevant steps in the process—creation of the concourse items, distribution to the sample population selected for the study, analysis of the findings—is explored in detail. Information pertaining to the validity and reliability of the method and subsequent results are included, as are general considerations designed to ensure a comprehensive and beneficial research experience for all involved individuals. The use of the R software application allowed for a timely and efficient analysis.

## CHAPTER 4: FINDINGS

This chapter explains the results of the Q study undertaken by the thirty participants from the four North Carolina community colleges involved in the North Carolina Competency-Based Education (NC-CBE) Project. These faculty members and administrators were asked to sort 60 concourse items related to a variety of topics and issues related to competency-based education. Again, these concourse items were drawn from the body of literature surrounding CBE. Per the recommendation of Bartlett and DeWeese (2015), the included participants are familiar with the topic in question and “have an opinion on the subject matter being studied” (p. 76). The methodology explained in Chapter 3 was followed in order to complete the research process.

The goal of this Q study was to address the following research question:

1. What are viewpoints of community college faculty and administrators toward competency-based education and why?

The participants received an invitation to participate via email after the researcher received approval from the NCSU Institutional Review Board and each of the institutions who have faculty and administrators participating in the survey. The data collected through this study addresses the aforementioned research question with as much depth as possible.

### **Data Collection and Analysis**

As noted by Watts and Stenner (2012), “A participant in a Q study is invited to impose their own personal meanings, or psychological significance, onto the items in the Q set, which are ultimately rendered homogeneous in relation to each individual sorter” (p. 70). In other words, by engaging in the sorting and ranking process, participants rank the

statements in relation to each other and their own preconceived notions of the topic. In this study, respondents were asked to rank the 60 concourse items—all of which were tied to the notion that CBE is, in general, a valid educational construct—accordingly. Once the sorting process was complete, the collected Q sorts were compared to one another and analyzed using factor analysis, which produced “themes” or “groups” (factors) that characterize the various mindsets and perspectives of the participant group as a whole (Hughes, 2016). A “forced choice” Q sort was used here so as to achieve the goal of having participants rank the various concourse statements in relation to one another. It should be noted too that, in general, “Q methodologists generally choose a fixed distribution because it represents the most convenient and pragmatic means of facilitating the item ranking process,” both for researchers and participants (Watts & Stenner, 2012, p. 78).

Participants submitted their completed sorts as a PowerPoint file to a secured Google Drive folder. The rankings used by participants contained a -6 to +6 scale, indicating “Most Disagree” to “Most Agree” as it pertained to the condition of instruction, the notion that CBE is a valid education delivery method (Bartlett & DeWeese, 2015). Regarding the number of participants, Watts and Stenner explain that, “Q methodology has little interest in taking head counts or generalizing to a population of people” (2012, p. 72); they further explain that—unlike R methodology—Q is focused squarely on establishing that particular viewpoints exist and is designed to help “understand, explicate, and compare them” (p. 72). It is further noted by Watts and Stenner (2012) that, in general, it is likely wise to stick with a number of participants that is fewer than the number of items in your Q set.

## P set Demographics

There were a total of 30 participants in this study. These individuals represent four North Carolina Community Colleges, including Central Piedmont Community College, Wake Technical Community College, Forsyth Technical Community College, and Stanly Community College. Table 1 represents the institutions included in this study.

Table 1: Colleges in sample

Community College	Type	<i>n</i>	%
Central Piedmont	Urban	12	0.40
Wake Tech	Urban	11	0.36
Forsyth Tech	Urban	3	0.10
Stanly	Rural	4	0.13

Note: *n*=number of participants from college; %=percentage of total

Given the scope of this study and relatively limited sample population from which participants were drawn, it was a straightforward process to contact the Planning and Research or IRB departments for each institution and receive approval in order to contact potential respondents. Also, given the small number of total NC-CBE Project curriculum development participants (54 total), the resulting 56% response rate felt more than adequate per the Q study guidelines outlined by Watts and Stenner (2012).

In terms of gender, 57% (*n*=17) of respondents were female and 43% (*n*=13) were male. Table 2 provides a more detailed breakdown of the gender of participants in the study:

Table 2: Participant gender

Community College	Male	Female	Total
Central Piedmont	5	7	12
Wake Tech	6	5	11
Forsyth Tech	0	3	3
Stanly	2	2	4

The enrollment at each institution varies, with Wake Technical Community College and Central Piedmont Community College both serving the largest number of students in terms of institutions represented in this study (Boone, 2016; Manning, 2015). Forsyth Technical Community College is on the lower end of the student population spectrum (“Forsyth Tech Fast Facts,” 2017), while Stanly Community College is the smallest institution in terms of enrollment (“Enrollment and FTE,” 2016).

Table 3: Students served

Community College	Location	<i>n</i>
Wake Tech	Raleigh, NC	67,843
Central Piedmont	Charlotte, NC	56,924
Forsyth Tech	Winston-Salem, NC	12,238
Stanly	Albemarle, NC	5,551

Note: *n*=student population, including curriculum and continuing education

Regarding job role within the various colleges, administrators, academic faculty, and career and technical education faculty were included in the study. For the purposes of this study, the three job roles are defined as those with a primarily non-instructional or leadership role (Administrators); those with a primarily instructional role in arts and sciences courses



(Academic Faculty); and those with a primarily instructional role in technical courses (Career and Technical Faculty). Table 4 provides an overview of the number of each job role represented.

Table 4: Job roles

Job Role	<i>n</i>	%
Administrators	11	0.37
Academic Faculty	13	0.43
Career & Technical Faculty	6	0.20

The collected demographic data provides a snapshot of the population that was surveyed as part of this study and helps provide some insight into the differences that exist in and among the various institutions.

### **Correlation Matrix and Factor Correlation Matrix**

The first step in Q analysis is the calculation of the correlation matrix, which represents the level of agreement and disagreement between the individual sorts (Van Exel & De Graff, 2005); this is also noted by Bartlett and DeWeese (2015) as, “the first primary step in analyzing the Q sorts” (p. 79). The full correlation matrix is contained in Appendix E; this highlights the level of agreement between sorts. The factor correlation matrix is a more concise representation of the groups that emerged from the study, and it highlights the level of agreement between factors.

Table 5: Correlation between factor z-scores

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor 1	1	0.25	0.28	0.25	0.32
Factor 2	0.25	1	0.36	0.34	0.38
Factor 3	0.28	0.36	1	0.3	0.27
Factor 4	0.25	0.34	0.3	1	0.37
Factor 5	0.32	0.38	0.27	0.37	1

Values that approach +1.00 indicate a high level of agreement, while those approaching -1.00 indicate disagreement (Bartlett & DeWeese, 2015). The generally low levels of agreement represented in Table 5 indicate the clear distinctions between factors and demonstrate that the five-factor solution helps highlight the varying perspectives that are a result of the study. Factors 2 and 5 had the highest level of agreement (.38), while Factors 1 and 2 and Factors 1 and 4 had the least amount of agreement (.25).

Regarding the correlation matrix between sorts, the highest correlation value was .60, which occurred between Participant 33, a career and technical faculty member at an urban institution, and Participant 8, another career and technical faculty member at an urban institution. The participants both loaded into Factor 2, which is labeled, “Positive Views of CBE.” These individuals feel that CBE is a beneficial modality and that minimal barriers exist in terms of its implementation and success. The next highest correlation value—.54—was found between Participants 14 and 42. Participant 14 is an academic faculty member at an urban institution, and Participant 42 is an administrator at an urban institution. Participant 14 did not significantly load into a factor, while Participant 42 did load into the “Positive Views of CBE” factor.

The lowest correlation value (-0.20) was found between Participants 42 and 19. Participant 42 is an administrator at an urban institution, and Participant 19 is an administrator at a rural institution. Participant 42 loaded into Factor 2 (“Positive Views of CBE”), while Participant 19 loaded into Factor 1 (“Skeptical Views of CBE”). Not surprisingly, these individuals hold divergent views regarding the implementation and feasibility of CBE as a modality and method for assigning credit. The next lowest correlation (-0.17) was identified between Participants 9 and 6. Participant 9 is an academic faculty member at an urban institution, and Participant 6 is an administrator at an urban institution. Participant 9 loaded into Factor 1 (“Skeptical Views of CBE”), while Participant 6 did not significantly load into a factor.

### **Factor Analysis and Rotation**

Factor analysis is at the heart of the Q sort statistical analysis, and, as explained by Watts and Stenner (2012), “There will be considerably fewer factors than there are Q sorts in the group, which is why factor analysis is known as a data reduction technique” (p. 98). The goal, then, is to determine an appropriate number of factors that characterize the various thematic groups represented in the study. However, it is worth noting that factor analysis is not an exact science (Wright, 2013); even though the statistical methods underpinning factor analysis are sound, a certain degree of discernment is required in order to settle on the “correct” number of factors. The data collected for this study were analyzed using the R Statistical Analysis Software. The eigenvalue (EV), which is calculated by summing the squared loadings of all the Q sorts on a factor (Watts & Stenner, 2012), will help determine an appropriate factor solution.

Table 6: Factor solutions

Factors	Significant Loads	Variance Explained	Eigenvalue	Reliability	Highest Factor Correlation	Range of People on Factors
4	26	49%	3	.95 to .97	0.4	5 to 9
5	24	54.30%	2.3	.89 to .97	0.38	2 to 8
6	21	58.80%	1.7	.89 to .97	0.44	2 to 7
7	21	63.10%	1.8	.80 to .95	0.39	1 to 5

*Note.* 5-factor solution; 6-factor solution had 1 factor with a negative load. 7-factor solution had 1 single person factor and a 2-person factor in which 1 person loaded negative.

For this study, the analysis began with a 4-factor solution, with an EV of 3.0. The analysis was run once more, this time with a 5-factor solution (EV=2.3), where 24 participants significantly loaded. In order to determine the appropriate number of factors, the analysis was also run with a 6-factor solution, though there were only two participants included in Factor 6, one of whom had a negative loading. With the 6-factor solution, there were only two people included in Factor Five. It was decided, then, that a 5-factor solution that accounted for 54.3% of the variance represented the best overall approach.

Table 7: Factor characteristics

Factor	Participants Loaded	Eigenvalues	Variance	Reliability	<i>SE</i> of Factor Scores
1	8	4.3	14.20	0.97	0.17
2	5	3.9	12.90	0.95	0.22
3	6	3.2	10.50	0.96	0.20
4	2	2.7	9.10	0.89	0.33
5	3	2.3	7.60	0.92	0.28
Total Variance			54.30		

Another method for selecting the number of factors involves examining a scree plot in conjunction with the raw data. These techniques—when combined with evaluation of the correlation matrix—helps researchers “identify distinct regularities or patterns of similarity in the Q sort configurations produced and hence in the viewpoints our participants have expressed” (Watts & Stenner, 2012, p. 98). In examining the elbow bend (Larsen & Warren, 2010) in Figure 6, the argument could be made that a 6-factor solution would be acceptable, but this plot—again, used in conjunction with the aforementioned statistical analyses—resulted in the determination that a 5-factor approach would be best.

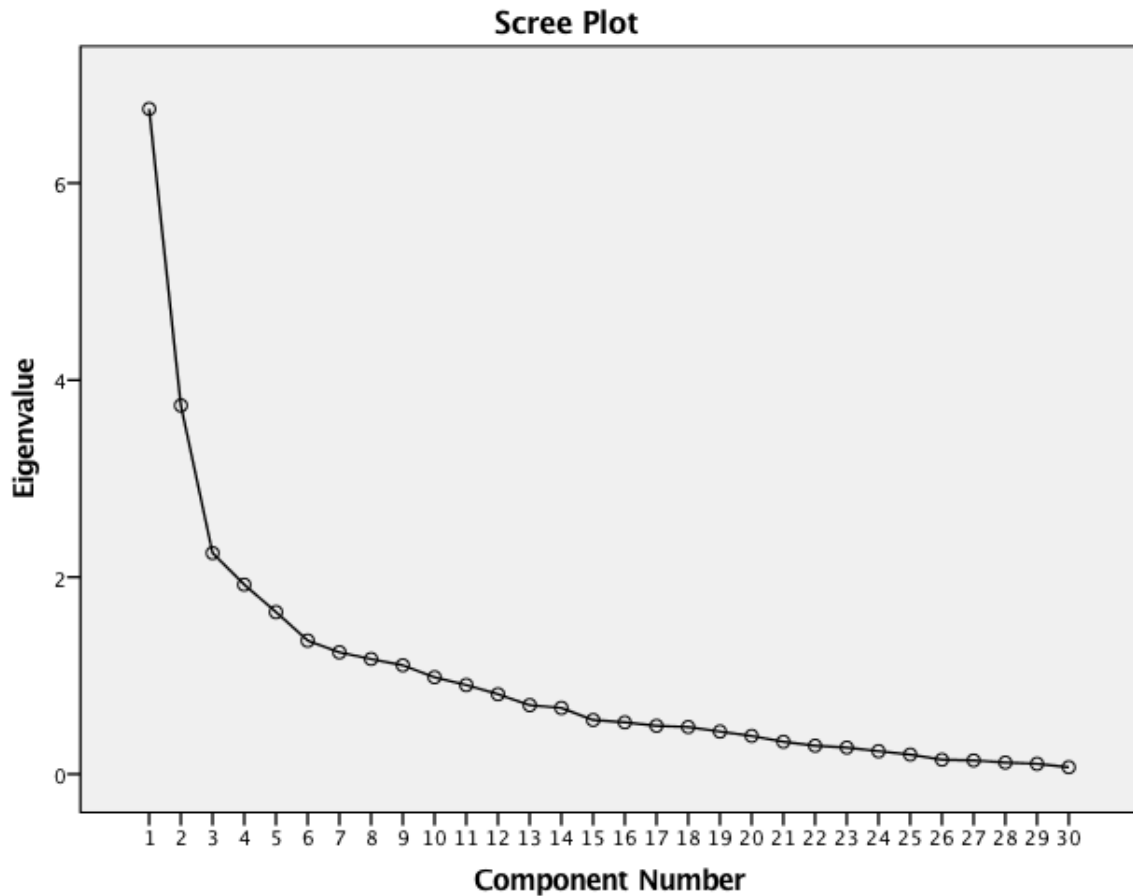


Figure 6: Scree plot representation of appropriate factor solution

Factor rotation was utilized in order to pinpoint the best possible explanation of the relationships between the Q sorts (Watts & Stenner, 2012). More specifically, Varimax rotation was employed, as it is noted as characterizing “the majority viewpoints of the group” (Watts & Stenner, 2012, p. 125), as is our concern here; it also helps maximize the overall study variance. Hand rotation was not employed since the interest was not in examining individual influences within the larger group.

### **Factor Loadings**

As explained by Bartlett & DeWeese (2015), “Performing factor analysis will unearth the relationships that exist between the individual sorters. Those with similar sorts will have high correlations. Here, the primary goal is to determine how many different Q sorts are in evidence” (p. 78). Van Exel & De Graaf (2005) go on to explain that “a factor loading is determined for each Q sort, expressing the extent to which each Q sort is associated with each factor. The number of factors in the final set depends on the variability in the elicited Q sorts” (p. 8). Van Exel & De Graaf (2005) also note that the number of factors can be anticipated by the number of original factors with at least two significant loadings; other parameters, such as factors with eigenvalues exceeding 1.00, can also determine the appropriate number (Watts & Stenner, 2012). Table 8 indicates which factors were “flagged” and deemed significant per the aforementioned criteria:

Table 8: Flagged factor loadings

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
P41	FALSE	FALSE	FALSE	FALSE	FALSE
P6	FALSE	FALSE	FALSE	FALSE	FALSE
P14	FALSE	FALSE	FALSE	FALSE	FALSE
P9	TRUE	FALSE	FALSE	FALSE	FALSE
P19	TRUE	FALSE	FALSE	FALSE	FALSE
P2	FALSE	FALSE	FALSE	FALSE	FALSE
P20	TRUE	FALSE	FALSE	FALSE	FALSE
P18	FALSE	FALSE	FALSE	FALSE	FALSE
P12	TRUE	FALSE	FALSE	FALSE	FALSE
P27	FALSE	FALSE	TRUE	FALSE	FALSE
P24	TRUE	FALSE	FALSE	FALSE	FALSE
P22	FALSE	FALSE	TRUE	FALSE	FALSE
P42	FALSE	TRUE	FALSE	FALSE	FALSE
P34	TRUE	FALSE	FALSE	FALSE	FALSE
P52	FALSE	FALSE	TRUE	FALSE	FALSE
P8	FALSE	TRUE	FALSE	FALSE	FALSE
P28	FALSE	FALSE	FALSE	TRUE	FALSE
P13	FALSE	FALSE	FALSE	FALSE	FALSE
P30	FALSE	FALSE	TRUE	FALSE	FALSE
P7	TRUE	FALSE	FALSE	FALSE	FALSE
P47	FALSE	FALSE	FALSE	TRUE	FALSE
P29	FALSE	FALSE	TRUE	FALSE	FALSE
P35	FALSE	FALSE	FALSE	FALSE	TRUE
P16	FALSE	TRUE	FALSE	FALSE	FALSE
P32	FALSE	FALSE	FALSE	FALSE	TRUE
P33	FALSE	TRUE	FALSE	FALSE	FALSE
P48	FALSE	TRUE	FALSE	FALSE	FALSE
P11	FALSE	FALSE	FALSE	FALSE	TRUE
P40	TRUE	FALSE	FALSE	FALSE	FALSE
P53	FALSE	FALSE	TRUE	FALSE	FALSE



Table 9: Five factor solution for faculty and administrator attitudes towards CBE

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
P41	-0.1393	0.1247	0.2758	0.3448	0.2822
P6	-0.3250	0.5474	0.1553	0.4094	0.1848
P14	-0.2064	0.5022	0.1725	0.4466	-0.1690
P9	0.7253	-0.1122	0.0280	0.0322	0.0275
P19	0.5221	-0.1643	0.1216	-0.0008	0.4092
P2	-0.2456	0.2920	0.3076	0.1710	0.4504
P20	0.8010	0.1200	0.0372	-0.0859	0.0429
P18	0.3215	0.4547	0.3100	-0.0918	-0.1122
P12	0.6365	-0.0290	-0.0508	0.4272	0.1146
P27	0.1645	0.1984	0.7345	0.0418	0.0753
P24	0.5133	0.3321	0.1778	-0.1478	0.0256
P22	0.2563	0.3048	0.5191	0.0198	0.0312
P42	-0.1506	0.8245	0.1975	0.0960	-0.0905
P34	0.5807	-0.0249	0.0385	0.5103	0.0624
P52	0.1520	0.1388	0.6309	0.5151	-0.1780
P8	0.3409	0.6700	-0.2010	0.0123	0.2784
P28	0.1591	-0.0836	-0.0138	0.6648	0.1059
P13	-0.0490	0.2512	0.2939	0.2978	-0.4754
P30	0.4064	-0.0973	0.5914	-0.0758	0.3776
P7	0.4625	0.0676	0.3089	-0.1098	-0.2871
P47	0.0520	0.3504	0.1307	0.7414	0.1471
P29	-0.1256	0.0966	0.7678	0.0724	0.0765
P35	0.3090	0.0885	-0.0398	0.0637	0.5167
P16	0.0619	0.5876	0.1696	-0.1034	-0.0119
P32	-0.1896	0.1797	0.0815	0.3628	0.5624
P33	0.4106	0.6042	0.1786	0.1585	0.1332
P48	0.1773	0.6275	0.0880	0.2507	0.2991
P11	0.2712	0.2186	0.1518	0.1251	0.6506
P40	0.6027	0.3736	0.2379	0.2167	0.0189
P53	-0.1590	0.1685	0.4535	0.2391	-0.0849

\*p.&lt;.05

The five factors that emerged after analysis include Skeptical Views of CBE; Positive Views of CBE; Critically Supportive of CBE; Stakeholder-centric CBE; and Faculty-centric CBE. Additional descriptions of each Factor were drawn from the associated distinguishing

statements, the highest and lowest ranked items, and responses provided on the post-survey questionnaire.

### **Factor Arrays**

As explained by Bartlett and DeWeese (2015), “Within Q analysis, factor scores on the factor array are another term for a z score of a given Q statement and is comprised of all the scores given to that specific statement by each participant taking part in the study” (p. 79). The use of whole numbers—similar to what is seen in the sorting process itself—is beneficial, as it allows for an easier comparison of the attributes, which characterize each statement and, ultimately, each group or factor (Bartlett & DeWeese, 2015). For this study, participants were asked to sort and rank statements regarding competency-based education on a “Most Agree” (+6) to “Most Disagree” (-6) scale.

Table 10: Factor arrays

Number	Statement	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
S1	Tutors and academic coaches are critical for success in CBE.	4	5	3	-2	2
S2	CBE allows for regular interaction with instructors.	-2	0	1	-4	-1
S3	CBE allows for substantive interaction with instructors.	-5	0	2	-3	-1
S4	CBE allows for access to higher ed. in ways other modalities do not.	-2	-1	0	4	4
S5	CBE is flexible enough to fit the learning styles of many students.	-5	3	-3	1	0
S6	Students will finish a CBE course more quickly than a traditional course.	-1	-1	-5	-3	2
S7	Flexibility in pacing will result in greater student success.	-1	-2	-2	0	1
S8	Recent high school graduates will be successful in the CBE format.	-6	-4	-6	-4	-4
S9	CBE, in general, can cost less than traditional education.	0	-4	-2	-5	3

Table 10 continued

S10	CBE provides evidence of learning equal to or more rigorous than traditional education.	-5	2	-2	1	-3
S11	CBE can effectively measure concepts associated with liberal arts.	-4	-2	-3	3	4
S12	CBE students are guaranteed to have mastered competencies in their field.	-4	-4	0	-2	1
S13	Effectively utilizing existing instructional technologies is crucial to the success of CBE.	2	1	-1	-1	5
S14	Effectively utilizing new instructional technologies is crucial to the success of CBE.	2	0	-3	2	5
S15	The use of technology in CBE is only effective if faculty perceive it to be easy to use.	1	1	-4	1	-1
S16	The time it takes to learn a new technology impacts my willingness to use it.	1	-1	-3	-4	-3

Table 10 continued

S17	Students won't be as successful in CBE because it's often delivered online.	0	-5	-4	-1	-2
S18	Technology could be a barrier to student success in CBE.	1	-1	1	0	2
S19	An LMS specifically designed for CBE is necessary for student success.	1	0	4	-2	-3
S20	CBE has the potential to limit academic freedom.	4	-2	-4	-6	0
S21	There could be limited opportunities for social learning in the CBE format.	6	3	1	2	2
S22	In general, students may have trouble adjusting to the CBE format.	2	-5	3	2	0
S23	CBE programs prevent students from developing "soft skills" due to their vocational nature.	4	-3	-5	-3	-4
S24	CBE could be impacted by issues of sustainability.	1	-1	1	3	2

Table 10 continued

S25	A learner demonstrating proficiency is more important than a learner earning a grade.	5	5	-1	2	-2
S26	The faculty role in CBE is just as important as it is in a traditional class.	-1	6	2	5	6
S27	Participation in CBE support lab settings will be high.	-2	-3	-2	-3	-4
S28	Having an academic coach or tutor is necessary for student success in CBE.	4	5	4	-3	5
S29	CBE helps address local economic needs.	0	1	0	0	1
S30	CBE helps address national economic needs.	-3	1	0	-4	-1
S31	College degrees earned through a CBE format are appealing to employers.	-3	0	-4	0	-3
S32	Students will benefit from CBE transcripts as they enter the workforce.	-3	1	0	0	0
S33	CBE is one of the best ways to close the skills gap among working adults.	-4	-1	1	-1	-3

Table 10 continued

S34	Engaging with employers is important when developing a CBE program.	5	4	3	5	4
S35	Employers prefer transcripts that itemize skills as opposed to traditional, "letter grade" records.	1	0	-1	-3	0
S36	Going through a CBE program improves a student's marketability.	-2	2	-3	-1	0
S37	In general, arts and sciences faculty believe that CBE is effective.	-3	-2	-2	-1	-1
S38	In general, program/vocational faculty believe that CBE is effective.	-1	1	0	3	1
S39	The organizational change required for a CBE program is best achieved through administrative support.	2	4	6	6	2
S40	The organizational change required for a CBE program is best achieved through faculty support.	3	4	4	2	1

Table 10 continued

S41	Demonstrating that an urgent need exists for a CBE program is important for faculty buy-in.	3	3	-1	2	-5
S42	CBE initiatives are perceived as one of many institutional projects, which can result in a diminished sense of importance.	2	-3	1	5	0
S43	CBE presents opportunities for a new organizational business model.	3	3	2	2	3
S44	Instructors may have trouble adjusting to the “guide on the side” role rather than the traditional “sage on the stage” role.	0	-4	5	0	-2
S45	The terminology associated with CBE could act as a barrier for faculty.	0	-2	-1	0	-2
S46	CBE will be a lasting trend in higher education.	-1	2	0	4	-4
S47	The audit of a prominent CBE institution by the U.S. Department of Education makes me nervous about the future of CBE.	5	-6	-2	4	-2



Table 10 continued

S48	The traditional classroom approach is inefficient or ineffective.	-3	-5	1	-5	-6
S49	CBE impacts equitable outcomes.	-1	0	-5	-1	1
S50	CBE impacts student learning.	1	2	5	-1	3
S51	CBE impacts completion.	0	-2	5	0	3
S52	CBE impacts transfer rates.	0	0	-1	-2	-2
S53	CBE is more transparent than traditional education approaches.	-4	1	3	0	-5
S54	CBE transforms the education process.	3	2	2	3	4
S55	There is a large demand for the innovation afforded by CBE.	-2	-3	2	1	-1
S56	Non-traditional students will, in general, be successful in the CBE format.	0	-1	4	1	1
S57	A CBE approach more accurately reflects student learning than a traditional approach.	-2	2	-1	1	-1

Table 10 continued

S58	Skilled test-takers will excel in a CBE format; others may not be as successful.	2	-3	0	-5	-5
S59	CBE allows colleges to accurately measure learning outcomes.	-1	3	2	-2	0
S60	CBE is beneficial because it often grants credit for life experience.	3	4	3	4	2

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Note: The complete concourse list with references can be found in Appendix A.

### Consensus Statements

Consensus statements do not distinguish between any of the factors, and the opinion of the participants is mostly shared as it relates to these statements (Klooster et al., 2008). In this study, six consensus statements emerged that help address an inquiry contained in the research question (Are viewpoints of competency-based education among career and technical education faculty, academic faculty, and administrators at four community colleges similar?), which is focused on shared perspectives among the participants as a whole as well as between institutions. Table 11 identifies the consensus statements and the corresponding factor array rankings. The statements “CBE transforms the education process” (S52) and “CBE is beneficial because it often grants credit for life experience” (S60) were the highest ranked consensus items. The ranking of these items indicates that NC-CBE Project curriculum development participants believe that CBE has the potential to transform educational processes and that granting credit for life experience, in whatever form that may

occur, are beneficial aspects of the competency-based modality. S29, “CBE helps address local economic needs,” is the only consensus statement that had a neutral ranking. The remaining three consensus items had low rankings, and include S27 “Participation in CBE support lab settings will be high,” S37, “In general, arts and sciences faculty believe that CBE is effective,” and S52, “CBE impacts transfer rates.” This ranking suggests that curriculum development participants don’t believe students will regularly participate in support labs given the opportunity; the rankings also indicate that respondents believe arts and sciences faculty do not see the merit in CBE in the same way that technical or vocational faculty do. The ranking of item S52 suggests that participants do not feel strongly that CBE will have an impact on transfer rates at the four participating colleges.

Table 11: Consensus statements

Number	Statement	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
S27	Participation in CBE support lab settings will be high.	-2	-3	-2	-3	-4
S29	CBE helps address local economic needs.	0	1	0	0	1
S37	In general, arts and sciences faculty believe that CBE is effective.	-3	-2	-2	-1	-1
S52	CBE impacts transfer rates.	0	0	-1	-2	-2
S54	CBE transforms the education process.	3	2	2	3	4
S60	CBE is beneficial because it often grants credit for life experience.	3	4	3	4	2

### Distinguishing Statements

Bartlett and DeWeese (2015) explain that distinguishing statements can be identified due to the difference in how they are rated between Factors. A distinguishing item or statement can be measured or identified when a statement's score on two factors exceeds the difference score or the magnitude of difference between a statement's score on any two factors that is required for it to be statistically significant (Van Excel & De Graaf, 2005). For this study, the distinguishing statements were used to define and describe the various Factors that emerged from the analysis.

**Factor One: Skeptical Views of CBE.** Factor 1 had eight participants and accounted for 14.2% of variance and 33% of the P set that loaded into a factor. This factor accounts for the largest number of participants in the study, and its name was derived from the generally negative perceptions of CBE as indicated by the ranking of items in the Q set. For example, item S21, “*There could be limited opportunities for social learning in the CBE format,*” is characteristic of the distinguishing statements for this group.

Table 12 provides distinguishing statements for this factor. Participants grouped into this factor do not believe that CBE allows for substantive interaction with instructors (S3)—Factors 4 and 5 had similar feelings toward this statement, while Factor 2 was neutral or indifferent—and Factor 1 participants also do not believe that CBE is flexible enough to fit the learning styles of a variety of students (S5). Factor 3 also felt that CBE affords limited flexibility, while Factor 2 believes such flexibility in a CBE format is present (Factors 4 and 5 were neutral toward this statement). Factor 1 was neutral toward the idea that CBE costs less than traditional education (S9), while Factors 2, 3, and 4 disagreed with this statement. Factor 5 mostly agreed with the statement. Factor 1 disagrees with the idea that CBE provides evidence of learning that is equal to or more rigorous than traditional education, as do Factors 3 and 5; Factors 2 and 4 agree with this, though Factor 4 takes a more neutral stance. Factor 1 does slightly agree with the notion that the time it takes to learn a new technology impacts faculty members’ willingness to use it (S16), while Factors 2, 3, 4, and 5 all disagree. The idea that competency-based education has the potential to limit academic freedom is also something that Factor 1 agrees with (S20), while Factors 2, 3, and 4 disagree (Factor 5 is neutral toward this idea). Factor 1 very much agrees with the statement that there

could be limited opportunities for social learning in CBE (S21), as do all other Factors.

Regarding the development of “soft skills,” Factor 1 feels that CBE can serve as a barrier toward students obtaining these skills (S23); Factors 2, 3, 4, and 5 all disagree with this.

Factor 1 does not believe that the faculty role in CBE is just as important as it is in traditional classes (S26), while all other Factors do believe it is as important. Participants in Factor 1 do not feel that there is worth or value to a CBE transcript for students (S32), while Factor 2 somewhat agrees with this statement. Factors 3, 4, and 5 are all neutral toward the idea of CBE transcripts being beneficial for students. Respondents grouped into Factor 1 believe that skilled test-takers may excel in CBE while other students may not be as successful (S58); Factors 2, 4, and 5 disagree with this statement, and Factor 3 is neutral.

Again, in general, Factor 1 can be viewed as having a negative view of CBE; these participants do not see the value in it as an educational modality.

Table 12: Distinguishing statements for Factor One

Number	Statement	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
S3	CBE allows for substantive interaction with instructors.	-5	0	2	-3	-1
S5	CBE is flexible enough to fit the learning styles of many students.	-5	3	-3	1	0
S9	CBE, in general, can cost less than traditional education.	0	-4	-2	-5	3
S10	CBE provides evidence of learning equal to or more rigorous than traditional education.	-5	2	-2	1	-3
S16	The time it takes to learn a new technology impacts my willingness to use it.	1	-1	-3	-4	-3
S20	CBE has the potential to limit academic freedom.	4	-2	-4	-6	0
S21	There could be limited opportunities for social learning in the CBE format.	6	3	1	2	2
S23	CBE programs prevent students from developing “soft skills” due to their vocational nature.	4	-3	-5	-3	-4
S26	The faculty role in CBE is just as important as it is in a traditional class.	-1	6	2	5	6
S32	Students will benefit from CBE transcripts as they enter the workforce.	-3	1	0	0	0
S58	Skilled test-takers will excel in a CBE format; others may not be as successful.	2	-3	0	-5	-5

Table 13 identifies the highest and lowest ranked items for Factor 1. The highest ranked item (S21) indicates that this Factor believes that there will be limited opportunities

for social learning in CBE. The next highest ranked statements provide a variety of perspectives that help characterize this Factor. This includes the idea that a student demonstrating proficiency is more important than earning a grade (S25), which is interesting given the distinguishing statement which indicates that participants in this Factor feel that CBE transcripts are not beneficial (S32). Those grouped in Factor 1 are also worried about the federal audit of a prominent CBE institution (S47), and they feel that engaging with employers is important when developing a CBE program (S34).

The lowest ranked item for this Factor indicates that these participants do not believe that recent high school graduates will be successful in the CBE format (S8). The remaining lowest ranked statements for Factor 1 are associated with instruction and learning, and suggest that these participants do not believe substantive interaction will occur in CBE courses (S3), that CBE is not flexible enough to fit various learning styles (S5), and that the evidence of learning provided by CBE is not on par with what occurs in a traditional course (S10).



Table 13: Highest and lowest ranked items for Factor One

Rank	Number	Statement
(Highest) 6	S21	There could be limited opportunities for social learning in the CBE format.
5	S25	A learner demonstrating proficiency is more important than a learner earning a grade.
5	S47	The audit of a prominent CBE institution by the U.S. Department of Education makes me nervous about the future of CBE.
5	S34	Engaging with employers is important when developing a CBE program.
(Lowest) -6	S8	Recent high school graduates will be successful in the CBE format.
-5	S3	CBE allows for substantive interaction with instructors.
-5	S5	CBE is flexible enough to fit the learning styles of many students.
-5	S10	CBE provides evidence of learning equal to or more rigorous than traditional education.

A post-sort questionnaire was included as part of the survey in order to collect additional thoughts and perceptions regarding CBE as a valid educational modality. Participants were asked to discuss the rankings of their highest (+6) and lowest (-6) statements in terms of the perceptions that influenced the ranking process. Regarding the concourse items that were ranked as +6, participants in Factor 1 provided a variety of clarifying notes. One participant wrote the following as it pertained to the high ranking of the statement dealing with the audit of a prominent CBE institution (S47): “Our previous discussions in the CBE initiative seemed to indicate some concern at the federal level regarding the quality and subsequent accreditation of CBE programs.” Another participant

discussed their concern regarding issues of sustainability (S24) by saying, “Based on some of the information that I have seen at conferences and have heard from other colleges, it appears that the CBE model works best at colleges with high populations of students.” Here, the perception is that CBE may not be as effective at smaller institutions. Another participant provided feedback regarding the rigor of CBE (S10) by saying, “I whole heartedly agree that if a student can complete the material that is more important than the grade they earn.” Additional clarifying statements were given that pertained to agreement with the item regarding granting credit for life experience (S60) and this being “probably the strongest selling point of a CBE program;” the notion that CBE impacts completion (S51) was also touched on, being described as “pretty definitive.” Lastly, one participant explained the importance of generating administrative support for a CBE program (S39) by highlighting the need for this in a community college environment: “For instance, considering we’re a community college and are governed more heavily than a 4-year college, I would think some exceptions would need to be made to be a true CBE program.”

Comments provided at the -6 ranking level for Factor 1 dealt primarily with the effectiveness of the modality in comparison to a traditional approach (S10, S48) and how effective such a course delivery method will be for recent high school graduates (S8). In regards to the overall effectiveness of CBE as an educational modality, one participant wrote, “The traditional classroom approach still works, especially since there are many students out there who need a traditional classroom. Though this may not be sustainable in 100 years, it is still efficient and effective now.” Another respondent said in response to S10, “In my limited experience it seems that the CBE learning model is less rigorous than traditional education.

Though the same material may be presented, the fact is there are usually fewer graded assignments and a focus on larger, more cumulative exams which, in my opinion, lessens the rigor of the course.” The connection of CBE to the liberal arts and sciences (S11) was another noted area of concern by one participant who said, “I am concerned that CBE programs are too heavily focused on general competencies/sub-competencies which are totally independent of any specific general education subject matter.”

In terms of how CBE will impact recent high school graduates (S8), Factor 1 participants expressed a variety of concerns. One person said, “If the CBE model allows self-tracking of attendance and completion of skills, and/or focuses ‘too’ much on individual learning, current generations of ‘traditional’ age students may not do well, considering those parameters of education are not the norm for k-12 public education.” Regarding S8, another participant said, “This statement just kept getting pushed to the end because I didn’t disagree with the other statements quite a much. If allowed to use any number, I probably would have given it a -4 or -5.”

Figure 7 is a model Q sort for Factor 1. It provides a visual representation of the average sorting response for the participants included in Factor 1, and serves as a nice summary of the perspectives contained therein.

Most Disagree												Most Agree
-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
Recent high school graduates will be successful in the CBE format.	CBE allows for substantive interaction with instructors.	CBE can effectively measure concepts associated with liberal arts.	CBE helps address national economic needs.	CBE allows for regular interaction with instructors.	Students will finish a CBE course more quickly than a traditional course.	CBE, in general, can cost less than traditional education.	The use of technology in CBE is only effective if faculty perceive it to be easy to use.	Effectively utilizing existing instructional technologies is crucial to the success of CBE.	The organizational change required for a CBE program is best achieved through faculty support.	Tutors and academic coaches are critical for success in CBE.	A learner demonstrating proficiency is more important than a learner earning a grade.	There could be limited opportunities for social learning in the CBE format.
	CBE is flexible enough to fit the learning styles of many students.	CBE students are guaranteed to have mastered competencies in their field.	College degrees earned through a CBE format are appealing to employers.	CBE allows for access to higher ed. in ways other modalities do not.	Flexibility in pacing will result in greater student success.	Students won't be as successful in CBE because it's often delivered online.	The time it takes to learn a new technology impacts my willingness to use it.	Effectively utilizing new instructional technologies is crucial to the success of CBE.	Demonstrating that an urgent need exists for a CBE program is important for faculty buy-in.	CBE has the potential to limit academic freedom.	Engaging with employers is important when developing a CBE program.	
	CBE provides evidence of learning equal to or more rigorous than traditional education.	CBE is one of the best ways to close the skills gap among working adults.	Students will benefit from CBE transcripts as they enter the workforce.	Participation in CBE support lab settings will be high.	The faculty role in CBE is just as important as it is in a traditional class.	CBE helps address local economic needs.	Technology could be a barrier to student success in CBE.	In general, students may have trouble adjusting to the CBE format.	CBE presents opportunities for a new organizational business model.	CBE programs prevent students from developing "soft skills" due to their vocational nature.	The audit of a prominent CBE institution by the U.S. Department of Education makes me nervous about the future of CBE.	
		CBE is more transparent than traditional education approaches.	In general, arts and sciences faculty believe that CBE is effective.	Going through a CBE program improves a student's marketability.	In general, program/vocational faculty believe that CBE is effective.	Instructors may have trouble adjusting to the "guide on the side" role rather than the traditional "sage on the stage" role.	An LMS specifically designed for CBE is necessary for student success.	The organizational change required for a CBE program is best achieved through administrative support.	CBE transforms the education process.	Having an academic coach or tutor is necessary for student success in CBE.		
			The traditional classroom approach is inefficient or ineffective.	There is a large demand for the innovation afforded by CBE.	CBE will be a lasting trend in higher education.	The terminology associated with CBE could act as a barrier for faculty.	CBE could be impacted by issues of sustainability.	CBE initiatives are perceived as one of many institutional projects, which can result in a diminished sense of importance.	CBE is beneficial because it often grants credit for life experience.			
				A CBE approach more accurately reflects student learning than a traditional approach.	CBE impacts equitable outcomes.	CBE impacts completion.	Employers prefer transcripts that itemize skills as opposed to traditional, "letter grade" records.	Skilled test-takers will excel in a CBE format; others may not be as successful.				
					CBE allows colleges to accurately measure learning outcomes.	CBE impacts transfer rates.	CBE impacts student learning.					
						Non-traditional students will, in general, be successful in the CBE format.						

Figure 7: Model sort for Factor One - Skeptical Views of CBE

Note: Distinguishing items are highlighted in red; consensus items are highlighted in green.

In terms of job role represented in this factor, all but one participant are faculty, with academic faculty representing the majority (four participants).

**Factor Two: Positive Views of CBE.** Factor 2 had five participants and accounted for 12.9% of the variance, as well a 21% of the P set that loaded into a Factor. Factor 2 was titled “Positive Views of CBE” because this characterizes the perspectives of the participants who loaded into this group; three of the four distinguishing statements indicated that these participants believe there are minimal or no barriers to success in CBE as it pertains to both instructors and students adjusting to the modality (S17, S22, S44). The highest ranked statement in this Factor is S26, which shows that these respondents believe that the faculty role in CBE is just as important as in a traditional course.

Table 14 identifies the distinguishing statements for this factor. Factor 2 feels that there are minimal barriers to the successful implementation of a CBE program. One of the participants in this Factor commented on the benefits of developing consensus and sharing ideas among instructors when addressing the concourse item pertaining to instructors adjusting to a more facilitative role (S44) by saying, “The instructor role is changing because of online technology and CBE. I also believe that many instructors do have preferences and strengths that fit well into a team approach which is the direction that education is going.” Also, participants in this factor disagree with the notion that students will not be successful in CBE courses because they may be delivered online (S17), and they believe students won’t have difficulty in adjusting to the competency-based format. These participants are also not worried about federal oversight acting as a barrier for CBE programs.

Table 14: Distinguishing statements for Factor Two

Number	Statement	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
S17	Students won't be as successful in CBE because it's often delivered online.	0	-5	-4	-1	-2
S22	In general, students may have trouble adjusting to the CBE format.	2	-5	3	2	0
S44	Instructors may have trouble adjusting to the "guide on the side" role rather than the traditional "sage on the stage" role.	0	-4	5	0	-2
S47	The audit of a prominent CBE institution by the U.S. Department of Education makes me nervous about the future of CBE	5	-6	-2	4	-2

Table 15 provides the highest and lowest ranked concourse items for Factor 2. Three of the highest ranked items (S26, S1, S28) are focused on the importance that tutoring and instruction will play in student success; the remaining highest ranked item indicates these participants' perception that demonstrating proficiency is more important than earning a grade (S25), which is also characteristic of this Factor's tendency to place learning above all else.

The lowest ranked item (S47) suggests that there are no concerns in this Factor regarding federal interference in CBE programs; two of the three lowest ranked statements (S48, S22, S17) are once again associated with learning and highlight the perception that

minimal barriers exist in the CBE format. The remaining lowest ranked item suggests that this Factor feels that CBE is not the only effective means for educating students.

Table 15: Highest and lowest ranked items for Factor Two

Rank	Number	Statement
(Highest) 6	S26	The faculty role in CBE is just as important as it is in a traditional class.
5	S1	Tutors and academic coaches are critical for success in CBE.
5	S28	Having an academic coach or tutor is necessary for student success in CBE.
5	S25	A learner demonstrating proficiency is more important than a learner earning a grade.
(Lowest) -6	S47	The audit of a prominent CBE institution by the U.S. Department of Education makes me nervous about the future of CBE.
-5	S48	The traditional classroom approach is inefficient or ineffective.
-5	S22	In general, students may have trouble adjusting to the CBE format.
-5	S17	Students won't be as successful in CBE because it's often delivered online.

The post-sort questionnaire, which asked participants to elaborate on what informed their decision to rank their highest (+6) and lowest (-6) ranked items, provides additional insight into this Factor's perceptions. Regarding the highest ranked items, a variety of attitudes emerge, not all of which are positive in terms of the CBE modality. In referencing the concourse item that dealt with social learning (S21), one participant said the following:

I picked this ranking since CBE is designed to get people through areas of known knowledge faster or allow someone to finish a program or set of courses faster than normal. I think this would put students on different paths and not necessarily have an

opportunity to interact with other students as they may be within different areas of a course that do not overlap or encourage discussions among peers.

Another participant noted that, “The setup of CBE is so different from what students are used to. They are going to have to get used to how CBE works.” In this regard, they felt that CBE is, in fact, transformational (S54), though there may be a learning curve involved. The remaining highest ranked items are centered on what is perceived to be the more intense rigor of CBE (S10) and the importance of the faculty role (S26).

In terms of the lowest ranked items, two of the participants in this Factor felt that the audit of a prominent CBE institution is not a cause for concern (S47). One of these participants wrote, “I just have confidence that in time all the concerns/issues will be worked out.” Another low-ranked item has to do with the effectiveness of the traditional classroom approach (S48); in response to this, one participant said, “The traditional classroom approach has its flaws, but it is hardly a waste of time.” This participant went on to say, “Many students need that face-to-face interaction on a regular schedule that only the traditional classroom approach can provide.”

Figure 8 is a model sort for Factor 2. This encapsulates the perspectives held by participants in this group, and characterizes their general belief that Positive Views of CBE exist.



Most Disagree												Most Agree
-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
The audit of a prominent CBE institution by the U.S. Department of Education makes me nervous about the future of CBE.	Students won't be as successful in CBE because it's often delivered online.	Recent high school graduates will be successful in the CBE format.	CBE programs prevent students from developing "soft skills" due to their vocational nature.	Flexibility in pacing will result in greater student success.	CBE allows for access to higher ed. in ways other modalities do not.	CBE allows for regular interaction with instructors.	Effectively utilizing existing instructional technologies is crucial to the success of CBE.	CBE provides evidence of learning equal to or more rigorous than traditional education.	CBE is flexible enough to fit the learning styles of many students.	Engaging with employers is important when developing a CBE program.	Tutors and academic coaches are critical for success in CBE.	The faculty role in CBE is just as important as it is in a traditional class.
	In general, students may have trouble adjusting to the CBE format.	CBE, in general, can cost less than traditional education.	Participation in CBE support lab settings will be high.	CBE can effectively measure concepts associated with liberal arts.	Students will finish a CBE course more quickly than a traditional course.	CBE allows for substantive interaction with instructors.	The use of technology in CBE is only effective if faculty perceive it to be easy to use.	Going through a CBE program improves a student's marketability.	There could be limited opportunities for social learning in the CBE format.	The organizational change required for a CBE program is best achieved through administrative support.	A learner demonstrating proficiency is more important than a learner earning a grade.	
	The traditional classroom approach is inefficient or ineffective.	CBE students are guaranteed to have mastered competencies in their field.	CBE initiatives are perceived as one of many institutional projects, which can result in a diminished sense of importance.	CBE has the potential to limit academic freedom.	The time it takes to learn a new technology impacts my willingness to use it.	Effectively utilizing new instructional technologies is crucial to the success of CBE.	CBE helps address local economic needs.	CBE will be a lasting trend in higher education.	Demonstrating that an urgent need exists for a CBE program is important for faculty buy-in.	The organizational change required for a CBE program is best achieved through faculty support.	Having an academic coach or tutor is necessary for student success in CBE.	
		Instructors may have trouble adjusting to the "guide on the side" role rather than the traditional "sage on the stage" role.	There is a large demand for the innovation afforded by CBE.	In general, arts and sciences faculty believe that CBE is effective.	Technology could be a barrier to student success in CBE.	An LMS specifically designed for CBE is necessary for student success.	CBE helps address national economic needs.	CBE impacts student learning.	CBE presents opportunities for a new organizational business model.	CBE is beneficial because it often grants credit for life experience.		
			Skilled test-takers will excel in a CBE format; others may not be as successful.	The terminology associated with CBE could act as a barrier for faculty.	CBE could be impacted by issues of sustainability.	College degrees earned through a CBE format are appealing to employers.	Students will benefit from CBE transcripts as they enter the workforce.	CBE transforms the education process.	CBE allows colleges to accurately measure learning outcomes.			
				CBE impacts completion.	CBE is one of the best ways to close the skills gap among working adults.	Employers prefer transcripts that itemize skills as opposed to traditional, "letter grade" records.	In general, program/vocational faculty believe that CBE is effective.	A CBE approach more accurately reflects student learning than a traditional approach.				
					Non-traditional students will, in general, be successful in the CBE format.	CBE impacts equitable outcomes.	CBE is more transparent than traditional education approaches.					
							CBE impacts transfer rates.					

Figure 8: Model sort for Factor Two – Positive Views of CBE

Note. Distinguishing items are highlighted in red; consensus items are highlighted in green.

The participants who loaded into this Factor are mostly career and technical education faculty (three of five participants). One administrator is represented here, as is one academic faculty member.

**Factor Three: Critically Supportive of CBE.** Factor 3 had six participants and accounted for 10.5% of the variance, as well as 25% of the P set that loaded into a factor.

This Factor's name was assigned due to the wide variety of highest ranked, lowest ranked, and distinguishing statements that characterize the Factor. One such example includes its highest-ranking concourse item (S39), which indicates that the participants believe that administrative support is very important for the success of a CBE program. The distinguishing statements for this Factor indicate that this group does not believe that using new instructional technology is crucial to the success of a CBE program (S14); they also do not believe online delivery of CBE courses will hinder student success (S17). However, this group does believe that an LMS designed specifically for a CBE course is important for student success (S19). In addition, this Factor feels that the faculty role in CBE is just as important as it is in a traditional course (S26).

Table 16 identifies the distinguishing statements for Factor 3. In addition to the aforementioned items regarding instructional technologies, participants in this Factor do not tend to believe that CBE can cost less than traditional education (S9). They also do not feel that CBE impacts equitable outcomes (S49), but they do think that it can impact completion (S51). Additionally, the respondents who loaded into this group feel that it is not as important to demonstrate an urgent need for a CBE program in order to generate faculty buy-in (S41). Interestingly, this group does somewhat feel that the traditional classroom approach is

ineffective (S48). They also feel that CBE is more transparent than traditional education approaches and that the non-traditional student will be successful in competency-based courses (S53, S56).

Table 16: Distinguishing statements for Factor Three

Number	Statement	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
S9	CBE, in general, can cost less than traditional education.	0	-4	-2	-5	3
S14	Effectively utilizing new instructional technologies is crucial to the success of CBE.	2	0	-3	2	5
S15	The use of technology in CBE is only effective if faculty perceive it to be easy to use.	1	1	-4	1	-1
S17	Students won't be as successful in CBE because it's often delivered online.	0	-5	-4	-1	-2
S19	An LMS specifically designed for CBE is necessary for student success.	1	0	4	-2	-3
S26	The faculty role in CBE is just as important as it is in a traditional class.	-1	6	2	5	6
S41	Demonstrating that an urgent need exists for a CBE program is important for faculty buy-in.	3	3	-1	2	-5

Table 16 Continued

S44	Instructors may have trouble adjusting to the “guide on the side” role rather than the traditional “sage on the stage” role.	0	-4	5	0	-2
S48	The traditional classroom approach is inefficient or ineffective.	-3	-5	1	-5	-6
S49	CBE impacts equitable outcomes.	-1	0	-5	-1	1
S51	CBE impacts completion.	0	-2	5	0	3
S53	CBE is more transparent than traditional education approaches.	-4	1	3	0	-5
S56	Non-traditional students will, in general, be successful in the CBE format.	0	-1	4	1	1

Table 17 provides the highest and lowest ranked items for Factor 3, “Critically Supportive of CBE.” The highest-ranked item (S39) indicates that this group believes that administrative support is key for the success of any competency-based education program. In regards to this, one participant said, “Administrative support ensures resources are appropriately allocated to the project and ensures compliance with local, state, and federal rules and regulations.” Another respondent wrote, “The changes CBE requires cannot happen without administrative support because they are fundamental changes to the way the system currently operates.” Two of the items ranked at the +5 level (S44, S50) are focused on instruction and learning; the former suggests that this group feels strongly that instructors

may have trouble adjusting to a more facilitative role, while the latter implies that, in general, this group believes that CBE will impact student learning.

Regarding the lowest ranked item, this Factor feels that recent high school graduates will not be successful in the CBE format (S8). One participant said, “Based upon the difficulties that young students often have with intrinsic motivation, time management, identifying their own needs, and self-guided learning, CBE may not be the proper choice for a recent high school graduate [...]” The remaining lowest ranked items address a variety of issues, ranging from the speed at which a student will complete a CBE course (S6), disagreement with the notion that CBE programs will prevent students from developing “soft skills” (S23), and disagreement with the sentiment that CBE impacts equitable outcomes (S49).

Table 17: Highest and lowest ranked items for Factor Three

Rank	Number	Statement
(Highest) 6	S39	The organizational change required for a CBE program is best achieved through administrative support.
5	S44	Instructors may have trouble adjusting to the “guide on the side” role rather than the traditional “sage on the stage” role.
5	S50	CBE impacts student learning.
5	S51	CBE impacts completion.
(Lowest) 6	S8	Recent high school graduates will be successful in the CBE format.
-5	S6	Students will finish a CBE course more quickly than a traditional course.
-5	S23	CBE programs prevent students from developing “soft skills” due to their vocational nature.
-5	S49	CBE impacts equitable outcomes.

Additional comments obtained from the post-sort questionnaire shed more light on the various statement rankings. Item S44 deals with the role of instructors and how well they will adapt to the “guide on the side” approach. One participant wrote, “Instructors may have difficulties allowing their students to guide their own learning if their own methods are built upon themselves as the expert. However, adjusting to new andragogical methods is best for adult learners.” Regarding the question of how CBE impacts completion (S51), one respondent said, “Providing flexibility to learn content at a personalized pace allows students to take more time on difficult concepts and speed up on easier concepts without having to keep the same pace as 20 other students which leads to increased completion; this personalization truly meets the learning needs of the individual learner.” Thoughts were also

provided regarding several of the lowest-ranked items, including commentary pertaining to the acquisition of “soft skills” (S23). A participant said, “[...] CBE programs incorporate and assess soft skills more explicitly than other programs because they address the student’s needs holistically.”

Figure 9 provides a model sort for Factor 3. This model sort was created using the factor array for Factor 3, and represents the average ranking score for each concourse item.

Most Disagree												Most Agree
-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
Recent high school graduates will be successful in the CBE format.	Students will finish a CBE course more quickly than a traditional course.	The use of technology in CBE is only effective if faculty perceive it to be easy to use.	CBE is flexible enough to fit the learning styles of many students.	Flexibility in pacing will result in greater student success.	Effectively utilizing existing instructional technologies is crucial to the success of CBE.	CBE allows for access to higher ed. in ways other modalities do not.	CBE allows for regular interaction with instructors.	CBE allows for substantive interaction with instructors.	Tutors and academic coaches are critical for success in CBE.	An LMS specifically designed for CBE is necessary for student success.	Instructors may have trouble adjusting to the "guide on the side" role rather than the traditional "sage on the stage" role.	The organizational change required for a CBE program is best achieved through administrative support.
	CBE programs prevent students from developing "soft skills" due to their vocational nature.	Students won't be as successful in CBE because it's often delivered online.	CBE can effectively measure concepts associated with liberal arts.	CBE, in general, can cost less than traditional education.	A learner demonstrating proficiency is more important than a learner earning a grade.	CBE students are guaranteed to have mastered competencies in their field.	Technology could be a barrier to student success in CBE.	The faculty role in CBE is just as important as it is in a traditional class.	In general, students may have trouble adjusting to the CBE format.	Having an academic coach or tutor is necessary for student success in CBE.	CBE impacts student learning.	
	CBE impacts equitable outcomes.	CBE has the potential to limit academic freedom.	Effectively utilizing new instructional technologies is crucial to the success of CBE.	CBE provides evidence of learning equal to or more rigorous than traditional education.	Employers prefer transcripts that itemize skills as opposed to traditional, "letter grade" records.	CBE helps address local economic needs.	There could be limited opportunities for social learning in the CBE format.	CBE presents opportunities for a new organizational business model.	Engaging with employers is important when developing a CBE program.	The organizational change required for a CBE program is best achieved through faculty support.	CBE impacts completion.	
		College degrees earned through a CBE format are appealing to employers.	The time it takes to learn a new technology impacts my willingness to use it.	Participation in CBE support lab settings will be high.	Demonstrating that an urgent need exists for a CBE program is important for faculty buy-in.	CBE helps address national economic needs.	CBE could be impacted by issues of sustainability.	CBE transforms the education process.	CBE is more transparent than traditional education approaches.	Non-traditional students will, in general, be successful in the CBE format.		
			Going through a CBE program improves a student's marketability.	In general, arts and sciences faculty believe that CBE is effective.	The terminology associated with CBE could act as a barrier for faculty.	Students will benefit from CBE transcripts as they enter the workforce.	CBE is one of the best ways to close the skills gap among working adults.	There is a large demand for the innovation afforded by CBE.	CBE is beneficial because it often grants credit for life experience.			
				The audit of a prominent CBE institution by the U.S. Department of Education makes me nervous about the future of CBE.	CBE impacts transfer rates.	In general, program/vocational faculty believe that CBE is effective.	CBE initiatives are perceived as one of many institutional projects, which can result in a diminished sense of importance.	CBE allows colleges to accurately measure learning outcomes.				
					A CBE approach more accurately reflects student learning than a traditional approach.	CBE will be a lasting trend in higher education.	The traditional classroom approach is inefficient or ineffective.					
						Skilled test-takers will excel in a CBE format; others may not be as successful.						

Figure 9: Model sort for Factor Three – Critically Supportive of CBE

Note. Distinguishing items are highlighted in red; consensus items are highlighted in green.



Five of the six participants who loaded into this Factor are administrators; one academic faculty member is represented here.

**Factor Four: Stakeholder-centric CBE.** Factor 4 had two participants, accounting for 9.1% of variance and 8% of the P set that loaded into a factor. This Factor's name was derived from its highest rated concourse items, one of which focuses on internal administrative influencers (S39), with the other centered on industry-level support (S34).

Table 18 provides the distinguishing statements for Factor 4. Participants in this Factor somewhat disagreed with the notion that tutors and academic coaches are critical for success in CBE (S1). These individuals also strongly disagree with the statement that CBE has the potential to limit academic freedom (S20). Those who loaded into this group believe that demonstrating proficiency is more important than earning a grade (S25), and they feel that program and vocational faculty think that CBE is effective (S38). Regarding how CBE is perceived in the midst of many college initiatives, they think that a diminished sense of importance is a real possibility (S46). Overall, these participants feel that CBE will be a lasting trend in higher education (S46), with one person ranking this as one of their highest items.

Table 18: Distinguishing statements for Factor Four

Number	Statement	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
S1	Tutors and academic coaches are critical for success in CBE.	4	5	3	-2	2
S20	CBE has the potential to limit academic freedom.	4	-2	-4	-6	0
S25	A learner demonstrating proficiency is more important than a learner earning a grade.	5	5	-1	2	-2
S28	Having an academic coach or tutor is necessary for student success in CBE.	4	5	4	-3	5
S38	In general, program/vocational faculty believe that CBE is effective.	-1	1	0	3	1
S42	CBE initiatives are perceived as one of many institutional projects, which can result in a diminished sense of importance.	2	-3	1	5	0
S46	CBE will be a lasting trend in higher education.	-1	2	0	4	-4
S50	CBE impacts student learning.	1	2	5	-1	3

Table 19 shows the highest and lowest ranked items for Factor 4. The highest-ranked item for this Factor (S39) drives home the observation that the participants who loaded into this group feel strongly that administrative support is necessary in order for a CBE program to be successful. Of the other highly-ranked statements, item S26 was given additional commentary by one of the two participants in this Factor. This person said, “I feel that the faculty role is important in any class, regardless of format. It is necessary to have that content expert that is able to extend concepts beyond the purely textbook applications.”

Of the lowest-ranked items, one participant wrote regarding S48, “Traditional classrooms are still very effective for learners and can be of use to CBE. The proliferation of online courses does not detract from the validity of well-designed and delivered face-to-face courses (and vice-versa).”

Table 19: Highest and lowest ranked items for Factor Four

Rank	Number	Statement
(Highest) 6	S39	The organizational change required for a CBE program is best achieved through administrative support.
5	S42	CBE initiatives are perceived as one of many institutional projects, which can result in a diminished sense of importance.
5	S34	Engaging with employers is important when developing a CBE program.
5	S26	The faculty role in CBE is just as important as it is in a traditional class.
(Lowest) -6	S20	CBE has the potential to limit academic freedom.
-5	S9	CBE, in general, can cost less than traditional education.
-5	S48	The traditional classroom approach is inefficient or ineffective.
-5	S58	Skilled test-takers will excel in a CBE format; others may not be as successful.

Figure 10 provides a model sort for Factor 4. Due to the rounding of the z scores for each course item, this is not a forced-choice distribution Q sort.

Most Disagree												Most Agree
-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
CBE has the potential to limit academic freedom.	CBE, in general, can cost less than traditional education.	CBE allows for regular interaction with instructors.	CBE allows for substantive interaction with instructors.	Tutors and academic coaches are critical for success in CBE.	Effectively utilizing existing instructional technologies is crucial to the success of CBE.	Flexibility in pacing will result in greater student success.	CBE is flexible enough to fit the learning styles of many students.	Effectively utilizing new instructional technologies is crucial to the success of CBE.	CBE can effectively measure concepts associated with liberal arts.	CBE allows for access to higher ed. in ways other modalities do not.	The faculty role in CBE is just as important as it is in a traditional class.	The organizational change required for a CBE program is best achieved through administrative support.
	The traditional classroom approach is inefficient or ineffective.	Recent high school graduates will be successful in the CBE format.	Students will finish a CBE course more quickly than a traditional course.	CBE students are guaranteed to have mastered competencies in their field.	Students won't be as successful in CBE because it's often delivered online.	Technology could be a barrier to student success in CBE.	CBE provides evidence of learning equal to or more rigorous than traditional education.	There could be limited opportunities for social learning in the CBE format.	CBE could be impacted by issues of sustainability.	CBE will be a lasting trend in higher education.	Engaging with employers is important when developing a CBE program.	
	Skilled test-takers will excel in a CBE format; others may not be as successful.	The time it takes to learn a new technology impacts my willingness to use it.	CBE programs prevent students from developing "soft skills" due to their vocational nature.	An LMS specifically designed for CBE is necessary for student success.	CBE is one of the best ways to close the skills gap among working adults.	CBE helps address local economic needs.	The use of technology in CBE is only effective if faculty perceive it to be easy to use.	In general, students may have trouble adjusting to the CBE format.	In general, program/vocational faculty believe that CBE is effective.	The audit of a prominent CBE institution by the U.S. Department of Education makes me nervous about the future of CBE.	CBE initiatives are perceived as one of many institutional projects, which can result in a diminished sense of importance.	
		CBE helps address national economic needs.	Participation in CBE support lab settings will be high.	CBE impacts transfer rates.	CBE program improves a student's marketability.	College degrees earned through a CBE format are appealing to employers.	There is a large demand for the innovation afforded by CBE.	A learner demonstrating proficiency is more important than a learner earning a grade.	CBE transforms the education process.	CBE is beneficial because it often grants credit for life experience.		
			Having an academic coach or tutor is necessary for student success in CBE.	CBE allows colleges to accurately measure learning outcomes.	In general, arts and sciences faculty believe that CBE is effective.	Students will benefit from CBE transcripts as they enter the workforce.	Non-traditional students will, in general, be successful in the CBE format.	The organizational change required for a CBE program is best achieved through faculty support.				
			Employers prefer transcripts that itemize skills as opposed to traditional, "letter grade" records.		CBE impacts equitable outcomes.	Instructors may have trouble adjusting to the "guide on the side" role rather than the traditional "sage on the stage" role.	A CBE approach more accurately reflects student learning than a traditional approach.	Demonstrating that an urgent need exists for a CBE program is important for faculty buy-in.				
					CBE impacts student learning.	The terminology associated with CBE could act as a barrier for faculty.		CBE presents opportunities for a new organizational business model.				
						CBE impacts completion.						
						CBE is more transparent than traditional education approaches.						

Figure 30: Model sort for Factor Four: Stakeholder-centric CBE

Note. Distinguishing items are highlighted in red; consensus items are highlighted in green.

One administrator and one academic faculty member loaded into this Factor.

**Factor Five: Faculty-centric CBE.** Factor 5 had three participants, which accounted for 7.6% of the variance and 13% of the P set that loaded into a Factor. The Factor's name was derived after reviewing the highest and lowest rated items for this group, most of which are focused on the impact of faculty. For example, the highest rated item for this group (S26) indicates that these participants feel strongly that the faculty role is just as important in a CBE class as it is in a traditional class; they also strongly believe that the traditional classroom approach is effective (S48).

Table 20 provides the distinguishing statements for Factor 5. The participants who loaded into this Factor somewhat agree that students in a CBE course will finish it more quickly than they might a traditional course (S6), and they agree that CBE could potentially cost less than traditional education (S9). They also feel that utilizing existing instructional technology is crucial to the success of CBE in general (S13). Those individuals who loaded into Factor 5 are neutral when it comes to determining whether or not students will have trouble adjusting to the CBE format (S22). Interestingly, they strongly disagree with the idea that an urgent need for CBE must be demonstrated in order to generate faculty buy-in (S41), and they do not seem to believe that CBE will be a lasting trend in higher education (S46). These participants strongly disagree with the statement that the traditional classroom approach is ineffective (S48), and they agree that CBE impacts completion (S51).

Table 20: Distinguishing statements for Factor Five

Number	Statement	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
S6	Students will finish a CBE course more quickly than a traditional course.	-1	-1	-5	-3	2
S9	CBE, in general, can cost less than traditional education.	0	-4	-2	-5	3
S13	Effectively utilizing existing instructional technologies is crucial to the success of CBE.	2	1	-1	-1	5
S22	In general, students may have trouble adjusting to the CBE format.	2	-5	3	2	0
S41	Demonstrating that an urgent need exists for a CBE program is important for faculty buy-in.	3	3	-1	2	-5
S46	CBE will be a lasting trend in higher education.	-1	2	0	4	-4
S48	The traditional classroom approach is inefficient or ineffective.	-3	-5	1	-5	-6
S51	CBE impacts completion.	0	-2	5	0	3

Table 21 indicates the highest and lowest ranked items for Factor 5. Two of the highest ranked statements deal with the importance of instruction and tutoring in regards to the success of a CBE program (S26, S28). The remaining two highest ranked items deal with the importance of utilizing both existing and new instructional technologies (S13, S14). In regards to the highest ranked item (S26), one participant wrote on the post-sort questionnaire, “The faculty, as always, are in charge of developing the course, designing the in-class activity and working with students. So, while the format has changed, it seems to me that the unique sensibilities of the instructor are still as valuable in CBE as in traditional.”

In regards to the lowest ranked item for this Factor (S48), a participant referred to the notion of the traditional classroom as being ineffective or inefficient as “non-sense.” Another participant wrote, “There have been a lot of successes using the traditional classroom approach (as witnessed by almost all the educators in higher-ed and scholarly research today).” This individual went on to say, “[...] students have always been responsible for their own learning within any framework, to include traditional and non-traditional modes of delivery.”

Table 21: Highest and lowest ranked items for Factor Five

Rank	Number	Statement
(Highest) 6	S26	The faculty role in CBE is just as important as it is in a traditional class.
5	S13	Effectively utilizing existing instructional technologies is crucial to the success of CBE.
5	S14	Effectively utilizing new instructional technologies is crucial to the success of CBE.
5	S28	Having an academic coach or tutor is necessary for student success in CBE.
(Lowest) -6	S48	The traditional classroom approach is inefficient or ineffective.
-5	S58	Skilled test-takers will excel in a CBE format; others may not be as successful.
-5	S53	CBE is more transparent than traditional education approaches.
-5	S41	Demonstrating that an urgent need exists for a CBE program is important for faculty buy-in.

Figure 11 provides a model sort for Factor 5. Due to the rounding of the z scores for each concourse item, this is not a forced-choice distribution Q sort.

Most Disagree												Most Agree
-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
The traditional classroom approach is inefficient or ineffective.	Demonstrating that an urgent need exists for a CBE program is important for faculty buy-in.	Recent high school graduates will be successful in the CBE format.	CBE provides evidence of learning equal to or more rigorous than traditional education.	Students won't be as successful in CBE because it's often delivered online.	CBE allows for regular interaction with instructors.	CBE is flexible enough to fit the learning styles of many students.	Flexibility in pacing will result in greater student success.	Tutors and academic coaches are critical for success in CBE.	CBE, in general, can cost less than traditional education.	CBE allows for access to higher ed. in ways other modalities do not.	Effectively utilizing existing instructional technologies is crucial to the success of CBE.	The faculty role in CBE is just as important as it is in a traditional class.
	CBE is more transparent than traditional education approaches.	CBE programs prevent students from developing "soft skills" due to their vocational nature.	The time it takes to learn a new technology impacts my willingness to use it.	A learner demonstrating proficiency is more important than a learner earning a grade.	CBE allows for substantive interaction with instructors.	CBE has the potential to limit academic freedom.	CBE students are guaranteed to have mastered competencies in their field.	Students will finish a CBE course more quickly than a traditional course.	CBE presents opportunities for a new organizational business model.	CBE can effectively measure concepts associated with liberal arts.	Effectively utilizing new instructional technologies is crucial to the success of CBE.	
	Skilled test-takers will excel in a CBE format; others may not be as successful.	Participation in CBE support lab settings will be high.	An LMS specifically designed for CBE is necessary for student success.	Instructors may have trouble adjusting to the "guide on the side" role rather than the traditional "sage on the stage" role.	The use of technology in CBE is only effective if faculty perceive it to be easy to use.	In general, students may have trouble adjusting to the CBE format.	CBE helps address local economic needs.	Technology could be a barrier to student success in CBE.	CBE impacts student learning.	Engaging with employers is important when developing a CBE program.	Having an academic coach or tutor is necessary for student success in CBE.	
		CBE will be a lasting trend in higher education.	College degrees earned through a CBE format are appealing to employers.	The terminology associated with CBE could act as a barrier for faculty.	CBE helps address national economic needs.	Students will benefit from CBE transcripts as they enter the workforce.	In general, program/vocational faculty believe that CBE is effective.	There could be limited opportunities for social learning in the CBE format.	CBE impacts completion.	CBE transforms the education process.		
			CBE is one of the best ways to close the skills gap among working adults.	The audit of a prominent CBE institution by the U.S. Department of Education makes me nervous about the future of CBE.	In general, arts and sciences faculty believe that CBE is effective.	Employers prefer transcripts that itemize skills as opposed to traditional, "letter grade" records.	The organizational change required for a CBE program is best achieved through faculty support.	CBE could be impacted by issues of sustainability.				
				CBE impacts transfer rates.	There is a large demand for the innovation afforded by CBE.	Going through a CBE program improves a student's marketability.	CBE impacts equitable outcomes.	The organizational change required for a CBE program is best achieved through administrative support.				
					A CBE approach more accurately reflects student learning than a traditional approach.	CBE initiatives are perceived as one of many institutional projects, which can result in a diminished sense of importance. CBE allows colleges to accurately measure learning outcomes.	Non-traditional students will, in general, be successful in the CBE format.	CBE is beneficial because it often grants credit for life experience.				

Figure 41: Model sort for Factor Five – Faculty-centric CBE

Note. Distinguishing items are highlighted in red; consensus items are highlighted in green.



All of the participants who loaded into Factor Five are academic faculty.

### **Summary**

In Chapter 4, the data collected from the survey distributed to NC-CBE Project curriculum development participants—which consisted of faculty and administrators—were analyzed, which resulted in 24 participants loading into the five factors that were identified. Both qualitative responses and quantitative data were collected and analyzed to complete the study. Factor analysis was performed on the Q sorts submitted by faculty and administrators. The post-sort questionnaire provided the qualitative data that helped explain the various ranking tendencies of the participants that loaded into each Factor.

Factor One, “Skeptical Views of CBE,” can be characterized as representing participants who feel that there are more drawbacks than benefits to the CBE modality. In general, those participants who loaded in this factor are worried about the future of CBE and the limitations of the modality.

Factor Two, “Positive Views of CBE,” contains individuals who believe that the opportunities afforded by CBE outweigh any potential risks. These participants feel that online delivery of CBE will not hinder student success and that students will not experience difficulty adjusting to the format. They are not concerned about instructors adjusting to the modality, and they are not worried about how federal oversight may impact the future of competency-based education.

Factor Three, “Critically Supportive of CBE,” is multifaceted, but could be defined first by its feelings toward the role of technology in a CBE course. These participants believe that a CBE-specific LMS is necessary for student success; they also feel that a faculty

member's perception of how easy-to-use a technology is does not impact the usefulness of that technology (in other words, they feel that having the appropriate technology in place in a CBE course is important, regardless of whether or not faculty are initially able to perceive its usefulness). Instruction was another important component of this factor, as participants felt that the faculty role is just as important in CBE as it is in traditional instruction; they also felt that some guidance may be needed in terms of helping instructors adapt to the CBE format. These individuals also felt that administrative support is important for the development of a CBE program.

Factor Four, "Stakeholder-centric CBE," felt that support at all levels—among administrators, faculty, students, and industry—will make or break a CBE program.

Factor Five, "Faculty-centric CBE," felt that the role of faculty as it is tied to the use of new and existing technologies, the role of the instructor within the classroom, and their perceptions of CBE as a potentially temporary trend will impact the development of a competency-based education program.

Based on this analysis, it is clear that there are a variety of perspectives contained within the curriculum team of the NC-CBE Project. Careful examination of the distinguishing statements, highest and lowest rated items, and post-survey questionnaire responses helps highlight these varying points of view.

## CHAPTER 5: DISCUSSION AND IMPLICATIONS

This study was designed to identify factors that characterize the perceptions and attitudes of curriculum development participants of the NC-CBE Project, which includes individuals from four North Carolina community colleges. A Q set of 60 items was developed from the prominent literature surrounding competency-based education, and a Q grid with a +6 (most agree) to -6 (most disagree) was created so that participants could rank their perceptions of the various statements as it relates to the notion that CBE is a valid educational method for assigning course credit. To date, the researcher is not aware of another study designed to examine a relatively small group of community colleges attempting to develop a CBE program in coordination with one another. This gap in the literature and the immediate application of the study made the subject relevant and timely given the goals of the NC-CBE Project.

This chapter will explore the findings of the study and will summarize the characteristics of the five factors that were identified.

### Conclusions

The following research question was addressed in this study:

1. What are the viewpoints of community college faculty and administrators toward competency-based education and why?

**Finding 1.** The five-factor solution that emerged from the research characterizes the various perspectives and points of view of the NC-CBE Project curriculum team members who participated in the study. In general, the perceptions of competency-based education vary widely among the five factors that were identified.

The five-factor solution that emerged from the analysis helps characterize the varying perspectives held by the curriculum participants of the NC-CBE Project. The researcher provided a title for each factor that characterizes the perspectives of each group.

Factor One: Skeptical Views of CBE

Factor Two: Positive Views of CBE

Factor Three: Critically Supportive of CBE

Factor Four: Stakeholder-centric CBE

Factor Five: Faculty-centric CBE: Faculty/Instructional Design Important in CBE

An in-depth description and review of these five factors is included in Chapter 4. This discussion includes an analysis of the highest and lowest ranked concourse items for each factor, as well as the distinguishing statements. In general, these five factors encompass the broad range of perspectives held by the NC-CBE Project curriculum team participants.

**Finding 2.** In order to address the overarching research question, the factor array was created and examined to identify the highest rated items in the concourse for each factor. The highest rated items were examined in conjunction with the lowest rated items and distinguishing statements for each factor in order to create a name that would most accurately characterize or describe the factor in question. The highest ranked items, contained in Table 22, suggest that four of the five factors believe that the role of faculty is important in a CBE program, as is administrative support. Technological support stood out as an important item for Factor Five alongside acknowledging the need for tutors or academic coaches.

Table 22: Highest ranked statements for the five factors

Factor	Number	Statement
F1: Skeptical Views of CBE	S21	There could be limited opportunities for social learning in the CBE format.
	S25	A learner demonstrating proficiency is more important than a learner earning a grade.
	S47	The audit of a prominent CBE institution by the U.S. Department of Education makes me nervous about the future of CBE.
	S34	Engaging with employers is important when developing a CBE program.
F2: Positive Views of CBE	S26	The faculty role in CBE is just as important as it is in a traditional class.
	S1	Tutors and academic coaches are critical for success in CBE.
	S28	Having an academic coach or tutor is necessary for student success in CBE.
	S25	A learner demonstrating proficiency is more important than a learner earning a grade.
F3: Critically Supportive of CBE	S39	The organizational change required for a CBE program is best achieved through administrative support.
	S44	Instructors may have trouble adjusting to the “guide on the side” role rather than the traditional “sage on the stage” role.
	S50	CBE impacts student learning.
	S51	CBE impacts completion.

Table 22 continued

	S39	The organizational change required for a CBE program is best achieved through administrative support.
F4: Stakeholder-centric CBE	S42	CBE initiatives are perceived as one of many institutional projects, which can result in a diminished sense of importance.
	S34	Engaging with employers is important when developing a CBE program.
	S26	The faculty role in CBE is just as important as it is in a traditional class.
F5: Faculty-centric CBE	S26	The faculty role in CBE is just as important as it is in a traditional class.
	S13	Effectively utilizing existing instructional technologies is crucial to the success of CBE.
	S14	Effectively utilizing new instructional technologies is crucial to the success of CBE.
	S28	Having an academic coach or tutor is necessary for student success in CBE.

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**Finding 3.** The lowest rated items were drawn from the factor array and were reviewed in conjunction with the highest rated items and distinguishing statements to create names for each factor. Among the factors, three disagreed with the notion that the traditional classroom is ineffective or inefficient. The remaining lowest ranked statements helped further draw distinctions between each factor.

Table 23: Lowest ranked statements for the five factors

Factor	Number	Statement
F1: Skeptical Views of CBE	S8	Recent high school graduates will be successful in the CBE format.
	S3	CBE allows for substantive interaction with instructors.
	S5	CBE is flexible enough to fit the learning styles of many students.
	S10	CBE provides evidence of learning equal to or more rigorous than traditional education.
F2: Positive Views of CBE	S47	The audit of a prominent CBE institution by the U.S. Department of Education makes me nervous about the future of CBE.
	S48	The traditional classroom approach is inefficient or ineffective.
	S22	In general, students may have trouble adjusting to the CBE format.
	S17	Students won't be as successful in CBE because it's often delivered online.
F3: Critically Supportive of CBE	S8	Recent high school graduates will be successful in the CBE format.
	S6	Students will finish a CBE course more quickly than a traditional course.
	S23	CBE programs prevent students from developing "soft skills" due to their vocational nature.
	S49	CBE impacts equitable outcomes.

Table 23 continued

	S20	CBE has the potential to limit academic freedom.
	S9	CBE, in general, can cost less than traditional education.
F4: Stakeholder-centric CBE	S48	The traditional classroom approach is inefficient or ineffective.
	S58	Skilled test-takers will excel in a CBE format; others may not be as successful.
	S48	The traditional classroom approach is inefficient or ineffective.
	S58	Skilled test-takers will excel in a CBE format; others may not be as successful.
F5: Faculty-centric CBE:	S53	CBE is more transparent than traditional education approaches.
	S41	Demonstrating that an urgent need exists for a CBE program is important for faculty buy-in.

**Finding 4.** In two of the five factors a very clear association between job role and characteristics of a given factor can be seen. 83% of Factor 3—“Critically Supportive of CBE”—is comprised of administrators. This finding indicates that those with job roles that are primarily administrative or non-instructional feel that CBE will benefit from the use of an LMS designed specifically for CBE; they believe the faculty role in CBE is just as important as it is in a traditional classroom; and they don’t feel that an urgent need for CBE needs to be demonstrated in order to generate faculty buy-in. Factor Five—“Faculty-centric CBE: Faculty/Instructional Design Important in CBE”—is composed of 100% academic faculty, and indicates that those in Factor 5 strongly disagree with the idea that demonstrating an



urgent need for CBE is necessary in order to create faculty buy-in. These academic faculty members also feel that CBE will not be a lasting trend.

Of the remaining three Factors, Factor 1 and Factor 2 both have identifiable associations with specific job roles, though neither is as strong as what was seen in Factors 3 and 5. The participants who loaded into Factor 1 (“Skeptical Views of CBE”) are mostly faculty (88%), with one administrator represented. However, the faculty types are split—there are four academic faculty members and three career and technical faculty members. In general, this group is comprised of mostly faculty who believe that competency-based education presents more challenges—and, potentially, detriments—than benefits. These participants believe that CBE could limit academic freedom and opportunities for social interaction among students; these individuals also feel that CBE is not as rigorous as traditional education, and they tend to disagree with the notion that the faculty role in a CBE course is as important as it is in a traditional course.

Those participants who loaded into Factor Two—“Positive Views of CBE”—hold the opposite view of those contained in Factor One. These individuals are mostly career and technical faculty (60%), though one academic faculty member and one administrator are represented. These individuals believe that students won’t be hindered by the online delivery of a CBE course and believe that students will not have difficulty adjusting to the format. These participants also feel that instructors will not have trouble adjusting to a more facilitative instructional role, and they are not worried about the audit of a prominent CBE institution.

Factor Four—“Stakeholder-centric CBE”—contains two individuals: one administrator and one academic faculty member. Therefore, this Factor cannot be associated with any one specific job role.

### **Application to the Theoretical Framework**

The Technology Acceptance Model (TAM) was the first component of the theoretical framework used for this study. Given the need to explore existing and new instructional technologies so as to most effectively engage students and track competency progress, this stood out as having clear relevance to the Q set and, ultimately, the factors that emerged. Factor 3 contains identifiable connections to the TAM as described by Money et al. (2015)—that is, the notion that individuals (in this case, faculty) will adopt technology based on its perceived usefulness, ease of use, and their own behavioral intentions; other contextual factors and consequent factors will impact overall usage and attitude. The participants in Factor 5 did have strong feelings about the importance of technology, though the various components of the TAM are not easily identified in their highest ranked or lowest ranked statements (or their distinguishing statements).

Those participants who loaded into Factor 3 do not feel that using new instructional technology is crucial to the success of a CBE program; they also do not believe that the use of technology in competency-based education is only effective if faculty perceive it to be useful (as indicated, this runs contrary to the principles of the TAM). These individuals also feel that online delivery will not hinder student success and that a learning management system designed specifically for CBE is necessary for student success. Thus, the

distinguishing items that emerged for Factor 3 suggest a perception among administrators that is—in many ways—contradictory to the tenets of the TAM.

Regarding organizational change and Kotter's model (Calegari et al., 2015), several of the factors have much to say about the impact of CBE on colleges as a whole. As a reminder, Kotter's Change Model (Calegari et al., 2015) specifies several elements that are identified as necessary for lasting organizational reform; specifically, these include creating a sense of urgency; building a guiding team; getting the right vision; communicating for buy-in; empowering action; creating short-term wins; being persistent (don't let up); and making change stick. Several of the concourse items—as drawn from the literature—are directly tied to the concepts contained in Kotter's model.

The highest rated items for Factors 3 and 4 include the statement, “The organizational change required for a CBE program is best achieved through administrative support.” In practice, this statement aligns with Kotter's assertion that “creating a guiding coalition” (Pollack & Pollack, 2015, p. 53) is necessary for lasting change; administrative support is often part of that goal. The notion of communicating for buy-in (Calegari et al., 2015) was contained in the concourse statement that read, “Demonstrating that an urgent need exists for a CBE program is important for faculty buy-in.” This statement was one of the lowest ranked statements for Factor 5 (“Faculty-centric CBE: Faculty/Instructional Design Important in CBE”), and indicates that academic faculty may decide to make their own determinations about the need for a CBE program, regardless of the demonstration of an urgent need from an administrative or other source. One of the distinguishing statements for Factor 4—“*CBE initiatives are perceived as one of many institutional projects, which can result in a*

*diminished sense of importance*”—was seen as most aligned with these participants’ viewpoints regarding the validity of CBE as an educational method; this view runs opposite of the beliefs held by the participants who loaded into Factor 5, and suggests that communication is, in fact, necessary to generate buy-in among the two participants in Factor 4.

Therefore, even though some components of Kotter’s model may have a role to play in the development and implementation of a CBE program, certain members of the curriculum development team within the NC-CBE Project may not deem every facet relevant.

### **Limitations**

This study sought to survey all curriculum development participants within the NC-CBE Project. Given the various roles of these faculty members and administrators, not everyone likely had time to complete the survey. The survey was distributed via email at the end of the Spring 2017 semester; due to the employment obligations of the parties involved, it is probable that many individuals did not respond because they simply were not able to venture away from their work duties. The very nature of the limited population and scope of the study—and the fact that a five-factor solution stood out as most appropriate even though a six-to-nine factor solution could have been utilized—suggests that the results may not be broadly generalizable.

It was also the case that several respondents did not correctly complete the sorting activity. That is, instead of returning a forced-choice matrix, they submitted an open-choice response that could not have been analyzed using the chosen statistical methods. Some

individuals stated their confusion regarding the sorting process, too. One participant wrote in their post-survey questionnaire, “The activity makes sense once you get to the end (and confirm one tile goes on one square), but since there were so many to sort through it sometimes felt counterintuitive since I wasn’t sure if I was doing it right or not.” Another respondent said, “[...] it would be helpful to know each box has a response. It took a while to figure that out.”

Some participants also felt that there was room for additional concourse items. For example, one participant felt that a statement indicating that students often have multiple opportunities to pass an assignment is a key part of CBE and should have been highlighted. Another person felt that addressing the issue of compensation for faculty developing a CBE program could have been an included statement.

One participant also communicated to the researcher that the forced-choice nature of the sorting activity felt unnatural and didn’t create a true representation of their perspective as it pertained to a number of concourse items.

### **Implications for Competency-Based Education Programs**

This study suggests that community colleges seeking to implement the competency-based education modality at their institutions should consider the perceptions of all individuals involved in curriculum development efforts. In particular, the ability to identify and categorize the perceptions of these individuals will help pinpoint potential problems or barriers that could arise during the development process. If, for example, there exists within the development team a contingency of individuals that view CBE as primarily an ineffective or non-beneficial endeavor, it would be worthwhile to address concerns with the broader

group and perhaps highlight the benefits of such a program. Likewise, it is important to seriously consider the perspectives of these individuals; both faculty members and administrators can hold these concerns, and weighing these against all other perspectives is crucial to the teamwork and cooperation necessary to successfully launch a CBE program.

The adoption of new technology is also an important consideration; as noted in the Technology Acceptance Model and its subsequent application to the results of this study, comparing and contrasting what the literature says about the topic as it applies to CBE and the real-world perceptions of curriculum development team members can help to create a balanced and honest approach to program creation. Similarly, working toward lasting organizational change requires a candid examination of all team members' perspectives.

### **Implications for Faculty**

Factors 1, 2, and 5 are characterized primarily by both arts and science and career and technical education faculty perceptions. This study seems to indicate that these perspectives are, at times, markedly different than those held by administrators. The indication, then, is that faculty would benefit from gaining a deeper understanding of the motivations of those working to develop a CBE program while looking through an administrative lens. The dichotomous nature of the two faculty groups (academic as well as career and technical) is revealing, too; it suggests that there can be a split within faculty of different disciplines and programs. In this instance, academic faculty sometimes felt that CBE could be more threatening than beneficial, while career and technical faculty felt the opposite. Advocating for curricular development in a cross-faculty and cross-discipline manner may help address these differences, and could potentially lead to smoother development and implementation of

a CBE program. Addressing any concerns that are aligned with a desire to maximize student success would be a way to effectively act on the results of this study; discussing CBE curriculum development in light of the five factors—including healthy skepticism—will help faculty achieve an honest and balanced approach to their course design.

### **Implications for Administrators**

Factor 3—“Critically Supportive of CBE”—was the only factor that could be clearly associated with administrators. This factor was characterized by logistical concerns regarding the cost of CBE, the need to effectively use instructional technologies, and the importance of the faculty role. Administrators in this group seem to value the importance of faculty as it relates to the success of a CBE program. Allowing administrators who are involved in the development of a competency-based education program to see and respond to the perceptions of both academic and career and technical faculty is important, as it can help foster dialogue that will result in fewer fissures between ideals regarding implementation.

The perceptions embodied in the remaining Factors are also important for administrators to be aware of (in fact, administrator representation can be found in several of the factors, even those composed primarily of faculty)—these aforementioned perceptions can help shed light on the amount and variety of feelings and attitudes held by those involved in curriculum development efforts. For example, being aware of the skepticism, positive perspectives, and tendency to value incremental adoption of CBE could inform course creation efforts in terms of mode of delivery and assessment approaches. Working with faculty who may harbor skeptical viewpoints toward CBE, too, could help administrators identify and address the legitimate concerns held by these curriculum development

participants. Surveys and roundtable discussions could be one approach to identify any perceived barriers so that they can be addressed or changes can be made to the program accordingly.

### **Implications for the NC-CBE Project**

The findings of this study provide some guidance in terms of what should be considered when developing a new CBE program such as the NC-CBE Project. In general, having a sense of the various groups that characterize the perceptions of those assisting with the creation of a new competency-based education program can help identify barriers early on; being aware of this information can help those leading such a project work with faculty and administrators to address concerns before they become insurmountable obstacles that could hinder the development of curriculum and other important components of such a program. Open and clear dialogue surrounding the challenges of adopting new technologies, too, is also something that this study has underscored as paramount.

Since completing this study, the awareness that I now have of the various perceptions that characterize the curriculum development participants of the project has influenced how information is communicated and disseminated among both faculty and administrators within the curriculum team. Knowing the perceived challenges associated with the adoption of a new LMS and other technologies, for example, has helped foster a heightened sensitivity of what participants may need to focus on as they continue developing courses for the Spring 2018 rollout. Similarly, the clear distinction among several of the groups that emerged from the study regarding the need for administrative support has helped in the decision-making process when it comes to determining the need for the individuals in those roles to voice their



backing of certain ideas or approaches. Insights such as these have become invaluable as we have been faced with strategic decisions that range from basic to very complex.

These findings illustrate for community college leaders the importance of weighing the views of all curriculum development participants carefully in the midst of the CBE design process. Selecting individuals who have honestly and fair criticisms or critiques to offer is important so that all barriers and obstacles are identified throughout the development phase, but it is important to balance this with individuals who can identify the merits and benefits of the competency-based approach. Using the factors identified in this study to develop a survey tool that could help identify a healthy diversity of perspectives when developing a CBE program would likely be an effective design approach. Periodic surveys throughout the development process, too, could also help identify shifting perspectives or approaches, and this will help address any unexpected barriers.

### **Recommendations for Future Research**

Even though this study sought to create a manageable research question that had immediate application for the NC-CBE Project, there are several teams involved in the creation of this specific CBE program. Other institutions seeking to create their own CBE programs will likely include information technology, student support, and business specialists just as Central Piedmont, Wake Tech, Forsyth Tech, and Stanly Community College have done. A more comprehensive study that examines the perspectives of all four of these areas would allow for a broader, more widely applicable set of findings that could help more fully characterize the perceptions of those involved in the development of a CBE program.

### **Recommendations for Future Q Studies**

The inclusion of additional post-sort questions tied to the aforementioned areas of student support, business, and information technology would shed more light on the motivations and perceptions of potential respondents. Exploring the possibility of an open-ended Q sort could be revealing, too; as previously noted, many participants in this study felt shackled by the constraints of the forced-choice format. Also, creating a more comprehensive Q set that addresses the other areas of competency-based development efforts would work toward fulfilling the need of a comprehensive analysis that is focused on all aspects of a CBE program. Using the results of this Q study, it is possible to create a survey instrument to look at how a sample of individuals who represent an organizational effort to implement a CBE program may perceive competency-based efforts in the form of statements that are generalizable to that particular population. The factors that emerged from this study—when used in conjunction with the results from the post-survey questionnaire—could serve as such an instrument.

### **Summary**

This research study analyzed the results of 30 NC-CBE Project participants who completed a Q sort. These individuals sorted 60 concourse items on a “most agree” (+6) to “most disagree” (-6) scale in a forced-distribution format so that they had to consider various CBE statements as drawn from the literature in relation to both one another and their own views in order to rank them as it pertains to CBE existing as a valid educational construct. Twenty-four of these individuals loaded into five factors, each of which has unique characteristics that help outline the varying perspectives of those who are engaged in

curriculum development efforts. The results of this study may be helpful for other researchers who are seeking to learn more about perceptions of CBE, as well as for colleges who are considering adopting a CBE modality.

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**APPENDICES**

**Appendix A: Q set**

- S1. Tutors and academic coaches are critical for success in CBE (Hicks, 2015).
- S2. CBE allows for regular interaction with instructors (Fain, 2016).
- S3. CBE allows for substantive interaction with instructors (Fain, 2016).
- S4. CBE allows for access to higher ed. in ways other modalities do not (Matkin, 2012).
- S5. CBE is flexible enough to fit the learning styles of many students (Bates, 2015).
- S6. Students will finish a CBE course more quickly than a traditional course (Melton, 1978).
- S7. Flexibility in pacing will result in greater student success (Melton, 1978).
- S8. Recent high school graduates will be successful in the CBE format (Kelchen, 2015).
- S9. CBE, in general, can cost less than traditional education (Silva & White, 2015).
- S10. CBE provides evidence of learning equal to or more rigorous than traditional education (Horn, 2015).
- S11. CBE can effectively measure concepts associated with liberal arts (Horn, 2015).
- S12. CBE students are guaranteed to have mastered competencies in their field. (Levine, 2015)
- S13. Effectively utilizing existing instructional technologies is crucial to the success of CBE (Doucette, 2016).
- S14. Effectively utilizing new instructional technologies is crucial to the success of CBE (Doucette, 2016).
- S15. The use of technology in CBE is only effective if faculty perceive it to be easy to use. (Money et al., 2015)
- S16. The time it takes to learn a new technology impacts my willingness to use it. (Tabata & Johnsrud 2008)
- S17. Students won't be as successful in CBE because it's often delivered online. (Lowenthal et al. 2015)
- S18. Technology could be a barrier to student success in CBE. (Conlon, 2016).
- S19. An LMS specifically designed for CBE is necessary for student success (Pavic, 2015).
- S20. CBE has the potential to limit academic freedom (Ultican, 2016).

- S21. There could be limited opportunities for social learning in the CBE format (Bates, 2015).
- S22. In general, students may have trouble adjusting to the CBE format (Zipper, 2015).
- S23. CBE programs prevent students from developing “soft skills” due to their vocational nature (Hollands, 2016).
- S24. CBE could be impacted by issues of sustainability (Riskind, 2014).
- S25. A learner demonstrating proficiency is more important than a learner earning a grade (Levine, 2015).
- S26. The faculty role in CBE is just as important as it is in a traditional class (Davis, 2016).
- S27. Participation in CBE support lab settings will be high (NC-CBE Project, 2015).
- S28. Having an academic coach or tutor is necessary for student success in CBE (Rainwater, 2016).
- S29. CBE helps address local economic needs (Kurshan, 2016).
- S30. CBE helps address national economic needs (Kurshan, 2016).
- S31. College degrees earned through a CBE format are appealing to employers (Friedman, 2016).
- S32. Students will benefit from CBE transcripts as they enter the workforce (Leuba, 2015).
- S33. CBE is one of the best ways to close the skills gap among working adults (Alssid, 2015).
- S34. Engaging with employers is important when developing a CBE program (Craig & Hernandez, 2016).
- S35. Employers prefer transcripts that itemize skills as opposed to traditional, “letter grade” records (Kamenetz, 2013).
- S36. Going through a CBE program improves a student’s marketability (Pisacreta, 2016).
- S37. In general, arts and sciences faculty believe that CBE is effective (Wehlburg, 2010).
- S38. In general, program/vocational faculty believe that CBE is effective (Wehlburg, 2010).
- S39. The organizational change required for a CBE program is best achieved through administrative support (Riskind, 2014).
- S40. The organizational change required for a CBE program is best achieved through faculty support (Gallagher, 2014).

- S41. Demonstrating that an urgent need exists for a CBE program is important for faculty buy-in (Calegari et al., 2015).
- S42. CBE initiatives are perceived as one of many institutional projects, which can result in a diminished sense of importance (Brewer, as cited in Fleming, 2002).
- S43. CBE presents opportunities for a new organizational business model (Riskind, 2014).
- S44. Instructors may have trouble adjusting to the “guide on the side” role rather than the traditional “sage on the stage” role (Zipper, 2015).
- S45. The terminology associated with CBE could act as a barrier for faculty (Berrett, 2015).
- S46. CBE will be a lasting trend in higher education (Brewer, as cited in Fleming, 2002).
- S47. The audit of a prominent CBE institution by the U.S. Department of Education makes me nervous about the future of CBE (Fain, 2016).
- S48. The traditional classroom approach is inefficient or ineffective (Semuels, 2015).
- S49. CBE impacts equitable outcomes (Clerkin & Simon, 2014).
- S50. CBE impacts student learning (Gallagher, 2014).
- S51. CBE impacts completion (Clerkin & Simon, 2014).
- S52. CBE impacts transfer rates (Rivers & Sebesta, 2016).
- S53. CBE is more transparent than traditional education approaches (“Competency-Based Education: What It Is”, 2014).
- S54. CBE transforms the education process (Gallagher, 2014).
- S55. There is a large demand for the innovation afforded by CBE (Gallagher, 2014).
- S56. Non-traditional students will, in general, be successful in the CBE format (Kelchen, 2016).
- S57. A CBE approach more accurately reflects student learning than a traditional approach. (Levine, 2015)
- S58. Skilled test-takers will excel in a CBE format; others may not be as successful (Bull, 2016).
- S59. CBE allows colleges to accurately measure learning outcomes (Solér, 2016).
- S60. CBE is beneficial because it often grants credit for life experience (Shapiro, 2014).

## Appendix B: IRB Approval Email

**From:** IRB Administrative Office <pins\_notifications@ncsu.edu>

**Date:** April 10, 2017 at 1:49 PM

**Subject: Bartlett - 11753 - IRB Protocol assigned Exempt status**

Dear Christopher Flowers:

IRB Protocol 11753 has been assigned Exempt status

Title: Competency-based education and faculty attitudes at North Carolina community colleges.

PI: Bartlett, James E

The research proposal named above has received administrative review and has been approved as exempt from the policy as outlined in the Code of Federal Regulations (Exemption: 46.101. Exempt b.2). Provided that the only participation of the subjects is as described in the proposal narrative, this project is exempt from further review.

This approval does not expire, but any changes must be approved by the IRB prior to implementation.

1. This committee complies with requirements found in Title 45 part 46 of The Code of Federal Regulations. For NCSU projects, the Assurance Number is: FWA00003429.
2. Any changes to the protocol and supporting documents must be submitted and approved by the IRB prior to implementation.
3. If any unanticipated problems or adverse events occur, they must be reported to the IRB office within 5 business days by completing and submitting the unanticipated problem form on the IRB website: <http://research.ncsu.edu/sparcs/compliance/irb/submission-guidance/>.
4. Any unapproved departure from your approved IRB protocol results in non-compliance. Please find information regarding non-compliance here: [http://research.ncsu.edu/sparcs-docs/irb/non-compliance\\_faq\\_sheet.pdf](http://research.ncsu.edu/sparcs-docs/irb/non-compliance_faq_sheet.pdf).

Please let us know if you have any questions.

Sincerely,

Deb Paxton

[919.515.4514](tel:919.515.4514)

IRB Administrator

[dapaxton@ncsu.edu](mailto:dapaxton@ncsu.edu)

NC State IRB Office

Jennie Ofstein

[919.515.8754](tel:919.515.8754)

IRB Coordinator

[irb-coordinator@ncsu.edu](mailto:irb-coordinator@ncsu.edu)

NC State IRB Office



## Appendix C: Survey Recruitment

Date: 5/12/17

To: Curriculum Development Participants / NC-CBE Project

Re: Inviting your participation in a study of faculty perceptions of CBE

Dear Curriculum Development Team Member,

You are invited to participate in a research study on perceptions of competency-based education (CBE). The purpose of this study is to determine perceptions and attitudes toward CBE as a valid educational and course delivery method. Data collection involves a sorting activity through a PowerPoint file that is attached to this email message; a brief post-survey questionnaire is included in this file. Once you have completed both components, these will be uploaded to a secure Google Drive so that the results can be analyzed. In total, these activities should take no more than 30 minutes.

Your perspectives will provide insight about how community college faculty and administrators perceive CBE—this information could help identify challenges that exist in the development of a CBE program.

The North Carolina State University Institutional Review Board has approved this study. I have also received approval from your institution to invite you to participate in the study. By completing the sorting activity and post-sort questionnaire, you are consenting to participation in this research project. You do not have to answer any question you do not want to answer. You may withdraw your participation at any time and your data will not be saved.

Please complete the sorting activity using the attached PowerPoint file. Please upload the completed sorting activity to the Google Folder link that has also just been sent to your email address.

If you are interested in participating in a follow-up focus group, please provide your email address upon completion of the survey. The focus group will provide additional information that will help define and describe the groups that emerged from the initial data analysis, and will be conducted via Blackboard Collaborate or another appropriate web-conferencing tool.

Thank you for your consideration and time! Please contact me if you have any questions or concerns.

Regards,

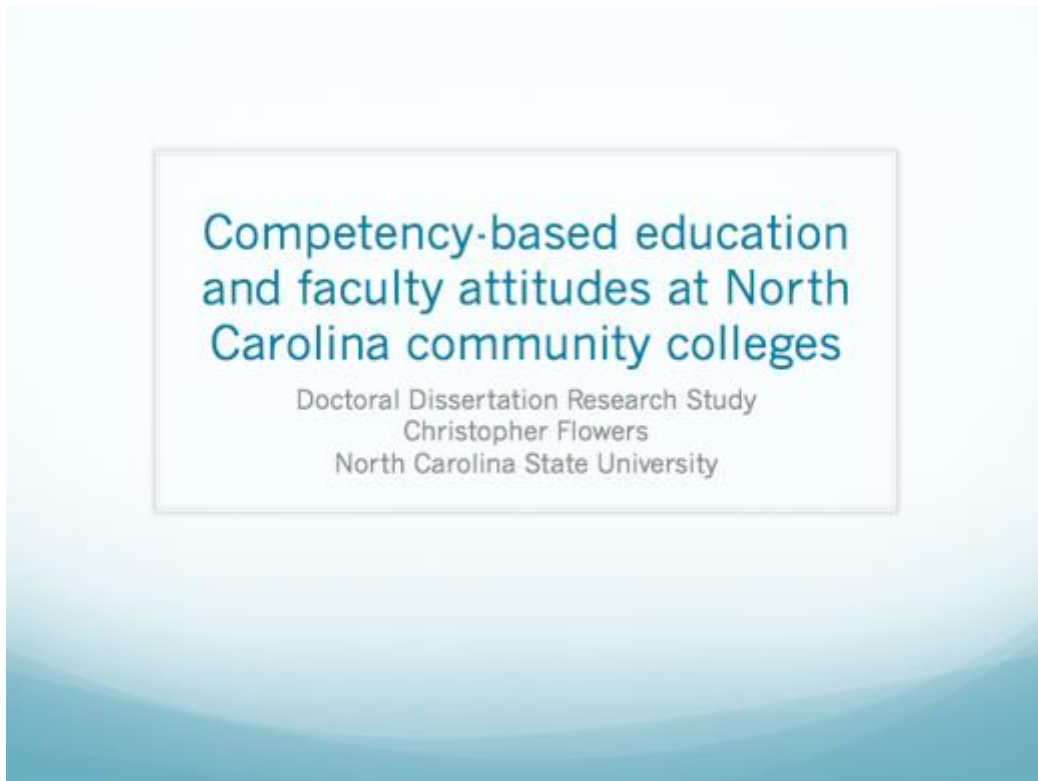
Chris Flowers

Ed.D. Candidate

North Carolina State University

[ccflower@ncsu.edu](mailto:ccflower@ncsu.edu)

**Appendix D: Survey PowerPoint**



# Directions

This study is designed to identify themes pertaining to perceptions of CBE. The sorting activity is done in PowerPoint and does not require that you play the slide show. If you have played the slide show, press "Escape" and then scroll down to move through the slides. If you are on a PC you may have to click on fit to screen. On a Mac you may need to zoom to view the whole slide. You may need to click "Enable Editing" depending on your settings. The next slide shows a graphical display of the sorting steps. This slide is marked with "SAMPLE."

The slide after "SAMPLE" contains a stack of cards (these are yellow) in the bottom, left hand corner that you will sort. The organization of these cards has been staggered so that they are easy to click on and then drag and drop to the appropriate area on the sorting grid. The goal here is to arrange the cards on the grid according to your response to the statement contained on the card. For example, if you mostly disagree with a statement, this would indicate that the card should be placed on the left side of the grid (e.g., -6 would represent the card you most disagree with). Conversely, if you mostly agree with a statement, it should be placed on the right side of the grid (e.g., +6 would represent the card you most agree with). If your feelings on a card are neutral, the card would be placed near the center of the grid. When completed, the grid will resemble an assembly of post-it notes; each card is a different size, and some overlap of the actual cards may occur, which is fine.

It's important to note that you may, in fact, mostly agree or disagree with each card; the organization of the cards on the grid could be viewed as relative to every other card. In other words, even though you may somewhat disagree with the statement contained on a card, it may turn out that it is pushed to the far left on the grid relative to your level of agreement or disagreement with the other cards.

Once you are done sorting move to the next page to complete the post-survey questions. When you have completed the short answer questions please save the file (any file name is fine; each participant has his or her own private Google folder) and upload it to the secure Google Drive folder referenced in the research recruitment letter/email you've received.

Thank you for your time and participation in this study. Please let me know if you have any questions by contacting me at XXXXXXXX or at [cflower@ncsu.edu](mailto:cflower@ncsu.edu).

**Cards to Sort**

Select cards from this area; drag and drop them on the sorting grid where appropriate.

**SAMPLE**

**MOST DISAGREE** **MOST AGREE**

-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6
-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6
-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5		
-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5		
-4	-3	-2	-1	0	+1	+2	+3	+4				
-3	-2	-1	0	+1	+2	+3						
-2	-1	0	+1	+2								
-1	0	+1										
0												

**Most Disagree**      **Most Agree**

-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6
-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6
-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5		
-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5		
	-4	-3	-2	-1	0	+1	+2	+3	+4			
		-3	-2	-1	0	+1	+2	+3				
			-2	-1	0	+1	+2					
				-1	0	+1						
					0							
						-1	0	+1				
							0					
								0				

**Cards to Sort**

- CBE transforms the skilled technicians will excel in a CBE format. A CBE approach more accurately reflects student learning than a traditional approach. -57-
- Non-traditional students will, in general, be successful in the CBE format. -58-
- CBE impacts completion. -51-
- CBE allows colleges to accurately measure learning outcomes. -52-

Are there statements characterizing competency-based education that you believe should have been included in the sorting activity that weren't present? If so, please provide an example of these statements.

- **Enter your response here.**

In regards to the sorting activity, did you find it easy to understand? If so, why? If not, why not?

- Enter your response here.

What additional thoughts regarding the statements would you like to note?

- Enter your response here.

In reviewing the highest rated and lowest rated items, could you provide some insight regarding what prompted you to rank your +6 and +5 (most agree) and -6 and -5 (most disagree) items. Any comments you have regarding the statements, their placement on the grid, etc., will be helpful.

- Enter your response here.



# Thank you!

- Once again, thank you for participating in this study. Please direct any questions to Chris Flowers, who can be reached at XXXXXXXX or [ccflower@ncsu.edu](mailto:ccflower@ncsu.edu) .

## Appendix E: Correlation Matrix

Correlation Matrix

Sort	P12	P16	P19	P20	P22	P24	P27	P28	P29	P30	P32	P33	P34	P35	P40	P42	P47	P48	P52	P53	P7	P8	P9	P11	P13	P14	P18	P2	P41	P6
P12	1	0.177	0.311	0.512	0.118	0.307	0.118	0.291	-0.062	0.201	0.161	0.251	0.536	0.347	0.392	-0.088	0.279	0.195	0.315	0.054	0.169	0.239	0.347	0.221	0.002	0.004	0.014	-0.028	0.094	-0.12
P16	0.177	1	-0.09	0.231	0.269	0.375	0.243	-0.116	0.048	0.078	0.09	0.179	0.02	0.147	0.177	0.488	0.068	0.327	0.263	0.211	0.02	0.251	-0.125	0.147	0.209	0.191	0.213	0.127	0.249	0.221
P19	0.311	-0.092	1	0.38	0.183	0.245	0.124	0.092	0.04	0.333	-0.014	0.155	0.313	0.363	0.205	-0.197	0.082	0.124	0.054	-0.19	0.07	0.106	0.347	0.422	-0.05	-0.07	0.215	0.074	0.07	-0.195
P20	0.512	0.231	0.38	1	0.333	0.436	0.169	0.026	-0.076	0.329	-0.116	0.247	0.384	0.237	0.438	0.014	0.125	0.161	0.122	-0.06	0.43	0.333	0.52	0.283	-0.09	-0.15	0.177	-0.074	-0.143	-0.163
P22	0.118	0.269	0.183	0.333	1	0.287	0.317	-0.018	0.367	0.333	0.122	0.291	0.263	0.026	0.392	0.275	0.251	0.311	0.462	0.197	0.185	0.247	0.092	0.12	0.135	0.161	0.305	0.283	0.104	0.141
P24	0.307	0.375	0.245	0.436	0.287	1	0.169	-0.006	0.175	0.341	0.078	0.384	0.289	-0.028	0.319	0.207	0.048	0.382	0.127	-0.06	0.215	0.223	0.301	0.197	0.12	-0.04	0.245	-0.016	0.02	0
P27	0.118	0.243	0.124	0.169	0.317	0.169	1	0.125	0.484	0.42	0.108	0.295	0.012	0.171	0.472	0.257	0.171	0.235	0.52	0.257	0.281	0.125	0.096	0.305	0.275	0.179	0.398	0.177	0.301	0.197
P28	0.291	-0.116	0.092	0.026	-0.018	-0.01	0.125	1	0.09	0.133	0.137	0.11	0.275	0.072	0.357	0.04	0.398	0.145	0.213	0.022	-0.145	0.048	0.155	0.231	0.046	0.171	0.044	0.026	0.147	0.221
P29	-0.062	0.048	0.04	-0.076	0.367	0.175	0.484	0.09	1	0.396	0.078	0.155	-0.002	-0.068	0.199	0.315	0.225	0.217	0.398	0.293	0.131	-0.05	-0.062	0.161	0.181	0.261	0.135	0.287	0.197	0.277
P30	0.201	0.078	0.333	0.329	0.333	0.341	0.42	0.133	0.396	1	0.127	0.335	0.273	0.245	0.301	-0.062	0.098	0.169	0.285	0.149	0.201	0.076	0.335	0.347	-0.06	-0.15	0.215	0.179	0.028	0.02
P32	0.161	0.09	-0.01	-0.116	0.122	0.078	0.108	0.137	0.078	0.127	1	0.209	0.11	0.125	-0.062	0.151	0.375	0.333	0.175	0.177	-0.155	0.207	-0.052	0.301	-0.06	0.104	-0.032	0.311	0.5	0.371
P33	0.251	0.179	0.155	0.247	0.291	0.384	0.295	0.11	0.155	0.335	0.209	1	0.253	0.237	0.536	0.45	0.446	0.442	0.313	0.229	0.319	0.608	0.297	0.355	0.088	0.315	0.498	0.145	0.197	0.269
P34	0.536	0.02	0.313	0.384	0.263	0.289	0.012	0.275	-0.002	0.273	0.11	0.253	1	0.177	0.404	-0.09	0.339	0.319	0.351	-0	0.205	0.129	0.357	0.285	0.145	0.032	0.145	0.056	0.106	0.112
P35	0.347	0.147	0.363	0.237	0.026	-0.03	0.171	0.072	-0.068	0.245	0.125	0.237	0.177	1	0.311	-0.056	0.11	0.233	0.068	0.118	-0.088	0.371	0.165	0.257	-0.14	-0.03	0.074	0.189	0.074	-0.026
P40	0.392	0.177	0.205	0.438	0.392	0.319	0.472	0.357	0.199	0.301	-0.062	0.536	0.404	0.311	1	0.359	0.347	0.353	0.315	0.082	0.267	0.442	0.341	0.347	0.133	0.116	0.468	0.052	0.167	0.074
P42	-0.088	0.488	-0.2	0.014	0.275	0.207	0.257	0.04	0.315	-0.062	0.151	0.45	-0.09	-0.056	0.359	1	0.378	0.39	0.237	0.253	0.044	0.359	-0.167	0.173	0.251	0.548	0.359	0.283	0.213	0.526
P47	0.279	0.068	0.082	0.125	0.251	0.048	0.171	0.398	0.225	0.098	0.375	0.446	0.339	0.11	0.347	0.378	1	0.436	0.454	0.243	-0.002	0.277	0.02	0.281	0.267	0.452	0.062	0.351	0.323	0.51
P48	0.195	0.327	0.124	0.161	0.311	0.382	0.235	0.145	0.217	0.169	0.333	0.442	0.319	0.233	0.353	0.39	0.436	1	0.179	0.181	-0.006	0.49	0.141	0.414	0.281	0.257	0.259	0.337	0.098	0.528
P52	0.315	0.263	0.054	0.122	0.462	0.127	0.52	0.213	0.398	0.285	0.175	0.313	0.351	0.068	0.315	0.237	0.454	0.179	1	0.462	0.185	0.02	0.129	0.078	0.337	0.47	0.287	0.173	0.289	0.269
P53	0.054	0.211	-0.19	-0.058	0.197	-0.06	0.257	0.022	0.293	0.149	0.177	0.229	-0.004	0.118	0.082	0.253	0.243	0.181	0.462	1	0.068	0.004	-0.074	-0.054	0.219	0.189	0.064	0.201	0.122	0.243
P7	0.169	0.02	0.07	0.43	0.185	0.215	0.281	-0.145	0.131	0.201	-0.155	0.319	0.205	-0.088	0.267	0.044	-0.002	-0.01	0.185	0.068	1	0.088	0.378	0.092	0.108	0.094	0.163	-0.026	0.006	-0.106
P8	0.239	0.251	0.106	0.333	0.247	0.223	0.125	0.048	-0.054	0.076	0.207	0.608	0.129	0.371	0.442	0.359	0.277	0.49	0.02	0.004	0.088	1	0.149	0.287	-0.07	0.209	0.269	0.131	0.068	0.203
P9	0.347	-0.125	0.347	0.52	0.092	0.301	0.096	0.155	-0.062	0.335	-0.052	0.297	0.357	0.165	0.341	-0.167	0.02	0.141	0.129	-0.07	0.378	0.149	1	0.159	-0.16	-0.13	0.223	-0.161	-0.1	-0.177
P11	0.221	0.147	0.422	0.283	0.12	0.197	0.305	0.231	0.161	0.347	0.301	0.355	0.285	0.257	0.347	0.173	0.281	0.414	0.078	-0.05	0.092	0.287	0.159	1	-0.16	0.092	0.157	0.311	0.251	0.249
P13	0.002	0.209	-0.05	-0.088	0.135	0.12	0.275	0.046	0.181	-0.058	-0.062	0.088	0.145	-0.141	0.133	0.251	0.267	0.281	0.337	0.219	0.108	-0.07	-0.159	-0.163	1	0.293	0.255	0.05	0.127	0.159
P14	0.004	0.191	-0.07	-0.145	0.161	-0.04	0.179	0.171	0.261	-0.145	0.104	0.315	0.032	-0.028	0.116	0.548	0.452	0.257	0.47	0.189	0.094	0.209	-0.131	0.092	0.293	1	0.163	0.361	0.147	0.484
P18	0.014	0.213	0.215	0.177	0.305	0.245	0.398	0.044	0.135	0.215	-0.032	0.498	0.145	0.074	0.468	0.359	0.062	0.259	0.287	0.064	0.163	0.269	0.223	0.157	0.255	0.163	1	0.058	0.054	0.177
P2	-0.028	0.127	0.074	-0.074	0.283	-0.02	0.177	0.026	0.287	0.179	0.311	0.145	0.056	0.189	0.052	0.283	0.351	0.337	0.173	0.201	-0.026	0.131	-0.161	0.311	0.05	0.361	0.058	1	0.155	0.43
P41	0.094	0.249	0.07	-0.143	0.104	0.02	0.301	0.147	0.197	0.028	0.5	0.197	0.106	0.074	0.167	0.213	0.323	0.098	0.289	0.122	0.006	0.068	-0.1	0.251	0.127	0.147	0.054	0.155	1	0.191
P6	-0.12	0.221	-0.2	-0.163	0.141	0	0.197	0.221	0.277	0.02	0.371	0.269	0.112	-0.026	0.074	0.526	0.51	0.528	0.269	0.243	-0.106	0.203	-0.177	0.249	0.159	0.484	0.177	0.43	0.191	1