University of the District of Columbia – Community College

Final Evaluation Report

Trade Adjustment Assistance Community College and Career Training (TAACCCT) Grant Program, Round 3

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UNIVERSITY OF THE DISTRICT OF COLUMBIA
COMMUNITY COLLEGE

TAACCCT ROUND 3 FINAL EVALUATION REPORT

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Table of Contents

Executive Summary

This final evaluation report describes the key findings related to the implementation, processes, and activities of the Trade Adjustment Assistance Community College and Career Training (TAACCCT) funded program at the University of District of Colombia-Community College (UDC-CC). It also examines the effect of the program on students' completion and credential attainment. Developed by ICF, the third-party evaluator, this report informs U.S. Department of Labor (DOL) about the program implementation and outcomes achieved by the activities of the TAACCCT-funded academies at UDC-CC.

Introduction

The UDC-CC Workforce Development & Lifelong Learning Division's (WDLL's) mission is to reduce unemployment and underemployment in the District of Columbia (DC) by enhancing the skills of its residents. In line with this mission, WDLL used Round 3 of the TAACCCT grant funds to enhance programs in the construction and hospitality sectors. The DC Construction Academy (DCCA) and the DC Hospitality Academy (DCHA) were implemented based on research conducted by DC's Workforce Investment Council (WIC), which identified these two industries as high-growth, high-demand sectors.

In their attempt to meet and adapt to the needs of the labor market and high-demand, high-wage industries that are hiring in the DC metropolitan region, program staff at WDLL added an academy approach to existing curricula. This approach represents an expansion and enhancement of the existing hospitality and construction programs that will lead to certification. Enhancement activities in the two academies included: expanded online programming; developing curricula; building latticed and stackable programming; and incorporating learning assessments, student supports and integrated teaching. Throughout the implementation period (2013 to 2017), program staff supported students to acquire new skills and transition to employment and further education, and tracked program performance measures and student outcomes.

Overview of Program Intervention and Activities

Using TAACCCT Round 3 funds, UDC-CC made enhancements to the Construction introductory class (Construction CORE)[1] designed to improve the training and work readiness of program completers. The enhancements included:

1. Integrating the math curriculum to give students a firm understanding of math along the pathway;
2. Incorporating soft skills and job readiness skills, which are highly sought after by employers;
3. embedding Occupational Safety and Health Administration (OSHA), cardiopulmonary resuscitation (CPR), first aid, and automated external defibrillator (AED) training, making students more work ready;
4. Creating a "Building Information Modeling (BIM)" class to upskill those already in the industry;
5. Employing student-support coordinators to help with job readiness activities and employer outreach;
6. Engaging industry partners by forming an industry advisory council to exchange ideas and solicit feedback on program activities and curricula.
7. Creating the DC Consortium for Career Development to formally connect agencies providing the same or similar programming as WDLL to minimize duplication and overlap of services and training offered in construction-related fields.

[1] Construction CORE is a prerequisite introductory course based on the National Center for Construction Education and Research (NCCER) Core Curriculum. The curriculum covers safety, employability and communication skills, materials handling, hand tools theory, safety using electrical tools, HVAC, plumbing and electrical safety, and how to communicate on the job.

The apartment-maintenance pathway was folded into the Construction Academy for better oversight and industry alignment. Enhancements included incorporating soft skills, funding an instructor, and including student-support staff. In the Hospitality Academy, staff leveraged programming frameworks from previous grant and incorporated soft skills to boost the job opportunities for those who chose that pathway. Exhibit ES-1 summarizes the program activities within each academy.

Exhibit ES-1: Program Enhancements Status

	DCCA	DCHA
Competency Models	▪ Commercial and industrial construction ▪ Heavy highway civil construction ▪ Residential construction competency	▪ Hospitality/hotel and lodging competency model
Curriculum Content Modification	▪ Integrated math into the curriculum ▪ Covered a broad set of safety skills using tools, employability and communication skills, materials handling, hand tools theory, HVAC, and plumbing. ▪ Added online course, "Building Information Modeling (BIM)" ▪ Purchased equipment to create BIM lab	▪ Incorporated work-based learning as an optional course from DCCA
National Standards Alignment	▪ Offered National Center for Construction Education & Research (NCCER) courses and certificates ▪ Offered Occupational Safety and Health Administration (OSHA) ▪ Offered Cardiopulmonary Resuscitation (CPR) ▪ Offered National Apartment Leasing Professional (NALP) courses and certificates ▪ Offered National Apartment Association (NAA) ▪ Offered Electrical Construction Services group (ESCO) courses and certificates	▪ Offered American Hotel & Lodging Educational Institute (AHLEI) courses and certificates ▪ Leveraged the Workforce Investment Council (WIC) grant model
Work-based Learning	▪ Integrated components from Tools for Success model and Bring Your 'A' Game to Work into Construction CORE classes	▪ Integrated components from Bring Your 'A' Game to Work into classes
Funded positions for staff support	▪ Funded instructors ▪ Funded internship coordinator	▪ Funded internship coordinator

Evaluation Design Summary

The strategic goals of the required third-party evaluation were to ensure that both short- and long-term program outcomes of DCCA and DCHA were met through rigorous methods and continuous feedback. Using a mixed-methods evaluation design, ICF conducted a formative implementation study that examined the program's processes and activities and an outcome study to assess the effect of the program on student outcomes.

The implementation study was designed to collect and synthesize information from interviews, focus groups, class observations, and other qualitative data to provide a narrative description of how the enhancements were implemented, and identify challenges, lessons learned, and best practices. The implementation study was guided by research questions that focused on student intake, program implementation processes and fidelity, and employer engagement (Exhibit ES-2).

Exhibit ES-2: Implementation Study Research Questions

Program Design, Enrollment, and Intake
Q1. How was the curriculum selected, used, and/or created? Q2. What are the processes for recruitment, screening, and intake? Have these processes changed overtime? What assessment tools and processes were used, and how were the assessment results used?
Student Characteristics
Q3. What are the initial target populations and what are the criteria for participation?
Program Implementation
Q4. How were grant funds used to develop an expanded curriculum as described in the proposal? Q5. What is the envisioned pathway for each targeted occupation? What type of credentials will students receive upon completion? Q6. Did the program promote transferability and articulation? Q7. To what extent (and how) did the program use grant funds to hire required staff and personnel as described in the proposal? Q8. What were the successes and challenges in service coordination? Q9. Were participating employers satisfied with the quality of the training students received? Q10. Was the choice of targeted occupations appropriate given the skill levels of program graduates and local labor market demand? Q11. What additional resources, not anticipated in the program design and budget, were necessary to run the program?
Partner Engagement
Q12. What partners were involved in the development of the pathways? What were the key vehicles for coordination? Q13. Did DCCA/DCHA use grant funds to develop or expand partnerships and collaborations as described in the proposal? Q14. What, if any, were the challenges in engaging employers and industry? Q15. What challenges or successes were a result of partner contributions?
Sustainability
Q16. When did planning for grant sustainability begin? Did sustainability planning result in any changes to the program?
Fidelity of Implementation
Q17. Was the program implemented as intended? Q18. What exogenous factors hindered fidelity of the intervention?

The outcomes study was designed to provide an unbiased estimate of the impact of the UDC-CC TAACCCT-funded enhancements on the student outcomes. The outcome evaluation approach to assess the effect of the enhancements in the two academies differed and were guided by the research questions (Exhibit ES-3). Due to the lack of data and a suitable comparison group, ICF looked at completion and credential attainment of those who enrolled in the DCHA.

For students enrolled in the Construction CORE classes, ICF identified viable comparison students from prior cohorts by matching treatment and comparison students on select variables using propensity-score matching. This quasi-experimental study design, involved the allocation of a non-random comparison group and allowed for the implementation of a rigorous evaluation while still enabling WDLL to serve as many students as intended.

ICF was not able to access the effect of the TAACCCT-funded enhancements on student employment and wage outcomes because unemployment insurance (UI) wage data was not available and participation in the online follow-up survey that would have provided self-reported income data was low.

Exhibit ES-3: Outcomes Research Areas & Questions

Persistence
Q1. Does participation in DCCA and DCHA result in increased certification rates occupational skills/ program-related relative to the comparison group? Q2. Does participation in DCCA and DCHA result in increased retention in training programs? Q3. Does participation in DCCA and DCHA result in increased course completion rates? Q4. Does participation in DCCA and DCHA result in increases in number and percent of students who pursue additional education post-program participation relative to the comparison group?
Employment/Career outcomes
Q5. Did employment status at baseline have an effect on credential and completion rates?

Evaluation Findings

The grant gave WDLL the funding to restructure existing programs into academies for better management, alignment, and oversight. Despite program implementation delays due to lengthy institutional approval processes, staff at the academies created program pathways with industry-recognized stackable credentials that allowed students to gain mastery in a particular field. The evaluation found that the program had a positive effect on credential attainment for those in the construction field, an indication that the program made students more employable. There were no positive effects or associations of the project on completion, however. Other findings from the evaluation are summarized in the following sections.

Outcome Study Findings

Program Participation

The outcome evaluation examined the effect of TAACCCT-funded enhancements on students' completion rates and credential attainment using both administrative data and program tracking data. DCCA and DCHA were able to surpass their enrollment, completion, and retentions goals, with the majority of the students enrolling in the Construction CORE classes (68%, n=519). Analyses conducted in this section examines how these students fared in terms of completion and credential attainment. The broader analysis looks at associations between TAACCCT-funded courses and these two outcomes.

Program Completion

TAACCCT program enhancements did not have a statistically significant effect on completion. Students who enrolled in Construction CORE had higher completion rates that those who enrolled in the other two pathways—apartment maintenance and hospitality (66% for construction versus 44%, and 51%, respectively). However, the difference in completion rates between the TAACCCT Construction CORE students (treatment) and the matched historical comparison group was not significant (Exhibit ES-4).

Exhibit ES-4: Program Completion Rates of TAACCCT Students and Historical Comparison Group

	Course Career Pathway			
	UDC TAACCCT Students			Comparison
Program Completion	Apartment Maintenance n=88	Hospitality n=156	Construction n=519	Construction n=266
Completed	56%	49%	66%	64%
Incomplete	44%	51%	35%	36%

Source: UDC-CC administrative data (XenDirect and AspirePath).

This may still be a positive finding because even with the embedded math module into the Construction CORE curriculum (thus making it more difficult), the completion rate for students was still comparable to rates before the TAACCCT-funded enhancements.

Credential Attainment

TAACCCT had a positive effect on credential attainment. Among the TAACCCT students, the construction (51%, n=229) and hospitality (44%, n=80) programs had the largest number of in-career credential certification recipients (vs. 11%, n=10, for apartment maintenance students) (See Exhibit ES-5).

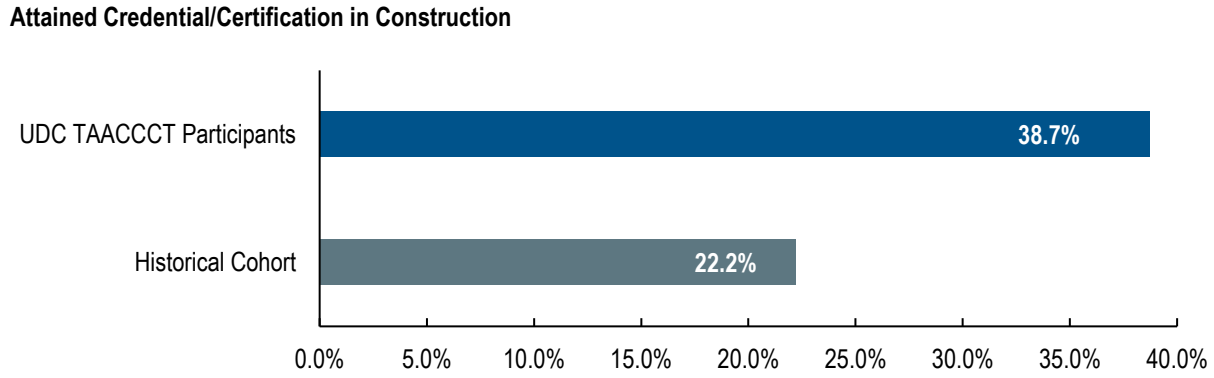
Exhibit ES-5: Credential Achievement Rates of TAACCCT Students and Historical Comparison Group[2]

	Course Career Pathway			
	UDC TAACCCT Students			Comparison Group
Credential Achievement[3]	Apartment Maintenance n=88	Hospitality n=156	Construction n=519	Construction n=266
No Credential Achievement	77%	53%	48%	72%
Credentials (Out-of-Career Pathway)	11.%	3%	1%	6%
Credentials (In-Career Pathway)	11%	44%	51%	22%

Source: UDC-CC administrative data (XenDirect and AspirePath) and program tracking data.

When comparing the TAACCCT Construction CORE treatment students and the historical cohort, the analyses shows that there is a significant positive effect of the program on credential attainment (p. <.0001, d=0.48). Exhibit ES-6 shows that the matched construction treatment group had a significantly higher credential attainment rate than the historical comparison group (38.7% vs. 22.2%). This finding indicates that TAACCCT enhancements and other program supports encouraged students to attain the credentials that would improve their employment opportunities. It is important to note that more credential-bearing classes were offered as part of DCCA, such as OSHA and CPR, and progress towards credential attainment was more closely tracked for TAACCCT students.

Exhibit ES-6: In-Career Pathway Construction Credential Rates of Matched TAACCCT Construction Treatment Students and Historical Comparison Group [4]



Source: UDC-CC administrative data (XenDirect and AspirePath) and program report records.

[2] The credential information for program students was closely monitored during the lifespan of the program; therefore, those data are more complete compared to the historical cohort.

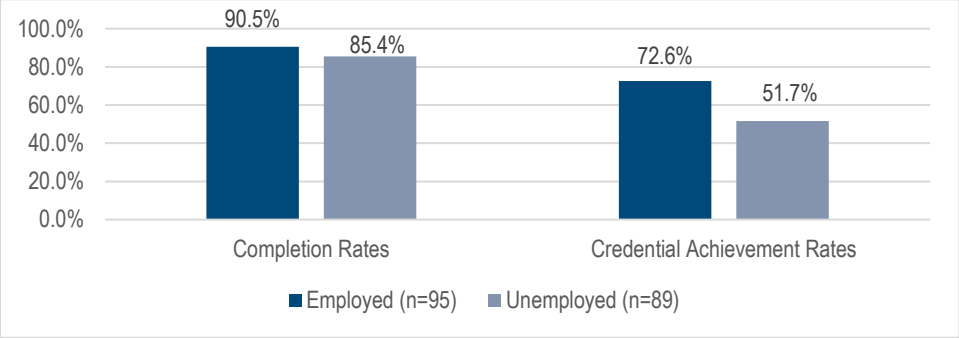
[3] ICF counted the credentials obtained from different training courses that were relevant to the three career pathways in two groups: 1) credentials TAACCCT students attained in their chosen pathway (referred as in-career pathway credentials), 2) the credentials attained outside one's career pathway (referred as out-of-career pathway).

[4] (d=0.48); the Cohen's d effect sizes (d=) show the magnitude (in absolute value) of the difference between the construction groups of UDC TAACCCT students and the Summer/Fall 2014 and Spring 2015 attendees on credential certification rates. Effect size range by Cohen's definition: *trivial* (<.20), *small* (.20 to .49), *medium* (.50 to .79), and *large* (>.79). The Cohen's d effect size calculations were based on the online effect size calculator for binary proportions available at: http://campbellcollaboration.org/escalc/html/EffectSizeCalculator-Home.php

Effect of Prior Employment on Completion and Credential Attainment

Previous employment was positively associated with credential attainment but not completion rates. Using employment status from baseline surveys (n=185), ICF examined if prior employment or employment during the program hindered or aided completion and credential attainment. Prior employment was not positively associated with completion. The program completion rates by employment status were 90.5% (n=86) for employed and 85.4% (n=76) for unemployed respectively. Those students who were employed at baseline were more likely to attain a credential (73%, n=69), compared to those who were not employed at baseline (52%, n=46). This finding could indicate that incumbent workers were highly motivated to upskill and attain credentials. In addition, the finding shows that even though incumbent workers may have had competing work priorities, they completed their program of study at similar rates (91%, n=86) to those who were unemployed (85%, n=76) at baseline (Exhibit ES-7).

Exhibit ES-7: Completion and Credential Achievement Rates by Employment Status Prior to Training of TAACCCT students



Source: UDC-CC administrative data (XenDirect and AspirePath); Student baseline survey and program tracking data.

Implementation Findings

Grant staff at DCCA and DCHA successfully implemented the majority of planned activities for the program. Despite program implementation delays due to UDC administrative processes, grant staff were able to enhance program pathways that aligned to the industry standards and that met the needs of local employers.

Program Enhancements

Grant staff were successful in enhancing the existing construction curricula to meet the needs of the changing construction industry in DC. Although modifications were made to the apartment and hospitality pathways, the changes were minimal and not as impactful. Incorporating the math module into the Construction CORE curriculum was in direct response to the difficulties student enrolled in construction classes had with math as they progressed further down the pathway. Employers also noted that students had trouble passing entry-level assessments at the workplace that involved math. Incorporating soft skills also satisfied industry concerns that entry level personnel lacked professionalism. The addition of OSHA 30 construction and CPR/first aid/AED training bolstered DCCA's students' employment opportunities, making them more job ready. Offering the BIM class enabled DCCA to attract more experienced incumbent workers who sought to upskill and re-enter the labor force at a higher pay level. Staff at DCHA were able to leverage the WIC program framework and continue to engage their partners in hospitality (e.g. Goodwill Industries of Greater Washington and Progressive Partners) to deliver a relevant program that equipped students with in-demand skills. DCCA and DCHA sought to offer programs of study that catered to the varying experience levels of the DC residents they served and also responded in a timely manner to the needs of the labor market.

Industry and Employer Engagement

The industry council played a critical role in providing grant staff with valuable feedback on the types of credentials graduates might need to transition into either an entry-level job or apprenticeship in the construction or hospitality sector. Additionally, they also provided guidance on ways to execute the curriculum—for example, to create more hands-on learning opportunities. They also provided students with opportunities to learn about the industries and better prepare them to transition into career pathways. Notably, one lesson learned was how to identify the right type of employer partner, such as the example with Cropp-Metcalf, whose entry-level apprenticeship was ideal for graduates of the HVAC program pathway.

Feedback from grant staff also provided insight on how to structure future grant proposals so that grant staff can better navigate UDC administrative processes. One example might be to hire a staff person dedicated to recruitment and intake processes. In another instance, the challenge of navigating the internal approval processes for memoranda of understanding (MOUs) or credit-articulation agreements proved to be insurmountable in the grant period.

Looking Forward

According to program staff, most of the enhancements made possible by the grant will be sustained, especially the modifications made to the program curricula. The influence of the industry council on DCCA classes was substantial, and grant staff believe those partnerships and the forum to share ideas will continue after the grant. Other support and services, such as certification test fees for students, may become a budgetary challenge and should be planned for in the future.

Recommendations

Grant staff were asked to share best practices and give recommendations to guide institutions that may implement similar programs in the future. Grant staff's advice was to incorporate and emphasize soft skills within these trades. They note that hiring an individual to work directly to improve students' job seeking skills and other job readiness training would greatly improve their employability and job placement since employers value the professionalism that came with it.

Institutions planning to implement similar project should plan early for sustainability by soliciting more funds to ensure that activities are funded after the grant. Creating more hands-on opportunities for students in these trades was also recommended because such opportunities ease their transition into the workforce.

Engaging industry partners emerged as a best practice. Staff advised institutions to engage partners early to solicit their input on program design. Furthermore, program staff should strive to engage partners throughout the project for relevant and timely feedback on program activities. They noted that industry partners would also serve as the pool of employers and because of their prior engagement would recognize the program and value the training students receive.

Conclusions and Implications

Grant staff at UDC-CC enhanced their programs and supported student completion and credential attainment. By working with industry partners through the industry council, grant staff ensured that the industry credentials offered addressed current and emerging needs. Results presented in this report indicate that there is a positive association between the TAACCCT-funded program and credential attainment, especially for those in Construction CORE. The construction pathway had the most enhancements and therefore was most modified out of the three pathways- construction, apartment maintenance and hospitality. The changes led to a positive effect on student credential attainment. These

findings may also indicate that similar changes could be made to the other pathways to realize similar impacts in student outcomes.

TAACCCT did not have an impact on completion despite more stringent attendance policies and support given to students in the program. Similar programs may benefit from hiring a completion coach, whose primary role would be to guide and support students towards course completion. The coach could identify internal and external supports that may be needed to help students overcome barriers to completion.

Program implementation in DCCA and DCHA were slowed down by delays in institutional approval processes. As the grant staff recommended, the different trades should have had their own project directors so that the management could be streamlined and each program component given equal attention. For instance, separate project directors could start sustainability planning early to ensure continuation of program elements.

Workforce development training program like the TAACCCT-funded DCCA and DCHA can help alleviate the high unemployment that persists in DC (6%).[5] With institutional support and strong industry involvement, programs such as DCCA and DCHA, can accelerate credential attainment and improve job opportunities. Such programs can effectively move District residents towards economic self-sufficiency.

[5] See Unemployment Rate. U.S. Bureau of Labor Statistics. (2017, August) D.C. unemployment rate. Accessed September,). "*District Of Columbia Economy at a Glance*." U.S. Department of Labor). Retrieved from: https://www.bls.gov/eag/eag.dc.htm.

Introduction

Background

The University of the District of Columbia Community College (UDC-CC) Workforce Development & Lifelong Learning Division's (WDLL) mission is to reduce unemployment and underemployment in the District of Columbia (DC) by enhancing the skills of its residents. In line with this mission, WDLL used Round 3 of the Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant funds to implement the UDC-CC DC Construction Academy (DCCA) and DC Hospitality Academy (DCHA). The construction and hospitality sectors were selected based on research conducted by DC's Workforce Investment Council (DC WIC) that identified these two industries as high-growth, high-demand sectors.

In 2013, the year the TAACCCT grant was awarded, hospitality jobs in DC were projected to grow 9% from 2010 to 2020, and construction jobs were projected to grow 27% over the same time, based on data UDC identified from the Bureau of Labor Statistics (BLS). Updated projections for 2014 to 2024 indicate that construction and hospitality jobs will grow by 4% and 7%, respectively, demonstrating a notable decline from initial expectations (Exhibit 1). Several factors influence these industries in the DC area, one of which is changes in political leadership at the local, state, and Federal level. In the case of construction, the Washington Council of Governments published a report in 2016 that indicated a decline in construction from 2010 to 2013 and a sharp decline in 2015.[6] The industry rebounded in 2016, however, with an increase in commercial construction, representing an increase of five million square feet from 2015 to 2016, making it the highest level of commercial construction in seven years.

Industry experts at the Stephen S. Fuller Institute for Research on the Washington Region's Economic Future at George Mason University shared a report in 2017 suggesting that the hotel industry is doing well financially; however, the way in which it serves customers and runs its business has changed. Hotels have reduced service options, which has resulted in fewer job openings for busboys, doormen, and food runners. Additionally, other job functions are being automated as hotels integrate technology and mobile applications into their systems.[7]

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[6] Kent, John (2017). *Commercial Construction Indicators 2016*. Metropolitan Washington Council of Governments. Accessed September 6 2017, Retrieved from: https://www.mwcog.org/documents/2017/05/23/commercial-construction-indicators-report--commercial-construction-economy/

[7] Gregg, A. (2017). "Tourism is booming in the nation's capital. So why aren't hotel jobs?" *The Washington Post*. Accessed September (accessed: 6 Sept. 2017,). Retrieved from: https://www.washingtonpost.com/news/capital-business/wp/2017/06/16/tourism-is-booming-in-the-nations-capital-so-why-arent-hotel-jobs/?utm_term=.9e992712f7db .

Exhibit 1: Hospitality and Construction Employment and Projections Data, Washington, DC (Base Year 2010 to Projected Year 2020[8] and Base year 2014 to 2024[9])

Title (Industry Code)	Accommodation and Food Services (720000)	Construction (230000)
	2010–2020	
2020 Projected Employment	222,235	176,603
Total 2010 – 2020 Employment Change	242,285	223,598
Total Percent Change	9%	27%
	2014–2024	
2024 Projected Employment	277,716	150,124
Total 2014 – 2024 Employment Change	19,116	6,082
Total Percent Change	7%	4%

Source: Bureau of Labor Statistics data and the DC Department of Employment Services Washington-Arlington-Alexandria DC-VA-MD-WV Metropolitan Statistical Area Long-Term Industry and Occupational Projections

In their attempt to meet and adapt to the needs of labor market and high-demand, high-wage industries that are hiring in the DC metropolitan region, program staff at WDLL added an academy approach to existing curricula. This approach represents an expansion and enhancement of the existing hospitality and construction programs to create latticed and stackable programs that will lead to certification. Enhancement activities in the two academies included: expanding online programming; developing curricula; building latticed and stackable programming; and incorporating learning assessments, student supports, and integrated teaching. The logic model in Appendix A captures the overarching program path and activities funded under the UDC 3 TAACCCT grant. Throughout the implementation period (2013 to 2017), program staff supported students acquiring new skills, and transition to employment and further education; staff tracked both program performance measures and student outcomes.

Evaluation Overview

In January 2014, ICF was competitively selected by UDC-CC WDLL as a third-party evaluator to evaluate the program implementation and the effect of the planned program on student outcomes. The strategic goals of the required third-party evaluation were to ensure that both short- and long-term program outcomes of TAACCCT Round 3 funded UDC-CC DC DCCA and DCHA were met through rigorous methods and continuous feedback.

This report presents both implementation and outcome findings of the evaluation. The first section presents an overview of the construction and hospitality academies and their TAACCCT-funded program components. The second section details the evaluation design and methodology used to evaluate the program components and answer the research questions. Each design—outcome and implementation—includes a description, associated data sources, collection and analyses carried out, and subsequent findings. The outcome study is the focus of section 3, and the implementation study is the focus of section 4. Looking forward, ICF examines sustainability plans for the TAACCCT-funded programs in the final

[8] UDC TAACCCT 3 Statement of Work: Projections Team and Bureau of Labor Statistics (2012).

[9] DC Washington D.C. Department of Employment Services (2016). *Washington-Arlington-Alexandria DC-VA-MD-WV Metropolitan Statistical Area Long-Term Industry 2014–2024*. Accessed September. Retrieved from: https://does.dc.gov/publication/washington-arlington-alexandria-dc-va-md-wv-metropolitan-statistical-area-long-term

section alongside any recommendations most relevant to the program staff, DOL policy makers, and practitioners within the fields of workforce development, and the hospitality and construction trades.

1. Program Description and Overview

Prior to the implementation of the TAACCCT grant, the construction and hospitality classes offered at WDLL were managed by individual site directors. The establishment of the academies was made possible by the grant. The academies allowed the creation of the construction and hospitality pathways under a program or pathway director. The creation of pathways, enhancement of existing courses, and alignment to both industry and employer needs made the courses more relevant and improved employment opportunities of students. The following is an overview of the enhancements made to courses along the construction and hospitality pathways.

1.1 Program Enhancements in DCCA: Construction Pathway

Using TAACCCT Round 3 funds, UDC-CC made enhancements to the Construction CORE class designed to improve the training and work readiness of program completers. Construction CORE is a prerequisite introductory course based on the National Center for Construction Education and Research (NCCER) Core Curriculum.[10] The Construction CORE curriculum covered safety, employability and communication skills, materials handling, hand tools theory, safety using electrical tools, HVAC, plumbing and electrical safety, and how to communicate on the job. After completing the Construction CORE class, students in DCCA enrolled in additional classes along the construction pathway to train for skills in carpentry, electrical, plumbing and HVAC (see Exhibit 2). Students had the opportunity to earn a variety of certifications along the way including certifications from NCCER, National Apartment Leasing Professional (NALP), and Heating, Electrical, and Air Conditioning Technology (H.E.A.T) certifications (see Appendix D for a list of construction-related certifications available in WDLL).

UDC-CC enhanced the construction pathway with TAACCCT grant funds in seven ways:

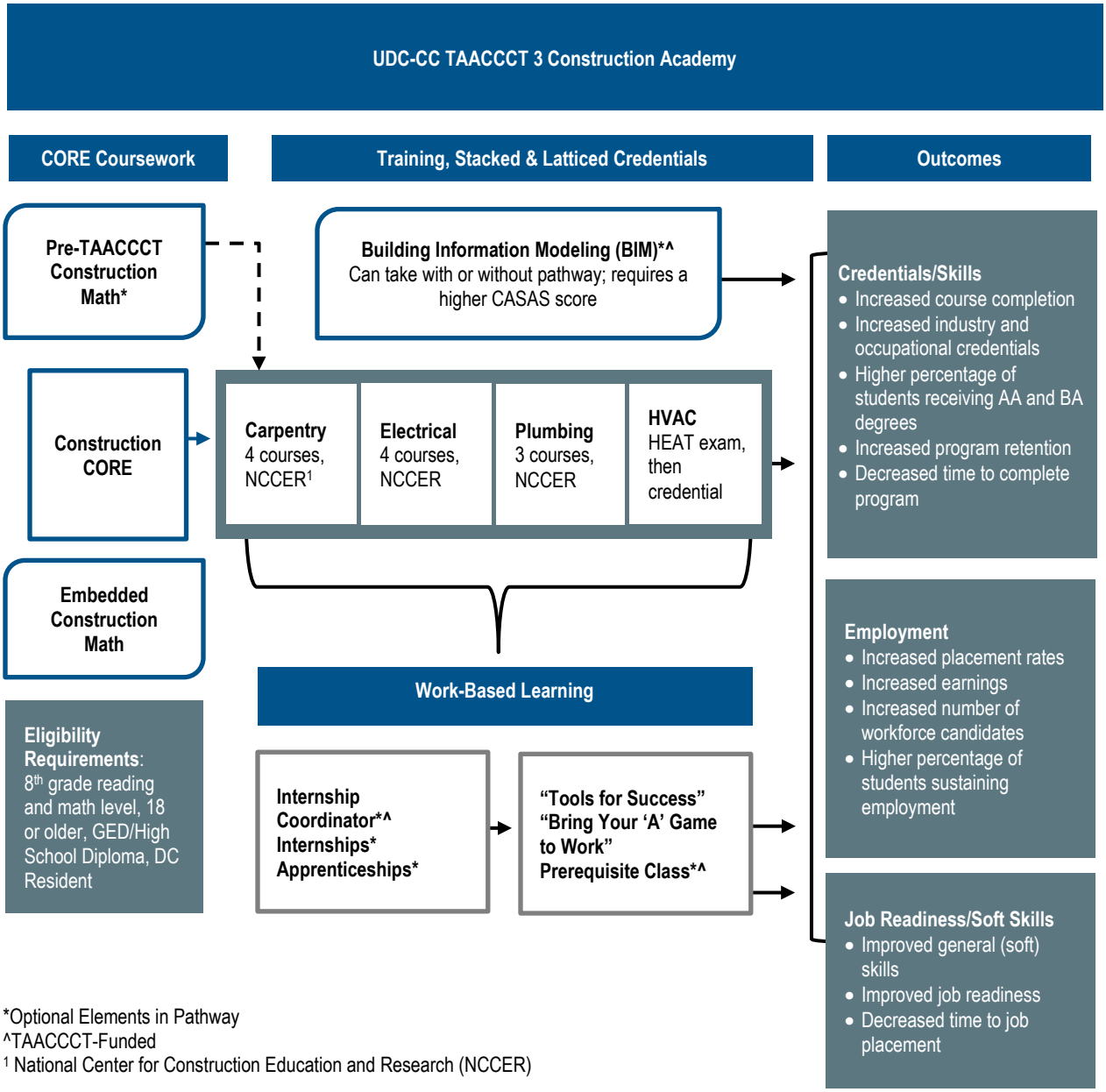
1. **Integrated math curriculum:** Prior to TAACCCT, no additional math component was offered in the pathway, only a numeracy and literacy course for those with low assessment scores. Instructors and grant staff observed that students struggled with the math module and thus needed a firm understanding of math to do well along the pathway. In addition, the industry council noted that students wanting to enter registered apprenticeship programs would need to pass a math assessment prior to being registered. To alleviate these challenges, program staff at UDC-CC embedded construction math as a required component of the initial entry-level Construction CORE class. Initially, DCCA staff offered the Construction math class as a standalone but due to low enrollment, they opted to embed it and make it a mandatory component. The expectation was that the integrated training would help students with the mathematics encountered in the CORE curriculum and in other classes further down the pathway, including apprenticeship. After completing the Construction CORE class, students in DCCA enrolled in additional classes along the construction pathway to train for skills in carpentry, electrical, plumbing and HVAC (Exhibit 2). Students had the opportunity to earn a variety of certifications along the way including certifications from NCCER, National Apartment Leasing Professional (NALP), and Heating, Electrical, and Air Conditioning Technology (H.E.A.T) certifications.[11]
2. **Incorporated work-based learning:** Enhanced courses incorporated soft skills and job readiness skills, both skills highly sought after by employers. This training was designed to ensure that DCCA

[10] See http://www.nccer.org/core-curriculum.
[11] See Appendix D for a list of construction-related certifications available in WDLL.

graduates were well-rounded employable and trainable job candidates. An NCCER curriculum, Tools for Success, was initially offered as a standalone course and was later embedded into the CORE curriculum course. This work-readiness component was geared toward those entering the construction industry. The "Tools for Success" component was replaced with another work readiness course titled, "Bring Your 'A' Game to Work." While "Tools for Success" was geared toward the construction industry, "Bring Your 'A' Game to Work" was not specific to an industry, and students could use the soft-skills training in any career pathway they chose. Furthermore, the program allows students to earn their work ethic proficiency certificate after successfully completing their online assessment. The construction academy's work-based learning component also included internships, apprenticeships, and other work-based experiences.

3. **Built in Occupational Safety and Health Administration (OSHA) information:** OSHA courses were embedded into the Construction CORE curriculum following feedback from the industry council. Coupled with CPR/first aid/automated external defibrillator (AED) training, the purpose of these certificates are to help students become more work ready, improve their employment opportunities, and potentially save hiring companies time and resources.
4. **Developed "Building Information Modeling (BIM)" course:** This addition to the construction course list allowed students to go through the process of constructing a 3-D digital model prior to starting a real-world construction project. The addition of the BIM course not only provided DCCA students with the opportunity to learn a new in-demand skill, but was also designed to attract incumbent workers looking to upskill. The grant funded a computer lab for BIM education.
5. **Added student support services:** The grant funded two individuals to work with construction pathway students to improve retention and improve internship and employment opportunities. These two employees worked with students to develop their job search, resume writing, and interviewing skills. A third hire, dedicated to employer outreach activities, worked to create and improve industry partnerships and hiring events.
6. **Industry Advisory Council:** The grant enabled the creation of an industry council to help guide the programming to ensure its relevancy and improve employment outcomes for participating students. The council was made up of both human resource personnel and field employees, from a variety of trades and construction companies.
7. **DC Consortium for Career Development:** The DC Consortium for Career Development was created to formally connect agencies providing the same or similar programming as WDLL to minimize duplication and overlap of services and training offered in construction-related fields. It was a way to keep abreast of what others were offering in the field and a forum to exchange ideas and get feedback from relevant stakeholders. Grant staff hosted and supported meetings of the consortium and created informational tools such as a pamphlet outlining the services provided by each of the participating agencies. The pamphlet was used as a resource to refer students to other services not offered by their home agency or institution.

Exhibit 2: UDC-CC TAACCCT 3 Construction Academy Pathway

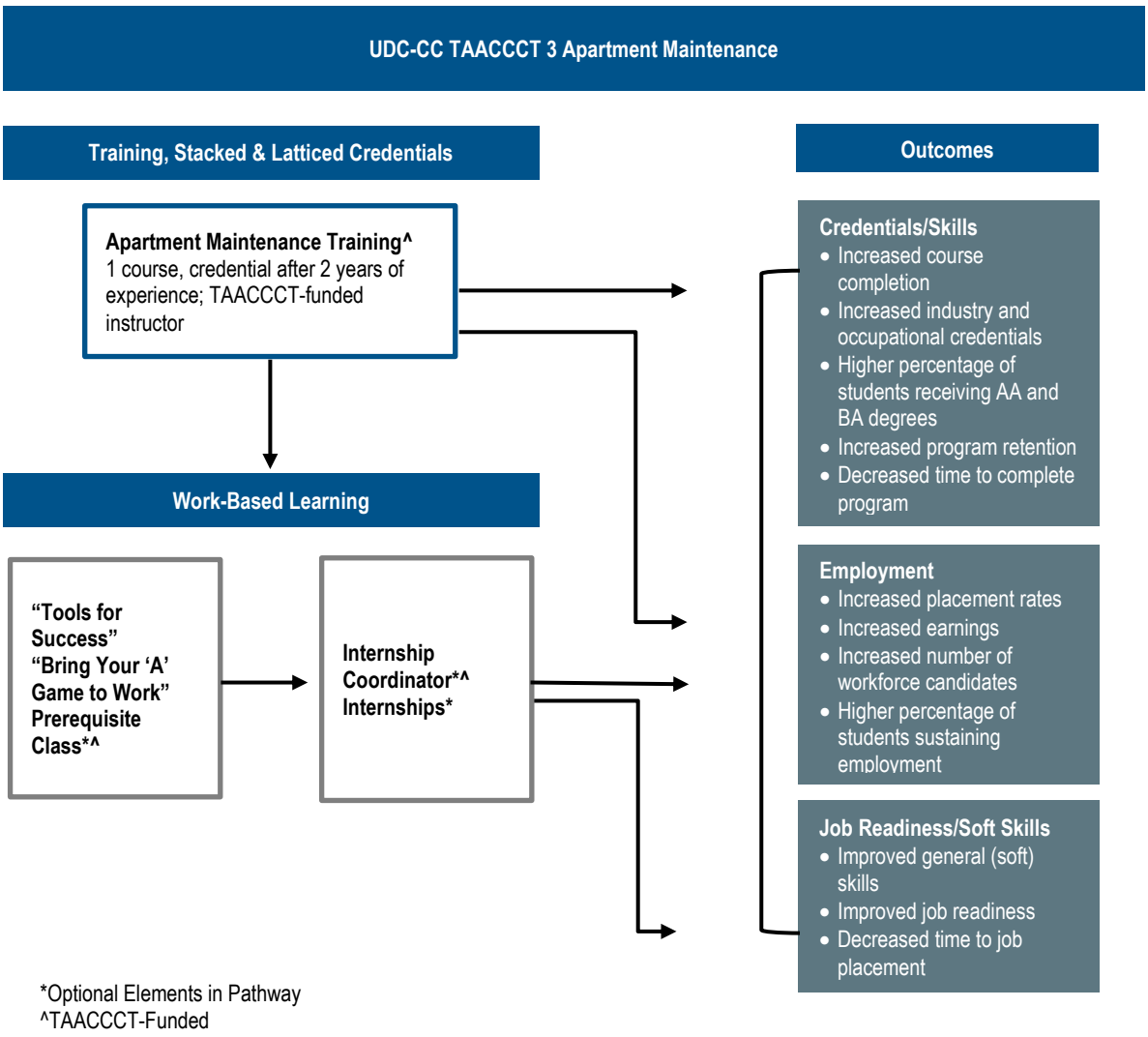


*Optional Elements in Pathway
^TAACCCT-Funded
[1] National Center for Construction Education and Research (NCCER)

1.2 Program Enhancements in DCCA: Apartment Maintenance

The apartment maintenance pathway was folded into the construction academy for better oversight and industry alignment. The curriculum used for this pathway was created and maintained by the National Apartment Association and approved by the American National Standards Institute (ANSI). For the apartment maintenance pathway, TAACCCT funded an instructor for the training and an internship coordinator to help with job placement. Students who enrolled in apartment maintenance also had the opportunity to enroll in work-based learning courses being offered in DCCA (Exhibit 3).

Exhibit 3: UDC-CC TAACCCT 3 Apartment Maintenance Pathway



1.3 Program Enhancements in DCHA: Hospitality Pathway

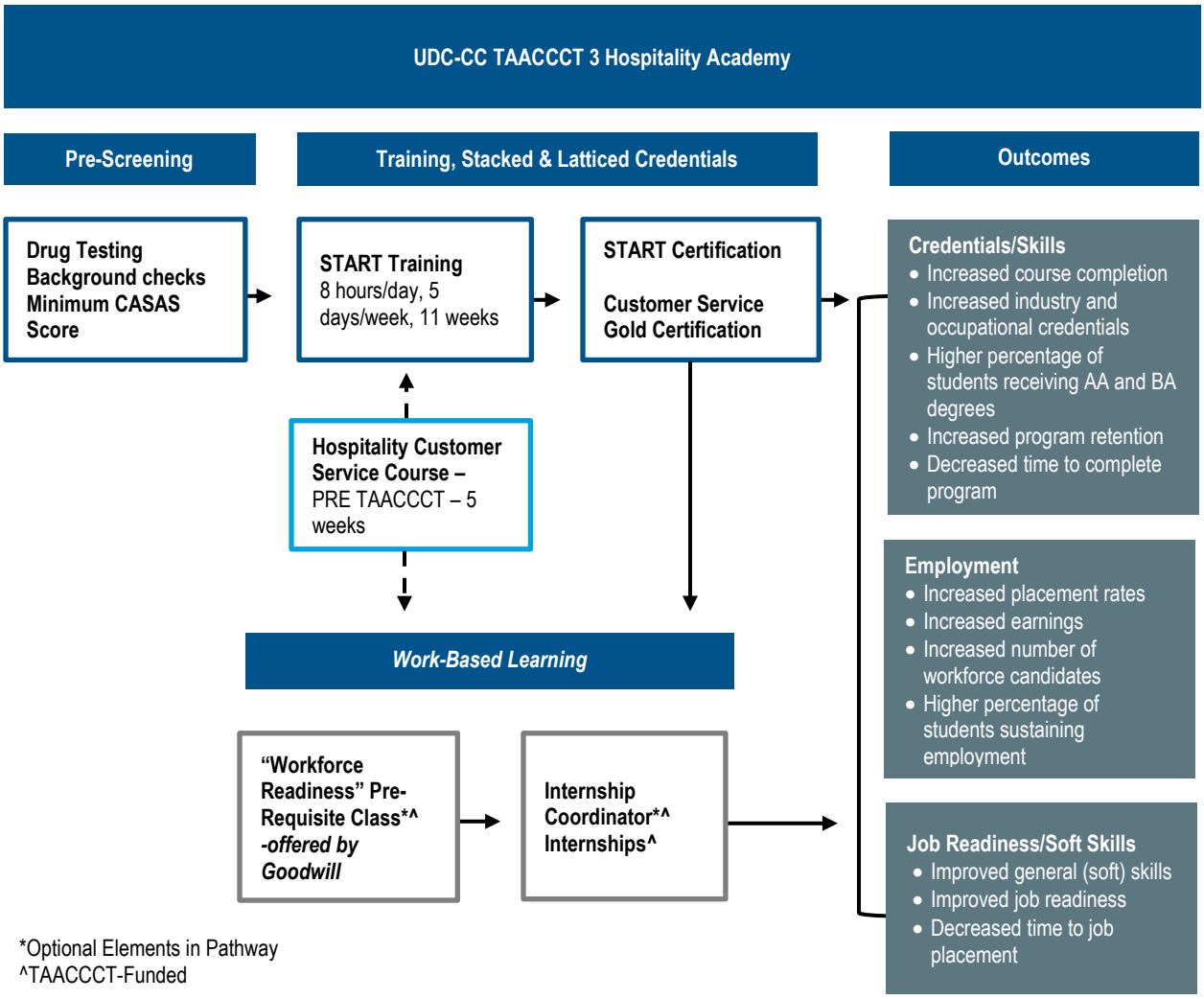
The TAACCCT Round 3 grant-funded interventions came on the heels of the implementation of a WIC program. The WIC framework (longer hospitality course with eight-hour days, five days a week) was completed in summer, 2015 (after six cycles of programming) (Exhibit 4). This longer hospitality course model was developed to make the course more relevant with the demands of the hospitality industry and help students gain and retain their employment. The WIC model also involved a host of interventions, including adult education and social services through Goodwill and other workforce development and employment partners. The course programming included the Skills, Tasks and Results Training (START), the Quick START (for incumbent workers in the hospitality industry), adult basic education component to improve math and reading literacy, digital literacy, customer service (customer service professional), hotel information systems, and job search and success. Students could earn two certificates and would receive assistance in their job search.[12]

[12] See Appendix D for a full list of hospitality certificates offered in WDLL.

TAACCCT funds leveraged the services provided by WIC by:

1. Forming partnerships with Goodwill Industries of Greater Washington and Progressive Partners to create a hospitality training program that mimicked the WIC model. Enhancements to the WIC framework required students to dress and act in a professional manner and adhere to strict attendance requirements of no more than two late arrivals or early departures and no more than two absences.
2. Funding the management and coordination of staff positions, including an internship coordinator. TAACCCT-funded staff conducted informational sessions and presentations, Comprehensive Adult Student Assessment Systems (CASAS) evaluations, and offered assistance with employment, resumes, and job interviewing skills
3. Enhancing the curriculum to make it more relevant to the job market and the needs of the industry by offering the work-based learning course, "Bring Your 'A' Game to Work," to the customer service hospitality students. It was initially offered as a stand-alone course and was not imbedded in the courses.

Exhibit 4: UDC-CC TAACCCT 3 Hospitality Academy Pathway



2. Evaluation Design and Methodology

ICF conducted a mixed-methods evaluation to estimate the effects of enhancements to the construction and hospitality programs provided through DCCA and DCHA. By conducting a mixed-methods evaluation (i.e., comparison cohort, summative evaluation, and implementation analysis) to triangulate rigorous evidence from the quasi-experimental study with the rich experiences of instructors, students, local business partners (involved in the academies), and supplementary administrative data, ICF was able to meet UDC-CC's objective to learn from the study, make adjustments based on interim findings, and use the evaluation as a tool not only to assess effectiveness, but to improve upon it.

The evaluation comprised an implementation study and an outcomes evaluation. The implementation study was designed to collect and synthesize information from interviews, focus groups, class observations, and other qualitative data to provide a narrative description of how the enhancements were implemented, and identify challenges, lessons learned, and best practices. The outcomes study was designed to provide an unbiased estimate of the impact of the UDC-CC TAACCCT-funded enhancements on the employment and wages of training program students.

The approach to the implementation study was the same for both the DCCA and DCHA training program evaluations. Because of differences between the DCCA and DCHA training programs in terms of program size and availability of suitable comparison groups, however, ICF used different approaches to study the effect of the construction, apartment maintenance, and hospitality programs. In the following section, ICF provides a brief overview of the outcomes evaluation approach.

3. Outcome Study

3.1 Construction Outcomes Evaluation Approach

The comparison group for the evaluation consisted of students who enrolled in non-TAACCCT-funded (i.e., original program, no enhancements) construction programs in Summer/Fall 2014 and Spring 2015. The treatment group for DCCA consisted of all students who enrolled in DCCA, starting Summer 2015. ICF drew comparisons between students who completed similar programs of study prior to the enhancements. For example, ICF compared DCCA students with students who completed construction classes at UDC-CC but did not benefit from TAACCCT-funded enhancements (e.g., integrated math and work-based learning). To identify viable comparison students from prior cohorts, ICF combined matched treatment and comparison students on select variables using propensity-score matching. The method involved exact matching on critical demographics and 1-to-1 nearest neighbor match on a logistic-regression based propensity score within a 0.25 caliper restriction.[13] This quasi-experimental study design allowed for a rigorous evaluation while still enabling WDLL to serve as many students as intended.

3.2 Hospitality Outcomes Evaluation Approach

The hospitality program had undergone numerous grant-funded changes; as a result, historical cohorts had been exposed or contaminated to varying degrees by a variety of interventions, and a suitable comparison

[13] Specifically, ICF followed a 1-to-1 nearest neighbor match on a logistic-regression based propensity score within a 0.25 caliper restriction, through a precise algorithm applied through a computer-based macro, called *MatchIt* (Ho, Imai, King, & Stuart, 2007). The default nearest neighbor matching method in *MatchIt* is 'greedy' matching, where the closest control match for each treated unit is chosen one at a time at a random order without replacement.

group was not available for a quasi-experimental impact study. ICF collected self-reported survey data from concurrent cohorts on several outcomes, including employment, for a pre-test/post-test evaluation to measure the impact of the TAACCCT-funded enhancements to the UDC-CC hospitality program. Due to very low response rates to the follow-up survey administered one year after the completion of the training, it was not feasible to estimate the impact of the hospitality training through a pre-test/post-test design.[14] Instead, ICF performed exploratory analyses to examine whether employment prior to participation had an effect on completion and credential rates among TAACCCT students.

3.3 Outcome Research Questions

Exhibit 5 presents research questions that guided the outcome evaluation in assessing the effect of the program and the associations between TAACCCT program implementation and the student outcomes of completion and credential attainment. ICF was not able to assess any of the initial employment related research questions because of the lack of both unemployment insurance (UI) data and follow-up survey data on employment.

Exhibit 5: Outcomes Research Areas & Questions

Persistence
Q1. Does participation in DCCA and DCHA result in increased certification rates occupational skills/ program-related relative to the comparison group? Q2. Does participation in DCCA and DCHA result in increased retention in training programs? Q3. Does participation in DCCA and DCHA result in increased course completion rates? Q4. Does participation in DCCA and DCHA result in increases in number and percent of students who pursue additional education post-program participation relative to the comparison group?
Employment/Career outcomes
Q4. Did employment status at baseline have an effect on credential and completion rates?

3.4 Outcome Evaluation Data Sources

ICF collected data from several sources as part of the outcome evaluation. These data provided the necessary information to generate unbiased estimates of the impact of TAACCCT Round 3 enhancements on student employment outcomes. Exhibit 6 provides an overview of the quantitative data that was collected for both DCCA and DCHA students.

Exhibit 6: UDC-CC TAACCCT Outcome Evaluation Data Collection Sources[15]

Data Source	Description
Administrative Data	UDC-CC administrative data includes enrollment and basic student demographics (age, race, gender). Administrative data consisted of data extracted from the two main data systems used by WDLL – AspirePath and XenDirect. The two formal databases contained demographics, certifications and course enrollment status information on students. ICF also obtained programmatic tracking data from grant staff in which grant staff tracked completions and credential attainment
Baseline Survey*	This survey is conducted at the beginning of the training course. Information includes employment status, years of experience in field of training, formal education, and receipt of public assistance.
Follow Up Survey*	This survey is conducted one year after the end of the training course. The follow-up survey collects updated information about employment status after course completion and receipt of training services.

*See Appendix B for a detailed description of the timing of and data collected from the surveys.

[14] See Appendix C for survey response rates
[15] *See Appendix B for a detailed description of the timing of and data collected from the surveys.

3.5 Outcome Evaluation Limitations

Survey Nonresponse. The online survey that students were asked to complete at both baseline and follow-up were designed to measure the effect of the program, primarily on employment, in the absence of unemployment insurance data. However, the response rate for the baseline and follow-up survey were quite low, thus the inability of the evaluation to estimate the effect of the program on employment outcomes. ICF therefore relied heavily on administrative data to conduct the analyses on completion and credential attainment.

Self-reported/Partial Findings. UI data on study participants was not available prior to the end of the project; therefore, ICF relied on survey data for students' employment status and wages. As noted, the response rate for this survey was quite low. Additionally, these data are self-reported, and ICF has no way to validate the responses.

Comparison group. The comparison group was created by using the demographic variables that were available for the propensity-matching score. However, this score cannot account for other differences between the two groups that were not controlled for.

3.6 Outcome Findings

This section provides a summary of the enrolled students in the three career pathways (construction, apartment maintenance, and hospitality) from Summer/Fall 2014 to Spring 2017, the comparison cohort, and the construction of a viable comparison group for the construction program. It concludes with findings addressing the study's original research questions. The results presented here stem from analyses conducted on two primary UDC-CC administrative data sources—XenDirect and AspirePath. They also draw from the UDC-CC TAACCCT program tracking data. The UDC-CC administrative data contained demographic and other enrollment characteristics (such as semester of enrollment, pursued career pathway) and the UDC-CC TAACCCT program tracking data included grades, reasons for not completing the program, and credentials. Due to the absence of the UI data, the analyses focused primarily on the effect of the TAACCCT-funded enhancements on two outcomes—program completion and credential achievement. ICF calculated chi-square statistics supported by Cohen's d effect sizes to compare the two groups.

3.6.1 Program Participation

A total of 763 unique participants were served by DCCA and DCHA, far exceeding the target of 250 unique participants (Exhibit 7). The number of students achieving DOL Outcome Measures 2, 3, and 5 (completion rate, retention rate, and rate of credential attainment) also exceeded the targets. Due to the lack of UI data and the program's inability to successfully capture current employment data from the district, the employment related measures could not be accurately tracked. Courses offered at WDLL are not credit-bearing; therefore, Measure 4 was not reported on.

Exhibit 7: DCCA and DCHA Performance Measures

DOL Outcome Measure	Target	July 2017	Percentage of Goal Achieved
1. Unique students receiving services under SEELC	250	763	305%
2. Students who have completed a grant-funded program of study	150	430	287%
3. Students retained in grant-funded programs of study	75	333	444%
4. Total number of students completing credit hours	150	Not applicable	-
5. Total number of earned credentials	100	314	314%
6. Total number of students enrolled in further education after completion	50	0	-
7. Students who become employed one quarter after program completion	100	Data not available	-
8. Students who remain employed three quarters after exiting the program	77	Data not available	-
9. Students employed at program enrollment who receive a wage increase	22	Data not available	-

Source: DCCA & DCHA program tracking data, Spring 2017.

To date, among DCCA and DCHA TAACCCT-funded classes from Summer/Fall 2014 to Spring 2017, the largest number of students were enrolled in the Construction CORE classes (68%, n=519). Students enrolled in the Construction CORE class were counted as unique TAACCCT students by UDC-CC. For the Hospitality pathway, however, only students that took a TAACCCT-funded work-based class were counted towards the total unique students served by TAACCCT. According to the administrative data collected from UDC-CC, enrollment among these classes fluctuated over time. Exhibit 8 shows the course enrollment of UDC-CC construction, apartment maintenance, and hospitality classes from the Summer/Fall 2014 to Spring 2017.

Exhibit 8: Overall TAACCCT-funded Course Enrollment Summer/Fall, 2014 to Spring, 2017 Cohorts[16]

Course Pathways	Summer/ Fall 2014	Spring 2015	Summer 2015	Fall 2015	Spring 2016	Summer 2016	Fall 2016	Spring 2017	Total	Percent (%)
Apartment Maintenance	14	20	17	11	10	4	7	5	88	12%
Construction CORE	0	5	104	126	78	88	64	54	519	68%
Hospitality	15	67	61	0	0	0	13	0	156	20%
Total	29	92	182	137	88	92	84	59	763	100%

Source: UDC-CC administrative data (XenDirect and AspirePath), UDC-CC TAACCCT program tracking data.

Student and Comparison Group Demographics

This section provides a detailed description of the characteristics of the TAACCCT students and the comparison cohorts in the study. Apartment maintenance and construction attracted more male students (75%, n=66, and 84%, n=434, respectively) than the hospitality program (26 %, n=41). Students who enrolled in apartment maintenance and hospitability were older (25 years of age and above) than those who enrolled in the construction program (one third were younger than 25). In all three programs a larger number of unmarried students (72% on average, n=551 together) and African Americans (ranged from 73%, n=381, for construction to 83%, n=71, for apartment maintenance) were enrolled.

After examining the UDC-CC administrative data, a viable retrospective comparison group was detected for the construction pathway. The last column of Exhibit 9 displays the demographics of the Summer/Fall 2014 and the Spring 2015 comparison group for construction. The two groups, the current TAACCCT

[16] These figures represent enrollment of students in TAACCCT-funded classes. These figures do not represent the number of students completing the course; course completion and actual enrollment figures may differ slightly from these numbers due to dropouts and course withdrawals.

construction treatment group and the comparison group, differed significantly on two demographic characteristics: marital status and race. The comparison group had more unmarried students (87% versus 73%) in relation to the construction study group and also more comparison group members identified as African-Americans (86.5 vs. 73.4%, ns=230 vs. 381). Further statistical testing was conducted to test if these two groups were in fact different. Using a standard metric, Cohen's d effect size, to test the size of that difference proved that the two groups were not similar in marital status (d=0.55)[17] and racial composition (d=0.51 for African Americans and d=0.62 for other races than Whites). Chi-square statistics also confirmed (p<0.001)[18] these medium-sized effect sizes.

Exhibit 9: Characteristics of UDC TAACCCT Students and Historical Comparison Group[19]

		Course Career Pathway			
		UDC TAACCCT Students			Comparison
		Apartment Maintenance n=88	Hospitality n=156	Construction n=519	Construction n=266
Gender	Missing Info	2%	0%	2%	.4%
	Female	23%	74%	15%	15%
	Male	75%	26%	84%	84%
Age	Missing Info	5%	1%	2%	.4%
	18 to 24	15%	18%	31%	40%
	25 to 34	30%	28%	31%	32%
	35 to 44	23%	17%	20%	15%
	Above 44	28%	37%	16%	12%
	Average Age	37.4	38.2	32.5	30.3
Marital status	Missing Info	7%	15%	14%	4%
	Married	13%	5%	9%	4%
	Single	72%	71%	73%	87%
	Other*	9%	10%	4%	5%
Race	Missing Info	13%	14%	20%	11%
	Black	83%	81%	73%	87%
	White	0%	1%	1%	1%
	Unknown	1%	1%	3%	1%
	Other*	3%	4%	3%	1%
Native English Speaker	Missing Info	2%	0%	2%	.4%
	No	5%	7%	6%	3%
	Yes	93%	93%	92%	96%

Source: UDC-CC administrative data (XenDirect and AspirePath).

Because of these two notable pre-existing differences (marital status and race) between the two construction groups, a propensity-score matching approach was pursued to construct a matched sample of retrospective students and construction students that look alike so ICF could draw causal inferences with

[17] The Cohen's d effect sizes (d=) referenced across the outcome findings section show the magnitude (in absolute values) of the differences between the construction groups of UDC TAACCCT students vs. Summer/Fall 2014 and Spring 2015 attendees on selected characteristics. Effect size range by Cohen's definition: *trivial* (<.20), *small* (.20 to .49), *medium* (.50 to .79), and *large* (>.79). *Trivial* and small effect sizes (d) are not referenced. The Cohen's d effect size calculations were based on the online effect size calculator for binary proportions available at: http://campbellcollaboration.org/escalc/html/EffectSizeCalculator-Home.php

[18] A p value indicates if the observed value of a test statistics (i.e., Chi-Square) is not due merely to chance. For instance, a p value of 0.001 indicates that one out of one thousand tests will be due to chance. Typically, a p value of 0.05 or smaller is preferred.

[19] *The other categories of marital status and race variables combine three categories each. For marital status, the other category combines the separated, divorced, and windowed categories. For race, the other category combines the Asian, American Indian/Alaskan, and "more than one race" categories.

confidence (i.e., make cause and effect statements about the effect of the program). Combining exact matching on marital status, with nearest neighbor 1-to-1 matching,[20] ICF identified 266 TAACCCT construction students that shared similar characteristics as the comparison group. In the matched sample (n=532), both groups had the same number of single individuals due to the exact match (87%, n=231 per group). The groups were very alike on all other characteristics such as African American composition (88%, n=234, and 87%, n=230); average age (of 30.5); gender composition (on average, 84% of the matched sample were male); and on missing data for marital status and race. As Exhibit 10 indicates, effect sizes of differences were trivial or small, Cohen's d<=.25).

Exhibit 10: Characteristics of Matched UDC TAACCCT Students and Historical Comparison Group in Construction[21]

		Construction Career Pathway (matched groups)		
		UDC TAACCCT n=266	Comparison n=266	Effect Size Cohen's d
Gender	Missing Info	.4%	0.4%	0.0
	Female	16%	15%	0.02
	Male	84%	84%	0.02
Age	18 to 24	35%	40%	0.13
	25 to 34	35%	33%	0.07
	35 to 44	18%	15%	0.10
	Above 44	12%	12%	0.00
	Average Age	30.9	30.3	0.1
	Missing Info	4 %	4%	0.0
Marital status	Married	6%	4%	0.2
	Single	87%	87%	0.0
	Other*	3%	5%	0.23
	Missing or Unknown	10%	11%	0.1
Race	Black	88%	87%	0.08
	White	1%	1%	0.25
	Other	2%	1%	0.18
	Missing Info	.4%	.4%	0.0
	No	3%	3%	0.0
Native English Speaker	Yes	96%	96%	0.0
	Missing Info	4%	.4%	0.0
	Female	16%	15%	0.02

Source: UDC-CC administrative data (XenDirect and AspirePath).

[20] Specifically, ICF followed a 1-to-1 nearest neighbor match on a logistic-regression based propensity score within a 0.25 caliper restriction through a precise algorithm applied through a computer-based macro, called *MatchIt* (Ho, Imai, King, & Stuart, 2007). The default nearest neighbor matching method in *MatchIt* is 'greedy' matching, where the closest control match for each treated unit is chosen one at a time at a random order without replacement.

[21] *The other categories of marital status and race variables combine three categories each. For marital status the other category combines the separated, divorced, and windowed categories. For race, the other category combines the Asian, American Indian/Alaskan, and "more than one race" categories. The Cohen's d effect sizes (d=) show the magnitude (in absolute values) of the differences between the construction groups of UDC TAACCCT students vs. Summer/Fall 2014 and Spring 2015 attendees on selected characteristics. Effect size range by Cohen's definition: *trivial* (<.20), *small* (.20 to .49), *medium* (.50 to .79), and *large* (>.79). The Cohen's d effect size calculations were based on the online effect size calculator for binary proportions available at: http://campbellcollaboration.org/escalc/html/EffectSizeCalculator-Home.php

3.6.2 Program Completion

Both DCCA and DCHA struggled with retaining students throughout the program, and this issue was prevalent throughout WDLL. The programs of study offered by WDLL targeted adults who had to juggle multiple priorities, including work and family. In fiscal year (FY) 2014 and FY 2015, the overall completion rates for all WDLL students enrolled were 73% and 68%, respectively.[22] Within DCCA and DCHA, grant staff tried to mitigate this systematic challenge by instituting a strict attendance policy for students. For example, in DCHA's WIC courses, students had to adhere to strict attendance requirements of no more than two late arrivals or early departures and no more than two absences. Student who completed were encouraged to also attain a credential that, in the long-term, would move them closer to employability. This section examines completion rates across the three pathways and among the construction study groups to assess the association between TAACCCT-funded courses and completion.

Program Completion

There were no significance differences in completion rates between the matched construction groups. Exhibit 11 displays the program completion rates for TAACCCT students in the three course career pathways and the identified historical comparison group. The original sample (n=519) of construction TAACCCT students had a higher completion rate (66%, n=340) than the students enrolled in the apartment maintenance and hospitality courses. The historical group of construction students also reported a higher completion rate (64%, n=170) than students in the other two pathways.

Exhibit 11: Program Completion Rates of TAACCCT Students and Historical Comparison Group

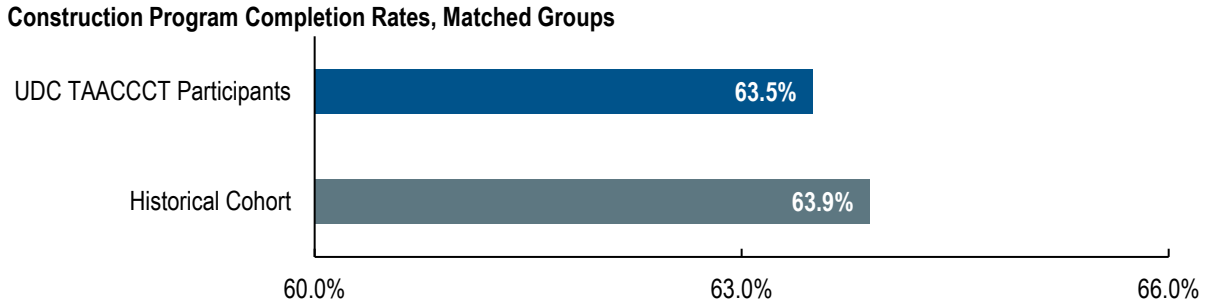
	Course Career Pathway			
	UDC TAACCCT Students			Comparison
Program Completion	Apartment Maintenance	Hospitality	Construction	Construction
	n=88	n=156	n=519	n=266
Completed	55.7%	48.7%	65.5%	63.9%
Incomplete	44.3%	51.3%	34.5%	36.1%

Source: UDC-CC administrative data (XenDirect and AspirePath).

Studying the effect of the UDC program to the matched TAACCCT students in the construction program, ICF found there were no differences in completion rates between the matched TAACCCT construction treatment students and the historical comparison group as Exhibit 12 shows (chi-square, p value=0.928).

[22] WDLL data and reporting, retrieved from https://www.udc.edu/docs/cc/wd/UDC-CC%20WDLL%20Demographics%20%20Fall%202014%20Semester%20(FY2015).pdf. *Workforce Development and Lifelong Learning: Unduplicated Counts Students Enrolled Fall 2014 (FY2015)*. UDC-CC. Retrieved from: https://www.udc.edu/docs/cc/wd/UDC-CC%20WDLL%20Demographics%20%20Fall%202014%20Semester%20(FY2015).pdf

Exhibit 12: Program Completion Rates of Matched TAACCCT Students and Historical Comparison Group in Construction



UDC-CC administrative data (XenDirect and AspirePath) and program report records.

Credential Attainment

DCCA and DCHA enhanced their programs of study to train low-skill individuals and upskill incumbent workers to make them more employable. These workforce development training programs sought to support students in their pursuit of stackable industry recognized certificates/credentials that were in high demand in the construction and hospitality industries. Offering stackable credentials encouraged low-skilled workers to advance to higher levels of education and to better paying jobs along a career pathway. DCCA and DCHA offered multiple industry-recognized credentials, allowing students to improve their occupation-specific mastery along their chosen pathway (Exhibit 13).

Exhibit 13: List of Credentials by TAACCCT Program Pathway

Program Pathway	Industry Recognized Credentials	
Apartment Maintenance	• Certificate for Apartment Maintenance (CAMT) • OSHA 10 General Industry • First Aid CPR/AED • NCCER Core Certificate	• Bring Your 'A' Game to Work • OSHA 10 Construction • National Apartment Leasing Professional
Construction CORE/ BIM	• NCCER Core Certificate • Bring Your 'A' Game to Work • Tools for Success • OSHA 10 Construction	• First Aid CPR/AED • Flagger Certification • Scaffold User • AutoDesk Revit User
Hospitality	• Guest Service Gold • START • Quick START	

This section compares the credential attainment rates achieved by construction treatment students and the historical comparison group of Construction students. Using UDC-CC administrative and program report data, ICF counted the credentials obtained from different training courses that were relevant to the three career pathways in two groups: 1) credentials TAACCCT students attained in their chosen pathway (referred as in-career pathway credentials), 2) the credentials attained outside one's career pathway (referred as out-of-career pathway).

TAACCCT had a positive effect on credential attainment for unmatched groups. Among the TAACCCT students, as Exhibit 14 shows, construction (51%, n=229) and hospitality (44%, n=80) programs had the largest number of in-career credential certification recipients (vs. 11%, n=10, for apartment maintenance students). The credential data for the historical comparison group that was extracted from the UDC-CC administrative database indicated that among the Summer/Fall 2014 and Spring 2015 construction students, there were 22% (n=59) who received a relevant credential certification compared to 51% (n=264) for the TAACCCT students. This difference in-career credential achievement rates observed

between the original unmatched groups of construction UDC TAACCCT students and the historical group has a medium-sized effect size (Cohen's d=0.62) but because the unmatched groups differ demographically ICF cannot attribute this effect solely to the program.

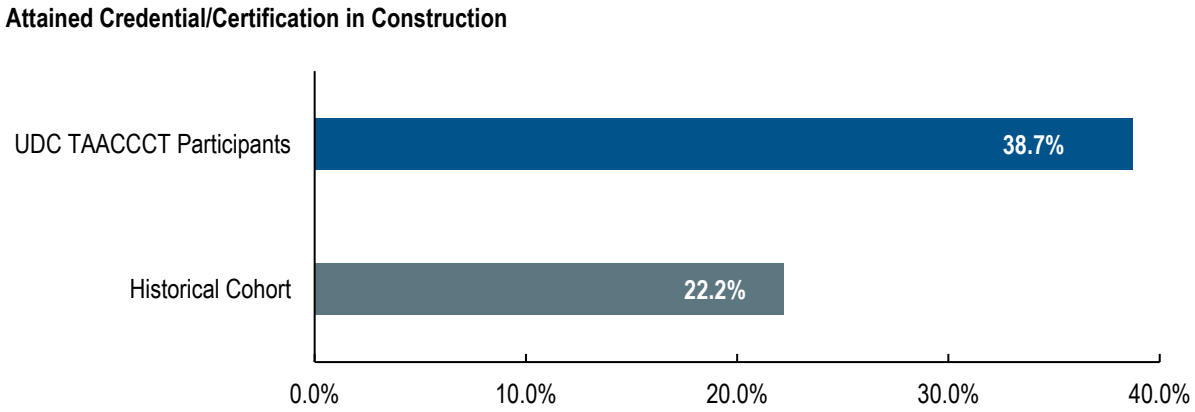
Exhibit 14: Credential Achievement Rates of TAACCCT Students and Historical Comparison Group[23]

	Course Career Pathway			
	UDC TAACCCT Students			Comparison Group
Credential Achievement	Apartment Maintenance n=88	Hospitality n=156	Construction n=519	Construction n=266
No Credential Achievement	77.3%	53.4%	48.1%	71.8%
Credentials (Out-of-Career Pathway)	11.4%	2.5%	.6%	6.0%
Credentials (In-Career Pathway)	11.4%	44.1%	51.3%	22.2%

Source: UDC-CC administrative data (XenDirect and AspirePath) and program tracking data.

TAACCCT had a positive effect on credential attainment for matched groups. Analyses with the matched groups construction treatment and comparison groups confirmed that there is indeed a significant positive effect of the program on credential attainment (chi-square, p<.0001, d=0.48) (See Exhibit 15). Although the findings are significant and are of medium effect size, they should be interpreted with some caution because more complete credential data were tracked and collected for TAACCCT students than the comparison group, which could account for part of the difference.

Exhibit 15: In-Career Pathway Construction Credential Rates of Matched TAACCCT Construction Treatment Students and Historical Comparison Group[24]



Source: UDC-CC administrative data (XenDirect and AspirePath) and program report records.

3.6.3 Effect of Prior Employment on Completion and Credential Attainment

As noted, it was not possible to perform employment outcome comparison analyses using a retrospective group as comparison for a number of reasons. First, ICF was not able to obtain UI wage records for both treatment and comparison groups. Second, data on employment outcomes were self-reported via a survey

[23] The credential information for program students was closely monitored during the lifespan of the program; therefore, those data are more complete compared to the historical cohort.

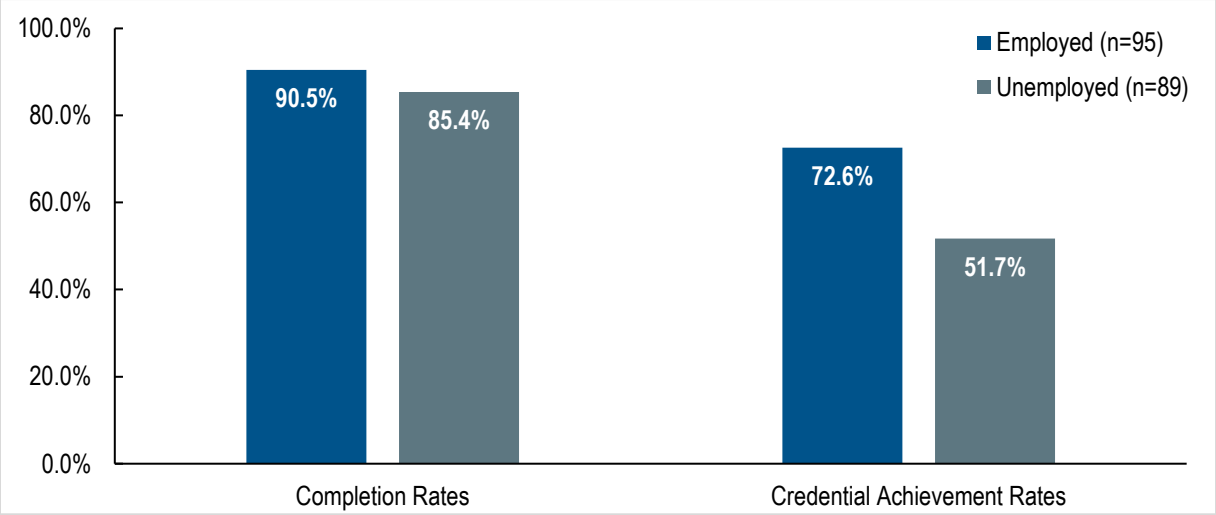
[24] (d=0.48) The Cohen's d effect sizes (d=) show the magnitude (in absolute value) of the difference between the construction groups of UDC TAACCCT students vs. Summer/Fall 2014 and Spring 2015 attendees on credential certification rates. Effect size range by Cohen's definition: trivial (<.20), small (.20 to .49), medium (.50 to .79), and large (>.79). The Cohen's d effect size calculations were based on the online effect size calculator for binary proportions available at: http://campbellcollaboration.org/escalc/html/EffectSizeCalculator-Home.php

that was only available to the students who enrolled in TAACCCT-funded courses. On the other hand, for the studied students in all three career pathways, employment data were collected before and after the implementation of the program, with a larger number of students taking the baseline survey (n=210) than the follow-up (n=28). In this section, ICF discusses whether employment prior to participation had an effect on completion and credential rates among TAACCCT students whose baseline survey data were linked to the UDC-CC administrative data and program report record (n=184). This analysis was conducted because DCCA and DCHA were supposed to positively impact both incumbent and non-incumbent workers. Supporting working adults to complete their course work and attain a credential would give them an opportunity for more quality employment. The general hypothesis, however, was that those students who were employed would find it difficult to complete or gain credentials because of competing work priorities.

Previous employment positively associated with credential attainment but with completion rates. As Exhibit 16 shows, almost three in four (73%, n=69) surveyed TAACCCT students who were employed before the training achieved a credential. Among TAACCCT students who indicated they were unemployed prior to the training, half (52%, n=49) gained a credential. The analyses indicated that the odds of receiving a credential certification in construction was 2.5 times higher for employed construction TAACCCT students than unemployed students, indicating that one's employment status prior to training was a good predictor of attaining a certification (chi-square, p=0.003).

One the other hand, employment status was not related to program completion (chi-square, p=0.283). Specifically, 91% (n=86) of employed and 85% (n=76) of unemployed participants completed the program

Exhibit 16: Completion and Credential Achievement Rates by Employment Status Prior to Training of TAACCCT students



Source: UDC-CC administrative data (XenDirect and AspirePath); student baseline survey and program tracking data.

3.6.4 Outcome Study Summary

In terms of program participation both the DCCA and DCHA programs exceeded the target numbers for DOL Outcome Measures related to program enrollment, completion, and retention, as well as the number of earned credentials. Looking at DCCA, the difference in completion rates between the treatment students and the matched historical comparison group was not significant. The proportion of treatment (38.7%) versus comparison (22.2%) students that obtained a credential in the DCCA program was statistically significant. Previous employment was positively associated with credential attainment but not completion rates.

4. Implementation Study

The implementation study documents program development, modifications, and improvements to courses within DCCA and DCHA. ICF gathered qualitative data from multiple sources to track the implementation of DCCA and DCHA programs including a conference call with grant staff, review of program documentation, observations of industry council meetings, site visits observations, interviews with grant staff, and student focus groups. Exhibit 17 provides a summary of implementation data reviewed in response to the research questions presented in Exhibit 18. ICF triangulated data from the various sources to develop the findings described in this section. This section lists the research questions that guided the implementation evaluation, discusses limitations to the study, and presents the findings of the evaluation. The findings are discussed according to the research questions and activities outlined in the logic model presented in Appendix A: program recruitment and participation; program enhancements and industry and employer engagement. The last section examines implementation fidelity and presents an overview of program activities *vis-à-vis* the planned activities of DCCA and DCHA.

Exhibit 17: Implementation Study Data Sources

Data Source	Description
Data Collection Calls	Conference calls with UDC-CC grant staff and leadership to share program implementation updates, challenges, lessons learned, and deviations/adaptations to the planned implementation.
Documents and Artifacts	Program documents including progress reports, course syllabi, and other training materials.
Industry Council Observations	Attendance and observation of industry council meetings between UDC-CC and construction employers during their initial development.
Staff Interviews	UDC-CC DCCA and DCHA program leadership and instructors' individual interviews.
Student Focus Groups	Focus groups with program participants, providing information about their experiences in the program, including challenges, successes, and lessons learned.

4.1 Implementation Research Questions

Exhibit 18 presents research questions that guided the implementation evaluation.

Exhibit 18: Implementation Study Research Questions

Program Design, Enrollment, and Intake
Q1. How was the curriculum selected, used, and/or created? Q2. What are the processes for recruitment, screening, and intake? Have these processes changed overtime? What assessment tools and processes were used, and how were the assessment results used?
Student Characteristics
Q3. What are the initial target populations and what are the criteria for participation?
Program Implementation
Q4. How were grant funds used to develop an expanded curriculum as described in the proposal? Q5. What is the envisioned pathway for each targeted occupation? What type of credentials will students receive upon completion? Q6. Did the program promote transferability and articulation? Q7. To what extent (and how) did the program use grant funds to hire required staff and personnel as described in the proposal? Q8. What were the successes and challenges in service coordination? Q9. Were participating employers satisfied with the quality of the training students received? Q10. Was the choice of targeted occupations appropriate given the skill levels of program graduates and local labor market demand?

Q11. What additional resources, not anticipated in the program design and budget, were necessary to run the program?
Partner Engagement
Q12. What partners were involved in the development of the pathways? What were the key vehicles for coordination? Q13. Did DCCA/DCHA use grant funds to develop or expand partnerships and collaborations as described in the proposal? Q14. What, if any, were the challenges in engaging employers and industry? Q15. What challenges or successes were a result of partner contributions?
Sustainability
Q16. When did planning for grant sustainability begin? Did sustainability planning result in any changes to the program?
Fidelity of Implementation
Q17. Was the program implemented as intended? Q18. What exogenous factors hindered fidelity of the intervention?

4.2 Limitations of the Implementation Study

Limited data sources. ICF gathered as much data as possible from the sources listed above in Exhibit 17. Program perceptions often came from a few grant staff, however, as grant staff turned over or there were delays in hiring. The program director and usually one support staff provided the majority of implementation data on program development, modifications and progress made.

Partial Findings. The limited data sources meant that information gathered from the available sources could be partial and biased. Although ICF interviewed multiple stakeholders to provide varying perspectives on program implementation, partiality could still be a factor when interpreting findings.

Inconsistent Program Messaging. Due to the changing staff structure and turnover, program staff were not always knowledgeable about the vision or planning for the program. Interview data had to be consolidated and reassessed, therefore, based on program's staff knowledge (or lack of) of the program. ICF also triangulated other qualitative data to come to a consensus when there were conflicting programmatic observations.

4.3 Implementation Findings

The implementation documented the TAACCCT-funded program implementation from May 2014 to August 2017.[25] The findings in this section summarize the implementation processes, discusses modification, success and challenges, and other internal or external factors that affected program implementation.

4.3.1 Recruitment

RQ2. What are the processes for recruitment, screening, and intake? Have these processes changed overtime? What assessment tools and processes were used, and how were the assessment results used?

Grant staff shared the responsibilities of recruitment, screening, and intake into the program after overcoming initial challenges as the grant did not fund a specified recruitment and intake position. The intake process did not differ from the UDC-CC's general intake process. Grant staff prepared outreach materials and hosted information sessions to recruit students. They would advise eligible incoming workers and prospective students about the steps they need to take to increase their core skills and administer an intake assessment, the Comprehensive Adult Student Assessment Systems (CASAS). Grant staff report that they had challenges conducting the intake process initially; however, over the grant period were able to refine their processes to divide tasks among themselves, as they did not have a dedicated recruitment and

[25] DCCA and DCHA grant implementation took place up to March 30, 2017. April 1, 2017 through September 30, 2017 was additional time for exit interviews with program staff and evaluation analysis and reporting.

intake position funded under the grant. Over the course of the program, the division of labor of who conducted intake evolved and, by the end of the program, grant staff report a balanced share across all staff to conduct intake in coordination with UDC. They used the CASAS assessment during intake to assess applicants' abilities before placing them into the program. Due to UDC-CC's admittance policies, where everyone is accepted into the college, CASAS assessments were not used to reduce the applicant pool. The recruitment efforts of grant staff paid off as DCCA and DCHA exceeded their unique students served and offered training to 763 students.

> "It seems that since this is a workforce development program that the program would take into consideration your previous experience, but in this case they don't."
> – *Student focus group 2016*

Recruitment efforts were bolstered by partnerships with the industry council members; however, refining placement processes could provide a more streamlined student experience. Through ICF's document review and interviews with project staff, it is evident that the industry council assisted grant staff in recruiting students to the program. Thus, this allowed UDC-CC to meet its goal of recruiting incumbent workers and new students to the program. Otherwise, grant staff reported in 2016 that they did not promote the program and felt that the targeted communities were not aware of UDC's offerings. In commenting on the intake and placement processes, some students reported they felt that they were taking unnecessary introductory courses, as they already had construction work experience.

Recruitment Successes & Challenges

Program partners through the industry council were helpful in recruiting students—particularly, incumbent workers—to the program. The recruitment process had some challenges, as students reported concerns about being placed in courses that covered content they already knew and suggested that the intake process should account for student work experience. Outlining a staff role for recruitment and intake activities for future grants would help with integration into the program.

4.3.2 Program Enhancements

RQ4. How were grant funds used to develop an expanded curriculum as described in the proposal?

RQ5. What is the envisioned pathway for each targeted occupation? What type of credentials will students receive upon completion?

RQ6. Did the program promote transferability and articulation?

RQ7. To what extent (and how) did the program use grant funds to hire required staff and personnel as described in the proposal?

As noted, TAACCCT funds were leveraged to redesign the construction, apartment maintenance, and hospitality curricula offered to students. All three curricula were enhanced by offering work-based learning, internship coordinators, and a workforce readiness class. Exhibit 19 summarizes program enhancements made and their status as of Spring 2017. The construction curriculum was enhanced by integrating math, OSHA 30 construction, and CPR/First Aid/AED training into the curriculum, while the hospitality curriculum was augmented with additional social support services offered through Goodwill of Greater Washington.

Exhibit 19: Program Enhancements Status

	DCCA	DCHA
Competency Models	▪ Commercial and industrial construction ▪ Heavy highway civil construction ▪ Residential construction competency	▪ Hospitality/hotel and lodging competency model

	DCCA	DCHA
Curriculum Content Modification	▪ Integrated math into the curriculum ▪ Covered a broad set of safety skills using tools, employability and communication skills, materials handling, hand tools theory, HVAC, and plumbing. ▪ Added online course, "Building Information Modeling (BIM)" ▪ Purchased equipment to create BIM lab	▪ Incorporated work-based learning as an optional course from DCCA
National Standards Alignment	▪ Offered National Center for Construction Education & Research (NCCER) courses and certificates ▪ Offered Occupational Safety and Health Administration (OSHA) ▪ Offered Cardiopulmonary Resuscitation (CPR) ▪ Offered National Apartment Leasing Professional (NALP) courses and certificates ▪ Offered National Apartment Association (NAA) ▪ Offered Electrical Construction Services group (ESCO) courses and certificates	▪ Offered American Hotel & Lodging Educational Institute (AHLEI) courses and certificates ▪ Leveraged the Workforce Investment Council (WIC) grant model
Work-based Learning	▪ Integrated components from Tools for Success model and Bring Your 'A' Game to Work into Construction CORE classes	▪ Integrated components from Bring Your 'A' Game to Work into classes
Funded positions for staff support	▪ Funded instructors ▪ Funded internship coordinator	▪ Funded internship coordinator

Grant writers for the UDC 3 grant proposal identified a goal for creating credit articulation agreements, which is a formal agreement or partnership between two or more colleges, documenting the transfer policies for a specific academic program or degree. UDC had several articulation agreements in place with a number of local higher education institutions prior to the grant and planned to use TAACCCT 3 funds to finalize agreements with University of Maryland University College, George Mason University, and Penn State Harrisburg. They also planned to pursue agreements with additional local institutions: George Washington University and the University of Maryland. Grant staff worked on creating these agreements; however, due to leadership changes within UDC and WDLL, they were unable to finalize them.

Construction Enhancements

Curriculum & National Standards

RQ4. How were grant funds used to develop an expanded curriculum as described in the proposal?

RQ5. What is the envisioned pathway for each targeted occupation? What type of credentials will students receive upon completion?

Grant staff successfully modified the curriculum and aligned it to national standards set forth by third-party associations. The construction courses were aligned to the standards set forth by NCCER. After completing the Construction CORE class, students in DCCA could enroll in additional classes along the construction pathway to train for skills in carpentry, electrical, plumbing, and HVAC[26]. Students also had the opportunity to earn a variety of certifications that aligned to a range of accreditation associations,

[26] See program pathways in Exhibit 2, 3 and 4.

including NCCER, National Apartment Leasing Professional (NALP), and Heating, Electrical, and Air Conditioning Technology (H.E.A.T) certifications.

In response to feedback from the industry council and WIB, courses were offered that were aligned to CPR from the American Heart Association and OSHA. Similarly, courses that aligned to certifications of the Electrical Construction Services group (ESCO) were embedded into the electrical classes. The BIM course was also offered as a semester-long course to provide students with digital modeling skills for construction. The course was developed in consultation with the UDC architectural department, which offers a similar course. It was launched for the first time in Fall 2016 and is a hybrid course with online components. By May 2017, grant staff report that they have integrated simulation components in the Construction CORE courses, OSHA 10, and BIM.

> "Learning is lifelong – just sit back and there may be something new that you learn. Students come back and say they're glad they had it. Overall, it's been positive."
>
> *– Grant staff interview 2017*

The integrated math component of the intervention was challenging to implement; however, it has proven to be a critical piece to student learning. Based on staff interviews and focus groups with the students, it seems the construction math core class is a critical component because some local employers, such as Potomac Electric Power Company (PEPCO), require a math test for job placement. There are some instances where students believe they need additional assistance such as tutoring to improve their math skills and were not fully aware the tutoring resources UDC-CC provides. Grant staff have also reported that employers have shared that they believe the integrated math skills are a necessity in their industry. Students reported in the 2016 focus group that they wanted math tutoring services; others reported that they had been offered tutoring. These findings suggest streamlining communication around the services offered could help students navigate the resources available.

Purchasing equipment to facilitate the curriculum was another critical subcomponent of the program enhancements proposed that was achieved by the end of the last year of the grant period. Over the course of the grant, staff experienced delays in securing a space and purchasing computers for the BIM course. By the beginning of 2017, staff report being able to obtain equipment and classroom space for this course. For the other construction courses, staff reported that there were some minor challenges with finding space for classes and some challenges with securely keeping the equipment they purchased for the classes.

The apartment maintenance program of this pathway was implemented successfully and included an online component that allowed the grant staff to implement hybridization. However, over the course of implementing the course, grant staff reported that students struggled with computer literacy, which limited their ability to engage with the content.

Work-based Learning

RQ9. Were participating employers satisfied with the quality of the training students received?

RQ10. Was the choice of targeted occupations appropriate given the skill levels of program graduates and local labor market demand?

Similar to the integrated math components, work-based learning was identified as a key component to the model, and employer partners on the industry council were responsive to the curricula grant staff integrated into the program. By the end of the program, the "Bring Your 'A' Game to Work" curriculum was integrated into the curriculum starting in 2016. It replaced the "Tools of Success" curriculum, which was initially written into the grant and offered as a stand-alone course in the spring of

2015. In 2015, staff reported some challenges with the timing of the "Tools of Success" curriculum in the overall course; they also saw low enrollment in that class. By the summer of 2015 "Tools for Success" had been embedded into the Construction CORE class; however, given that this offering did not provide students with a certificate and was focused only on construction, grant staff decided to identify another program that could be broadly applicable to both construction and hospitality and could lead to a certificate. In 2015, they identified "Bring Your 'A' Game To Work," which offers the opportunity to earn a certificate through the Center for Workplace Ethics.

Staff reported that they found greater success integrating the curriculum towards the end of the course, as students were initially resistant to the class as a stand-alone near the beginning of the course. They were better able to see the benefits of the course when they received it towards the end when they were going to start job hunting and attending job fairs. Additionally, grant staff reported that employer partners encouraged them to keep this component of the curriculum, as they believe the occupational skills (e.g., workplace communication) are key and not something they can teach on the job.

Staffing

> RQ7. To what extent (and how) did the program use grant funds to hire required staff and personnel as described in the proposal?

Hiring qualified staff in a timely manner proved to be a challenge for the construction program. In quarterly reports to DOL, grant staff reported that they experienced challenges with hiring staff due to delays with UDC human resources processes. The program initially started with the project manager (only for six months) and two project coordinators (one for each academy). DCCA project coordinators had several responsibilities, including curriculum management, instructor coordination, instructor management (ensuring that instructors show up on time and conduct their class in an appropriate way), industry consulting, and compliance assurance with nationally recognized certification programs. The DCCA project coordinator worked hand-in-hand with the program manager to initiate the DCCA program, start the process of integrating math into the core construction curriculum, and introduce the work-based learning assessment (Tools for Success) to instructors and students.

> "I like the way the teacher taught the class – he made us understand the material."
> – *Student survey response*

While there was turnover in the role of project coordinator, there was still continuity in integrating the math and work-based learning components into the curriculum. Instruction was also consistent over the course of the program. Students reported in the follow-up survey that they greatly appreciated the expertise and experience of the instructors in the construction program. Additionally, the project director, who was experienced and knowledgeable about the construction sector, was with the program almost from the beginning to the end.

Hospitality Enhancements

Curriculum & National Standards

> RQ4. How were grant funds used to develop an expanded curriculum as described in the proposal?
>
> RQ5. What is the envisioned pathway for each targeted occupation? What type of credentials will students receive upon completion?

The hospitality pathway leveraged lessons learned from a previous implementation and aligned curriculum with the American Hotel & Lodging Educational Institute (AHLEI) standards. The TAACCCT Round 3 grant-funded interventions came on the heels of the implementation of a WIC program model. The WIC model (longer hospitality course with eight-hour days, five days a week) was completed in Summer 2015 (please see the program pathway in Exhibit 4). This longer hospitality course model was

developed to make the course more relevant to the demands of the hospitality industry and help students gain and retain their employment. The WIC model also involved a host of interventions, including adult education and social services through Goodwill and other workforce development and employment partners. The program manager also considered adding the Training for Intervention Procedures (TIPS®) Training for anyone who would be serving alcohol.

Work-based Learning

> RQ9. Were participating employers satisfied with the quality of the training students received?
>
> RQ10. Was the choice of targeted occupations appropriate given the skill levels of program graduates and local labor market demand?

Identifying an appropriate work-based learning curriculum took more time than expected; however, the integration of Bring Your 'A' Game to Work proved to be successful. Early in the implementation of the program, grant staff discovered that the work-based learning class they had planned to use for hospitality students was actually a work-readiness class that prepared students to enroll in the UDC-CC WDLL education system instead of training students for workplace opportunities. Grant staff therefore had to look for a work-based learning course much like the "Tools for Success" class in construction.

"Bring Your 'A' Game to Work" was recommended to the project team when they visited with academic departments at Red Rock Community College, Colorado. This course is not trade-specific, like the construction-focused "Tools for Success" class that had been used in the construction academy, and is not expensive. "Bring Your 'A' Game to Work" was piloted in Summer 2016, in two courses: 1) Customer Service Retail and 2) Customer Service Hospitality. The 16-hour course was offered as an add-on to the end of the classes, as an optional course for students. At the end of the class, students receive a certificate that is recognized by some industries.

Staffing Structure

> RQ7. To what extent (and how) did the program use grant funds to hire required staff and personnel as described in the proposal?

Similar to the challenges with staffing for DCCA, DCHA struggled with staff turnover, which affected program implementation. The DCHA program lost the program coordinator initially hired for the grant, thus leaving an internship and retention coordinator and an office clerk, the latter of which also supported the construction pathway. The coordinator position was later filled in 2016 and the new coordinator worked with existing hospitality program pathway staff to figure out ways to incorporate work-based learning into the apartment maintenance programs. The coordinator was successful in creating relationships with employers to provide students with opportunities to shadow local real estate apartment management companies. In quarterly reports to DOL, grant staff reported that they experienced challenges with hiring staff due to delays with UDC human resources processes.

Enhancements Successes & Challenges

> RQ8. What were the successes and challenges in service coordination?
>
> RQ11. What additional resources, not anticipated in the program design and budget, were necessary to run the program?

There were a mix of challenges and successes with the implementation of the program enhancements for both the construction and hospitality programs. Overall, students reported having a more positive experience with the construction program in the follow-up survey than with the hospitality program. Specific challenges and successes are discussed in this section.

Successes

> "I think the apartment maintenance training class was an excellent class, it covered a lot of topics that would surely help in the AM field."
>
> *- Student survey response*

Staff felt they were already seeing the positive effects of the integrated math curriculum in student scores on coursework modules. Furthermore, incorporating work-based learning was a direct response to industry need for training in soft skills and therefore will result in more employable and trainable graduates. Finally, the addition of the BIM class offered students yet another opportunity to gain in-demand skills to be more competitive in the job market.

Challenges

The grant's involvement with the DCHA program has been limited due to overlapping grant interventions prior to (WIC) and after the start of the grant (TAACCCT Round 4); therefore, it will be difficult to decipher the effect the grant has on DCHA program students without confounding factors from these other grants.

Most of the DCCA students are non-traditional students; they are working adults who often seek gainful employment to make money for their rent and families. Many students are committed, but the program suffered from low retention, especially for lengthier classes. Students had to adhere to the strict attendance policies of WDLL and that helped keep motivated students focused on completion.

The construction industry is unique in many ways, and many students did not understand relevant workplace expectations, such as having reliable transportation to job sites, the early morning hours, and working outside in the elements. Clearer expectations from the beginning could help direct students to career paths that are a better fit for their circumstances.

Grant staff reported experiencing delays with UDC-CC approval processes, which hindered the development of agreements with other educational institutions for credit articulation agreements; staff hiring processes; the purchase of equipment for simulation trainings; and access to online components such as Blackboard to hybridize courses, particularly in DCCA.

4.3.3 Employer Engagement

RQ12. What partners were involved in the development of the pathways? What were the key vehicles for coordination?

RQ13. Did DCCA/DCHA use grant funds to develop or expand partnerships and collaborations as described in the proposal?

RQ14. What, if any, were the challenges in engaging employers and industry?

RQ15. What challenges or successes were a result of partner contributions?

DCCA engaged employers to develop program pathways and primarily connected with them through UDC industry council, which was set to fulfill the following key goals:

- Close the gap between students and the industry professionals by ensuring that the training provides skills and credentials that match industry needs and expectations.
- Acquire more support from industry to mentor students, talk to classes, and provide different employment opportunities.
- Gather details from members of the council about the industry, different backgrounds and disciplines, and specifics about what to teach.
- Provide mentorship and offer advice on how to navigate students from the program to employment.

The industry council fulfilled these goals and more during quarterly meetings, at which industry representatives provided specific advice on what the industry needs from the students and how to improve skills for students. The program informally partnered with the DC WIB and other local employers.

The project director built informal partnerships with the DC WIB and other local organizations with similar interests to develop a joint effort towards engaging employers for their trainees. Grant staff also held career fairs and class presentations to engage employers. Increasing opportunites that allowed face-to-face interactions between students and employers provided students a realistic view on what skills construction and hospitality industry jobs require, and gave them an opportunity to ask questions. It also gave employers a chance to interact with potential employees and served to build relationships and informal partnerships with local employers. DCCA was able to secure class presentations from the Independent Electrical Contractors (IEC) and Pepco, which provided students with a better understanding of job application requirements and work conditions. UDC-CC has offered IEC space to host some classess in an effort to increase these interactions between industry and students. In addition to IEC, DCCA was able to create informal partnerships with other employers, including UIP General Contracting, Bozzuto, and DC Water. Grant staff report that they were unable to create formal agreements and MOUs as they experienced delays with UDC approval processes and delays due to leadership changes in WDLL. Grant staff reported that it was challenging to develop partnerships with construction employment partners since staff primarily work at construction sites, which limits their availability to make class visits.

DCCA: Internships, Apprenticeships and Job Placement

The DCCA program had an internship and retention coordinator that actively worked with employers and students to secure internships and apprenticeships. Staff reported that they felt employers were sometimes reluctant to hire graduates because of liability issues and employer perceptions of graduates' lack of expereince, professionalism, and dependability. Furthermore, employers seemed hesitant to hire interns due to the costs associated with bringing on new employees. For example, if employers have to cover insurance for employees, they preferred to hire an apprentice or an employee who would be around for a longer period of time, not an intern. Grant staff reported that they were able to develop relationships with employers that enabled them to transition students into apprenticeships. One example was the relationship developed with Cropp-Metcalf, which offers HVAC services; the company appreciated the curriculum UDC offered, as it allowed students to develop the right amount of knowledge and experience needed to transition into their apprenticeship program. This was an example of what the internship coordinator described as the right type of employer partnership, where the DCCA pathway offerings aligned with employer needs.

In additon to the coordinator, instructors also promoted the program and got students internships with their contacts in the industry. In mid-2017, grant staff reported being able to coordinate hiring events and career fair with employers. Notably, staff reported that in September 2016, one employer partner visited the campus to interview students and in May 2017 two partners had visited the campus to interview students.

DCHA: Internships and Job placement

The apartment maintenance students had the opportunity to engage in job shadowing with local real estate apartment management companies and participated in career fairs with presenters on career day where student have interviews. Grant staff stated that in this industry, certifications are a plus and help to get students in the door, but businesses are looking for those with some experience. Therefore, grant staff worked with employers such as Buzzuto that train on the job. Similary, staff report being able to develop informal partnerships with Entertainment Cruise Lines and Line hotels, which held hiring events for DCHA students in early 2017.

Employer Engagement Successes & Challenges

RQ8. What were the successes and challenges in service coordination?

RQ11. What additional resources, not anticipated in the program design and budget, were necessary to run the program?

Grant staff were relatively successful in building partnerships to increase opportunities for students and employers to interact. These connections developed by grant staff were mutually beneficial as students gained exposure to the industry and employers gained confidence in the UDC TAACCCT curriculum and the quality of the graduates. The partnerships experienced sustained success but also had to work through some challenges.

Successes

Industry feedback has been essential for quality program enhancemnt in the academies. Integrating work-based learning components from the Bring Your 'A' Game to Work and Tools for Success curricula focused on building soft skills, such as workplace communication and the importance of punctuality, were responsive to industry and employer needs and resulted in more employable and trainable students. Integrating math into the curriculum was also in response to employer and industry needs. Students reported that they have found it beneficial in job interview and placement opportunities with employers that require applicants to take math placement tests.

Interacting with employer and business partners has expanded the reach of the academies. Grant staff report that they find local and regional businesses are now more familiar with their program and have created informal partnerships with local businesses that have hired some of their students and allowed students to visit their sites, as part of the work-based learning components of the curriculum.

Student not only benefited from the employer impact through curriculum changes, but they were also given the oportunites to interact face-to-face with their potential employers. Providing students with access to employers via class presentations or site visits gave them tangible insight into the job requirements of the construction industry and served to build relationships between employers and the program. Additionally, identifying partners that had entry-level jobs or apprenticeships was a best practice that the internship coordinator learned through building relationships.

Challenges

For both DCCA and DCHA, grant staff reported that some of the internal approval processes at UDC-CC and the change in leadership within WDLL delayed their ability to establish formal memoranda of understanding (MOUs) and agreements with employer partners and neighboring academic institutions.

In addition, grant staff reported challenges placing students in internships, as employer partners were reluctant to offer internships in either hospitality or construction. Employers were more inclined to offer apprenticeships or to hire graduates, which they considered to be a better investment.

DCHA and the apartment maintenance program did not have an industry council to influence curriculum changes or offer employment opportunities to students. Employer emagement for these two pathways has therefore been peripheral.

4.3.4 Fidelity of Implementation

RQ4. How were grant funds used to develop an expanded curriculum as described in the proposal?

RQ17. Was the program implemented as intended?

RQ18. What exogenous factors hindered fidelity of the intervention?

To the extent possible, UDC-CC implemented the DCCA construction programs with fidelity to the proposed model but encountered challenges in fully executing the hospitality program, which was subsequently ended due to the overlap with the TAACCCT Round 4 hospitality academy. Exhibit 20 provides a brief overview of the competency models and curriculum components that were outlined in the 2012 TAACCCT grant application and a description of the fidelity of implementation to those components.

Exhibit 20: Key Components and Fidelity Challenges

Program	Key Components	Fidelity Notes
Recruitment	Use assessments during intake	Used CASAS assessment tool to evaluate applicants' abilities before they joined the program.
DCCA: Construction	Competency Models: Commercial and industrial construction Heavy highway civil construction Residential construction Curriculum Components: Math Work-based learning Employer Engagement: Create MOUs with employer partners Engage employers in stakeholder committees Place students in work-based learning opportunities Credit Articulation: Create credit articulation agreements	Competency Models: Developed curriculum based on competency models. Curriculum Components: Integrated math into the curriculum Integrated components from Tools for Success model and Bring Your 'A' Game to Work into core classes Covered a broad set of skills safety using tools, employability and communication skills, materials handling, hand tools theory, HVAC, and plumbing Employer Engagement: Engaged employers in stakeholder committees such as Industry advisory council Established informal partnerships with employer Credit Articulation: Unable to finalize agreement with other regional higher education institutions
DCCA: Apartment Maintenance	Competency Model: National Apartment Association and American National Standards Institute (ANSI) standards Curriculum components: Work-based learning	Competency Model: Developed curriculum based on competency models Curriculum components: Work-based learning as an optional course
DCHA: Hospitality	Curriculum components: Work-based learning Curriculum components: Work-based learning	Curriculum components: Work-based learning as an optional course Curriculum components: Work-based learning as an optional course

According to the summary provided in Exhibit 20, it would seem that grant staff were challenged in executing the DCCA and DCHA programs in accordance to the proposed models and components due to challenges with grant staff hiring and turnover, leadership change at WDLL, and delays with UDC-CC approval processes. The latter factors were beyond the control of the grant program director. The main components the project was unable to implement include the industry council for hospitality and apartment maintenance and establishing MOUs with institutions of higher learning for articulation agreements.

4.3.5 Implementation Summary

Grant staff at DCCA and DCHA were successful in implementing the majority of planned activities for the program. Despite program implementation delays due to UDC administrative processes, grant staff were able to execute program pathways that aligned to the industry standards and that met the needs of local employers. Feedback from Industry and employer partners was an integral part of program design, job readiness and job placement.

5. Looking Forward

The creation of the construction and hospitality academies and enhancements made to their respective pathways made the training more relevant to industry needs and improved the employability and job opportunities for WDLL students. Sustaining the changes made possible with grant funds would depends on how grant staff can leverage other external funding. In discussing the design and implementation of the program with grant staff, a few lessons learned emerged. In the sections that follow, grant staff share their perspectives on program sustainability after the end of the TAACCCT grant and offer recommendations for further programming.

5.1.1 Sustainability

RQ16. When did planning for grant sustainability begin? Did sustainability planning result in any changes to the program?

Planning for sustainability remains a challenge for grant staff, mainly due to exogenous factors to the grant. Grant staff report that as of early 2017, WDLL is under new leadership and that the vision for the department is in transition; thus, they are unsure of what program components can be aligned with the new vision. Grant staff were provided with a questionnaire that gathered information on what program components they believe would be sustained within the academy. Exhibit 21 provides an overview of their responses.

Exhibit 21: Program Sustainability Ratings[27]

Academic Enhancements	
Construction Core Integrated Math	Likely
Enhanced Apartment Maintenance Courses	Likely
Bring Your 'A' Game to Work	Likely
Building Information Modeling (BIM)	Likely
Enhanced Hospitality Courses	Likely
Student Supports	
Coaching Services	Likely
Career Readiness Support	Likely
Job Placement Support	Likely
Programmatic Support	
Industry Council	Likely
Partnerships	Likely
College Support	
Leadership Support	Maybe

Grant staff were confident that there is funding to continue implementing the academic enhancements developed through the TAACCCT funds. Specifically, the additional math and OSHA 10 construction, workplace readiness, and CPR/first aid/AED components, have all been embedded successfully into the introductory course and can be sustained. Grant staff noted that incorporating these components has garnered high praise from the industry council, and benefitted students. There are minimal costs that staff at DCCA have to factor into their budget going forward without the grant, including: individual student certificate fees; additional purchase of workplace readiness course materials, and instructor fees for OSHA 10 course and CPR/first aid/AED course.

[27] Score rating from sustainability questionnaire: Likely = 7–10; Maybe = 4–6; Unlikely = 1–3.

According to grant staff, the apartment maintenance courses are likely to be sustained because the CAMT certificate meets and fills a great need in the apartment management and land development industries. Staff felt BIM would likely be sustained after the grant. BIM provides an important up-skill for incumbent workers in the construction industry and, to date, the maintenance for the computers purchased under the grant and other logistics are being maintained by university staff. Grant staff were uncertain, however, how the lab created for the BIM course will be maintained because WDLL would have to identify other funds to replace any units.

Following the success of the Quick START and START programming in DCHA, program staff believe those enhancements will be sustained even though it will require greater oversight to manage the schedules of the different agencies partners involved in delivering those courses. One main budgetary concern for sustainability planning for DCHA would be the availability of funds for drug testing.

With the onset of the grant, WDLL hired student support staff with local funds to work with students on job readiness activities, which was critical to student employment placement. These services are expected to continue after the end of the grant.

Sustaining the industry council emerged as a best practice because of the valuable feedback and job placement connections that were made throughout the duration of the grant. Grant staff felt that continuing to engage industry partners would be extremely beneficial to the program and would not incur additional cost to WDLL.

5.1.2 Recommendations

During the Spring 2017 onsite visits and via a questionnaire, grant staff offered a variety of lessons learned and recommendations for institutions wishing to implement similar programs:

Emphasize soft skills training. Grant staff encouraged institutions to teach and incorporate soft skills training, such as workplace communication and punctuality. They observed that soft skills training was critical early on and throughout the program, particularly for those with difficult employment barriers and challenging circumstances. Staff implementing similar programs should hire personnel to work directly with students to improve their job seeking skills, resume building, and interview skills, to help improve employability and job placement.

Engage employers in the industry council and via career fairs. The industry council for DCCA strongly influenced the program modifications to the construction curriculum and served as both a guide for keeping curriculum relevant and as a hiring source for students. Future programs should likewise involve employers and other industry partners so that they can interact with and help expose students to the industry and job requirements and opportunities.

Create more hand-on opportunities for students. Grant staff felt that more hands-on, practical opportunities would have greatly benefited students and better prepared them for real on-the-job situations. For example, institutions that want to implement a hands-on course such as BIM could first establish a virtual lab that students first experienced followed by a lab with training equipment to provide hands-on learning could have allowed for a dedicated space for the program. Another example, would be a virtual training component focused on operating heavy equipment.

Separate management roles by trade. Although the grant funded two academies, one program director was in charge of both pathways. Grant staff noted that such an arrangement was not always beneficial to the implementation of either trade and that future programming should consider separating the grant leadership roles by trade. This separation would allow grant leadership to better coordinate funding streams and resources to implement the programs.

Plan early for sustainability. In retrospect, grant staff felt they should have looked for other grant opportunities or other funding sources earlier on to ensure sustainability of program components. They advised future program staff to engage a grant writer and actively seek funding opportunities for programming and additional costs such as student certification fees.

6. Conclusion

This evaluation report described the program implementation, processes, and activities of the TAACCCT-funded construction and hospitality academies at UDC-CC. It also examined the effect of the program on students' completion and credential attainment. The grant gave WDLL the funding to restructure existing programs into Academies for better management, alignment, and oversight. Despite program implementation delays due to lengthy institutional approval processes, staff at the academies created program pathways with industry-recognized stackable credentials that allowed students to gain mastery in a particular field. The program had a positive effect on credential attainment for those in the construction field, an indication that the program made students more employable. There were no positive effects or associations of the project on completion, however. Other findings from the evaluation are summarized as in the sections that follow:

6.1.1 Outcome Study Findings

Program Participation

The outcome evaluation examined the effect of TAACCCT-funded enhancements on students' completion rates and credential attainment using both administrative data and program tracking data. DCCA and DCHA were able to surpass their enrollment, completion, and retentions goals, with the majority of the students enrolling in the Construction CORE classes (68%, n=519).

Program Completion

TAACCCT program enhancements did not have a significant effect on completion. Although students who enrolled in Construction CORE had higher completion rates than those who enrolled in the other two pathways–-apartment maintenance and hospitality (66% for construction versus 44% and 51%, respectively for apartment maintenance and hospitality)—the difference in completion rates between the TAACCCT students and the matched historical comparison group was not significant. This may be a positive finding for the construction program because, although the math module was embedded into the Construction CORE curriculum, thus making it more difficult, the completion rate for students was still comparable to rates before the TAACCCT-funded enhancements.

Credential Attainment

TAACCCT had a positive effect on credential attainment. Among the TAACCCT students, the construction (51.3%, n=229) and hospitality (44.1%, n=80) programs had the largest number of in-career credential certification recipients (vs. 11.4%, n=10, for apartment maintenance students). There was a significant positive effect of the program on credential attainment (chi-square p. <.0001, d=0.48) when TAACCCT construction students were compared to the historical cohort.

Effect of Prior Employment on Completion and Credential Attainment

Previous employment, taken from the baseline survey, was positively associated with credential attainment but not completion rates. Students employed at baseline were more likely to attain a credential (73%, n=69), compared to those who were not employed at baseline (52%, n=46). Prior employment was not positively associated with completion. The program completion rates by employment status were 90.5% (n=86) for employed and 85.4% (n=76) for unemployed respectively. This finding could indicate that

incumbent workers were highly motivated to upskill and attain credentials. In addition, the findings show that even though incumbent workers may have had competing work priorities, they completed their program of study (90.5%, n=86) at similar rates to those who were unemployed (85.4%, n=76) at baseline for employed and 85.4% (n=76) for unemployed respectively.

6.1.2 Implementation Findings

Grant staff at DCCA and DCHA successfully in implemented the majority of planned activities for the program. Despite program implementation delays due to UDC administrative processes, grant staff were able to create program pathways that aligned to the industry standards and that met the needs of local employers.

Program Enhancements

Incorporation of the math module into the Construction CORE curriculum was in direct response to the difficulties students had with math as they progressed further down the pathway. Employers also noted that students had trouble passing entry-level assessments at the workplace that involved math. Incorporating soft skills also satisfied industry concerns about the lack of professionalism at the entry-level. The addition of OSHA 30 construction and CPR/first aid/AED training bolstered DCCA's students' employment opportunities, making them more relevant and job ready. Staff at DCHA were able to leverage the WIC model and continue to engage their partners in hospitality (Goodwill Industries of Greater Washington and Progressive Partners) to deliver a relevant program that equipped students with in-demand skills. Offering the BIM class enabled DCCA to attract more experienced incumbent workers who sought to upskill and re-enter the labor force at a higher pay level. DCCA and DCHA sought to offer programs of study that catered to the varying experience levels of the DC residents they served and also respond in a timely manner to the needs of the labor market.

Industry and Employer Engagement

The industry council played a critical role in providing grant staff with valuable feedback on the types of credentials graduates might need to transition into either an entry-level job or apprenticeship in the construction or hospitality sectors. Additionally, it also provided guidance on ways to execute the curriculum—for example, to create more hands-on learning opportunities. The council also provided students with opportunities to learn about the industries and better prepare them to transition into career pathways. Notably, one lesson learned was how to identify the right type of employer partner, such as the example with Cropp-Metcalf, whose entry-level apprenticeship was ideal for graduates of the HVAC program pathway.

Grant staff recommended that a future program hire a staff person dedicated to recruitment and intake and another staff person to address the challenge of navigating the internal approval processes for MOUs or credit articulation agreements.

6.1.3 Looking Forward

According to program staff, most of the enhancement made possible by the grant will be sustained, especially the modifications made to program curriculum. The influence of the industry council on DCCA classes was significant, and grant staff believe those partnerships and the forum to share ideas will continue after the grant. Other support and services such as certification test fees for students may become a budgetary challenge and should be planned for.

Grant staff were asked to share best practices and give recommendations to guide institutions that may implement similar programs in the future. Grant staff advised these institutions to incorporate and emphasize soft skills within these trades. They noted that hiring an individual to work directly to improve

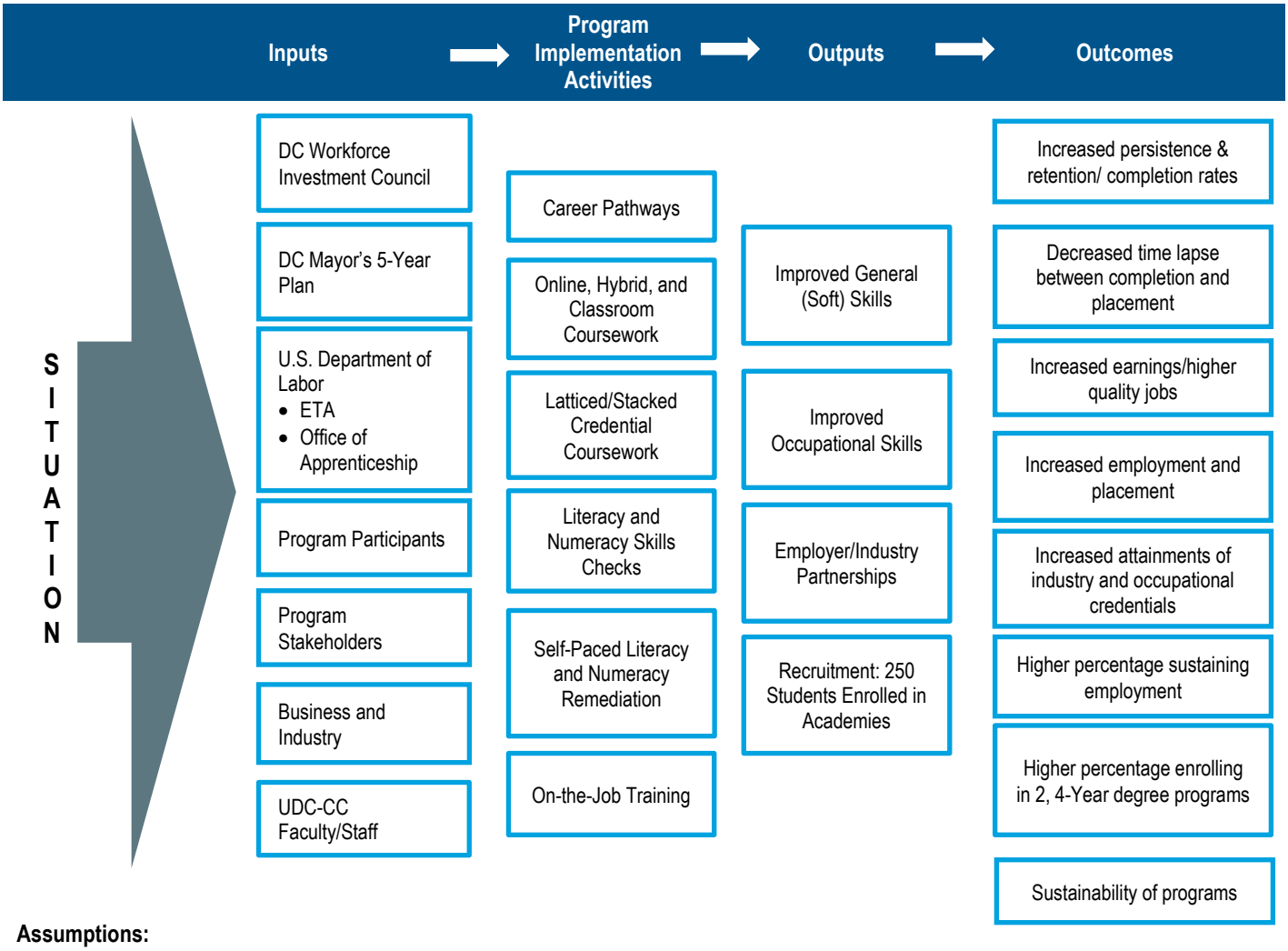
their job seeking skills and other job readiness training would greatly improve their employability and job placement since employers values the professionalism that come with it.

Institutions planning to implement similar project should plan early for sustainability by soliciting more funds to ensure that activities are funded after the grant. Creating more hands-on opportunities for students in these trades was also recommended as a way to ease their transition into the work force.

Engaging industry partners emerged as a best practice. Staff advised institutions to engage partners early to solicit their input on program design. Furthermore, program staff should strive to engage partners throughout the project for relevant and timely feedback into program activities. They noted that industry partners would also serve as the pool of employers and because of their prior engagement would recognize the program and value the training students received.

APPENDICES

APPENDIX A: UDC 3 LOGIC MODEL



Assumptions:
Program Implementation/Activities: The ICF Team assumes that processes and activities will change and have varied effects on program outputs and outcomes; Outputs/Students: Evaluators will monitor changes in participation as a result of program processes and activities across each cohort and type of students.

APPENDIX B: SURVEY DATA COLLECTION

Data Collection Tool	Data Gathered	Dates
Baseline Survey ▪ Administered in person.	Demographics, education history, employment and wage history, unemployment challenges, healthcare benefits and public assistance	Summer 2015 cohort: May/June 2015 Fall 2015 cohort: September 2015 Spring 2016 cohort: January 2016 Summer 2016 cohort: May 2016 Fall 2016 cohort: September 2016 Spring 2017 cohort: January 2017
Baseline + Follow-up Survey ▪ Conducted via web-based survey.	Employment and wage history, program experience, education history, current employment, healthcare benefits, public assistance, observations and recommendations	Fall 2014 cohort: May/June 2015 (comparison group) Spring 2015 cohort: May/June 2015 (comparison group)
Six Month Follow-up Survey ▪ Conducted via web-based survey.	Program experience, job readiness, employment and wages, unemployment challenges, healthcare benefits and public assistance	Spring 2015 cohort: September 2015 (comparison group) Summer 2015 cohort: December 2015 Fall 2015 cohort: May 2016 Spring 2016 cohort: September 2016 Summer 2016 cohort: December 2016 Fall 2016 cohort: May 2017 Spring 2017 cohort: May 2017
12-Month Follow-up Survey ▪ Conducted via web-based survey.	Employment and wages, unemployment challenges, healthcare benefits and public assistance	Fall 2014 cohort: December 2015 (comparison group) Spring 2015 cohort: May 2016 (comparison group) Summer 2015 cohort: September 2016 Fall 2015 cohort: September 2016 Spring 2016 cohort: May 2017 Summer 2016 cohort: May to June 2017 Fall 2016 cohort: September 2017
Program data via file transfer	Credential earnings, Program completion and grades, student demographics	All cohorts:

APPENDIX C: SURVEY RESPONSE RATE

Cohort	Cohort Size	Baseline Survey	Baseline Responses	Follow-Up Survey	Follow-Up Responses*
Fall 2014	259	259	6 (2.3%)	259	6 (2.3%)
Spring 2015	247	247	24 (9.7%)	247	24 (9.7%)
Summer 2015	222	222	47 (21.2%)	222	21 (9.5%)
Fall 2015	225	225	56 (24.9%)	225	14 (6.2%)
Spring 2016	154	154	46 (29.9%)	154	24 (15.6%)
Summer 2016	94	94	26 (27.7%)	94	14 (14.9%)

APPENDIX D: CAREER PATHWAY OPTIONS IN CONSTRUCTION

Construction Pathway	Description	Industry-Recognized Credentials
1. Apartment Maintenance Extended Career Pathway	This pathway allows students to move into employment opportunities in the apartment maintenance and construction fields; it also provides students the opportunity to learn the fundamentals associated with apartment leasing.	▪ Certificate for Apartment Maintenance ▪ OSHA 10 General Industry ▪ First Aid CPR/AED ▪ NCCER Core Certificate ▪ Bring Your 'A' Game to Work ▪ OSHA 10 Construction ▪ National Apartment Leasing Professional
2. Apartment Maintenance Career Pathway	This pathway allows students to move into employment opportunities in the apartment maintenance industry, while providing an opportunity to learn Spanish in the workplace.	▪ Certificate for Apartment Maintenance ▪ OSHA 10 General Industry ▪ First Aid CPR/AED
4. Building Information Modeling (BIM) Career Pathway	This pathway builds upon the knowledge received by the students in the Construction CORE curriculum in a unique way. BIM is a rapidly advancing area in the construction industry, and there is high demand for individuals who possess the skills required to develop, interpret, and update these computer-generated models. This requires highly technical and software-based training and this pathway provides that type of education.	▪ NCCER Core Certificate ▪ Bring Your 'A' Game to Work ▪ OSHA 10 Construction ▪ First Aid CPR/AED ▪ AutoDesk Revit User
8. Construction Field (Labor) Career Pathway	This pathway requires that students complete the Construction CORE curriculum prior to entering the Building Futures program, where they can work towards other specialty certifications.	▪ NCCER Core Certificate ▪ Bring Your 'A' Game to Work ▪ OSHA 10 Construction ▪ First Aid CPR/AED ▪ Flagger Certification ▪ Scaffold User
12. Construction Field (Superintendent) Career Pathway	This pathway requires that students complete the Construction CORE curriculum prior to entering the project management program to receive additional focused management training.	▪ NCCER Core Certificate ▪ Bring Your 'A' Game to Work ▪ OSHA 10 Construction ▪ First Aid CPR/AED ▪ Certified Associate in Project Management (CAPM)