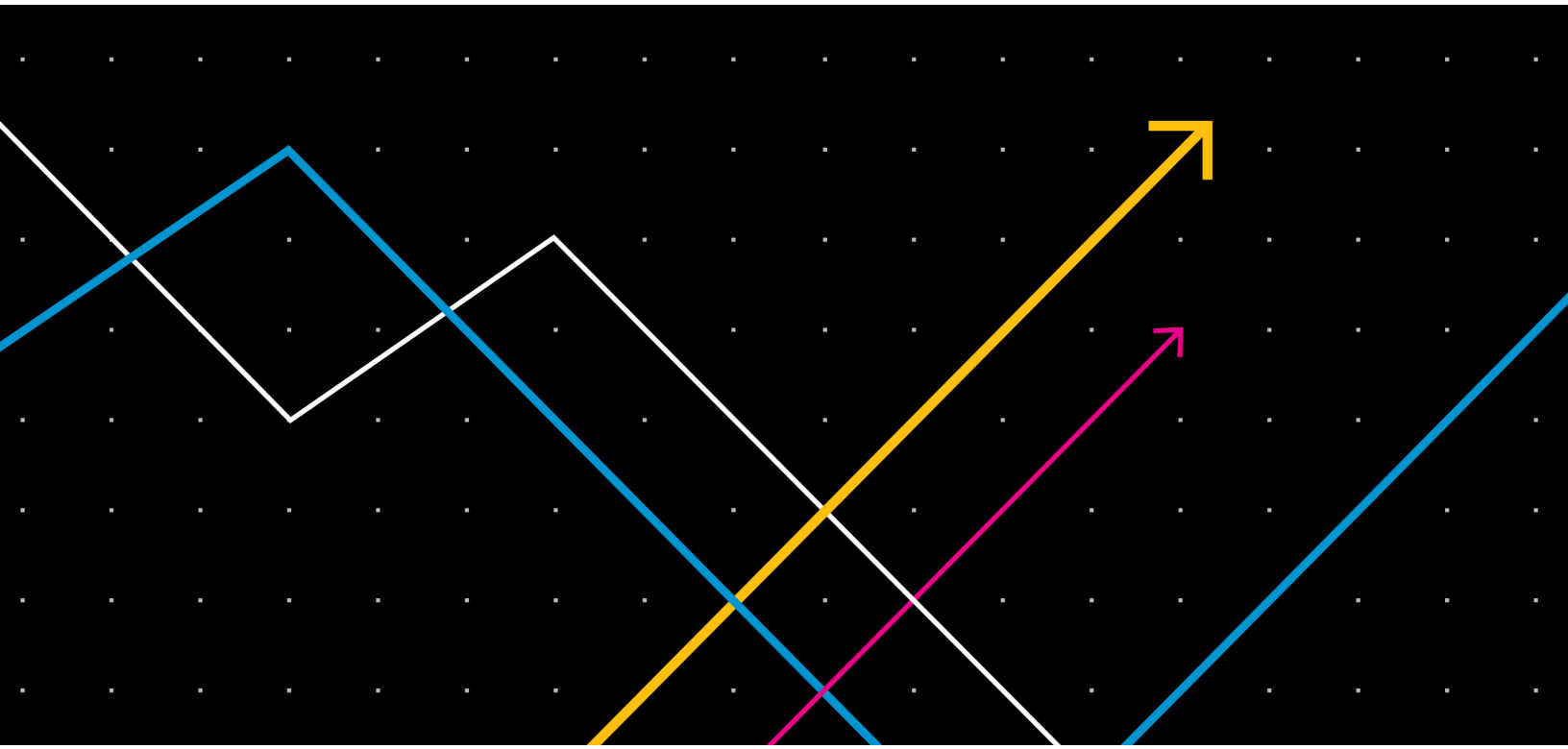


RESEARCH REPORT

A Synthesis of Findings from the Rounds 1 and 2 Trade Adjustment Assistance Community College and Career Training Third-Party Evaluations

Lauren Eyster

December 2019

URBAN INSTITUTE · ELEVATE · THE · DEBATE

DISCLAIMER

This report was prepared for the US Department of Labor (DOL), Chief Evaluation Office by the Urban Institute, under contract numbers DOLU129633972. The views expressed are those of the author and should not be attributed to DOL, nor does mention of trade names, commercial products, or organizations imply endorsement of same by the US Government.

ABOUT THE URBAN INSTITUTE

The nonprofit Urban Institute is dedicated to elevating the debate on social and economic policy. For nearly five decades, Urban scholars have conducted research and offered evidence-based solutions that improve lives and strengthen communities across a rapidly urbanizing world. Their objective research helps expand opportunities for all, reduce hardship among the most vulnerable, and strengthen the effectiveness of the public sector.

Suggested citation: Eyster, Lauren. (2019). *A Synthesis of Findings from the Rounds 1 and 2 Trade Adjustment Assistance Community College and Career Training Third-Party Evaluations.* (Research Report). Prepared for the US Department of Labor, Chief Evaluation Office. Washington, DC: Urban Institute.

Contents

Acknowledgments

The views expressed by the author should not be attributed to the Urban Institute, its trustees, or its funders. Funders do not determine research findings or the insights and recommendations of Urban experts. Further information on the Urban Institute's funding principles is available at www.urban.org/support.

The authors would like to thank the many evaluators of the Rounds 1 and 2 TAACCCT grants. The findings from their evaluation reports serve as the basis of this report and have helped to build the evidence on the approaches to building the capacity of community colleges to provide effective job training. We are also grateful to our project officers Janet Javar and Chayun Yi from the Chief Evaluation Office at the U.S. Department of Labor (DOL), who provided helpful guidance and comments during the development of this report. The Division of Strategic Investments team within DOL's Employment and Training Administration, especially Cheryl Martin, Robin Fernkas, Eugenie Agia, and Evan Burke, also supported this effort, shaping the key topics in the report and helping us locate the final evaluation reports from the grantees. Finally, we thank the Urban Institute staff – Kelly Mikelson, Christin Durham, Daniel Kuehn, and Alice Mei – who helped review the findings from the final evaluation reports to support the development of this report.

Summary of the Report

The Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant program awarded $1.9 billion to institutions of higher education that offer programs of two years or less, mostly community colleges, to build their capacity to provide workforce education and training to adults in need of new skills for in-demand jobs. The grant program, which ran from 2011 to 2018, was also designed to address other key issues—changing education and workforce systems to be better connected and integrated, more effectively addressing employer needs for skilled workers, and transforming how community colleges deliver education and training to adult learners. This report is part of a series of publications from the TAACCCT national evaluation that spans the four rounds of the grants.[1] Focused on Rounds 1 and 2, this report synthesizes the implementation and impact findings from nine Round 1 and 78 Round 2 grantee-sponsored, third-party evaluations.

The TAACCCT national evaluation seeks to build evidence about the capacity-building strategies and career pathways approaches implemented by Rounds 1-3 grantees.[2] In addition to the national evaluation, grantees sponsored third-party evaluations of their programs. A key component of the national evaluation is synthesizing the findings from the grantee-sponsored third-party evaluations to understand across grantees if and how service delivery and/or system reform innovations resulted in improved employment outcomes and increased skills for participants. (See box ES.1 for an overview of the national evaluation and the third-party evaluations. More detailed information is provided in section 1.2.) To do so, the synthesis draws from the third-party evaluation findings to develop an understanding of the career pathways approaches and systems innovation that were implemented, and to assess the extent to which TAACCCT participants increased their educational attainment and made gains in employment.

[1] All publications from the TAACCCT national evaluation are available on DOL's Chief Evaluation Office website, found at https://www.dol.gov/agencies/oasp/evaluation/completedstudies.

[2] For the purpose of the national evaluation, career pathways approaches to workforce development offer an articulated sequence of education and training programs focused on an industry sector, combined with support services, to enable individuals to enter and exit at various levels and to advance over time to higher skills, recognized credentials, and better jobs with higher pay.

BOX ES.1

TAACCCT National Evaluation Components and This Report

- An ***implementation analysis*** (Rounds 1–4) of the service delivery approaches developed and the systems changed through the grants based on a survey of colleges and visits to selected colleges
- ***Syntheses of third-party evaluation findings*** (Rounds 1–4) to draw a national picture of the implementation of the TAACCCT capacity-building strategies and build evidence of the effectiveness of the strategies on participants' education and employment outcomes
  - ***A Synthesis of Findings from the Rounds 1 and 2 Trade Adjustment Assistance Community College and Career Training Third-Party Evaluations – Final Report (this report)***
- An ***outcomes study*** of nine Round 4 grantees using survey data and administrative records to better understand the characteristics of TAACCCT participants, their service receipt, and their education and employment outcomes
- A ***study of employer relationships*** with selected Round 4 employer-partners to better understand employers' perspectives on how to develop and maintain strong relationships with colleges

This synthesis of grantee-sponsored third-party evaluations addresses a key research question from the TAACCCT national evaluation: ***what service delivery and/or system reform innovations resulted in improved employment outcomes and increased skills for participants?*** To do so, the synthesis draws from the third-party evaluation findings to develop an understanding of the career pathways approaches to support service delivery and systems innovation that were implemented and assess whether TAACCCT participants increased their educational attainment and made gains in employment. The synthesis also seeks to highlight the successes and challenges and identify promising strategies that can inform efforts to replicate or scale the grantees' career pathways efforts. In addition, the synthesis provides lessons for evaluating future community college and workforce initiatives.

The synthesis is based on the findings and lessons from the third-party evaluation reports for nine Round 1 reports and 78 Round 2 final evaluation reports. The third-party evaluation designs had to include a 1) program implementation analysis, and 2) a participant outcome and/or impact analysis. For the implementation analysis, third-party evaluators had to document and assess the implementation of the key grant activities, specifically new and enhanced programs of study, support services, curriculum development, participant assessments and career guidance, and partnership development. For the impact analysis, DOL encouraged evaluators to use the most rigorous evaluation design feasible to estimate the impact of grant-funded activities on participants' education and employment outcomes, using either an experimental design with random assignment or a quasi-experimental design. DOL required Rounds 2-4 grantees to sponsor third-party evaluations. Round 1 grantees were encouraged to do so. Rounds 3 and 4 evaluators also received additional evaluation support from the Urban

Institute (e.g., review and feedback on their evaluation design, webinars, online resources) to help improve the rigor and quality of the third-party evaluations.

This synthesis focuses on third-party evaluation findings, the first in a series of syntheses, provides overall picture of the grants and draws lessons and implications for future community college and workforce initiatives and evaluations. It adds to a growing body of evidence on career pathways approaches that encourage accelerated learning, college completion, and connections to employment. Future syntheses from the Rounds 3 and 4 third-party evaluation findings will further contribute to the body of evidence on career pathways approaches.

1. Introduction

The Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant program was a $1.9 billion federal workforce investment. It was aimed at helping community colleges across the nation increase their capacity to provide education and training programs for unemployed workers and other adult learners to prepare for in-demand jobs. The US Department of Labor (DOL) administered the grant program from 2011–2018 in partnership with the US Department of Education.[3] Across four rounds of grants, TAACCCT reached over 60 percent of the nation's publicly-funded community colleges and included at least one college from every U.S. state in each round (Cohen et al. 2017).

DOL contracted with the Urban Institute to conduct a national evaluation of the Rounds 1-3 TAACCCT grants, which seeks to build a body of evidence on the strategies implemented by the grantees. The national evaluation uses a mix of qualitative and quantitative methods to understand and assess the capacity-building strategies and career pathways approaches funded by the grant program to inform future federal workforce investments and policy. A key component of the national evaluation are the syntheses of the findings from the grantee-sponsored, third-party evaluations. DOL required Rounds 2-4 grantees and encouraged Round 1 grantees to use grant funds to engage an independent third-party evaluator to design and conduct an evaluation of their grant projects. The third-party evaluations had to document and assess the implementation of capacity-building activities funded by TAACCCT and examine participants' educational and employment outcomes and impacts. (More detailed information is provided in section 1.2.)

As a product of the national evaluation, this report synthesizes findings from 87 third-party evaluations of the Rounds 1 and 2 TAACCCT grants. The findings are based on the final evaluation reports that assess the implementation of the grant activities and estimate the impact of TAACCCT on the education and employment outcomes of participants. The goal of this synthesis is to summarize what has been learned from the first two rounds of the grants to support a growing body of evidence on strategies that encourage accelerated learning, college completion, and connections to employment. The report is designed to be useful to policymakers, practitioners, and researchers.

[3] The seven years are federal fiscal years, from October 1, 2011 through September 30, 2018.

1.1. TAACCCT Grant Program and Career Pathways

Congress authorized the TAACCCT grant program as part of the American Recovery and Reinvestment Act of 2009 to increase the capacity of community colleges to meet local and regional labor demand for a skilled workforce. The Health Care and Education Reconciliation Act, signed in March 2010, provided the grant program with $2 billion in funding over fiscal years 2011–14, or approximately $500 million annually over four rounds of grants.[4] DOL, which administered the grants, funded 256 three- to four-year grants to institutions of higher education offering programs of study that can be completed in two years or less. The Rounds 1 and 2 grants, the focus of this report, ended by September 2016.

The overarching goals of the TAACCCT grant program as described in the Rounds 1–4 grant announcements were to [5]

1. better prepare the Trade Adjustment Assistance-eligible workers and other adults for high-wage high-skill employment or reemployment in growth industry sectors by increasing their attainment of degrees, certificates, diplomas, and other industry-recognized credentials that match the skills needed by employers;
2. introduce or replicate innovative and effective methods for designing and delivering instruction that addresses specific industry needs and leads to improved learning, completion, and other outcomes for Trade Adjustment Assistance-eligible workers and other adults; and
3. demonstrate improved employment outcomes for TAACCCT participants.

To achieve these goals, the grantees from all four rounds focused on developing and implementing career pathways approaches to build colleges' capacity for providing education and training to adult learners.[6] ***Career pathways approaches***[7] to workforce development offer an articulated sequence of education and training programs focused on an industry sector, combined with support services, to enable individuals to enter and exit at various levels and to advance over time to higher skills, recognized credentials, and better jobs with higher pay.

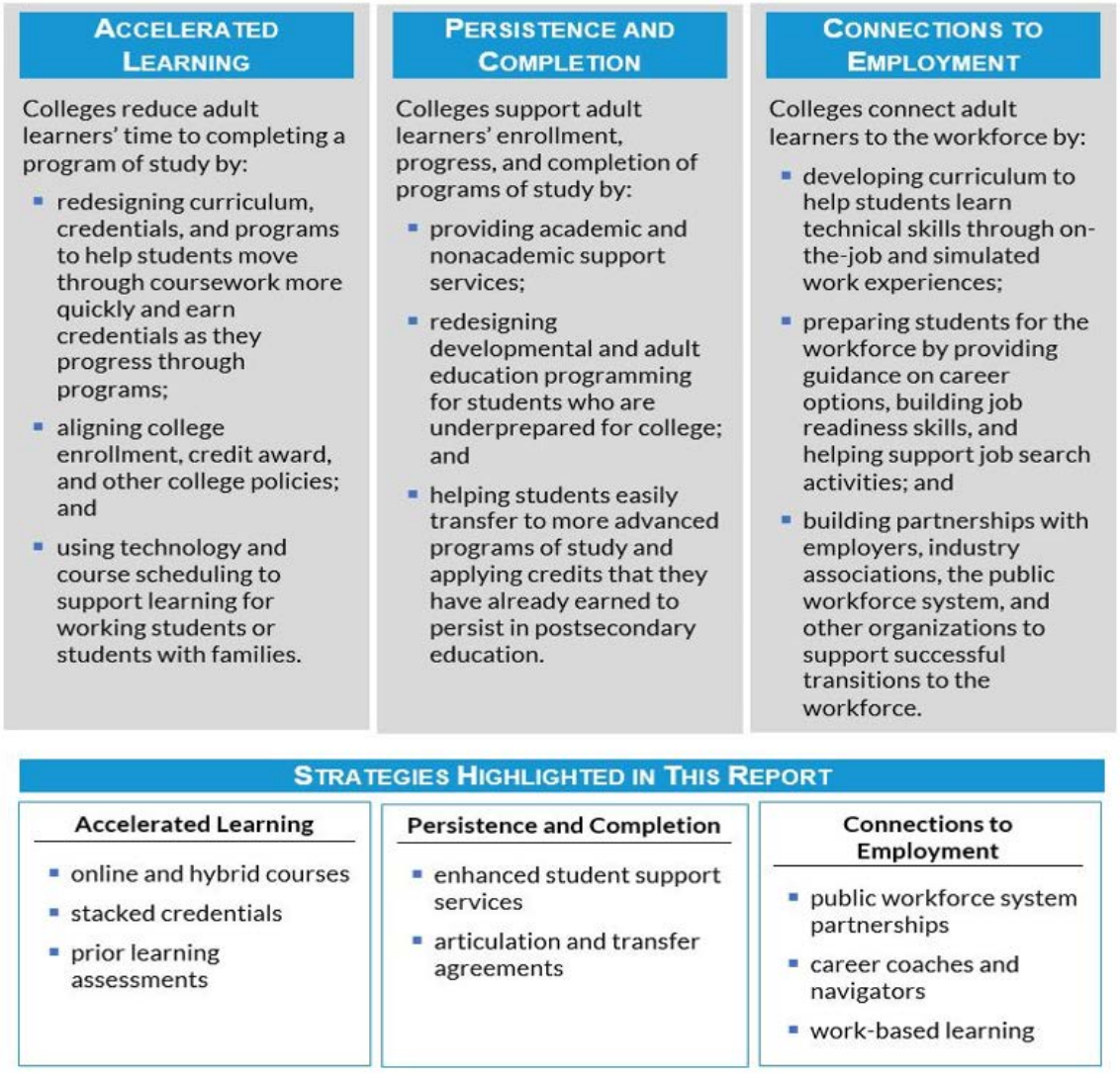
Across all four rounds, there were many strategies that grantees developed and implemented to build their capacity for providing education and training programs to adult learners as a part of career

[4] The total amount for the grant program was reduced to $1.9 billion due to rescissions under the 2013 budget sequestration.
[5] DOL issued the grant announcements in spring of FY 2011 (Round 1), FY 2012 (Round 2), FY 2013 (Round 3), and FY 2014 (Round 4). For more information, see "Applicant Information," Trade Adjustment Assistance Community College and Career Training Grant Program, last updated April 27, 2017, https://www.doleta.gov/taaccct/applicantinfo.cfm.
[6] More information on the goals of the TAACCCT grant program and by round can be found at https://www.dol.gov/asp/evaluation/completed-studies/20170308-TAACCCT-Brief-1.pdf.
[7] There are many definitions of career pathways in the literature. The definition used for the national evaluation aligns with the definition for the Career Pathways Design Study, which provides a high-level synthesis of the findings from career pathway research and design. See Sarna and Strawn (2018) and Schwartz, Strawn and Sarna (2018) for more information.

pathways. To better understand the range of strategies implemented by grantees, the national evaluation team identified three categories of strategies—***accelerated learning***, ***college persistence and completion***, and ***connections to employment***. Figure 1.1 provides definitions of each of these categories and a list of the strategies within each category highlighted in this report.[8] The chapters on the implementation findings provide definitions of the strategies for the Rounds 1 and 2 synthesis.

FIGURE 1.1

Types of Strategies Identified by the TAACCCT National Evaluation



[8] In each TAACCCT evaluation report, different strategies will be highlighted based on which round(s) of the grants and data sources are the focus of the report.

1.2. TAACCCT Evaluation Efforts

An important goal of DOL is to build a body of evidence through evaluation of the career pathways and capacity-building strategies implemented by TAACCCT grantees, to understand how these strategies worked, and how they may have contributed to participants' educational attainment and labor market outcomes. The TAACCCT grant program's two major evaluation efforts are the TAACCCT national evaluation and the third-party evaluations of each TAACCCT grant.

The national evaluation uses a mix of qualitative and quantitative methods to understand and assess the capacity-building strategies funded by the grant program to inform future community college and workforce initiatives.[9] The main components of the national evaluation are highlighted in box 1.1.

BOX 1.1

TAACCCT National Evaluation Components and Publications

- An ***implementation analysis*** (Rounds 1–4) of the service delivery approaches developed and the systems changed through the grants based on a survey of colleges and visits to selected colleges
  - *The Trade Adjustment Assistance Community College and Career Training Grant Program: Implementation of the Rounds 1 and 2 Grants – Final Report*
  - *Implementation of the Round 3 Trade Adjustment Assistance Community College and Career Training Grants – Final Report*
  - *A Picture of the Trade Adjustment Assistance Community College and Career Training Grants: Results from a Survey of Round 4 Colleges – Final Report*
  - Topic Briefs from Round 4: *Context, Infrastructure, and Alignment Matter: Statewide Systems Change in Round 4 of TAACCCT*; *Building Career Pathways Programs and Systems: Insights from TAACCCT Round 4*; and *Employer Perspectives on Building Partnerships with Community Colleges: Lessons for Local Leaders and Practitioners*
  - Early Descriptive Briefs: *TAACCCT Goals, Design, and Evaluation*; *Grantee Characteristics*; *Approaches, Targeted Industries, and Partnerships*; and *Early Results of the TAACCCT Grants*
- ***Syntheses of third-party evaluation findings*** (Rounds 1–4) to draw a national picture of the implementation of the TAACCCT capacity-building strategies and build evidence of the effectiveness of the strategies on participants' education and employment outcomes
  - ***A Synthesis of Findings from the Rounds 1 and 2 Trade Adjustment Assistance Community College and Career Training Third-Party Evaluations – Final Report (this report)***
  - *Systems Change in Community Colleges: Lessons from a Synthesis of the Round 3 TAACCCT Third-Party Evaluation Findings – Final Report*
  - *A Synthesis of Impact Findings from the Round 3 Trade Adjustment Assistance Community College and Career Training Third-Party Evaluations – Final Report*
  - *Implementation and Impact Synthesis Report: Round 4 TAACCCT Third-Party Evaluation – Final Report*

[9] More information on the national evaluation activities can be found at https://www.dol.gov/asp/evaluation/completed-studies/20170308-TAACCCT-Brief-1.pdf.

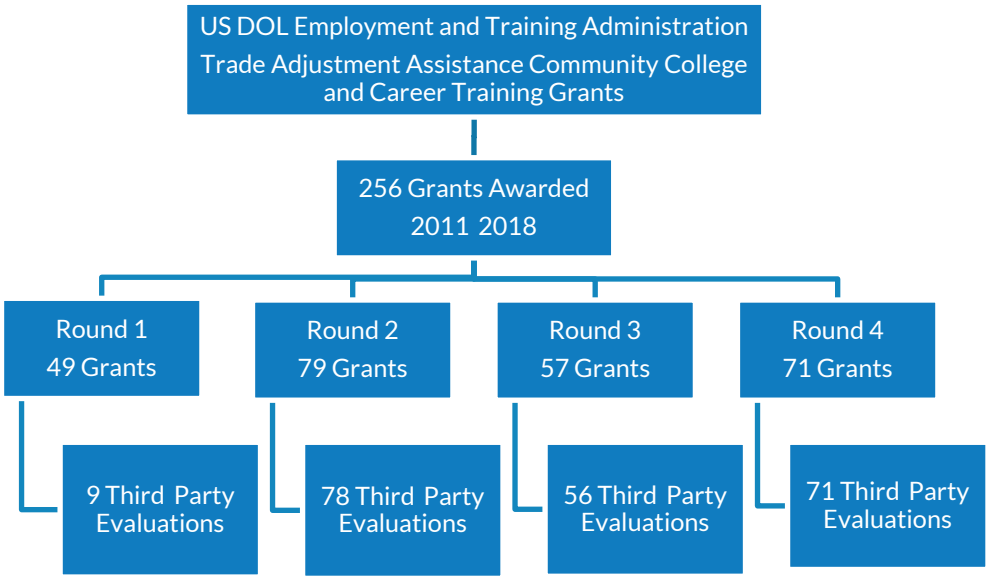
- An ***outcomes study*** of nine Round 4 grantees using survey data and administrative records to better understand the characteristics of TAACCCT participants, their service receipt, and their education and employment outcomes
  - *Trade Adjustment Assistance Community College and Career Training Grants: Round 4 Outcomes Study – Final Report and Grantee Profiles*
- A ***study of employer relationships*** with selected Round 4 employer-partners to better understand employers' perspectives on how to develop and maintain strong relationships with colleges
  - *The Employer Perspectives Study: Insights on How to Build and Maintain Strong Employer-College Partnerships – Final Report*

The second major effort to evaluate the TAACCCT grants is the grantee-sponsored third-party evaluations.[10] Beginning in Round 2, DOL required grantees to use grant funds to engage an independent third-party evaluator to design and conduct an evaluation of their grant projects. The third-party evaluations had to document and assess the implementation of capacity-building activities funded by TAACCCT and examine participants' educational and employment outcomes and impacts. [11] Nearly 20 percent of Round 1 grantees also sponsored independent evaluations but were not required to do so. All Rounds 2-4 grantees had to provide evaluation design plans in their grant application. The Urban Institute reviewed and provided feedback on Rounds 3 and 4 evaluation design plans to help improve the rigor and quality of the evaluations; DOL approved the plans before evaluators could proceed. Figure 1.2 shows how evaluation requirements changed across the rounds.

[10] For more detailed information on the planned evaluation designs and data collection methods used by third-party evaluators, see "TAACCCT Goals, Design, and Evaluation Designs" at https://www.dol.gov/asp/evaluation/completed-studies/20170308-TAACCCT-Brief-1.pdf.
[11] For more information on the Round 2 requirements for third-party evaluations, see pp. 33-35 in "Notice of Availability of Funds and Solicitation for Grant Applications for Trade Adjustment Assistance Community College and Career Training Grants Program" at https://doleta.gov/grants/pdf/taaccct_sga_dfa_py_11_08.pdf.

FIGURE 1.2

Grants Awarded and Third-Party Evaluations Across All Rounds of the Grants



Source: Urban Institute's review of the third-party evaluation reports across all rounds.

Note: Only nine Round 1 grantees had third-party evaluations as it was not required. One Round 2 third-party evaluator did not submit a final report. The Urban Institute did not receive a final evaluation report from one Round 2 third-party evaluator. One Round 3 grant ended before the end of the period of performance so there are 56 instead of 57 third-party evaluations with implementation analyses.

Figure 1.3 shows the number of grants awarded in each of the four rounds and the third-party evaluations that included implementation analyses for each round. All Rounds 2-4 evaluations included implementation analyses, per the grant requirements. However, only a subset of the Round 1 grantees (nine) had third-party evaluations as it was not required. All grantees that had evaluations included implementation analyses as a part of their design. Eighty-seven evaluations are included in the Rounds 1 and 2 implementation synthesis.

FIGURE 1.3

Third-Party Evaluation Requirements across All Rounds of the TAACCCT Grants

Round 1	Round 2	Round 3	Round 4
Not required, but evaluation of grant projects was encouraged	Required; grantee had to submit short evaluation design plan with application	Required; grantee had to submit short evaluation plan with application and detailed evaluation plan at a later date; plan was subject to DOL approval	Required; grantee had to submit short evaluation plan with application and detailed evaluation plan at a later date; plan was subject to DOL approval

Source: Rounds 1-4 Solicitation of Grants Announcement at https://www.doleta.gov/taaccct/applicantinfo.cfm.

Grantee-sponsored third-party evaluation designs had to include a 1) program implementation analysis, and 2) a participant outcome and/or impact analysis. For the implementation analysis, third-party evaluators had to document and assess the implementation of the key grant activities, specifically new and enhanced programs of study, support services, curriculum development, participant assessments and career guidance, and partnership development. Per the grant announcement, the participant outcome and impact analysis had to assess education and employment outcomes such as program completion, credential attainment, placement into employment, and employment retention, but third-party evaluators could use other outcome measures to reflect the goals of the TAACCCT strategies tested. For the impact analysis, DOL encouraged evaluators to use the most rigorous evaluation design feasible to estimate the grant activities' impacts on participants, using either an experimental design with random assignment or a quasi-experimental design.[12] DOL required that third-party evaluators submit interim and final reports with findings from these analyses. This synthesis uses the final reports for the review of findings, as discussed in the next section.

1.3. Synthesis of TAACCCT Evaluation Findings

This synthesis of grantee-sponsored third-party evaluations addresses a key research question from the TAACCCT national evaluation: ***what service delivery and/or system reform innovations resulted in improved employment outcomes and increased skills for participants?*** To do so, the synthesis draws from the third-party evaluation findings to develop an understanding of the career pathways approaches to support service delivery and systems innovation that were implemented and assess whether TAACCCT participants increased their educational attainment and made gains in employment. The synthesis also seeks to highlight the successes and challenges and identify promising strategies that can inform efforts to replicate or scale the grantees' career pathways efforts. In addition, the synthesis provides lessons for conducting research on community college and workforce development initiatives.

The synthesis explores career pathways approaches within the three categories: ***accelerated learning***, ***college persistence and completion***, and ***connections to employment***. As discussed earlier, these topics represent career pathways approaches implemented by the grantees that align with the grant program's goals. The synthesis highlights selected strategies rather than all possible strategies within these topic areas. DOL and the national evaluation team jointly identified specific strategies for the synthesis, basing the choice on 1) whether the strategy was highlighted in the Rounds 1 and 2 grant

[12] Appendix B provides summary charts on the planned evaluation designs and data sources from the third-party evaluations.

announcements as a focus, or 2) whether the strategy was commonly used in the Rounds 1 and 2 grants, based on results from a survey of Rounds 1 and 2 colleges and other documentation. Strategies and other topics for future syntheses will be selected based on the foci of the Rounds 3 and 4 grants.

The synthesis is based on the findings and lessons from the third-party evaluation reports for nine Round 1 reports and 78 Round 2 final evaluation reports—87 in total. [13, 14] All the third-party evaluations included in this review provided an analysis of the implementation of the grant activities, with Round 2 evaluators guided by research questions provided in the grant announcement.[15] Because of the number of evaluation reports, a review of the reports initially identified implementation findings and lessons highlighted in the final reports' executive summaries, the basis for the synthesis of the implementation findings in chapters 2–4 of this report. Additional details on the findings and implementation examples were then drawn from the main bodies of the final reports.

Chapter 5 reviews the impact findings from 11 Rounds 1 and 2 final evaluation reports that used quasi-experimental methods to assess the impact of TAACCCT on participants' educational and employment outcomes.[16] It summarizes the magnitude and direction of impact estimates for both education and employment outcomes and discusses facets of the evaluation designs that can help readers interpret the findings. However, the synthesis does not assess the rigor or conduct a formal review of the methods third-party evaluations used. In the future, the Clearinghouse of Labor Evaluation and Research (CLEAR),[17] administered by DOL, may formally review some third-party evaluations to assess the evidence's strength.

As noted, 11 third-party evaluations, a small subset of the 87 reports reviewed for the synthesis, used quasi-experimental methods, such as propensity score matching, to estimate the impact of TAACCCT on participants. No third-party evaluators used experimental design, which provides the

[13] The synthesis does not include reports in the review that do not provide findings on the implementation or outcomes/impacts of the TAACCCT activities or if the evaluator was not a third party external to the TAACCCT grantee institution.
[14] The final evaluation reports can be found at www.SkillsCommons.org, a DOL-sponsored online repository of job-driven workforce development materials where grantees posted these reports and other grant products. Other information on grants, including applications and short project descriptions, can be found at https://www.dol.gov/general/grants. Another resource, state profiles of the TAACCCT grants, can be found at https://www.doleta.gov/taaccct/state-profiles.cfm.
[15] See appendix C for the four research questions third-party evaluators had to address for their implementation analysis.
[16] The synthesis does not summarize participant outcomes, as reported by the third-party evaluators. The outcomes are similar to the performance outcomes grantees report to DOL. DOL releases this information separately, and a program summary can be found at https://doleta.gov/taaccct/pdf/TAACCCT-Fact-Sheet-Program-Information.pdf. In addition, a brief on the early results of the TAACCCT grants with information on performance outcomes can be found at https://www.urban.org/research/publication/early-results-taaccct-grants.
[17] Information on the CLEAR and its review process can be found at https://clear.dol.gov/.

strongest evidence of the impact of an intervention on a treatment population.[18] Many third-party evaluators experienced difficulty in implementing experimental and quasi-experimental evaluation methods, which the grant announcement had encouraged.

Based on informal discussions with some third-party evaluators, using experimental design was challenging as there were limits to implementing random assignment of treatment and control groups in the TAACCCT setting, as community colleges do not deny enrollment to any interested applicant because of open access policies. Also, it may have been difficult to randomly assign applicants because of the nature of grant activities, where students across the college could access courses and tools being developed. Finally, the grantees had to meet enrollment goals for the grants, making it unlikely that there would be oversubscription to grant-funded programs.

The evaluations that used or attempted to use quasi-experimental designs experienced a number of challenges. Many had difficulty finding a viable comparison groups, either within the TAACCCT colleges (using concurrent or prior cohorts) or from other institutions with similar programs of study. Other evaluators struggled to isolate the "TAACCCT" treatment, as many efforts, such as changes in institutional policy or the scale of the implementation, may have reached most or all students at a TAACCCT college. Another major challenge was data availability, especially of state Unemployment Insurance wage records, to estimate grant activities' impact on employment and earnings. Other evaluators indicated that the size of their treatment groups may have been too small to detect statistically significant differences in outcomes for treatment and comparison groups. Nearly all evaluators cautioned about making causal inferences about the effect of the grant activities on participants' education and employment outcomes because of methodological rigor. (Many evaluators responsibly included limitations for interpreting their impact findings because of weaknesses in the designs.)

This report first synthesizes the implementation findings from these two rounds for selected capacity-building strategies within the three topic areas, providing examples and key takeaways to inform future strategy scaling and replication. The report then focuses on the evaluations that used quasi-experimental methods to estimate the impact of the grant-activities on participants' education and employment outcomes and presents those results. Finally, the report discusses the implications of these findings in understanding the strategies that the Rounds 1 and 2 grantees implemented and their potential effect on adult learners who participate in education and training at community colleges. Future reports will cover the Rounds 3 and 4 third-party evaluation findings.

Overall, the synthesis of the Rounds 1 and 2 third-party evaluation findings are an important product from the national evaluation, aiding the effort to build an overall picture of the TAACCCT grants and draw lessons and implications for future workforce investments and research. It adds to a growing body of evidence on career pathways approaches that encourage accelerated learning, college completion, and connections to employment.

2. Accelerated Learning Strategies: Implementation Findings

This chapter summarizes the Rounds 1 and 2 implementation findings on accelerated learning strategies as a career pathways approach. The TAACCCT grantees designed these strategies to help participants complete coursework and programs of study more quickly. The TAACCCT colleges implemented various strategies, often to support career pathways programs. The synthesis focuses on three accelerated learning strategies: ***online and hybrid learning***, ***stackable credentials***, and ***prior learning assessments***.

Table 2.1 highlights the prevalence of these strategies across the Rounds 1 and 2 colleges.[19] The colleges focused on stackable credentials and technology-enabled learning, emphasizing prior learning assessments (PLAs) for the Rounds 1 and 2 grants. [20]

TABLE 2.1

Prevalence of Selected Rounds 1 and 2 TAACCCT Accelerated Learning Strategies

Accelerated learning strategy	Percent of Rounds 1 and 2 colleges implementing strategy
Online learning	49
Hybrid learning	62
Stackable credentials	66
Prior learning assessments	41

Source: Rounds 1 and 2 TAACCCT college surveys (2014–15).
Notes: Number of Rounds 1 and 2 TAACCCT college survey responses = 584. TAACCCT colleges include single institution grantees, consortium grant leads, and consortium partners.

[19] The TAACCCT college online survey was fielded to 614 colleges involved in the 128 Rounds 1 and 2 TAACCCT grants, with 590 responding, or a response rate of 96 percent. The colleges were single-institution grantees, consortium grant lead institutions, or consortium member institutions.
[20] For information on the strategies of focus for the Rounds 1 and 2 grants, see the Round 1 and Round 2 grant announcements at https://www.doleta.gov/taaccct/applicantinfo.cfm.

1.1. Technology-Enabled Learning via Online and Hybrid Courses

Technology-enabled learning was a core element of the Rounds 1 and 2 TAACCCT grants. One approach to support career pathways for adult learners was through online learning, where courses are accessed through the internet on computers at home or elsewhere. Hybrid learning courses have both online and in-person components. Grantees sought to accelerate learning through technology, allowing participants to take courses at their own pace and making courses more accessible if participants worked, had families, or lived far from campus.

Grantees developed several online learning tools for participants. Some grantees took their in-person courses and redesigned them for online delivery, or created new online courses altogether. Some colleges found ways to provide experiential learning online by creating work simulations and laboratory coursework for online instruction. Other online tools included satellite learning sites, e-books, podcasts, and interactive videos. One college, Leeward Community College, even had a laptop lender program (Helms 2015). Employers working with Central Lakes College allowed participants to take online courses from work (Ho 2016a). Box 2.1 provides an example of how one grantee implemented a suite of online tools for its participants to support acceleration and increase access to the programs.

BOX 2.1

Mitchell Technical College's Technical Education at a Distance Model

The purpose of the grant was to create a mentor-supported, hands-on hybrid distance learning model to support Trade Adjustment Assistance-eligible and low-skilled workers in South Dakota, which includes rural areas with limited access to campus facilities. The college designed Technical Education at a Distance as a hybrid model, incorporating a virtual classroom, face-to-face regional labs, and interactive technology. While the virtual classroom included a variety of online and technology-enabled tools, participants indicated the use of VoiceThread, an online tool that facilitates interaction among participants, classmates, and instructors, to be an effective part of the program model.

Source: Swanson and Erickson (2016).

Key implementation findings from the experiences of TAACCCT Rounds 1 and 2 grantees in developing online and hybrid learning include the following:

- **Faculty and Staff Perspectives.** Implementing the online learning technology required a shift in the perspectives of faculty and staff who may not have previously used an online platform for teaching and serving students. Some faculty and staff, especially those at Lake Region State College, had good experiences with and were excited about the online components of courses and wanted to make all courses online in the future (Good and Knotts 2016). However, while many faculty were positive about the changes, some faculty and staff resisted changing courses to online formats because of a lack of familiarity with the technology and the need to adapt curriculum to the format (Eastern Iowa Community College District) (de la Mora et al. 2016).

- **Participant Experiences.** Participants' views on online learning varied, with some appreciating the convenience and self-paced nature of online courses, while more participants preferred in-person interaction with instructors to help them learn the material (Norwalk Community College) (Mokher and Pearson 2016). Implementing online courses for adult learners could be challenging because of the participants' lack of computer access and low digital literacy skills, as noted for colleges serving a more rural population (Bossier Parrish Community College) (Aspen Institute Workforce Strategies Initiative 2016).

Key Takeaways on Online and Hybrid Learning:

Nearly half the Rounds 1 and 2 TAACCCT colleges designed and implemented online and courses and 62 percent designed and implemented hybrid courses to increase access to and accelerate completion of training. Colleges had to carefully consider the challenges adult learners faced in accessing online or hybrid learning, such as a lack of a computer. Colleges may also have lacked the capacity or infrastructure necessary to effectively deploy the technology. Some colleges had to address the concerns of faculty and staff who were resistant to online learning. Instructors who were more comfortable with the technology helped convince other instructors to teach courses online.

- **Challenges with Online/Hybrid Learning.** Although grantees may have developed online learning platforms and tools for participants, their implementation could vary across colleges within a consortium. The use of hybrid learning across colleges in a Round 2 Tennessee consortium depended on instructor interest, the technology available, and local infrastructure, even though participants who had access to hybrid learning saw higher completion rates and passage of certification exams than those who did not (Roane State Community College) (Sturges et al. 2016). Some colleges were successful in developing the online courses or bringing the technology to campus but could not offer the online courses in the end due to a

lack of internal capacity and infrastructure; for example, Palm Beach State College developed the online courses but could not offer them because of the time and effort needed to get the courses approved through the industry accrediting body (WorkEd Consulting and MNA Associates 2016). Another college purchased the technology, but faculty and staff did not widely use it for instruction (Cuyahoga Community College District) (The New Growth Group 2016).

1.2. Stacked Credentials as a Part of Career Pathways

As shown in table 2.1, two-thirds of Rounds 1 and 2 colleges participating in the survey created new programs or enhanced current programs that embedded stackable credentials—such as certificates, degrees, and industry certifications—to help students advance in a career pathways program. As a core element in the Round 2 grant announcement, these "stacked" credentials demonstrate educational and training progress and allow students to exit training to enter the workforce in their chosen occupation before completing a career pathways program and reenter training to complete the program at a later date. Colleges and industry partners design these credentials to demonstrate increasing levels of competency within an occupation, so credentials are stacked to show this advancement.

Key implementation findings from the experiences of TAACCCT Rounds 1 and 2 grantees in developing stacked credentials include the following:

- **Credentials as a Part of Career Pathways.** Two-thirds of Rounds 1 and 2 colleges developed new and enhanced current credentials designed to lead to a degree and increase the employability of those who advance along career pathways. Bossier Parish Community College consortium colleges offered a continuum of completion by stacking certificates and building a certificate-to-degree career pathway leading to various occupations. This strategy allowed colleges with to offer participants an option that better connected their educational experiences to local job opportunities. One college built an exit point into the workforce after earning 30 credits in a 60-credit program in the health care information field to qualify for a medical office assistant position (Aspen Institute Workforce Strategies Initiative 2016). For two South Carolina colleges in Round 2, developing a full set of credentials in the advanced manufacturing and transportation and logistics industries involved: 1) creating six new industry credentials; 2) enhancing eight current credentials by updating curriculum to reflect new training equipment purchased through TAACCCT or converting credentials from non-credit

into for-credit, among other strategies; and 3) adding a national career readiness certificate as part of the pathway (Orangeburg-Calhoun Technical College) (SCATE Inc. 2015). The credentials included certificates and industry certifications.

- **Shorter Steps to Credentials.** Grantees often created new credentials, but many established a series of credentials or redesigned existing credentials to support progress on a career pathway. Florida colleges in the Wallace Community College consortium with new welding programs opted for National Center for Construction Education and Research curricula that included stacked credentials (PTB & Associates 2016). Modifications to current courses included bundling existing courses, credits, and competencies so that participants could earn shorter-term credentials more quickly (Northeast Wisconsin Technical College) (Price et al. 2016). For the Prince George's Community College grant, the steps to test for and earn four information technology credentials in a 16-week period may have been too short (ICF International 2016). Most participants were only able to complete three credentials during the semester. Similarly, Colorado Mesa University had difficulty providing shorter-term stackable credentials to accelerate completion of the Fast Track program as employers and faculty did not think it was feasible for the curriculum as designed to fully prepare the participants for entry-level jobs in a semester. In response, the institution made the program more flexible, allowing students to go part time, and made most courses intermediate and advanced. However, only four of the 40 participants completing at least one certificate earned additional stackable credentials—three certificates and two associate's degrees—by the end of the grant (Michael and Rua 2016).

Key Takeaways on Stackable Credentials:

Two-thirds of Rounds 1 and 2 TAACCCT colleges developed new or used existing credentials – noncredit and credit certificates, industry certifications, and degrees – to build a stackable set of credentials as a part of career pathways programs to allow participant to accelerate learning with short-term credentials that allow for exit points into the workforce. Grantees often worked with employers and industry to develop stackable credentials. Ensuring stackable credentials could be earned quickly was challenging as some programs needing longer than a semester to build competencies and skills required for the credentials. Another challenge was that some credentials were not recognized by employers in the hiring process.

- **Connecting Credentials to Employment.** At William Rainey Harper College, stackable certificates gave participants a sense of accomplishment after completion and encouraged continued enrollment, increasing the pace of participants' transition to employment by providing credentials in a short time (Bucci 2016). Some grantees included job readiness and

employability skills certificates in their career pathways. Similar to the Orangeburg-Calhoun Technical College consortium, the Estrella Mountain Community College consortium members embedded the National Career Readiness Certificate and the Energy Industry Employability Skills Certificate across all programs within an industry-based eight-tier competency model to help build foundational skills for participants. [21] However, employers often did not recognize these credentials, which may have contributed to participants' difficulty finding energy-related jobs (Kracker Selzer et al. 2016). Other grantees also developed stackable credentials in partnership with industry to ensure the credential would be valued and recognized in the workforce. The Los Medanos consortium grant, for example, used sector partnerships to build career pathways programs with stackable credentials. The consortium developed the East Bay Skills Alliance, a regional partnership including industry and higher education in California, to help build and promote a regional "career path" system with stackable credentials and worked closely with employers in the alliance to ensure the certificates aligned with industry needs across the colleges (Rayyes et al. 2016).

1.3. Prior Learning Assessments

Slightly over 40 percent of Rounds 1 and 2 TAACCCT colleges responding to the survey implemented PLAs, which are processes by which colleges award credit for skills and experience gained outside the classroom (see table 2.1 on page 11). PLAs can help students complete their coursework in less time because they do not have to take courses for which they have already demonstrated their knowledge and skills. PLAs include competency-based assessments, portfolio reviews, and badges for demonstrating mastery of skills. Box 2.2 provides an example of how one grantee implemented PLAs that updated and standardized current PLA systems to develop career pathways programs for participants.

[21] While colleges may have added employability skills credentials such as the National Career Readiness Certificate based on industry demand, these types of non-occupation-specific credentials did not count toward completed credentials under TAACCCT performance reporting. Credentials had to meet the definition of Training and Employment Guidance Letter #15-10 (http://wdr.doleta.gov/directives/attach/TEGL15-10acc.pdf) to be counted.

BOX 2.2

Norwalk Community College's Prior Learning Assessment Experience

In collaboration with the Connecticut Career Assessment Program, administered by Charter Oak State College, a consortium of Connecticut colleges refined PLA systems to award credit for relevant credit and noncredit coursework, prior training, and work experience. Charter Oak worked with the consortium colleges to coordinate and standardize the PLA process at each college. By the end of the grant period, the five colleges awarded 15,164 credits to 1,629 unique participants, with the grantee partially attributing this outcome to PLAs.

Source: Mokher and Pearson 2016.

Key implementation findings from the experiences of TAACCCT Rounds 1 and 2 grantees in developing PLAs include the following:

- **State-Level Coordination to Implement PLAs.** Some statewide consortium grantees worked with member colleges and state officials to develop standardized PLA policies, such as the Connecticut example highlighted in box 4. In Missouri, eight of the 10 colleges in a Round 2 consortium, led by St. Louis Community college, developed consistent PLA policies, collaborating across colleges and working with the state community college associations to leverage existing state committees for academic and student affairs to develop the policies. The Round 2 consortium built off Round 1 PLA efforts to continue to address internal barriers to developing policies to create bridges between noncredit and credit programs, including short-term programs in PLAs, and getting buy-in from existing faculty. The colleges indicated that there was little use of PLA before the grant and that 7 percent of students received credit for prior learning based on the updated PLA policies. Under the Round 4 grant, Missouri has continued using PLA policies (Cosgrove, Cosgrove, and Bragg 2015).
- **Gaining "Buy-In" from Many Stakeholders.** Grantees often indicated the need to work closely with stakeholders such as faculty, advisers, financial aid counselors, and administrators to develop successful PLA policies and processes. Montgomery Community College succeeded in this effort by convening a workgroup that standardized PLA materials and processes across colleges, addressed differences across partner colleges, and shared best practices, which would be sustained after the end of the grant (Hayman 2016). College leadership supported workgroup members in devoting the time needed to participate and encouraged remote participation in workgroup meetings and activities to avoid interference with other job duties. Clackamas Community College engaged state education officials to make state policy changes necessary for implementing PLAs (Watrus and Fercho 2015).

- **Ensuring Take-Up of PLAs by Participants.** Some grantees that developed or enhanced PLA policies in their institution also saw a need for supporting students' access to PLAs. Lake Region State College hired regional cognitive tutors, who provided tutoring, academic advising, and coordination with faculty, and facilitated PLAs (Good and Knotts 2016). Mid-South Community College developed a PLA intake tool for awarding credit for noncredit courses, which aligned learning outcomes from specific courses to apply to certificate courses as a part of the curriculum (Thomas P. Miller Associates 2016). The college also created a complementary toolkit and training for advisers. For the Bellevue College consortium, several colleges believed the PLA framework developed through the grant would be increasingly used by future participants (Kogan et al. 2016).

Key Takeaways from Prior Learning Assessments:

Over 40 percent of Rounds 1 and 2 TAACCCT colleges developed new PLAs and improved existing ones. Developing and implementing PLAs required coordination across dedicated college administrators, faculty, and staff across institutions, in addition to involving the state community college staff. Gaining buy-in and building a high level of cross-institution collaboration could be challenging, especially when using PLAs to award credit for noncredit programs and when aligning program requirements with the skills of the adult learners. In addition, having staff responsible for working with students to help them access PLAs was important to ensuring TAACCCT participants could take advantage of PLAs to help accelerate their time to completion.

- **Challenges to Implementing PLA.** Grantees reported several challenges for successfully implementing PLA policies, including a lack of alignment between programs and the skills participants had, inconsistent implementation across colleges, a lack of faculty buy-in, and a lack of marketing and outreach to participants. While many grantees developed PLAs for veterans, Fox Valley Community College found it challenging to award credits for this experience because the competencies for advanced manufacturing did not align well with the skills the veterans gained from military experience (Public Policy Associates 2016). In another instance, programs of study were too short to make PLAs useful for accelerating learning (Wichita Area Technical College) (Office of Educational Innovation and Evaluation 2016a). Also, standardized PLA policy could be difficult to consistently implement across colleges without a central state office for community colleges, and if college staff responsible for implementing PLA policies lacked the authority to make institutional policy, which is what Montgomery County Community College and Casper College staff faced (Hayman 2016, Ho 2016b). Some grantees reported having a PLA system in place that was not widely used. Some faculty, especially at William Rainey Harper College, did not feel that participants were

adequately prepared by their prior coursework (Bucci 2016). Colleges, such as those in the Bossier Parish Community College consortium, also did not market PLAs enough to increase take-up of the opportunity (Aspen Institute Workforce Strategies Initiative 2016).

3. Approaches to Support College Persistence and Completion: Implementation Findings

This chapter summarizes the implementation findings on career pathways strategies to support participants' persistence in and completion of TAACCCT programs of study and advance along career pathways. While the Rounds 1 and 2 grantees used many completion strategies, this review focuses on ***student support services*** and ***articulation agreements***.

Rounds 1 and 2 grants both focused on student support services and articulation agreements, but in different ways. DOL allowed grantees to use grant funds to provide access to student supports in the Rounds 1 and 2 grant announcements, and many colleges targeted and enhanced student support services as a part of their grants. As shown in table 3.1, over half (55 percent) of colleges responding to the survey provided enhanced academic support such as personalized instruction, online tools, tutoring and case management, and proactive advising. Nearly 80 percent of colleges also worked with partners within their institution to provide access to supports such as financial aid, public assistance, and transportation assistance.

TABLE 3.1

Prevalence of Selected Rounds 1 and 2 TAACCCT Persistence and Completion Strategies

Persistence and completion strategy	Percent of Rounds 1 and 2 colleges implementing strategy
Student supports	
Academic support and tutoring	55
Access/referral to support services	79
Articulation agreements	41

Sources: Rounds 1 and 2 TAACCCT college surveys (2014–15).
Notes: Number of Rounds 1 and 2 TAACCCT college survey responses = 584. TAACCCT colleges include single institution grantees, consortium grant leads, and consortium partners.

Articulation agreements were a core element of the TAACCCT grant program, as highlighted in the Round 2 grant announcement. Over 40 percent of Rounds 1 and 2 colleges reported using articulation

strategies. Chapter 5 of this report highlights third-party evaluators' findings from the impact analysis of grant activities on participants' persistence and completion of grant-funded programs of study.

3.1. Enhanced Student Support Services

Many grantees sought to improve student support services, with advisers and other staff coordinating supports that met the needs of adult learners. Supports included both academic and nonacademic services that could help participants successfully enroll in and complete their programs of study. The many types of support services are highlighted in box 3.1. The report goes into more detail on career coaching and navigation in section 4.2.

BOX 3.1

Range of Services Developed and Offered by TAACCCT Colleges to Support Persistence and Completion

- bridge programs with contextualized language arts, math, and science (Waubonsee Community College)
- "booster" modules that provide participants additional tools to successfully complete coursework (Norwalk Community College)
- coaches to provide counseling to support persistence and completion (East Los Angeles College)
- contextualized remediation (Central Community College)
- individualized education action plans (Lake Region State College)
- digital literacy assistance (Georgia Piedmont Community College)
- tutoring (Collin County Community College District)
- statewide industry mentoring group (Great Bay Community College)

Source: Various Rounds 1 and 2 third-party evaluation final reports.

Key implementation findings from the experiences of TAACCCT Rounds 1 and 2 grantees in developing services to support student persistence and completion include the following:

- **Coordination Across Multiple Student Supports.** Many grantees implemented a package of support services to improve persistence and completion, including academic, personal, and financial supports. New River Community and Technical College implemented tutoring, placement testing, academic advising and workshops, disability assistance, and financial aid support (Knotts and Bumgardner 2016). Some grantees, such as Central Community College, introduced individualized education and learning plans to help participants and staff track

student progress and identify support services needed for participants to succeed (Shain and Grandgenett 2016). Participants were often satisfied with the support services they received. Participants at the colleges in the Round 1 consortium led by West Hills College Lemoore thought the enhanced services they received supported their success, with the consortium demonstrating improved academic behaviors and progress in their programs during the grant (Tan, Moore, and Venezia 2015). However, some participants needed more assistance to succeed in their programs of study. At Prince George's Community College, grant staff indicated that participants, who were required to attend full time could have benefited from more assistance to support basic needs such as food, housing, and child care (ICF International 2016).

- **Access to Advising.** Many grantees changed how student advisers serve TAACCCT participants to improve access to student supports. In the Colorado Round 1 consortium of community colleges, led by Community College of Denver, the colleges worked with the state to reform developmental education statewide, eliminating or shortening time in developmental education to one semester before taking college coursework. To help participants succeed in college coursework, some Colorado colleges provided mandatory in-person advising, advising when students sit for placement tests, and mandatory orientations. Advisers became well-versed in the academic and career pathways offered to help participants to successfully complete programs of study (McKay, Michael, and Khudododov 2016). Grantees also used technology to enhance advising strategies, but some challenges emerged. One grantee purchased technology to provide alerts to instructors and advisers on participants who were not progressing in their program as planned (Kansas City Kansas Community College) (Martin and Melzer 2016). However, the system was not fully deployed as planned, and instructors and advisors did not use it to work with their students.

Key Takeaways on Support Services:

Rounds 1 and 2 TAACCCT colleges offered a range of supports for adult learners to support persistence and completion, with 55 percent offering academic support and tutoring. For example, enhanced academic supports such as booster modules helped adult learners reinforce what they learned in their courses. In addition, 79 percent of colleges provided access to a range of academic, personal, and financial aid services, often through proactive advising. Advisers needed to be knowledgeable in the career pathway program offerings to ensure their advice helped participants take the courses they needed to complete their programs. Advisers also connected participants to available support services but some grantees reported that more assistance was needed.

- **Enhanced Academic Supports.** Grantees implemented new academic supports to improve persistence and completion of programs. The College of Southern Nevada and Kansas City Kansas Community College implemented the Integrated Basic Education and Skills Training model, also known as I-BEST, which promises improving educational attainment for adult learners with low basic skills and integrates basic skills training with technical instruction through the team-teaching model (Anderson et al. 2017). An adult basic education instructor works with a technical instructor in the classroom to reinforce academic skills while teaching occupational skills (Pacific Research and Evaluation 2016a; Martin and Melzer 2016). The Round 2 Connecticut health care and life sciences consortium, led by Norwalk Community College, developed 154 math and science booster modules, with most of the nearly 4,800 participants reporting that it was a useful in reinforcing course material (Mokher and Pearson 2016).

3.2. Articulation and Transfer Agreements

Articulation and transfer agreements helped many TAACCCT project participants transfer to four-year and other postsecondary institutions as a part of career pathways the grantees developed. Grantees worked closely with faculty and college staff to develop new or improve existing agreements to ensure the courses and credits earned at a TAACCCT college could successfully transfer. Some grantees also provided support to participants to help them ensure courses and credits would transfer, as shown in box 3.2.

BOX 3.2

Coconino County Community College District's Reverse Transfer Policy

The Coconino County Community College District's grant focused on increasing the number of participants who complete credentials and degrees and transfer to Northern Arizona University to complete baccalaureate degrees as part of its engineering pathways. The grantee developed a reverse transfer policy to ensure participants could complete an associate's degree. Coconino Community College and Northern Arizona University developed an agreement for participants who transferred to Northern Arizona University to have course credits earned at Northern Arizona University transfer back to Coconino Community College. This allowed participants to complete the course requirements for an associate's degree from the community college while attending a four-year degree program at Northern Arizona University. Grant funds also helped support modifications and upgrades to DegreeWorks, a web-based degree audit and tracking system that allows participants to see 1) courses transferred from other institutions, and 2) courses in progress needed to complete a degree of study. Overall, TAACCCT participants were 3.5 times as likely as nonparticipants to transfer to a four-year institution.

Source: Magnolia Consulting (2016).

Key implementation findings from the experiences of TAACCCT Rounds 1 and 2 grantees in developing articulation agreements include the following:

- **Agreements across Institutions.** Grantees developed articulation agreements across multiple postsecondary education and training institutions to build ways to advance along career pathways. Some grantees developed "2+2" agreements, where participants attend community college for two years and then a four-year institution for two years to complete a bachelor's degree. A member college from a consortium created 2+2 agreements with four-year colleges and coordinated visits from those colleges to walk participants through the transfer process (Central Maine Community College) (Tara 2015). One grantee worked with a four-year college to make curriculum changes to incorporate the aerospace program in its bachelor of applied science program for its articulation agreement (North Idaho College) (Office of Educational Innovation and Evaluation 2016b).

Key Takeaways on Articulation Agreements:

Over 40 percent of Rounds 1 and 2 TAACCCT colleges designed different types of articulation agreements, such as 2+2, reverse transfer, and dual enrollment, to support persistence and completion of career pathways for adult learners. Colleges indicated that creating articulation agreements required coordination across stakeholders at many institutions, involving state officials, college administrators, and faculty to agree on new or revised articulation and transfer policies. Developing articulation agreements was sometimes stymied by challenges such as needing to change state policy and having to align agreements with industry certification requirements.

- **Stakeholder Collaboration.** Strong collaboration across stakeholders in partner institutions, such as administrators, faculty, and other staff, was necessary for successfully developing articulation agreements. The Round 1 consortium, led by Great Bay Community College, had to work across many stakeholders across New Hampshire community colleges, high schools, career and technical education centers, and four-year institutions to develop 24 formal articulation agreements for their manufacturing pathway (Singer 2015). These articulation agreements awarded credit and offered advanced placement for high school students, aligned programming with career and technical education centers, and used a manufacturing competency model that articulated from the community colleges to four-year institutions. The colleges in the Round 2 Louisiana-Mississippi consortium, led by Bossier Parish Community College, found the development of articulation policies challenging initially but worked to build support among various stakeholders, especially their state community college offices, to develop and implement the policies in the first year of the grant (Aspen Institute Workforce Strategies Initiative 2016).

- **Challenges to Articulation Agreements.** Many grantees found developing new and modifying current agreements a challenge because of state policy, industry requirements, and the need to coordinate with many stakeholders. Some articulation agreements between colleges, such as Roane State Community College, and four-year institutions were stymied by state-level policy (Sturges et al. 2016). For Palm Beach Community College, only one articulation agreement with another college was developed because of challenges aligning the pathway offerings with American Health Information Management Association requirements (WorkEd Consulting and MNA Associates 2016). One cross-state consortium, led by Wichita Area Technical College, saw uneven implementation of articulation agreements across the five partner colleges. The colleges implemented the curriculum in different ways, making it difficult to understand how the TAACCCT programs could be articulated to more advanced degrees in a consistent way. Also, the colleges had to work with their own state's education officials to implement articulation policies, with varying success. Two colleges that were part of the consortium were able to establish articulation agreements during the grant period (Office of Educational Innovation and Evaluation 2016a).

4. Approaches to Support Connections to Employment: Implementation Findings

This chapter focuses on how selected TAACCCT career pathways approaches designed to connect participants to new jobs and careers and help employers find qualified workers were implemented. While there are many ways the grantees build connections to employment for their participants, this chapter specifically highlights ***partnerships with the public workforce system, career coaches and navigators,*** and ***work-based learning***. [22]

The Rounds 1 and 2 grant announcements focused on partnerships with the public workforce system, with 60 percent of TAACCCT colleges responding to the survey reporting partnerships with local workforce development boards or American Job Centers (see table 4.1). The grant announcements also allowed grantees to pay for access to career counseling as a part of the support services for participants. A common strategy for providing career guidance was the use of career coaches or navigators, which 70 percent of colleges implemented. In the grant announcements, work-based learning was highlighted as a component of employer engagement for the grant activities. As shown in table 4.1, TAACCCT colleges implemented various work-based learning strategies. Later in the report (chapter 5), the report highlights third-party evaluators' findings from the impact analysis of grant activities on participants' employment outcomes.

[22] Other components of the national evaluation, such as the employer perspectives study, will provide insights into college-employer relationships, so they are not discussed in detail in this report except as it relates to specific strategies.

TABLE 4.1

Prevalence of Selected Rounds 1 and 2 Connections to Employment Strategies

Connections to employment strategy	Percent of Rounds 1 and 2 colleges implementing strategy
Partnerships with the public workforce system	60
Career coaches and navigators	70
Work-based learning strategies	
Internships	47
Clinical placements	20
Job shadowing	19
On-the-job training other than registered apprenticeship	16
Cooperative education or work-study program	14
DOL-approved registered apprenticeships	6
Other work-based learning approaches	8

Sources: Rounds 1 and 2 TAACCCT college surveys (2014–15).
Notes: Number of Rounds 1 and 2 TAACCCT college survey responses = 584. TAACCCT colleges include single institution grantees, consortium grant leads, and consortium partners.

4.1. Partnerships with the Public Workforce System

TAACCCT grantees developed and expanded many different types of partnerships during their grants, with employers, industry associations, state and local public workforce systems, other government agencies, and community-based organizations. The grant program encouraged partnerships with the public workforce system. Local workforce development boards oversee local public workforce systems, with programs and services offered at American Job Centers. These centers provide and coordinate employment and training services from various programs including Workforce Innovation and Opportunity Act, Wagner-Peyser Act, Trade Adjustment Assistance, Veterans' Employment and Training Service, and vocational rehabilitation. Thus, by partnering with the public workforce system, TAACCCT colleges could improve participants' connections to employment by connecting American Job Center customers to grant-funded programs, supporting participants' enrollment in the programs, providing job placement and career guidance services, and connecting colleges to employer partners. Box 4.1 provides an example of the regional approach a consortium grantee implemented to build workforce system partnerships.

BOX 4.1

Los Medanos Community College

The Los Medanos College consortium created a regional workforce development network of community colleges, local boards, two- and four-year postsecondary institutions, local employers and industry professionals, and other community partners for its Design it-Build it-Ship it project. Local workforce development boards and American Job Centers in five counties participated in the grant activities. At a regional level, the Contra Costa and Alameda County boards took an active role in the cluster partnerships. Many American Job Centers also developed or enhanced their relationships with specific colleges and programs through the grant. The initiative collaborated college staff and faculty, workforce development professionals, and industry representatives in the three industry clusters.

Source: Rayyes, Abe, Sanchez, Lai, Akiya, Chan, and Barach 2016.

Key evaluation findings from the experiences of TAACCCT Rounds 1 and 2 grantees in developing partnerships with the public workforce system include the following:

- **Developing New and Building on Existing Relationships.** Grantees sought to develop new and build on existing relationships with the public workforce system. Bossier Parish Community College noted that all its colleges had partnerships with their local workforce systems, which was crucial for engaging employers, recruiting participants, and providing funds to support student enrollment (Aspen Institute Workforce Strategies Initiative 2016). A long-term partnership between Casper College and the Casper Workforce Center led to the Center representative playing an active role in the grant management, as well as ensuring TAACCCT participants receive WIOA services and referring Center customers to the TAACCCT programs at the college (Ho 2016b). For some grantees, communications with public workforce system staff improved during the grant. For the consortium led by Roane State Community College, staff at most colleges reported enhancing relationships and increasing communication with local boards; about the same number reported improved relationships and more frequent contact with their college's internal workforce development offices. These relationships included informal faculty relationships with local employers, advisory board participation, and interactions through local workforce offices (Sturges et al. 2016).

- **Leveraging Resources.** Grantees and public workforce system partners leveraged various resources to support grant-funded programs. Some grantees, such as Fox Valley Technical College and Mitchell Technical Institute, worked closely with their local American Job Centers to recruit Trade Adjustment Assistance-eligible workers and veterans to their grant-funded programs (Public Policy Associates 2016; Swanson and Erickson 2016). Some public workforce system partners helped TAACCCT participants access financial aid for programs of study, as the grant could not provide tuition support. New Mexico Workforce Solutions was an essential partner to Clovis Community College in helping participants who qualified access financial aid (Caffey 2016). A consortium of tribal colleges leveraged the TAACCCT grant with another DOL grant received by the Job Service of North Dakota, providing advisement and support services to veterans and Native Americans in training for oil jobs (Woodke 2015). The Job Service used the grant to provide support services to TAACCCT participants. Grantees, such as Wallace Community College, also worked with the local boards to obtain employment data for their participants (PTB & Associates 2016).

Key Takeaways on Public Workforce System Partnerships:

Sixty percent of Rounds 1 and 2 TAACCCT colleges had partnerships with public workforce system organizations such as workforce development boards and American Job Centers to provide referrals, tuition assistance, data, and career advising. Having a grant such as TAACCCT provided colleges with a point of entry to working with the public workforce system or strengthening current partnerships, although early development of new relationships with local boards and American Job Centers may be helpful. Partnerships with the public workforce system helped community colleges serve adult learners by leveraging various resources such as participant referrals, advising, employer connections, financial aid, other support services, and access to employment data. Some colleges did not partner with local boards and American Job Centers as closely for referrals of participants as there were fewer customers needing job assistance with the economy improving during that time period.

- **Challenges to Partnering.** Some grantees noted challenges with developing partnering arrangements with the public workforce system. Establishing relationships with local boards and American Job Centers took time, and the strength of the partnerships varied across colleges, as occurred with the Round 2 Estrella Mountain Community College consortium. Engagement with the American Job Centers earlier in the grant could have helped address the challenges with developing the relationships (Kracker Selzer et al. 2016). Also, some public workforce system partners did not provide the referrals they initially promised. Washtenaw Community College indicated that the American Job Center could not support recruitment as

much as they had expected as the improving economy led to fewer customers using local workforce services (McNulty, Tice, and Spencer 2016). While some local boards helped grantees obtain unemployment insurance wage records to measure postprogram employment, Elaine Nunez Community College had issues obtaining the data from the local board, as they had not understood the legal limitations in obtaining the data (Knoster and Bumgardner 2016). Other grantees, including Northwest Wisconsin Technical College and Wallace Community College, did not build on partnerships with public workforce system stakeholders as a part of the grant activities (Price et al. 2016) or found the interactions to be sporadic (PTB & Associates 2016). The consortium of Wisconsin technical colleges did not seem to use the public workforce system to recruit participants or share resources, as evidenced by the small (10 percent) proportion of American Job Center customers becoming TAACCCT participants (Price et al. 2016). One explanation provided is that most colleges reported that there were few Trade Adjustment Assistance-eligible workers or veterans in their communities.

4.2. Career Coaches and Navigators

Many TAACCCT grantees incorporated career coaches and navigators into their grant activities to help participants find and retain employment in their field of study. Career coaches and navigators could be hired by the college or be funded through a local American Job Center. The primary role of these staff was to work closely with participants to identify where they needed to improve their job readiness, counsel them on job search activities, and provide access to services and supports to help their transition to the workforce. Career coaches and navigators could also provide academic and personal supports to help participants ensure they completed their courses. Box 4.2 provides an example of one grantee's career navigator model.

BOX 4.2

Flathead Valley Community College's Workforce Navigator Model

The Workforce Navigator was a staff person who played multiple roles—recruitment, student support, and job placement—and remained flexible to student needs. The Workforce Navigator position was embedded with participants and faculty in programs of study. The Workforce Navigator became an "expert" in the program to be able to help participants with program-specific questions and support their success in courses and transition to employment. The Workforce Navigators had a physical presence in the trades department, allowing them to build relationships with faculty and offer drop-in services for participants. The grantee considered the Workforce Navigator model a "key innovation" of the grant, and Rounds 3 and 4 grantees in Montana built on the model as part of their activities.

Source: Feldman, Staklis, Hong, and Elrahman (2016).

Key evaluation findings from the experiences of TAACCCT Rounds 1 and 2 grantees in using career coaches and navigators to support connections to the labor market include the following:

- **Delivery of Career Coaching and Navigation.** The services offered by career coaches and navigators focused on providing career guidance and job placement assistance but often also included other student supports, such as financial aid and academic support. At the University of West Alabama, coaches provided individualized and intensive student support services in academics, finances, school community, commitment to graduation, career choices, managing commitments, and healthy behaviors (Ho 2016c). A key component of the career coaching and navigator role was the time they spent meeting with participants. Survey data from participants for one consortium showed that nearly a third of the participants at Eastern Iowa Community College District met with their career navigator monthly, with half meeting with their navigator once a semester (de la Mora, Kemis, Callen, and Starobin 2016). One consortium, led by Clackamas Community College, used a cohort model (i.e., in which the same students progress through the program together) as an enhancement to 25 of its training programs, with career coaching provided from start to finish

Key Takeaways on Career Navigation and Coaching:

Seventy percent of Rounds 1 and 2 TAACCCT colleges saw career coaching and navigation approaches as promising for supporting adult learners' connections to the workforce and for persistence and completion. Adult learners appreciated the career guidance they received, but outreach efforts were needed to ensure students were aware of and took advantage of the career coaching and navigation offered. Colleges had dedicated coaches and navigators to serve adult learners but faculty and other college staff also provided career guidance and coaching. Using current faculty and staff for career coaching roles were ways to help sustain this student support after grant funding ends.

for participants. Participants who received the career coaching saw an 89 percent completion rate, compared with a 67 percent completion rate for all TAACCCT participants, and saw higher employment rates (Watrus and Fercho 2015).

- **Staff Providing Career Coaching.** While some colleges hired new staff, others had faculty serve as the career coaches for the grant activities. Metropolitan Community College implemented a faculty-coach model, where faculty took responsibility for maintaining communications with participants, monitoring their progress, intervening to provide supports as necessary, and supporting their transition to employment. The college credits this model with strong retention, completion, and employment for its participants (Welch 2016). Other staff at the community college may support participants' efforts to find employment, in addition to the career coach or navigator. At Wallace Community College, career coaches offered job search assistance, job readiness skills, and career planning in group meetings. However, participants also received help from their instructor in contacting employers, which was especially helpful in their job search (PTB & Associates 2016).
- **Challenges to Career Coaching and Navigation.** While career services were generally appreciated by TAACCCT participants, several challenges existed. Staff turnover and heavy caseloads in the consortium led by Pennsylvania College of Technology may have limited the career guidance participants received (Dunham et al. 2016). At Rogue Community College, participants underutilized career coaches, possibly owing to the difficulty of becoming a known presence across 10 courses or programs, with some students unaware of the coach and the services offered (Pacific Research and Evaluation 2016b). Many grantees noted concerns for sustaining career navigators and coaches after the grant ended, although Metropolitan Community College overcame this issue. Their faculty-coach model enabled the college to continue this role for faculty without additional funding (Welch 2016).

4.3. Work-Based Learning

Many TAACCCT grantees developed new work-based learning opportunities, such as internships, job shadowing, apprenticeships, clinical experiences, or other on-the-job training, for participants. Although most often on a job site, work-based learning could also happen at the college, often using simulation laboratories (or "labs") with equipment purchased using the grant or donations from employers. Grantees often worked closely with employers and industry to ensure the work-based learning

activities would teach the skills employers demanded for the occupation of training. Box 4.3provides an example of how one grantee developed work-based learning opportunities.

BOX 4.3

North Idaho College's New Aerospace Training Facility

With its grant, the college established an off-site training location in 2015 to practice skills on equipment, with an employer-partner's employee hired as an adjunct instructor through the college to provide training in their facility in the evenings. Industry partners such as Lockheed Martin continually donated materials and equipment, which allowed for more frequent labs at a reduced cost to participants. These partnerships also helped the college leverage resources for sustainability and has provided a model for developing programs to serve other industries in the region not directly related to aerospace.

Source: Office of Educational Innovation and Evaluation 2016b.

Key evaluation findings from the experiences of TAACCCT Rounds 1 and 2 grantees in developing and implementing work-based learning opportunities include the following:

- **Working with Employers to Develop Work-Based Learning Opportunities.** Grantees often worked closely with employers through advisory boards, one-on-one relationships, and sector partnerships when creating work-based learning opportunities, both at company's job sites or through simulation laboratories on campus. One consortium grantee and its member colleges worked closely with companies to create paid internships in science, technology, engineering, and math fields that would help participants meet their course requirements. Companies often ended up hiring internship participants, as occurred for the Anne Arundel Community College consortium (Stewart 2015). The College of Southern Nevada prepared participants for registered apprenticeships through its facilities maintenance and operations program, where participants gained on-the-job training at an employer site (Pacific Research and Evaluation 2016a). Clovis Community College worked with health care providers to offer clinical placements for its programs (Caffey 2016). For one consortium, led by Pennsylvania College of Technology, employers also donated nearly $2.5 million in equipment for training in the oil and gas industry, enhancing the hands-on components of the program. Training programs emphasized students spending half their time practicing on the training equipment provided (Dunham 2016).

- **Hands-On Practice with New Training Equipment.** Equipment purchased to simulate the workplace was common among grantees. Amarillo College purchased equipment for both its truck driving ("SimMan") and health care programs (West Texas Office of Evaluation and Research 2016). At Clovis Community College, faculty provided an introduction to Radiolic Technology using newly purchased digital imaging equipment. A Round 1 consortium of Montana and North Dakota tribal colleges, led by United Tribes Technical College, purchased equipment to simulate work experiences, as the colleges believed it would provide an interactive way for participants to practice and apply skills while they receive feedback from instructors (Woodke 2015). The colleges also indicated that, without the grant, they would not have been able to purchase this equipment that was crucial to their programs.

Key Takeaways on Work-Based Learning:

Rounds 1 and 2 TAACCCT colleges provided a range of work-based learning opportunities, including internships, clinical placements, job shadowing, on-the-job training, work-study programs, and registered apprenticeships. The most common type of work-based learning was internships and the least common was registered apprenticeships. According to grantees, employers were crucial to developing work-based learning opportunities by providing on-the-job training opportunities and donating or advising on training equipment that could help simulate work environments. The TAACCCT grants provided community colleges with an opportunity to build capacity for developing on- and off-campus work-based learning using the equipment they purchased and simulation laboratories they constructed. Challenges to work-based learning included staff turnover, reluctant employers, and a lack of awareness or interest among TAACCCT participants.

- **Challenges to Developing Opportunities.** Developing work-based learning opportunities was not always a smooth process, often involving staff turnover, participant awareness of opportunities, and a lack of internship opportunities. Central Lakes College was only able to develop two of the planned six simulation courses because of staff turnover and the unanticipated time it took to develop the courses (Ho 2016a). While many grantees developed work-based learning activities, some participants did not take advantage of the opportunities. For example, when interviewed, participants at Elaine Nunez Community College reported that they had limited experience with the hotel simulator, business simulator, and student café (Knoster and Bumgardner 2016). For the consortium led by William Rainey Harper College, less than 10 percent of participants reported participating in the internships developed as part of career preparation for the manufacturing industry. The colleges struggled to develop internships, as the local economy and employers' legal liability issues limited available positions.

A lack of internship opportunities may have affected participants' ability to find employment after completing the program, as they lacked specific experience an internship could have provided (Bucci 2016). Bellevue College encountered challenges developing a health IT apprenticeship for veterans, as the TAACCCT staff were not able to recruit a hospital sponsor (Kogan et al. 2016).

5. Participant Educational and Employment Outcomes: Impact Findings

This chapter summarizes the more rigorous findings from the Rounds 1 and 2 TAACCCT third-party evaluations on participants' education and employment outcomes. The chapter first highlights the impact estimates related to the education and employment outcomes from 11 third-party evaluations, which used more rigorous methods of estimating the impacts. These evaluations used quasi-experimental methods to estimate impacts (i.e., matching strategies). As noted in section 1.3, the findings provide important suggestive evidence, but should be interpreted cautiously as the rigor of the methods used has not been fully assessed. This chapter closes with a discussion of the findings and their implications.

5.1. Findings from Selected Evaluations

This section presents short summaries of the quasi-experimental findings on the education and employment outcomes from 11 third-party evaluations. Table 5.1 provides a summary of the statistically significant impact estimates and the direction of the estimate. Overall, the findings for educational outcomes are mainly positive. The results for participants' employment are positive or mixed. Only four evaluations provided impact estimates on participants' employment, mainly due to data limitations for evaluations that did not provide estimates.

TABLE 5.1

Summary of Education and Employment Impact Estimates for TAACCCT Participants, by TAACCCT Grant Project

TAACCCT Grant Project	Statistically significant differences in educational outcomes	Statistically significant differences in employment outcomes
Connecticut Health and Life Sciences Career Initiative	No impact	n.a.
Alabama-Florida Technical Employment Network	Positive	Positive
East Los Angeles College's Technology and Logistics Program	Positive	n.a.
Advanced Manufacturing Education (AME) Alliance	Positive	n.a.
Health Professions Pathways (H2P) Consortium	Positive	Positive
Information Technology (IT) Pathways Consortium	Mixed	n.a.
Wisconsin's Making the Future Consortium	Positive	Mixed
ShaleNET Consortium	n.a.	Positive
Competency-Based Education (CBE) Consortium	Negative	n.a.
Colorado Online Energy Training Consortium	Positive	n.a.
Community College Consortium for Bioscience Credentials	Negative	n.a.

Source: Findings from the final evaluation reports from the 11 grants. See Alamprese et al. 2017; Bragg et al. 2015: Dunham et al. 2016; Ho 2016a; McKay, Michael, and Khudododov 2016; Mokher and Pearson 2016; Patnaik and Prince 2016; Person, Thomas, and Bruch 2016; Price et al. 2016: PTB & Associates 2016; and Wijma 2016.
Notes: n.a. = not available. Educational outcomes include credential attainment, credits earned, grade point averages, and completion of programs of study. Employment outcomes include employed after participating in the program and quarterly earnings.

The 11 Rounds 1 and 2 third-party evaluations used a variety of educational and employment outcomes to measure the impact of TAACCCT approaches on participants, as shown in table 5.2. Most (7 out of 11) evaluations included outcomes on credential completion, half included outcomes on credit accumulation, and 4 out of 10 included outcomes on program completion. These evaluations also included a variety of other educational outcomes such as persistence, grade point average, program withdrawal, course completion, and course grades. Four evaluations included employment outcomes, with all four providing impacts on whether participants became employed and three providing impacts on earnings.

Table 5.3 reports the intervention studied, the sample, data, limitations, and the magnitude, direction, and statistical significance of the educational and employment impacts of TAACCCT on participants across the evaluations. Short descriptions of each evaluation follow the table.

TABLE 5.2

Outcomes for Which Impacts of TAACCCT Approaches on Participants Were Estimated, Selected Rounds 1 and 2 Grant Third-Party Evaluations

	Educational Outcomes				Employment Outcomes	
TAACCCT grant project (grantee)	Credential comple-tion	Credit accumu-lation	Program comple-tion	Other[a]	Employed	Earnings
Connecticut Health and Life Sciences Career Initiative (Norwalk Community College)	✓	✓		✓		
Alabama-Florida Technical Employment Network (Wallace Community College)	✓	✓		✓	✓	
Technology and Logistics Program (East Los Angeles College, or ELAC)	✓		✓			
Advanced Manufacturing Education (AME) Alliance (Central Lakes College)			✓	✓		
Health Professions Pathways (H2P) Consortium (Cincinnati State Technical and Community College)			✓		✓	✓
Information Technology (IT) Pathways Consortium (Bossier Parish Community College)	✓	✓				
Wisconsin's Making the Future Consortium (Northeast Wisconsin Technical College)	✓	✓			✓	✓
ShaleNET Consortium (Pennsylvania College of Technology)					✓	✓
Competency-Based Education (CBE) Consortium (Sinclair Community College)	✓			✓		
Colorado Online Energy Training Consortium (Community College of Denver)	✓	✓	✓	✓		
Community College Consortium of Bioscience Credentials (Forsyth Technical Community College)				✓		

Source: Findings from the final evaluation reports from the 11 grants. See Alamprese et al. 2017; Bragg et al. 2015: Dunham et al. 2016; Ho 2016a; McKay, Michael, and Khudododov 2016; Mokher and Pearson 2016; Patnaik and Prince 2016; Person, Thomas, and Bruch 2016; Price et al. 2016: PTB & Associates 2016; and Wijma 2016.

Notes: "Other" educational outcomes include measures of persistence, grade point average, program withdrawal, course completion, and course grades.

TABLE 5.3

Rounds 1 and 2 Evaluations with Quasi-Experimental Findings on Education and/or Employment Outcomes for TAACCCT Participants

TAACCCT grant project (grantee)	Authors	Intervention for impact analysis	Estimation methods	Sample (unmatched N)	Data	Limitations noted in reports	Impact estimates for educational outcomes (=average treatment effect)[b]	Impact estimates for employment outcomes (=average treatment effect)[b]
Connecticut Health and Life Sciences Career Initiative (Norwalk Community College)	Mokher and Pearson (2016)	New certificate and degree programs using online and hybrid learning, PLAs, access to support services, internships, and career guidance for health care occupations	Coarsen exact matching[c] with regression-adjusted mean outcomes	Year 1 N=6,218 Year 2 N=3,840 Treatment group: TAACCCT participants from the first two years of the grant project Comparison group: Prior cohorts from the same or similar programs at same colleges	Student records from 2009 to 2015 from the consortium colleges	The follow-up period (one to two years) may have been too short to observe effects on associate's degree students, which made up 90% of the sample. Employment impacts are not reported, as the evaluators did not have access to student-level employment data.	Persistence: After 1 year=0.1% After 2 years=0.7% Credential completion: After 1 year=0.5% After 2 years=1.8% Credit accumulation: After 1 year=-0.3 After 2 years=1.3	n.a.
Alabama-Florida Technical Employment Network (Wallace Community College)	PTB & Associates Inc. (2016)	New and enhanced programs in welding that incorporated mobile training units and other simulation equipment and career coaches	Propensity score matching using inverse probability weighted regression-adjustment with regression-adjusted mean outcomes	**N**=854 Treatment group: TAACCCT participants from two Alabama colleges from 2013–16 Comparison group: Prior cohorts from the same programs at the same colleges from 2012–13 school years	Student records from two Alabama consortium colleges; employment data from local one-stop center and state labor agency	Employment data were incomplete, as evaluator was waiting for additional data from UI wage records. In addition, an updated impact analysis was anticipated to incorporate longer follow up on students and full set of employment data.	GPA: =0.8*** Credit accumulation: =5.0** Credential completion: =11.9%**	Employed during and after enrollment =19.5%***

TAACCCT grant project (grantee)	Authors	Intervention for impact analysis	Estimation methods	Sample (unmatched N)	Data	Limitations noted in reports	Impact estimates for educational outcomes (=average treatment effect)[b]	Impact estimates for employment outcomes (=average treatment effect)[b]
Technology and Logistics Program (East Los Angeles College, or ELAC)	Wijma (2016)	New and enhanced courses in logistics with career, academic, and life coaching for students	Propensity score matching with one-to-one nearest neighbor matching; unclear if estimates were adjusted	N=unspecified Treatment group: TAACCCT participants in logistics programs of study at ELAC Comparison group: Students in automotive technology programs at ELAC (unclear if enrolled at the same time)	Student records	No employment impacts could be measured as the state would only provide aggregate employment data.	Pathway completion: =25.6%*** Credential attainment: =24.9%***	n.a.
Advanced Manufacturing Education (AME) Alliance (Central Lakes College)	Ho (2016)	Training programs in manufacturing with simulation courses, hybrid and modularized courses, and educational and employment advisors	Propensity score matching with regression-adjusted mean outcomes	N=360 (after match) Treatment group: TAACCCT participants who enrolled in the fall of 2014 at three colleges Comparison group: Prior cohorts of students in similar programs at same colleges	Student records	Regression analyses that did not control for selection based on matching procedures were conducted on GPA, persistence, employment gains, and wage gains due to small sample size from a student exit survey and that most respondents were completers, potentially biasing the results.	Program completion: =1.6 (odds ratio)** Program withdrawal: =0.1 (odds ratio)***	n.a.

TAACCCT grant project (grantee)	Authors	Intervention for impact analysis	Estimation methods	Sample (unmatched N)	Data	Limitations noted in reports	Impact estimates for educational outcomes (=average treatment effect)[b]	Impact estimates for employment outcomes (=average treatment effect)[b]
Health Professions Pathways (H2P) Consortium (Cincinnati State Technical and Community College)	Bragg et al. (2015)	Health care career pathways at nine colleges in five states with PLA, contextualized/ integrated instruction, foundational courses, career guidance, incumbent worker training, and stackable credentials	Propensity score matching (using preprogram earnings) with regression-adjusted mean outcomes	Full sample N=1,527 Treatment group: Cohorts of TAACCCT participants in LVN and ADN programs across six colleges Comparison group: Prior cohorts of students who were enrolled in LVN and ADN programs at the same six colleges in the fall of 2009	Student records and Minnesota state UI wage records	Impact analysis could only look at LVN and ADN programs due to comparison group and data limitations.	Program completion: Full=7.0% LVN=18.0*** ADN=0.4%	Employed in final three quarter in cohort observation period: =8.0%*** Median earnings: (log): =22.4%***

TAACCCT grant project (grantee)	Authors	Intervention for impact analysis	Estimation methods	Sample (unmatched N)	Data	Limitations noted in reports	Impact estimates for educational outcomes (=average treatment effect)[b]	Impact estimates for employment outcomes (=average treatment effect)[b]
Information Technology Pathways Consortium (Bossier Parish Community College)	Patnaik and Prince (2016)	Integrated (IT) career pathways programs across Louisiana and Mississippi colleges with stackable/ portable credentials, PLA, student supports, and hybrid and online learning	Propensity score matching with regression-adjusted mean outcomes	N=6,791 Treatment group: TAACCCT participants in credit programs enrolling from 2013–14 and 2014–15 school year across the nine colleges Comparison group: Prior cohort of students enrolled in similar programs in 2012–13	Student records	Due to data limitations, only education impacts for credit-bearing programs are presented. State UI wage record data were not available to the evaluators for conducting an impact analysis. PSM did not include prior education, prior employment, household size, and family characteristics. PSM does not correct for selection bias due to unobserved characteristics.	Credits earned per semester: =0.7*** Earned any credential: =7.9%*** Earned any certificate: =6.8%*** Earned any degree: =5.5%*** Earned more than one credential: =-0.7	n.a.
Wisconsin's Making the Future Consortium (Northeast Wisconsin Technical College)	Price et al. (2016)	Advanced manufacturing career pathways programs in Wisconsin with stackable credentials, modularized learning, academic and nonacademic student supports, and PLA	Propensity score matching with regression-adjusted mean outcomes	N=11,824 Treatment group: Participants in TAACCCT-funded manufacturing programs at consortium colleges Comparison group: Students in non-TAACCCT-funded manufacturing programs at consortium colleges	Student records and Wisconsin state UI wage records	Due to lags in UI wage records, employment impacts are estimated for a subset of the sample.	Credential attainment: =18.0%*** Credit accumulation: =3.0***	Employed first quarter after exit (non-incumbent worker): =4.0%* Earnings increase (incumbent worker): =1.0%

TAACCCT grant project (grantee)	Authors	Intervention for impact analysis	Estimation methods	Sample (unmatched N)	Data	Limitations noted in reports	Impact estimates for educational outcomes (=average treatment effect)[b]	Impact estimates for employment outcomes (=average treatment effect)[b]
ShaleNET Consortium (Pennsylvania College of Technology)	Dunham et al. (2016)	Oil and gas industry career pathways programs across multiple states set up as training "hubs" with a career counselor and support technician for training equipment	Propensity score matching using nearest neighbor and caliper matching with regression-adjusted mean outcomes	N=353 (after match) Treatment group: TAACCCT participants who completed noncredit programs at two PA hubs Comparison group: Individuals who received and exited programs providing employment services or staff-assisted services (but no training) from ES and WIOA programs from 2013 to 2015 in two PA hubs	Student records and PA state UI wage records	Due to data limitations, evaluators could not restrict the comparison group sample to those receiving services of similar intensity to the TAACCCT participants.	n.a.	Employed in 1st, 2nd, and 3rd quarter after completion (odds ratio):[d] Employment services =1.9* Staff-assisted=1.5 Earnings in 1st, 2nd, and 3rd quarter after completion:[c] Employment services =$2,539* Staff-assisted =$2,357*
Competency-Based Education (CBE) Consortium (Sinclair Community College)	Person, Thomas, and Bruch (2016)	CBE programs in IT at three colleges with academic supports and coaches	Propensity score matching using nearest neighbor with regression-adjusted mean outcomes	N=5,556 Treatment group: TAACCCT participants across the three colleges Comparison group: Students who were in traditional (non-CBE) programs in similar fields of study	Student records	Few variables were available to use for matching and explain little (8%) of the variation consortium wide. State UI wage record data were not available to the evaluators for conducting an impact analysis.	Gatekeeper course completion: =-4.6%** Credential attainment: =-2.6%**	n.a.

TAACCCT grant project (grantee)	Authors	Intervention for impact analysis	Estimation methods	Sample (unmatched N)	Data	Limitations noted in reports	Impact estimates for educational outcomes (=average treatment effect)[b]	Impact estimates for employment outcomes (=average treatment effect)[b]
Colorado Online Energy Training Consortium (Community College of Denver)	McKay, Michael, and Khudododov (2016)	Developmental education redesign for energy-related programs with online and hybrid learning, mobile learning labs, and career coaches	Propensity score matching with regression-adjusted mean outcomes	N=5,256 Treatment group: TAACCCT participants in credit programs Comparison group: Prior cohort of students enrolled in energy programs prior to TAACCCT from spring 2009 to spring 2011	Student records	State UI wage record data were not available to the evaluators for conducting an impact analysis.	Program completion:[e] =2.5*** (odds ratio) Credential attainment (odds ratios): AAS=14.7*** Certificate=5.9*** Both=6.5** Credit accumulation: =2.2*** Grade of C or better in energy courses: =1.7*** (odds ratio) Grade of C or better in energy courses: =1.6*** (odds ratio)	n.a.

TAACCCT grant project (grantee)	Authors	Intervention for impact analysis	Estimation methods	Sample (unmatched N)	Data	Limitations noted in reports	Impact estimates for educational outcomes (=average treatment effect)[b]	Impact estimates for employment outcomes (=average treatment effect)[b]
Community College Consortium for Bioscience Credentials (Forsyth Technical Community College)	Alamprese et al. (2017)	Online introductory biology and chemistry courses	Propensity score matching using a "doubly robust" approach[f]	N=736 Treatment group: TAACCCT participants at one college in online courses Comparison group: Concurrent cohort of students in non-TAACCCT course in the same subjects	Student records	There were not appropriate comparison groups at other TAACCCT college as there was no "business as usual" courses were offered. State UI wage records were not available for conducting an impact analysis.	Course completion: Biology=-18.3%*** Chemistry=-15.4%** Average course grade: Biology=-0.6*** Chemistry=-0.5***	n.a.

Sources: Selected Rounds 1 and 2 final evaluation reports. See Authors column for citations.

Notes: ADN=associate degree of nursing, AAS-associate of applied science, Cal=caliper, CBE=competency-based education, ES=Employment Service, GPA=grade point average, IT=information technology, LVN=licensed vocational nurse, n.a.=not available, PA=Pennsylvania, TAACCCT=Trade Adjustment Assistance Community College and Career Training, UI=unemployment insurance, WIOA=Workforce Innovation and Opportunity Act. [a] Nearly all evaluation reports acknowledge that the quasi-experimental methods used cannot rule out other explanations for the findings due to unobserved characteristics not included in the analysis. [b] *0.10 significance level, **0.05 significance level, ***0.01 significance level. [c] The authors used coarsen exact matching (CEM) for the matching procedure for treatment and comparison groups. The CEM procedure, according to the authors, temporarily transforms continuous variables into categorical variables to bound the size to maintain the balance across the treatment and comparison group and to maximize the sample size during the matching process. More information can be found in Iacus, King, and Porro 2011. [d] These estimates are for nearest neighbor only for simplicity. The impact estimates and statistical significance of the estimates for both methods were very close. [e] The authors calculated odds ratios from logistic coefficients to make estimates interpretable by readers. [f] The authors used a "doubly robust" approach to propensity score matching (Stuart 2010), where they estimated impacts using linear regression models where the observations were weighted using the propensity score.

Connecticut Health and Life Sciences Career Initiative. A Round 2 consortium of five colleges, led by Norwalk Community College, developed new certificate and degree programs using online and hybrid learning, PLAs, access to support services, internships, and career guidance. The evaluation used coarsen exact matching to compare TAACCCT participants with participants from prior cohorts who did not receive any grant-funded services. [23] There was little to no difference in college persistence, credential completion, and credit accumulation between the TAACCCT participants and the matched comparison group. One reason offered for this finding is that completion rates for participants were already high at 90 percent. In exploratory analysis, the evaluation showed that participants completing courses online or in hybrid courses had higher grades than matched participants in traditional in-person courses. In addition, TAACCCT participants with PLAs were more likely than those who did not to complete credentials but their persistence in college was mixed. Employment outcomes were not provided in this report due to data limitations (Mokher and Pearson 2016).

Alabama-Florida Technical Employment Network. A Round 2 consortium of Alabama and Florida community colleges, led by Wallace Community College, developed new certificate (welding) and degree (industrial electronics), embedded with new equipment and technology for online learning and simulation labs, career coaches, and other support services. The impact analysis design used propensity score matching with prior cohorts from the same colleges. [24] The analysis focused on only two Alabama programs as the Florida colleges did not have similar programs prior to the grant. Participants in the Alabama programs were more likely to have higher GPAs, credential attainment, and program completion than the matched comparison group. Participants were also more likely to be employed during and after the program. When restricting the sample to later cohorts to allow for full implementation, the magnitudes become smaller (GPA), not statistically significant (credential attainment and employment), and negative (credit accumulation). The evaluators indicate that a possible explanation is the changing (and generally improving) labor market (PTB & Associates 2016).

East Los Angeles College's Technology and Logistics Program. East Los Angeles College, a single institution Round 2 grantee, built new and enhanced existing courses to support its associate's degree in technology and logistics and support student success through coaching in all aspects of participants' lives. The evaluation used propensity score matching for creating a similar comparison group of participants from automotive technician (AutoTech) programs. When compared with AutoTech participants, TAACCCT participants were more likely to complete their pathway and receive a

[23] For more information on coarsen exact matching, see Iacus, King, and Porro (2011).
[24] For more information on propensity score matching, see Shadish, Cook, and Campbell (2002).

certificate or degree. Employment outcomes were not provided in this report due to data limitations (Wijma 2016).

Advanced Manufacturing Education (AME) Alliance. A Round 2 consortium of three Minnesota colleges, led by Central Lakes College, developed manufacturing programs using five key strategies: a technology-enriched environment, hybrid and modularized curriculum, student supports, marketing and outreach, and employer and workforce system partnerships. The evaluation used propensity score matching with historical cohorts of participants to examine the effects of the programs on TAACCCT participants in later cohorts. These TAACCCT participants saw higher program completion than the matched comparison group. Evaluators attributed this finding to the high level of satisfaction with the programs that participants expressed during focus groups. Employment impacts for TAACCCT participants were not reported due to small sample sizes (Ho 2016a).

Health Professions Pathways (H2P) Consortium. A multistate Round 1 consortium of nine colleges, led by Cincinnati State Technical and Community College, developed new strategies for transforming health education within their schools. These strategies included PLAs, contextualized and integrated developmental education, core curriculum for foundational knowledge and skills, incumbent worker programs, career serves, and industry-recognized stackable credentials. The impact analysis only examines the outcomes of TAACCCT participants in licensed vocational nursing programs and associate's degree of nursing programs because of data limitations. The evaluation used propensity score matching with historical cohorts of participants from the colleges. The evaluation found that the TAACCCT participants in licensed vocational nursing programs were 18 percent more likely to earn a credential than the matched comparison group. There was no impact on participants in associate's degree in nursing programs. TAACCCT participants also were 8 percent more likely to be employed and 22 percent higher wages than the comparison group. While the findings demonstrate the potential value of the long-term certificate and degree in the labor market, the evaluators indicated that the results could have been tempered by a weaker economy (Bragg et al. 2015).

Information Technology (IT) Pathways Consortium. A Round 2 consortium of eight Louisiana and Mississippi colleges, led by Bossier Parish Community College, created new IT pathways in cyber security, health information, and industrial maintenance and implementing elements of the I-BEST model. The evaluation used propensity score matching with historical cohorts of participants from the year prior to implementation of the grant. The analysis indicated that the IT pathways had a positive impact on the credit accumulation and overall credential attainment, but had no impact on earning more than one credential as part of a career pathway. These findings varied by state and IT pathway.

The evaluation was unable to examine labor market outcomes because of data access issues (Patnaik and Prince 2016).

Wisconsin's Making the Future Consortium. A Round 2 consortium of 16 technical colleges, led by Northeast Wisconsin Technical College, modified career pathways in advanced manufacturing to include bundled and modularized curriculum, PLAs, and support services. The evaluation used propensity score matching with participants in manufacturing programs at the colleges that did not participate in the modified programs in the same colleges. TAACCCT participants saw higher credential attainment rates and credit accumulation than the matched comparison group. Nonincumbent worker TAACCCT participants had slightly higher rates of employment than the matched comparison group at 4 percent, but no differences in earnings were observed between TAACCCT incumbent workers and the matched comparison group. The finding on earnings is likely because incumbent workers may not have realized wage gains because they were already employed and the short follow-up period for observing differences (Price et al. 2016).

ShaleNET Consortium. A Round 2 multistate consortium of four colleges, led by Pennsylvania College of Technology, created new career pathways with stackable credentials for occupations in the shale oil and gas industry. The evaluation used propensity score matching with a comparison group of individuals who received employment related services from other federally-funded employment programs but no training. As such, only labor market impacts were estimated. Participants who participated in noncredit programs had positive and statistically significant employment gains in the first, second, and third quarters after completion over the matched comparison group. However, employment gains may have been driven by the robust employment of earlier cohorts before oil and gas prices dropped in 2014 (Dunham et al. 2016).

Competency-Based Education (CBE) Consortium. A Round 2 consortium of three colleges in Florida, Ohio, and Texas developed training programs using a competency-based education (CBE) model for IT pathways. The evaluation used propensity score matching with a comparison group of students in traditional (non-CBE) programs in similar fields of study at the three colleges. Gatekeeper course completion and credential attainment were slightly lower for participants than the matched comparison group, which may be driven by differences across colleges and few variables available for matching (Person, Thomas, and Bruch 2016).

Colorado Online Energy Training Consortium. A Round 1 consortium of Colorado colleges conducted a major redesign of developmental education for its IT programs and building in online and hybrid learning, mobile learning labs, and career coaches. The evaluation used propensity score

matching for it TAACCCT participants in credit programs with a comparison group of students enrolled in credit energy programs prior to the grant's implementation. The educational outcomes – program completion, credential attainment, credit accumulation, and grades – across the consortium were consistently positive, although there were some differences across the five colleges in the analysis. No impact estimates on employment were provided due to data limitations (McKay, Michael, and Khudododov 2016).

Community College Consortium for Bioscience Credentials. This Round 2 consortium, led by Forsyth Technical Community College (Forsyth Tech), focused on three subsectors in the bioscience industry—biomanufacturing, medical devices, and lab skills—and on developing modularized, more flexible approaches to learning. An impact analysis was conducted to assess the effects of online biology and chemistry courses on educational attainment at one college, Forsyth Tech, using a comparison group of the college's students who took similar courses that were not enhanced through the grant. Overall, students who took the online biology and chemistry courses were less likely to complete the course and had lower average course grades (Alamprese et al. 2017).

5.2. Discussion of Impact Findings

The findings presented from the 11 third-party evaluations represent the more rigorous designs and methods used to evaluate the effectiveness of Rounds 1 and 2 grants. Some promising results on educational attainment emerge from these evaluations. Seven of the 10 evaluations providing educational impact estimates found positive differences in educational outcomes for TAACCCT participants. It is not surprising that the results show higher credential attainment (five evaluations) and program completion (four evaluations) among TAACCCT participants as career pathways are designed to embed shorter-term, stackable credentials and accelerate learning. The increased credential attainment is aligned with the findings that credit accumulation was greater for TAACCCT participants in four evaluations. However, there were two evaluations that showed a negative impact of TAACCCT on course completion.

Four of the evaluations provided findings from the analysis on employment outcomes. All four evaluations showed positive differences in being employed during the observable period, which allowed for only a very short follow-up period due to the timing of producing the evaluation. There were three evaluations with impact findings on earnings differences. One evaluation found that the TAACCCT participants saw a 22-percent increase in median earnings over nonparticipants, while another

evaluation found that there was no statistically significant increase in earnings for incumbent workers. The third evaluation found earnings increases between $2,350 and $2,540 for TAACCCT participants over three quarters observed. In addition to short follow-up for employment outcomes, challenges obtaining employment data on treatment and comparison groups made it difficult to provide a clear and consistent story about how the grant-funded approaches may have affected participants' employment and earnings.

These findings are only suggestive of the impacts the grant-funded approaches had on education and employment for two main reasons. First, the evaluation findings presented use quasi-experimental methods, which often have selection issues that remain after the match. For example, few of the evaluations included preprogram earnings as a matching variable, a key predictor of program participation. This was often owed to an inability to access the necessary state unemployment insurance wage record data. In addition, nearly all the evaluators noted the limitations of quasi-experimental designs in providing unbiased estimates of the impacts, a threat to internal validity, and cautioned about making causal inferences from the results.

Second, nearly all the evaluations used comparison groups of participants from similar programs at the college or cohorts from prior years of the programs. Both are viable options as participants are likely to be similar on observable characteristics but the differences observed may be small because the counterfactual is a similar treatment. In other words, it does not mean the grant-funded program was not effective, but that it may have had a similar effect as the program in which the comparison group participated.

6. Conclusions

To build the evidence on career pathway approaches, the Rounds 1 and 2 TAACCCT grantee-sponsored, third-party evaluations produced 86 final evaluation reports that describe and assess the implementation of the grants and, in some cases, estimate the impact of grant-funded approaches on participant outcomes. The implementation findings present a rich picture of the approaches funded by the grants, with the goals of accelerating learning, improving college persistence and completion, and building better connections to employment. The impact findings from 11 evaluations offer insight into how well TAACCCT participants fared in increasing their education attainment and improving their employment and earnings. This report synthesizes these findings to understand what has been learned from the first two rounds of the grants to be useful for policymakers, practitioners, and researchers.

The grantees developed a wide range of strategies to build the capacity of community colleges to address the needs of adult learners and employers in a specific industry. The synthesis identifies and discusses the more prevalent strategies from the Rounds 1 and 2 grants and implementation findings from the third-party evaluations. These strategies include: online and hybrid learning, stackable credentials, prior learning assessments, student supports, articulation agreements, partnerships with the public workforce system, career coaches and navigators, and work-based learning. It identifies themes as well as potentially promising strategies for scaling and replication of the TAACCCT and similar career pathways strategies such as:

- **Cross-college collaboration, as seen with consortium grants, was important for developing models and core curricula and sharing best practices.** TAACCCT colleges that had stakeholders within their college–such as administrators, faculty, admissions student services, financial aid, and others–at the table during grant planning and implementation were better able to overcome common challenges. For example, it was necessary for grant directors to work with faculty and staff who were resistant to the major changes to their jobs such as technology-enabled learning or PLA to ensure these stakeholders eventually "buy into" the new strategies and support their implementation. Developing articulation and transfer agreements required collaboration among institutions of higher education, especially four-year colleges and universities to ensure career pathways programs allow students to take more advanced educational steps.

- **Many adult learners needed coordination and higher-touch communications (e.g., required rather than optional check-ins, in-person and virtual interaction rather than text) from**

career navigators, faculty, and staff to support their persistence and completion of grant-funded programs of study and other activities. Some colleges developed individualized education and learning plans for participants, combined with information and guidance, to help TAACCCT participants take advantage of tools to support their success, such as PLA, booster modules, career coaching, and internships. Some colleges found developing toolkits for advisors to be useful for ensuring participants had access to support services and PLAs to support acceleration and completion.

- **Partnerships outside the community college can support student success and the development of programs of study.** The public workforce system can be a useful partner to colleges to help leverage resources from discretionary grants, such as TAACCCT, with the Workforce Innovation and Opportunity Act and Trade Adjustment Assistance programs, or with other funding to support student success. Workforce Development Boards and American Job Centers can provide referrals, financial assistance to participants, access to employment data, and connections to employers but they are sometimes difficult to engage. Employers also supported the grant activities through curriculum and credential input, donation or advice on training equipment and facilities, instructors from industry, and referrals of employees to the college.

The findings from the third-party evaluators' quasi-experimental impact analyses also suggest that the strategies implemented by TAACCCT grantees are promising for improving educational attainment by increasing credential attainment, credit accumulation, and program completion. Increased credential attainment is not surprising as grantees introduced new short-term certificates within programs of study as a part of the career pathways model, with similar findings in other studies (Anderson et al. 2017). Fewer studies examined employment and earnings, and the findings were less consistent. Policymakers, practitioners, and researchers should use caution in interpreting the findings as it is difficult to rule out other explanations for the findings due to the limitations of the methods, as discussed in chapter 5.

Three key evaluation issues arose and may have implications for community colleges and evaluators for future workforce and community college initiatives:

- **Having too short of a follow-up period for measuring outcomes.** It is important to ensure that there are adequate data and a long enough evaluation follow-up period to ensure outcomes such as credential attainment and postprogram employment can be measured. Employment

outcomes are particularly challenging to capture, especially if the theory of change suggests that outcomes will not be realized for many months or years after program completion.

- **Identifying a viable comparison group.** When using quasi-experimental evaluation methods, it is necessary to identify an appropriately similar comparison pool of individuals for which a rich set of data can be obtained (e.g., preprogram earnings) to ensure a successful matching procedure for drawing the comparison group. Involvement of the colleges is essential to successfully identifying the comparison group.

- **Presenting the full set of limitations to ensure appropriate interpretation of findings.** When reporting findings from quasi-experimental analyses, evaluators should include information on the limits of the analysis to provide important context for interpreting the findings, especially when the counterfactual is a similar type of training program. For example, an important caveat an evaluator might include is understanding that the contrast between the treatment and comparison group services may be minimal and it may be difficult to detect effects unless the approach being tested has large impacts on participants being served.

In addition to the synthesis of the Rounds 1 and 2 evaluations, the TAACCCT national evaluation synthesis implementation and impact findings from the Rounds 3 and 4 third-party evaluations.[25] These syntheses will build on the results from this synthesis, comparing and contrasting was learned across the four rounds of evaluations, and discuss additional strategies that are relevant to the Rounds 3 and 4 grants. Reports from the national evaluation on the grants' implementation, outcomes, and employer relationships will also support learning across the grant initiative to draw lessons and implications for future workforce and community college approaches.

[25] All publications from the TAACCCT national evaluation are available on DOL's Chief Evaluation Office website, found at https://www.dol.gov/agencies/oasp/evaluation/completedstudies.

Appendix A. Workforce Innovation and Opportunity Act of 2014 (WIOA) Definition of Career Pathways

The full WIOA definition of *career pathways* is "a combination of rigorous and high-quality education, training, and other services that—

(A) aligns with the skill needs of industries in the economy of the State or regional economy involved;

(B) prepares an individual to be successful in any of a full range of secondary or postsecondary education options;

(C) includes counseling to support an individual in achieving the individual's education and career goals;

(D) includes, as appropriate, education offered concurrently with and in the same context as workforce preparation activities and training for a specific occupation or occupational cluster;

(E) organizes education, training, and other services to meet the particular needs of an individual in a manner that accelerates the educational and career advancement of the individual to the extent practicable;

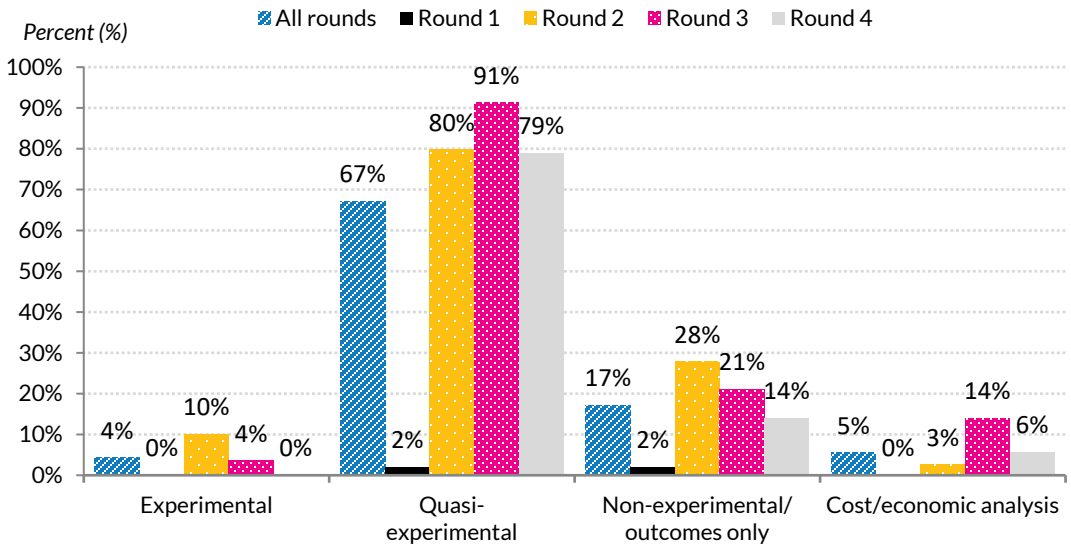
(F) enables an individual to attain a secondary school diploma or its recognized equivalent, and at least 1 recognized postsecondary credential; and (G) helps an individual enter or advance within a specific occupation or occupational cluster" (29 U.S. Code § 3102 Definitions).

Appendix B. Third-Party Evaluation Designs and Data Sources

A TAACCCT brief highlights information on the third-party evaluations, gleaned from the Rounds 1-4 grant applications and evaluation designs. [26] Information is minimal for Round 1 grants as there was no evaluation requirements for that round. These figures from the brief provide summary information on the planned evaluation designs, anticipated quantitative and qualitative data sources, and the comparison groups evaluators planned to use. These methods and sources are not the final evaluation designs evaluators used, as the feasibility or appropriateness of the evaluation approaches proposed may have changed during the grant activities.

APPENDIX FIGURE B.1

Grant Evaluations Using Various Methods to Measure Outcomes and Impacts, Rounds 1–4



Source: Urban Institute TAACCCT grantee database.

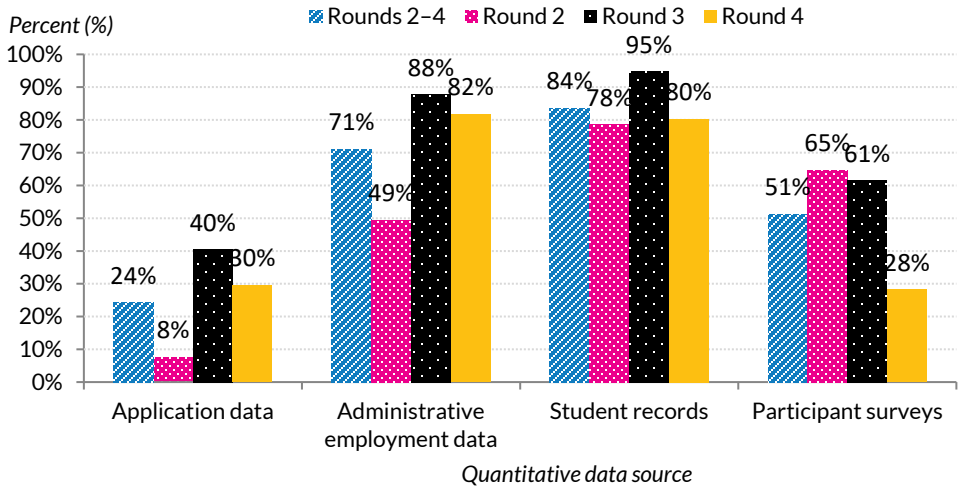
Notes: In Round 1, an evaluation plan was not required, and 48 of the 49 grantees did not submit an evaluation plan. Round 2 grantees were required to submit 10-page summary evaluation plans, and their planned evaluation methods were culled from those summaries. Round 2 awarded a total of 79 grantees, and 10 sites did not report on any outcomes. In Rounds 3 and 4, grantees were required to select an independent third party to conduct a rigorous evaluation of their project and to submit a detailed evaluation plan. In Round 3, all 57 grantees submitted a detailed evaluation plan. In Round 4, 11 grantees had not submitted an approved detailed evaluation plan at the time this brief was published. The experimental category consists of evaluation plans with a full experimental design or regression discontinuity. The quasi-experimental category includes evaluation

[26] For more information, see Cohen et al. (2017).

plans with designs using propensity score matching. The nonexperimental design category is composed of evaluation plans using outcomes or correlational and pre- and postanalysis.

APPENDIX FIGURE B.2

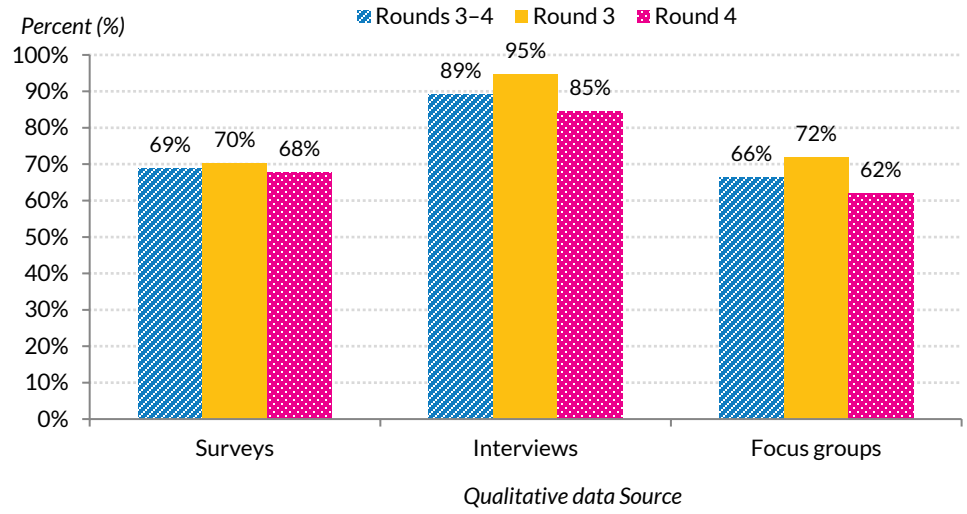
Grant Evaluations Using Various Quantitative Data Sources, Rounds 2–4



Source: Urban Institute TAACCCT grantee database.
Note: In Rounds 2 and 4, some grantees did not report their quantitative data sources. Four Round 4 grantees had not submitted an approved detailed evaluation plan at the time these data were published.

APPENDIX FIGURE B.3

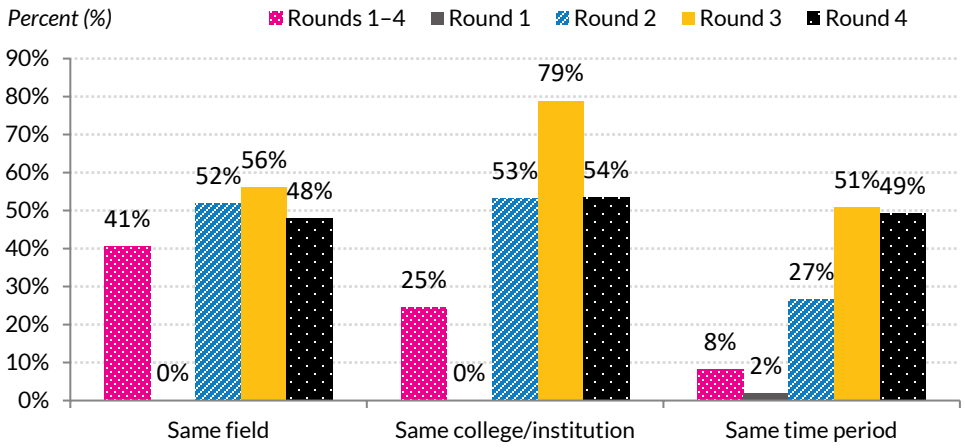
Grant Evaluations Using Various Qualitative Data Collection Methods, Rounds 3–4



Source: Urban Institute TAACCCT grantee database.
Note: This information is not available for Rounds 1 and 2. Four Round 4 grantees had not submitted an approved detailed evaluation plan at the time these data were analyzed.

APPENDIX FIGURE B.4

Grant Evaluations Using Various Sources of Comparison Groups, Rounds 1–4



Source: Urban Institute TAACCCT grantee database.
Note: Four Round 4 grantees had not submitted an approved detailed evaluation plan at the time the data was published, and their information is not included here.

Appendix C. Implementation Research Questions for TAACCCT Third-Party Evaluations

These are the research questions posed in the Rounds 2-4 grant announcements that third-party evaluations were required to answer for the implementation analysis: [27]

1. How was the particular curriculum selected, used, or created?
2. How were programs and program design improved or expanded using grant funds? What delivery methods were offered? What was the program administrative structure? What support services and other services were offered?
3. Did the grantees conduct an in-depth assessment of participant's abilities, skills and interests to select participants into the grant program? What assessment tools and process were used? Who conducted the assessment? How were the assessment results used? Were the assessment results useful in determining the appropriate program and course sequence for participants? Was career guidance provided and if so, through what methods?
4. What contributions did each of the partners (employers, workforce system, other training providers and educators, philanthropic organizations, and others as applicable) make in terms of: 1) program design, 2) curriculum development, 3) recruitment, 4) training, 5) placement, 6) program management, 7) leveraging of resources, and 8) commitment to program sustainability? What factors contributed to partners' involvement or lack of involvement in the program? Which contributions from partners were most critical to the success of the grant program? Which contributions from partners had less of an impact?

[27] For more information on the Round 2 requirements for third-party evaluations, see pp. 33-35 in "Notice of Availability of Funds and Solicitation for Grant Applications for Trade Adjustment Assistance Community College and Career Training Grants Program" at https://doleta.gov/grants/pdf/taaccct_sga_dfa_py_11_08.pdf.

References

Note: The final evaluation reports can be found at www.SkillsCommons.org, a DOL-sponsored online repository of job-driven workforce development materials where grantees posted these reports and other grant products.

Alamprese, J.A., Costelloe, S., Price, C., and Zeidenberg, M. (2017). Evaluation of the Community College Consortium for Bioscience Credentials (c^3bc): Final Report. Bethesda, MD: Abt Associates, February.

Anderson, T., Kuehn, D., Eyster, L., Barnow, B. S., and Lerman, R. I. (2017). New Evidence of Integrated Pathways: Final Impact Report on Accelerating Opportunity. Washington, DC: The Urban Institute, June.

Aspen Institute Workforce Strategies Initiative. (2016). Retraining the Gulf Coast through Information Technology Pathways: Final Implementation Evaluation Report. Washington, DC: Aspen Institute Workforce Strategies Initiative.

Bragg, D.D., Giani, M.S., Fox, H.L., Bishop, C., and Bridges, K. (2015). Third-Party Evaluation of the Impact of the Health Professions Pathways (H2P) Consortium. Champaign, IL: Office of Community College Research and Leadership, University of Illinois at Urbana-Champaign, September.

Bucci, P.T. (2016). Evaluation of the Illinois Network for Advanced Manufacturing: Final Report. Rockville, MD: Westat, September.

Caffey, D.L. (2016). Clovis Community College TAACCCT Project: Final Evaluation Report. September.

Cohen, E., Mikelson, K., Durham, C., and Eyster, L. (2017). TAACCCT Grantee Characteristics. TAACCCT Grant Program Brief 2. Washington, DC: Urban Institute, February.

Cosgrove, J.J., Cosgrove, M.S., and Bragg, D. (2015). Evaluation of the MoHealthWINs Outcomes and Impact. Cosgrove & Associates, Inc. and Bragg & Associates, Inc., August 26.

De la Mora, A., Kemis, M., Callen, E., and Starobin, S. (2016). 2016 Pathways to Engineering Technology Careers Annual Evaluation Report. Ames, IA: Research Institute for Studies in Education, School of Education, Iowa State University, September 26.

Dunham, K., Hebbar, L., Khemani, D., Comeaux, A., Diaz, H., Folsom, L., and Kuang, S. (2016). ShaleNet Round 2 TAACCCT Grant Third-Party Evaluation: Final Report. Oakland, CA: Social Policy Research Associates, September 29.

Feldman, J., Staklis, S., Hong, Y., and Elrahman, J. (2016). Evaluation Report of the Amplifying Montana's Advanced Manufacturing and Innovation Industry (AMAMII) Project. Berkeley, CA: RTI International, Fall.

Good, K., and Knotts, A. (2016). Training Precision for Agricultural Technicians: Final Evaluation Report. Charleston, WV: McREL International, September.

Hayman, A. (2016). Montgomery County Community College Prior Learning Assessment & Entrepreneurship Grant Evaluation: Final Report. Syracuse, NY: Hezel Associates, September 29.

Helms, S. (2015). University of Hawai'i, Leeward Community College Enhancement and Acceleration of the Education Program: Interim Evaluation Report. Haleiwa, HI: Summer H. Helms, June.

Ho, H. (2016a). Advanced Manufacturing Education (AME) Alliance Evaluation: Final Evaluation Report. Charleston, WV: McREL International, October.

Ho. H. (2016b). Casper College's Health Science Simulation Center (HSSC) Project: Final Evaluation Report. Charleston, WV: McREL International, November.

Ho, H. (2016c). University of West Alabama's Applied Manufacturing Technology Program: Year 4 Final Evaluation Report. Charleston, WV: McREL International, November.

Iacus, S.M., King, G., and Porro, G. (2011). Causal Inference without Balance Checking: Coarsen Exact Matching. *Political Analysis* 20:1–24.

ICF International. (2016). Prince George's Community College, TAACCCT, INsTEP: Final Evaluation Report. Fairfax, VA: ICF International, September.

Knoster, K., and Bumgardner, K. (2016). Nunez Community College's TAACCCT Final Evaluation Report. Charleston, WV: McREL International, September 30.

Knotts, A.E., and Bumgardner, K.L. (2016). New River Community and Technical College's Framework for Institutional Transformation: Reimagining Allied Health in Southeastern West Virginia: Summative Evaluation Report. Charleston, WV: McREL International, September.

Kogan, D., Negoita, M., Mack, M., and DeFever, R. (2016). Evaluation of the Bellevue College Consortium's Health eWorkforce (HeW) TAACCCT Grant: Final Report. Oakland CA: Social Policy Research Associates, September.

Kracker Selzer, A., Sanchez, R., Michaelides, M., Shetty, S., and Bertrane, C. (2016). Arizona Sun Corridor Get into Energy Consortium (ASC-GIEC): Final Evaluation Report. Columbia, MD: Impaq International, September 15.

Magnolia Consulting. (2016). Coconino County Community College TAACCCT Grant Final Report. Charlottesville, VA: Magnolia Consulting, September 30.

Martin, G., and Melzer, B.A. (2016). Kansas City Kansas Community College: Training for Employment (T4E) Program: Final Report. Evalytics, LLC, September.

McKay, H., Michael, S., and Khudododov, K. (2016). The Transformation of Colorado's Development Education Program: Executive Summary. Piscataway, NJ: Rutgers Education and Employment Research Center, February.

Michael, S., and Rua, J. (2016). Fast Track Certificates: Final Report. New York: Suzanne Michael Consulting LLC, October.

Mokher, C., and Pearson, J. (2016). Evaluation of the Connecticut Health and Life Sciences Career Initiative: Final Report. Arlington, VA: CNA Analysis & Solutions, August.

McNulty, A.F., Tice, K.E., and Spencer, P.A. (2016). Intentionally Growing New Information Technology Employees in Michigan (IGNITE): FERA Final Evaluation Report. Ann Arbor, MI: Formative Evaluation Research Associates, September.

Office of Educational Innovation and Evaluation. (2016a). National Aviation Consortium TAACCCT Grant Program: Third-Party Evaluation Final Report. Manhattan, KS: Office of Educational Innovation and Evaluation, Kansas State University, College of Education, September 30.

Office of Educational Innovation and Evaluation. (2016b). North Idaho College: Soaring to Success: TAACCCT Evaluation Final Report. Manhattan, KS: Office of Educational Innovation and Evaluation, Kansas State University, College of Education, September 30.

New Growth Group (The). (2016). Cuyahoga Community College TAACCCT Grant: Final Report. Cleveland, OH: The New Growth Group, October.

Pacific Research & Evaluation LLC. (2016a). Final Evaluation Report TAACCCT Grant Round 2: College of Southern Nevada. Portland, OR: Pacific Research & Evaluation, LLC, September.

Pacific Research & Evaluation LLC. (2016b). Final Evaluation Report TAACCCT Grant Round 2: Rogue Community College. Portland, OR: Pacific Research & Evaluation, LLC, July.

Patnaik, A., and Prince, H. (2016). Retraining the Gulf Coast through Information Technology Pathways: Final Impact Report. Austin, TX: Ray Marshall Center for the Study of Human Resources, September.

Person, A., Thomas, J., and Bruch, J. (2016) Outcomes of Competency-Based Education in Community Colleges: Summative Findings from the Evaluation of a TAACCCT grant. Oakland, CA: Mathematica Policy Research, September.

Price, D., Sedlak, W., Roberts, B., and Childress, L. (2016). Making the Future: The Wisconsin Strategy: Final Evaluation Report. Indianapolis, IN: DVP-PRAXIS LTD, October.

PTB & Associates. (2016). Evaluation of the Alabama/Florida Technical Employment Network TAACCCT Program. Bethesda, MD: PTB & Associates, September 30.

Public Policy Associates, Inc. (2016). Final Report: Evaluation of the AMP PLUS Program. Lansing, MI: Public Policy Associates, Inc., September.

Rayyes, N., Abe, Y., Sanchez, R., Lai, F., Akiya, K., Chan, V., and Barach, I. (2016). Contra Costa Community College District Design it-Build it-Ship it (DBS) Final Evaluation Report. Oakland, CA: Impaq International, September.

Sarna, M., and Strawn, J. (2018). Career Pathways Implementation Synthesis: Career Pathways Design Study. Prepared for the US Department of Labor, Chief Evaluation Office. Bethesda, MD: Abt Associates, February.

SCATE, Inc. (2015). Accelerating Advanced Manufacturing and Global Logistics Careers Partnership (AAMGLCP). Florence, SC: SCATE, Inc.

Schwartz, D., Strawn, J., and Sarna, M. (2018). Career Pathways Research and Evaluation Synthesis: Career Pathways Design Study. Prepared for the US Department of Labor, Chief Evaluation Office. Bethesda, MD: Abt Associates, February.

Shadish, W. R., Cook, T.D., and Campbell, D. T. (2002). Experimental and Quasi-Experimental Designs for Generalized Causal Inference. 2nd edition. Belmont, CA: Wadsworth Publishing.

Shain, M., and Grandgenett, N. (2016). Project IMPACT INNOVATIONS MOVING PEOPLE TO ACHIEVE CERTIFIED TRAINING: Final Evaluation Report. Shain Evaluation and Consulting, September.

Singer, S. (2015). Community College System of New Hampshire TAACCCT Grant: Final Evaluation Report. Syracuse, NY: Hezel Associates, Inc., November.

Stewart, S. (2015). National STEM Consortium Evaluation Final Report. Syracuse, NY: Hezel Associates, September 29.

Stuart, E.A. (2010). Matching Methods for Causal Inference: A review and looking forward. *Statistical Science* 25(1): 1-21.

Sturges, K.M., Usher, K.P., Horwood, T.J., and McKinney, M. (2016). A Prescription for Healthcare Training in Tennessee (RxTN) Program Evaluation Final Report. Fairfax, VA: ICF International, September 30.

Swanson, J., and Erickson, J. (2016). Mitchell Technical Institute's Technical Education at a Distance (TED) Program: Final Evaluation Report. Rapid City, SD: Technology & Innovation in Education, September.

Tan, C., C. Moore, A. Venezia. (2015). Developing Programs of Study and Career Pathways: The C6 Consortium in California's Central Valley Region. Sacramento, CA: Education Insights Center at California State University, Sacramento, September.

Tara, A. (2015). Central Maine Community College TAACCCT Grant Project: Final Evaluation. December.

Thomas P. Miller & Associates. (2016). ASU Mid-South TAACCCT-Round 2 Grant TC-23837-12-60-A-5. Indianapolis, IN: Thomas P. Miller & Associates.

Watrus, B., and Fercho, H. (2015). Oregon Credentials, Acceleration and Support for Employment (CASE) Evaluation Report: Results, Key Issues, and Implications for Policy, Practice, and Systems. September.

Welch, G. (2016). Alternative Transportation Fuel Systems: Advancing the Workforce: Final Evaluation Report. Lincoln, NE: University of Nebraska-Lincoln.

West Texas Office of Evaluation and Research. (2016). Accelerated Career Pathways from Hawaii to the Texas Panhandle: Final External Evaluation Report. Canyon, TX: West Texas Office of Evaluation and Research, West Texas A&M University, September.

Wijma, C. (2016). East Los Angeles College: Technology & Logistics Program: TAACCCT Final Evaluation Report. San Francisco, CA: WestEd.

Woodke, L. (2015). TCC DeMaND Workforce Project Annual Evaluation: Summative Report. Bismarck, SD: Woodke360 Consulting, September.

WorkEd Consulting and MNA Associates. (2016). Palm Beach State College TAACCCT Project gEHRing up for HIT (EHR): Final Evaluation Report. Burke, VA and Fairfax, VA: WorkEd Consulting and MNA Associates, September.

About the Author

Lauren Eyster is a senior fellow in the Income and Benefits Policy Center at the Urban Institute, where her research focuses on innovative workforce development programs and how to best evaluate and learn from them. Most recently, Eyster has examined industry-focused job training and career pathways initiatives implemented through the workforce investment system and at community colleges. She studies how these programs can best provide education and training to different groups such as laid-off workers, youths, low-income people, and older workers. She also researches how systems and various stakeholders can collaborate to help these people find and retain jobs. Eyster holds an MPP from Johns Hopkins University and a PhD in public policy and administration from the George Washington University.

Statement of Independence

The Urban Institute strives to meet the highest standards of integrity and quality in its research and analyses and in the evidence-based policy recommendations offered by its researchers and experts. We believe that operating consistent with the values of independence, rigor, and transparency is essential to maintaining those standards. As an organization, the Urban Institute does not take positions on issues, but it does empower and support its experts in sharing their own evidence-based views and policy recommendations that have been shaped by scholarship. Funders do not determine our research findings or the insights and recommendations of our experts. Urban scholars and experts are expected to be objective and follow the evidence wherever it may lead.

500 L'Enfant Plaza SW
Washington, DC 20024

www.urban.org