



# INNOVATE AND EVALUATE

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EXPANDING THE RESEARCH BASE  
FOR COMPETENCY-BASED EDUCATION

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## Executive Summary

Competency-based education (CBE) has garnered significant attention lately from reformers and policymakers. Put simply, CBE awards credit based on what students have learned rather than how much time they spend in class. Competency-based programs identify specific competencies, develop assessments to measure mastery of those competencies, and then award credit or other credentials to those students who meet or exceed benchmarks on those assessments.

CBE programs give students flexibility to move at their own pace, which could potentially shorten the time to degree and enhance affordability. CBE credentials may also more clearly signal to employers students' knowledge and career preparedness.

Clearly, the benefits of expanding access to CBE could be substantial. But, what does existing research suggest about the likely effect of reforms to promote CBE? In this paper, we analyze 380 studies of postsecondary CBE and prior-learning assessment listed in the Department of Education's Education Resources Information Center database. We reviewed each study's methodology (i.e., quantitative or qualitative) and topic (i.e., program design, student characteristics, student outcomes, and policy environment).

We found that existing research leaves important questions unanswered. What types of students enroll in CBE? How do students fare in CBE programs, and do particular groups do better than others? Are CBE graduates more attractive to potential employers?

Our analysis uncovered more than twice as many qualitative studies (228 articles) as quantitative ones (102). The studies in our sample tended to focus on questions of design and practice, describing the manner in which providers have identified competencies, developed assessments, and structured courses and programs. Far fewer articles explored data on questions about who actually enrolls in CBE and how

students fare in terms of learning, completion, and labor market success. A substantial number of studies (56) examined assessment in CBE, including questions about the design, results, and validity of different assessment techniques.

We also looked at the relationship between methodology and content. We found that qualitative studies typically described program design (113) or prescribed best practices for program design (97). Quantitative studies examined program design (47) and student outcomes (42).

However, the research on outcomes was limited. Many of these studies looked at students' self-assessments of their own competencies after a competency-based course or program. Few examined outcomes such as retention, graduation, or job-placement rates. Only a handful looked at CBE in comparison to a counterfactual; just 13 compared CBE outcomes to those from traditional programs.

The paper concludes with some recommendations for future research. We suggest that researchers should use the ongoing expansion of CBE programs as an opportunity to launch a research and development agenda. Specifically, we suggest that researchers work with CBE providers to answer the following basic questions:

- How do the demographics of students who enroll in CBE compare to those enrolled in traditional programs?
- What do success rates in CBE programs look like, especially relative to comparable programs? Do students who earn credit via prior-learning assessment perform comparably in subsequent coursework?

- How do employers view CBE graduates? Do they see CBE credentials as being more informative than traditional degrees?

We sketch out the role that policymakers, philanthropists, and other parties should play in facilitating the rigorous evaluation of CBE programs.

# Innovate and Evaluate: Expanding the Research Base for Competency-Based Education

Andrew P. Kelly and Rooney Columbus

*This paper is the sixth in a series examining competency-based higher education from a number of perspectives.*

Higher education is under increasing pressure to change. The combination of soaring costs, stagnant completion rates, and an uncertain labor market for recent college graduates has given rise to a sustained push for innovation, both at existing colleges and via new postsecondary providers.

In the ensuing national debate, few ideas have received more attention than competency-based education (CBE), which has been around for decades but has reemerged as a favorite innovation of reformers and policymakers. Simply put, competency-based models award credit based on what students can prove they have learned rather than how much time they spend in class. CBE programs identify specific competencies, develop assessments to measure student mastery of those competencies, and then award academic credit to students who meet or exceed benchmarks on those assessments.

The model's appeal derives largely from its potential to overcome some of the pressing challenges facing higher education. First, it could enhance college affordability by allowing students to progress through a degree program at their own pace, potentially decreasing the time it takes some students to earn a credential.<sup>1</sup> Second, CBE could help boost college completion, as it enables prospective students to obtain credit for prior learning—skills and knowledge learned on the job, in the military, and so on—thereby reducing the number of credits needed to graduate.<sup>2</sup> Third, a credential from a CBE program may better signal what a student knows and is able to do than a traditional college transcript.

Because competencies are clearly identified and credit is awarded based on mastery, employers could more accurately distinguish the students who have the skills and knowledge they need.<sup>3</sup> Lastly, a focus on transparent measures of student learning instead of time could help move us toward a market in which schools compete on the quality of the education they provide rather than the students they enroll or the amenities they offer.<sup>4</sup>

The potential to improve these dimensions is reason enough to experiment with CBE models. Luckily, a growing number of institutions are doing so already. And policymakers at the federal and state level have worked to create space for such models, inviting providers into state systems and waiving existing regulations for a subset of programs so as to study their outcomes. Indiana, for instance, welcomed CBE provider Western Governors University (WGU) as an official state institution in 2010, which allowed Indiana students to enroll using state financial aid.<sup>5</sup> Other states have incorporated WGU into their systems too, including Missouri, Nevada, Tennessee, Texas, and Washington.<sup>6</sup> At the federal level, a 2014 bill passed unanimously in the House of Representatives setting up “demonstration projects” for several CBE providers, waiving federal aid requirements such as the credit hour.<sup>7</sup>

What does existing research suggest about the likely effect of expanding CBE on access, affordability, and attainment? Who enrolls in CBE programs? Who completes them, how do they fare after graduation, and how do their outcomes compare to similarly qualified peers?

To shed some light on the stock of CBE research—with an eye toward nudging researchers and institutions to adopt a proactive research agenda—we analyzed studies listed in the Department of Education’s Education Resources Information Center (ERIC) database. We limited our analysis to those that focused on CBE at the postsecondary level and were published between 1996 and 2015.

We find that existing research leaves many of these basic questions unanswered. In short, researchers have not conducted the kinds of rigorous empirical evaluations of CBE that, in a perfect world, leaders and policymakers could draw on in creating effective policies. The majority of CBE studies in the ERIC database employ a qualitative methodology, while quantitative studies are less common. Only a small portion of the studies reviewed relevant literature. There are more than two times as many qualitative articles as quantitative articles.

Most studies in the database focus on questions of program design and institutional practice, describing the process through which institutions have identified competencies, created assessments, and developed programs before making recommendations about best practices. Fewer articles have explored empirical questions as to who actually enrolls in CBE and what program outcomes such as learning, completion, and labor market success look like.

Some of this gap reflects the newness of the latest round of experimentation; dozens of programs have only recently emerged, and research on them is just getting underway. This flurry of experimentation represents a key opportunity to engage in the kind of research and development necessary to inform policy and institutional decision making. We conclude the paper with some recommendations for such an agenda, as well as advice to different stakeholders who can help develop it.

The rest of this paper proceeds as follows. First, we describe the process by which we identified and coded studies in the ERIC database. We then explore the findings, looking first at methodology (quantitative versus qualitative) and then at content (what the studies focused on). We conclude with some suggestions for future research and the role that policymakers and other parties might play in facilitating that research agenda.

## Methodology: Identifying and Coding Studies

To get a sense of the existing research on postsecondary CBE, we turned to the ERIC database, an online bibliographic and full-text digital library of education research, which includes peer-reviewed journal articles and non-journal materials.<sup>8</sup> The Institute of Education Sciences administers the database. ERIC selects its peer-reviewed journal articles from more than 1,000 academic journals from around the world, and its collection includes bibliographic records for 1.6 million items indexed since 1966.<sup>9</sup> It is the largest and most widely used database for education-related literature.<sup>10</sup>

To identify studies of CBE in a postsecondary context within the ERIC database, we searched for studies using the term “competency based education.”<sup>11</sup> We also searched using the term “prior learning assessment”—a type of CBE—which generated an additional set of studies (44 articles) that did not surface in our search of “competency based education.”<sup>12</sup>

We further refined the results in a few ways. First, we considered papers from only the last 20 years. Second, we included only peer-reviewed articles. Some may quibble with that choice, but peer-reviewed publications are considered the gold standard in scientific research.

We excluded papers that exclusively analyzed CBE in an elementary or secondary school setting. We also excluded professional development and on-the-job training that was not done in conjunction with a college or university.<sup>13</sup> For instance, an article titled “Kentucky’s Early Childhood Professional Development Initiative to Promote Social Emotional Competence” did not make the cut because it fell under the professional-development category.<sup>14</sup> Lastly, we eliminated clear false positives that had nothing to do with CBE.<sup>15</sup>

This search and the refinements yielded 380 academic papers. While this sample likely does not cover all existing research on CBE—and obviously misses any non-peer-reviewed research—we believe it represents the majority of recent, peer-reviewed research on the model. We encourage other researchers to use different search criteria, although we would be surprised if modified search techniques dramatically altered the overall findings.

The ERIC search produced a list of article titles including information on authors, the year of publication, the journal name and number, and the abstract. To review each article's content, we first sought access to the full text. If the ERIC database had no link to the full text, we searched Google and Google Scholar for the title of the article in question. If that failed, we turned to the online research database EBSCOhost.

These measures allowed us to locate the full text of 80 percent (305 of 380) of the articles in our sample. For the papers we could not track down, we relied on the abstracts provided by ERIC, which are available for all articles. We then reviewed the full text or the abstracts to code studies according to their research methodology and their focus.

We first coded the 380 articles according to the research methodology employed. Specifically, we investigated whether the paper was primarily quantitative, qualitative, or a review of previous literature. A quantitative paper relies primarily on data and statistics to analyze research questions. A qualitative paper uses interviews, descriptive case studies, and other nonstatistical techniques. A literature review presents an overview of prior research in the field but does not offer new research findings of its own.<sup>16</sup>

We considered these three categories mutually exclusive, but we admit that there is potentially overlap. For instance, a researcher could employ mixed quantitative and qualitative methods when tackling a research question. Likewise, most empirical studies include a short literature review to situate their findings. To be sure we were correctly categorizing quantitative research, we erred on the side of coding mixed-method articles as quantitative.<sup>17</sup>

We also analyzed each study's subject matter: what topics or research questions did the authors pursue? We categorized each paper as covering one or more of the following content categories.

- **Student Characteristics.** Papers in this category describe the “who” of CBE: what types of students enroll in CBE programs?
- **Student Outcomes.** Papers in this category describe the educational outcomes of CBE

courses or programs. These papers could explore the outcomes—such as learning outcomes, retention and graduation rates, or employment—of a specific CBE program in isolation or could compare the outcomes of CBE students to those of similar students not participating in CBE.

- **Assessment.** Papers in this category focus on the process of developing and validating the assessments at the center of competency-based programs. Some studies included in this category propose new tools for measuring competency, while others evaluate the validity of existing assessment methods—whether they actually measure the competencies identified—and the alignment of assessments to curriculum.
- **Description of Program Design.** Papers in this category describe the details of a CBE program or programs, including program structure, mode of instruction, manner of assessment, and number of students. Oftentimes this type of study takes the form of a case study of a particular institution or program.
- **Prescription for Program Design.** Papers in this category generally seek to outline best practices in designing CBE programs. This type of study recommends how to best construct, implement, or administer CBE. Several studies in this category focused on identifying competencies needed in a particular field, often through a survey of experts.<sup>18</sup>
- **Policy and Market Environment.** Papers in this category examine the CBE market and the policy environment in which it exists. That includes articles on the number and type of CBE providers, the laws and regulations that govern postsecondary CBE, and potential obstacles to CBE implementation.
- **Educational Theory.** Papers in this category discuss the theory behind competency-based approaches to postsecondary education. This type

of paper often explores the meaning and definition of competency in the realm of education. The category is distinct from descriptive design in that it stops short of discussing technical design questions or the actual implementation of a particular program.

- **History.** Papers in this category discuss the origins of CBE and how the model has evolved.

Unlike the research-methodology categories, content categories are not mutually exclusive. For instance, the study “Assessment Criteria for Competency-Based Education: A Study in Nursing Education” evaluates “the effects of the type of assessment criteria (performance-based vs. competency-based), the relevance of assessment criteria (relevant criteria vs. all criteria), and their interaction on vocational education students’ performance and assessment skills.”<sup>19</sup> We coded that study’s content under the Assessment and Student Outcomes categories because it describes two particular approaches to assessment in nursing education and then details how students perform on those assessments.

For an article to be included in a given category, the topic had to be a significant focal point of the article. To judge significance, we relied on a list of cues: repeated discussion of the topic throughout the study, a clear discussion of the topic in the abstract or introductory section, or a section devoted entirely to the topic. Coding of this sort always entails some level of subjectivity. To ensure basic consistency at the outset, we each coded the same subsample of studies, compared our codes, and then refined the coding rules to reflect any disagreement.

## Findings

The first section discusses the distribution of methodologies in the sample of studies. The next moves on to examine study content.

**Study Methodology.** Of the 380 articles in our analysis, just over one-quarter (102 studies, or 26.8 percent)

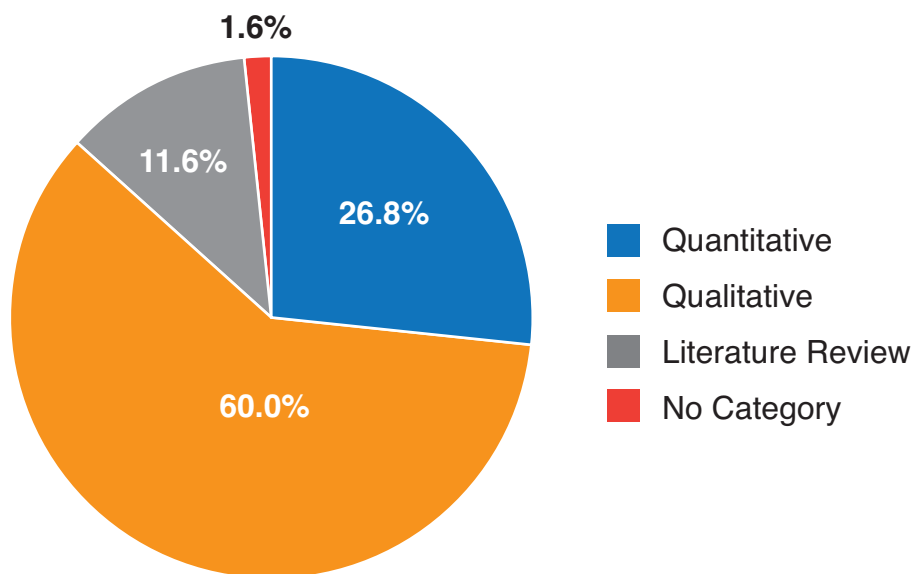
employed a quantitative design that analyzed data and reported statistical results. Sixty percent (228 studies) were qualitative, and 11.6 percent (44 studies) were literature reviews. We were unable to categorize six articles (1.6 percent), as we could not access the full text of each, and the abstracts did not clearly reveal the methodology.

As seen in Figure 1, more than 70 percent of the research focused on qualitative research or literature reviews. To be sure, qualitative research certainly helps guide institutional practice, especially as more institutions seek to develop these models. Interviewing students and faculty can provide a more detailed and nuanced understanding of how the model works and how various stakeholders experience it. It can also inform our understanding of how to actually implement these types of programs and the potential challenges therein.

For instance, a qualitative study by Jackie Krause, Laura Portolese Dias, and Chris Schedler from Central Washington University (CWU) asked how best to measure the quality of CBE courses. After reviewing the literature on quality assessment in both traditional online education and competency-based education and gleaning best practices from other CBE providers, the authors propose a detailed rubric for quality-assurance reviews of online competency-based courses. The authors also describe their experience implementing a preliminary version of the rubric in the FlexIT program at CWU, finding that “many of the existing learning objectives needed to be rewritten for competency-based courses to be specific and measurable.”<sup>20</sup> The authors plan to gather “quantitative data . . . for a future research study” on the rubric’s broad applicability in other programs at CWU and other institutions.<sup>21</sup>

Such studies can inform the development of CBE programs and policy reform. In today’s education policy-making environment, however, quantitative research is the coin of the realm. For instance, in assessing the effect of interventions on educational outcomes, the federal What Works Clearinghouse considers only quantitative studies because, while qualitative designs are useful in many respects, they do not allow researchers to assess effectiveness from a “credible comparison of outcomes between program and counterfactual conditions.”<sup>22</sup> Our ability to learn more about the model’s effectiveness

Figure 1. Distribution of CBE Articles by Article Methodology



Note: n = 380.  
 Source: Authors' calculations.

with students from different backgrounds—a key question for policymakers—will depend on quantitative research that meets these criteria.

Most of the quantitative studies were descriptive in nature; that is, they use administrative or survey data to report observational statistics on student characteristics, student perceptions and outcomes, stakeholder opinions, and other things. For example, Mart van Dinther and others survey students' perceptions of CBE assessments and measures of student self-efficacy—a belief in one's own effectiveness in a particular area—in their article "Student Perceptions of Assessment and Student Self-Efficacy in Competency-Based Education." They examine the interplay of the two indicators, how they influence learning outcomes, and which assessment characteristics in particular influence learning positively.<sup>23</sup>

Some quantitative studies focused instead on measuring CBE's effect on student outcomes by assessing gains in competence made during a course or program. Fifteen quantitative studies examined pre- and posttest results among a single group of CBE students to assess gains in competency.

For instance, Carrie Rishel and Virginia Majewski used a pretest-posttest design to measure changes in the perceived competency level of 117 students on 17 competencies at the center of a master's program in social work. The authors also examined self-efficacy and found statistically significant effects on 17 different objectives. The authors argue that their assessment is applicable to other CBE programs.<sup>24</sup> However, without comparable data from an appropriate comparison group, assessing how these gains compare to the relevant counterfactual of traditional coursework—or no coursework at all—is not possible.

On that score, we found that few studies compared the characteristics and outcomes of CBE students to a relevant comparison group. Just 13 of the 102 quantitative studies compared the experience and outcomes of students enrolled in CBE to a comparison group of similar students enrolled in traditional courses. One study, "Faculty Collaboration and Competency-Based Curriculum Agreements: Meaningful Link in Transfer Education," used a quasi-experimental method to evaluate a competency-based program designed for transfer students at five community colleges and one liberal arts



**Table 1. Percentage of Articles by Content Category**

Category	Number of Articles	Percentage of Total Articles
Student Characteristics	13	3.4%
Student Outcomes	60	15.8%
Assessment	56	14.7%
Descriptive Design	178	46.8%
Prescriptive Design	139	36.6%
Policy and Market Environment	101	26.6%
Educational Theory	62	16.3%
History	33	8.7%

Note: n = 380. The percentages reflect the proportion of articles falling into each category out of the total number of articles. Percentages do not sum to 100 percent because an article could be coded as covering more than one category. Source: Authors' calculations.

college. The author found that transfer students who came through the CBE route had “higher post-transfer GPAs than non-participating transfer students.”<sup>25</sup> An older study by Malcolm Taylor compared the program outcomes of business school students who earned credits based on work experience with those who took traditional coursework and found that the competency-based students outperformed their peers.<sup>26</sup>

Notably, several studies also relied on self-assessments of competency—essentially asking students to report their level of competence on various dimensions before and after the course or program. Such self-assessments may reliably estimate actual competency levels. But it is not possible to know how reliable they are without validating them against an objective measure of competence. Even then, competency-based assessments would need to be validated against external measures—success in subsequent coursework, job placement, employer satisfaction, and so on—to ensure that they capture the competencies they claim to.

In short, most of the 380 studies analyzed were qualitative in their approach. Quantitative studies were less common, and only a handful of quantitative studies used data to compare CBE offerings to traditional courses or programs. Therefore, we still lack answers to basic questions that could help guide policy.

**Study Content.** When it comes to the content of the articles in our sample, the most common categories focused on program design—either describing what programs currently do (descriptive) or how practitioners should design their programs (prescriptive). Recall that studies could fall into more than one category, so the percentages do not sum to 100.

Nearly 47 percent of the studies had a descriptive design component, and about 37 percent provided a prescriptive discussion of program design. A smaller—although not insignificant—number of studies included analyses of student outcomes or assessment techniques (15.8 and 14.7 percent, respectively). About one-quarter of the studies featured a discussion of the policy and market environment for CBE. Thirteen articles analyzed the characteristics of students enrolled in CBE programs.

To provide more detail, we also looked at the cross-tabs of methodology and content. What kind of qualitative and quantitative research has been conducted on what topics? Table 2 provides the cross-tabs of methodology by selected content categories. (Table A1 in the appendix includes the full set of cross-tabs.)

Table 2 shows that of the 228 qualitative articles, about half described the design of current CBE programs (113 articles), while 97 articles prescribed design

**Table 2. Cross-Tab Analysis of Article Content by Article Methodology**

	Total Articles	Student Characteristics	Student Outcomes	Assessment	Descriptive Design	Prescriptive Design	Policy and Market Environment
<b>Quantitative</b>	102	8	42	35	47	35	15
<b>Qualitative</b>	228	4	16	20	113	97	69
<b>Literature Review</b>	44	0	2	1	15	5	14

Notes: n = 374. Uncategorized articles (by methodology) are not included in this table. Full table with all content categories available in Table A1 in the appendix.

Source: Authors' calculations.

principles—“best practices”—for designing or improving a CBE program. In a 2014 *Change Magazine* article, for instance, Kris Clerkin and Yvonne Simon outlined the features of Southern New Hampshire University’s competency-based program, from its project-based curriculum with learning coaches to its close cooperation with employers and workforce-relevant competencies.<sup>27</sup>

Another *Change Magazine* article from Sally M. Johnstone and Louis Soares provides a prescriptive take on how to design a CBE program. The paper argues that CBE “can fit into existing campus structures, if certain principles are followed: the degree reflects robust and valid competencies; students are able to learn at a variable pace and are supported in their learning; effective learning resources are available any time and are reusable; [and] assessments are secure and reliable.”<sup>28</sup> The authors say that the principles “can help guide higher education leaders as they develop their own CBE programs.”<sup>29</sup>

As you might imagine, these two categories often overlapped. Indeed, 27 articles included both a descriptive and prescriptive discussion of CBE program design. One such study, which examines the University of Missouri’s competency-based dental hygiene program, provides “examples of program competencies . . . the complete scoring rubric for portfolios, and the student portfolio evaluation survey.”<sup>30</sup> The article concludes that “although portfolio evaluation requires continual revision and analysis, it offers many advantages” and suggests how providers can adopt the university’s approach to competency-based assessment.<sup>31</sup>

Turning now to the 102 quantitative studies, Table 2 shows that many of these articles examined student outcomes in some respect. Forty-two articles were outcomes-focused, a much higher proportion than in the qualitative studies.

Many of these articles analyzed the assessment scores of students in a particular competency-based program or discipline. For instance, in their paper “An Integrated Competency-Based Approach to Management Education: An Italian MBA Case Study,” Arnaldo Camuffo and Fabrizio Gerli measure student gains in 27 separate competencies over the course of their MBA at an Italian school of management.<sup>32</sup> The authors examine self-assessments and behavioral event interviews from before and after the program and found significant gains in many areas. However, the study did not include a comparison group of non-CBE students.

Only a small number of studies focused on retention or graduation rates in CBE programs; two are worth highlighting. One study by Miriam Ben-Yoseph, Patrick Ryan, and Ellen Benjamin measured the retention and graduation rates of adult students in a competency-based individualized degree program. Using enrollment data from 1986 to 1996 and course-progression data from 1990 to 1995, the authors found that “three-fourths of those who graduated 1988-94 did so within three years; retention was most difficult in the self-directed and research phases [of the program]; [and] the women’s graduation rate was higher.”<sup>33</sup>

Another study from Milan Hayward and Mitchell Williams examined differences in graduation rates at four community colleges among adult learners who

used prior-learning assessments (PLA), those who did not, and those who used different methods of PLA. The researchers found significant differences in completion rates for PLA learners (28.4 percent) and non-PLA learners (11.8 percent), as well as significant differences among various distinct PLA methods.<sup>34</sup> Unfortunately, studies employing rigorous designs such as these were few and far between.

Only a few quantitative studies examined labor market success, despite high hopes that CBE will send a clearer signal to the labor market. Just 14 articles in the Student Outcomes category mentioned employers or industry. Some of these articles focused on employers' role in identifying competencies and informing program design. Rarely, though, did researchers actually follow graduates into the labor market, looking at job placement or career readiness.<sup>35</sup>

Just one study looked at employment rates. It examined the relationship between a competency-based language program for immigrants in Australia and job attainment, finding a significant but weak relationship between the students' level of English-language competence and employment.<sup>36</sup>

Several studies used surveys of subject-matter experts or employers to identify the key competencies for a given program of study. A common approach in these studies was the so-called "Delphi method," in which experts are surveyed numerous times and are provided with a summary of interim, aggregate results from the first questionnaire before answering the second. The idea is to encourage experts to revise their initial answers based on information from their peers, thereby illustrating areas of consensus and disagreement.<sup>37</sup> We coded these studies as falling into the "quantitative" and "prescriptive design" cells; they used quantitative survey data to identify key competencies and typically made clear curricular recommendations based on their findings.<sup>38</sup>

A similar number of quantitative studies (35 studies) focused on the assessments at the heart of CBE models—a research area that is crucial to building confidence in the competency-based approach. Many of these studies focused on validating competency measures to ensure that they accurately captured what they intended.

In one example, Marion Bogo and coauthors evaluated the predictive validity of a new objective structured clinical evaluation (OSCE) tool, an assessment for a practicum in a master's in social work program. The researchers administered a one-scenario OSCE to 125 students, rating their performance against previously standardized scales for the practicum. They found that the OSCE captured a wide range of scores associated with performance in the practicum, but also that some students who performed poorly on the OSCE performed well in the practicum evaluation.<sup>39</sup>

One area that received consistent attention from researchers was the Policy and Market Environment category. Roughly a quarter of all articles discussed this topic, with 69 qualitative and 15 quantitative articles covering this domain. Studies in this category looked at the different types of CBE emerging across higher education (direct assessment, PLA) and key policy questions, such as CBE's relation to federal credit-hour policies and accreditation.<sup>40</sup>

Notably, 62 of the 84 studies in this category examined CBE in a foreign context. Overall, few studies in this category systematically examined the domestic landscape of CBE providers. As a result, it is difficult to get a comprehensive list of who is offering CBE, let alone who enrolls, how much they pay, and how well they do.

Foreign studies were common across the board; 48.2 percent of all articles studied (183) examined CBE in another country. The most frequent foreign countries studied were Australia (37 articles), England/United Kingdom (29 articles), Canada (25 articles), and the Netherlands (21 articles). In all, 29 distinct countries were mentioned, not counting the United States.<sup>41</sup> While much of this research may be applicable to the US context, studies of American programs are likely the most relevant to current policy debates.

### **What Questions Should Researchers Ask About CBE?**

In sum, we still know less than we need to about how many institutions are offering CBE, who they serve, and how they perform. When it comes to

questions of student outcomes, the picture is seriously incomplete.

Some of this is obviously due to the recent spike in the creation of competency-based programs. Early on, practitioners and affiliated researchers are largely focused on trying to develop and implement effective programs, and descriptive work can help others identify the best practices. Likewise, formal evaluations of the model take time. Completion rates and labor market success take years to measure, and it is likely best to wait until a program is fully implemented before evaluating it. All of this means that many new programs could be a few years away from a comprehensive study of their outcomes.

At the same time, lawmakers and regulators will naturally ask whether the model “works” and for which types of students. These policymakers will be hard-pressed to find the kind of rigorous evaluation that has become increasingly common in other areas of education policy.

But researchers, funders, and policymakers have an opportunity to build such a research base. What research questions should they pursue? And what roles can different stakeholders play in promoting such a research agenda?

**Areas for Future Research.** A new research agenda should augment existing descriptive, programmatic work with empirical studies of the following questions.

*How do CBE students compare to those enrolled in traditional programs?* Conventional wisdom suggests that CBE programs are well-suited for and tend to attract nontraditional students—working adults who often have the opportunity to gain credit for prior learning. But is this conventional wisdom accurate? Which types of students select into CBE programs, and how do they compare to the students who enroll in traditional courses and programs? Basic descriptive studies of student characteristics, perhaps coupled with survey data on incoming student perceptions and goals, would do much to inform our understanding of the CBE landscape.

*How do measures of student success—learning, progress, completion, and employment—in CBE programs compare*

*to those in comparable traditional programs?* The major blind spot in CBE research relates to student outcomes. Unlike other innovations—online learning, for one—CBE has not yet been subject to the sorts of rigorous evaluations in which outcomes of “treated” students (those enrolled in CBE) are compared to outcomes of students in a “control” condition (traditional coursework, perhaps).

The gold standard here is a randomized study, although observational studies that rely on carefully considered comparison groups could also inform the discussion. This research should provide more than a simple “horse race” between CBE and traditional coursework. Rather, it should focus on asking how different types of students fare when they enroll in different varieties of CBE, as compared to similar students who either enroll in traditional coursework or do not enroll at all. Learning which models seem to be more effective and with which types of students can help policymakers and school leaders target their efforts where they are most likely to be successful.

*Do the assessments at the heart of CBE map to success in future tasks (subsequent courses, graduate school, or the workplace)?* Another related question is how well performance on CBE assessments predicts future success—are the assessments “externally valid”? As Katie McClarty and Matthew Gaertner asserted in a recent paper, “External-validity evidence is critical to supporting the claims that CBE programs can make about the relationship between their measures of competence and workplace success, and about comparability of graduates from CBE and non-CBE programs.”<sup>42</sup> Researchers should design studies that test the predictive power of CBE assessment scores with students’ performance in higher-level courses in the same program, graduate school courses, or the labor market.

*Is CBE more cost-effective than traditional models (for students and institutions)?* One of the most common arguments in favor of CBE focuses on its apparent affordability. The model itself is likely less expensive to offer than traditional coursework; rather than sitting through a set number of lectures and sections, students can learn at their own pace and take a series of

assessments. The ability to move more quickly—especially under “all-you-can-learn” tuition plans—may lower time to degree and tuition paid.

As Robert Kelchen points out in his analysis of tuition pricing in CBE, while earning more affordable credits through CBE programs is certainly possible, it is not a foregone conclusion.<sup>43</sup> This is a simple enough empirical question: how much do CBE graduates pay, on average, for their degrees relative to comparable students who earn degrees in traditional programs? How much debt do these two groups of students take on? This information is readily available via administrative data, and a descriptive research project would help inform the conversation.

*How do employers view CBE?* In “Employer Perspectives on Competency-Based Education,” an earlier AEI paper in this series, Parthenon-EY’s Chip Franklin and Rob Lytle surveyed a sample of employers and generally found an openness to CBE models but also low levels of overall awareness of the approach.<sup>44</sup> But there is much more work to be done.

A more detailed look could identify employers that have hired a critical mass of CBE graduates and ask them how they view those employees compared to those who came from more traditional routes. Researchers could couple survey data with objective measures (earnings, advancement). In addition, researchers could conduct a “résumé experiment,” in which they send fictitious résumés to employers with job openings, some of which feature a CBE degree or transcript (the treatment group), while the others feature a traditional degree or transcript.<sup>45</sup> Does the additional information that comes with a CBE credential affect employer decisions about who to interview and hire? These research questions could help fill in some of the blanks in the study of student outcomes.

**How Can Stakeholders Support This Research Agenda?** Who can help push this research agenda along? Thanks to the quick and continued expansion of CBE, there is a tremendous opportunity to build a sustainable research and development enterprise that can inform institutional practice and federal and state policy.

The federal government could play a significant role in expanding the study of this new mode of instruction, particularly through the Department of Education’s ongoing Experimental Sites Initiative. Under this program, the department waives certain eligibility requirements for the federal student aid program, allowing a set number of new, innovative providers to receive federal grants and loans. CBE is now the focus of an Experimental Sites project, and 40-plus programs were accepted into the program last year.<sup>46</sup>

Using experimental-sites authority to test CBE models is a positive step. However, policymakers must make sure that this flexibility is coupled with rigorous evaluation, ideally modeled on the What Works Clearinghouse standards.<sup>47</sup> Congress could also consider setting up a CBE demonstration project, as Reps. Jared Polis (D-CO) and Matt Salmon (R-AZ) proposed in their 2014 bill.<sup>48</sup> The demonstration project bill would change federal law, officially allowing the secretary of education to give waivers to up to 30 CBE providers for participation in the federal student aid program. Demonstration projects should be subject to rigorous evaluations as well.

Philanthropy also has an obvious role to play here. Major higher education funders have shown interest in the model and have invested in efforts to build programs, study the policy environment, and so on.<sup>49</sup> These gifts have likely played an important role in encouraging the recent bump in interest in CBE. Philanthropists could build on this work by funding rigorous quantitative work on the questions laid out earlier.

In September 2015, the tandem of the Bill & Melinda Gates Foundation and the Lumina Foundation released a report on CBE providers’ roles in the new experimental-sites initiative, one of which included volunteering for “vigorous, third party evaluation . . . and [leading] a national research agenda . . . to ensure that the effectiveness of CBE programs will be rigorously evaluated.”<sup>50</sup> These organizations should continue to fund projects that fulfill this spirit.

Finally, higher education researchers should take a fresh look at these important research questions, especially researchers who are not immediately part of the CBE community. As it happens, WGU and publisher

John Wiley & Sons recently founded the *Journal of Competency-Based Education*, a new peer-reviewed journal focused explicitly on CBE. (Full disclosure, one of us sits on the advisory board for the journal.) The goal is to advance theoretical and empirical research on the model, and its first issue featured original research on student and faculty experiences, student outcomes, and costs. The journal will also feature case studies on existing programs’ practices and short opinion essays on the state of CBE.<sup>51</sup> This journal could provide academics with a peer-reviewed platform to publish new research

while creating a clearinghouse for work that tackles many of the earlier questions.

Attention to the research questions and the various stakeholder roles laid out earlier will help build our understanding of CBE programs, but only if such research is truly objective and open-ended. Wherever possible, CBE proponents and sympathizers should invite outsiders in to apply their tools to the model. Doing so will enhance the credibility of the research and increase the likelihood that policymakers will come to rely on it.

## Appendix

**Table A1. Full Cross-Tab Analysis of Article Content by Article Methodology**

	Total Articles	Student Characteristics	Student Outcomes	Assessment	Descriptive Design	Prescriptive Design	Policy and Market Environment	Educational Theory	History
<b>Quantitative</b>	102	8	42	35	47	35	15	7	0
<b>Qualitative</b>	228	4	16	20	113	97	69	33	15
<b>Literature Review</b>	44	0	2	1	15	5	14	21	18

Notes: n = 380. Uncategorized articles (by methodology) are not included in this table.  
 Source: Authors’ calculations.

## Notes

1. Robert Kelchen, *The Landscape of Competency-Based Education: Enrollments, Demographics and Affordability*, American Enterprise Institute, January 2015, [www.aei.org/wp-content/uploads/2015/04/Competency-based-education-landscape-Kelchen-2015.pdf](http://www.aei.org/wp-content/uploads/2015/04/Competency-based-education-landscape-Kelchen-2015.pdf).
2. Paul Fain, "College Credit Without College," *Inside Higher Ed*, May 7, 2012, [www.insidehighered.com/news/2012/05/07/prior-learning-assessment-catches-quietly](http://www.insidehighered.com/news/2012/05/07/prior-learning-assessment-catches-quietly).
3. Chip Franklin and Robert Lytle, *Employer Perspectives on Competency-Based Education*, American Enterprise Institute, April 2015, [www.aei.org/wp-content/uploads/2015/04/Employer-Perspectives-on-Competency-Based-Education.pdf](http://www.aei.org/wp-content/uploads/2015/04/Employer-Perspectives-on-Competency-Based-Education.pdf).
4. Jamie Merisotis, "Competency-Based Learning: A Big Deal, But Not Because of the Feds," *Huffington Post*, April 2, 2013, [www.huffingtonpost.com/jamie-merisotis/competencybased-learning-\\_b\\_2994751.html](http://www.huffingtonpost.com/jamie-merisotis/competencybased-learning-_b_2994751.html).
5. Doug Lederman, "A Marriage Made in Indiana," *Inside Higher Ed*, July 14, 2010, [www.insidehighered.com/news/2010/07/14/wgu](http://www.insidehighered.com/news/2010/07/14/wgu).
6. Western Governor's University, "The WGU Story," [www.wgu.edu/about\\_WGU/WGU\\_story](http://www.wgu.edu/about_WGU/WGU_story).
7. Paul Fain, "Experimenting with Competency," *Inside Higher Ed*, January 13, 2015, [www.insidehighered.com/news/2015/01/13/feds-move-ahead-experimental-sites-competency-based-education](http://www.insidehighered.com/news/2015/01/13/feds-move-ahead-experimental-sites-competency-based-education).
8. US Department of Education, Institute of Education Sciences, Education Resources Information Center, "ERIC Selection Policy," April 2014, <http://eric.ed.gov/?selection>.
9. See US Department of Education, Institute of Education Sciences, Education Resources Information Center, "What Is ERIC?" <https://ies.ed.gov/ncee/projects/eric.asp>. Of the more than 1,000 journals indexed in ERIC, nearly all are indexed comprehensively, meaning every article in the journal is included in the database. ERIC indexes a small number of journals selectively, including only the education-related articles. ERIC also indexes a wide variety of non-journal items, which we did not use for this paper. Additionally, all materials indexed in ERIC must be directly related to the field of education as described by one or more of the topic areas outlined in the authorizing legislation for the Institute of Education Sciences. For more information on the comprehensive selection policy of ERIC, including the process of approving journal sources or the topics considered directly relating to education, see US Department of Education, Institute of Education Sciences, Education Resources Information Center, "ERIC Selection Policy," January 2016, [https://eric.ed.gov/pdf/ERIC\\_Selection\\_Policy.pdf](https://eric.ed.gov/pdf/ERIC_Selection_Policy.pdf).
10. ProQuest, "ERIC: About," <http://proquest.libguides.com/eric>.
11. ERIC actually features a tag for "competency based education," which allows readers to narrow their search to studies that administrators have identified as being relevant to the topic. However, we did not rely on this tag because we wanted to be sure we captured all relevant studies. To ensure we did not miss studies that may not have been tagged yet, we opted for the Boolean search for both search terms, which resulted in far more studies than searching with the tags. The search was completed in August 2015.
12. Although there are a few other subvarieties of competency-based education, "prior learning assessment" received its own tag on ERIC as well, so we conducted an additional Boolean search using that term. For more information on PLA, see Council for Adult and Experiential Learning, *Fueling the Race to Postsecondary Success: A 48-Institution Study of Prior-Learning Assessment and Adult Student Outcomes*, March 2010.
13. We did not exclude workforce training if it occurred in a postsecondary environment. See Tracy A. Irani, "GNC University: Exploring the Influence of a Unique Academic-Industry Partnership on Understanding and Use of Nutrition Concepts Among GNC Managers," *Quarterly Review of Distance Education* 8, no. 2 (2007): 127–37.
14. Elizabeth M. McLaren, Phyllis J. Hall, and Pamela Fox, "Kentucky's Early Childhood Professional Development Initiative to Promote Social-Emotional Competence," *NHSA Dialog* 12, no. 2 (2009): 170–83.
15. An example of a clear false positive was the article "A New Approach to Small Business Training: Community Based Education," which happens to share use of the acronym "CBE," but throughout bore no mention of competency-based education. See Janice Redmond and Elizabeth A. Walker, "A New Approach to Small Business Training: Community Based Education," *Education + Training* 50, no. 8/9 (2008): 697–712.

16. Also included in the literature review category was a small minority of articles that were literary critiques or purely theoretical articles. There are not many of this type of article, and they did not present “new” findings similar to a literature review.
17. Qualitative studies with literature reviews were coded as “qualitative studies.”
18. Note that descriptive and prescriptive designs are not mutually exclusive; an article could both describe and prescribe the practices of a CBE provider. In those instances, articles were coded as falling under both categories.
19. Greet M. J. Fastre et al., “Assessment Criteria for Competency-Based Education: A Study in Nursing Education,” *Instructional Sciences* 42, no. 6 (November 2014): 971–94.
20. Jackie Krause, Laura Portolese Dias, and Chris Schedler, “Competency-Based Education: A Framework for Measuring Quality Courses,” *Online Journal of Distance Learning Administration* 18, no. 1 (Spring 2015).
21. Ibid.
22. US Department of Education, Institute of Education Sciences, “What Works Clearinghouse: Frequently Asked Questions,” <http://ies.ed.gov/ncee/wwc/document.aspx?sid=15&pid=10#qualitative>.
23. Mart van Dinther, Filip Dochy, Mien Segers, and Johan Braeken, “Student Perceptions of Assessment and Student Self-Efficacy in Competence-Based Education,” *Educational Studies* 40, no. 3 (2014): 330–51.
24. Carrie W. Rishel and Virginia Majewski, “Student Gains in Self-Efficacy in an Advanced MSW Curriculum: A Customized Model for Outcomes Assessment,” *Journal of Social Work Education* 45, no. 3 (Fall 2009): 365–83.
25. Brent Cejda, “Faculty Collaboration and Competency-Based Curriculum Agreements: Meaningful Links in Transfer Education,” *Michigan Community College Journal: Research & Practice* 4, no. 1 (Spring 1998): 69–78.
26. Malcolm Taylor, “Accessing Higher Educational Awards Through National Vocational Qualifications in Management,” *Journal of Vocational Education & Training* 48, no. 3 (August 1996): 295–309.
27. Kris Clerkin and Yvonne Simon, “College for America: Student-Centered, Competency-Based Education,” *Change: The Magazine of Higher Learning* 46, no. 6, (November/December 2014).
28. Sally M. Johnstone and Louis Soares, “Principles for Developing Competency-Based Education Programs,” *Change: The Magazine of Higher Learning* 46, no. 2 (April 2014).
29. Ibid.
30. Cynthia Gadbury-Amyot et al., “Implementation of Portfolio Assessment in a Competency-Based Dental Hygiene Program,” *Journal of Dental Education* 64, no. 5 (May 2000): 1559–71.
31. Ibid.
32. Arnaldo Camuffo and Fabrizio Gerli, “An Integrated Competency-Based Approach to Management Education: An Italian MBA Case Study,” *International Journal of Training and Development* 8, no. 4 (November 2004): 240–57.
33. Miriam Ben-Yoseph, Patrick Ryan, and Ellen Benjamin, “Retention of Adult Students in Competence-Based Individualized Degree Program,” *Journal of Continuing Higher Education* 47, no. 1 (1999): 24–30.
34. Milan S. Hayward and Mitchell R. Williams, “Adult Learner Graduation Rates at Four U.S. Community Colleges by Prior Learning Assessment Status and Method,” *Community College Journal of Research and Practice* 39, no. 1 (2015): 44–54.
35. Camuffo and Gerli, “An Integrated Competency-Based Approach to Management Education”; and Alexander Lunev, Inna Petrova, and Viktoria Zaripova, “Competency-Based Models of Learning for Engineers: A Comparison,” *European Journal of Engineering Education* 38, no. 5 (2013): 543–55. The qualitative research base also offers several articles that discuss what competencies businesses want and how best to link postsecondary education and the working world. For example, see Karen Paulson, “Using Competencies to Connect the Workplace and Postsecondary Education,” *New Directions for Institutional Research* 2001, no. 110 (2001): 41–55.
36. John Fitzgerald Ehrich, Sun Hee Ok, and Laura Ficorilli, “Competency-Based Assessment, Employment and Immigrant Background: An Exploratory Investigation of Adult Language Learners in Australia,” *Language and Education* 24, no. 6 (2010): 485–94.
37. Chia-Chien Hsu and Brian A. Sandford, “The Delphi Technique: Making Sense of Consensus,” *Practical Assessment, Research & Evaluation* 10, no. 12 (2007): 1–8.
38. For instance, see Wen-Jye Shyr, “Industry-Oriented Competency Requirements for Mechatronics Technology in Taiwan,” *Turkish Online Journal of Educational Technology* 11, no. 4 (October 2012): 195–203.



39. Marion Bogo et al., "Evaluating an Objective Structured Clinical Examination (OSCE) Adapted for Social Work," *Research on Social Work Practice* 22, no. 4 (July 2012): 428–36.
40. For instance, see Frederick Carl Prasuchn, "Credit Hours with No Set Time: A Study of Credit Policies in Asynchronous Online Education," *American Journal of Distance Education* 28, no. 1 (March 2014), 4–13; and Peter Boahin, Jose Eggink, and Adriaan Hofman, "Competency-Based Training in International Perspective: Comparing the Implementation Processes Towards the Achievement of Employability," *Journal of Curriculum Studies* 46, no 6 (2014): 839–58.
41. A number of studies also examined "Europe" (16) or "international settings" (5).
42. Katie Larsen McClarty and Matthew N. Gaertner, *Measuring Mastery: Best Practices for Assessment in Competency-Based Education*, American Enterprise Institute, April 2015, [www.aei.org/wp-content/uploads/2015/04/Measuring-Mastery.pdf](http://www.aei.org/wp-content/uploads/2015/04/Measuring-Mastery.pdf).
43. Kelchen, *The Landscape of Competency-Based Education*.
44. Franklin and Lytle, *Employer Perspectives on Competency-Based Education*.
45. For example, see Rajeev Darolia et al., "Do Employers Prefer Workers Who Attend For-Profit Colleges? Evidence from a Field Experiment" (working paper, National Center for Analysis of Longitudinal Data in Education Research, August 2014), [www.caldercenter.org/sites/default/files/WP-%20116.pdf](http://www.caldercenter.org/sites/default/files/WP-%20116.pdf).
46. Fain, "Experimenting with Competency."
47. US Department of Education, Institute of Educational Sciences, *What Works Clearinghouse: Procedures and Standards Handbook, Version 2.1*, [https://ies.ed.gov/ncee/wwc/pdf/reference\\_resources/wwc\\_procedures\\_v2\\_1\\_standards\\_handbook.pdf](https://ies.ed.gov/ncee/wwc/pdf/reference_resources/wwc_procedures_v2_1_standards_handbook.pdf).
48. H.R. 3136, "Advancing Competency-Based Education Demonstration Project," July 24, 2014, [www.congress.gov/bill/113th-congress/house-bill/3136](http://www.congress.gov/bill/113th-congress/house-bill/3136).
49. Bill & Melinda Gates Foundation, "Postsecondary Success Areas of Focus: Competency-Based, Marketable Credentials," <http://postsecondary.gatesfoundation.org/areas-of-focus/pathways-for-student-success/flexible-paths-to-college-completion/competency-based-credentials/>; and Paul Fain, "Competent at What?" Inside Higher Ed, December 12, 2013, [www.insidehighered.com/news/2013/12/12/lumina-funded-group-seeks-lead-conversation-competency-based-education](http://www.insidehighered.com/news/2013/12/12/lumina-funded-group-seeks-lead-conversation-competency-based-education).
50. Lumina Foundation and Bill & Melinda Gates Foundation, *Summary Report: Convening in Support of Federally Authorized Experimental Sites for Competency-Based Education*, September 2015, [www.luminafoundation.org/files/resources/Experimental-CBE-sites-convening.pdf](http://www.luminafoundation.org/files/resources/Experimental-CBE-sites-convening.pdf).
51. Wiley Online Library, "The Journal of Competency-Based Education," [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)2379-6154/issues](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)2379-6154/issues).

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