

RECOGNITION OF PRIOR LEARNING IN THE 21ST CENTURY

Credit for Prior Learning in the Community College: A Case from Colorado

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Introduction

Community colleges are an important part of the higher education landscape in the United States. These open-access institutions serve over 12 million students annually in credit and non-credit programming, and in 2017, enrolled around 35 percent (5.9 million) of all undergraduate students. Community colleges have many roles, including awarding degrees (associate and, in some cases, bachelor's), preparing students for transfer to four-year institutions, and providing skills development for employment through career and technical education – typically in the form of certificate programs. They are an affordable access point to postsecondary education for a diverse group of students; they serve a disproportionate number of low-income and first

Key Highlights of This Brief

- ▶ Creating a Credit for Prior Learning (CPL) policy alone will not lead to strong improvements in uptake and use of CPL. Implementation and the creation of practices supportive of policy are essential.
- ▶ Grant funding for CPL policy and practice implementation can ignite change but will not necessarily lead to sustained change.
- ▶ Creating greater awareness of CPL at community colleges among students, faculty, and staff can increase uptake by students.
- ▶ White and Latino students' probabilities of credential completion are significantly impacted by their CPL status regardless of age or gender.
- ▶ Earning CPL is associated with a higher probability of earning any postsecondary credential. However, the associations are stronger for predicting degree completion than certificate completion.

generation students, students of color, students of non-traditional age, and immigrant students. For many students, community colleges provide an access point to postsecondary education and a pathway to socioeconomic mobility.

However, many students who enter community college never complete a credential; fewer than four of every 10 finish a certificate or degree within six years. The results of this non-completion include economic and social implications for the country, states, families, and individuals. Non-completion also has emotional implications for students who pursue degrees but fail to achieve that goal.

To improve persistence and completion at these institutions, some scholars and policymakers point to the need for systemic changes to lifelong learning pathways that students take through college and work. Among these recommended changes is the development of formal means to acknowledge and give credit for learning that occurs throughout those work/school pathways.

The methods that colleges use to evaluate and credential college-level knowledge and skills outside of a classroom are typically referred to with terms like recognition of prior learning, credit for prior learning, and prior learning assessment. Throughout the remainder of this brief, we use the **term** “credit for prior learning (CPL)” because that is the terminology used by the Colorado Community College System. Research shows that students who earn CPL have better persistence rates, graduate at higher rates, and save time and money on route to those degrees.

This brief examines an effort by the federal government to promote CPL in community colleges. It also looks at how colleges implement CPL and the impacts of that implementation on student success. The brief identifies practices and challenges in implementation of CPL. Our findings suggest that community colleges can make important changes to policy and practice in CPL and that this work helps students complete postsecondary credentials. However, our work also suggests that creating policy is not enough to ensure that students are using and benefiting from CPL. Attention must be paid to implementation and to creating awareness of CPL policies among students, faculty, and staff at colleges. Additionally, the brief also notes that more attention must be paid to the outcomes for students of color, students from low-income backgrounds, and other underrepresented groups to ensure that

Types of Prior Learning Assessment

Many students – as well as potential students – have acquired a great deal of college-level knowledge and skills through their day-to-day lives outside of academia: from work experience, on-the-job training, formal corporate training, military training, volunteer work, self-study, and myriad other extra-institutional learning opportunities available through low-cost or no-cost online sources.

The process for recognizing and awarding credit for college-level learning acquired outside of the classroom is often referred to as Credit for Prior Learning (CPL) or Prior Learning Assessment (PLA). There are several ways students can demonstrate this learning and earn credit for it in college. The various partners involved in creating this series of briefs are examining different types of CPL and using the following general descriptions of the different methods.

- **Standardized examination:** Students can earn credit by successfully completing exams such as Advanced Placement (AP), College-Level Examination Program (CLEP), International Baccalaureate (IB), Excelsior exams (UExcel), DANTES Subject Standardized Tests (DSST), and others.
- **Faculty-developed challenge exam:** Students can earn credit for a specific course by taking a comprehensive examination developed by campus faculty.
- **Portfolio-based and other individualized assessment:** Students can earn credit by preparing a portfolio and/or demonstration of their learning from a variety of experiences and non-credit activities. Faculty then evaluate the student’s portfolio and award credit as appropriate.
- **Evaluation of non-college programs:** Students can earn credit based on recommendations provided by the National College Credit Recommendation Service (NCCRS) and the American Council on Education (ACE) that conduct evaluations of training offered by employers or the military. Institutions also conduct their own review of programs, including coordinating with workforce development agencies and other training providers to develop crosswalks that map between external training/credentials and existing degree programs.

A Federal Investment in Recognizing Non-Institutional Learning

The TAACCCT grant program was a nearly \$2 billion investment over four competitive grant rounds from 2012 to 2018.¹³ This program was authorized by Congress in 2009 as part of the American Recovery and Reinvestment Act following the Great Recession. In total, 256 grants were awarded to 729 colleges, 630 of which were community and technical colleges.¹⁴ Grants were awarded to both single institutions and to lead institutions among consortia of colleges. These consortia were often groups of colleges within a single state. The request for proposals (RFP) for each round of grants identified strategies that colleges could pursue as part of their grant. CPL – called “Prior Learning Assessment (PLA)” in the grant solicitations – was included in all four RFPs.¹⁵ Each round required colleges to describe how they would measure and award credit for prior learning.

To understand how these grants impacted colleges’ CPL activities, we reviewed publicly available third-party evaluation reports on the grants. All TAACCCT grants were required to have an evaluation component, and the evaluation reports were to be posted on SkillsCommons.org. We reviewed these reports for references to PLA and/or CPL. In total, we found references in 136 project documents. We documented emergent themes and activities below from that review, which provide insight into what community colleges decided to use grant dollars for and the challenges that emerged in their work. A recent study by New America, which reviewed 50 high-quality TAACCCT consortia evaluations, confirms many of our findings.

Design and Implementation

TAACCCT colleges used their grants primarily to reform policy and practice efforts. Many third-party evaluations noted that while policies were put into place, implementation was still in early stages or had not been a focus during the grant period. This meant that few students experienced the redesigns. In some cases, this may have been a result of not having enough time to fully implement planned changes. In other cases, connecting policy to practice may not have been prioritized. Further, efforts to train and inform advisors, faculty, and staff did not always occur.

Some design and implementation themes included:

- Developing or refining CPL policies and forming committees to undertake this work.
- Hiring a dedicated staff member to lead and implement CPL policy and practice efforts.
- Hiring PLA experts to serve as advisors to students and/or faculty and staff.
- Aligning CPL redesign efforts with larger policy initiatives at the state level.

Assessment

Another focal point for many grantees was the expansion of methods of assessment for CPL. Colleges worked to make sure that the assessment methods mentioned in their policies were actually available to students. This meant developing challenge exams and training faculty and staff on portfolio development and review. Some colleges also began using technology tools for assessment including using CAEL’s products and implementing electronic portfolios.

Automation

Some schools began to automate the process of credit review, creating websites and online tools to conduct crosswalks. This was done most often to document knowledge gained as a result of military experience. The third-party evaluations did not have much information on the results of this work. Exploring these efforts further, particularly to examine whether reviews conducted in an automated way reduce bias and result in more uniformity in credit attainment for all students could be very valuable.

Targeted population

While most grants focused their work on all students, some focused some or all of their efforts on targeted student populations. Most commonly, when projects noted a focus population, it was military or veteran students. Some grants also focused on displaced workers and/or unemployed or underemployed workers. Notably, there was not a specific focus on students of color, students from low-income backgrounds, or other underrepresented student groups.

Awareness

Many colleges made efforts to improve awareness of CPL among students. Colleges attempted this work in a variety of ways, including adding CPL questions and information to intake processes and forms, making information on CPL more widely available on campus and on websites, and training advisors on CPL and having them mention options to students as part of regular practices.

policies and practices are being implemented in ways that address equity.

Recognizing Non-Institutional Learning in Community Colleges

Research on CPL in community colleges and universities finds that while many institutions have CPL policies in place, they are often accessed by only a small proportion of students. One accrediting body, the Southern Association of Colleges and Schools Commission on Colleges, recently surveyed their institutions on CPL practices and found only four percent of students earn CPL credit. In our own baseline study of CPL in the Colorado Community College System (CCCS), looking at the period between 2007 and 2010, we found that less than two percent of the total population had received CPL. A recent study by the Council for Adult and Experiential Learning (CAEL) and the Western Interstate Commission for Higher Education (WICHE) had similar findings among a national sample of community colleges. They conclude that even when policies exist, they are not being used by as many students as could take advantage of them. In particular, the CAEL study points to the many non-traditional students who come to community colleges with existing competencies gained at work, in everyday life, or in other learning environments. In their study, over 90 percent of community colleges reported having students with completed technical training that could be assessed for college-level credit. Unfortunately, many of these students were not receiving credit for that learning, and the majority of colleges did not have plans to address this problem.

This is surprising because as noted above, CPL has a positive effect on student outcomes. Indeed, this observed lack of CPL access in community colleges may have led the United States Department of Labor to include references to CPL in the Obama Administration's Trade Adjustment Act Community College and Career Training (TAACCCT) grant (see box on page 5 for more information).

Reform in the Colorado Community College System

Between 2013 and 2017, the Colorado Community College System (CCCS) implemented the TAACCCT-funded Colorado Helps Advanced Manufacturing

Programs (CHAMP). The \$24.9 million consortium grant was intended to facilitate the redesign or creation of certificate and degree programs that respond effectively to the needs of the 21st-century manufacturing sector. Another goal was to redesign the system's credit for prior learning model to help students accelerate progress toward credentials. The Education and Employment Research Center (EERC) at Rutgers, the State University of New Jersey, conducted the third-party evaluation of the CHAMP grant. Below we present results from that evaluation and information about what happened after the grant ended.

Colorado colleges have awarded credits to students with workplace experience or specialized training, including military training, for more than 40 years. However, until CHAMP, there was no centralized process to do this. In fact, all 13 colleges in the system assessed students for prior learning in different ways:

- some relied on standardized tests (i.e. College Board's College-Level Examination Program (CLEP) exams),
- others utilized published guides for assessing training (i.e. the American Council on Education's credit recommendations for military training),
- and still others allowed students to submit portfolios of their work.

Colleges also charged different fees for these assessments (anywhere from \$13 per credit to \$62 per credit). Many failed to clearly inform students about opportunities to get CPL credit. Additionally, colleges collected data on CPL in different ways, making it difficult for them or CCCS – the central governing body of the colleges – to track CPL implementation and student pathways.

One Student's Experience with CPL

After immigrating to the United States from South America, one future Colorado community college student found that he could not find a job as a medical image technologist, a field he had worked in for years and for which he had extensive training, including a bachelor's degree. After many unanswered job applications, the student discovered that he could not get a job doing medical imaging in the United States without certification from the American Registry of Radiologic Technologists (ARRT).

The Colorado Community College System (CCCS) is made of up 13 unique open-access colleges with 40 locations across the state of Colorado. They include Arapahoe Community College, Colorado Northwestern Community College, Community College of Aurora, Community College of Denver, Front Range Community College, Lamar Community College, Morgan Community College, Northeastern Junior College, Otero Junior College, Pikes Peak Community College, Pueblo Community College, Red Rocks Community College, and Trinidad State Junior College. CCCS educates over 137,000 students every year in credit and non-credit programming.

CCCS used the TAACCCT grant as a vehicle to reform and standardize policy and practice. Specifically, the overall goal was to help students accelerate their progress towards a degree. In 2014, led by a staff person from CCCS, CCCS established a subcommittee with representatives from each of the colleges, affiliates from CAEL, and industry representatives to spearhead this work. Each school's representative was chosen by the school and was typically a person who had historically worked with CPL at that respective school. Interestingly, the subcommittee was comprised of people from a variety of different roles including testing center staff, staff who worked with military and veterans, faculty, registrars, and others.

The subcommittee was tasked with reviewing existing prior learning assessment policies at Colorado community colleges and suggesting potential revisions to policymakers. The subcommittee's work resulted in important recommended policy changes including:

- Creating a uniform data collection system and related processes for CPL across all CCCS institutions.
- Instituting a standard charge for CPL assessments.
- Making sure that multiple modes of assessment were available to students at every institution including:
- Complying with a state mandate to create "challenge tests" that allow students to earn credit for any general education course without completing an actual course;
- Creating "crosswalks"—charts showing the connections between prior learning experiences and their college equivalents—to ensure students, particularly those with military training, receive specific course credits, not just elective credits; and
- Developing and training faculty and staff on the portfolio evaluation process.

The policy work, which was comprehensive and often time consuming, was completed about three years into the four-year grant, leaving little time for implementation efforts. However, by the close of the grant period, most CHAMP consortium colleges had established plans for moving forward and had begun to make changes. One of the biggest first steps was to introduce the concept of CPL to faculty, advisors, and other staff who may have been previously unaware of it. The system offered professional development via trainings and webinars. One subcommittee member stated that the change in awareness at her school was noticeable: "The awareness has changed for sure among everyone, among advisors, faculty, department chairs. ... I think it's becoming more incorporated just in the language of the campus and faculty meetings."

Another implementation effort many schools began considering, and in some cases implementing, was educating students about CPL and how they could access it. Prior to CHAMP, most schools did not advertise CPL to students; it may have been on their website or in a policy manual but it was not shared widely. Some colleges reported developing marketing plans, including informing student advisors of available prior learning assessment options, creating brochures and posters, and adding information to school websites.

Early implementation at individual colleges required a significant amount of collaboration within each school. Because committee members who were often registrars or CPL-focused staff or administrators at the colleges lacked the independent authority to institute changes, it was critical that they get support from college faculty. The willingness of faculty to embrace prior learning assessment varied significantly among colleges and individual departments: some were concerned it would undermine full-time enrollment and academic standards, others were open to standardized testing for prior learning but skeptical of portfolios because they considered them time-consuming or less rigorous. Despite these concerns, committee members noted that they saw increasing faculty acceptance of CPL, which they attributed to their own efforts to raise awareness and enthusiasm of faculty already "on board."

"I sent out a bunch of resumes and everyone wanted the ARRT certification and everyone said it would take three years to get it, but I had already studied like 10 [years] in another country."

This meant returning to school and possibly a long path back to his chosen career. In the region of Colorado where he lived, the only options available were two-year programs of study, resulting in an A.A.S. and then the completion of the ARRT certification exam. For someone who needed and wanted to work and had already been through a long educational pathway to acquire the skills needed for the field, this reality was daunting and disheartening. The student found himself at the Community College of Denver, and upon reviewing his paperwork, the chair of the department decided that they needed to come up with another solution. She brought his files to the college CPL coordinator and they used the college's CPL policy to help him get credit for his previous work and educational experiences and prove the competencies he already had.

"I took exams for every single subject in the program and passed all but one on the American laws." He described the exams as hard, noting that he would not have passed if he did not know the material. In the end, he earned 35 CPL credits and simply had to take two classes (a math and an English course) and a few internships to complete the ARRT prerequisites. When asked how he felt about this result, "Oh my gosh, you have no idea – so happy! I was so desperate to find a job in something I love." The student is now working in a local community health center as a medical image technologist and continuing his education.

CPL Post-TAACCCCT

CPL continues to be an important issue in Colorado post-TAACCCCT. In fact, in 2019, a CPL bill was introduced in the state legislature, HB19-1252.¹⁷ The bill requires that a plan for determining and awarding academic credit for postsecondary education based on past and present work-related experience be implemented. It also notes that there should be an effort to transfer academic credit from career and technical education programs and technical certificate programs to state public two- and four-year institutions of higher education.

CCCS also has a continued focus on CPL. The system recently reconvened its CPL committee in 2019 to re-examine CPL use and implementation at the

colleges. In Winter of 2019-20, an EERC researcher had the opportunity to speak with 13 CPL committee representatives and conduct in-depth interviews with two colleges. The findings are documented below.

CPL Committee

The majority of the CPL committee members had either not been involved in the TAACCCT grant work or had not been at the college during that period. As such, many representatives had heard about the grant but did not have a good understanding of how it impacted their college. Products of the grant most commonly mentioned were the creation of the CPL policy and the uniform pricing for CPL credits. One of the few representatives who had been involved in the grant spoke about its importance to CPL, "It was very impactful, we looked at the policies and procedures, we did a lot of work on the published guide." Others said they felt that the interest for CPL faded with the close of the grant, "It seems like much of what happened under TAACCCT shut down after the grant ended." Others talked about how losing positions that had been paid for by the grant to focus on CPL and student services around CPL both at the system and college levels impacted implementation of CPL changes at the colleges.

One notable change since the start of TAACCCT emerged in that most campuses had someone with some part of their time dedicated to CPL. For some, this was a full-time focus, but for most this was one of many responsibilities. This was, however, a change from the start of the TAACCCT grant, when it was difficult for some schools to figure out who should serve on the committee.

Committee members talked about some of the challenges with CPL implementation and use on their campuses. Many echoed the challenges that emerged during the grant period.

Awareness among faculty, staff, and students was mentioned often. One committee member spoke about the lack of awareness among students, "I can't tell you how many times I look at a transcript and see that a student took a class they didn't need. Students aren't aware [of CPL] and so they don't ask." Others talked about the need to educate faculty about CPL. They noted that departments and faculty have fears about CPL. They are, "worried about the loss of money" or that "no one can teach this the way I can teach this." Members talked about the ongoing need to help their school communities overcome, "CPL angst."

Committee members also talked about why it was important that they reconvene the committee and what they plan to do. They spoke, for example, about the legislation noted above, incorporating CPL into the work they are doing in guided pathways, sharing practices among colleges, and updating policies and procedures which many noted are already outdated since the end of the grant.

As college representatives spoke, it was clear that CPL practice varies widely by college; some are moving forward at a fast pace and making CPL a priority and at other schools CPL is available but used rarely. In the sections below, we will look more closely at the results of the redesign of the CCCS's credit for prior learning model. In particular, we examine use of both CPL by students and outcomes of students who earned CPL. We then look at characteristics of students who earn CPL credit and how the student characteristics impact the relationship between CPL and student outcomes (e.g., credential completion). Finally, we share a short case study documenting the current work on CPL at one CCCS college. This collective analysis provides important insights into the impact of the CHAMP grant on CPL.

Outcomes of the Redesign

The CHAMP grant provided the impetus and resources to improve and standardize policy and practice at the 13 community colleges in Colorado.

Below we examine the impact of that work by focusing on student outcomes. Analyzing data provided to us by CCCS, we address three primary research questions:

1. How did the number and type of CPL awards change over the TAACCCT grant period, and how did this vary across the 13 colleges?
2. What are the characteristics of the students who were awarded CPL?
3. How did CPL awards impact students' chances of completing credentials (associate degrees and certificates)?

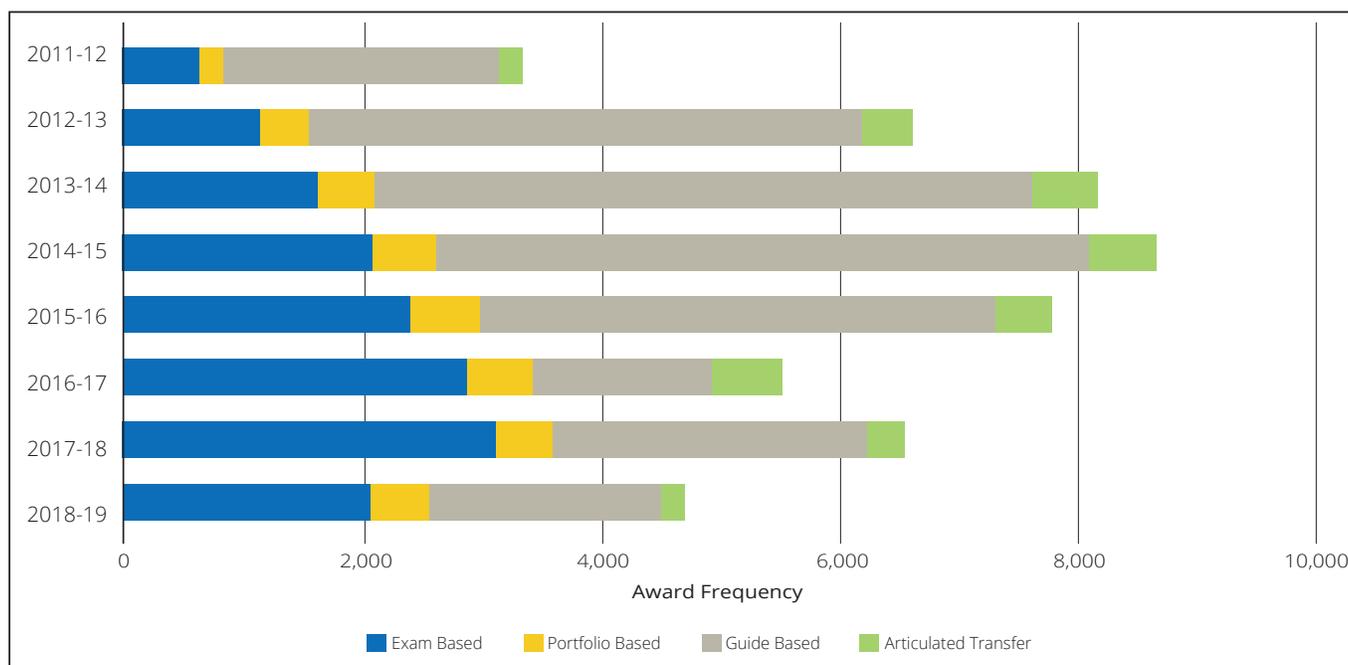
Our analysis of the latter two questions is focused on the potential of CPL as a tool to increase educational equity at community colleges. As such, the following findings specifically examine differences by gender and racial/ethnicity.

Trajectories of CPL Awarding in CCCS

Figure 1 plots the number of CPL awards (of any credit value) per year in the period from 2011-12 to 2018-19, and color codes those award frequencies according to the assessment methods used. Note that for the last year (2018-19) the data are incomplete. Two general patterns are evident:

1. Between 2011-12 and 2014-15, there is a substantial increase in CPL awards. This increase is supported primarily by growth in both guide-based (i.e. ACE military credit recommendations)

Figure 1: CPL Awards by Assessment Type and Academic Year



Case Study: Front Range Community College (FRCC)

Since the TAACCCT grant, FRCC has made CPL a priority and the college has completely overhauled its processes. The college made CPL part of the job of a new hire in 2017. She told us about how her CPL work was described to her when she started her position, “They said we have a handbook and a process, but we have only had 12 students a year accessing CPL”. With this reality in front of her, she began to examine the processes and procedures around CPL, which she described as, “loosey-goosey.” Many parts of the process needed improvement, including awareness and availability.

After this inventory of challenges, she began to implement some solutions and create new processes. One such process was for challenge exams. Now, a student with interest in proving non-institutional learning and getting CPL sits down with an instructor to talk it through and determines if they have the competencies needed to pass a CPL test or get CPL via other means. If the student is going to take a test, the faculty member fills out an online form; once completed, this form goes to the cashier so the student can pay for the test right away. The student then takes the test. If they pass, the instructor approves it in the online system, and it gets transcribed. This new system has been found to be efficient and the student does not experience delays or get stuck amid procedural challenges.

In addition to creating processes for implementing CPL, the new designated lead also worked to make sure there were CPL options for all the offerings at the college. They did an inventory and found where tests needed to be created. Developing tests is a work in progress but she notes that, “if we don’t have a test, we will create a test or provide a portfolio option.”

Another important aspect of the CPL work at FRCC has been creating awareness. The dedicated staff member did “a ton of training with faculty and staff, educating them on the value of CPL to both students and the college.” She worked to dispel fears by sharing data on CPL and shared information on the value for students. In addition to working with faculty and staff, FRCC also advertised more widely to students. In the end, she says the college saw an “833% increase in CPL in 2018-19.”

She described the work at FRCC to date as creating a real culture shift. “I think faculty now really think about how they can use CPL. Now they think outside of the box, and it is a solution to lots of problems.” She also noted that the data speak for themselves. Noting that in one year 2018-19, CPL had saved students, “\$62,000 in tuition ... 318 credits were earned ... and 94 percent of CPL students were retained and 64 percent finished a degree.” She noted that, “those numbers impacted the whole school ... everyone turned their heads and saw what a real tool this is to help students be successful.” The work at FRCC continues to build on this early success and improve processes and procedures.

and exam-based (i.e. CLEP exams) CPL, though more modest growth is also observed in portfolio-based CPL and articulated credit transfers.

2. By contrast, in the period from 2015-16 to 2017-18, there is a sharp decline and then a partial recovery in the total number of CPL awards. The decline is primarily in guide-based awards, as we see fairly steady frequencies in other assessment categories, and even further growth in exam-based CPL assessment.

These findings confirm the fact that as implementation unfolded, college faculty embraced exam-based CPL while remaining skeptical of other assessment methods. The drop-in guide-based assessments in the latter period may be exogenous to the TAACCCT implementation, especially because many guide-based credits are awarded based on military experience. Thus, there may be a relationship between decline in guide-based awards and a decline in military personnel size. This is supported by data from the World Bank indicating an active duty personnel size of 1.59 million in 2010,

which declined to 1.35 million in 2016, with the largest percentage drops occurring in 2013-14 and 2014-15 periods.

CPL awards also varied significantly among the CCCS colleges. CPL awards were generally a function of institution size; the two institutions that have the highest frequencies of CPL awards – Pikes Peak Community College (PPCC) and Front Range Community College (FRCC) – are among the largest in the CCCS system. But other institutional features also appear to play a role. Notably, PPCC is located near military bases, and as a result makes many CPL awards (through guide-based assessment) to service members and veterans. Further confirmation of this hypothesis is that after 2015, we observed a drop in CPL at PPCC which corresponds with a drop in the size of the active duty military force. CPL award growth at the other institutions, notably FRCC and possibly at Pueblo Community College (PCC), and the Community College of Aurora (CCA), may be the result of more robust efforts at implementing changes recommended as a result of the TAACCCT program. See information on FRCC’s implementation efforts below.

Characteristics of CPL-earning Students in CCCS

Table 1 reports the demographic characteristics of students by CPL award type, for students who received at least one CPL award of that type. Thus, an individual student may be counted in more than one category.¹⁸ As a comparison, the table also presents characteristics of students who did not receive any CPL award. In general, men earned far more CPL credits than women, and this is particularly true for CPL credits awarded by methods other than exams. In terms of race and ethnic groups, Latino students are disproportionately represented among CPL awardees, specifically in the exam-based and articulated credit categories. Measured in 2016, CPL-earning students were somewhat younger than non-CPL students (26.6 vs. 29.4 years, respectively), though students who earned non-exam-based credits were much older than those who earned exam-based credits. CPL students in general were slightly less likely to have been awarded Pell Grants in the study period, though students who earned guide-based credits were more likely to have done so.

CPL earning and credential completion

Having broadly described the characteristics of CCCS students who earned CPL, we now turn to examine the relationship between student characteristics, CPL awards, and credential earning. As a first step in

Table 1: Demographics of CPL Students by Assessment Type

	Non-CPL	Any CPL	Exam-Based CPL	Guide-Based CPL	Portfolio-Based CPL	Articulated Credit
<i>Gender</i>						
Female	62.5%	41.9%	56.0%	21.1%	44.4%	46.1%
Male	37.5%	58.1%	44.0%	78.9%	55.6%	53.9%
<i>Race/Ethnicity</i>						
White	64.7%	59.3%	57.6%	59.6%	67.4%	57.3%
Asian	2.7%	2.6%	2.6%	2.7%	1.8%	2.3%
Black	6.8%	6.3%	2.5%	12.0%	3.6%	6.7%
Hispanic	15.8%	19.9%	23.7%	15.6%	17.0%	21.1%
Other/Multiple Race	5.5%	4.9%	4.2%	5.8%	4.3%	5.9%
Unknown/Non-Resident	4.6%	7.1%	9.4%	4.3%	5.9%	6.8%
<i>Age in 2016</i>						
Mean	29.4	26.6	23.5	30.3	32.9	23.6
<i>Ever Pell Eligible</i>						
No	49.2%	53.1%	60.5%	39.4%	58.8%	64.8%
Yes	46.4%	43.7%	37.7%	55.4%	38.7%	32.2%
Not Specified	4.5%	3.2%	1.9%	5.2%	2.5%	3.1%
<i>N</i>	64,118	13,771	6,759	5,085	1,156	1,076

this process, we examine the general association between CPL award status and credential completion.

Table 2 presents bivariate associations between CPL status and credential earning at various levels. In general, CPL students were slightly more likely (35.1 percent) to have earned any credential than non-CPL students (31.5 percent). But diving deeper, this overall difference by credential type suggests that the relationship between credential earning is concentrated among associate's degree awards. There is a significant difference among students who earned one or more associate degrees, and among those who earned both certificates and associate degrees. There is, however, no significant difference in the proportions of students who earned only certificates. Exploring these credential type differences suggests that CPL is either not used by certificate-intending students, or that there is a knowledge gap between certificate and degree-intending students.

Table 2: Credential Earning by CPL Status

	Non-CPL Students		CPL Students	
	Count	%	Count	%
No credential	43,910	68.5%	8,934	64.9%
One or more certificates only	6,135	9.6%	1,374	10.0%
One or more associate degrees only ***	10,306	16.1%	2,579	18.7%
Certificates and associate degrees *	3,767	5.9%	884	6.4%
Any credential ***	20,208	31.5%	4,837	35.1%
N	64,118		13,771	

Earning credit for prior learning positively impacts students' chances of earning a degree. But that positive impact is not the same for all students, and not all students have the same access to prior learning credits. So, we use statistical methods to account for those differences so that our impact assessment is more precise. We find that men and younger students are more likely to earn CPL. Nonetheless, controlling for those characteristics, the overall CPL impact on degree completion is still positive. In terms of age, gender, and race/ethnicity, a separate analysis shows that White and Latino students who earned CPL appeared to benefit more than African American or Asian students.

To understand the potential equity implications of CPL policy at community colleges, we need to understand how student traits mediate this general positive association between CPL status and credential completion. To facilitate this, our second step is to correlate student traits reported in Table 1 with the students' odds of any CPL award.

Table 3 presents the results of a logistic regression which relates student traits with the odds of earning any CPL award. As a result of our model specification, this baseline refers to a white, female student, who was between 18 and 25 years old in 2016 and who never received a Pell Grant in the study period. This baseline student had a 17.3 percent probability of having earned any CPL. As we saw in Table 2, men were far more likely to earn CPL credits; in this model, holding constant other traits, that increased likelihood translates into a 12-percentage point higher probability. Among the race and ethnicity groups, Latino students were 4 percentage points more likely to earn any CPL award. Traditional age students (the reference group) were more likely than any other age group to earn CPL credits, and the model indicates that the probability of earning CPL credits decreased monotonically among older student groups. The last covariate in the model, first enrolled term, suggests that the earlier a student's first term, the more likely they were to have earned CPL credits. This last result is predictable, as these students had more potential terms in which to earn any credits – CPL or otherwise.

Table 3: Predicted Probabilities of Earning any CPL. Logistics Regression with Marginal Effects

	Marginal Effect Size
<i>Baseline Probability</i>	17.3%
<i>Gender (ref. Female)</i>	
Male	12.2%
<i>Race/Ethnicity (ref. White)</i>	
Asian	0.2%
Black	1.1%
Hispanic	4.2%***
Other/Multiple Race	-0.6%
Unknown/Non-Resident Student	6.2%***
<i>Age in 2016 (ref. 18-25)</i>	
26-35	-6.4%***
35-45	-7.5%***
45+	-9.3%***
<i>Student Ever Received Pell Grant</i>	0.0%
<i>First Enrolled Term</i>	0.1%***

*** p<.001

From a methodological standpoint, this model suggests that the likelihood of earning CPL credits is meaningfully predicted by certain student traits. Thus, understanding the impact of CPL on student outcomes requires a quantitative model that accounts for student traits. We present such a model in Table 4, which is the third step in our analysis of student outcomes.

Table 4: Predicting Credential Earning by CPL Status, Logistic Regression

Outcome	Logistic Regression Models	
	Non-CPL Baseline Probability	CPL Coefficient
Earned a certificate	16.5%	2.3%***
Earned an associate degree	23.7%	5.9%***
Earned any credential	33.8%	6.7%***

***p<.001

Having established that the odds of earning CPL credits vary meaningfully by student traits, and that there is a general relationship between CPL status and credential completion, we estimate an impact of CPL status on the probability of completing a credential. The first column of the table presents the baseline probability of the outcome indicated by the row heading (which control for the same set of covariates shown in Table 2). The second column shows the marginal effect of a given student having earned any CPL credits in predicting the outcome. We conducted these additional analyses because, as Table 2 shows, students who earned CPL credits were different in certain key ways from those who did not. This analysis holds constant student traits in order to more precisely estimate the unique impact of CPL on credential completion.

In each case, earning CPL is associated with a higher probability of earning either credential type or any credential. However, the associations are stronger for models predicting associate degree completion (5.9 percentage points) or any credential (6.7 percentage points) than for those predicting certificate completion (2.3 percentage points). One opportunity that emerges from these findings is that CPL could be made more effective at supporting students completing non-degree credentials. This may require a better understanding of which students pursue these credentials and how they might be better engaged by CPL policies. For example, one possibility is that older students are

more likely to be pursuing certificates. As we show in Table 3, these students are less likely to earn any CPL.

The last findings presented further investigate the equity dimension of the relationship between CPL and credential completion. Table 5 uses the logistic regression model predicting any credential earning (Table 4, Row 3) and Stata's marginal effects commands. The table shows predicted probabilities of credential earning for particular student groups (gender, race/ethnicity, age) by CPL status. It also shows the raw change (Δ) in probability for CPL students within the particular race/gender combination, and the percent change over the non-CPL baseline.

Table 5: Predicted Probability of Credential Earning by CPL Status, Race/Ethnicity, Age, and Gender

	Non-CPL Students (%)	CPL Students (%)	Δ CPL - Non-CPL	Percent Change in Rate
<i>18-25-year old male students, not Pell Eligible</i>				
Asian	31.8%	32.4%	0.6	+1.9%
Black	20.1%	21.9%	1.8	+9.0%
Hispanic	29.0%	35.4%	6.4*	+22.1%
White	34.0%	40.9%	6.9*	+20.3%
<i>18-25-year old female students, not Pell Eligible</i>				
Asian	35.3%	35.9%	0.6	+1.7%
Black	22.8%	24.7%	2.1	+9.2%
Hispanic	32.3%	39.1%	6.8*	+21.1%
White	37.5%	44.7%	7.2*	+19.2%
<i>26+ -year old male students, not Pell Eligible</i>				
Asian	29.9%	30.5%	0.6	+2.0%
Black	18.7%	20.4%	1.7	+9.1%
Hispanic	27.2%	33.4%	6.2*	+22.8%
White	32.1%	38.8%	6.7*	+20.9%
<i>26+ -year old female students, not Pell Eligible</i>				
Asian	33.3%	33.9%	0.6	+7.8%
Black	21.2%	23.1%	1.9	+9.0%
Hispanic	30.4%	37.0%	6.6*	+21.7%
White	35.5%	42.5%	7.0*	+19.7%

*p<.05

What we observe is a marked difference among racial/ethnic groups in the relationship between CPL status and credential earning. While completion rates are generally higher among women (panels 2 and 4) than among men (panels 1 and 3), the association with CPL status is slightly higher for men – though this difference is not statistically significant. More notably, the table shows that among both men and women, and for both younger (18-25

years old) and older students (26 and older); white and Latino students' probabilities of credential completion are significantly impacted by their CPL status (approximately 19-22 percent), while completion probabilities for African American and Asian students appear to be uncorrelated with CPL status. In the CCCS data, completion rates for Asian students are lower than those of Latino and white students – a deviation from the national picture – while completion rates for African American are far below the other three groups – which corresponds to national estimates. In terms of the impact of CPL, the association is positive in all cases, but smaller for African American students (about a 9 percent increase), and far smaller for Asian students than for any other group (about a 2 percent increase).

From an equity standpoint, two potential implications follow from these final results. The first is that an expansion of CPL could potentially help to narrow the male-female credential completion gap. A second is that the wide disparity in CPL credential association for African American and Asian students presents an opportunity to better understand how to leverage CPL among these student populations. As mentioned in the case of certificate-intending students, it may be the case that African American and Asian students are comparatively less aware of opportunities to earn CPL.

Conclusion

The TAACCCT grants provided an important infusion of dollars and resources to community and technical colleges to promote CPL policy and practice reform. Although grantees had three to four years to develop policies and implement change, many never got further than the policy creation phase. This meant that when the time came for the development of practices and implementation of the policy, the resources were gone and often so were the grant-funded staff who championed these efforts. This reality led to scattered implementation across grantees and even within systems as is the case in Colorado. It also meant that the results of these efforts were not properly documented by the third-party evaluations.

The Colorado case shows us that for those students who get CPL credit, it helps them to persist and to get a credential, but students can only access CPL if they are aware of it. After TAACCCT, awareness was still reported to be low at many colleges. FRCC is an interesting example of a continued effort to implement CPL policy post-TAACCCT and results seem promising.

We recommend that institutions and systems developing CPL policies should simultaneously create an implementation plan. Furthermore, we recommend that institutions and systems consider equity in their policy design and implementation plans. For example, how are students made aware of CPL opportunities? What forms and content of college-level learning are recognized in the CPL policy? How will the institution or system evaluate student outcomes related to CPL policy? Other briefs in this series offer additional suggestions on how institutions and systems might create equitable CPL policies and practices.¹⁹

Further research is required to better understand what works in CPL implementation and how to improve uptake among all students. Research is also needed to better understand the equity concerns that emerge in this brief. For example, in what ways do race-equity factors associated with choice of credentials such as type and occupation (e.g., certificates vs. degrees, health care or manufacturing vs. general transfer), impact CPL uptake rates and outcomes? What tools and/or practices can be employed to help bridge these gaps? One such tool might be the automated credit review noted above.

The economic impact of COVID-19 suggests there will be more opportunities to engage displaced workers in postsecondary education as they look to reskill and upskill. The evidence from TAACCCT in Colorado and more widely provides important information on how creating CPL policy can be done at the system level. Now research must be conducted to help us better understand implementation and use of CPL.

Endnotes

¹ American Association of Community Colleges, “Fast Facts,” accessed on 1 June 2020 at <https://www.aacc.nche.edu/research-trends/fast-facts/>.

² Kevin Dougherty, Hana Lahr, and Vanessa Smith Mostert, *Reforming the American Community College: Promising Changes and Their Challenges* (New York, NY: Community College Research Center, Columbia University, 18 November 2017), accessed on 1 June 2020 at <https://ccrc.tc.columbia.edu/publications/reforming-american-community-college-promising-changes-challenges.html>.

³ Melinda Mechur Karp, Lauren O’Gara, and Katherine L. Hughes, *Do Support Services at Community Colleges Encourage Success or Reproduce Disadvantages? An Exploratory Study of Students in Two Community Colleges* (New York, NY: Community College Research Center, Columbia University, January 2008), accessed on 1 June 2020 at <https://ccrc.tc.columbia.edu/media/k2/attachments/support-services-reproduce-disadvantage.pdf>; Thomas Bailey, Shanna Smith Jaggars, and Davis Jenkins, *Redesigning America’s Community Colleges: A Clearer Path to Student Success* (Cambridge, MA: Harvard University Press, 2015).

⁴ Bailey, Smith Jaggars, and Jenkins, *Redesigning America’s Community Colleges*; Elizabeth Mann Levesque, *Improving Barriers to Community College Completion Rates by Addressing Structural and Motivational Barriers* (Washington D.C.: Brookings Institute, 8 October 2018), accessed on 1 June 2020 at <https://www.brookings.edu/research/community-college-completion-rates-structural-and-motivational-barriers/>.

⁵ Bailey, Smith Jaggars, and Davis Jenkins, *Redesigning America’s Community Colleges*.

⁶ Bailey, Smith Jaggars, and Davis Jenkins, *Redesigning America’s Community Colleges*.

⁷ Rebecca Klein-Collins and Sean Hudson, *What Happens When Learning Counts? Measuring the Benefits of Prior Learning Assessment for the Adult Learner—A CAEL Self-Study of the Academic Outcomes of Learning Counts Students* (Indianapolis, IN: Council for Adult and Experiential Learning, 2017), accessed on 1 June 2020 at <https://www.cael.org/adult-learning/publication/when-learning-counts?hsCtaTracking=d8da4991-ed08-4c8e-9a42-839f4e4a876d|68b75780-3859-44a3-bacc-a46088c46f9f>; University System of Ohio, *PLA With a Purpose: Prior Learning Assessment & Ohio’s College Completion Agenda* (Columbus, OH: Ohio Board of Regents), accessed on 1 June 2020 at https://www.ohiohighered.org/sites/ohiohighered.org/files/uploads/PLA/PLA-with-a-Purpose_Report_FINAL_041614_0.pdf.

⁸ Heather McKay, Renee Edwards, and Suzanne Michael, *Colorado Helps Advanced Manufacturing Program Final Report* (Piscataway, NJ: Education and Employment Research Center, Rutgers State University of New Jersey, September 2017), accessed on 1 June 2020 at https://smlr.rutgers.edu/sites/default/files/documents/Centers/champ_final_report.pdf.

⁹ McKay, Edwards, and Michael, *Colorado Helps*.

¹⁰ Alexei Matveev, “Survey of Non-Credit to Credit Conversion Activities: Key Highlights.” PowerPoint Presentation, Connecting Credentials Presentation, 2018, Atlanta, GA.

¹¹ Li Kuang and Heather McKay, *Prior Learning Assessment and Student Outcomes at the Colorado Community College System* (Piscataway, NJ: Education and Employment Research Center, Rutgers State University of New Jersey, December 2015), accessed on 1 June 2020 at [https://smlr.rutgers.edu/sites/default/files/documents/PLA Baseline Report FINAL 2-4-16.pdf](https://smlr.rutgers.edu/sites/default/files/documents/PLA%20Baseline%20Report%20FINAL%202-4-16.pdf).

¹² Rebecca Klein-Collins, Jason Taylor, Carianne Bishop, Peace Bransberger, Patrick Lane, and Sarah Leibrandt, *The PLA Boost Results from a 72-Institution Targeted Study of Prior Learning Assessment and Adult Student Outcomes*, (Indianapolis, IN: Council for Adult and Experiential Learning), forthcoming.

¹³ Urban Institute, *Trade Adjustment Assistance Community College and Career Training* (Washington, D.C.: Urban Institute, 30 October 2017), accessed on 1 June 2020 at <https://www.urban.org/policy-centers/cross-center-initiatives/building-americas-workforce/projects/trade-adjustment-assistance-community-college-and-career-training>.

¹⁴ Elissa Cohen, Kelly S. Mikelson, Christin Durham, and Lauren Eyster, *TAACCT Grantee Characteristics: The Trade Adjustment Assistance Community College and Career Training Grant Program Brief 2*. (Washington, D.C.: The Urban Institute, 17 March 2017), accessed on 7 July 2020 at <https://selfsufficiencyresearch.org/content/taacct-grantee-characteristics-trade-adjustment-assistance-community-college-and-career>.

¹⁵ U.S. Department of Labor, Employment and Training Administration, “Trade Adjustment Assistance Community College Career Training,” accessed on 1 June 2020 at <https://www.dol.gov/agencies/eta/tradeact/community-colleges>.

¹⁶ Iris Palmer and Sophie Nguyen, *Connecting Adults to College with Credit for Prior Learning* (Washington, D.C.: New America, 7 October 2019) accessed on 1 June 2020 at <https://www.newamerica.org/education-policy/reports/lessons-adapting-future-work-prior-learning-assessment/lessons-from-pla-implementation/>.

¹⁷ Colo. Rev. Stat. § HB19-1252 (2019), accessed on 1 June 2020 at <https://leg.colorado.gov/bills/hb19-1252>.

¹⁸ Our goal here is to examine aggregate characteristics by award type, which is not compromised by this double-counting.

¹⁹ Wendy Kilgore, *An Examination of Prior Learning Assessment Policy and Practice as Experienced by Academic Records Professionals and Students* (Boulder, CO: Western Interstate Commission for Higher Education, July 2020), accessed on 28 July 2020 at <https://www.wiche.edu/wp-content/uploads/2020/07/aacrao-brief071420.pdf>; Amelia Parnell and Alexa Wesley, *Advising and Prior Learning Assessment for Degree Completion*, (Boulder, CO: Western Interstate Commission for Higher Education, August 2020), accessed on 2 September 2020 at <https://www.wiche.edu/key-initiatives/recognition-of-learning/>; Amy Goldstein, *HBCUs and Prior Learning Assessments*, (Boulder, CO: Western Interstate Commission for Higher Education), forthcoming; Rebecca Klein-Collins and Nan Travers, *Learning Recognition and the Future of Higher Education – A Vision for a Post-Pandemic Learning Ecosystem* (Boulder, CO: Western Interstate Commission for Higher Education), forthcoming.

References

American Association of Community Colleges. “Fast Facts.” Accessed on 1 June 2020 at <https://www.aacc.nche.edu/research-trends/fast-facts/>.

Bailey, Thomas, Shanna Smith Jaggars, and Davis Jenkins. *Redesigning America’s Community Colleges: A Clearer Path to Student Success*. Cambridge, MA: Harvard University Press, 2015.

Cohen, Elissa, Kelly S. Mikelson, Christin Durham, and Lauren Eyster. *TAACCT Grantee Characteristics: The Trade Adjustment Assistance Community College and Career Training Grant Program Brief 2*. Washington, D.C.: The Urban Institute, 17 March 2017. Accessed on 7 July 2020 at <https://selfsufficiencyresearch.org/content/taacct-grantee-characteristics-trade-adjustment-assistance-community-college-and-career>.

- Colo. Rev. Stat. § HB19-1252 (2019). Accessed on 1 June 2020 at <https://leg.colorado.gov/bills/hb19-1252>.
- Dougherty, Kevin, Hana Lahr, and Vanessa Smith Morest. *Reforming the American Community College: Promising Changes and Their Challenges*. New York, NY: Community College Research Center, Columbia University, 18 November 2017. Accessed on 1 June 2020 at <https://ccrc.tc.columbia.edu/publications/reforming-american-community-college-promising-changes-challenges.html>.
- Goldstein, Amy. *HBCUs and Prior Learning Assessments*. Boulder, CO: Western Interstate Commission for Higher Education, forthcoming.
- Kilgore, Wendy. *An Examination of Prior Learning Assessment Policy and Practice as Experienced by Academic Records Professionals and Students*. Boulder, CO: Western Interstate Commission for Higher Education, July 2020. Accessed on 28 July 2020 at <https://www.wiche.edu/wp-content/uploads/2020/07/aacrao-brief071420.pdf>.
- Klein-Collins, Rebecca, Jason Taylor, Carianne Bishop, Peace Bransberger, Patrick Lane, and Sarah Leibrandt. *The PLA Boost Results from a 72-Institution Targeted Study of Prior Learning Assessment and Adult Student Outcomes*. Indianapolis, IN: Council for Adult and Experiential Learning, forthcoming.
- Klein-Collins, Rebecca and Sean Hudson. *What Happens When Learning Counts? Measuring the Benefits of Prior Learning Assessment for the Adult Learner—A CAEL Self-Study of the Academic Outcomes of Learning Counts Students*. Indianapolis, IN: Council for Adult and Experiential Learning, 2017. Accessed on 1 June 2020 at <https://www.cael.org/adult-learning/publication/when-learning-counts?hsCtaTracking=d8da4991-ed08-4c8e-9a42-839f4e4a876d|68b75780-3859-44a3-bacc-a46088c46f9f>.
- Klein-Collins, Rebecca and Nan Travers. *Learning Recognition and the Future of Higher Education – A Vision for a Post-Pandemic Learning Ecosystem*. Boulder, CO: Western Interstate Commission for Higher Education, forthcoming.
- Kuang, Li and Heather McKay. *Prior Learning Assessment and Student Outcomes at the Colorado Community College System*. Piscataway, NJ: Education and Employment Research Center, Rutgers State University of New Jersey, December 2015. Accessed on 1 June 2020 at [https://smlr.rutgers.edu/sites/default/files/documents/PLA Baseline Report FINAL 2-4-16.pdf](https://smlr.rutgers.edu/sites/default/files/documents/PLA%20Baseline%20Report%20FINAL%202-4-16.pdf).
- Mann Levesque, Elizabeth. *Improving Barriers to Community College Completion Rates by Addressing Structural and Motivational Barriers*. Washington D.C.: Brookings Institute, 8 October 2018. Accessed on 1 June 2020 at <https://www.brookings.edu/research/community-college-completion-rates-structural-and-motivational-barriers/>.
- Matveev, Alexei. "Survey of Non-Credit to Credit Conversion Activities: Key Highlights." PowerPoint Presentation, Connecting Credentials Presentation, 2018, Atlanta, GA.
- McKay, Heather, Renee Edwards, and Suzanne Michael. *Colorado Helps Advanced Manufacturing Program Final Report*. Piscataway, NJ: Education and Employment Research Center, Rutgers State University of New Jersey, September 2017. Accessed on 1 June 2020 at https://smlr.rutgers.edu/sites/default/files/documents/Centers/champ_final_report.pdf.
- Mechur Karp, Melinda, Lauren O'Gara, and Katherine L. Hughes. *Do Support Services at Community Colleges Encourage Success or Reproduce Disadvantages? An Exploratory Study of Students in Two Community Colleges*. New York, NY: Community College Research Center, Columbia University, January 2008. Accessed on 1 June 2020 at <https://ccrc.tc.columbia.edu/media/k2/attachments/support-services-reproduce-disadvantage.pdf>.
- Palmer, Iris and Sophie Nguyen. *Connecting Adults to College with Credit for Prior Learning*. Washington, D.C.: New America, 7 October 2019. Accessed on 1 June 2020 at <https://www.newamerica.org/education-policy/reports/lessons-adapting-future-work-prior-learning-assessment/lessons-from-pla-implementation/>.
- Parnell, Amelia and Alexa Wesley. *Advising and Prior Learning Assessment for Degree Completion*. Boulder, CO: Western Interstate Commission for Higher Education, August 2020.
- U.S. Department of Labor, Employment and Training Administration. "Trade Adjustment Assistance Community College Career Training." Accessed on 1 June 2020 at <https://www.dol.gov/agencies/eta/tradeact/community-colleges>.
- University System of Ohio. *PLA With a Purpose: Prior Learning Assessment & Ohio's College Completion Agenda*. Columbus, OH: Ohio Board of Regents. Accessed on 1 June 2020 at https://www.ohiohighered.org/sites/ohiohighered.org/files/uploads/PLA/PLA-with-a-Purpose_Report_FINAL_041614_0.pdf.

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