Summative Evaluation

knowledge

Knowledge to Work: A Portal for Competencies and Individualized Learning

Lord Fairfax Community College

TAACCCT Grant

Third Party Evaluation Report September 13, 2018

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EXECUTIVE SUMMARY

Lord Fairfax Community College (LFCC) received a Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant from the U.S. Department of Labor (USDOL) in September 2014. This report *constitutes the final (and summative) third-party evaluation report* required by USDOL. It describes the implementation of the grant during most of its four years, including an overview of LFCC's approach to documenting student outcomes through Competency-Based Education (CBE) techniques. Named "Knowledge to Work," this initiative initially deployed direct assessment techniques and, subsequently, classroom-based CBE techniques in career and technical programs selected to meet regional workforce needs. Knowledge to Work also developed a web portal linking an expanding number of Open Education Resources (OER) for users and faculty to create personalized learning programs tied to competencies. This report also seeks to provide *evidence-based narratives of lessons learned* in implementing CBE as supplemented by web technology intended to inform USDOL, policymakers and researchers interested in using CBE for workforce programs, other colleges considering a CBE approaches, and practitioners interested in competency-based approaches.

Knowledge to Work's *purpose* was the *development of multiple training modes and platforms customized for grant participants* based on their needs. Learning plans pull together the modules of curriculum in a way which makes sense to the individual student, while satisfying the expectations of the industry and potential employers; and (2) the development of a national web portal for competencies and individual learning. Personalized learning plans, in turn, were intended to flow into competencies and competency-based delivery for the completion of awards and credentials and to satisfy expectations for the desired occupation, thereby creating a lattice of sequential attainment. K2W created CBE pathways in three industry areas—information technology, health information management, and advanced manufacturing. Existing college programs in information systems technology, administrative support technology, and health information management were converted to CBE, with different exit points tied to the AAS degree, certificate, and career studies certificate. A partnership with American Health Information Management Association (AHIMA) also created a new occupation-specific competency framework and credential entitled Health Information Technology Specialist. A certification exam for this program was piloted by AHIMA and its release is imminent.

The *K2W evaluation design* provided an evidence-based framework for formative decision making by responding to specific research questions about project outcomes. The *goal of the evaluation* was to answer required USDOL outcome questions and to guide implementation and formative feedback for grant operations. A combination of quantitative and qualitative data were gathered throughout the grant period. These data consisted of non-identifiable student unit record data that were supplemented by interviews with project staff, faculty, and students. The evaluator also trained grant personnel and associated faculty in

constructing competency-based education models and rubric development for assessment. The overall goal for the evaluation was to systematically gather, analyze, and interpret evidence of K2W effectiveness.

The *implementation study design* responds to *four questions required of each grantee*: (1) How was the particular curriculum or activity selected, used, or created? (2) How were programs/program designs improved or expanded using grant funds? What delivery methods were offered? What was the program administrative structure? What support or other services were offered? What was the program administrative structure? (3) Are in-depth assessment of participant abilities, skills, and interests conducted to select or enroll individuals into the program being evaluated? What assessment tools and process were used? Who conducted the assessments? How were the assessment results used? Were the assessment results useful in determining the appropriate program and course sequence for participants? Was career guidance provided? If so, through what methods? (4) What contributions did each of the partners and other key stakeholders make towards: a) program design, b) curriculum development, c) recruitment, d) training, e) placement, f) program management, g) leveraging of resources, and h) commitment to program sustainability? What factors affected partner involvement or lack of involvement? Which contributions from partners were most critical to the success of the grant program? Which contributions from partners had less of an impact? The evaluation design also probed whether **short-term education outcomes differ** for participants enrolled in course-based CBE and corresponding non-CBE courses? The last question is addressed using a *Propensity Score Analysis*.

This summative evaluation was guided by the *K2W logic model* (Appendix A). That model intends to bring clarity to the *structure of K2W's assumptions, inputs, activities, outputs, outcomes, and impact*. Because the CBE delivery model changed during the course of the grant, thereby shortening the timeframe for cohort analysis to measure associated student outputs, outcomes, and impact, the bulk of evaluative work fell into the input and activities domains of the model. Enrollment data were monitored both before and after the change from direct assessment CBE to course-based delivery. Interviews with K2W staff, LFCC administrators, and students enrolled in direct assessment served to *triangulate evaluative conclusions* based on that model and offered here as well as three previous annual evaluation reports.

Introduction of *competency-based education models* in higher education institution *can be transformational*. Necessary changes in daily and strategic operations at the College to implement competency-based education direct assessment were documented and compared to known student-centric practice. *Indicators for competency-based delivery* include policy changes in administrative and instructional areas: recruitment, admissions, career guidance, transcription of credits and competencies, and faculty workload. *Usage indicators for K2W's web portal* include time-linked analysis of users by: (1) education plan; (2) resources, e.g., OER, added by role; (3) number of resource summary clicks; (4) clicks on employer pages; (5) clicks on job seeker pages; (6) clicks on learner pages; and (7) clicks on advertisements. Additionally,

K2W collected data on user affiliation; user geography; resources added by user affiliation; and total resources added to the portal by subject area.

Implementation findings include

- Development of institutional capacity through *specific training of faculty and staff* in key areas including CBE model development and alterations to institutional administrative policy.
- Expansion of *institutional capacity in curriculum development* to include establishing both direct assessment and classroom-based in CBE including the development of learner performance standards as measured by rubrics.
- Introduction of a web portal including competency frameworks used in the direct assessment CBE programs, software and features for personalized learning plans, a search engine for OER tied to competencies, job search, and incorporation of USDOL O*NET occupational data.
- Provision of *national frameworks* and expertise in competency-based model development for faculty and instructional personnel.
- Portal partnerships with other national organizations and stakeholders seeking to accelerate competency-based education including AHIMA, Microsoft, the International Association of Administrative Professionals (IAAP), Concentric Inc. (operator of the Badge Alliance), Merlot OER repository, Saylor Academy, Community College Consortium for Open Education Resources (CCCOER), Zinc Learning Labs, and the Open Textbook Library.

Despite the switch from initial decision to deploy direct assessment CBE to classroombased CBE, the project *retained and met all TAACCCT proposed activities and deliverables*. Since classroom-based CBE is marginally easier to administer and easier for faculty, administrators, and students to understand, the overall impact was marginal. K2W engaged fully in all planned activities and produced all promised deliverables

Evaluation of *operational strengths and weaknesses* appear throughout this report and are summarized here. Strengths include: (1) commitment from the top administration to engage in competency-based education models, (2) flexibility and adaptability among K2W project staff, (3) buy-in from lead faculty to develop CBE models; and (4) technical ability among K2W leadership to create competency tracking and case management software for direct assessment and a web portal. Weakness include: (1) a national policy framework that first encouraged direct CBE assessment but which became lukewarm as regulatory actors returned to concerns stressing time measurement over learning outcomes, (2) lack of student information software system capability on the state level to fully transcript competencies, (3) a lack of awareness among prospective students and employees about the benefits of CBE, (4) the time required to develop of institutional policies and procedures for review by the College's regional accreditor after initial direct assessment CBE which, in turn, impacted student recruitment.

Participant impacts and outcomes for all participants are summarized by two sets of impact and outcome data. The first are the nine outcomes required by USDOL's Solicitation for Grant Applications. These are common across all TAACCCT projects. The second are impact and outcome data associated with the K2W portal.

K2W Cumulative Outcomes Required by USDOL	
Outcome	#
1. Unique Participants Served/Enrollees	2,034
2. Total Number Who Have Completed a Grant-Funded Program of Study	92
2a. Total Number of Grant-Funded Program of Study Completers Who Are Incumbent	6
Workers	
3. Total Number Still Retained in Their Programs of Study (or Other Grant-Funded Programs)	495
4. Total Number Retained in Other Education Program(s)	152
5. Total Number of Credit Hours Completed	3,414
5a. Total Number of Students Completing Credit Hours	1,003
6. Total Number of Earned Credentials	149
6a. Total Number of Students Earning Certificates - Less Than One Year	0
6b. Total Number of Students Earning Certificates - More Than One Year	81
6c. Total Number of Students Earning Degrees	33
7. Total Number Pursuing Further Education After Program of Study Completion	4
8. Total Number Employed After Program of Study Completion	6
9. Total Number Employed After Retained in Employment After Program of Study Completion	0
10. Total Number of Those Employed at Enrollment Who Receive a Wage Increase Post-	3
Enrollment	
Source: K2W reports	

Portal use steadily increased throughout the grant period in pace with new functionality and improvements in user experience.

- Among new portal users between March 2016 and July 2018
 - A total of 15,734 users visited the web portal
 - \circ 1,079 of these users completed a profile and enrolled
 - o 1,141 personalized learning plans were generated
 - the modal portal entry source (n=401) for new users was IAAP (International Association of Administrative Professionals)
 - \circ $\,$ New users represented all US states and the US Virgin Islands; 81 were international users
- Between September 2017 and July 2018 site visitors included
 - 1,370 users who viewed employer pages
 - 5,280 users who viewed the job seekers pages
- As of July 2018, 21,881 curated learning resources (Open Education Resources and other learning objects) were freely available for educators to develop CBE models and for learners to develop personalized learning plans on the.

Limitations of the data and interpretation include the switch between cohort tracking capability associated with direct CBE assessment and panel analysis associated with coursebased assessment. *USDOL tracking presumes that cohorts of students enter TAACCCT programs at one point in time*; LFCC's transition toward course-based CBE delivery precludes the tracking of cohorts. Participants in course-based CBE may or may not have been participants in K2W programs

This report identifies *lessons learned as well as innovative and capacity-building* **activities** based on K2W experiences. These are especially important for CBE practice at postsecondary institutions exploring or implementing CBE pathways including technological solutions to creating competency-based learning models to include personalized learning plans. These sections contain advice about practical steps in which K2W succeeded as well as those steps that fell short of its original vision. Recommendations for future workforce and education research conclude this report.

INTRODUCTION

The U.S. Department of Labor (USDOL), Employment and Training Administration (ETA) Grants are designed to help workers eligible for training under the TAA for Workers program, as well as a broad range of other adults. Every U.S. state received funding for each of four years through 256 grants totaling \$1.9 billion. Trade Adjustment Assistance Community College and Career Training (TAACCCT) grants have impacted 60% of the nation's publicly-funded community colleges and building industry-aligned programs in manufacturing, healthcare, information technology, energy, transportation and other industries (USDOL, n.d.). The broad goals of the TAACCCT program were (1) to increase attainment of degrees, certificates, and other industry-recognized credentials that provide skills for employment in high-wage, high growth fields; (2) to introduce or replicate innovative and effective curricula that improve learning that is relevant to employment; and (3) to improve employment outcomes for participants, especially those eligible for Trade Adjustment Assistance and other economically dislocated and low-skilled adult workers.

Following a successful proposal to USDOL, Lord Fairfax Community College was awarded a Round Four TAACCCT grant in September 2014. TAACCCT resources helped to fund LFCC's initiative named "Knowledge to Work" (K2W). LFCC's award totaled \$3.25 million for four years to create a local, regional, and national system for Trade Adjustment Act-eligible workers, veterans, and other adults to document competencies through individualized learning plans, leverage free and low-cost electronic learning resources, and earn industry credentials that make them marketable in three high wage, high growth industry sectors. This amount included \$750K in funding above the \$2.5M cap to create a new national competency framework and credential and to support new features in K2W's web portal. The new credential created in conjunction with the American Health Information Management Association was in the field of information technology in healthcare.

Physically located in the Northern Shenandoah Valley of Virginia, Lord Fairfax Community College's (LFCC) service region consists of the seven counties of Frederick, Fauquier, Page, Shenandoah, Clarke, Warren, and Rappahannock, and the city of Winchester. LFCC intends to serve local and regional employers through K2W as well as to create a national model that technologically links OERs, competencies, credentials, and certifications to jobs. Competency-Based Education (CBE) is a rapidly developing initiative across all of higher education. By embarking on this grant, especially deploying direct CBE assessment, LFCC has set itself on a course to become a pioneer as well as a test bed from which other colleges and organizations can learn about strong practices.

Organization of the Report

Unlike the three previous annual reports, this summative report not only analyzes education outcomes of K2W TAACCCT participants and the development of an education portal designed to connect OER to CBE efforts but, more critically, offers narrative insight about

lessons learned as well as observations about innovation, capacity, and sustainability. Potential audiences for this report include USDOL, policymakers and researchers interested in using CBE for workforce programs, other colleges considering CBE approaches, practitioners interested in competency-based approaches, and postsecondary institutional transformation efforts

This report consists of six chapters. The remainder of this chapter provides the reader with a history and current status of CBE in the US including an identification of universal implementation issues. Chapter Two is a high-level overview of *lessons learned* in establishing a competency-based model as supplemented by the web portal developed by K2W. The focus of this chapter is on how these findings *might be replicated* in other settings, especially community colleges. Chapter Three summarizes K2W activity underneath *four categories of innovation*. Chapter Four explores *capacity building and sustainability activities*. Section Five describes K2W's approach to implementation, research questions, a review of the logic model, and methodology for the evaluation. Section Six provides an overview of participant streams, evidence of program outcomes, user data from the web portal, and a synopsis of the Propensity Score Analysis performed by the third-party evaluator. Section Seven is an interpretative discussion of K2W outcomes while *identifying workforce education research areas* based on the experience gained though implementing this project.

Competency-Based Learning Models

Competencies challenge century-old traditions for measuring and reporting learning progress. That is to say that educators are accustomed to relying on time spent on structured learning activities with an identified beginning and ending as a proxy for documenting learning. In 1910, the Carnegie Foundation for the Advancement of Teaching developed the standard units of time for higher education (credit hour) and secondary education (student hour) as the national form of academic currency. It has been noted that this effort at standardizing learning moved its focus to "the efficiency and productivity of educational institutions in a manner similar to that of industrial factories" (cited in Barrow, 1990, p. 67).

Competency-based education is generally distinguished from other educational approaches in several ways. First, all units of learning (competencies) are *precisely defined* so as to be *measurable*. Second, students must demonstrate mastery of each competency at a *predefined level* before moving on to the next. CBE does not rely on seat-time as a measure of learning attainment. Rather, competency-based models seek to document what a student has learned by creating a set or system of competencies for which a student must demonstrate mastery. Third, students in CBE can accelerate their progress through a chosen program more than is often the case in traditional program. Although growing in both awareness and acceptance, CBE programs are the exception rather than the rule in community colleges. Even more rare is a decision by a community college to engage in *direct assessment* as explained below.

The history of competencies in the US is now more than five decades old (Voorhees and Bedard-Voorhees, 2016). The widespread interest among higher education institutions is only

recent, however. Recognition of CBE's utility in demystifying educational processes by linking learning to measurement has brought CBE increasingly to the forefront. Higher education periodicals and the national press document CBE's potential and actual impact on policymakers, academic leaders, foundations and institutions, chiefly as a perceived faster route to completion of degrees and certificates. It is now estimated that 500,000 students across 750 colleges will be enrolled in CBE programs by the year 2020 (Fleming 2015).

Despite a somewhat long history and aside from a handful of cutting-edge efforts, CBE primarily has operated on a conceptual level in higher education. It is only recently that interest in accelerating student completion of educational objectives and programs has brought these concepts nearer to widespread implementation. The current result is an early evidence base. It is hoped that the present evaluation can add to available knowledge.

CBE Implementation Issues

As attractive as CBE is to accelerate learning, it also challenges the longstanding traditions of educational delivery while simultaneously creating significant hurdles to successful implementation. The most significant institutional challenge is to decide how students will interact with the new CBE program. This initial decision triggers other, secondary institutional responses necessary to operate the program.

In the evaluator's experience, identifying where a CBE program will be placed on several continua is *critical prior to implementation*: (1) direct assessment CBE or classroom-based CBE, (2) self-paced or faculty-driven; (3) term based or non-term based; and (4) *a priori* identification of competencies and associated learner performance criteria or a piecemeal structure. These decisions will be interconnected and there are no "right" or "wrong" answers. Collectively, these decisions carry consequences for practice and delivery. Once these decisions are clearly taken, the institution can plan to support learners along the CBE pathway including adapting existing business models to accommodate students in the new CBE program.

Direct assessment is defined by the federal government as "an instructional program that, in lieu of credit hours or clock hours as a measure of student learning, utilizes direct assessment of student learning, or recognizes the direct assessment of student learning by others." Direct assessment programs, then, move beyond the time bounded by the traditional credit hour as the unit of instruction and toward the mastery of competencies. Students can progress at their own pace without the constraints of a traditional class schedule expressed in weeks, semesters, and/or years. Direct assessment transcripts document not only course completion and grades but also the specific competencies that the student has mastered.

Course-Based CBE, as implied by its name, occurs within the timeframe of a traditional course. That is, CBE delivery begins at a fixed point and ends at the date corresponding to an institution's academic schedule. There are large differences between course-based CBE and a traditional course, however. Classroom management for course-based CBE focuses on clearly identifying and helping students master a pre-defined set of competencies mapped to the

course objectives while a traditional classroom may contain these elements but typically operates on much less defined instructional model. Generally, course-based CBE means moving away from lectures and passive instruction toward facilitating student mastery of those predefined set of competencies through one or more learning pathways. The process for demonstrating mastery of a given competency in a course-based CBE classroom is similar, if not identical, to processes for direct assessment. Both require systematic and substantive interaction between faculty and students as part of the instructional process. Because the focus is upon groups of students and not necessarily individual students, course-based CBE may not provide a level of personalization that is possible with more flexible direct assessment formats, however.

It is also easier to create a CBE model delivered to students inside a classroom where students are more "reachable" and can interact face-to-face with faculty and other learning staff. This delivery mode ensures that students can be kept on track and that they have the opportunity to interact with their peers. Delivery and associated learning activities occurring outside the classroom are harder to monitor and, although the technology to track students' interaction with competencies outside the classroom setting is improving, it is still not perfect, and the institution will want to allow for a measurement schemes that can help to keep even the most dedicated self-paced learner on task and provide frequent feedback.

When it is decided that students will engage in *flexibly-paced* pursuit of competency attainment as opposed to *faculty-led delivery*, the institution will need to ensure that the structure for competencies is transparent to faculty and students alike and includes expected, unambiguous performance standards so that learners can clearly demonstrate they have mastered each competency. Self-paced competency pathways require high levels of student maturity and motivation while faculty-driven engagement may be more efficient where maturity and motivation lag. A hybrid delivery system that combines self-paced and faculty-driven modes may also be desirable. In any case, students and faculty alike benefit from an open structure that identifies all competencies and their performance standards for a program.

A decision to develop a **non-term-based** CBE model carries other consequences. CBE offers the possibility of creating learning experiences that may be shorter or longer than a fixed academic term. If shorter, a compartmentalized or modularized learning experience might be inserted between the start or end of a term. If longer, the institution will need to grapple with how to transcript credits across terms, how to provide appropriate support across those terms to ensure student success, and how to deal with financial aid disbursements that are tied to credit hours earned within a specific academic term.

A complete competency-based model will curate and catalog all competencies a learner is expected to master to complete a given program. This will be done prior to implementing the program, meaning that considerable thought and time will be required to not only identifying those program competencies but also to specifying how students can *clearly demonstrate that they have mastered those competencies*. A priori identification of competencies and associated *learner performance criteria* demarcate a true competency-based program from those programs that are competency-based in name only. Programs that systematically have identified complete competencies and then have paired these competencies with authentic assessment can also efficiently implement competency tracking schemes. It benefits students and faculty alike when this level of transparency is present since students will then have clear expectations in front of them and faculty will have an overview of what the student knows at any given point in the education process from initial enrollment through degree completion. Populating a full model also makes **prior learning assessment** (PLA) transparent because it displays unambiguously the skills required by a particular program and how they will be measured. Creating a full-blown competency-based learning model may be painstaking and laborious for faculty and program personnel in the beginning but will pay generous dividends in time and effort after model implementation.

In summary, *a well-crafted CBE model is transparent*, providing users with a full view of its component parts and how they interrelate to produce a system. With that as an ultimate goal, new implementers will want to think on a granular level while not letting the original contours of the overall model become obscure. A full model will consist of a set or sets of competencies that specify the observable behavior which is to be measured, how that behavior will be measured, and what degree of learner performance on those established measures is necessary to confirm the competency has been attained. The presence of these criteria separates a fully functioning, rigorous CBE model from models that simply identify competencies, but which lack a performance measurement scheme.

LESSONS LEARNED

Select Programs to Convert to CBE

Certain programs lend themselves more efficiently to CBE than others. Programs that require skill demonstration are more competency-friendly than programs that operate primarily at a conceptual level. For example, many career and technical education faculty at community colleges are accustomed to assessing observable skills that are part of their degree and certificate programs. Lord Fairfax Community College began with seven existing LFCC career and technical programs to create direct CBE direct assessment certificates and degrees. Later, the College chose general education discipline areas required by these programs to convert to CBE formats. The College also added a CBE career studies certificate program in supervision and, in a non-grant activity, piloted a CBE-based early childhood education program. The initial programs were approved for direct assessment CBE delivery on July 1, 2015 by LFCC's regional accreditation agency, the Southern Association for Colleges and Schools Commission on Colleges (SACSCOC).

- 1. Health Information Management (AAS Degree)
- 2. Information Systems Technology (AAS Degree)
- 3. Office Systems Assistant (Certificate)
- 4. Cybersecurity (Career Studies Certificate)

- 5. Hospital Facility Coding (Career Studies Certificate)
- 6. Information Processing Certificate (Career Studies Certificate)
- 7. Networking Specialist (Career Studies Certificate)

Utilize National Competency Frameworks

LFCC's direct assessment programs were aligned with, adopted, and/or were informed by these national frameworks:

- Health Information Management. *American Health Information Management Association (AHIMA)* and the *Commission on Accreditation for Health Informatics and Information Management Education (CAHIIM*)
- Information Systems Technology. *Association for Computing Machinery-Committee (ACM) for Computing Education in Community Colleges*
- Administrative Support Technology. *International Association of Administrative Professionals (IAAP)*

National frameworks carry implicit content validity owing to studies commissioned by their respective organizations. They can be adapted for local use while conveying credibility to faculty, students, and employers. LFCC employed these frameworks for each of its initial direct assessment programs. LFCC paid particular heed to those frameworks promulgated by the USDOL with the O*NET database of occupational data and the Competency Model Clearinghouse (<u>https://www.careeronestop.org/competencymodel</u>). O*NET may be mined to examine KSAs in a specific industry and across a range of SOC codes, using a defined content format of value labels for normalized data.

Anticipate Disconnects in Existing Student Information Systems

CBE changes the role of student information systems. Historically, student information systems have existed to provide an audit trail for student enrollments and subsequent grades in courses so that traditional transcripts and tuition bills could be generated. CBE, because it is not time linked poses challenges to these traditional systems. A vision for a student information system to support CBE would include, fundamentally, the capability to log progress and mastery of competencies. It would work both in real time as well as providing the ability to generate a transcript of mastered competencies as well as a secondary, traditional transcript that would equate those mastered competency-based transcript would be too unfamiliar or unwieldy. A CBE-friendly student information system would include a visual depiction of what competencies have been mastered with an accompanying time stamp, allowing faculty and program administrators a quick way to see which types of students are making progress and which are not as well as a method for judging whether one or more competencies are misspecified. Such a system could also provide a place for construction of student CBE learning plans and digital competency portfolios so that students can track their own progress and generate competency

lists for employment or for consideration by other higher education institutions. Given the current state of the art in student information systems these additions are revolutionary.

LFCC's experience within these challenges included dialog with the Virginia Community College System about modifications to the existing PeopleSoft® ERP to document competency attainment as well as investigating potential external workarounds. Only one other Virginia community college was working on competency tracking and transcription issues during the grant period. Efforts to secure support for alterations to PeopleSoft® to accommodate transcription and bill payment for CBE students didn't reach fruition during the grant period. As a result, *LFCC built its own competency tracking software*. In LFCC's instructional area, a workaround pursued by LFCC was to embed competency modules within course shells in the Blackboard learning management system (LMS) to house competencies and to track their attainment within a given course equivalency. The College's custom competency tracking and case management software *provided faculty with a mechanism to generate a personalized learning plan* and the institution the *capability to generate a CBE transcript*.

Like CBE itself, software to accommodate its execution is in its infancy. Colleges considering a commercially-available solution to CBE tracking may wish to carefully consider the cost of altering their existing student information systems or purchasing new systems. Either route may be prohibitive to establishing a comprehensive CBE model. Student information systems to support direct assessment models would need to be more elaborate than the adaptation of student information systems for classroom-based CBE since direct assessment would require an estimate of time spent on a competency set for accountability purposes. As an alternative, colleges might create their own homegrown tracking system for competency attainment. Such a one-off package could be built in Excel or Access and may have the ability to upload and download data from the institution's student information system.

Plan to Generate Competency-Based Transcripts

Transcripts generated by CBE models will be qualitatively and quantitatively different than a traditional academic transcript which reports courses and grades. CBE models operate at a level of granularity that record a set of competencies within a given program and a given student's level of mastery for each competency. A competency-based transcript requires knowledge of CBE data structures to implement. K2W served on the IMS Global CBE Record Data Standard working group. As part of this effort, staff analyzed how data structures from the Common Education Data Standards (CEDS, <u>https://ceds.ed.gov</u>) could be used to support CBE. Over time, IMS went on to pilot extended transcripts and LFCC was part of this effort. IMS eventually developed the IMS Competency and Academic Standards Exchange (CASE, <u>https://www.imsglobal.org/activity/case</u>) project to support vendor development of competencies and digital learning objects such as those found in the K2W web portal. K2W elected to develop "extended" transcripts that document both competencies mastered and course equivalents including previously attained competencies (prior learning assessment) and new educational activity to acquire competencies. **No software solutions were commercially available** to K2W that could support these key functions required for a direct assessment model. The result was that LFCC researched alternatives, participated in national efforts to develop appropriate standards, and *addressed these solutions as an open source software solution*.

Collaboration with External CBE Initiatives and Stakeholders

The K2W director and staff actively partnered with more than a handful of national organizations seeking to advancing competency-based education. The benefit to K2W was to bring back to the College the latest thinking about issues in CBE implementation in a rapidly evolving field. The pathway to innovation requires seeking out a much wider source of ideas to identify and test more creative solutions A representative list of partner organizations and entities includes:

- Staff from the American Council on Education (ACE) partnered to promote the K2W web portal alongside other national efforts for CBE generally. K2W subsequently participated in an ACE webinar, which in turn, led to interaction with VCCS staff in charge of Prior Learning Assessment (PLA) and discussion of VCCC's Career to Credits, a new portal for mapping military job codes to VCCS courses.
- The American Health Information Management Association (AHIMA) partnered with K2W to create a new national (and international) competency framework and credential entitled Healthcare Technology Specialist. This framework is based on the results from four national job task analyses conducted by AHIMA in 2016. That framework is now complete, piloted, and awaiting AHIMA's final decision about vendor deployment. AHIMA plans to roll out the certificate no later than the beginning of 2019. AHIMA will use direct marketing within its own educator community and, subsequently, a wider education market. LFCC funded a full-time faculty member to build its own CBE program for this certificate and the new Health Care Technology Specialist certificate appears for the first time in LFCC's 2018 catalog. AHIMA also participated in the ongoing refinement of K2W's web portal. LFCC worked with AHIMA to document OER and map them to competencies for four AHIMA apprenticeships.
- K2W's director led an effort with *American Institutes of Research (AIR), C-BEN,* and *Public Agenda* to develop a national survey of postsecondary CBE. *Lumina Foundation* made CBE one of its top strategic plan goals and this survey a priority. The director serves on the national advisory board and working group for this survey, which is being released with preliminary results in September 2018 at CB Exchange.
- LFCC also joined the *Community College Consortium for Open Education Resources* (*CCCOER*), part of the *Open Education Consortium*. CCCOER is a joint effort by community colleges, regional and statewide consortia, the Open Courseware Consortium, the American Association for Community Colleges, the League for Innovation in the Community Colleges, and other partners to develop and use OERs, open textbooks, and open courseware to expand access to higher education

and improve teaching and learning. LFCC's digital librarian served on the CCCOER board.

- Competency-Based Education Network (C-BEN), a group of colleges and universities working together to address shared challenges to designing, developing and scaling competency-based degree programs. The K2W director serves on the C-BEN Board. As part of a story telling exercises provided by TAACCCT at the 2017 OLC Innovate conference and C-BEN at its spring 2017 convening, the director worked on new approaches to outreach. He wrote a country western song called "A Robot Took My Job" and performed it at several competency-based education convenings.
- **Concentric Inc**. (operator of the Badge Alliance), branding for competency-based badges on the K2W portal.
- **CAEL** (Council for the Advancement of Experiential Learning) collaborated with K2W to profile the project as a national case study for CBE implementations. LFCC worked with CAEL as part of braided funding provided by an America's Promise grant called Pathways to the American Dream. CAEL analyzed PLA and adult learner practices, policies, and procedures for nine participating institutions, including LFCC. LFCC spent this summer doing process mapping of its PLA processes and is expanding its credit for prior learning offerings as a result.
- IMS Global. K2W advised staff about metadata standards for cataloging and storing OER. As a result of multiple efforts, IMS now provides the *Competencies and Academic Standards Exchange (CASE)* tool (<u>https://www.imsglobal.org/activity/case</u>) and open source access to compare competency taxonomies. LFCC's competency cataloging and OER mapping incorporate these same evolving standards.
- Discussion with *Lumina Foundation* staff focusing on projects such as the Degree Qualifications Profile (DQP), DQP assessment tuning, the Beta Credentials Framework, and the Credential Engine and Credential Registry. The K2W director was invited to participate in two CBE convenings held by Lumina and presented at the most recent National Competency Framework convening in April 2018.
- *Merlot* (Multimedia Educational Resource for Learning and Online Teaching) signed an MOU to extract OER.
- *Microsoft* and K2W created an MOU to develop the portal resources related to information technology skills including access to free learning objects in Microsoft's Virtual Academy and Lynda.com.
- The national *Skills2Impact group* helps to increase the use of the USDOL SkillsCommons site and other TAACCCT products. LFCC was selected as one of the top 10 innovations across TAACCCT grants. The K2W director was invited to serve on the "Guru Network" of TAACCCT project directors. The portal is featured in the forthcoming TAACCCT field guide, with video, podcasts, and other promotional materials available about the Knowledge to Work portal.
- The **TAACCCT Virtual Sustainability Institute** and planning for grant work, especially the K2W portal, continues after year four.

K2W has developed other collaborative relationships with these national organizations and providers:

- CB Exchange
- Jobs for the Future
- National Council on Workforce Education (NCWE)
- New Horizons OLC Innovate
- OpenHire
- Saylor Academy

Set Realistic Enrollment Expectations

In common with the experiences among other direct assessment providers, LFCC's initial enrollments in direct assessment CBE programs were substantially less than proposed. The College identifies several factors that it believes contributed to low enrollments in direct assessment: (1) the CBE concept, especially direct assessment, is new and difficult to explain to potential students and their employers, (2) student participation in direct assessment requires commitment to active, self-paced learning as well as maturity that may be lacking in younger students fresh from secondary school, (3) LFCC's rural location meant a more constricted pool of individuals for potential enrollment; (4) direct assessment programs were under development and not available for enrollment until the end of first grant year, August 2015, (5) more connections between the CBE initiative, the College's workforce development unit, and the local Workforce Investment Board, and (6) an inability to offer federal financial aid for CBE direct assessment enrollment. Each of these factors should be a touchstone to prospective implementers planning for CBE enrollments especially those colleges that are considering direct assessment CBE models.

The K2W portal appears to have been successful in creating awareness of the project as measured by making CBE more accessible to a wider audience outside the College's service area. For example, in a recent period, 1,079 new users enrolled in the portal and created 1,141 personalized learning plans. Many more visit the portal to search for OER tied to competencies and to explore career paths. K2W staff are tracking an increasing number of portal visitors and analyzing their demographics, locations, and educational objectives to inform better targeting efforts in the future. Additionally, working with the LFCC Foundation, K2W staff qualified the college for \$10,000 a month in free Google search engine advertising and this is being used, along with paid search engine optimization strategies using the Microsoft search engine Bing. Targeted emails and other efforts were put in place during year three.

CBE and Financial Aid

The financial aid area is perhaps the most complex area facing CBE implementation since external regulations are cumbersome and explicit permission from the United States Department of Education, Office of Federal Student Aid (OFSA), is required to award financial aid for direct assessment participants. The feasibility of the direct assessment initiative CBE is national in scope and at this writing only eight institutions appear to have been approved by both regional accreditors and the Department of Education to become eligible to offer Title IV financial aid. Some of these institutions have, for the most part, relatively small enrollments in their direct assessment programs. Others are for-profit and are able to engage in substantial, national marketing and promotion. Other national leaders such as Southern New Hampshire University (SNHU) do not recruit and serve individual CBE students, per se. Instead, SNHU serves groups of employees of large companies such as Anthem. Companies contract with the University directly and pay for their students to enroll in direct assessment programs

Many of the regulations governing competency-based education are experimental and subject to interpretation. Additionally, the Department of Education, has sent mixed signals about its support of CBE. LFCC submitted required documentation to the Department and the project director was invited to present at the SACSCOC Summer Quality Institute to provide an overview of direct assessment, known regulatory requirements, and the planning necessary to implement such programs. Despite sustained efforts and dialog, LFCC did not receive permission to award financial aid to direct assessment students from OFSA at a critical time in direct assessment's development. This, in turn, limited K2W's ability to recruit students with financial need, partially resulting in the decision taken by the College to shift to course-based CBE. This decision to turn to course-based CBE simplified the process of awarding financial aid because a classroom-based model can account more easily for the time that students spent in a given learning activity (as increasingly required by OFSA) and was aligned with the College's standard disbursement cycles already in place for awarding fiederal financial aid.

Direct assessment requires new responses for a College's financial aid office that may be foreign. The award of federal aid is time-linked and course-based while direct CBE assessment is premised on neither. Those institutions embarking on direct assessment will want to clearly articulate the instructional assessment process so that the equivalence between the students' progress in direct CBE assessment and traditional seat time can be established. For example, tracking the proportion of competencies that have been mastered in a clear sequence can pinpoint the place on a pre-specified instructional continuum a given student's progress lies, thereby triggering an equivalent distribution of federal aid. Such a system would require intense collaboration between financial aid professionals and instructional leadership, requiring both to use a clear CBE tracking system and pre-defined competencies that have been equated to existing coursework.

A subscription model for tuition would permit students to take an unlimited number of courses by paying a flat fee. Such a model would fit a direct assessment CBE model well and its

feasibility was examined by LFCC's leadership. Such a model, however, does not fit well with a state reimbursement model for instructional activity built on credit hours. A subscription model in which students pay a flat fee for unlimited competency attainment was advisable, in the opinion of the evaluator. An "all-you-can-learn" model, in which students are charged a fee every six months to complete as many competencies or learning modules as they can may have accelerated enrollments in K2W. For example, Southern New Hampshire University charges students a flat fee for each six-month subscription period to participate in College for America.

LFCC unsuccessfully sought the support of the Virginia Community College system to launch a different tuition payment model for CBE. This proposal would have required VCCS state board approval but LFCC's initial request came at a time when direct assessment was very new and the perceived problems of offering non-course-based instruction tied to an alternate payment structure were insurmountable. It would seem that private institutions would have more possibilities to engage in a subscription tuition model given their more flexible access to institutional, and not state, resources.

Train Faculty and Staff to Use New CBE Paradigms

Implementation of CBE will necessarily cause changes in both administrative and instructional practice. Institutions wishing to implement CBE are advised to assess not simply faculty development needs but staff training needs and how both instructional and administrative systems interact for a successful implementation. There are many moving parts that require coordination for successful implementation, some of which are beyond a College's control while many parts can be anticipated and planned. Some practices may be akin to starting a new college; LFCC's experiences can help illuminate these interrelationships and the training required.

Foremost among faculty training needs is in how to write an actionable competency and how to develop a method for assessing student mastery of each competency. The LFCC experience is that practice is needed to write a competency in vocabulary that is understandable to students and faculty alike. Measurement is best accomplished by creating rubrics that unambiguously detail levels of attainment for each competency while providing clear guidance about what level of learner performance constitutes mastery and what levels do not meet mastery. Clear measurement is what separates a competency from a learning objective. K2W arranged several workshops for faculty and professional staff in writing competency statements, rubric development, and created a process for faculty to engage in a peer, inter-rater agreement exercise for building assessment rubrics to ascertain reliability, rigor, level of skill for competencies. Inter-rater reliability studies to document faculty scoring of assessment artifacts using rubrics was a recommendation by the SACSCOC visiting team in March 2016. The third-party evaluator assisted LFCC with training faculty and staff to grapple with CBE issues at the College. He also assisted in reviewing and providing substantive feedback about the college's response to the SACSCOC visiting committee report, especially providing guidance and support about the use of rubrics, the scoring of assessment artifacts, establishing

expected student performance levels, and implementing a process for using peer review to estimate inter rater reliability for rubrics.

Faculty also may need training to map competencies to "traditional" curricula as well as how individual competencies come together to form a program structure. There are many pathways to demonstrating competency attainment; an overview of choices in competency pathways and overall model structure is also a desirable faculty training topic. Faculty may also require training in validating competencies either through an iterative Design A Curriculum (DACUM) process and/or use of national competency frameworks. Faculty who have not been trained in promoting student interaction in online instruction will benefit from these techniques.

Staff also require training. The highest need is for professional staff is to understand and interact with the constituent parts of a full-blown CBE model. Like faculty, professional staff also need to know how to write a competency statement including the other side of the competency statement, an unambiguous measurement scheme. There is a temptation to label programs as "CBE" when they lack transparent structure and clear instructions on how individual competencies will be measured to determine mastery. This is the *sine qua non* of model development. A focus on the student experience in the CBE model also is critical. In that area, training advisors to understand the full model including its entry and exit points is needed. Prospective students will want to know what their investment in CBE will produce in employability, transferability, and/or other forms of future education.

As leaders for the overall CBE initiative, professional staff also should ensure that the institution's workforce development unit is solidly on board to work with those prospective incumbent workers it touches to make them aware of the advantages of CBE. Professional staff will also need to work closely with mid-level staff in a dynamic environment to award student financial aid, whether scholarships will be made available for CBE students, the mechanics of tuition payment, how refunds are to be handled, the registration process, transcription of credit, and the potential transferability of the CBE degree. In LFCC's experience the development of written policies will help not only with identifying needed practices to support CBE and associated responsibilities but will also help accreditors and other regulatory agencies to assess the institution's commitment to the new CBE paradigm.

An implementing college should also budget for CBE development including professional development, ensuring that adequate (and trained) staff are available, and to make budgetary decisions about faculty load or release time to develop and maintain the CBE model. The latter topic is especially important for a direct assessment CBE model where faculty interaction with students is not predictable.

The lens that institutions should use in designing training focuses on student success. That is, what processes and policies need to be examined and potentially altered to provide for student progression through the CBE model? How many succeed, how many don't succeed, and what factors are associated with student progression. This brief section has suggested several key areas and decision points to examine although the list presented here is not exhaustive of the entire student experience.

Technology and Personalized Learning

K2W is supported technologically by middleware developed by K2W staff to provide personalized learning plans, case management, and competency-based extended transcripts for its direct assessment CBE programs. This software and its underlying data structure were then used to build an online portal that became operational in the second grant year. That portal helps learners create personalized learning programs by finding and mastering program competencies through the use of OER. Features within the portal for developing personalized learning plans include: custom dashboards, saved searches, administrative consoles, notes, saved resources, blogs, profiles, and secure logins. LFCC believes that the availability of the personalized learning software, OER, and an education search engine available to the public at no cost will speed students' completion of credentials and their entry into labor markets that require specific and general competencies mapped to employer needs. A Spanish version of the portal was launched in 2017.

K2W also conducted a broad review of the available literature and research about CBE models. To track this changing knowledge base, K2W staff created *a special resource called CBE Links*, available at http://highered.org/cbe. Promoted as a joint effort with C-BEN, this site provides a *compilation of online research and articles about CBE cataloged by topical area*. C-BEN is now working on ways to incorporate this guide within its new website design.

The College viewed the portal as a launching pad to increase enrollment and awareness of its direct assessment CBE programs, as well as a source of revenue to sustain the program beyond the grants. Direct assessment CBE programs and the software for personalized learning plans and case management were in place and served students through the spring 2017 semester using the knowledgetowork.com domain. The domain highered.org was originally used by LFCC to promote the search engine/portal. This direct assessment software is no longer being used and the knowledgetowork.com domain now is used instead for the portal. Initial assumptions about increasing enrollment through direct assessment changed when the shift to course-based CBE occurred. The portal continues to be a work in progress and recently has developed an improved user interface with new features directed specifically at job seekers, incumbent workers, and employers.

Catalog OER and Other Learning Objects

Portal development began by identifying the contents of relevant bodies of knowledge within K2W's selected industry and associated career pathways, determining the availability and complexity of allied competency frameworks, and incorporating both into a practical data structure. This work helped to *prioritize curation and cataloging of OER* and their subsequent mapping to competencies. It is notable that LFCC did not create new OER, but, instead, used this knowledge to create new CBE redesigned courses and materials. These contributions have

been *uploaded to SkillsCommons* as a TAACCCT grant requirement. Some OER are proprietary and available for use only by institutions that are accredited by the framework creator. The portal promotes a wide array of OER and learning objects that are free or low-cost. It also spans the continuum of CBE learning—a central focus of K2W—with resources tied to competencies for adult basic education to the GED to developmental education and onward to college degree programs.

Software was developed with open source tools to catalog competencies, providing the basis to develop crosswalks among multiple levels of competency frameworks based on the same concepts used by IMS CASE and similar tools. The OER catalog incorporates IMS metadata standards. Administrative consoles were then designed to assist in documenting competency frameworks, cataloging learning objects, and managing the relationships between competencies. This facilitated the *creation of competency frameworks for soft skills*, ranging from those use by USDOL for O*NET by occupation to VCCS soft skills, the ACT Work Readiness System, the USDOL Competency Model Clearinghouse, the National Network of Business and Industry Associations (NNBIA) Common Employability Skills, and the VCCS Professional Readiness Framework. A unique portal feature displays competency frameworks and counts of OER by competency (see, for example, https://www.knowledgetowork.com/competencyframeworks.php).

Significant outcomes also are found in the work of K2W's Digital Librarian to locate, catalog, and curate open educational resources (OER) matched to the competencies found in national competency frameworks. As of August 2018, **22,026 curated learning resources (Open Education Resources and other learning objects) were freely available on the portal** for educators to develop CBE models and for learners to develop personalized learning plans. OER on the K2W portal vary in granularity by how specifically a competency is addressed. These vary also by level of mastery, such as introductory, reinforcement, or mastery; by educational level (high school to graduate school); and the levels of Bloom's taxonomy (old and new).

K2W identified *three structural issues at the heart of cataloging learning content and competencies*. First, the level of granularity for OER varies widely and takes time and subject matter expertise to code properly. Second, multiple versions of resources or changes need to be captured, including other formats and languages, as well as the possibility that these objects might be removed from access. Third, the lack of interoperability across taxonomies makes cataloging more expensive, time consuming, and occasionally redundant; hence the interest and emphasis in standardizing competency frameworks. All available competency frameworks contain hierarchical categories of information which clearly are not consistent across providers. Another source of mismatch arises when the OER within these frameworks are mapped to topic areas the provider believes to be important. Although this practice provides a high-level overview of competency sets, it limits their utility for inclusion in new frameworks. Machine learning and artificial intelligence algorithms may someday overcome these obstacles and until that arrives, cataloging and curating competency frameworks is an intensely manual process.

Planning for Accreditation and External Oversight

LFCC was the first institution to receive approval from its regional accreditor (the Southern Association of Colleges and Schools Commission on Colleges) to offer direct assessment CBE. K2W's executive director met with the assigned SACSCOC Vice President within two weeks of grant receipt to begin planning. Approval was conferred on July 1, 2015, for the seven direct assessment programs some nine months after award of the TAACCCT grant. Admission to the College's CBE programs was only possible after SACSCOC approval meaning that there would be no CBE students enrolled until August 2015. Upon receipt of SACSCOC approval, LFCC applied to the United States Department of Education, Office of Federal Student Aid (OFSA), in August 2015 to request approval to award Title IV funds for these programs. K2W's project director met in person with Department of Education staff in spring 2015, shortly after LFCC was accepted for C-BEN membership. The project director and LFCC's financial aid director worked toward meeting Department requirements until they appeared to be met in December 2015. Several months later, OFSA asked LFCC to provide further substantiation of its request by noting that, "there is no evidence of a detailed review by SACSCOC of the method that LFCC uses to determine the equivalencies between the program competencies and credit hours" (J. Kern, OSFA email communication, March 2, 2016).

SACSCOC conducted a site visit in March 2016. Afterward the substantive change committee found that LFCC did not adequately demonstrate the process and criteria used to calibrates documented student learning to the *amount of academically engaged time* for a typical student, especially about the credit hour calculations based on assessments. The visiting team also wanted to see data from established rubrics used to validate the assessment or other standards that provide evidence of the calibration of documented student learning. The team also urged more attention to the assessment policies, processes and practices that LFCC would employ to validate mastery and financial aid eligibility. Last, the visiting team also recommended that LFCC's rubrics should be detailed in scoring content, tested and validated by subject matter experts using a peer review process to ascertain reliability, rigor, level of skill. LFCC shared the visiting team report with OFSA and responded to the visiting team's recommendations in August 2016, almost two years after the College's receipt of its TAACCCT grant and one year after its application to OSFA. SACSCOC reviewed the College's response and concluded in a January 11, 2017 letter that there were three further recommendations that needed to be addressed: (1) institutional effectiveness, (2) program length, and (3) the definition of credit hours.

Accreditors have been the *gatekeepers to federal financial aid* for colleges and universities for the last few decades. It is the evaluator's opinion that the sets of questions and concerns raised by SACSCOC and OSFA were circuitous, asking essentially how the College would calibrate student time on task for programs that were previously approved by SACSCOC—not based on time but based on student performance. To require estimates of time for these previously authorized programs was a *volte-face* that was not totally unexpected. The College also decided early on that all direct assessment activity would occur within bounds of a traditional semester, a decision that may have blurred the boundary between direct CBE assessment and standard course formats in the perceptions of the visiting team. Mixed signals also were sent by the U.S. Department of Education which, on one hand, encouraged innovation including direct assessment as a way to speed degree completion while, on another hand, probing how institutions pursuing this innovation would equate direct assessment CBE to traditional measures of seat time. Incongruously, as direct assessment programs attracted more national visibility, the promise that they would be exempt from seat time as a unit of learning became less guaranteed. Regional accreditors became keenly aware of these shifting regulatory undercurrents especially after the U.S. Department of Education Solicitor General's report recommended that Western Governors University return \$712 million of financial aid disbursed to students in its CBE programs because of the finding that it did not require weekly regular and substantive interaction between faculty and students.¹

Encouragingly, the College received permission from the Virginia State Approving Agency to award state Veteran's GI Bill Benefits for veterans enrolled in direct assessment programs in November 2016. However, that approval may have occurred too late to make a significant difference in enrollment since it was also clear that approval for federal financial was not happening soon enough to remove ambiguity for the College and prospective CBE students. In January 2017, after meeting with SACSCOC personnel, the College decided on its own initiative to withdraw its SACSCOC substantive change for direct assessment and to transition its seven direct assessment programs to a course-based CBE model. The College also received permission from SACSCOC to add a certificate in supervision. The result of LFCC's decision was that these programs could now disburse financial aid to eligible students under the College's existing federal approval.

Another immediate consequence of this decision was that enrollments in the new K2W course-based CBE classes significantly increased the total number of K2W participants. Another consequence was that because students would no longer be admitted as identifiable cohorts to these programs, with a common entry point, tracking cohort completion and subsequent outcomes would no longer be possible as required by TAACCCT accountability guidelines. Instead, only short-term accountability measures would be retrievable, i.e., within course completion, grades, withdrawal rates, and next term retention. Course-based CBE enrollment was heterogeneous, consisting of those students wishing to complete a degree or certificate in one of the College's CBE programs as well as students who may have taken a course for other purposes.

¹ See, for example: U.S. Department of Education, Office of the Inspector General (2017, September). Western Governors University Was Not Eligible to Participate in the Title IV Programs. Retrieved February 19, 2018 at https://www2.ed.gov/about/offices/list/oig/auditreports/fy2017/a05m0009.pdf

Set Realistic Time Horizons

Because K2W's aspirations meant doing new work in new space within a risk adverse business—higher education—most tasks required to implement a CBE model took longer to complete than originally forecast. Successful CBE models require shifts in the traditional business model found within colleges and public systems of higher education. Similarly, lacking context, many prospective incumbent workers required longer to expose to the benefit of CBE although their employers appeared to grasp the advantages quicker. Even when external partners were aware of CBE and direct assessment, they, too, were navigating new ground which also resulted in protracted timelines. New programs seeking to implement CBE would be well advised not to pull back their ambitions for change, but to set aside time to nurture and educate students and employers alike about CBE as well as to understand that new practices evolving in higher education and new external policies to support CBE are not yet mature.

Sustainability Planning

New/Expanded Programs of Study. As a public-supported institution, LFCC is dependent on state reimbursement for instructional activity. All CBE programs and classes modified and/or created by K2W will continue as long as there is sufficient enrollment demand. The need for the seven initial direct assessment programs (now converted to course-based CBE) was based on regional employment trends. The direct assessment offering with the largest enrollment and graduates was the Administrative Support Technology program. The supervision certificate was an existing program that was converted to course-based CBE. LFCC has also developed a CBE version of its one credit student development course. During the grant's last quarter, K2W continued to document CBE redesigned courses for submission to SkillsCommons, TAACCCT's open digital library of workforce training materials.

Existing general education courses also have been converted to course-based CBE and will be available to satisfy requirements of existing CBE programs in career and technical areas and any new programs that the College elects to expand. Instructors in these programs will continue at LFCC given sufficient student demand. Activity on the K2W web portal continues to increase and it is anticipated that this activity will drive future face-to-face enrollments.

K2W Web Portal. K2W's web portal (portal at <u>http://knowledgetowork.com</u>) links the expanding Open Education Resources (OER) universe for users and faculty to create personalized learning programs tied to competencies. K2W staff have been devoted to curating, cataloging, and linking program-specific OER on the sites and to improving its functionality to improve user experience. The site underwent a revamping in summer 2017 including a relocation from the HigherEd.org domain, which was perceived to be too closely (and narrowly) aligned with higher education, to the Knowledgetowork.com domain which is intended to be more employer-focused. Rebranding and reworking of all pages and resources was a result of

observations made by USDOL staff and the TAACCCT sustainability coach. New features have since been added including job search and customized pages for employers, job seekers, and learners. The user interface and navigation scheme were upgraded in August 2018, including improved display of the dashboard for tracking competencies.

The development of personalized learning plans is a central feature of the K2W portal that also carries implications for sustainability. Avenues within personal learning plans can include self-paced study and mastery of competencies mapped to OERs generated by the K2W portal, online instruction offered through *other* colleges and universities on a credit or noncredit basis, informal learning (not led by faculty or other individuals) and learning portfolio development that incorporates the competencies laid out in the personalized learning plan. This service is currently free on the portal and has generated significant activity. K2W might now consider charging a modest fee for non-LFCC students to engage with or complete a personalized learning plan. In the last grant year, the portal added frameworks and data structure to integrate and crosswalk competencies to the emerging O*NET SOC competencies including soft skill competency frameworks.

Although the more than 21,000 OER and other learning materials now on the portal are provided by other entities and only linked, the *expertise* in locating, cataloging, and adapting them to ensure quality control may be marketable to other colleges wishing to go down the CBE pathway. Staff for SkillCommons, the TAACCCT-funded open online library for free open learning materials and program support materials for job-driven workforce development, are now in conversations with K2W about future collaborations and may be a natural ally for collaboration and identifying new opportunities. K2W has had a series of conversations with potential partners with vendor funding, including Schoology, Pearson, MacMillan/Intellus, WorkFountain, eLumen, Concentric, and Thrivist. To date, however, these entities have been wary of CBE development as an investment strategy except for potential sales of educational materials and LMS products to institutions.

Increase Partnerships with Regional Employers. K2W found that most employers were unaware of CBE, especially direct assessment. When employer awareness increased they became interested in pathways that their employees might take toward degree and certificate completion. Several employers operated tuition reimbursement programs for their employees and K2W created a marketing strategy and corresponding brochure to promote these employer programs. The recent success of the supervision certificate may bode well for increasing employer and employee interest in the region and perhaps even statewide. The Navy Federal Credit Union, for example, and the regional communications company, Shentel, have longstanding relationships with the College and have expressed interest in CBE programs. K2W's work with C-BEN suggests that the most meaningful uptake for CBE programs is with businesses.

Expand Prior Learning Assessment. LFCC direct assessment CBE programs provide learners the opportunity to demonstrate mastery of competencies they already have mastered. The result is that prospective students would not have to pay for knowledge they already have.

These competencies live on LFCC's course-based CBE model since they adhere to the competencies and measurement strategies K2W previously created. *Introduction of PLA requires "flipping" the CBE classroom so that students work on new competencies at all times and are not sitting idly by surrounded by instruction on concepts they already have mastered.* K2W recently has analyzed PLA data to create a baseline before implementing changes. LFCC's participation in the Pathways to the American Dream grant has enabled engagement with CAEL to identify process improvements for PLA at the College. Work over the past year has led to concrete plans to increase PLA, including documentation of competencies mapped to course credit equivalencies.

Create Technological Partnerships. K2W recently entered into a partnership with a USDOL America's Promise grant entitled "**Pathways to the American Dream**" awarded to a consortium including the New River/Mount Rogers Workforce Investment Area Consortium Board (NR/MR WIACB) in Virginia to use and expand the web portal to incorporate employment pathways. These pathways include advanced manufacturing, information technology and health care, the same broad areas pursued by the K2W grant. The regional workforce collaborative includes four Workforce Development Boards and nine community colleges in the Virginia Community College System (VCCS) that serve as education and training partners, including LFCC.

Braided funding available through this grant partnership will ensure the sustainability of the K2W portal through December 2020 and will expand the portal to include new pathways within the same three industries served currently by K2W. The new, collaborative portal is intended to meet the needs of employers, with job roles and occupations tied to competency frameworks with available OER for training and hiring. Expansion means that job seekers can look for additional opportunities within these career pathways and make themselves more marketable by using OER to develop new skills and review previously attained competencies. The products generated for the web portal include job search and customized pages for employers, job seekers, and learners, for example, and are consonant with the **U.S. Chamber of** *Commerce's intentions to develop a job registry* as a resource to connect employers directly with prospective employees by clearly identifying skills and competencies.

Market CBE Expertise. The CBE field is in the early stages of transitioning from a fad to solid practice. Solid practice requires more than "old wine in new skins." New CBE programs require the expertise that LFCC has developed to train others to develop robust and measurable competency statements alongside rubrics that support competency attainment. These skills should be marketable to other institutions, thereby producing a new revenue stream for the College. Recently completed work on the portal that crosswalks competencies directly to selected pathways is another example of rare expertise. Recent discussions with Thomas Edison State University and Danville Community College about their possible use of the open source personalized learning plan software developed to track competencies, provide case management, and create transcripts offer proof of concept. A fully working demo version of the competency tracking, extended transcript, and case management software for CBE is available, along with a user manual. One sustainability potential would be for LFCC to leverage this open source approach and provide consulting to install and support the software.

Other Sustainability Approaches. New initiatives frequently fail to attach themselves to predictable, internal funding, meaning that their sustainability isn't guaranteed after grant funding expires. A disciplined approach to internal funding is to lay claim to the new enrollments brought to the College by K2W's innovations and set them apart to develop other, new innovations. For example, if 200 new students enroll at LFCC as a result of K2W's efforts, their tuition and state reimbursement (either in whole or in part) could be directed to a new innovation account to defray current expenses and to serve as seed money for further innovations. It is the evaluator's experience, however, that such fiscal discipline is uncommon.

Summary of What Worked Well

By electing to deploy direct assessment, LFCC has set itself on a course to become a pioneer as well as a test bed for new practices from which other colleges and organizations can learn about strong practices in this emerging area. The vision of providing direct CBE assessment in a rural setting by a public institution was possibly before its time. At conclusion of the K2W project, these thoughts may be instructive to other community colleges that wish to implement CBE in general and direct assessment CBE in particular.

One unit in a college operating independently could not have had the impact that K2W has. While the portal was exclusively created by K2W staff, the creation of direct assessment programs and, later, course-based CBE required focused participation by faculty and by instructional and student services leadership. Presidential leadership was also critical to grant operations, especially since guidelines for putting CBE into operation were few and the concept quite new. A sense of *esprit de corps* was evident early in K2W's implementation and that helped sustain the CBE vision through rougher moments when direct assessment enrollments failed to materialize and when external approvals were delayed as the regulatory environment shifted toward time and not performance measures.

K2W's leadership in the national CBE movement also brought credibility back home as well as a valuable mechanism to test K2W's ideas about program features and to learn about how other college-based CBE efforts had navigated the regulatory labyrinth. Increased visibility for direct assessment and K2W's efforts led to new opportunities and recognition as a case study from CAEL from which other colleges can learn.

The portal development is arguably the most efficient and potentially sustainable part of the K2W grant. As an example of continuous quality improvement, it underwent a series of iterations to improve functionality and user experience that continue today, it has become at once a local and a national resource.

Summary of What Might Have Been Better

It is convenient to identify slow bureaucracy and byzantine regulations as the chief reasons for much lower than anticipated enrollment in LFCC's direct CBE assessment programs. While that assertion would be partly correct, K2W's narrative is somewhat more complex. The design time for developing seven direct CBE assessment programs required most of the 2014-15 academic year and programs were not fully built out until late summer of 2015. SACSCOC approval for direct assessment was conferred only a month before classes were to begin, meaning LFCC could not recruit students in the College's established recruitment cycle since there were no approved programs to receive students. Recruitment also was impeded because of the unavailability of federal financial aid. In other words, there was little time to recruit students to programs that weren't fully developed until late in the normal cycle coupled with an inability of the College to award student financial aid. In turn, the initial promotional materials developed by the College for local recruitment couldn't fully spell out content of the programs and by fall 2016 it was clear that these programs needed to re-oriented to course-based competency-based education.

INNOVATION

Innovation is often a cliché among educators. For some, it means implementing something totally new that produces great results. For others it may mean identifying strong practice and institutionalizing that practice. K2W sought innovation on two fronts: the development of direct assessment CBE and the creation of a web portal to support not just its direct assessment CBE programs but to link national and perhaps international job seekers and employers to a framework of documentable skills. For others, innovation simply means repurposing the tools at hand to meet new challenges. Both were departures from traditional higher education and embody at least some risk taking.

Not everything that glitters is gold, however, and not all innovations are truly innovative. One measure of innovation for K2W is how much its work expands the field of competency-based education compared to its financial and human cost. Another measure is the length of time the innovation persists beyond the grant period. The former requires careful calibration of what is known at this point in time and documented by this final evaluation while it is too early to assess the latter. Neither the K2W web portal development nor changes to the curriculum came quickly or easily. There is, however, evidence that both have spread as the number of the College's classes embedding CBE techniques has steadily increased since December 2016 while the portal continues to grow as evidenced by an increasing number of users, provide a platform to collaborate with other entities, and to generate personalized learning plans for registered users.

Approaches to Innovation have been conceptualized in four spaces: intelligence, solution, technology and talent (Leurs, 2018). intelligence space focuses on making sense of

the challenges facing an innovation. Solution space focuses on methods to test and develop solutions. Intelligence space is perhaps academic, contrasted to solution space which is more entrepreneurial. Technology space includes approaches and technology that enable action and change, such as the digital tools available on the K2W web portal. Talent space focuses on mobilizing talent and organizational readiness to make change happen. Following are K2W selected innovations brought forward by LFCC categorized by these approaches.

Intelligence space

- Mapping of competencies from national frameworks and other sources to instructional materials such as OER and calculating traditional course credit equivalencies.
- LFCC was the only community college with regional accreditor approval to offered direct assessment CBE
- Developed procedures for overcoming interoperability deficits in existing competency frameworks
- Adapted the Blackboard LMS to serve competency-based instruction for students with free and low-cost OER, as well as simulations.

Solution space

- Created and participated in the IMS pilot of an extended transcript (eT) including competencies and course equivalences and using linked data software (JSON-LD) at LFCC
- Addressed a significant gap in certification of information technology in healthcare in collaboration with AHIMA to create a national certification examination and launching a new LFCC certificate program to prepare healthcare IT (HIT) professionals
- Created a process in the K2W web portal for users to depict competencies attained a feature that could be employed in students' LinkedIn profiles
- K2W's director worked with IMS Global to develop a standard for CBE record data structures for IMS, evolving, in turn, national data structures
- Development of custom software to document national competency frameworks to allow for crosswalks across multiple levels and types of competencies. These are showcased on the portal

Technology space

- Built open source personalized learning plan software with associated case management capability
- Created a new educational search engine combining Amazon and Google operability concepts for search and filtering of learning objects
- Built an open source tool for cataloging and mapping taxonomies across competency frameworks for use with USDOL occupation work skills and other existing competency frameworks as well as new frameworks as they emerge

• Pioneered the use of new USDOL tools like APIs to identify and serve job and occupations data to learners.

Talent space

- Leveraged national competency frameworks for engagement with Lumina and CBEN leaders about how to use these in instruction, especially making more use of OER
- OER approaches can develop new talent, shortening the time to employment by developing personalized learning plans and triggering a granular and documentable approach to prior learning assessment
- Developed the capability to engage new learners and other stakeholders in narratives that describe the benefits that accrue to them with CBE models

CAPACITY BUILDING AND SUSTAINABILITY

LFCC developed additional capacity at a rapid pace during the grant period. Implementation of CBE as noted earlier is complex work that challenges both culture and existing business models. To engage in capacity building requires the development of new competencies and skills that, in turn, can sustain new initiatives. Capacity building, sustainability, and innovation are interdependent concepts that collectively sketch out what LFCC might look like five and ten years from now. The evidence shows that the K2W grant helped LFCC develop capacity in these areas:

Successful Implementation of Two CBE Models

The process of *identification of relevant and measurable competencies*, analyzing national competency frameworks, *developing reliable assessments*, and *transitioning traditional academic programs to CBE models* requires new faculty and staff skills and competencies. The faculty skills gained have already been used to create CBE learning opportunities in career and technical programs and general education that were not originally envisioned in the K2W proposal. This critical mass can benefit LFCC as it continues down a competency-based pathway. Implementation of two CBE models is noteworthy; the initial work to develop direct assessment CBE meant the process of again transitioning to course-based CBE went quickly. According to LFCC's leadership, the use of assessments through artifacts, rubrics, and inter-rater reliability of scoring has helped the clarify the PLA process at the College.

Reconfiguring Business Processes

Direct assessment students are likely to interact differently with college services than traditional students. Guidelines are few for the former while they are well-known for the latter. Although the College has made the transition to course-based CBE, the development of practices for direct assessment CBE students also can identify processes that can be streamlined for all students. For example, the College's recruitment cycle became less tied to a traditional recruitment cycle and personnel learned how to interact with businesses and industries that desire a year-around admission cycle and a focus on student acceleration to program completion. Implementing the K2W web portal meant that *students could develop personalized learning plans that did not initially require face-to-face interaction* with LFCC personnel. Similarly, the creation of mechanisms to produce extended transcripts (competencies matched to traditional coursework) will *allow future efforts to certify competencies for students to use in the workplace while providing employers with more information about job candidates than can be found on traditional transcripts*. Other business processes brought about by CBE implementation include new approaches to calculating faculty workload in CBE programs and tracking student effort for direct assessment delivery including analyzing engagement data. It is likely that none of these practices would have been on the drawing board at LFCC without the K2W grant. Acquisition of new institutional skills and competencies bode well for future innovation.

K2W Portal and Capacity

Institutional capacity created by the K2W portal includes *identifying, curating, and cataloging quality OER to support students and program development*, the potential to develop the aforementioned personal learning, and as a recruitment mechanism for existing and new CBE programs available at the College. The web portal provides LFCC with tested tools to employ as the College pursues new student-centric programs and pathways in the future. The portal also, as noted elsewhere, provides an opportunity to *sustain CBE and the web portal* beyond the grant period and to *accelerate future students through programs*.

IMPLEMENTATION EVALUATION

Implementation of the K2W Approach

Competency-based education models were only beginning to receive national attention among community colleges when LFCC made its successful proposal to TAACCCT in 2014. LFCC's intentions to create a direct assessment CBE model was an extraordinary aspiration at that time and remains so some four years later. Even rarer was the ratification of direct assessment by the College's regional accreditor in mid-2015. Coupling these aspirations to the development of a sophisticated web portal marked new territory for higher education that is ripe for exploration even at the grant's conclusion. That portal—a technology-enabled platform which would assist learners to develop CBE-enabled personalized learning plans nationally and internationally— was intended to supplement K2W's direct CBE assessment aspirations. Together, the development of local CBE programs and K2W web portal were symbiotic.

Planned Activities and Deliverables

Knowledge to Work *accomplished all planned activities and proposed deliverables on time* to USDOL throughout the grant by the target date proposed. Quarterly reports documenting this achievement have been submitted on time to USDOL and are available for inspection by contacting the Director of Knowledge to Work at Lord Fairfax Community College or through the US Department of Labor.

Research Questions

This section addresses the *SGA's four required research questions* (as well as an additional research question developed by the third-party evaluator and K2W executive director).

1. How was the particular curriculum or activity selected, used, or created? The seven programs chosen for LFCC's initial direct CBE assessment model were selected based on analysis of regional labor market needs. These also are industries targeted nationally by the USDOL as having direct pathways from training and education to jobs that lead to in-demand, mid- to high-skill jobs with family-supporting wages. In addition to the seven career and technical programs selected, LFCC added Adult Basic Education (ABE), trades apprenticeship, and a CBE certificate in supervision as part of meeting continuum of competency needs with the grant. The grant made funding possible for a full-time ABE/GED instructor, two career coaches, and a workforce navigator, as well as a part-time trades apprenticeship coordinator to support this continuum. Eventually, due to lack of enrollment, the trades/apprenticeship component was discontinued, and effort was extended serving veterans. Additionally, ABE, GED, trades, and CBE programs were targeted to jail inmates with braided funding for a full-time instructor.

2. How were programs/program designs improved or expanded using grant funds? What delivery methods were offered? What was the program administrative structure? What support or other services were offered?

The seven programs were initially converted to direct CBE assessment with the aid of national competency frameworks promulgated by national professional associations. This faculty-intensive process involved identification of existing competencies within programs and comparison to these frameworks to determine which competencies K2W would advance. Faculty were paid stipends for their work. Subsequently, and as noted above all direct assessment CBE programs were transitioned to course-based CBE. K2W was managed by Dr. John Milam who authored the grant. Dr. Milam oversaw the development of the K2W web portal and served as liaison to the academic faculty and administrators in charge of CBE development. The grant offered the opportunity for anyone to develop personalized learning plans through the portal

as well as face-to-face job coaching. K2W also provided unique support approaches for students with a range of support needs, including jail inmates and hard to employ individuals seeking entry-level credentials and GED's.

3. Are in-depth assessment of participant abilities, skills, and interests conducted to select or enroll individuals into the program being evaluated? What assessment tools and process were used? Who conducted the assessments? How were the assessment results used? Were the assessment results useful in determining the appropriate program and course sequence for participants? Was career guidance provided? If so, through what methods?

The student intake process required a pre-assessment to determine whether potential students are ready to undertake direct assessment. Additionally, LFCC supplemented its standard LFCC admissions form with an intake form to collect demographic data not found on the College's standard application blank for direct assessment CBE enrollees. Because numbers of entrants and completers were low, no meaningful analysis of these limited intake data was performed. Instead completers were interviewed by the third-party evaluator; these completers were vocal about the benefits of CBE. Several indicated that without the possibility of accelerating completion their program they would not have finished. Participants were recruited by one faculty member in one discipline (AST). *After transition to course-based CBE, it* was determined that a cohort-based analysis, assuming that all students were enrolled in these particular classes, was no longer possible and that intake analysis would not yield consequential data. Career guidance was provided to direct assessment CBE enrollees and users of the portal who are empowered to view career pathways and make themselves more marketable by using OER to develop new skills and review previously attained competencies. Prospective students received career (and other) assistance from K2W career coaches and the Workforce Navigator who also worked with employers to recruit students into career pathways generated by K2W.

4. What contributions did each of the partners and other key stakeholders make towards: (a) program design; (b) curriculum development; (c) recruitment; (d) training; (e) placement; (f) program management; (g) leveraging of resources; (h) commitment to program sustainability? What factors affected partner involvement or lack of involvement? Which contributions from partners were most critical to the success of the grant program? Which contributions from partners had less of an impact?

Many of answers to these questions appear in the "lessons learned" and "innovations" portion of this report. K2W benefited from the involvement of *key local stakeholders* and national partners as discussed above. Regional employer partners were *slow to develop CBE training opportunities* for their employees. National entities helped directly and indirectly with curriculum development, especially AHIMA and its efforts to create *a new national certificate* combining information technology with

healthcare information management. All partnerships were discussed earlier in this report.

Partnerships that were pivotal include the relationship with the *American Council on Education* to promote the portal and creative use of frameworks for veterans. Placement has been slower to develop since the number of students only recently has met enrollment expectations owing, in part, to the conversion from direct CBE assessment to course-based CBE. Program management was particularly adept at networking with *national organizations* involved in advancing CBE as well as with the Virginia State Community College System to investigate the utility of statewide student information system software for a CBE model and to engage in discussions through CAEL and an America's Promise grant about policy improvements needed to increase prior learning assessment. Partner involvement or lack of involvement appears to be a lack of awareness of CBE and how it can save employees and student time toward a certificate or degree. The CBE model is difficult to explain to those with little prior contact with higher education. A *stronger push to recruit* incumbent workers through the local WIB by the College's workforce arm could have produced greater awareness and acceptance of direct assessment in the region, initially, and, later, course-based CBE. Specific partner contributions are highlighted above. Recent *partners, especially the New River Consortium,* will help ensure *sustainability* for the web portal. Earlier, this evaluation discussed specific ways that LFCC can sustain its CBE experiment by earmarking both tuition revenue and state support to create other innovations along the CBE pathway. The *innovation space for CBE* became quite occupied during the K2W grant. In the main, partners who stood to generate revenue from CBE implementation were the most enduring K2W partners.

5. Do short-term education outcomes differ for participants enrolled in course-based CBE and corresponding non-CBE courses?

A Propensity Score Analysis was performed in early 2018 to estimate whether coursebased CBE delivery resulted in differences in short-term outcomes compared to traditional classroom delivery of the same courses delivered in traditional formats. No statistically significant differences were found.

Program Logic Model

The K2W Logic Model comprises Appendix A and provides a visual structure and sequence of activities leading to the ultimate outcomes envisioned for K2W: (1). students in CBE programs are retained at rates higher than a comparison group; (2) graduates of LFCC's CBE programs earn credentials at a rate faster than comparison groups; (3) graduates obtain jobs directly related to their chosen fields; and (4) graduates are retained in employment. Because of the transition from direct CBE assessment to course-based CBE delivery and the associated relinquishment of a cohort model in which students entering a program are tracked throughout their time at the college and onward to completion, and subsequently into labor

markets. These outcomes will be fully reported in the final year report due in mid-November 2018 after this summative evaluation has been submitted.

Methodology/Data Collection and Analysis

This summative evaluation, like its three predecessor annual reports, synthesizes quantitative and qualitative data, i.e., mixed methods techniques. Quantitative data consist of extracts of files from LFCC's PeopleSoft® student information system software. These extracts include data needed for USDOL performance reporting as well as data drawn for a Propensity Score Analysis (PSA) performed by the third-party evaluator. Qualitative data include interviews with direct assessment program completers, extensive interviews with K2W staff and LFCC personnel, review of K2W's Quarterly Reports to USDOL, and review of written products generated by K2W for all activities.

PROJECT OUTCOMES

Participant Streams

Enrollment in direct assessment programs was significantly short of the expectations as established in the original TAACCCT proposal. The College received notice from USDOL in June 2016 that low enrollment was an issue after the first grant year, with only 1% of the total projected participants envisioned in the original grant enrolled. During the first two years of the grant ten students were served in the seven direct assessment CBE instructional programs found above. There were nine total completers in direct assessment. The shift to course-based CBE has resulted in a significant upswing in participant numbers (Table 1). Enrollment data were carefully monitored both before and after the change from direct assessment CBE to course-based delivery.

K2W's impact and service to participants beyond those initially enrolled in its former direct assessment programs provides a fuller picture of program impact. According to K2W staff, 2,034 participants were served in one or more forms of competency-based education through the second quarter of the fourth grant year, March 2018. Table 1 captures all participant streams during this time. These participants are working in a pathway that leads them towards earning nationally-recognized credentials in the industries and programs targeted by the grant. Students enrolled in these courses are counted as grant participants because they meet the criteria identified by TAACCCT.²

² See Performance Reporting Technical Assistance Resource #2. they are credit or non-credit grant-funded courses, the courses are part of a program leading to an industry-recognized credential, students who enroll in the grant-funded programs are required to take the courses to receive the credential, the students are enrolled beyond the add/drop period, and the programs with these courses are included in the statement of work.

- Adult Basic Education (ABE) participants lacking readiness for higher education and requiring adult basic education skills. These participants were placed on a pathway to course-based CBE.
- **Adult Detention Center** participants are incarcerated in a regional corrections facility that are served with ABE and CBE trade services instruction.
- **Course-Based CBE** participants enrolled in courses that faculty have redesigned in a CBE delivery format.
- **Direct Assessment CBE** participants were enrolled in one of the seven direct assessment CBE programs identified in the grant, including degree, certificate, and career studies certificate programs in the areas of health information management, information technology, and administrative support technology.
- **General Education Development (GED)** participants lack a secondary diploma or equivalency and require help in obtaining a GED. These participants were placed on a pathway to course-based CBE.
- **Portal** participants are users of the online portal at http://knowledgetowork.com who enroll on the site, create a personalized learning plan, and use open educational resources to attain competencies needed for a nationally recognized credential.
- **PluggedinVA (PIVA)** participants enroll through the LFCC's Northern Shenandoah Valley Adult Education Center to earn a GED and pursue Certified Medical Administrative Assistant (CMAA) certification and other program courses. CBE approaches and methodologies are used in the GED component of the program.
- **Trade Adjustment Act (TAA)** participants are displaced workers who were assessed by the College's Transitions/ABE team.
- **Veterans** includes those students who have veteran status and have received personalized support, including documenting Military Occupational Specialty codes mapped to courses and competencies.

Table 1						
K2W Participant Streams Year One through 2 nd Quarter Year Four						
Stream	Year One	Year Two	Year Three	Year Four*		
Adult Basic Education	6	5	38	15		
Adult Detention Center		20	52	31		
Course-Based CBE		128	718	175		
Direct Assessment CBE	6	4				
General Education Development (GED)	27	58	73	34		
Online Portal	2	72	179	393		
Plugged In Virginia		6	9	4		
Trade Adjustment Assistance		51		6		
Veterans			53	6		
Total	39	311	1,061	623		
Source: LFCC, September 2018.						

Participant streams for GED, ABE, Adult Detention Center, and veteran enrollments subject to minor duplication. *Year Four data represents one half of the final year or quarters one and two of the final year of grant operation. Table 1 shows that the largest growth area is in a stream not envisioned when the grant was implemented, course-based CBE. The enrollments for course-based CBE, coupled with other participant streams, result in KW2 exceeding its target negotiated with the Department of Labor for total unique participants in year three. The online portal was second in overall growth in the third year. Figure 1 is a visual representation of enrollment by participant stream from the first grant year through the fourth. Participant demographics are summarized below in Figures 2 through 4. CBE participants were more likely to be students of color, especially Hispanic/Latino (Figure 2), female (Figure 3), and older (Figure 4) than the profile of LFCC students in general.













USDOL Program Outcomes through Second Quarter of Year Four (March 2018)

USDOL required K2W to develop and report nine (9) outcome measures. For K2W low direct assessment enrollments in general as well as no enrollment in some direct assessment program areas cloud an **overall assessment** of K2W's outcomes. Table 2 depicts targets from K2W's Scope of Work (SOW) compared to performance numbers submitted for the project's Annual Performance Reports (APR) over K2W's first three years.

Table 2				
Program Outcomes through the Second Quarter of Year Four				
		Target	% of	
	Number	from	Target	
Category	from APR	SOW	Achieved	
Total Unique Participants Served/Enrollees	2,034	2,829	71.9	
Total Number Who Have Completed a Grant-	92	1,495	6.2	
Funded Program of Study				
Total Number Still Retained in Their Programs	495	1,280	38.7	
of Study (or Other Grant-Funded Programs)				
Total Number of Students Completing Credit	1,003	1,466	68.4	
Hours				
Total Number of Earned Credentials	149	1,633	9.1	
Total Number Pursuing Further Education	4	1,132	0.4	
After Program of Study Completion				
Total Number Employed After Program of	6	1,454	0.4	
Study Completion				
Total Number Employed After Retained in	0	1,277	0.0	
Employment After Program of Study				
Completion				
Total Number of Those Employed at	3	896	0.3	
Enrollment Who Receive a Wage Increase				
Post-Enrollment				

K2W Web Portal User Data

Use of K2W's web portal saw steady increases throughout the grant period in pace with new functionality and improvements in user experience.

• Between March 2016 and July 2018

- o 15,734 users visited the portal
- o 1,079 of these individuals completed a profile and enrolled
- o 1,141 personalized learning plans were generated
- the modal entry source (n=401) for new users visiting the portal was IAAP (International Association of Administrative Professionals)
- New users represented all US states and the US Virgin Islands; 81 were international users

• Between September 2017 and July 2018 site visitors included

- \circ 1,370 users who viewed employer pages
- o 5,280 users who viewed the job seekers pages

As of July 2018, there are 21,881 curated learning resources (Open Education Resources and other learning objects) were freely available for educators to develop CBE models and for

learners to develop personalized learning plans on the portal (as well as for educators to develop CBE models).

Propensity Score Analysis Summary

A Propensity Score Analysis was completed in early 2018 and analyzed these available short-term outcomes: (a) passing course with a grade of C or better, (b) course withdrawal, (c) subsequent term grade-point average; and program completion. The unit of analysis was the largest enrolled CBE-aligned course offered at LFCC in fall 2016, Principles of Public Speaking (CST 100). Students enrolled in CBE-aligned CST 100 students constituted the intervention (or treatment) group while students enrolled in all other non-CBE aligned sections of CST 100 constituted the comparison (control) group.

Table 3					
PSA Short-Term Student Outcomes, Matched Groups					
				Finished	
			Subsequent	Program at	
	Passed Course		Term Average	End of Fall	
CBE Status	with C or Better	Withdrew	GPA	2017	
Enrolled in	27 (81.8%)	2 (6.1%)	2.65	17 (51.5%)	
CBE-					
Aligned					
Course					
(n=33)					
Not	31 (93.9%)	2 (6.1%)	2.66	14 (42.4%)	
Enrolled in					
CBE					
Course					
(n=33)					

There were no statistically significant differences between the CBE-aligned CST and non-CBE-aligned CST courses when students were matched on age, previous GPA, gender and race/ethnicity (Table 3). As noted, these results should be interpreted cautiously since students may have been unaware that they were enrolled in CBE-aligned sections of this single course.

DISCUSSION AND FUTURE RESEARCH IMPLICATIONS

K2W's implementation demonstrates that direct assessment CBE and course-based CBE were successful in certain areas, although much learning remains. The transition between these two delivery modes came about halfway through the project and complicates the analysis of all program outcomes since course-based CBE is not premised on homogenous groups of students beginning an education program at an identified point in time. Nonetheless, the short-term education outcomes summarized in this summative evaluation can be instructive. Further

tracking of participant outcomes beyond the confines of the grant period will be necessary to gain a full picture of K2W's ultimate quantitative outcomes. At the same time, this summative evaluation provides a narrative of choices made by LFCC, lessons learned, and consequences which should be of help to other postsecondary institutions embarking on the innovation pathway.

Knowledge to Work's trajectory also was not as predictable from the onset as one might find among other TAACCCT projects that planned to deliver known education strategies to a pre-defined population of learners culled from pre-existing employer networks. K2W's approach incorporates many unknowns while the latter approach fits more closely with traditional expectations for how training programs operate. As an exercise in innovation, few guideposts were available to K2W that might have marked pitfalls along the pathway to a new paradigm. The only constants during the grant period were increased national recognition of direct assessment as an important and desirable direction for postsecondary education and shifting regulatory expectations.

Implications for Future Workforce and Education Research

Amid K2W's intentions for sweeping change, one of the largest challenges was in making prospective students, their employers, and, additionally, nearly everyone inside the College *aware of the advantages and disadvantages of direct assessment CBE and, later, course-based CBE*. Further findings about how to interface with employee and employer attitudes and institutional culture may help future programs seems advisable. *Quantitative segmenting of potential markets* may in turn, help colleges make more *data-driven predictions* about future enrollment. Understanding those segments and how they interact may also speed *institutional alignment of recruitment and subsequent student services* and may also help fine tune the total competency-based model.

Allied with the potential benefits arising from market segmentation is the perennial evaluation question: *what types of students change in what ways under what circumstances?* This summative evaluation provides a modicum of insight about short-term outcomes for course-based CBE offerings but little guidance about the changes that are attributable to direct assessment CBE. More effort could be directed at understanding more precisely the motivations of students who enroll in CBE courses and their perceptions of the experience. Faculty, in turn, might capture those CBE techniques they believe to most efficacious in accelerating learning and which students succeed better than their peers with which of those techniques. This evaluation used readily available institutional demographic student data to make early conclusions; *future research should explore connections between student success in CBE models and student motivation, prior educational experiences, and the quality of CBE delivery itself*.

A final area of significant inquiry for future workforce research drawn from the K2W experience lies in assessing the impact of CBE delivery on an institution's total future curricula. This report *noted early signs of diffusion of CBE techniques* across career and technical areas as

well as general education courses at LFCC. An intriguing question is whether the *proportion of total curricular delivery at a college that embarked on creating CBE models has shifted upward over a period of time*. If so, what factors led to that expansion? What factors detracted? If the announced goal is to transform a college's entire range of curricula and the ways in which students experience that curricula, what are suitable benchmarks to gauge progress?

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APPENDIX A Knowledge to Work (K2W) LOGIC MODEL Version 2

ASSUMPTIONS

1. Competency-based learning accelerates students' completion of workforce certificate and degree programs 2. CBE assessment leads institutions and faculty to develop new learning pathways 3. Higher education needs new direct assessment models. 4. LFCC is committed to transformational change 5. LFCC will build capacity to fully implement competencybased programs built on course-based CBE.

INPUTS

 Resources from TAACCCT grant.
 Staff and faculty expertise in Competency-Based Education (CBE) and Open Education Resources (OER).
 Commitment from LFCC's administration and faculty.
 Support from national organizations and networks.

ACTIVITIES

1. Faculty and staff training to develop competency-based degree and certificate pathways and programs in selected areas. 2. Development of wrap around student support services. 3. Partnerships with area employers for curriculum development and employment opportunities for graduates. 4. Recruitment and induction of students. 5. Development of partnerships with AHIMA and Microsoft. 6. Creation of a web portal and search engine connecting learners to OER resources used to create individual learning plans.

OUTPUTS

1. Establishment of Competency-based programs via using strong practices in CBE. 2. Curriculum reflects competencies drawn from standards established by national partners. 3. Student-centric materials drawn from its experience in educating students about CBE and direct assessment are developed. 4. Templates for individual education plans using CBE. 4. Integration of web portal and search engine within LFCC's

selected programs.

OUTCOMES

 Students in CBE programs are retained at rates higher than a comparison group.
 Graduates of LFCC's CBE programs earn credentials at a rate faster than comparison groups.
 Graduates obtain jobs directly related to their chosen fields.
 Graduates are retained in employment.

IMPACT

 Competency-Based Education becomes the primary vehicle for Career and Technical programs.
 LFCC's experience in establishing CBE and direct assessment informs and educates national work in workforce development and community college education. 43