pennsylvania
DEPARTMENT OF LABOR & INDUSTRY

FINAL EVALUATION REPORT

2019

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EXECUTIVE SUMMARY

MICRO-CREDENTIALS: OPPORTUNITIES THROUGH STACKABLE ACHIEVEMENTS

In 2015, the PA Department of Labor & Industry (Department)—lead entity for the grant—received a $6 million grant through the U.S. Department of Labor (USDOL) Workforce Innovation Fund (WIF) program to fund the *Micro-credentials: Opportunities through Stackable Achievements* project. The project united seven community colleges and seven workforce development boards (partnerships) with the goal of creating bite-sized educational opportunities for students with barriers to education and employment. The map to the right shows the geographic locations of the seven partnerships.[1]

Figure 1: Geographic Locations of Partnerships Across PA

As a new and untested idea, the hypothesis behind the proposed strategy was based on evidence that there is a need to connect out-of-school youth, adults with low basic skills, and other learners with significant barriers to education and employment with post-secondary education and training that can be obtained quickly and in segments, as evidenced by Frank Catalano from the Institute of Credentialing Excellence Digest.[2] The idea of micro-credentials differs from traditional educational models where the degree (credential) is not received until a series of competencies are displayed via requisite courses. Micro-credentials are designed to allow students to earn credentials in a shorter timeframe, helping address the needs of the individuals to quickly gain skills and become employed.

Given the evidence and assumptions, the project's hypotheses were based on the following:

- Credentials connect people to jobs and educational programs, and define career pathways;[3,4]
- Individuals with barriers to employment typically need a steady income in a short period of time and cannot reasonably wait two years or more to obtain a degree before entering the workforce or are employed while in college and are looking to advance in their career quickly; and
- Traditional credentialing systems have not adequately latticed technical and job-readiness competencies in a way that rewards student progress and encourages retention, as well as meets employer demand.

Based on these hypotheses, the project sought to enhance target population student outcomes (e.g., retention and credential obtainment), ensure students are employable by providing access to training for

[1] Please note that due to location, there may be some colleges and WDBs that overlap location pins.
[2] Retrieved from http://www.credentialingexcellence.org/p/cm/ld/fld=203
[3] Lumina Foundation. (2015). Connecting Credentials: Making the Case for Reforming the U.S. Credentialing System. Retrieved from https://www.luminafoundation.org/files/resources/making-the-case.pdf
[4] Xu, D. & Trimble, M. J. (2016). What about certificates? Evidence on the labor market returns to non-degree community college awards in two states. Educational Evaluation and Policy Analysis, 38(2). Retrieved from http://ccrc.tc.columbia.edu/media/k2/attachments/what-about-certificates-returns-to-non-degree-awards.pdf

industry-relevant skills and competencies, and encourage pathways from credentials to degrees through implementation of bite-sized educational opportunities for students with barriers to education and employment.

The core elements of the initiative were developed around the WIF objective that sought to "enhance strategic collaboration and alignment of workforce development and partner programs to provide more effective services that are aligned to employer needs and local economic development activities."[5] Centered around this objective, the initiative's goal was to improve the educational and employment outcomes of students with barriers and to make micro-credentials an integral part of career pathways for individuals. Project objectives included: (1) establish career pathway models, (2) utilize interventions and supportive services, (3) explore assessment tools, (4) enhance education/workforce relationship, and (5) effectively engage employers in development of micro-credentials.[6]

PROGRAM EVALUATION

The Department contracted with Thomas P. Miller & Associates (TPMA), LLC to serve as an independent, third-party evaluator. TPMA, together with Next Step Associates (NSA) and the Indiana Statistical Consulting Center (ISCC), comprised the Evaluation Team. The evaluation's primary purpose was to assess the planning, implementation, and effectiveness of the intervention. The evaluation itself consisted of three components.

Implementation Evaluation

The Implementation Evaluation began May 2016 and continued through December 2018 to document program progress, monitor program outcomes, and provide recommendations for continuous improvement of program operations. The Implementation Evaluation primarily focused on the training provided by each partnership, but also covered progress on all grant-funded initiatives. The Implementation Evaluation was primarily qualitative and included conference calls, in-person interviews and focus groups, surveys, curriculum study and review (conducted by NSA), and document reviews. The Implementation Evaluation can be described in two parts – the formative, or ongoing analysis of the program, and the summative, or the final cumulative program analysis. A general inductive thematic approach was used to analyze the data gathered throughout the Implementation Evaluation. Research questions can be found in the Implementation Evaluation section of this report.[7]

Outcomes Evaluation

The Outcomes Evaluation with Predictive Analyses, in partnership with ISCC, began May 2016 and continued through May 2019 to measure the effects, positive or negative, of micro-credential participation on students to understand the extent of the impact of the program on key outcome measures. The outcomes analysis answered several research questions, found in the Outcomes Evaluation section, and leveraged the following data sources: administrative data and wage data from the Pennsylvania Center for Workforce Information and Analytics.[8]

The Outcomes Evaluation focused on student outcomes within-program and post-program. The table below highlights the specific outcomes of interest. In addition, the Outcomes Evaluation measured whether

[5] Drawn from WIF Funding Opportunity Announcement.
[6] Drawn from original grant narrative.
[7] A detailed look into the methods used for this study can be found in Appendix A.
[8] A detailed look into the methods used for this study can be found in Appendix B.

sociodemographic variables and/or institution-level variables contributed to the likelihood of within-program and post-program success.

Table 1: Outcomes of Interest

Within Program	Post Program
Micro-Credential Completion	Continuation to For-Credit Academic Programs
Persistence in Micro-Credential Program[9]	Post-Program Employment
Completion of a Micro-Credential Pathway	Change in Employment Status from Pre- to Post-Program
Industry-Recognized Credentials Earned	Post-Program Wages
	Change in Wages from Pre- to Post-Program

Due to the lack of a reasonable comparison group, and the variability in the types of pathways students in a control group and the participants would explore, a one-group, pre-posttest design was chosen to assess participant outcomes, without any attribution of causality. A one-group, pre-posttest design will allow the Evaluation Team to assess the extent to which participants' employment and earnings circumstances change between the time of 12 months before they enrolled in a college's micro-credentialing program and six months after exiting the program. Assessing participants' earning and wages twelve months before enrollment will allow the evaluators to look at multiple quarterly wages and observe the possible incidence of Ashenfelter's dip (decline in participants' mean earnings in the period prior to enrollment in education and training programs[10]).

A limitation of the one-group pre-posttest study design is that any results observed cannot be attributed to the intervention. However, the results can still be useful for program administrators and contribute to the evidence base. With this, historical effects may have influence on the outcome variables and limitations around the data reporting timeline and availability could have also influenced findings. Selection bias in the enrollment process and, generally, limitations around the proposed study design are those that the Team attempted to mitigate as much as possible, but could have influenced findings in a variety of ways. These limitations are discussed further in the Outcomes Evaluation section.

Cost Evaluation

The Cost Evaluation began October 2015 and continued through May 2019 to document and understand the extent of investment into the initiative, the grant recipients and partner contributions, and the cost of the initiative by participant and key outcome measure. The following data sources were leveraged to answer the research questions outlined in the Cost Evaluation section of this report: Department financial reports, partnerships' fiscal agent reports, and data collection questionnaires. National Student Clearinghouse and Unemployment Insurance data were also used.

For the initiative's evaluation, investment cost analysis, cost allocation analysis, and a basic form of cost effectiveness analysis methods were applied. Costs included are discussed at length in the Cost Evaluation section of this report, and include direct grant expenditures, matching costs for all implementation partners, and the value of in-kind contributions from external partners. Grant expenditures cost categories include personnel costs, fringe, equipment and supplies, participant support, travel, and contractual costs. The value of participants' time is not considered a cost in the context of this analysis. The partnerships did

[9] Persistence is defined as the enrollment in another micro-credential after completing the first in their career pathway. Participants who persist but drop out prior to completion will still be flagged as persisting.
[10] Heckman, J. J., & Smith, J. A. (1999). The pre-program earnings dip and the determinants of participation in a social program – Implications for simple program evaluation strategies. Retrieved from http://athens.src.uchicago.edu/jenni/dvmaster/FILES/ash_dip.pdf

not include overhead or indirect cost rates in their grant budgets; therefore, the value of what these costs would have been if charged directly are accounted for in the methodology.

This Final Evaluation Report provides USDOL with evidence-based findings and lessons learned from this initiative, giving insight for future funding and program scaling decisions.

SUMMARY OF EVALUATION FINDINGS

Between May 2016 and December 2018, partnerships developed and implemented a project designed to increase the number of qualified, employable candidates by providing bite-sized credentials to barriered populations. Partnerships aimed to capitalize on innovative education models to make micro-credentials more attainable for non-traditional students, pairing with more accessible and comprehensive support services to help students succeed.

The cost analysis sought to pinpoint the cost per participant in this initiative, while the outcomes evaluation sought to understand the extent of the impact of the programs on participants. Data were examined throughout the evaluation period, helping provide information to the Department and partnerships for continuous improvements, best practices identification, and sustainability of the initiative beyond the grant.

Themes of Successes

Important themes around success include:

Grant and Programmatic Flexibility

The initiative was designed to be flexible, to allow for adaptation in a variety of educational structures, for employer needs, participant skill level and needs, and support methods. Partnerships were able to implement programs that were flexible and accessible for students with barriers to education through use of innovative delivery methods (e.g., hands-on training and class time), comprehensive support services, and programs aligned with industry needs. Modifications could be made throughout the grant and partnerships felt comfortable enhancing program offerings in a variety of ways and experimenting with a more comprehensive student support approach. Partnerships noted appreciation for the ability to support students in a more intentional way and innovate within programs to offer opportunities in industries that did not exist prior to the grant or were not geared toward students with barriers to education.

Partner Engagement

Partner engagement with employers, community organizations, as well as between the college and WDB enabled the partnerships to enhance and expand programs. Partnerships were able to ensure that programs were aligned to industry needs, while also leveraging resources at both the college and WDB to develop quality programming. Without these partnerships, including the award of the USDOL WIF grant, the partnerships would not have been able to provide the micro-credential programs in a variety of industry areas.

Themes of Challenges

Helpful background around the initiative challenges include:

Grant Structure and Requirements

While the grant offered a level of flexibility that enabled partnerships to experiment with innovations and programming, partnerships also noted that the requirements within the grant created challenges. Most notable, the timelines of the grant felt condensed as partnerships wanted more time to implement programs and enroll students so a greater impact could be experienced. With this, partnerships noted a need to hire specialized staff to handle various grant requirements – including those around data collection and management. Without specialized staff, partnerships consistently reported delays with data collection and reporting, especially for the evaluation.

Target Population

Throughout the grant period all partnerships reported challenges with mitigating and removing participant barriers to education. As the target populations included students with barriers to education, grant staff reported that providing the necessary supports, or referring students to other services, was a challenge. With this, recruiting partnerships from the target population was also a challenge in that many were not willing or able to enroll. Grant staff explained that during recruitment, a potential student would be interested in a micro-credential program but were unable to commit due to a variety of barriers (e.g., transportation and childcare). This was exacerbated by the changes in the regions' economies throughout the grant period as the local economies improved, which resulted in lower unemployment rates impacting the availability of jobs. Because of this, partnership staff reported declines in enrollment rates and challenges in incentivizing potential students to enroll. With this, for students that did enroll, some students would obtain employment before the end of their micro-credential program. While getting students employed was viewed as a success by the partnerships, it did hinder completion rates.

Outcomes Evaluation

A total of 700 individuals enrolled in the 19 micro-credential pathways offered across all partnerships and 685 of these participants were included in the analysis. Across the seven partnerships, 19 micro-credential pathways were offered to potential students that could enroll in multiple micro-credential pathways during the grant period. If a student enrolled in multiple pathways, they were counted as an enrollment for each pathway in which they enrolled. Of the 685 participants, 554 (80.1%) enrolled in one pathway, 99 (14.5%) enrolled in two, and 32 (4.7%) enrolled in three.[11] For each pathway in which a participant enrolled, they were counted as a unique enrollment, hereafter referred to as participant-pathways. In total, there are 848[12] unique participant-pathways.

The outcomes study with predictive analysis resulted in the following findings:

- Micro-credential completion and persistence;
- Micro-credential pathway completion;
- Industry-recognized credentials earned;

[11] Only participants in the Allegheny Partnership (4), the Philadelphia Partnership (60), and the Westmoreland Partnership (35) enrolled in two pathways. Only participants in the Westmoreland Partnership (32) enrolled in three pathways.
[12] 554*1 + 99*2 + 32*3 = 848

- Changes in participant employment and wages from pre- to post-program; and
- The extent to which sociodemographic and program factors predicted results in each of the above areas.

Micro-credential participants who completed at least one micro-credential and were employed both 12 months pre-program and six months post-program[13] had an average increase of $801.50 in quarterly wages, a highly significant increase (p = 0.0178). This indicates that one would see a change in wages of this magnitude less than two percent of the time, if it were in fact by random chance rather than an effect of the program (though due to the design of the study, no claims of causality can be made). Further statistical analyses show that sociodemographic factors were not a predictor for wage increases among participants. However, post-program wages (rather than gains) were significantly greater for White, non-Hispanic students; Males; married students; and those with at least a bachelor's degree.

Employment outcomes showed less favorable results, as participants overall were less likely to be employed six months post-program (40.5%) than 12 months pre-program (53.7%). Of the 631 participants that completed at least one micro-credential, 87 were not employed pre-program and gained employment six months post-program (13.8%). Data showed that participants of all sociodemographic backgrounds had a decline in employment rate from pre- to post-program and the statistical model was not a reliable estimator of the odds of finding employment.

Micro-credential participants were highly likely to complete at least one micro-credential, as 90.3% of the 848 participant-pathway enrollments achieved this outcome. Across the seven partnerships, Bucks had the lowest rate of participants not completing at least one micro-credential (0.8%), while nearly one-fifth of participants from the Allegheny partnership did not complete any micro-credentials (19.8%). Further analyses demonstrated that sociodemographic characteristics were not significant predictors of micro-credential completion, which could suggest the overall accessibility of the model.

For participants enrolled in pathways with more than one micro-credential, 92% persisted to enroll in the second micro-credential in the pathway, and all participants from the Bucks partnership who completed at least one micro-credential persisted to enroll in the next micro-credential. Further 70% of all participant-pathway enrollments completed all micro-credentials of the pathway in which they enrolled. Additional analyses showed that White, non-Hispanic individuals were statistically more likely to complete their pathway than their peers, and married individuals were more likely to compete the pathway than unmarried individuals.

Cost Evaluation

Leveraging the data sources described in the Cost Evaluation section of this report, the analysis presented the following findings:

- Total resources invested to date in the initiative;
- Total direct expenditures (grant dollars) invested to date in the initiative, and direct expenditures as a share of total resources invested across fiscal year and partnerships;
- The total value of matching contributions invested to data in the initiative, matching costs as a share of total resources invested across fiscal years and partnerships, and the breakout of matching cost categories; and

[13] N = 183 of the 631 who completed at least one micro-credential.

- The total value of in-kind contributions invested to data in the initiative, in-kind contributions as a share of total resources invested across fiscal years and partnerships, and the breakout of in-kind cost categories.

The Philadelphia partnership chose not to use the standard reporting methodology for valuation of matching and in-kind contributions. Where missing data is noted, current resource investment data is likely underestimated.

According to accrued expenditure data current as of March 2019 (program implementation ceased in December 2018), a total of $4,225,440.77 was invested into the initiative in the form of federal grant dollars. This includes expenditures from the community colleges and WDBs. The Department's grant expenditures were the lowest and of the partnership programs, the Delaware partnership had spent the least in grant dollars ($424,497.86), while the Bucks partnership had spent the most ($775,265.64). The Bucks and Westmoreland partnerships received extra grant dollars after the Department reallocated funds toward the end of the project, releasing them from partnerships that did not plan to use their entire allocation.

Through the end of the implementation period (December 2018), a total of $1,113,896.71 had been invested into the initiative in the form of matching contributions from grantee institutions. The value of matching contributions ranged from just under $31,000 (Westmoreland partnership) to almost $210,000 each (Montgomery and Lehigh/Northampton partnerships) over four fiscal years. With this, through the end of the implementation period (December 2018), a total of $43,999.21 had been invested into the initiative in the form of in-kind contributions. The value of in-kind contributions ranged from $0.00 (Allegheny, Delaware, Philadelphia, and Westmoreland partnerships) to almost $22,000.00 (Bucks partnership) over four fiscal years.

As of the end of program implementation (December 2018) 700 unique participants had been served by the initiative. Taking into consideration the total investment in the initiative ($5,383,336.69 – including direct grant expenditures and the value of matching and in-kind contributions), the initiative's cost per participant was $7,690.48. As of the end of program implementation (December 2018), participants had completed a total of 3790 micro-credentials. Taking into consideration the total investment in the initiative ($5,383,336.69 – including direct grant expenditures and the value of matching and in-kind contributions), the initiative's cost per completed micro-credential was $1,420.41.

BEYOND THE GRANT

Lasting Effects

One of the many findings within this evaluation report is projects like this take time to implement, re-examine, and improve upon. In the early stages of this initiative, success and progress had been made toward increasing short-term training opportunities for disadvantaged and barriered populations. As the grant concludes, many partnerships are sustaining current programs and pursuing opportunities to continue growing the programs. Effects of this initiative are anticipated to continue through the end of the grant and beyond, including:

- Sustaining micro-credential programs, support services that were expanded through the grant, and exploring implementation of other initiatives beyond the grant (e.g., Title II).

- Establishing additional partnerships with community partners for internship opportunities, hiring and interviewing commitments, engagement in curriculum and program development/modifications, and participation in program implementation to ensure that programs continue to meet employer needs. The best practices and strategies drawn from the grant will likely be sustained moving forward.
- Ongoing collaboration between the partnerships through joint program development, employer engagement, supporting students, and other opportunities that may arise beyond the grant.
- Continuing modifications and improvements to micro-credential programs as well as potential addition of programs at some partnerships.

Through the funding provided by USDOL and investments made by the partnerships, the initiative was able to solidify a framework for future success.

REPLICATION STRATEGIES

Throughout the grant, leadership, staff, and instructors identified recommendations for a similar institution/organization considering implementing programs similar to those within this initiative. These recommendations, at a high-level, include:

Consider Specialized Staff

Federal funders, such as USDOL, have various financial, tracking, reporting, and monitoring requirements, in addition to the overall project management required of grant initiatives. Hiring staff that specialize in one, or a couple, of those areas can help alleviate the burden from individuals that are already serving in multiple roles (for example, those serving as grant staff and college staff) or those that may not have grant-specific knowledge or expertise.

Opportunities for Cross-Partnership Sharing

Implementing a grant across several partnerships requires a significant amount of coordination and collaboration. Because these entities operate with different internal functions and within varying environments, creating opportunities for cross-partnership collaboration and sharing could be valuable.

Intentionally Engage Employers

Establishing employer partners is valuable to several areas of a grant, including program enrollment, curriculum development, event participation, and post-program job placement. Employers understand the job market, skillsets needed for the job, new and emerging trends in the industry, and can recognize what other employers in the industry look for in an employee.

Document Institutional Knowledge

Because many grant-hired positions may be temporary, it is typical to experience staff and leadership turnover throughout a grant period. However, this turnover can create significant delays in implementation due to the loss of institutional knowledge and may negatively impact grant progress and success. To counteract this challenge, it is recommended that grant staff and leadership identify ways to document institutional knowledge.

Leverage Existing Resources

Grant design and implementation processes tend to be expedited due to condensed grant startup timelines (for WIF grants, this timeline is one year). Because it can be challenging for partnerships to finalize and implement all setup processes (e.g., curriculum development, hiring, and internal approval processes), it could be valuable to first identify opportunities to build upon and expand existing resources and structures.

Prioritize Population in Design

When designing a program, it is valuable to prioritize and consider the needs of the target population to ensure that the program will encourage individuals to enroll and persist and will facilitate their success. Early in the program design phase, it could be beneficial to discuss with relevant stakeholders the needs of the target populations relative to student support services, intake processes, course scheduling, barriers to education, and program curriculum content (including desired level of difficulty)

Develop Marketing Campaign

Because recruiting from disadvantaged and marginalized populations can be a challenge in that these populations are difficult to find and motivate to return to college, relying on traditional marketing strategies may not be sufficient. Developing a targeted marketing campaign early in the grant period can help the partnership identify the appropriate avenues to recruit from to increase student enrollment.

FUTURE RESEARCH

A review of the evaluation findings and limitations suggests several directions for possible future research. The following studies would provide additional insight into the effects of the WIF-funded programs:

(1) Whether a longer post-program observational window would reveal impacts of greater magnitude;
(2) A more sophisticated cost benefit analysis methodology would have allowed for a calculation of the net benefit observed because of a program, considering when program benefits accrue, as well as its net cost;
(3) The extent to which participants are employed in program-related industries and any variations; and
(4) Examination of additional sociodemographic participant factors.

Following the first suggestion would require extending the post-program observational period for the purposes of examining outcomes beyond the first quarter following program completion. Employing an extended post-program observational period would answer questions about whether the effects of WIF-funded programs were different over the short and longer terms. Hypothetically, it seems reasonable to expect that the influence of the programs would not manifest in the first quarter post completion. This empirical question would be worth investigating.

Further research on this initiative or other similar initiatives should take the value of the benefits realized as a result of the outcomes into consideration, so a sound value judgement can be made that will inform policymakers and the public about whether the program is worth the investment. Such a study would consider the same costs that this study considered (and perhaps additional costs not considered such as

the value of participant time) but would also consider potential benefits that accrue from the outcomes noted. These benefits could include but are not limited to:

- Individual, familial, and societal benefits of participant post-completion employment (including averted or reduced social assistance costs for those earning income that were not before completing the program);
- Increased long-term earning potential as a result of additional education and accrued experience for participants and the implications for their families and society;
- Employment retention and reduced cost of turnover for employers; and
- More intangible social benefits such as reduced crime as a result of employment.

Such cost-benefit analysis must be paired with an impact study design to ensure that the outcomes measured are attributable to the initiative within a reasonable margin of error.

The third suggestion would require accurate and complete industry codes and would allow researchers to determine if the micro-credential structure is more or less successful for specific industries, and if students who complete the program continue on the career trajectory from the micro-credential program. This could also provide insights on the extent to which earning any micro-credential could improve employment or wage outcomes for participants. However, often these codes are self-reported by employers and are not always accurate.

Collecting more detailed participant demographics (e.g., English Language Learning, out-of-school youth, etc.) is difficult for college staff as this information is self-reported by participants. However, more detailed data on these demographics of participants in targeted populations could further examine any differences between groups in successful program and employment outcomes. This process could be facilitated by all involved partnerships targeting the same specific groups to ensure that the sample size for each category is robust enough for analysis. While WDBs might capture some of these data due to federal funding requirements (e.g., out-of-school youth), data systems for WDBs and colleges are not connected and require matching participants across the systems.

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MICRO-CREDENTIALS: OPPORTUNITIES THROUGH STACKABLE ACHIEVEMENTS

MICRO-CREDENTIALS: OPPORTUNITIES THROUGH STACKABLE ACHIEVEMENTS

DESIGN SUMMARY

In 2015, the PA Department of Labor & Industry (Department)—lead entity for the grant—received a $6 million grant through the U.S. Department of Labor (USDOL) Workforce Innovation Fund (WIF) program to fund the *Micro-credentials: Opportunities through Stackable Achievements* project. The project united seven community colleges and seven local workforce development boards (partnerships) with the goal of creating bite-sized educational opportunities for students with barriers to education and employment. The project sought to (1) improve educational and employment outcomes for students with barriers enrolled in post-secondary programs, (2) develop portable micro-credentials for a wide and diverse array of industry employers, and (3) encourage inclusion of micro-credentials as an integral part of career pathways for individuals.

More specifically, the project sought to (1) increase student retention, credential obtainment, and job placement; (2) provide students with the ability to show employers specific skills and competencies learned that improve their employability, even without a degree; and (3) create micro-credentials as part of a pathway to credentials or a degree by bridging employers, educational institutions, and the workforce system. For this section, information was drawn from the original grant narrative submitted to USDOL. In addition, the following sources were used to supplement the information gathered from the grant narrative:

- Regular implementation update calls with the Department
- Regular implementation calls with each partnership
- In-person interviews and focus groups with the Department and partnership leadership, staff, instructors, participants, employers, and community partners
- Surveys administered to participants, instructors, staff, administrators, and partners
- Partnership documents and artifacts, including quarterly program reports, program-related brochures and promotional materials, and other documents

The information gathered from these sources was combined to identify the project's scope, grant elements and activities, logic model, and evidence base.

GRANT ELEMENTS AND ACTIVITIES

The core elements of the initiative were developed around the WIF objective that sought to "enhance strategic collaboration and alignment of workforce development and partner programs to provide more effective services that are aligned to employer needs and local workforce development activities."[14] Centered around this objective, the initiative's goal was to improve the educational and employment outcomes of students with barriers and to make micro-credentials an integral part of career pathways for individuals. Project objectives included: (1) establish career pathway models, (2) utilize interventions and supportive services, (3) explore assessment tools, (4) enhance education/workforce relationship, and (5)

[14] Drawn from WIF Funding Opportunity Announcement.

effectively engage employers in the development of micro-credentials.[15] These objectives, and the activities within, are described in greater detail on the following page:

Establish Career Pathway Models

While each partnership approached this piece differently, the primary goal was to embed multiple industry-recognized micro-credentials along a pathway. With this, partnerships should be able to obtain the micro-credentials continuously in route to a degree or may exit and reenter the program over several years. The purpose of the micro-credentials was to give students with barriers to education and employment the opportunity to show potential employers specific skills and competencies learned that improve their employability even without a traditional degree. Students are able to more quickly add skills or retrain if seeking a promotion or changing careers and can be used as a motivation tool by offering a sense of accomplishment and achievement.

Each partnership worked to identify high-demand occupations and industries appropriate for their region to serve as the basis for career pathway development. Colleges worked with the WDBs and other local agencies to design micro-credential programs and engaged employers to ensure the programs met local need. All partnerships prioritized programs that could lead to employment, and worked to reevaluate and, if needed, modify programs throughout the course of the grant if employer or student needs changed. Additionally, all programs embedded both technical and soft skills into the curriculum to increase students' job readiness.

Utilize Interventions and Supportive Services

Because the target population of the grant included individuals with barriers to education and employment, a key piece of this initiative was to ensure that supports were in place for students in danger of not completing the programs. Partnerships sought to identify these challenges – whether they be educational (e.g., reading comprehension or writing abilities) or other barriers (e.g., financial, time constraints, transportation) – as early as possible and, in many cases, worked internally and with local agencies to help address the barriers experienced by students.

Throughout program delivery, instructors developed transparent relationships with the students to encourage sharing and openness. Instructors and students alike reported through interviews and surveys that these relationships helped instructors identify challenges and intervene before students left the program. Once challenges were identified, staff and instructors worked directly with students to connect them to college, WDB, and other community resources.

Explore Assessment Tools

Assessment tools (e.g., TABE) were used to measure competencies in a variety of areas prior to program enrollment to help instructors and staff determine the need for remediation. These assessment tools were administered during the intake process, in which many partnerships incorporated interviews and other measures to help determine skill level and commitment to the program. During this process, staff also worked to set expectations for the program around time commitment, attendance, and other indicators that could facilitate student success to ensure that students were prepared for enrollment.

[15] Drawn from original grant narrative.

Throughout the programs, instructors administered regular surveys to students to gather feedback on program delivery – including challenges faced, suggestions for improvement, and best practices that should be used moving forward. This type of ongoing assessment helped initiative staff determine the need for program modifications to better meet students where they were.

Enhance Education/Workforce Relationship

A significant priority through this grant was to enhance the relationship between the education and workforce systems. Therefore, the approach to this project required 'partnerships' – one college and local WDB. The partnerships were expected to work together to develop programs that met the needs of employers and students – populations that were served by both entities but typically in different ways. The partnerships drew upon their varying resources and services to design programs that could help increase the employability of enrolled students.

All partnerships noted in interviews a strengthened relationship between the college and WDB, which was directly attributed to the grant. While many partnerships noted instances of working together in the past, this grant offered an opportunity to really explore the differences and similarities between the two entities in a way that facilitated a heightened level of success. Beyond the grant, many partnerships reported plans to continue working together.

Effectively Engage Employers

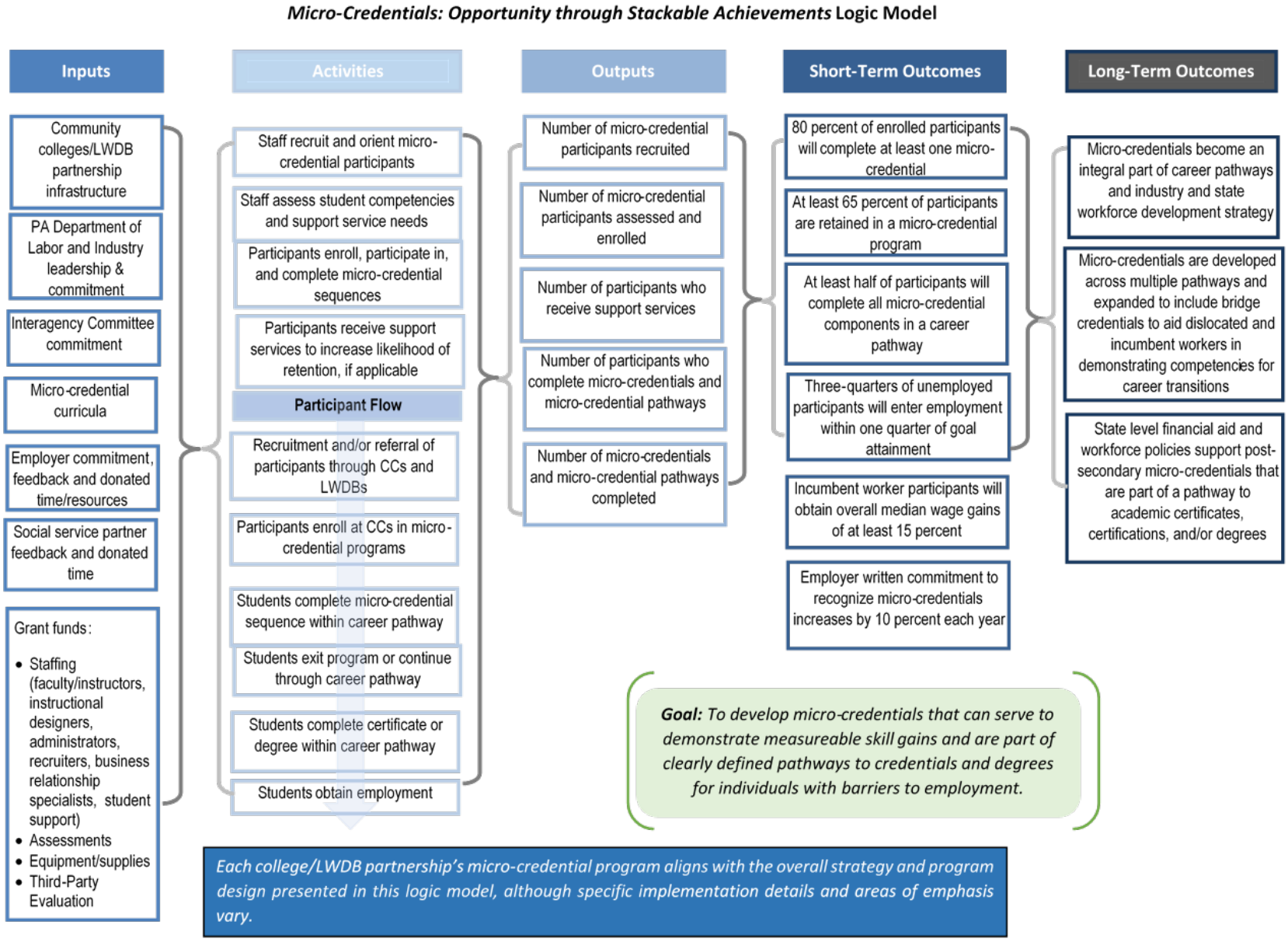
To ensure that programs met employer demand, it was critical to effectively engage employers in the design, implementation, and monitoring of the programs. The strategic involvement of employers helped ensure that micro-credentials aligned specifically to soft skill, job readiness, and occupational skill needs; thus, enhancing the employability of credential earners.

Throughout the grant, partnerships indicated employer involvement in all aspects of program design and delivery, including, but not limited to: curriculum review, advisory board participation, intake interview assistance, course presentations, company tours, campus and community event involvement, internships and other on-the-job training opportunities, mock interviews and resume feedback, and interview and hiring commitments. Partnerships continually reported the importance of engaging employers during all phases of the initiative and anticipates continuing to expand these engagement opportunities beyond the grant.

LOGIC MODEL

The logic model outlines the resources, activities, outputs, and outcomes that are expected as a result of the innovation. More specifically, the logic model highlights **inputs** (the resources that go into the program), **activities** (what is done to implement the program), **outputs** (of the measurable products of the activities), **direct short-term outcomes** (tangible changes that occur because of the outputs of the project), and **long-term outcomes** (less measurable, visionary changes that occur because of the project). The components were utilized to serve the overarching goal of developing micro-credentials that can serve to demonstrate measurable skill gains and are part of a clearly defined pathway to credentials and degrees for individuals with barriers to employment. Please see the logic model located on the following page.

Figure 2: Initiative Logic Model



EVIDENCE BASE

Traditional credentialing systems have not adequately latticed technical and job-readiness competencies in a way that rewards student progress and encourages retention, as well as meets employer demand to date. With these challenges in mind, the *Micro-credentials: Opportunities through Stackable Achievements* project sought to develop new models for measurable skill gains in short-term, focused segments that have a positive impact for individuals and employers.[16]

As a new and untested idea, the hypothesis behind the proposed strategy was based on evidence that there is a need to connect out-of-school youth, adults with low basic skills, and other learners with significant barriers to education and employment with post-secondary education and training that can be obtained quickly and in segments, as evidenced by Frank Catalano from the Institute of Credentialing Excellence Digest.[17] The idea of micro-credentials differs from traditional educational models where the degree (credential) is not received until a series of competencies are displayed via requisite courses. Micro-credentials are designed to allow students to earn credentials in a shorter timeframe, helping address the needs of the individuals to quickly gain skills and become employed.

The project partners utilized the Lumina Foundation for the framework that was used in developing and awarding credentials, creating competency-based curricula, and developing career pathways. The framework, "is organized around competencies that are broken into two learning domains: knowledge and skills. The latter domain is broken into three sub-domains: specialized skills, personal skills, and social skills."[18] The framework uses competencies (i.e., what the learner knows and is able to do themselves) as reference points to help understand the knowledge and skills that encompass degrees, certificates, industry certifications, and other credentials. The concept was that using this framework would help in micro-credential and career pathway development, to clarify the meaning of credentials, making them easier to compare and move from one credential to another.

Given the evidence and assumptions, the project's hypotheses were based on the following:

- Credentials connect people to jobs and educational programs, and define career pathways;[19,20]
- Economically disadvantaged individuals typically need a steady income in a short period of time and cannot reasonably wait two years or more to obtain a degree before entering the workforce or are employed while in college and are looking to advance in their career quickly; and
- Traditional credentialing systems have not adequately latticed technical and job-readiness competencies in a way that rewards student progress and encourages retention, as well as meets employer demand.

Based on these hypotheses, the project was designed to link employer needs to higher education through the systematic development of micro-credentials to serve the needs of individuals with barriers to

[16] Content in this section drawn from original grant narrative and Evaluation Design Report.
[17] Retrieved from http://www.credentialingexcellence.org/p/cm/ld/fld=203
[18] Lumina Foundation. (2015). Connecting Credentials: A Beta Credentials Framework. Retrieved from https://www.luminafoundation.org/files/resources/connecting-credentials.pdf
[19] Lumina Foundation. (2015). Connecting Credentials: Making the Case for Reforming the U.S. Credentialing System. Retrieved from https://www.luminafoundation.org/files/resources/making-the-case.pdf
[20] Xu, D. & Trimble, M. J. (2016). What about certificates? Evidence on the labor market returns to non-degree community college awards in two states. Educational Evaluation and Policy Analysis, 38(2). Retrieved from http://ccrc.tc.columbia.edu/media/k2/attachments/what-about-certificates-returns-to-non-degree-awards.pdf

employment. The project goals included the establishment of several career pathway models that included multiple industry-recognized micro-credentials along the pathway, as well as cataloging available interventions and support services to assist students at-risk of not completing their credentials.

There is strong evidence for the demand of micro-credentials. The Executive Summary of a June 2012 study, *Certificates: Gateway to Gainful Employment and College Degrees*,[21] notes: "at a time when 36 million American workers who attended college did not complete a degree, certificates are piecemeal, attainable, bite-sized educational awards that can add substantially to post-secondary completion." The report further states: "these bite-sized educational awards also provide the on-ramp to college education and middle-class jobs for low-income, minority, and immigrant Americans who are often the first in their families to attend college. For incumbent workers, certificates can be the most effective way to catch up, keep up, and get ahead in their chosen field. For the unemployed and underemployed, certificates can offer a jumpstart in the labor market."[22] Credentials that are inexpensive, reliable, and efficient, quickly certifying trainability and employability are valuable especially for dislocated workers who often do not have a high school diploma.[23]

By 2020, labor economists predict that 65 percent of all jobs in the U.S. economy will require some form of post-secondary degree or credential.[24] The Lumina Foundation states, "students of all ages and backgrounds need a new system of credentials that validates a variety of experiences, education, and training so they can compete for 21st century jobs." More specifically, students seek and are successful in short-term certificate programs with clear indicators of the type of skills that graduates must possess and explicit ties to particular jobs in the local labor market. These types of programs have resulted in particularly strong wage increases and employment outcomes in a number of educational settings.[25] Today's market for higher education includes a more diverse group of non-traditional students that seek education that can be obtained quickly so students can return to/enter the workforce.[26] However, there is disconnect between employer needs and post-secondary education. A reimagined system that connects credentials can fill the gaps in employers' talent pipeline. Micro-credentials were designed to offer a new and innovative way of obtaining credible skills and competencies that are recognized by employers.

[21] Carnevale, A., Rose, S., & Hanson, A. (2012). Certificates: Gateway to gainful employment and college degrees. Georgetown University Center on Education and the Workforce. Retrieved from https://cew.georgetown.edu/wp-content/uploads/2014/11/Certificates.ExecutiveSummary.071712.pdf
[22] Drawn from original Letter of Interest
[23] Bolin, B. (2011). The career readiness certificate: The foundation for stackable credentials. Retrieved from http://files.eric.ed.gov/fulltext/EJ964087.pdf
[24] Lumina Foundation. (2015). Connecting Credentials: Making the Case for Reforming the U.S. Credentialing System. Retrieved from https://www.luminafoundation.org/files/resources/making-the-case.pdf
[25] Xu, D. & Trimble, M. J. (2016). What about certificates? Evidence on the labor market returns to non-degree community college awards in two states. Educational Evaluation and Policy Analysis, 38(2). Retrieved from http://ccrc.tc.columbia.edu/media/k2/attachments/what-about-certificates-returns-to-non-degree-awards.pdf
[26] Lumina Foundation. (2015). Connecting Credentials: Making the Case for Reforming the U.S. Credentialing System. Retrieved from https://www.luminafoundation.org/files/resources/making-the-case.pdf

THE EVALUATION

THE EVALUATION

The PA Department of Labor & Industry (Department) contracted with Thomas P. Miller & Associates (TPMA), LLC, with Next Step Associates (NSA) and the Indiana Statistical Consulting Center (ISCC) as partners, to serve as an independent, third-party evaluator. Within this evaluation, there were three main components:

IMPLEMENTATION EVALUATION

The Implementation Evaluation began May 2016 and continued through December 2018 to document program progress, monitor program outcomes, and provide recommendations for continuous improvement of program operations. The Implementation Evaluation primarily focused on the training provided by each partnership, but also covered progress on all grant-funded initiatives. The Implementation Evaluation was primarily qualitative and included conference calls, in-person interviews and focus groups, surveys, curriculum study and review (conducted by NSA), and document reviews. The Implementation Evaluation can be described in two parts – the formative, or ongoing analysis of the program, and the summative, or the final cumulative program analysis. A general inductive thematic approach was used to analyze the data gathered throughout the Implementation Evaluation. Research questions can be found in the Implementation Evaluation section of this report.[27]

OUTCOMES EVALUATION

The Outcomes Evaluation with Predictive Analyses, in partnership with ISCC, began May 2016 and continued through May 2019 to measure the effects, positive or negative, of micro-credential participation on students to understand the extent of the impact of the program on key outcome measures. The outcomes analysis answered several research questions, found in the Outcomes Evaluation section, and leveraged the following data sources: administrative data and wage data from the Pennsylvania Center for Workforce Information and Analytics.[28]

The Outcomes Evaluation focused on student outcomes within-program and post-program. The table below highlights the specific outcomes of interest. In addition, the Outcomes Evaluation measured whether sociodemographic variables and/or institution-level variables contributed to the likelihood of within-program and post-program success.

Table 2: Outcomes of Interest

Within Program	Post Program
Micro-Credential Completion	Continuation to For-Credit Academic Programs
Persistence in Micro-Credential Program[29]	Post-Program Employment
Completion of a Micro-Credential Pathway	Change in Employment Status from Pre- to Post-Program
Industry-Recognized Credentials Earned	Post-Program Wages
	Change in Wages from Pre- to Post-Program

Due to the lack of a reasonable comparison group, and the variability in the types of pathways students in a control group and the participants would explore, a one-group, pre-posttest design was chosen to assess participant outcomes, without any attribution of causality. A one-group, pre-posttest design will allow the

[27] A detailed look into the methods used for this study can be found in Appendix A.
[28] A detailed look into the methods used for this study can be found in Appendix B.
[29] Persistence is defined as the enrollment in another micro-credential after completing the first in their career pathway. Participants who persist but drop out prior to completion will still be flagged as persisting.

Evaluation Team to assess the extent to which participants' employment and earnings circumstances change between the time of 12 months before they enrolled in a college's micro-credentialing program and six months after exiting the program. Assessing participants' earning and wages twelve months before enrollment will allow the evaluators to look at multiple quarterly wages and observe the possible incidence of Ashenfelter's dip (decline in participants' mean earnings in the period prior to enrollment in education and training programs[30]).

A limitation of the one-group pre-posttest study design is that any results observed cannot be attributed to the intervention. However, the results can still be useful for program administrators and contribute to the evidence base. With this, historical effects may have influence on the outcome variables and limitations around the data reporting timeline and availability could have also influenced findings. Selection bias in the enrollment process and, generally, limitations around the proposed study design are those that the Team attempted to mitigate as much as possible, but could have influenced findings in a variety of ways. These limitations are discussed further in the Outcomes Evaluation section.

COST EVALUATION

The Cost Evaluation began October 2015 and continued through May 2019 to document and understand the extent of investment into the initiative, the grant recipients and partner contributions, and the cost of the initiative by participant and key outcome measure. The following data sources were leveraged to answer the research questions outlined in the Cost Evaluation section of this report: Department financial reports, partnerships' fiscal agent reports, and data collection questionnaires. National Student Clearinghouse and Unemployment Insurance data were also used.

For the initiative's evaluation, investment cost analysis, cost allocation analysis, and a basic form of cost effectiveness analysis methods were applied. Costs included are discussed at length in the Cost Evaluation section of this report, and include direct grant expenditures, matching costs for all implementation partners, and the value of in-kind contributions from external partners. Grant expenditures cost categories include personnel costs, fringe, equipment and supplies, participant support, travel, and contractual costs. The value of participants' time is not considered a cost in the context of this analysis. The partnerships did not include overhead or indirect cost rates in their grant budgets; therefore, the value of what these costs would have been if charged directly are accounted for in the methodology.

[30] Heckman, J. J., & Smith, J. A. (1999). The pre-program earnings dip and the determinants of participation in a social program – Implications for simple program evaluation strategies. Retrieved from http://athens.src.uchicago.edu/jenni/dvmaster/FILES/ash_dip.pdf

IMPLEMENTATION EVALUATION

IMPLEMENTATION EVALUATION

DESIGN SUMMARY

The implementation evaluation for the *Micro-credentials: Opportunities through Stackable Achievements* project began in May 2016 and continued through December 2018 to document project progress, monitor program outcomes, and provide recommendations for continuous improvement of project operations across partnerships. The Evaluation Team conducted a formative and summative evaluation, primarily focused on the training and services provided through this initiative. Because the initiative's purpose was to enhance academic instruction, close student support gaps, and strengthen career pathways, the implementation evaluation proved to be a key element in establishing lessons learned to enhance project implementation and results in real-time. Evaluation feedback was provided through analysis of the following primary themes:[31]

- Progress toward achieving program outcomes or milestones
- Fidelity toward partnership models
- Program accelerators, barriers, and best practices
- Program modifications and changes that occurred as a result of shifting needs and realities
- Context for sustaining components

To gather information on the themes above, the Evaluation Team used a combination of conference calls, in-person interviews and focus groups, program document review, and survey results including:

- Quarterly implementation calls with the PA Department of Labor & Industry (Department)
- Bimonthly implementation calls with the colleges and workforce development boards (WDBs) – or partnerships
- In-person interviews and focus groups with the Department staff, college staff and faculty/instructors, WDB staff, program participants, and community partners/employers
- Program- and initiative-related documents, including curriculum, program-related brochures, and other documents
- Survey results as part of the curriculum study that targeted program participants, program instructors, college administrators, and community partners

The implementation evaluation enabled the Evaluation Team, Department, and partnerships to better understand the program's core activities and the outputs produced by each activity. The analysis qualitatively evaluated how the operations of the initiative functioned (before and through the grant), placing the outcomes of the intervention into context with the implementation process and determining whether the program was implemented as designed. This allowed the Evaluation Team to uncover potential threats to the validity of the study and helped program staff understand how the process might be modified to produce better results.

[31] More information is provided in the Implementation Evaluation Methods section of this report.

FINDINGS OVERVIEW

Findings from the implementation evaluation were grouped by research question theme. Every research question is represented within this section. Overall themes within the implementation evaluation findings include:

Table 3: Implementation Findings Overview

Finding	Description
Programmatic Development	The purpose of the project was to implement micro-credential programs in high-demand industries throughout the Commonwealth of Pennsylvania. Partnerships reported that they were able to launch programs and models that would not have been possible otherwise due to limitations in staff capacity, funding, and college resources. For some partnerships, a credit version of the same program existed at the college, but the grant allowed the partnerships to expand non-credit offerings into new and innovative areas. With this, partnerships were able to experiment with a variety of new student services approaches to help remove barriers to education (e.g., partnerships with community organizations for transportation and childcare assistance). Beyond the grant, partnerships noted opportunities to grow and expand program offerings and student services and cited the grant as helping lay the groundwork for future work.
Capacity Building	The grant funds enabled the partnerships to build their capacity around short-term program offerings by providing opportunities to experiment with programming and student service innovations as well as hire staff to design, implement, and monitor program progress and outcomes. While elements of these innovations, including the program offerings, will last, even more so the impact will be on the capacity of the partnerships to continue to enhance program offerings and support services to meet the needs of students with barriers to education. Grant-funded activities that contributed to capacity building are detailed in the Implementation Evaluation: Beyond the Grant section.
Stakeholder Engagement	Throughout the grant, partnerships consistently noted the importance of stakeholder engagement – whether this be internally (between the college and WDB) or externally (with employers and community partners). Investing in stakeholder engagement enabled the partnerships to strengthen internal and external relationships, leading to donations, program support and participation, establishment of internships, and, subsequently, quality programming for the students. The partnerships relied on close connections with employers and community partners to increase job placement and opportunities for students to remove barriers to their education (e.g., transportation, childcare, housing). See Partner Perspectives section for more.
Flexibility and Innovation	An overarching theme throughout the project was the challenge associated with, and the benefit of, flexibility. The project was designed to be flexible and adaptable because the funding stream promotes project modifications to identify best practices. This allowed partnerships to experiment with innovative program, learning, and support service strategies. With this flexibility, however, came challenges with having to make consistent changes to recruitment plans, program structures, engagement approaches, and other program-related components. Partnerships noted that making these regular changes sometimes created confusion, both for internal staff and students. However, it was through this struggle with flexibility that partnerships were able to implement real-time program structure innovations that led to successful student outcomes, such as job placement.

INITIATIVE IMPLEMENTATION

The content within this section of findings focuses on research questions grouped around the common elements of project implementation. These findings discuss the overall grant rollout, changes, and outputs.

Research Questions

Fidelity and Documentation Questions

(1) How closely did the partnerships implement the *Micro-credentials: Opportunities through Stackable Achievements program* according to the original plans? What factors caused major deviations from the work plans, and how did these deviations impact project progress?
(2) How did local dynamics, context, and existing relationships and alliances shape and impact the micro-credential and support service design and delivery of each partnership's program?
(3) Who were the main stakeholders and decision-makers in each partnership's program? How did roles, level, and nature of involvement of different types of stakeholders vary among the partnerships?
(4) How were support service assessment protocols and academic readiness assessments selected and implemented at the different partnerships?
(5) How did each of the partnerships approach design and delivery of support services to participants?
(6) How do the different partnerships' capacities and abilities to collaborate effectively with industry and support service partners evolve over the course of the project? What factors support or hinder this ability?
(7) How did the PA Department of Labor & Industry's interagency committee support project implementation at each college? What specific interagency committee contributions were most valuable to certain partnerships?

Utility Questions

(8) How do micro-credentials address the needs of employers?
(9) How has employer recognition of micro-credentials changed throughout and following the program's completion?

Curriculum Study Questions

(10) What are the factors underlying the micro-credential curriculum design process that were considered and were significant in promoting or hindering the development of the curriculum?
(11) How effective is the micro-credentialing curriculum in meeting the needs of participants who have barriers to employment (i.e., content accuracy, depth, and scope)?

Annual Activities

Year 1 (October 1, 2015 – September 30, 2016)

Throughout Year 1 of the grant, partnerships worked to hire appropriate personnel or leverage existing personnel for programmatic development. Partnerships developed informal communication plans for communication with each other and many worked to establish their relationship early in the grant period. While most partnerships noted a relationship prior to the grant, many indicated opportunities for expanding this relationship as the grant started.

During this initial phase of the grant, partnerships worked to develop curriculum and identify program logistics (e.g., timing and personnel). Partnerships also worked to establish and enhance relationships with

regional employers to gather input on curriculum as well as program structure. Year 1 of the grant was the official grant start-up time so partnerships worked mainly to develop programs, relationships, and infrastructure that would be used throughout the project.

Challenges regarding the approval timeline for the evaluation plan surfaced early in the grant as the Evaluation Team worked to gain Evaluation Design Report approval as quickly as possible. Because of the delays in approval, partnerships were unable to begin enrollment into programs until the end of Year 1/early into Year 2.

Year 2 (October 1, 2016 – September 30, 2017)

Year 2 consisted of a range of project implementation activities including:

- Program and curriculum refinement and finalization
- Participant recruitment and development of recruitment plans across the partnerships
- Launching programs and modifying structure as needed
- Enrolling students into micro-credential programs
- Gathering ongoing feedback from employers as well as students going through the programs
- Enhancing student support services to help remove barriers to education for students

While partnerships made significant progress with project implementation, many reported challenges in tailoring programs to the needs of the project (e.g., bite-sized credentials) and students (e.g., structuring in a way that kept students in programs through completion). Partnerships worked to leverage community and employer relationships to help strengthen support services to ensure that students needs were met, and also worked with employers to increase recognition of the programs across their respective regions. Partnerships embraced the flexibility of the grant to make ongoing improvements utilizing the feedback gathered from students, employers, and community partners.

Year 3 (October 1, 2017 – September 30, 2018)

As the grant entered into Year 3, partnerships focused on ongoing program improvements, strengthening recruitment efforts, and exploring new ways to engage employers. More specifically, partnerships expanded program offerings and adjusted program structures and curriculum as they continued to focus on the needs of students. Some partnerships developed new programs and launched them in Year 3, making adjustments as needed.

To help increase student completion, several partnerships modified recruitment and intake processes, ensuring that proper communication around program requirements was completed. Partnerships also worked to engage employers in new ways; for instance, leveraging employer expertise in the initial intake processes (e.g., interviewing potential candidates and reviewing applications). With this, partnerships also began intentional discussions around project sustainability and explored ways to use college funds, WDB funding, and employer donations and partnerships. All partnerships reported successful outcomes, including student placement and completion, expanded student services, refined program curricula, and enhanced community relationships.

Year 4 (October 1, 2018 – September 30, 2019)

In the final year of the grant, partnerships largely worked to finalize sustainability plans for the programs. All partnerships reported plans to use some combination of college funds (including other grants), WDB funds, and employer relationships to sustain the programs developed through this grant. While

partnerships continued to refine programs, Year 4 consisted mostly of sustainability discussions and program maintenance, which included ongoing recruitment, running the programs, helping the students obtain jobs, and making small adjustments to curricula as needed through the implementation period.

Year 4 also included grant wrap-up activities for the partnerships and the Department as well as final evaluation activities (e.g., final data collection and reporting) for the Evaluation Team.

Initiative Changes

As highlighted in the narrative above, throughout the course of the grant, changes and adjustments were made to the original project model. Reflecting on the original project design created for the grant application, several adjustments were made to account for lessons learned and contingencies that surfaced during actual rollout and implementation. These adjustments were modifications to grant concepts/activities, which are outlined below.

Table 4: Notable Initiative Changes Throughout Grant

Change	Description
Programming and Curriculum	Ongoing changes to curriculum to better meet employer and student needs. This included addition of programs, modifications to structure and content in programs, additions and modifications to badges and structure of micro-credential award, changes in course delivery and timing, as well as changes to textbooks and other course materials.
Partnership Staffing	Three partnerships experienced staffing changes at the Program Coordinator position, and two partnerships experienced multiple transitions in this position. In addition, two partnerships determined additional grant staff were needed during program implementation to assist with data tracking.
Targeted Population	Throughout the grant period, several partnerships made slight modifications to the populations they were targeting through the grant. For these partnerships, challenges with recruiting and retaining target population students encouraged partnerships to broaden their definitions. While all partnerships maintained the general target population of students with barriers to education and employment, the specific subpopulations may have been modified to increase enrollment numbers.
Employer Engagement	As highlighted throughout this report, partnerships explored new and innovative ways to engage employers. This included, but was not limited to curriculum review, advisory board participation, intake interview assistance, course presentations, company tours, campus and community event involvement, internships and other on-the-job training opportunities, mock interviews and resume feedback, and interview and hiring commitments.
Partnership Engagement	As noted throughout this report, most partnerships noted enhanced relationships between the college and WDB throughout the grant period. While partnerships reported working together prior to the grant, the grant's strategic effort to bridge the workforce and educational systems helped the partnership fully leverage the resources and capabilities from both entities.
Department Staffing	In December 2017, the Department transitioned the project management role of the grant from the PA State Workforce Development Board to the Bureau of Workforce Development Administration (BWDA). The Grant Services Unit of BWDA provided an improved strategic alignment for a more effective approach to project management.

Change	Description
	This change parallels the project management of other Federally funded grants by the same unit allowing for added consistency.
Implementation Timeline	In September 2017, partnership staff were informed that grant implementation activities would conclude on December 31, 2018. Some partnerships anticipated a longer period of program implementation, which resulted in modifications to program timelines, offerings, and budgets.

PARTNERSHIP IMPLEMENTATION

The content within this section focuses on research questions centered around project implementation by each partnership. Because each partnership approached the project differently, it is important to highlight each partnership's approach.

Research Questions

(1) Who were the main stakeholders and decision-makers in each partnership's program? How did roles, level, and nature of involvement of different types of stakeholders vary among the partnerships?
(2) How were support service assessment protocols and academic readiness assessments selected and implemented at the different partnerships?
(3) How did each of the partnerships approach design and delivery of support services to participants?
(4) How do the different partnerships' capacities and abilities to collaborate effectively with industry and support service partners evolve over the course of the project? What factors support or hinder this ability?

Bucks County Community College and Bucks County Workforce Development Board

Micro-Credential Program

Table 5: BCCC Program Design

Design	Description
Original Design	• Served populations included ex-offenders, out-of-school youth, individuals with disabilities, and displaced workers. • Metalwork micro-credential program was designed to include eight modules: Introduction to Manufacturing, Hand Tool Use, Shop Math and Measurement, Blueprint Reading, Machining, Welding, Workplace Employability Skills, and Personal Finance. • Students tested for a National Institute for Metalworking Skills (NIMS) Level 1 certification
Interim Design	• Industrial Maintenance was added as a second micro-credential track and included the following modules: Introduction to Manufacturing, Shop Math and Measurement, Blueprint Reading, Workplace and Industry Interpersonal Skills, Personal Finance, Basic Electricity, Electric Relay Control, and Mechanical Fabrication. • Programmable Logic Controller (PLC) was added to the Industrial Maintenance program after discussions with local employers. • Upon completion of all micro-credentials, Metalwork students tested for a National Institute for Metalworking Skills (NIMS) Level 1 certification.

Design	Description
Final Design	• Increased emphasis on PLC training based on employer demand. • Program offered at an additional site in the Upper Bucks Region with classroom training that took place at the college campus and hands-on training that took place at the local tech school using a modified schedule based on availability of the lab. • Students participated in 6-8 company tours per cohort.

Staffing Model

Key staff for BCCC, Bucks WDB, and the PA CareerLink® included:

Table 6: BCCC Staffing Model

Role	Description	Role	Description
BCCC		**WDB & PA CareerLink®**	
Executive Director	Oversaw all components of the micro-credential program: curriculum/instruction, recruitment and communication with students, and communication with community partners including PA CareerLink®	**Business Manager**	Primary point of contact for workforce. Tracked participant outcomes for WIOA reporting. Coordinates WDB and PA CareerLink® efforts for micro-credential programs including linking the college and community partners and supporting participant recruitment
Job Developer	Point of contact for employers. Fostered employer interest in the program and connected employers and students. Helped students with resume, interview preparation, etc.	**Director of Finance**	Oversaw program expenditures. Coordinated additional funding opportunities for participants during and after the program
Support Specialist	Supported various aspects of the program as opportunities arose	**Employer Services Manager**	Connected employers and post-program graduates with OJT opportunities
Assessments Manager	Located at the PA CareerLink®. Provided Valpar dexterity test to program candidates		
Instructors	Curriculum design and implementation, including connecting theory with practice		

Key Project Changes

In late 2017, the Bucks partnership added an Industrial Maintenance micro-credential track due to a reported employer need in the region. Within this curriculum, staff increased use of Programmable Logic Controller (PLC) content.

In March 2018, the partnership began offering the program at the Upper Bucks location at the request of the local employers. The partnership modified the schedule to accommodate the lab at a local tech school, which was available during certain hours.

Community College of Allegheny County and Partner4Work

Micro-Credential Program

Table 7: CCAC Program Design

Design	Description
Original Design	• Served populations included out-of-school youth, adults with low basic skills, unemployment insurance recipients, underemployed, and learners with significant barriers. • Three micro-credential program tracks: Patient Care Technician, Health Information Technician, and Computer User Network Support Technician. • Within each program track, each micro-credential built upon the one prior to it along a path, starting with the first course.
Interim Design	• The Patient Care Track included two micro-credentials: Activities of Daily Living, Certified Nurse Aide. Electrocardiography (EKG) was a potential additional micro-credential that staff determined was not necessary as a separate component. • Computer User Network Support Technician included four micro-credentials: Information Technology (IT) Essentials Part 1, IT Essentials Part 2, Computer Networking, and Cyber Security.
Final Design	• Computer User Network Support Technician included a bootcamp to help students prepare for the A+ certifications, an additional 40 hours of instruction. • Health Information Technician was modified to include six micro-credentials: Microsoft Office for Healthcare, Medical Terminology, Introduction to Health Care Statistics, Introduction to Databases, Building Databases, and Applying Databases. • TABE testing pre-requisite of 11th grade math and English.

Staffing Model

Key staff for CCAC, Partner4Work, and the PA CareerLink® included:

Table 8: CCAC Staffing Model

Role	Description	Role	Description
CCAC		**WDB & PA CareerLink®**	
Assistant President and Dean of Workforce Development	Served as the supervisor and director of the micro-credential program at the college	**Director of Youth Innovation**	Connected students to services at the WDB, referred students from the Out-of-School Youth service providers, marketed the micro-credential program in the community and to potential students
Project Coordinators	Two part-time project coordinators oversaw the data collection, enrollment, and job placement activities	**PA CareerLink®**	Connected students to job opportunities through job search, resume, and other types of assistance
Curriculum Developers	Developed curriculum in each micro-credential track and responsible for any curriculum changes		
Instructors	Taught the micro-credential program to students		

Key Project Changes

Early in the project, there were several changes to grant leadership. There were also two individuals that served as Coordinators for the majority of the grant. In October 2017, based on student feedback, grant staff modified the Computer User Network Support Technician program to be more accessible for students and better prepare students for the certification tests. Grant staff changed the instructor for the program and the instructor helped to modify the program. The book used for the class was modified, and grant staff added an additional 40 hours of instruction to the program. In June 2018, grant staff added an additional certification to the program, CompTIA A+ certification.

Based on instructor and student feedback, grant staff modified the prerequisites for enrollment in all programs and developed a more rigorous intake process for students. Grant staff increased the TABE requirement for all students to score at least at the 11th grade Math and English level, if students did not meet this requirement, they did not proceed through the intake process and were referred to other programs at the college. Due to the need in all programs for computer skills, the IT instructor recommended a computer literacy test to ensure students were prepared for the programs' technology requirements. Once students passed the literacy test, they were interviewed by grant staff to assess the students' interests, ability to study outside of class time, and to share expectations of the program. Grant staff also collected student resumes and references to ensure the students had "the soft skills" necessary for the program. Additionally, instructors for each micro-credential track developed a pre-test to ensure instructors understood student abilities prior to the cohort beginning, which allowed for cohort-by-cohort program delivery modifications.

Community College of Philadelphia and Philadelphia Works, Inc.

Micro-Credential Program

Table 9: CCP Program Design

Design	Description
Original Design	• Developed curriculum based on employer needs identified through advisory meetings and informal discussions. • Target populations included: under-skilled, unemployment insurance recipients, underemployed, Opportunity Youth, ex-offenders/re-entry, English Language Learners, KEYS recipients, students requiring developmental education, those from the Adult Community Education program, and Educational Support Services.
Interim Design	• Phase 1 (21st Century Skills) participation required for all program students. Participants who completed series of courses, earned up to three digital badges around the following competencies: Essential Computer Skills (Technology); Writing and Speaking at Work (Communication); and Collaboration and Problem Solving (Teamwork). Participants who earned all three badges automatically earned a fourth badge: Ready to Work, in which they are eligible to proceed to Phase 2. • Phase 2 (technical programs/short-term job training) included several high-demand short-term training programs. Each program aligned with the following pathways: healthcare, automotive technology, advanced manufacturing, or business and technology. After completion, students could continue their education or enter the workforce. • Phase 3 of the program design was not funded by the grant but was a pathway to academic programs in the college. Participants could continue education to certificate (less than 30 credits) or several aligned associate degree programs at the college.

Design	Description
Final Design	• Added Bookkeeping, Welding, and Pharmacy Technician programs as options in Phase 2. • Increased lab time from 8 hours to 2 days a week.

Staffing Model

Key staff for CCP, Philadelphia Works (WDB), and the PA CareerLink® included:

Table 10: CCP Staffing Model

Role	Description	Role	Description
CCP		**WDB & PA CareerLink®**	
WIF Coordinator	Oversaw all grant operations including intake interviews and student enrollment, programmatic development, and evaluation activities	**WDB**	Assisted with many components of program implementation (e.g., discussions on curriculum needs and changes, next steps, potential program modifications, and engaging employers), convened employers to engage with the college
Assistant Vice President and Vice President of Workforce and Economic Innovation	General oversight of grant including adherence to timelines and original proposal/plan, and expediting and assisting with programmatic development	**PA CareerLink®**	Connected students to job opportunities through job search, resume, and other types of assistance
Instructors	Taught micro-credential program courses, including Orientation to Careers and staffing computer labs		
Office Administrative Assistant (Grant Data Specialist)	Hired toward the end of the grant, this individual was charged with managing all data associated with the grant as well as managing all communication relative to data with the evaluators and CWIA.		

Key Project Changes

College staff moved the assessment testing earlier in the soft skills course sequencing to ensure that instructors could gauge the student's capabilities prior to technical skill course enrollment in early 2017. Because students entered the programs at different levels and with different capabilities, instructors indicated it was critical to understand these levels prior to the program start.

Changes to technical program offerings were also made in early 2017 to reflect additions to the High Priority Occupations list for the Philadelphia region with Welding and Pharmacy Technician Training with Externship added to the options for Phase 2. Bookkeeping was also added as an additional opportunity in Phase 2.

Based on student and employer feedback, grant staff increased the amount of computer lab time for students in Phase 1 from eight hours to two days a week. Grant staff reported this time was used for additional career readiness skills, computer experience, and as a time for students to work on homework. Grant staff implemented a more in-depth program orientation, including refresher sessions on math and

reading skills to help increase student TABE scores. Toward the end of the grant, CCP also hired an individual to manage the data associated with the grant.

Delaware County Community College and Delaware County Workforce Development Board

Micro-Credential Program

Table 11: DCCC Program Design

Design	Description
Original Design	• Leveraged existing Computer Numerical Controls (CNC)/ Metalworking. • Served populations included workforce system clients, unskilled workers, veterans, and high school students. • Module topics included Being the Employee that Employers Want, Exploring Careers, Utilizing Technology in the Workplace, Career Up Skilling, and Work-Life Balance. • Modules stackable to academic credit.
Interim Design	• NIMS certification embedded into program. • Micro-credentials tailored more toward industry need included: Math for Occupational Technologies; Prints, Layout, and Measurement for Machining; Basic Technical Skills; Manufacturing Processes; Machining Technology; CNC Machine Tool Operations; and CNC Programming and Advanced Operations.
Final Design	• No significant changes to program structure were made.

Staffing Model

Key staff for DCCC, DCCC WDB, and the PA CareerLink® included:

Table 12: DCCC Staffing Model

Role	Description	Role	Description
DCCC		**WDB & PA CareerLink®**	
Grant Manager	Oversaw all grant operations including intake interviews and student enrollment, programmatic development, evaluation activities, and administrative components (e.g., grant reporting)	**WDB**	Connection to employers (e.g., engaged with employers, created partnerships, connected students to jobs in the community, and facilitated reviews and committee meetings)
Bookkeepers/ Administrative Assistants	Directed interested students to appropriate contacts, assisted with student enrollment processes, and administrative components (e.g., ordering books and certificates)	**PA CareerLink®**	Connected students to job opportunities through job search, resume, and other types of assistance
Instructors	Taught micro-credential program courses, and developed curriculum and daily lesson plans		
College Workforce Liaison	Interacted with the WDB and PA CareerLink®		

Role	Description	Role	Description
DCCC		WBD & PA CareerLink	
Dean of Workforce Development	General oversight of grant including adherence to timelines and original proposal/plan, expediting and assisting with programmatic development, and involvement with crosswalk development		
Program Consultant	Staff member from college that assisted with NIMS certification modules (i.e., development of micro-credential modules that adhere to NIMS requirements)		
Director of Grants Management	Assisted with grant start up, ensured ongoing compliance to grant requirements, and finalized grant reports		

Key Project Changes

In December 2017, based on employer feedback, a new textbook was used for the Metalworking program that targeted content more relevant to the industry. In addition, use of guest speakers was built into the program earlier than before to re-motivate students enrolled in the program to increase program retention. In June 2018, the program also required NIMS certification registration earlier in the program to help students feel more comfortable with testing.

The day session of the program was removed due to low attendance in late 2017.

Montgomery County Community College and MontcoWorks

Micro-Credential Program

Table 13: MCCC Program Design

Design	Description
Original Design	• The primary target population for the Montgomery partnership's program was unemployed jobseekers referred through the PA CareerLink®. • Four initial micro-credential pathways: Health Claims Technologist, Medical Billing and Coding, Payroll Technician, and CNC Operator. • Certifications were built into the pathways, and students earned micro-credential badges throughout each pathway. • All pathways were non-credit but could stack into academic certificates and degrees at the college.
Interim Design	• Four micro-credential pathways were developed: Medical Billing Specialist, Office Assistant/Customer Service Specialist, Payroll Technician, and CNC Operator. • Health Claims Technologist was collapsed into Medical Billing program and Office Assistant was added. • Micro-credentials awarded as digital badges upon completion of modules.

Design	Description
Final Design	• Within the Medical Billing pathway, a receptionist-track option was added to provide more job opportunities for students. Badges within this pathway included business software and customer service.

Staffing Model

Key staff for MCCC, MontcoWorks (WDB), and the PA CareerLink® included:

Table 14: MCCC Staffing Model

Role	Description	Role	Description
MCCC		**WDB & PA CareerLink®**	
Program Director	Oversaw and managed all components of the micro-credential program: coordinated curriculum development, instruction logistics, and articulation with credit programs; provided student support in collaboration with the Career Coach, helped students navigate the college; liaised with industry partners; and maintained program data and records	**Title I Career Coach**	Completed all eligibility and facilitated necessary assessment for students prior to enrollment; coordinated tuition coverage through Title I staff; facilitated supportive services with WDB staff; maintained contact with students to intervene in cases of issues; followed up with students to arrange for employment prep upon credential completion; and coordinated with Title I Business Services
Support Specialist	Assisted the Program Director with various administrative and student support functions	**Title I Business Services**	Worked with employers to facilitate placement of student upon program completion
Micro Credential Technical Support Specialist	Served as the badging/micro-credentialing expert at MCCC and provided training and ongoing technical assistance	**WDB Fiscal Manager**	Processed invoices for MCCC and assisted with ongoing budgeting; provided technical assistance as needed
Instructors	Created/Modified curriculum; designed modules and competency badges in Blackboard, and taught modules/ courses to students	**WDB Executive Director**	Facilitated oversight of Title I/WDB staff involved in project; developed and submitted reports as requested; tracked performance outcomes
Grant Accountant	Maintained grant budget and expenditure records; submitted invoices and documentation to the WDB		
Vice President of Academic Affairs	Facilitated strategic efforts around non-credit to credit articulation, competency-based education models, and student success in the college, as well as sustainability plans		

Key Project Changes

The partnership had originally planned to offer a Health Technologist micro-credential program; however, this program was ultimately collapsed into the Medical Billing and Coding specialist program in 2017. The Office Assistant/Customer Service Specialist program was also added in 2017.

Additionally, the staffing structure of the project evolved from the original plan, which included a part-time Coordinator and a Success Coach. Ultimately, the part-time Coordinator and Success Coach positions morphed into the full-time Project Director position in 2017.

In Spring 2018, Montgomery added a Billing Receptionist focus to the Medical Billing program due to needs identified by employers. Montgomery found that the demand in this field was not for entry-level billers and shifted the program to increase employment rates for participants in the program. Customer service, Microsoft Word, and Excel modules were added to the program with badges associated with those modules. Grant staff reported each pathway was specifically designed to offer two key career opportunities upon completion to increase overall job placement options.

Northampton Community College and Workforce Board Lehigh Valley

Micro-Credential Program

Table 15: NCC Program Design

Design	Description
Original Design	• The target population for the program was unemployed and underemployed individuals seeking services through the PA CareerLink® and through other social service and community-based programs with which staff have contacts and relationships. • Original micro-credentials included: Is Manufacturing Right for Me, Safety and Quality First, Working with Equipment and Tools, Manufacturing Processes and Production, and Transitions to College or Work. • Pathways were available to transition to academic program.
Interim Design	• The program ran for three weeks (20 hours hours/week), incorporating classroom instruction using an online curriculum (180 Skills) and hands-on skill development in the Fab Lab. • Micro-credentials included: Module 100—Is Manufacturing for Me (mandatory): learn about the industry, earn an OSHA 10 certification, SDS and hazard communication, and Lockout/Tagout procedures; Module 201—Assembler (mandatory): basic skills in assembly, surface preparation, basics of the bonding process, and hand and power tools; Module 202—Operator (optional): basic skills in machine manufacturing processes centering on CNC machines, 3D printing, physical and mechanical properties, abrasives, and robotics; Module 203—Quality Inspector (optional): quality processes and systems and learn how to use common inspection tools; Module 300—Transition to Work or Post-Secondary Education (elective): explore career pathways in manufacturing, practice resume and interview skills, and learn how to transition in a credit program.
Final Design	• Based on company and learner feedback, the program was changed from 15 weeks to 9 weeks. In addition, Module 100, 201 and 300 were mandatory modules as they were deemed more than adequate to prepare learners for entry level employment in manufacturing.

Design	Description
	• The 180 Skills online curriculum for Modules 202 and 203 were available for learners throughout the program but were not deemed micro-credentials.

Staffing Model

Key staff for NCC, Workforce Board Lehigh Valley, and the PA CareerLink® included:

Table 16: NCC Staffing Model

Role	Description	Role	Description
NCC		**WDB & PA CareerLink®**	
Associate Dean, Workforce Development	Supported the overall strategy of the micro-credential program and facilitated necessary partnership in the institution and in the community	**Executive Director**	Supported the overall strategy of the micro-credential program and the partnership with NCC; liaised with industry partners
Project Director	Oversaw and managed all components of the micro-credential program: curriculum development, instruction logistics, and student support; liaised with industry partners; and maintained program data and records	**Project Director (consultant)**	Provided strategic guidance on overall program strategy and approach to Executive Director, served as the Subject Matter Expert on micro-credentialing and comprehensive education in the region
Student Support Specialist	Provided ongoing support to students to address barriers that helped them be successful. Managed program orientation and assessments. Assisted with recruitment and linking students with employment opportunities	**Career Coaches**	Referred clients with appropriate interests and skills to the micro-credential program
Recruitment Specialist	Worked with the PA CareerLink® to conduct program marketing, outreach and recruitment activities for workforce system customers. Assisted with program orientation and assessments and linking students to job opportunities	**Fiscal Director**	Provided financial management and oversight of the grant, monitored progress towards goals
Instructors	Designed and implemented the curriculum: 180 Skills online modules/classroom lecture[32] and Fab Lab hands-on instruction		
Grant Accountant and Compliance	Management of grant funds – approval and purchasing, invoiced WDB, ensured compliance with all federal grant requirements		

[32] For more information, please see: http://www.180skills.com/

Key Project Changes

Changes in grant leadership occurred in April 2018 as the previous grant manager left the college. The position was replaced by another member of the existing grant team.

Northampton also submitted a modification to the WDB to change the numbers that would be served by the grant (85, reduced from 150) and the service delivery timeline (changed to December 2018). Program modification occurred to the delivery method of program modules as two modules were deemed optional and available for online completion. The three key modules were completed by participants in person. Following completion of the three key modules, students had the opportunity to interview with companies during a designated "interview day" held at the college.

Westmoreland County Community College and Westmoreland-Fayette Workforce Development Board

Micro-Credential Program

Table 17: WCCC Program Design

Design	Description
Original Design	• The intended target population for the micro-credential programs included out-of-school youth, adults with low basic skills, unemployed or underemployed people, students with barriers, and general workforce system customers. • Westmoreland offered two technical micro-credentials, Welding and Machining. Both were 60 hours over 10 weeks, and students completed both. Micro-credentials included the certifications (American Welding Society (AWS) and NIMS that students earned when they completed the program and passed the exam tests.
Interim Design	• In collaboration between the grant staff and the instructors, a nine-day Pre-Employment pathway was created to provide a foundational level of skills to participants. Upon completion of this pathway, students would move into Machining and Welding programs. • The two technical micro-credential programs were revised to be only 40 hours each, instead of the 60 hours required in the original design.
Final Design	• In addition to the programs above, Westmoreland added a culinary program in June 2018. This program was 80 hours over four weeks (20 hours each week). Courses were run in the evenings to accommodate students with jobs and offered certifications such as ServSafe upon completion.

Staffing Model

Key staff for WCCC, Westmoreland-Fayette WDB, and the PA CareerLink® included:

Table 18: WCCC Staffing Model

Role	Description	Role	Description
WCCC		**WDB & PA CareerLink®**	
Program Director	Oversaw the micro-credential program, coordinated with the Program Coordinator on curriculum development, and coordinated instruction implementation with the instructors. Maintained relationships with the local employers	**Executive Director**	Promoted the program with employers, maintained regular relationships with the grant staff, and assisted with recruitment

Role	Description	Role	Description
WCCC		**WDB & PA CareerLink®**	
Program Coordinator	Led curriculum development, student recruitment, and social media marketing. Served as a Career Coach (assisted students with resume writing and developing interview skills) and kept program records	**PA CareerLink® Administrators**	Reviewed the curriculum, recruited participants, and communicated with employers
Instructors	Created/Modified curriculum and instructed students in pre-employment modules	**Career Coaches**	Referred clients with appropriate interests and skills to the micro-credential program
Grant Support	Advised the Program Director and Program Coordinator on grant administration issues. (Employed by the college's Grants Office)	**Fiscal Director**	Provided financial management and oversight of the grant, monitored progress towards goals
Vice President	Provided leadership and guidance on grant program implementation		

Key Project Changes

In the early implementation phases, the Westmoreland partnership developed a pre-employment micro-credential program to precede the two technical micro-credential tracks. Following discussions with local employers, it was determined that the college should add a culinary micro-credential program which was modified from existing programming at the college. The program launched in June 2018 and has had reportedly successful enrollment numbers.

Additionally, early in 2018, there was a transition in grant leadership and the Grant Manager position was made full-time. The new grant leader has worked to make significant changes since his hire. The program schedule was also changed in 2018 to accommodate students with transportation barriers and aligned with the earliest arrival and latest departure times for the campus bus stop. Changes to program modules occurred in 2018 as well – Introduction to Hydraulics and Introduction to Lean Manufacturing courses were incorporated into the last two Pre-Employment cohort's program schedule based on needs identified from local employers.

DEPARTMENT IMPLEMENTATION

The findings within this section address research questions around the Department's involvement throughout the project.

Research Questions

(1) How did the PA Department of Labor & Industry's interagency committee support project implementation at each college? What specific interagency committee contributions were most valuable to certain partnerships?

Level of Support

The Department provided a wide range of support to the partnerships, including:

- Regular attendance on bimonthly evaluation calls with partnerships;

- Overseeing fund expenditures and reallocating funds across partnerships when needed; and
- Providing guidance to the partnerships when they have questions or are facing challenges through utilization of USDOL, Jobs for the Future, and other local, state, and national resources.

Promising Practices

The Department, as the project's general manager, identified the following best practices that could be used by other entities overseeing a consortium grant. These best practices were also noted as valuable to the partnerships and are outlined below.

Provide Opportunities for Knowledge Sharing

To create efficiencies and identify best practices, it could be beneficial for grant leadership to provide opportunities for knowledge sharing across sub-grantees at the startup of the project and throughout implementation. Facilitating knowledge sharing provides opportunities for sub-grantees to learn from each other by sharing successful practices and bringing challenges with implementation to the group for discussion. The sub-grantees could also choose to share resources across the consortium (e.g., curriculum, program delivery models, and partnership strategies), which creates efficiencies in design and implementation and can encourage strengthened relationships among the sub-grantees.

Prioritize Consistent and Regular Engagement

To build rapport with the sub-grantees from the beginning of the project and throughout implementation, grant leadership should consider prioritizing consistent and regular engagement. This engagement could be in the form of regular calls, all-grantee meetings, and visits to the sub-grantees throughout the project. Engagement could begin early in the project to facilitate an understanding of the sub-grantee's project approach and continue throughout the grant to help mitigate challenges as they arise, identify best practices, and provide technical assistance. In building this rapport between project leadership and subgrantees early in the project, and strengthening this relationship throughout, a foundation for future projects and partnerships could be established.

Consistently Monitor Grant Expenditures

In cases where the lead entity is managing all sub-grantee funding, consistently monitoring grant spending can help ensure that funds are expended prior to the end of the project. Due to budget modifications and sub-grantee, state, and federal processes, it can become difficult to expend all grant funds prior to the end of the grant due to the delays that these processes may cause. If this funding is closely monitored throughout the project, grant leadership can project spending for each sub-grantee and facilitate funding reallocation to other sub-grantees as needed (e.g., if a sub-grantee is not likely to expend all funds, reallocating a portion of funds to a sub-grantee that is spending funds quickly). With these processes revisited regularly throughout the project, grant leadership can help ensure that all grant funds are expended.

Document Processes and Approach

When implementing multi-year grants, transitions in grant leadership can become more probable. Mid-grant leadership changes can also, at times, create delays in implementation as new leadership must familiarize themselves with grant implementation progress and processes used to date. Documenting leadership processes and approaches early in the grant could help mitigate challenges associated with leadership changes as well as ensure that processes are documented for future grant-related efforts. This

documentation can take the form of memos, notes, and formal documents that are stored on a shared system and can be accessed as needed by current grant managers, new grant managers (as a result of leadership changes), and grant managers of similar projects to share knowledge and best practices.

CURRICULUM STUDY

The purpose of the curriculum study,[33] which supplemented the implementation evaluation, was to explore and evaluate the process the community colleges used to develop and fully implement programs for participants to successfully obtain micro-credentials. The extent to which the curriculum met the needs of participants with barriers to education, with specific focus on content accuracy, depth, and scope in order to support improvement and sustainability were also examined. The scope of this study involved a comparison between stories of successful and failed attempts at development and implementation of the initiative, as reported by the seven partnerships.

The methodology employed was a mixed-methods sequential exploratory design with emphasis on triangulation of qualitative and quantitative data to address the curriculum study research questions. These were gathered from a variety of stakeholders (i.e., students, instructors, staff, grant leadership, and partners) through program artifacts, evaluation calls, surveys, and annual site visits. The findings revealed several factors underlying the micro-credential curriculum design process that were considered and were significant in promoting or hindering the development of the curriculum, alongside being effective in meeting the needs of participants with barriers.

These findings are clustered around multiple themes that relate to: (a) leveraging existing partnerships, program curricula, assistance from WDBs, and existing statewide databases (e.g., PA CareerLink®) to expedite curriculum development as well as student and staff recruitment; and (b) enhancing student achievement by increasing the proficiency of students completing the program and mitigating barriers. The primary limitation to the curriculum study was selection bias in the composition of participant and partner focus groups, as well as in survey responses. Also, self-reported data can be biased, and there can be a tendency to downplay problems, delays, and shortcomings in program implementation. To mitigate this threat to validity, the Evaluation Team employed triangulation methods, collecting and validating data from a variety of sources on one topic before drawing conclusions.

The following subsections provide the guiding research questions, methodology and levels of supports, partnership curricula, findings, and conclusions of the curriculum study in more detail, alongside recommendations for practice and future research.

Research Questions

The primary research question that guided the curriculum study sought to understand the factors underlying the micro-credential curriculum design process that were considered and were significant in promoting or hindering the development of the curriculum. With this, the following subset of research questions were created in order to guide the *qualitative* segment of this curriculum study:

(1) **Perspective**: What are the impressions, opinions, reactions, and priorities of participants affected by the curriculum?

[33] The curriculum study was conducted by Next Step Associates, LLC (NSA).

(2) **Design**: How will the colleges design curriculum and build relationships with workforce development agencies in ways that create the flexibility necessary to accommodate a practicum experiential design that requires learners to work both in the field and classroom?
(3) **Reflection**: Based on discussions with community colleges and workforce development agencies, what strategies or resources yielded successful development of the curriculum?
(4) **Sustainability**: How will the lessons learned through the curriculum design approaches come together in order to support improvement and stronger micro-credential implementation?

The secondary research question that guided the curriculum study sought to evaluate the effectiveness of the micro-credentialing curriculum in meeting the needs of participants who have barriers to employment (i.e., content accuracy, depth, and scope). Subsequently, the following subset of research questions were created in order to guide the *quantitative* segment of this curriculum study:

(5) **Content Accuracy**: To what extent is the curriculum content thorough and accurate with credible authorship and reviewers?
(6) **Content Depth**: To what extent is the content coverage rich and does the content provide opportunities to explore depth of content?
(7) **Content Scope**: To what extent does the curriculum thoroughly cover foundational concepts?
(8) **Design**: To what extent does the design facilitate use with appealing features and navigation ease?
(9) **Ease of Use**: To what extent after training, is the program well laid out and intuitive? Are distinctive materials worth the time to implement and effective?
(10) **Lesson Model**: To what extent does the lesson plan design include effective concept introduction, practice, summarizing, and assessment of key concepts and essential skills?
(11) **Program Philosophy**: To what extent does the program have a sound philosophy grounded in credible evidence, research, and/or experience?
(12) **Standards Coverage**: To what extent does the curriculum thoroughly cover all appropriate standards and meet the intention of the standards?
(13) **Students Learning Trajectories**: To what extent does the curriculum carefully develop incremental concepts along student learning trajectories?
(14) **Teaching Methods**: To what extent does the curriculum employ effective, innovative, and engaging teaching methods that are founded in pedagogy/andragogy research?
(15) **Program Instruction/Evaluation Methods**: To what extent do the instructional materials model appropriate work habits in industry, and are the program content/learning activities consistent with industry practices?
(16) **Graduation Requirements/Employment Requirements**: To what extent are the requirements for successful completion (e.g., passing grades of courses, work term completion) of the program sufficient and validated through employers?
(17) **Construct Linkages with the Private Sectors**: To what extent is the relationship being defined between workforce demand and supply, and what are the established linkages for employment (school to work transition programs, career counseling, and job placement)?

These questions were analyzed over various phases of the methodological design. A summary of the methodological design is noted in the Design Summary section.

Design Summary

This study employed a mixed-methods sequential exploratory design that allowed for a comprehensive curriculum study with specific focus on content accuracy, depth, and scope. This methodological approach consisted of two distinct segments: **qualitative** followed by **quantitative**.[34]

In this design, qualitative data was first collected and analyzed, and themes were used to drive the development of four quantitative instruments – a curriculum rubric and three different surveys – to further explore the research questions.[35] After the curriculum design period, a concurrent nested approach was taken with priority given to a qualitative approach that guided the remainder of the study, while the quantitative approach remained embedded or nested into the study and supplemented the qualitative results. Data was collected through a variety of methods including:

- Bimonthly evaluation calls with partnership grant leadership;
- Discussions around the curriculum rubric with curriculum development and support priorities (see Appendix C for curriculum rubric);
- Individual calls with partnership instructors;
- Surveys to students, instructors, and administrators/partners;
- Annual site visits, which included discussions with a variety of stakeholders (students, instructors, staff, grant leadership, and partners) and classroom observations; and
- Program artifacts from each partnership.

Level of Support

Next Step Associates (NSA) supported the partnerships in three phases outlined in greater detail below.

Phase I: Curriculum Rubric and Surveys (February 2017)

Early in 2017, to guide the curriculum study process, NSA designed a curriculum rubric for the partnerships in the initiative. Research suggests that using a rubric as an instrument to design curriculum ensures that courses will provide instruction in key domains, will promote assessment that demonstrates development in the target skills and knowledge, and will encourage reflection and monitoring of the curriculum.[36] For this project, the rubric was designed to help partnerships develop curriculum or identify and adopt existing curriculum, providing a flexible, criterion-referenced definition of success for students as well as the micro-credential program itself. The criteria were characterized in terms of the skills, habits of mind, and organizational principles that could foster excellence in an instructional program and used an inventory of criteria recommended for standardized curriculum as indicated by the Pennsylvania Department of Education, the U.S. Agency for International Development, and the U.S. Department of Education Office of Vocational and Adult Education.[37]

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[34] Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Los Angeles, CA: SAGE Publications Inc.
[35] Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed method approaches* (3rd ed.). Thousand Oaks, CA: SAGE Publications Inc.
[36] Reddy, M. and Andrade, H. (2009). A review of rubric use in higher education. *Assessment & Evaluation in Higher Education*, 35, 435-448.
[37] Pennsylvania Department of Education (2016). *Approved Program Evaluation Checklist*: *Vocational Education Standards*. Retrieved from http://www.education.pa.gov/Documents/K-12/Career%20and%20Technical%20Education/Program%20Approval/Approved%20Program%20Evaluation%20Checklist.pdf; U.S. Agency for International Development (n.d.). *Workforce Development Program Guide*. Retrieved from www.equip123.net/docs/e3-programguidesworkforcedevelopment.pdf; U.S. Department of Education, Office of Vocational and Adult Education. (2010). *Career and Technical Programs of Study: A Design Framework*. Washington, DC: U.S. Department of Education. Retrieved from

The rubric was intended to be used not only as an evaluation tool, but to be part of the curriculum development/refinement process to help colleges identify priorities that would allow students to gain the skills and knowledge necessary to earn micro-credentials, badges, and subsequently, employment. In completing this rubric, partnerships were encouraged to mark the appropriate indicator as it applied to the curriculum being inventoried and record corresponding comments to provide evidence as to how the marked indicators exceeded, met, or did not meet the stated goals. From there, a review of the results would occur by the colleges to further refine program and curriculum goals. However, during calls and site visits, partnerships consistently reported that they did not use the rubric as a tool to develop curriculum, but rather relied on adapted and augmented existing curriculum to fit micro-credential tracks, supplemented with instructors who had experience in the industry, and/or instructor-designed curriculum, assessments, and recommended readings. This was paired with employer partners providing and identifying the skills and related content students needed to master. Colleges ultimately determined how and at what point in the development/refinement process the rubric would be used. After the first year of implementation, the rubric focus shifted to instructional practices and progress monitoring. See Appendix C for the curriculum rubric.

To further examine the process used to develop micro-credentials, badges, and career pathways, surveys were administered to partnership stakeholders in order to obtain additional information on perspectives and experiences from different populations regarding the micro-credential programs. These surveys focused on the following curriculum-related research questions:

- **Scope and Sequence**: To what extent is the order of skills and concepts sequenced along a continuum of development?
- **Activities and Instruction**: To what extent do activities and instruction models appropriate work habits in industry? Is program content/learning consistent with industry practices?
- **Assessments**: To what extent do the assessments and required activities measure the adequacy of the student's knowledge acquisition and skills required in the workforce?
- **Progress Monitoring**: To what extent is student learning and progress monitored, and what is the level of flexibility in the curriculum to help students achieve program instructional outcomes?

Surveys to administrators and partners (e.g., employers, workforce system, and college administrators) were distributed through SurveyMonkey annually, and to instructors and enrolled students approximately two weeks prior to the students' course/module completion. If this was not feasible, instructors were asked to administer the surveys as close to the end of the module/course as possible. While all partnerships administered the surveys to instructors and students at different times depending on their program schedule, it was expected that all participants and instructors were to complete a survey for each course/module that was completed/instructed.

Throughout this process, the Evaluation Team was available via email for support throughout the administration of the surveys and discussed survey administration progress on bimonthly evaluation calls. On a quarterly basis, the results were analyzed and provided to the partnerships in the form of brief reports that outlined information to help the partnerships better understand changes in stakeholder experiences over time and throughout different classes. Additionally, the reports highlighted stakeholders' experiences

http://cte.ed.gov/file/POS_Framework_Unpacking_1-20- 10.pdf

with specific pieces of the program, including program design/development, implementation to date, program structure, intake processes, and suggestions for improvement.

On bimonthly evaluation calls with the colleges, it was reported that these summary reports were valuable in helping inform decisions about program offerings, textbooks and instructional materials, instructional practices, and support services needed for students. In some instances, colleges reported immediate corrections to the programs leveraging results from the surveys.

Phase II: Curriculum Meetings and Observations (October – November 2017)

The teaching and assessment indicators, as outlined in the curriculum rubric, were the focus of Phase II support in which NSA helped build instructional capacity through direct work with the colleges. This was completed utilizing several methods:

- **Classroom Observations**: During the July 2017 and July/August 2018 site visits, NSA conducted objective classroom observations at each college to better understand the instructional practices used within different programs.
- **Student Focus Groups**: During the 2017 and 2018 site visits, NSA participated in discussions with students to delve deeper into their experiences with the program.
- **Curriculum Meetings**: Following the 2017 site visit, NSA facilitated meetings with instructors at each college to examine the learning standards used in conjunction with curricula to determine the extent to which these documents formed a coherent set of expectations for teaching and learning.

During the curriculum meetings, instructors provided NSA with a working knowledge of the curriculum selected, and instruction and assessment processes, including the instructors' issues/concerns. Following these discussions, NSA helped provide concrete tools and strategies that could be used to enhance and improve classroom instruction moving forward.

Phase III: Continued Progress Monitoring (November 2017 – December 2018)

Following Phase I and Phase II activities, NSA worked to monitor progress throughout the remainder of the implementation period.[38] These monitoring strategies have included ongoing guidance and support, and providing timely information to partnerships to facilitate program modifications.

Several key indicators of successful curriculum implementation were also tracked through the outcomes study. These indicators included:

- Number and characteristics of participants earning credentials or badges
- Number and characteristics of participants employed post-completion
- Number and characteristics of participants enrolled in internships, and apprenticeship programs
- Number and characteristics of participants that received articulated credit
- Number of credits awarded to participants that opted to continue with the current level college credits earned by students participating in credit articulation

[38] The grant implementation period concluded in December 2018. NSA continued to provide support and monitored progress through December 2018.

Partnership Curricula

Beginning in late 2015/early 2016, the partnerships began curriculum development processes by collaborating with local employers to identify their workforce development needs, skill gaps, and education requirements in different sectors. Faculty, staff, project leadership, and employers worked together to develop program curricula, identify course content and program competencies; review existing curricula; identify micro-credentials within the programs; and explore pathway options to higher degrees.

Community colleges leveraged existing partnerships, program curricula, assistance from the WDBs, and existing statewide databases (e.g., PA CareerLink®) to expedite curriculum development as well as student and staff recruitment. Across the seven partnerships, the curriculum utilized was selected by each college to ensure that participants completing the programs were ready to compete for entry-level positions or continue their education to earn a certificate and/or degree. All seven community colleges implemented curricula using varying structures that included the incorporation of competency-based instruction, acceleration of student learning, and comprehensive supports. Colleges used technology integration as a means for personalizing learning and expanding opportunities to demonstrate mastery of skills, career connections including thematic and contextualized learning experiences, and active employer engagement to strengthen curricula and authentic learning. The programs of study and curriculum for the final year of implementation, are outlined in greater detail for each of the seven colleges in Appendix D.

The collaboration between the partnerships, which was prioritized in this grant, helped facilitate development of the micro-credentials that integrated certificates, badges, and opportunities to embed college credit. These offerings, by partnership, are outlined in greater detail in Appendix D.

Study Findings

As highlighted above, surveys were used to gather information on stakeholder perspectives and experiences with the program while site visits were used to gather more detailed information around the initiative's context, implementation process, and outcomes (see Appendix E for aggregate survey reports by partnership). Through these discussions and surveys, findings were identified around specific reform initiatives that occurred throughout the duration of the project. These findings are clustered around multiple themes that relate to enhancing student achievement by increasing the proficiency of students completing the program, mitigating barriers, and other feedback regarding design changes. These findings were identified using ATLAS.ti Version 8[39] for the coding process, with frequencies and percentages highlighted in the table on the following page.

[39] ATLAS.ti is a software, used in qualitative and mixed methods data analysis, for the qualitative analysis of large bodies of textual, graphical, audio and video data. For more information visit https://atlasti.com/product/what-is-atlas-ti/.

Table 19: Curriculum Study Themes

Theme	Code	Frequency[40]	Percent
Staff & Student Recruitment	Interview/Hire	43	1.47
	Career Link	31	1.06
	Placement/Aptitude Test	29	0.99
	Enrollment	28	0.95
	Catalog	17	0.58
	Social Media, flyer	16	0.55
Time	Time Management	37	1.26
	Afternoon/Night	36	1.23
	Location	34	1.16
	Space Constraint	33	1.12
	Day	29	0.99
Experiential Learning	Labs	48	1.64
	Simulations	32	1.09
	Internship/Apprenticeship	30	1.02
	Kinesthetic (Hands-on)	28	0.95
Skill Proficiency	Academic Impediments	129	4.40
	Reading Levels	123	4.19
	Academic Skills	91	3.10
	Test-Taking (Certification Tests)	82	2.79
	Computer Skills	66	2.25
	Writing and Analytical Skills	57	1.94
	Soft Skills	27	0.92
Nonacademic Challenges & Student Barriers	Time Management & Attendance	124	4.23
	Internal Family Needs	96	3.27
	Transportation	64	2.18
	Life Barriers	63	2.15
	Eligibility and Motivation	39	1.33
	Child Care/Adult Care	34	1.16
	Behavioral Life Skills	33	1.12
	Economics	32	1.09
	Communication	19	0.65
Feedback & Design Changes	Engaged Instructors and Staff	64	2.18
	Program Content and Credentials	228	7.77

[40] The column labeled "frequency" lists the actual number of times a word associated with the listed codes came up during site visit interviews. The column labeled "percent" lists the actual percentages of the total sample that fall into the listed code.

Theme	Code	Frequency[40]	Percent
	Enhanced Workforce (CareerLink) and Education Connection	153	5.21
	Early Obstacle Identification	148	5.04
	Employer Involvement	124	4.23
	Partnership Engagement Opportunities	118	4.02
	Schedule Accommodations	105	3.58
	Increased Hands-On Learning	101	3.44
	Student Placement	71	2.42
	Specialized Student Support Staff & Resources	68	2.32
	Pre-Employment Development and Retention	58	1.98
	Program Expansion	40	1.36
	Modified Intake Process	39	1.33
	Non-Credit to Credit Alignment & Pathways	36	1.23
	Opportunities for Blended Learning	31	1.06

Provided below is a cross-case analysis of the data that contributed to an understanding of the findings within multiple themes, encapsulating significant discussions that occurred and open-ended responses received from surveys. Presentation of findings from the curriculum study have been organized into sections as follows: (a) Student Recruitment, (b) Time, (c) Experiential Learning, (d) Nonacademic Challenges and Student Barriers, (e) Skill Proficiency, (f) Feedback and Design Changes, and Promising Practices.

Staff and Student Recruitment

"I have a bachelor's degree, but in a different field."
Program Participant

Colleges reported that one of the drawbacks of the initial phase of the program was a late start date. In designing the program, colleges reported delays in bringing staff on board as curriculum developers. As a result, community colleges leveraged existing partnerships, program curricula, assistance from the WDBs, and existing statewide databases (e.g., PA CareerLink®) to expedite curriculum development as well as recruitment. However, staff reported that the recruitment of students was difficult without a firm start date and, in some cases, the rural location of the college made recruitment even more difficult. Consequently, colleges used focused recruitment to meet enrollment targets. Several recruitment strategies were used across colleges including:

- Working with in-house communication teams to utilize social media;
- Advertising in course catalog paired with a “cheat sheet” for frequently asked questions;
- Spreading the word by mouth and via flyers;
- Setting up partnerships with PA CareerLink® for job fairs and referrals;
- Tracking website inquiries;
- Sharing with resource groups;
- Mailing pamphlets to local residents;
- Hosting information sessions; and
- Highlighting student success stories in magazines.

With this, many students were attracted to the fact that there was no out-of-pocket expense for the program, and there were opportunities to learn new skills that could help in obtaining employment. Before enrolling in a micro-credential program, many colleges required students to complete an aptitude test (e.g., TABE) and a screening interview. Based on review of some curriculum and feedback provided by partnership stakeholders, it appeared that many of the programs required a high level of baseline proficiency and aptitude to be successful. With this, some colleges discussed the difficulty in recruiting students who met entry criteria and fit the targeted population of the micro-credential programs. As such, colleges adjusted their initial target population and opened the program to other populations (but still within the target population of those with barriers to education). Some of which exhibited higher skillsets, education, or experience; however, they might not have necessarily fit the original target population for the grant.

> "I've been doing this for 25 years and learned from a family member, but I never had any formal education."
> *Program Participant*

Time

Curriculum design is a time-consuming process.[41] During the onset of the initiative, time was a reoccurring theme reported across partnerships. Many colleges relied on adapted and augmented existing curriculum components to expedite the design of a curriculum that would fit the micro-credential design. Colleges supplemented the program with instructors who had experience in the industry in order to ensure content accuracy, depth, and scope of the curriculum. However, given the nature of the micro-credential programs, college staff and instructors needed to accelerate program content to ensure students could receive credentials and/or badges in a shorter amount of time than more traditional, credit-bearing programs.

> "I would like the course to be a bit longer to account for the large amounts of material and give us an opportunity to go more in depth."
> *Program Participant*

Instructors indicated that because the micro-credential tracks were delivered in a shorter amount of time, a significant time commitment outside of class was required for students to understand the course content. Students reported that, in many cases, the time commitment was too consuming, especially with external commitments that could prevent them from attending class (e.g., children, employment). Given the expedited curriculum development, partnerships reported that there was not adequate time to see if the curriculum and materials were going to be effective with the target population. It was revealed that the curriculum content was too dense and fast paced, and not accessible to students lacking basic skills (e.g. academic and soft skills) across multiple partnerships. This surfaced a challenge in the ease of use of the curriculum with many of the initial cohorts of students, and colleges reported adjusting delivery of instruction after the first site visit in order to better attempt to provide cognitive experiences to help students perceive, process, rehearse, store, and transfer new knowledge or skills.

Student attendance was a significant concern, as reported by college staff and instructors in interviews. Some colleges offered both day and evening classes to best accommodate the students' availability, but in some instances, there was low attendance during day sessions due to schedule conflicts, location, and space availability within the colleges. To accommodate the mode of curriculum delivery, partnerships noted

[41] Masten, M. (2015). *8 Barriers to Curriculum Design*. ASCD. Retrieved from http://inservice.ascd.org/8-barriers-to-curriculum-design/

that incorporating online components allowed them to better meet the needs of students that struggled to attend class regularly and to help facilitate learning outside of the classroom.

College staff also indicated a challenge in finding time to support the program, given their other responsibilities within the college. For one partnership, instructors indicated that there was not enough time in the courses to cover all content comprehensively, which impacted the scope of the curriculum causing some concepts to be covered more thoroughly than others.

Experiential Learning

> "We are learning lots of info, but I want to apply hands on learning. The lab is nice, but I would really like to go into a work scenery for hands on as opposed to purchased kits."
> *Program Participant*

In its simplest form, experiential learning means learning from experience or learning by doing, and is the process through which students deepen their understanding of what they are learning, building skills, applying their knowledge, and fostering connections between concepts in the classroom and concepts in real-world or authentic situations.[42] While college partners generally recognized the impact of tactile experiential learning on student performance, many partnerships expressed difficulty in balancing classroom opportunities with lab experience. This area impacted partnerships' abilities to integrate and support depth of knowledge and workplace skills within the curriculum. A challenge related to lab time included the lack of time and space available to students because credit bearing classes were given priority on the schedule and there were only a few slots available for students in non-credit bearing classes. In an attempt to mitigate this challenge, many of the partnerships indicated use of computer simulations and virtual labs but, in some cases, provided limited hands-on opportunities. Students and instructors, through interviews and surveys, consistently expressed a need for more hands-on learning in micro-credential programs.

Colleges also suggested more involvement with industry partners (i.e., embedding an internship or externship into the curriculum) could provide additional experiential learning opportunities to engage students in ways to help them understand the reality of the profession they seek, and use tasks/activities that reflect real, on-the-job situations. An industry partner for one of the colleges suggested scheduling students for full-day job shadowing, rather than just company tours that were only for a short portion of the day, to let the students experience the environment and reality of the workforce.

Another recommendation from an industry partner was to provide an internship with a day's pay to allow industry partners to become more familiar with students for potential employment and bringing in an employee to do training on a specific topic/project with the class. This approach could help incentivize students to actively participate in these work-based opportunities. A third industry partner suggested extending the length or selected days of the program to provide multiple on-the-job experiences, which could potentially be extended site visits or, once students qualified, an apprenticeship. Most industry partners stressed that companies need to be more involved in order to facilitate more hands-on opportunities for students and improve ability to model appropriate work habits in industry.

[42] Voltz, D. L., Sims, M. J., & Nelson, B. P. (2010). *Connecting teachers, students, and standards: strategies for success in diverse and inclusive classrooms*. Alexandria, VA: ASCD; Willis, J. (2006). *Research-based strategies to ignite student learning insights from a neurologist and classroom teacher*. Alexandria, VA: Association for Supervision and Curriculum Development.

Nonacademic Challenges and Student Barriers

The largest barrier reported by college staff and instructors were nonacademic challenges. Reported by one partnership in an interview was an issue with behavioral life skills and economic barriers, which was indicated as more of a case management/supplemental support concern (e.g. counseling and social services, one-on-one advisement, and future planning). Colleges in more rural areas reported transportation as an issue, which reinitiated discussions around time and student attendance. One partnership sought to address this barrier by providing student participants with bus passes and gas cards. Several colleges identified a need to address childcare services, alongside providing supplies, uniforms, and materials to students in order to mitigate the impact of the students' barriers.

"The challenge lies on when to run the program, how to service the target population, transportation, internal family needs, childcare, and employer commitment to hire. There is also a need for support services before employment."
College Staff

Time was also a topic of discussion as it relates to nonacademic challenges in regard to scheduling, which was difficult to accommodate as the students had other commitments (e.g., jobs and children) that could prevent them from attending class. One partnership mitigated this barrier by allowing students to complete online curriculum modules at their own pace, repeat assessments until mastery was achieved, and then participate in the lab activities onsite.

In reflecting on the successes of the micro-credential program, one college highlighted that all of the students that completed the micro-credential program obtained job offers, but some students had to turn down offers due to other circumstances (e.g., childcare and transportation). Partnerships noted the need for ongoing support services before students are admitted into the program and throughout their educational experience.

"Students are more worried about when they will eat or how they will get to class when they don t have a car than attending class."
College Staff

This theme of nonacademic challenges and student barriers was constant throughout the implementation of the initiative. Several student barriers impacted participants' program attendance, persistence, and completion. As reported by several participants and grant staff, many classes had a strict attendance policy due to the accelerated nature of the programs, which was a challenge for some students to accommodate due to their personal barriers. College staff indicated that too many absences not only affected achievement for the absent student but also disrupted learning for the entire class.

Other barriers ranged from childcare and transportation to housing and food insecurity. These nonacademic challenges and student barriers surfaced an increased need to embed digital learning as a tool for delivery to provide maximum flexibility over time, place, path, and pace of the curriculum to help students achieve program instructional outcomes, alongside supplemental support services to enable students to access academic, personal/social, and career supports to maximize their potential for success. While instructors noted several instances of trying to accommodate these barriers through modifications to course schedules (e.g., offering day or evening classes) and structures, many colleges indicated use of a soft skills and career preparation as a curriculum component to "show them how to

"Redefine our curriculum… We recognize we have adults and we try to exhibit flexibility."
College Staff

address these things in the work place." Yet, overcoming these barriers was still noted as a challenge by participants and grant staff.

Skill Proficiency

> "I have been lost all along. Took me awhile to understand language."
> *Program Participant*

Skill proficiency is the aptitude level of academic and technical knowledge, as well as soft skills a student has or needs to prepare for further education and for careers in emerging and established professions.[43] In survey and interview feedback received, instructors voiced the need to identify the students' skill levels and potential barriers prior to program enrollment. Partnerships reported attempts to meet this need with more rigorous intake processes to determine the skill level of the student before they entered the program. These processes helped identify obstacles presently in the students' lives earlier on in the program and identify other potential obstacles to student completion and success. Partnerships indicated use of a wide variety of methods to help identify the students' skill levels and obstacles including:

- Standardized assessments such as the TABE test where students are only admitted if they obtain a specific score range,
- More in-depth orientation processes that include interviews and expectation setting,
- Remedial courses to help provide a refresher on math and English, or
- Pre-tests completed prior to program enrollment that identified the student's skill level in the specific industry field.

> "I'd say the information is at about an 11th or 12th grade reading level and I only have about three students on target to successfully complete the program."
> *College Instructor*

With this, colleges reported challenges enrolling students with limited academic background (e.g. below basic reading and math levels). For several partnerships, initial academic criteria were put in place to determine whether students could enroll in micro-credential programs and be successful. In general, students who did not meet the initial academic criteria for entry were encouraged to seek mathematics and literacy support so they could eventually reenroll. If a student wished to continue to be admitted to the program, they were invited to retest after being provided with online tutoring or one-on-one support to improve skills. Many partnerships also attempted to make corrections to their instruction approach during implementation to ensure it better met the needs of the students and their skill levels. Leveraging lessons learned with beginning cohorts and feedback from staff and students, several partnerships noted program modifications such as focusing more on soft skills and career preparation in the programs and offering micro-credential badges to motivate completion. These components were embedded in opening modules students were expected to complete before matriculation through other modules of the program. These types of modifications, as reported by grant staff, helped further facilitate grant progress, student success, and completion in the micro-credential programs.

As noted throughout this report, the nature of the micro-credential programs required college staff and instructors to accelerate program content to teach skills required for a given credential in a shorter amount of time. College staff and instructors from some partnerships reported that students may not be as

[43] Great Schools Partnership. (2016). *Proficiency-based learning. The Glossary of Education Reform.* Retrieved from: https://www.edglossary.org/proficiency-based-learning/.

prepared for the pace of the course work and may not possess the basic skills necessary to succeed in the programs. For some students, the accelerated course content was challenging to complete in the short amount of time due to the volume of material covered and reading level of some of the materials. However, students also noted an understanding and appreciation of the accelerated content so they could complete and enter the workforce more quickly. For other students, the curriculum itself was difficult as it was too advanced, and the acceleration magnified those challenges. Students who came into the programs with basic skill deficiencies had the most challenges with the delivery of the micro-credential program according to surveys and interviews. Many students and grant staff confirmed the need to complete coursework outside of class time to fully master the program content, which, for some students, was a challenge to accommodate.

Partnerships utilized informal communications with students who completed their programs in order to continue adjustments to curriculum delivery. Survey summary reports that outlined information to help the partnerships better understand changes in stakeholder experiences over time and throughout different classes were also utilized. The survey summary reports also highlighted stakeholders' experiences with specific pieces of the program, including program design/development, implementation to date, program structure, intake processes, and suggestions for improvement. See Appendix E for survey summary reports.

Feedback and Design Changes

Many colleges reported leveraging instructor, staff, and employer partner feedback and expertise to make midcourse corrections throughout the grant period that would address underlying variables. The feedback played a role in illuminating the work—what was going well, what was not going well, and where improvements could be made.

Employer Engagement

> "Basically, you get the theory part and also a real world part that we would not have if we did not have them [instructors]."
> *Program Participant*

Because one of the overarching goals of the grant was to increase the perceived value of micro-credentials amongst employers, employer engagement was necessary to facilitate program and student success. Partnerships reported engaging employers in new ways including through curriculum feedback and review processes, intake processes, throughout the program for events and presentations, hiring, and in other programmatic areas. While some partnerships struggled to sufficiently engage employers, employers at many sites indicated satisfaction in their engagement with the colleges. Some employers noted that the ability to assist with curriculum development helped them feel confident that the students that were completing the programs had the necessary skills for entry-level work. Partnerships also reported that the ability to leverage employer feedback in new ways helped the colleges ensure the programs were relevant to the industry. For more feedback from employers, please see Partner Engagement section.

Instructor Industry Experience

Apart from employer engagement to help refine and enhance programs, partnerships also indicated the value of instructors with relevant, industry-based experience. Not only could these instructors assist with curriculum development, leveraging their industry experience to guide course content, they were able to incorporate practical knowledge and construct application scenarios that contextualized the content for students. Partnerships noted that this facilitated a greater understanding of the connection between

course content and hands-on material in a way that was not possible prior to the grant. For more information, please see Student Progress section.

Online Learning

Though all partnerships incorporated the blended learning model in which class time was balanced with hands-on time, some partnerships sought to embed online components into the programs as well. Partnerships noted that incorporating online components allowed them to better meet the needs of students that struggled to attend class regularly and to help facilitate learning outside of the classroom. For instance, if students missed class, they could catch up on course content online when they were available. Students noted this as a valuable addition to the programs, for those partnerships that explored online learning. One program instructor noted, "if they have a computer and need to stay at home with the kids, they can work when they are gone. There is flexibility there."

> "Invest more in the online. Anything I can do to help the students improve their attendance. Just let them come here to focus on the hands on."
> *College Staff*

Conclusions

The findings of this curriculum study have several important implications for future practice. Therefore, the following recommendations were formed from discussions with project stakeholders and survey findings and also stemmed from best practices.

Integrate Soft Skills into Programs

The findings highlighted in this section may provide some support for the conceptual premise that program curriculum may benefit from integrating soft skills as these skills are necessary for job obtainment. Employers noted on several instances the importance of communication and other soft skills as the technical skills, according to employers, are more easily trained.

Integrate Industry-Focused Instructional Model

Employers and grant staff noted consistently a need to ensure that program activities and instruction models reflect work habits in the industry, and program content and learning should be consistent with industry practices. It is critical that students are exposed to industry-based learning experiences, such as career-based or field/work-site experiences that are aligned to technical knowledge or skills, while enrolled in a program to help further facilitate learning. Employers have cited satisfaction in their level of engagement with the partnerships in which they were able to identify their skill and course needs.

Conduct Thorough Intake Processes

While time-consuming, partnerships that reported expansions to program intake processes tended to note successes in student retention and persistence. Intake processes included: standardized assessments such as the TABE test where students are only admitted if they obtain a specific score range; more in-depth orientation processes that include interviews and expectation setting; remedial courses to help provide a refresher on math and English; or pre-tests completed prior to program enrollment that identified the student's skill level in the specific industry field. Thorough intake processes help better prepare students and set expectations around the program and curriculum, alongside the required level of baseline proficiency and aptitude to be successful. The additional time that was incorporated into the intake processes helped grant staff better identify the students' skill levels and potential barriers so staff could connect students to the appropriate resources prior to program enrollment.

Embed Progress Monitoring

While most partnerships indicated progress monitoring processes that were already embedded into all programs at the college, others noted expansions to these monitoring efforts due to the flexibility afforded through this grant and utilized survey summary reports in helping to inform decisions about curriculum. Partnerships cited the importance of these monitoring processes in helping ensure that the programs were able to help students achieve instructional outcomes indicated by the scope of the curriculum. Through these monitoring processes, partnerships noted ongoing modifications to program structures, curriculum, and intake and placement processes to help enhance student success throughout the grant period.

PROJECT ELEMENTS

The content within this section of findings focuses on research questions grouped around the common theme of project elements. These findings discuss the accelerators, barriers, and environmental factors that influenced grant success and progress.

Research Questions

(1) How closely did the partnerships implement the *Micro-credentials: Opportunities through Stackable Achievements program* according to the original plans? What factors caused major deviations from the work plans, and how did these deviations impact project progress?

(2) How did local dynamics, context, and existing relationships and alliances shape and impact the micro-credential and support service design and delivery of each partnership's program?

Accelerators and Strengths

Strengths and accelerators are defined as the elements of the initiative that positively impacted project outputs, outcomes, and/or implementation. Project accelerators included:

- Flexibility of Grant Structure
- Strengthened College/WDB Relationship
- Innovative Employer Engagement
- Comprehensive Student Support Approach
- Enhanced Program Offerings

Flexibility of Grant Structure

> "That s the value of these kinds of grants. They allow you to try new things things that were too risky to try in other situations."
> *Grant Leader*

The function of the WIF grant was to allow grantees the ability to innovate and experiment in their initiatives in an effort to identify best practices to be used in future efforts. Partnerships noted throughout the grant period that the ability to innovate and experiment encouraged partnerships to continually adjust and restructure programs in a way that was not possible prior to the grant. Partnerships stated that they appreciated that adjustments could be made to a program, both in content and process, if they were not functioning properly or were not addressing students' or employer needs. Partnerships also reported the value in being able to expand upon successful practices. One grant leader stated, "this is a unique grant, so we can take more risks and figure out ways to be innovative and strategic and learn from our mistakes. There is a tendency to not course correct in other grants because you need to get from point 'A' to 'B,' but this grant allowed us

to learn." Another grant leader noted, "the innovations we had in mind all along, we were able to implement them with this grant."

Strengthened College/WDB Relationship

Most partnerships noted the enhanced relationships between the college and WDB throughout the grant period as a significant strength. While partnerships reported working with the WDBs prior to the grant, the grant's strategic effort to bridge the workforce and educational systems helped the partnerships fully leverage the resources and capabilities from both entities. One grant leader noted, "we have been trying to work together for years but this grant gave us the opportunity to get it right and understand each other's worlds a little more. It's a launching pad for other things and already has been. From a college perspective, I think our programs are stronger with this connection and collaboration." One WDB leader shared, "our experience with this project really is serving as a guide for us moving forward. We are all on the same page and it's nice to do things together."

Leveraging this strengthened relationship, partnerships noted several instances of expedited program developments and processes due to the additional resources and capabilities available from both entities. One grant leader reported, "the WDB has been there to advise customers on the program and that's helped get more students in the door. We work together with employers and combine all our efforts. It keeps things moving."

Innovative Employer Engagement

Many partnerships noted enhanced and innovative use of employer partners throughout the grant, which facilitated several opportunities that may not have been available to students before the grant. Partnerships reported engaging employers traditionally through reviewing curriculum, participating in advisory meetings, setting up internship opportunities for students, and helping hire program graduates. However, in addition to these opportunities, partnerships also reported engaging employers in ways that were innovative to the partnerships – involving employers in course presentations, intake processes, mock interviews, ongoing feedback processes, company tours, and community and campus events (e.g., career fairs and hiring and industry-specific events).

> "What I have found to be awesome about this program is how open to suggestions they are."
> *Employer Partner*

Partnerships cited strengthened relationships because employers were engaged throughout the entire program process rather than just at the beginning of program design and at the end of cohort graduation. One employer noted, "we worked together as true partners… other institutions are not as responsive, they aren't paying attention...I would like to use this as a springboard with other schools and show them what we have been able to do." In engaging employers in new and innovative ways, partnerships and employers have cited strengthened and enhanced relationships.

Comprehensive Student Support Approach

To further facilitate student success, partnerships took a comprehensive student support approach to ensure that students were connected with the college, WDB, and community resources needed to succeed. Students reported utilizing college instructors for classroom and scheduling challenges, WDB staff for resume assistance, and community resources for barriers such as those around housing, transportation, and childcare that the college or WDB could not already address. Students noted appreciation for the comprehensive supports available to them, which, as noted in the Student Progress section, helped them

succeed in the program. Partnerships prioritized understanding students' potential barriers to education early in enrollment in an effort to mitigate the impact of those barriers on the students' education as quickly as possible.

Enhanced Program Offerings

"We can provide a much richer, in depth focus on key subject areas in less time. It s been a game changer for us."
College Staff

The grant funds enabled the partnerships to experiment with program innovations in a way that had not been explored in the past. Partnerships were able to prioritize populations with barriers to education by creating short-term, bite-sized (in many cases, non-credit) programs that could enhance an individual's employability. Colleges worked with WDBs to implement programs in high-demand industry areas to increase the chances of program participants getting hired. Because of this, many partnerships indicated that they were able to truly enhance the program offerings at the college as these types of programs may not have been offered in the past. The grant funding allowed the partnerships to meet the needs of a disadvantaged population in a meaningful and intentional way.

Barriers and Opportunities

As with any grant project, several factors hinder or slow grant progress. For this initiative, these included a range of elements from enrollment and recruitment to retention and placement. These factors included:

- Removing Student Barriers
- Need for Specialized Staff
- Regional Economic Shifts
- Non-Traditional Student Demographics
- Condensed Grant Timelines

Removing Student Barriers

"Students have so many bigger issues happening. It's hard to keep them [in the program] and keep them motivated when they have these barriers."
College Staff

Throughout the grant period all partnerships reported challenges with mitigating and removing participant barriers to education. As the target populations included students with barriers to education, grant staff reported that providing the necessary supports, or referring students to other services, was a challenge. Grant staff reported that participants faced a variety of barriers, including childcare, transportation, and other responsibilities (e.g., full- and part-time jobs). Several partnerships reported that some students did not have money for their basic needs, including food and housing. These barriers, grant staff reported, prevented students from attending classes regularly, or resulted in their need to drop out of the programs or be removed.

Instructors from several partnerships reported that student barriers created challenges within the classroom as well, as some instructors reported students might fall asleep in class when they had a full day of work prior to class or were too hungry to focus. One Program Manager further explained, "the population we serve, they are caretakers of other people, so their life doesn't come first," which hindered students' abilities to be fully engaged in the program. Grant staff explained that they worked throughout the grant period to provide participants with additional supports and connections to services, but that sometimes this effort was not enough to mitigate challenges. Partnerships reported that

a more intentional connection to social services beyond those offered at the WDBs could have been beneficial to removing participant barriers.

Need for Specialized Staff

Across multiple partnerships, grant staff reported that aspects of implementation, student supports, and project management would have been more successful with additional specialized grant staff. Multiple partnerships reported that grant staff underestimated the time and effort commitment necessary for data collection, and that grant staff would have benefited from a dedicated data specialist. Two partnerships were able to hire an additional support staff in the last year of the grant, however those partnerships reported this addition would have been beneficial from the beginning of the grant.

Due to student barriers, grant leadership at one college noted that there was a need for more intentional student support services and associated staff, explaining "support services we think are really necessary; it was more than what we built into the program." Other partnerships reported a similar need, explaining that wraparound services or case management would have provided students with more regular support while allowing other grant staff to spend more time on other responsibilities with the grant. While grant staff noted that case management services were available at the WDBs, having a staff person be available at the college may have been beneficial.

Additionally, multiple partnerships reported that due to the evaluation being the primary outcome of the funding, many did not incorporate direct job development or placement services specifically for program participants. Students reported that while they could utilize services at the PA CareerLink®, they thought program staff could provide more direct connections for employment opportunities. One grant staff member explained, "if we had the entire [staffing] piece together initially, we could serve them better and retain them."

Regional Economic Shifts

Partnerships reported that throughout the grant period, the local economies improved, resulting in lower unemployment rates than the start of the grant. Partnerships reported that the low unemployment rates combined with the availability of jobs created a variety of challenges in grant implementation. For instance, grant staff reported that enrollment rates declined as the economy improved as people who want jobs can get them more easily.

> "Unemployment is low and everyone who wants to work is working, even if it's a gig job."
> *College Staff*

Grant staff also explained that due to the availability of jobs, some students would obtain employment before the end of their micro-credential program. While getting students employed was viewed as a success by the partnerships, it did hinder completion rates. Grant staff at some partnerships noted agreements with industry partners to stall hiring until program completion, but reported these efforts were not always successful. While these economic trends may have impacted program success, grant staff noted continued and innovative efforts to increase recruitment and enrollment moving forward.

Non-Traditional Student Demographics

Partnerships reported throughout the grant period that due to the target population having a variety of barriers (see above), recruiting participants from the target population that were able and willing to enroll in the program was a challenge. Grant staff explained that during recruitment, a potential student would

be interested in a micro-credential program but were unable to commit due to a variety of barriers (e.g., transportation and childcare). Additionally, students with barriers might not have had success previously with education and grant staff reported it was difficult to explain the benefits of committing time to the full program. Grant staff reported that some potential participants, "walk away because they didn't buy into it," and that students may not have seen that the investment would result in meaningful employment with wages that would cover their basic needs.

Grant staff also reported challenges with retaining students, which resulted in many partnerships implementing a more intensive intake process during the past year to ensure, "students understand there are expectations and requirements going through the courses," as noted by one grant staff. Grant staff reported that these challenges required the partnerships, "to dig deeper to find out who is ready," to enroll in classes and who would be able to make the time commitment given other life circumstances.

Condensed Grant Timelines

> "You don t get a lot of time to get acclimated to things before you have to move on. It s hard."
> *College Staff*

The WIF grant was structured to incorporate a planning phase, implementation phase, and evaluation phase. During the planning phase, however, many partnerships noted that they were ready to launch their programs but could not due to several factors including the planning phase restrictions and delayed evaluation approval. The delays caused by these factors led to several challenges, as reported by partnerships. Several partnerships struggled to recruit participants and finalize their programs within the two-year implementation phase. Partnerships cited that the two years of implementation did not enable them to experience the full impact of their programs as they were continuing to refine programs up until the end of the implementation period. Moving forward, partnerships noted a need for a longer implementation period to be able to fully and successfully implement their programs.

Environmental Factors

In addition to accelerators and barriers, there were also several external factors that positively and negatively impacted implementation. These included:

- Regional Differences
- Consortium Approach
- Workforce/Education Relationship

Regional Differences

The seven partnerships within the consortium represent varying populations, industries, skill needs, and more. Because of this, all seven partnerships approached the project differently in terms of industry focus, target population, program structure, and general approach. While this hindered the partnerships from sharing resources (e.g., curriculum), it also increased the reach of the grant. For example, by allowing the partnerships to focus on different areas, rather than attempt to apply the same solution to different needs, the Department, and therefore the Commonwealth of Pennsylvania, was able to better identify best practices as there are many case studies from which to pull. The partnerships were able to remain flexible by recognizing the differences across their regions to help ensure the grant was used to address their community's needs.

Consortium Approach

While the grant was awarded to the Department and, from there, to seven partnerships across Pennsylvania, the project was approached as seven different projects. This approach to the federal grant came with advantages and disadvantages. Similar to the Regional Differences section, the ability for each partnership to approach the project with the needs of their community in mind was beneficial. Partnerships were able to customize their approach to fit specific student population's needs and ensure the programs aligned with industry needs. However, not utilizing the consortium approach hindered the partnerships' abilities to collaborate.

While not a requirement of the grant, several partnerships noted interest in more collaboration opportunities throughout the grant to share resources, discuss obstacles, brainstorm potential solutions, rather than remaining siloed. This lack of collaboration did not necessarily negatively impact grant progress and success but was noted as an area of growth by partnership staff.

Workforce/Education Relationship

One of the overarching goals of the WIF funding is to strengthen the bridge between the education and workforce systems through intentional work that seeks to build communities and the individuals within them. Prior to the grant, many partnerships reported varied relationships (and success with those relationships) between the college and WDB. Several partnerships noted that the grant's strategic effort to bridge these systems helped the partnership fully leverage the resources and capabilities from both entities. However, for several partnerships, this was a challenge early in the grant in that the colleges and WDBs did not speak the same language (e.g., in terms of operations and processes as well as how the entities functioned). As the grant progressed, though, many partnerships noted improved and strengthened relationships. One grant leader noted, "the working relationship between the WDB and the college has improved considerably because we have the same goals for the grant and we've been able to work closely together on how do we put the student in the center of what we're doing and how do we create things to help them be successful. The grant has allowed us to draw together the work we are both doing which hasn't been there in the past."

STUDENT PROGRESS

The content within this section of findings focuses on student progress. These findings outline student feedback from focus group discussions over the course of the grant period.

Student Perspectives

Interviewed students reported overall satisfaction with the program offerings and structure of the initiative. Students indicated satisfaction, in general, with the following:

Comprehensive Approach to Student Services

One of the goals of the grant was to remove barriers to education, which included taking a more comprehensive approach to student services. This involved the college, WDB, and community working together to ensure that students were connected to the appropriate resources and had the support they needed to complete the micro-credential programs. With this, many students noted an appreciation for this approach and attributed the support received during the program as a significant contributor to their success in the programs. Interviewed students indicated that the ongoing guidance and support empowered students to succeed.

Attentive and Experienced Instructors and Staff

The attentiveness and experience of the micro-credential program instructors and staff was valuable to interviewed and surveyed students. Many of the students indicated that discussions with instructors and staff prior to enrollment influenced their subsequent decision to enroll and, from there, persist through the program. Students reported that instructors and staff were knowledgeable and attentive to the students' needs and career goals, guiding students through their educational experience and providing networking opportunities with local employers to support student employment upon program completion.

> "[The instructors] don t just stop at school they help you through personal stuff too. They are really there for you."
> *Program Participant*

Employer Involvement in Program Delivery

Through the grant, partnerships sought to involve local employers in all facets of program design and implementation. This included gathering employer feedback on program curriculum and program structure, joining in intake interviews, conducting in-class mock interviews and presentations, and participating in campus and community job events (e.g., career fairs). Interviewed students recognized the opportunities to engage with employers throughout the programs as a significant strength to the micro-credential programs as these types of opportunities do not necessarily exist in other programs. Students noted in surveys and interviews that the level of engagement with employers helped them succeed in the program and with getting a job.

Soft Skill Development Opportunities

All partnerships incorporated some form of soft skills development (e.g., teamwork and communication) into their programs through soft skill courses, classroom expectations that mimic the workplace, and internship opportunities. These opportunities to develop soft skills was consistently noted as valuable by students enrolled in the programs. For these non-traditional students without significant work experience, the ability to develop soft skills that made them more employable was a reported strength to the programs. Students understood the importance of soft skill development to their future career goals and the structure of the micro-credential programs made that development possible.

> "It's good they give you the foundations you need. They let you build on that with the technical skill stuff."
> *Program Participant*

PARTNER ENGAGEMENT

The content within this section is focused on partner engagement and perspectives. Throughout the course of the evaluation, the Evaluation Team interviewed employers and community partners, and discussed partner engagement with partnership staff and leadership.

Research Questions

(1) How do micro-credentials address the needs of employers?
(2) How has employer recognition of micro-credentials changed throughout and following the program's completion?

Partner Perspectives and Contributions

Interviewed and surveyed partners (primarily industry and community partners) reported overall satisfaction with the micro-credential programs at the colleges and their partnership with the WDBs. More specifically, partners indicated satisfaction with the following:

Partnership Engagement Opportunities

> "Anytime I have a suggestion, it's not faced with retaliation but how can we make this work?"
> *Employer Partner*

An important piece of this grant was to design programs that actively involved employer and partner feedback and encouraged engagement. Employers from focus groups and surveys consistently noted that the ability to provide feedback on the program at every step, as well as remain engaged throughout implementation, was a selling point of this initiative. Employers cited several engagement opportunities with the partnerships, including participation in advisory meetings and councils, curriculum review and feedback, intake interviews and course engagement (e.g., presentations and events), interviewing and hiring program completers, and work-based learning opportunities (i.e., internships, externships, and apprenticeships). Many employers from focus groups and surveys noted that this grant facilitated a true partnership – where open feedback loops enabled the employers to discuss changes in their needs as the grant progressed, while also maintaining their desired level of engagement in program implementation. This approach resulted in many employers reporting interest in continuing partnership opportunities beyond the grant.

Relevant Program Curriculum

Employers from focus groups and surveys highlighted their appreciation for short-term programs that meet the employers' skill needs throughout the grant. Many employers reported that the ability to assist with curriculum review and feedback processes helped employers feel confident in the students that were completing the programs. Employers from focus groups reported that because they were familiar with the curriculum, and involved in program delivery in some cases, they knew the graduating students had the skills they needed in an employee. One employer noted, "they are providing a solid foundation. The students are getting the tools they need and I'm retaining these people. That's big for us."

New and Strengthened Partnerships

> "We have been true partners. I feel like we are breaking ground with this partnership. Other schools need to do this."
> *Employer Partner*

New employer partners reported through focus groups and interviews that the grant funding facilitated partnerships with the colleges and WDBs, and existing partners reported relationships were strengthened as a result of the grant funding. Because this grant encouraged involvement from local partners in program development and implementation, college staff reported in interviews increased engagement with local employers. Employers in focus groups and surveys noted that they were able to build and engage with the colleges in new ways because of the grant funding. College staff worked with WDB staff to help establish and build true partnerships with employers. Some employers reported that this approach motivated them to engage, with one employer stating, "our feedback is not just treated as feedback. It's not one-way traffic and that's why we are here and would like to continue with the program." Many grant staff and employers indicated new and strengthened partnerships that were generated because of the grant and will likely continue beyond the grant.

BEYOND THE GRANT

The following section focuses on sustainable change created by the grant and considerations for other similar institutions and organizations that may implement a project similar to this initiative.

Initiative Sustainability

Reflecting over the grant period, partnerships indicated satisfaction with the grant. All individuals recognized the importance of the grant in expanding and enhancing micro-credential training programs and academic instruction as well as support services and employer engagement.

Partnerships anticipate continuing to implement and improve the program offerings at the colleges to continually serve the needs of students with barriers moving forward. Partnerships also anticipate continuing to explore ways to better support students, by leveraging college, WDB, and community resources.

The following are legacies of the *Micro-credentials: Opportunities through Stackable Achievements* initiative:

- College and WDB Collaboration
- Program Innovations and Enhancements
- Strengthened Stakeholder Engagement
- Positive Student Outcomes
- Support Services Expansion

College and WDB Collaboration

Most partnerships noted the enhanced relationships between the college and WDB throughout the grant period as a significant strength. This collaboration enabled the partnerships to utilize the resources and capabilities from both entities, expediting program development and processes in many cases. Moving beyond the grant, most partnerships noted an interest in continuing to work together and many cited opportunities that were already being sought after together.

Program Innovations and Enhancements

The partnerships experienced a strengthened focus on the needs identified by participants and employers in programmatic development and implementation. Partnerships implemented programs in high-demand occupations to increase participant employability and leveraged the feedback from employers to further innovate within program offerings. These program innovations and enhancements that were implemented through the grant will continue beyond the grant period.

Strengthened Stakeholder Engagement

The grant project highlighted the need to meaningfully engage employers throughout program design and implementation and to cultivate strong relationships with partners in the community. Fundamentally, identifying in-demand skillsets in different industries could not be accomplished without partner engagement. Partnerships noted a stronger focus on reaching out to community partners and finding new ways to engage partners throughout program implementation.

Positive Student Outcomes

The micro-credential programs were designed to meet the needs of individuals with barriers to education. With that, much of the decision-making at each partnership was driven by this goal – from program design to student support services. Because of this, many students reported successful outcomes (e.g., employment and permanent housing) following completion of the micro-credential tracks. Partnerships shared countless success stories from students enrolled in the program, and those positive outcomes will continue beyond the grant – not just for the program alumni, but also for incoming students.

Support Services Expansion

Partnerships noted an expansion of student support services in that colleges and WDBs were able to pool their resources and also intentionally engage community partners. These expansions – including one-on-one support, transportation assistance, childcare, tutoring, etc. – will continue beyond the grant, as reported by partnerships. The ability to offer comprehensive student support not only helped students succeed in the programs, as reported by students and staff, but also helped the partnerships meet their objective – to break down barriers to education for various populations.

Future Implementation

Partnership staff and instructors identified the following recommendations and best practices for an educational institution and/or consortium considering implementing projects similar to this initiative. It is important to note that these considerations were drawn from promising practices utilized across the partnerships as well as lessons learned that were identified by the partnerships. These considerations are outlined below:

- Hire/Identify Specialized Staff Early in Grant Period
- Create Opportunities for Cross-Partnership Sharing
- Explore Innovative Use of Employer Partners
- Document Institutional Knowledge Throughout Grant
- Leverage Existing Resources and Structures
- Prioritize Target Population in Program Design
- Develop Marketing Campaign Early in Grant

These best practices and lessons learned are provided below:

Hire/Identify Specialized Staff Early in Grant Period

Federal funders, such as USDOL, have various financial, tracking, reporting, and monitoring requirements, in addition to the overall project management required of grant initiatives. Hiring staff that specialize in one or a couple of those areas can help alleviate the burden from individuals that are already serving in multiple roles (for example, those serving as grant staff and college staff) or those that may not have grant-specific knowledge or expertise. These specialized staff could include a point person for data tracking and reporting while another staff person manages overall project management and goal tracking.

Creating more specialized roles within a grant and hiring or identifying these individuals early in the grant period could strengthen the partnerships' ability to meet grant timelines – creating more efficiency and, thus, maximizing grant funds for programmatic development. While partnerships should consider the consequences (both positive and negative) in locating and onboarding new staff or utilizing existing staff

with other responsibilities, hiring and identifying staff to dedicate time to specific grant requirements could be valuable to successful grant implementation.

Create Opportunities for Cross-Partnership Sharing

Implementing a grant across several partnerships requires a significant amount of coordination and collaboration to execute grant components across partnerships. Because these entities operate with different internal functions and within varying environments, creating opportunities for cross-partnership collaboration and sharing could be valuable. Partnerships can share resources (e.g., curriculum, community partners, and others), which could expedite grant implementation, and can also share promising practices and innovative approaches within the group to help other partnerships address challenges and obstacles.

Providing opportunities for partnerships to regularly collaborate throughout the grant period can facilitate further grant success. These opportunities can manifest in several different ways, including formal meetings on specific topics (e.g., employer engagement) or can be informal forums for discussion. A subset of partnerships could also meet to discuss implementation of a shared resource or could meet one-on-one to discuss other opportunities for collaboration.

Explore Innovative Use of Employer Partners

Establishing employer partners is valuable to several areas of a grant, including program enrollment, curriculum development, event participation, and post-program job placement. Employers understand the job market, skillsets needed for the job, new and emerging trends in the industry, and can recognize what other employers in the industry look for in an employee. Engaging employers for program design feedback, internships/apprenticeships, and hiring can help expedite job placement for program participants.

In addition to these avenues of employer engagement, it could be beneficial for partnerships to explore other innovative ways to involve partners in the grant program. For instance, employers can be involved in intake processes, mock interviews, participation in events (e.g., career fairs), and provide presentations and company tours. These opportunities not only expose participants to the industry, they can help maintain employer buy-in into the grant program and further expedite placement as employers can be exposed to participants early in the process.

Document Institutional Knowledge Throughout Grant

Because many grant-hired positions may be temporary, it is typical to experience staff and leadership turnover throughout a grant period. However, this turnover can create significant delays in implementation due to the loss of institutional knowledge and may negatively impact grant progress and success. To counteract this challenge, it is recommended that grant staff and leadership identify ways to document institutional knowledge throughout the grant to ensure this information is available in the event of staff turnover.

Staff could consider documenting the following: program goals and objectives, partner and relevant contact information, progress updates on various grant components, budgetary and reporting requirements, as well as other structures and information that should be readily available in case of future monitoring. This information can be stored in a variety of ways (e.g., shared drive) and updated frequently throughout grant implementation. Ensuring consistent and frequent documentation of institutional knowledge related to the grant could help mitigate challenges in cases of staff turnover.

Leverage Existing Resources and Structures

Grant design and implementation processes tend to be expedited due to condensed grant startup timelines (for WIF grants, this timeline is one year). Because it can be challenging for partnerships to finalize and implement all setup processes (e.g., curriculum development, hiring, and internal approval processes), it could be valuable to first identify opportunities to build upon and expand existing resources and structures. While not always a possibility due to the nature of the grant and objectives of the program, finding ways to leverage structures that already exist could help expedite program startup and implementation as there is a working foundation with which to work.

These opportunities may include but are not limited to: existing staff and instructors with expertise in the area, existing curriculum that can be used or modified for the purposes of the grant, and existing partners that could be leveraged for startup and implementation. Prior to program design, and perhaps even prior to the application process, it could be beneficial for partnership staff to discuss the resources and structures that are in place and how they might be leveraged for purposes of the new grant opportunity.

Prioritize Target Population in Program Design

When designing a program, it is valuable to prioritize and consider the needs of the target population to ensure that the program will encourage individuals to enroll and persist and will facilitate their success. Early in the program design phase, it could be beneficial to discuss with relevant stakeholders the needs of the target populations relative to student support services, intake processes, course scheduling, barriers to education, and program curriculum content (including desired level of difficulty).

For instance, a target population with barriers to education may have challenges getting to class during the day due to outside employment or getting to class consistently due to lack of childcare and transportation options. When identifying student support services, it could be useful to target childcare and transportation to help remove those barriers for the target population. In addition, it may be beneficial to think about evening, weekend, and/or online course scheduling to accommodate those students with outside employment. Considering the target population in all aspects of program design and making more thoughtful accommodations for the population based on their needs can help facilitate program success.

Develop Marketing Campaign Early in Grant

Because recruiting from disadvantaged and marginalized populations can be a challenge in that these populations are difficult to find and motivate to return to college, relying on traditional marketing strategies may not be sufficient. Developing a targeted marketing campaign early in the grant period can help the partnership identify the appropriate avenues to recruit from so as to increase student enrollment. Partnerships can examine current marketing approaches, as well as approaches used by other entities that have yielded success, to determine the most effective approach for the grant.

This may include development of a marketing campaign, in which staff develop tangible goals and action items for achieving those goals. This campaign can include an outline of the avenues that will be used for recruiting (e.g., brochures, radio, newspaper), the type of information that may be highlighted to generate student interest, and a timeline for distribution of materials. This campaign should be reexamined consistently to ensure that methods are still effective and if not, discuss modifications that can be made to further facilitate success. Staff could also consider leveraging existing partner organizations that might have preexisting relationships with the target population for recruitment purposes.

OUTCOMES EVALUATION

OUTCOMES AND PREDICTIVE ANALYSIS EVALUATION

DESIGN SUMMARY

The outcomes and predictive analysis study design for *Micro-credentials: Opportunity through Stackable Achievements* consisted of a one-group (participant) study, analyzing micro-credential and career pathway completion outcomes and changes in employment status and wages from 12 months before the participants enrolled in a college's micro-credentialing program and six months after exiting the program. Assessing participants' earning and wages twelve months before enrollment allowed the Evaluation Team (TPMA in partnership with ISCC) to look at multiple quarterly wages and observe the possible incidence of Ashenfelter's dip (decline in participants' mean earnings in the period prior to enrollment in education and training programs[44]).

The Evaluation Team merged administrative data collected by the community colleges, National Student Clearinghouse data, and wage and employment data from the Commonwealth's Unemployment Insurance data system to answer the research questions. By documenting the number and type of micro-credentials each participant completed and the rate of persistence along the micro-credentialing career pathways, the Evaluation Team explored the differences in participant outcomes by institution, field of study, program dosage, and demographics (e.g., gender, age range, race, and ethnicity). Predictive models were constructed to determine whether there were sociodemographic variables that contributed to the likelihood of employment, wage increase, and completion of micro-credentials pathways.

The Evaluation Team conducted an evaluability assessment prior to grant implementation, which revealed the non-existence of suitable comparison groups across implementation sites (as similar as possible to the participants in terms of observable characteristics and variables, but also those that are unobservable, to limit the impact of endogeneity on the observed results) and impaired feasibility of accessing data for potential groups. Therefore, the Evaluation Team, in partnership with the Department, decided to conduct an outcomes analysis with predictive analysis in lieu of an impacts study design. While the Evaluation Team considered conducting an impacts analysis with traditional pathway students as a control group, there were two major reasons why they were not optimal controls, and therefore any study results comparing their outcomes to participant outcomes likely would not have reflected the true impact of *Micro-credentials: Opportunity through Stackable Achievements*:

(1) To accurately assess impact of the program on employment and wages post-completion, the participants and controls must be training for same types of jobs. While the community colleges developed some of the micro-credentials in sectors/disciplines that already existed, and traditional pathway students were taking classes in these areas, the micro-credential and traditional pathways had different trajectories and intermediate goals. The end goal may have been the same—for example, as micro-credentials were aligned with career pathways, the occupation(s) at the end of the pathway may have been the same for both the micro-credentialed and traditional students. However, it may have taken more time for a participant not on that traditional path to meet that end goal, and he/she/they may have worked a series of jobs along the way, whereas traditional students were more likely to be able to start working in that occupation immediately after finishing their full course of study in one continuous block of time.

[44] Heckman, J. J., & Smith, J. A. (1999). The pre-program earnings dip and the determinants of participation in a social program – Implications for simple program evaluation strategies. Retrieved from http://athens.src.uchicago.edu/jenni/dvmaster/FILES/ash_dip.pdf

(2) Across implementation sites, the targeted participant population faced barriers to education and employment that many traditional pathway students do not face, making the two groups fundamentally different. This fundamental difference cannot completely be mitigated using methods like propensity score matching.

Research Questions

The following research questions guide this study:

(1) What proportion of all participants who begin a micro-credentials program at one of the colleges completes at least one micro credential?
(2) What is the rate of persistence of participants who begin a micro-credentialing program?
(3) What proportion of participants complete all micro-credential components outlined in a career pathway?
(4) What is the change in employment rate among micro-credentialing program participants from 12 months before they began the program to six months after exiting the program?
(5) How does the change in employment rate for micro-credentials participants vary by the following segment variables: community college, industry, number of micro-credentials completed, demographic variables (age, sex, race, ethnicity, income)?
(6) What are the mean wage gains (or losses) among micro-credentialing program participants from 12 months before they began the program to after exiting the program?
(7) How do mean wage gains (or losses) vary by the following segment variables: community college, industry, number of micro-credentials completed, demographic variables (age, sex, race, ethnicity, income)?
(8) What proportion of participants achieves at least one industry-recognized credential by the time they complete the program?
(9) Are there any sociodemographic factors, and institution-level factors if available, that improve the likelihood of participants completing at least one micro-credential?
(10) Are there any sociodemographic factors, and institution-level factors, if available, that improve the likelihood of participants persisting in their micro-credentials career pathway?
(11) Are there any sociodemographic factors, and institution-level factors if available, that improve the likelihood of participants completing all micro-credentials within a given career pathway?
(12) Are there any sociodemographic factors, and institution-level factors if available, that improve the likelihood of participants finding employment within six months of exiting or completing their last micro-credential on record?
(13) Are there any sociodemographic factors, and institution-level factors if available, that improve the likelihood of participants achieving at least one industry-recognized credential by the time they exit the program?
(14) Are there any sociodemographic factors, and institution-level factors, if available, that improve the mean wages earned at jobs found within six months of exiting or completing their last micro-credential on record?

Data Sources

Since micro-credential programs are, for the most part, non-credit, there is variability in how the data are collected and what data are collected from the participants at each partnership. To help overcome this potential barrier, the Evaluation Team created intake forms and individualized Excel spreadsheets to collect micro-credential participant data. The Evaluation Team required the following data points to be collected by each partnership at minimum and allowed partnerships to add additionally datapoints for internal reporting and tracking purposes (e.g., disconnected youth status):

Table 20: List of Student Demographic and Micro-Credential Data Used in Analysis

Student Demographic Data	Micro Credential Data
Last Name	Name of Micro-Credential Enrolled In
First Name	Date of Enrollment/Micro-Credential Start Date
Social Security Number	Micro-Credential Completion Status
Age	Incomplete/Withdrawal Status
Ethnicity	Date of Micro-Credential Completion
Race	Industry Certification Earned
Gender	Continuation to For-Credit Educational Program
Marital Status	
Year of High School Graduation/GED Completion	
Highest Level of Education Attained Prior to Enrollment	
First Generation College Student	
Ex-Offender Status	
Veteran Status	
Referral Source	

In addition to the demographic and enrollment data collected by the colleges, Unemployment Insurance (UI) data were collected by the Commonwealth. Since the data consists of personally identifiable information (PII), before the data were made available to the Evaluation Team, the PII was removed and a Random ID was assigned to each participant and added to the dataset (as described in the process under Methodology).

Year of high school graduation/GED completion was not included in any analyses due to high rates of missingness and inconsistency, and errors in data entry. For example, some participants had years of high school graduation that were prior to their year of birth (calculated by subtracting age from the date of enrollment, as year of birth was not collected). Other participants were listed as having less than a high school degree/GED but had a year of high school graduation/GED completion. Also, due to low numbers of participants in various race categories, race we redefined as White (non-Hispanic), and non-White.

Variable Definitions

Persistence. Persistence is a success metric used in research questions 2 and 10 in the outcomes analysis. For the purposes of this study, it was defined as the continuation by the individual into subsequent units of the sequence in which they were enrolled. For micro-credentials participants, persistence was the enrollment in another micro-credential after completing the first in their career pathway. This was a binary metric indicating whether or not a person continued to persist in at least one unit following their initial enrollment. Note that participants who persisted but

dropped out prior to completion were still flagged as persisting. A value of "1" indicated persistence, and a value of "0" indicated no persistence.

Completion. Completion is defined in the context of the outcomes analysis research questions 1, 3, 4, and 6. For the purposes of this study, it was split into two unique variables: one variable was a binary indicator of whether or not the participant completed at least one micro-credential, and the other was a binary indicator of whether or not the participant completed all of the micro-credentials in a given institution's developed career pathway. A value of "1" indicated completion, and a value of "0" indicated no completion.

Achievement of Industry-Recognized Credential. Achievement of Industry-Recognized Credentials is defined as the dependent variable of the outcomes analysis research questions 8 and 13. For the purposes of this study, it was a binary variable denoting whether or not the individual achieved at least one industry-recognized credential. A value of "1" indicated achievement of at least one industry-recognized credential, and a value of "0" indicated no achievement of an industry-recognized credential. An industry-recognized credential is defined as credential accepted or deemed useful by multiple employers within an industry.

Obtainment of Employment. Obtainment of employment is defined as the dependent variable of the outcomes analysis research questions 4 and 12. For the purposes of this study, it was a binary variable denoting whether or not the participant was employed within six months after exiting the program. A value of "1" indicated that the participant was employed within six months of exiting the program, and a value of "0" indicated that the participant was not employed within six months of exiting the program.

Wages. Participant wages are defined as the dependent variable in research questions 6, 7, and 14 of the outcomes analysis. For the purposes of this study, it was a continuous variable indicating earnings in dollars per quarter. All measurements on wages were taken 12 months prior to enrollment in the participant's respective program and six months following the participant's exit from the program.

Methodology

Data Collection

Participant data were collected via the intake forms and entered into each of the college's record keeping file created for the evaluation. Program staff also submitted student information to the National Student Clearinghouse to determine post-program micro-credential completion academic outcomes. The Evaluation Team recognizes the sensitivity of collecting participants' Social Security Numbers (SSNs) and the possible hesitancy of the institutions to share SSNs in a dataset with an external third-party evaluator. Therefore, the Evaluation Team developed a data exchange protocol that allowed the Evaluation Team to have access to participant-level administrative information for certain employment and wage variables, while preventing the acquisition of participants' PII. Leveraging this protocol, TPMA and the Pennsylvania Center for Workforce Information and Analysis (CWIA) developed a data transfer process, which was vetted and agreed upon by each partnership.

The Evaluation Team provided program staff with participant intake and exit forms, including informed consent statements, to administer to participants along with protocols, instructions, and a timeline for

data collection. Program staff inputted demographic and micro-credential enrollment, retention, completion, and performance data for each participant into an Excel record file layout provided by the Evaluation Team. At certain intervals during program implementation, program staff submitted the completed record files to the Pennsylvania Center for Workforce Information and Analysis (CWIA) including SSN and name. CWIA provided a secure web-based file sharing system to protect this sensitive information.

CWIA used SSNs to match with Unemployment Insurance (UI) records and populated the blank pre-/post-program employment, industry, and wage fields in the file. Participant names were used as a second check against the SSN to ensure validity of matches. When discrepancies arose during matching, CWIA staff communicated directly with program staff to ensure data was entered accurately and completely. This ensured that the Evaluation Team would not be involved in any discussions including participant PII. CWIA generated a unique participant ID for each student, removed SSN and names from all records, and submitted the redacted version to the Evaluation Team for analysis via the secure web-based file sharing system.

Concurrently, during program implementation on a quarterly basis, program staff submitted a redacted version of the record file layout directly to the Evaluation Team with SSN and names removed. This parallel exchange allowed the Evaluation Team to verify completeness of the dataset and provide technical assistance to the program staff with data collection and entry, as needed.

Data Analyses

The Evaluation Team used a variety of statistical methods depending on the nature of the research question. For participant demographics, and to answer research questions 1 – 8, the Evaluation Team conducted a one-group post-test descriptive analysis. To answer these questions, the Evaluation Team investigated a single group (students who enrolled in at least one pathway at one of the seven partnerships). In this case, the treatment was considered to be enrollment in a pathway and the post-test outcome was whether or not the participant completed at least one micro-credential, persisted beyond the first micro-credential, completed the entire pathway, or received an industry-recognized credential.

For research question 4, the Evaluation Team utilized a one-group pre-post design. Here, a single group of participants was analyzed using inferential statistics to determine the effect of treatment (i.e., completing at least one micro-credential) on the outcome of employment. A pre-post design requires an outcome measurement before and after the treatment; here, the pre-test outcome was employment status 12 months prior to enrollment and the post-test outcome was employment status either three months or six months after completion. This methodology was used again for research question 6 to describe the impact of treatment (i.e., completing at least one micro-credential) on the outcome of differences in quarterly wage gains. Hence, wages were collected 12 months prior as the pre-treatment outcome and three or six months after completion as the post-treatment outcome.

Research questions 5 and 7 extends research questions 4 and 6 to non-equivalent control group pre-post designs to make descriptive statements about the impact of various demographic factors on post-pathway employment and wage gains. Questions 12 and 14 further extend the same design in order to make inferential statements about the impact of the same demographic factors on these two outcomes. In these cases, the treatment and control assignment of the variables can be found by looking for the “ref” category in the binary logistic regression output.

For research questions 9-11 and 13, the Evaluation Team utilized a non-equivalent control group design to make inferential statements about the impact of various demographic factors on the same four outcomes as research questions 1-3 and 8. Here, the Team considers demographic factors to be treatments/controls. For example, the "control" is Female and the "treatment" is Male; the "control" is aged 17-29, and the "treatments" are other age ranges; the "control" is minority status and the "treatment" is White, non-Hispanic status, etc. In each case, the "control" is labeled in the output as "ref" for "reference category." Once again, the post-test outcomes were completion of at least one micro-credential, persistence beyond the first micro-credential, completion of the entire pathway, or receipt of an industry-recognized credential as being four treatments (one per research question). This method was used again for research question 14 with the post-test outcome being average wage six months after completing the final micro-credential. For a detailed methodology including statistical methods, see Appendix B.

Sampling

No weighting or clustering was necessary in sampling. Eligibility for inclusion in the analyses varied based on outcomes and predictor variables. For example, in research questions 1, 3, and 8, all students were included if they enrolled in a single pathway, regardless of completion (N = 848 observations of participants enrolling in a pathway). For research questions 9-14, those failing to disclose demographic information were not included in the reported analysis. Gender was unreported for two participants; marital status for 33, education level for 12, first generation college student for 54, conviction status for 19, race/ethnicity for 22, and age for three. In all, 91 participants did not disclose all of their demographic information. For additional information on the inclusion requirements for each research questions, refer to Appendix B.

FINDINGS OVERVIEW

A total of 700 individuals enrolled in the 19 micro-credential pathways offered across all partnerships. It is important to note, however, that 15 participants were excluded from all analyses due to inconsistencies or errors in data entry.[45] Therefore, 685 unique individuals were included in the analysis and participants' age ranged from 17 – 74 years old at the time of enrollment. More than two-thirds of participants had not completed education beyond a high school diploma or GED (68.6%) and slightly more than one-tenth had earned a bachelor's degree or higher prior to enrolling in the program (10.5%). More than half of all micro-credential participants were White (54.2%) and one-third were Black or African American (34.0%). Additionally, one-fifth of participants were married (21.0%), one-fourth were first generation college students (25.8%), less than one-tenth were ex-offenders (9.3%) and 3.8% were veterans.

Across the seven partnerships, 19 micro-credential pathways were offered to potential students that could enroll in multiple micro-credential pathways during the grant period. If a student enrolled in multiple pathways, they were counted as an enrollment for each pathway in which they enrolled. Of the 685 participants, 554 (80.1%) enrolled in one pathway, 99 (14.5%) enrolled in two, and 32 (4.7%) enrolled in three.[46] For each pathway in which a participant enrolled, they were counted as a unique enrollment, hereafter referred to as participant-pathways. In total, there are 848[47] unique participant-pathways. The Philadelphia partnership had the highest rate of enrollment and represented one-fifth of the total unique

[45] These participants are from two pathways: Delaware's CNC Operator and Allegheny's Computer User Network Technician. Data errors included both demographic data issues and program enrollment or completion data.
[46] Only participants in the Allegheny Partnership (4), the Philadelphia Partnership (60), and the Westmoreland Partnership (35) enrolled in two pathways. Only participants in the Westmoreland Partnership (32) enrolled in three pathways.
[47] 554*1 + 99*2 + 32*3 = 848

individuals enrolled in the micro-credentials program. The Delaware partnership enrolled the fewest students, with a total enrollment of 36 participants representing 3.3% of all grant participants.

Table 21: Participant and Enrollment by Partnership

Partnership	Total Unique Participants	Participant Pathway Enrollments[48]
Allegheny	125	121
Bucks	133	133
Delaware	36	28
Montgomery	83	83
Northampton/Lehigh	88	88
Philadelphia	140	200
Westmoreland	95	195
TOTAL	700	848

Enrollment and Completion Findings

Micro-Credential Completion

Of the 848 participant-pathway enrollments, nearly nine in ten (90.3%) completed at least one micro-credential, which included 213 enrollments in pathways that only required one micro-credential. This represents 631 unique individuals who completed at least one micro-credential (92.1% of unique individuals). The Bucks partnership participants had the highest completion rate at 99.3%, closely followed by the Montgomery partnership at 96.4%. As noted in the Implementation Evaluation section, the Bucks partnership maintained a rigorous participant intake process throughout the grant, which staff reported increased retention and completion of students. Nearly one in five students at Allegheny failed to complete a single micro-credential, resulting in the lowest rate of participants completing at least one micro-credential. This was mainly driven by low completion in the Health Information Tech pathway (see Appendix D).

Table 22: Completed Micro-Credential Enrollment by Partnership

	Completed Micro Credential Enrollment				
	1+		None		Overall[49]
	N	(%)	N	(%)	N
All Participant Pathways	766	(90.3)	82	(9.7)	848
Partnership					
Allegheny	97	(80.2)	24	(19.8)	121
Bucks	132	(99.3)	1	(0.8)	133
Delaware	24	(85.7)	4	(14.3)	28
Montgomery	80	(96.4)	3	(3.6)	83
Northampton/Lehigh	76	(86.4)	12	(13.6)	88
Philadelphia	186	(93.0)	14	(7.0)	200
Westmoreland	171	(87.7)	24	(12.3)	195

[48] Excludes any omitted participants.
[49] This includes 632 unique participants; 528 (83.5%) participated in one pathway, 74 (11.7%) participated in two, and 30 (4.7%) participated in three.

The Evaluation Team conducted a logistic regression to determine if any sociodemographic factors improved the likelihood of completing at least one micro-credential (N = 729[50]). In this series of tests, the outcome is the odds of completing at least one micro-credential. A logistic regression tests the model at two levels: first, a likelihood ratio tests whether the model itself does a better job predicting outcomes than just guessing the most common outcome for each person, regardless of demographics. For example, since participants completed at least one micro-credential in about 90% of pathways in which they enrolled, the baseline model for the "completed at least one micro-credential" outcome would be to always predict "YES." The alternative model attempts to improve one's ability to correctly predict completion based on one or more demographics. The p-value for the likelihood ratio test reports the probability of having improved predictive ability based on demographics just by random chance. According to the likelihood ratio (LR = 21.43), the overall model is significant at the 5% level (p-value = 0.0444), meaning that, by random chance alone, one would see improvements in predictive ability of the magnitude observed herein only about 4.44% of the time. If the overall model is shown to significantly improve predictive ability, a second level of testing is performed on the individual predictors.

For this level of testing, the likelihood ratio is replaced with an odds ratio. The odds ratio (OR) tells the increased (>1) or decreased (<1) probability of earning at least one micro-credential given that an enrollee is in the demographic listed at the left of the table rather than the reference category in the same group.

For example, an odds ratio of 1.97 for enrollees aged 40-49 years indicates that they are nearly twice as likely to complete at least one micro-credential (97% *more* likely), when compared to those aged 17-29 years (the reference group). The p-value of 0.1711 indicates that the probability of observing an odds ratio this extreme by random chance is about 17%. Hence, while the result is of some interest, it is not statistically significant at the commonly recognized threshold of 5%. Likewise, those aged 50-59 years are about half as likely to complete a micro-credential (53% *as* likely); a finding one would expect to see by random chance about 13.8% of the time.

The confidence intervals give an upper and lower limit for the test's guess of the range of odds ratios that include the true odds ratio. In other words, for the 40-49-year-old group, the ratio may be as low as .75 (participants are about three quarters as likely to complete a micro-credential) to 5.17 (participants are over five times as likely to complete a micro-credential). Hence, one cannot say with confidence that being in one's 40s increases the likelihood of completing a micro-credential. Looking at the rest of the table, no age group appears to be any more or less likely to complete a micro-credential than 17-29 year-olds, though using the 50-59 age group as the reference would likely reveal a statistically significant difference between those in their 50s and those in their 40s, wherein 40-somethings are nearly four times as likely (OR = 1.97/0.53 = 3.72) to complete at least one micro-credential than 50-somethings.

Ethnicity does not appear to impact likelihood of completion, nor does education, first generation college student status, previous offender status, or veteran status. Although these are not statistically significant, they can be considered to reveal some good news about the accessibility of the micro-credentials. The odds ratios near 1 indicate that the programs seem to reduce or remove some typical barriers to entry, such as being a first generation college student or lacking education. However, it does appear that males are about twice as likely (OR = 2.28) to complete a micro-credential, and this result is statistically significant (p-value

[50] There were 119 participant-pathways with missing demographic data, leaving 729 of the original 848 for statistical analysis. A second (unreported) analysis confirms all findings are robust to the inclusion of "Unknown" categories for each variable with missing data.

= 0.01). According to the likelihood ratio (LR = 21.43), the overall model is significant at the 5% level (p-value = 0.0444).

Table 23: Likelihood of Completing at Least One Micro-Credential

	Odds Ratio	95% Confidence Interval		p value
		Lower	Upper	
Age group				
17-29 (ref)	-	-	-	-
30-39	0.95	0.48	1.91	0.8937
40-49	1.97	0.75	5.17	0.1711
50-59	0.53	0.23	1.22	0.1381
60-74	1.12	0.24	5.30	0.8866
Race/Ethnicity				
Other (ref)	-	-	-	-
White, non Hispanic	0.92	0.53	1.62	0.7785
Sex				
Female (ref)	-	-	-	-
Male	2.28	1.22	4.26	0.0100
Marital status				
Not married (ref)	-	-	-	-
Married	2.06	0.90	4.67	0.0857
Education				
High school diploma or less (ref)	-	-	-	-
Associate degree or certification	1.07	0.52	2.20	0.8634
Bachelor's or graduate degree	1.54	0.50	4.77	0.4517
First generation college student				
Yes (ref)	-	-	-	-
No	0.76	0.41	1.38	0.3586
Ex offender				
Yes (ref)	-	-	-	-
No	2.10	0.89	4.99	0.0925
Veteran				
Yes (ref)	-	-	-	-
No	2.33	0.69	7.92	0.1740

In addition to calculating the rate of completing at least one micro-credential, the Evaluation Team examined the completion rates for all micro-credentials enrolled in by participants. Overall, there were 3,989 micro-credentials enrolled in by the 685 unique participants and 95.0% of these micro-credentials were completed. Allegheny had the lowest individual micro-credential completion rate which was still more than four-fifths of enrollments (84.9%), while 98.7% of micro-credentials were completed at the Philadelphia partnership. It is important to note that Philadelphia's micro-credential program consisted of nine one- to two-day courses, which were each a micro-credential, so it was less likely for a student to not complete a micro-credential that they had begun.

Table 24: All Micro-Credential Enrollments by Partnership

All Micro Credential Enrollments (N=635)	All Micro Credential Enrollments				
	Yes		No		Overall
	N	(%)	N	(%)	N
	3,790	95.0	199	5.0	3,989
Partnership					
Allegheny	248	84.9	44	15.1	292
Bucks	1,022	96.1	42	3.9	1,064
Delaware	136	94.4	8	5.6	144
Montgomery	448	92.8	35	7.2	483
Northampton/Lehigh	243	92.4	20	7.6	263
Philadelphia	1,091	98.7	14	1.3	1,105
Westmoreland	602	94.4	36	5.6	638

While some of the pathways offered no opportunity for the enrollee to earn an industry credential, many did. In the following table, "N/A" indicates it was not possible for students in this partnership to earn a higher number of credentials. For example, the Philadelphia partnership did not include industry-recognized credentials in any of the micro-credential pathways, whereas the Allegheny partnership offered up to four industry credentials (available in the IT pathway). Across the initiative, 403 of the 766 participant-pathways who completed at least one micro-credential also earned at least one industry credential, and over 700 industry-recognized credentials were earned in total.[51] These industry-recognized credentials include credentials that are widely recognized and offered by industry associations or other national organizations (e.g., OSHA, AWS, NIMS, Microsoft Office).

Table 25: Industry Credentials Achieved by Partnership

Partnership	Industry Credentials Achieved					
	0	1	2	3	4	Total
All Participant Pathways (N= 848)	445	190	136	63	14	848
Partnership						
Allegheny	78	39	1	1	2	121
Bucks	3	1	129	N/A	N/A	133
Delaware	10	1	4	1	12	28
Montgomery	36	47	N/A	N/A	N/A	83
Northampton/Lehigh	13	75	N/A	N/A	N/A	88
Philadelphia	200	N/A	N/A	N/A	N/A	200
Westmoreland	105	27	2	61	N/A	195

The logistic regression model is shown to be a reliable estimator of the odds of a participant achieving at least one industry credential (N = 555[52]; LR = 25.00; p-value = 0.0148). Specifically, marital status and first generation college student status are statistically significant at the 5% level. While age as a general factor is not a significant predictor, participants in their 30s are about three-fifths as likely to achieve at least one industry-recognized credential compared to participants ages 17-29 (OR = 0.58; p-value = 0.0401). Married

[51] 190 + 136 + 63 + 14 = 403; 190*1 + 136*2 + 63*3 + 14*4 = 707;
[52] The 200 participants from the Philadelphia partnership were not given the option of earning an industry credential, so they were not included in this analysis. Of the remaining 648, 93 participant-pathways with missing demographic data, leaving 555 for statistical analysis.

individuals are also less likely to earn a credential (OR for unmarried is 1/0.59 = 1.69; p-value = 0.0208). Lastly, first generation college students are 56% more likely to earn a certificate (OR for first generation = 1/0.64 = 1.56; p-value = 0.0257). These findings are interesting in that the odds that have been in favor of one group are reversed in this analysis for both significant demographics, marital status and first generation college school status.

Table 26: Likelihood to Achieve at Least One Industry-Recognized Credential

	Odds Ratio	95% Confidence Interval		p value
		Lower	Upper	
Age group				
17-29 (ref)	-	-	-	-
30-39	0.58	0.34	0.98	0.0401
40-49	1.34	0.79	2.27	0.2766
50-59	1.17	0.63	2.18	0.6224
60-74	1.63	0.66	4.05	0.2929
Race/Ethnicity				
Other (ref)	-	-	-	-
White, non Hispanic	0.81	0.55	1.21	0.3051
Sex				
Female (ref)	-	-	-	-
Male	0.86	0.58	1.28	0.4535
Marital status				
Not married (ref)	-	-	-	-
Married	0.59	0.37	0.92	0.0208
Education				
High school diploma or less (ref)	-	-	-	-
Associate degree or certification	0.90	0.55	1.48	0.6832
Bachelor's or graduate degree	0.92	0.51	1.64	0.7749
First generation college student				
Yes (ref)	-	-	-	-
No	0.64	0.43	0.95	0.0257
Ex offender				
Yes (ref)	-	-	-	-
No	1.17	0.63	2.17	0.6152
Veteran				
Yes (ref)	-	-	-	-
No	1.01	0.41	2.48	0.9907

Persistence

To calculate persistence, the 213 enrollments into pathways that consisted of a single micro-credential were excluded in the analysis, which represent the seven micro-credential pathways with only one micro-

credential.[53] Of the remaining 635 participant-pathways enrollments for pathways with more than one micro-credential, 92% persisted in the pathway (i.e., after completing the first micro-credential in their pathway, they went on to enroll in the next). Bucks partnership had the highest persistence, with all 132 students who completed at least one micro-credential continuing to the next micro-credential in the pathway. Allegheny had the lowest persistence, again driven by the Health Information Tech Pathway (see Appendix D).

Table 27: Persistence by Partnership

	Persisted				
	Yes		No		Overall
	N	(%)	N	(%)	N
All Participant Pathways (N=635)	584	(92.0)	51	(8.0)	635
Partnership					
Allegheny	58	(79.5)	15	(20.55)	73
Bucks	132	(99.2)	1	(0.8)	133
Delaware	24	(85.7)	4	(14.3)	28
Montgomery	80	(96.4)	3	(3.6)	83
Northampton/Lehigh	76	(86.4)	12	(13.6)	88
Philadelphia	132	(94.3)	8	(5.7)	140
Westmoreland	82	(91.1)	8	(8.9)	90

A total of 559[54] individuals were included in the analysis of factors for improving persistence within the pathway. This excludes individuals in pathways with only one micro-credential, individuals who did not complete at least one micro-credential, and any participants with missing demographic data. From the logistic regression, the model is shown to be a reliable estimator of the odds of a participant persisting in their pathway (LR = 32.10; p-value = 0.0013). Specifically, marital status, ex-offender status, and veteran status are statistically significant at the 5% level. Married individuals were more than four times as likely to persist compared to the unmarried (OR = 4.19; p-value = 0.0234). Likewise, non-convicts and non-veterans are also over four times as likely to persist compared to ex-offenders and veterans (ORs = 4.47 & 4.42, respectively; p-values = 0.0015 & 0.0251, respectively).

Table 28: Factor Influence on Persistence of Pathway

	Odds Ratio	95% Confidence Interval		p value
		Lower	Upper	
Age group				
17-29 (ref)	-	-	-	-
30-39	0.52	0.22	1.24	0.1412
40-49	1.66	0.47	5.78	0.4295
50-59	0.47	0.16	1.40	0.1750
60-74	0.37	0.09	1.58	0.1787
Race/Ethnicity				
Other (ref)	-	-	-	-

[53] Pathways with only one micro-credential include Westmoreland's Welding and Machining pathways and Philadelphia's Advance manufacturing, Automotive Tech, Business Tech, and Health Care pathways. Allegheny's Patient Care Technician pathway included two micro-credentials; however, the Certified Nurse Aid micro-credential was not required for pathway completion. Therefore, this pathway is not included in the persistence metric.

[54] Among the participant-pathways with more than one available micro-credential, 76 are missing demographic data, leaving 559 of the original 635 for statistical analysis. A second (unreported) analysis confirms all findings are robust to the inclusion of "Unknown" categories for each variable with missing data.

	Odds Ratio	95% Confidence Interval		p value
		Lower	Upper	
White, non Hispanic	0.95	0.47	1.91	0.8771
Sex				
Female (ref)	-	-	-	-
Male	1.98	0.87	4.50	0.1017
Marital status				
Not married (ref)	-	-	-	-
Married	4.19	1.21	14.45	0.0234
Education				
High school diploma or less (ref)	-	-	-	-
Associate degree or certification	0.75	0.33	1.71	0.4865
Bachelor's or graduate degree	1.19	0.31	4.50	0.8023
First generation college student				
Yes (ref)	-	-	-	-
No	1.06	0.50	2.25	0.8888
Ex offender				
Yes (ref)	-	-	-	-
No	4.47	1.77	11.25	0.0015
Veteran				
Yes (ref)	-	-	-	-
No	4.24	1.20	14.98	0.0251

Pathway Completion

Nearly 70% of all participant-pathway enrollments (N = 848) completed all micro-credentials of the pathway in which they enrolled, which includes all pathways regardless of how many micro-credentials were required. The most successful partnership in terms of pathway completion was the Bucks partnership, with a 91% completion rate. Participants enrolled in the Delaware partnership's program had the lowest completion rate, with slightly more than one-third completing the pathway (35.7%). As noted in Appendix D, the Delaware partnership's micro-credential program required a ten- to eleven-month commitment (approximately 320 hours) from students to complete the pathway. While the total number of hours required of students was not significantly more than the programs at the Bucks partnership (288 hours), the Delaware program would take a participant approximately 28 more weeks to complete.

Table 29: Completed Pathways by Partnership

	Completed Pathway				
	Yes		No		Overall
	N	(%)	N	(%)	N
All Participant Pathways (N=848)	587	(69.2)	261	(30.8)	848
Partnership					
Allegheny	71	(58.7)	50	(41.3)	121
Bucks	121	(91.0)	12	(9.0)	133
Delaware	10	(35.7)	18	(64.3)	28
Montgomery	59	(71.1)	24	(28.9)	83
Northampton/Lehigh	64	(72.7)	24	(27.3)	88
Philadelphia	128	(64.0)	72	(36.0)	200

	Completed Pathway				
	Yes		No		Overall
	N	(%)	N	(%)	N
Westmoreland	134	(68.7)	61	(31.3)	195

The logistic regression included 729[55] participant-pathway enrollments. The model is shown to be a reliable estimator of the odds of a participant completing in their pathway (LR = 30.70; p-value = 0.0022). Specifically, race/ethnicity and marital status are statistically significant at the 5% level. White, non-Hispanic individuals were 70% more likely to complete their pathway compared to minorities (OR = 1.70; p-value = 0.0031). Likewise, married individuals were 78% more likely to complete their pathway compared to the unmarried (OR = 1.78; p-value = 0.0142).

Table 30: Odds of Completing Pathway

	Odds Ratio	95% Confidence Interval		p value
		Lower	Upper	
Age group				
17-29 (ref)	-	-	-	-
30-39	0.83	0.54	1.29	0.4066
40-49	1.05	0.63	1.76	0.8435
50-59	0.57	0.32	1.02	0.0581
60-74	0.64	0.25	1.61	0.3423
Race/Ethnicity				
Other (ref)	-	-	-	-
White, non Hispanic	1.70	1.20	2.40	0.0031
Sex				
Female (ref)	-	-	-	-
Male	1.21	0.84	1.75	0.3155
Marital status				
Not married (ref)	-	-	-	-
Married	1.78	1.12	2.83	0.0142
Education				
High school diploma or less (ref)	-	-	-	-
Associate degree or certification	1.03	0.65	1.62	0.9159
Bachelor's or graduate degree	1.65	0.85	3.19	0.1397
First generation college student				
Yes (ref)	-	-	-	-
No	1.16	0.81	1.65	0.4281
Ex offender				
Yes (ref)	-	-	-	-
No	1.37	0.77	2.43	0.2814
Veteran				
Yes (ref)	-	-	-	-
No	1.13	0.47	2.70	0.7932

[55] There were 119 participant-pathways with missing demographic data, leaving 729 of the original 848 for statistical analysis. A second (unreported) analysis confirms all findings are robust to the inclusion of "Unknown" categories for each variable with missing data.

Employment and Wage Findings

Employment Rates

Outcomes related to employment and wage changes only included participants who completed at least one micro-credential (i.e., 766 of the 848 participant-pathway enrollments). The UI wage database only reports employment status as "employed" or "unknown" with the latter indicating that the individual did not have any employment information reported by an employer to the Commonwealth. Therefore, individuals with an "unknown" status could be unemployed or could be working but their employment and wages are not being reported. The UI wage database reports wages as summative wages for calendar year quarters. Participant wage and employment data is reported by quarter, starting 12 months prior to program enrollment and ending six months after the latest completion date. For the purposes of this analysis, the Evaluation Team examined data for the quarter which was 12 months prior to program enrollment and six months after the latest date a participant completed a micro-credential.[56]

One year prior to enrolling in a micro-credential, 53.7% of participants completing at least one micro-credential were employed; six months after completion, about half of those participants (27%) remained employed. Of the 46.3% of participants who were not employed a year before beginning a pathway, about two thirds (13.4%) gained employment by six months post-program. Overall, two out of five participants were employed six months after completion (40.5%), and a third of those participants had not been employed 12-months prior to initial pathway enrollment. Participants enrolled at the Bucks partnership had the highest post-program employment rate (63%) while participants enrolled at the Delaware and Westmoreland partnerships had the lowest post-program employment rates with less than one-fourth of students employed.

Employment rates declined regardless of the number of micro-credentials completed, but the largest decreases were seen for those who only completed one or two micro-credentials (from 55% to 30% employed). For those who completed eight to twelve micro-credentials, employment rates only decreased from 50.9% to 46.6%. Participants who completed eight or more micro-credentials were slightly less likely to be employed twelve months pre-program and were most likely to be employed six months post program.

Table 31: 12 Months Pre-Program to 6 Months Post-Program Employment by Partnership

	12 months pre program				6 months post program			
	Employed (%)		Unknown (%)		Employed (%)		Unknown (%)	
All Participant Pathways (N=766)	411	(53.7)	355	(46.3)	310	(40.5)	456	(59.5)
Partnership								
Allegheny	60	(61.9)	37	(38.1)	40	(41.2)	57	(58.8)
Bucks	74	(56.1)	58	(43.9)	83	(62.9)	49	(37.1)
Delaware	15	(62.5)	9	(37.5)	5	(20.8)	19	(79.2)
Montgomery	52	(65.0)	28	(35.0)	46	(57.5)	34	(42.5)
Northampton/Lehigh	39	(51.3)	37	(48.7)	29	(38.2)	47	(61.8)
Philadelphia	70	(37.6)	116	(62.4)	69	(37.1)	117	(62.9)
Westmoreland	101	(59.1)	70	(40.9)	38	(22.2)	133	(77.8)
Micro credentials completed								

[56] A review of employment rates three months prior to enrollment in a micro-credential revealed that employment rates had dropped from 53.7% to 50.2%, a trend that continued throughout the timespan of the study.

	12 months pre program				6 months post program			
	Employed (%)		Unknown (%)		Employed (%)		Unknown (%)	
All Participant Pathways (N=766)	411	(53.7)	355	(46.3)	310	(40.5)	456	(59.5)
1- 2	143	(55.0)	117	(45.0)	78	(30.0)	182	(70.0)
3- 7	128	(55.4)	103	(44.6)	104	(45.0)	127	(55.0)
8- 12	140	(50.9)	135	(49.1)	128	(46.6)	147	(53.5)

Of additional interest is the change in employment status from pre- to post-program for unique participants who completed at least one micro-credential (n=631). More than half of micro-credential participants had no change in employment status from 12 months pre-program to six months post-program (i.e., were employed both pre- and post-program or had an unknown status both pre- and post-program). More than one out of ten participants had unknown employment 12 months pre-program and were employed six months post-program (13.8%). The Bucks and Northampton/Lehigh partnerships had the highest rates of participants gaining employment from pre- to post-program while Westmoreland and Delaware partnerships had the lowest rates. Any participants who completed their last micro-credential during Q4 2018 might not have accurate post-program employment data due to the delay in data availability and these participants would have an "unknown" status in the UI database.

Table 32: Change in Employment Status by Partnership

	Total Number		Employed to unknown		No change in employment status		Unknown to employed	
Unique Participants (N= 631)	N	(%)	N	(%)	N	(%)	N	(%)
	631	(100.0)	158	(25.0)	386	(61.2)	87	(13.8)
Partnership[57]								
Allegheny	93	(14.7)	27	(29.0)	58	(62.4)	8	(8.6)
Bucks	132	(20.9)	17	(12.9)	89	(67.4)	26	(19.7)
Delaware	24	(3.8)	10	(41.7)	14	(58.3)	**	**
Montgomery	80	(12.7)	18	(22.5)	50	(62.5)	12	(15.0)
Northampton/Lehigh	76	(12.0)	24	(31.6)	38	(50.0)	14	(18.4)
Philadelphia	139	(22.0)	26	(18.7)	90	(64.7)	23	(16.5)
Westmoreland	87	(13.8)	36	(41.4)	47	(54.0)	**	**

Decreases in pre- to post-program employment rates were present for all age groups, though those 50 and older experienced the largest decline (for whom employment decreased by around 30%). Those in the 40-49-year age group had a slightly lower decrease in employment (around 5% loss) than those younger than 40 (around 9% loss). Females were more likely to lose employment (15% loss was approximately double that of males'). White non-Hispanic enrollees saw decreases in employment rates from around 60% to around 46%, while the employment rate for minority enrollees dropped from about 48% to about 39%.

Participants with an associate degree or certificate experienced the largest decline in employment, while those with a bachelor's or graduate degree were least likely to lose employment. First generation college students and non-veterans were more likely to lose employment than their counterparts.

Industries are reported according to where participants worked at the time indicated by the column; thus, there are no counts for those with Unknown employment and percentages in the Industry section sum by

[57] **Cells are suppressed if a cell has less than five individuals, including zero.

column rather than across Employed/Unknown. To reduce cell suppression, industry codes are reported at the 2-digit level. Prior to enrolling in the micro-credential program, one-fifth of participants who were employed worked in retail jobs which decreased to 9.3% at post-program. Employment rates in the food service decreased from pre- to post-program. The industry with the highest increase in employment rates from pre- to post-program was in manufacturing, which had an increase of nearly 20 percentage points.

Table 33: 12 Months Pre-Program to 6 Months Post-Program Employment by Factor

	12 months pre program				6 months post program			
	Employed (%)		Unknown (%)		Employed (%)		Unknown (%)	
Unique participants (N=631)	341	(54.0)	290	(46.0)	270	(42.8)	361	(57.2)
Pre/Post industry code[58]								
23 Utilities	6	(1.8)			**	(**)		
31-33 Manufacturing	41	(12.0)			84	(31.1)		
42 Wholesale trade	11	(3.2)			7	(2.6)		
44-45 Retail trade	72	(21.1)			25	(9.3)		
48-49 Transportation warehousing	15	(4.4)			8	(3.0)		
52 Finance and insurance	8	(2.3)			**			
54 Prof, scientific, & tech services	11	(3.2)			15	(5.6)		
56 Admin & support waste mgmt	51	(15.0)			40	(14.8)		
61 Educational services	11	(3.2)			7	(2.6)		
62 Health care & social assistance	51	(15.0)			41	(15.2)		
71 Arts, entertainment, & rec	5	(1.5)			**			
72 Accommodation & food services	43	(12.6)			24	(8.9)		
92 Public administration	**				5	(1.9)		
Age group								
17-29	136	(53.0)	119	(46.7)	116	(45.5)	139	(54.5)
30-39	74	(49.7)	75	(50.3)	60	(40.3)	89	(59.7)
40-49	61	(51.7)	57	(48.3)	55	(46.6)	63	(53.4)
50-59	55	(64.0)	31	(36.1)	30	(34.9)	56	(65.1)
60-74	14	(66.7)	7	(33.3)	9	(42.9)	12	(57.1)
Unknown	1	(50.0)	1	(50.0)	0	(0.0)	2	(100.0)
Sex								
Female	161	(55.3)	130	(44.7)	116	(39.9)	175	(60.1)
Male	180	(53.1)	159	(46.9)	154	(45.4)	185	(54.6)
Other	0	(0.0)	1	(100.0)	0	(0.0)	1	(100.0)
Race/Ethnicity								
White, non Hispanic	194	(59.5)	132	(41.0)	149	(45.7)	177	(54.3)
Other	137	(48.1)	148	(51.9)	112	(39.3)	173	(60.7)
Unknown	10	(50.0)	10	(50.0)	9	(45.0)	11	(55.0)

[58] **Cells are suppressed if a cell has less than five individuals, including zero. Industries with less than five individuals both pre- and post-program are removed from the table. These industries and NAICS codes are: 11 Ag, Forestry, Fishing & Hunting; 21 Mining; 51 Information; 53 Real estate rental & leasing; 55 Management – companies & enterprises; and 81 Other services.

	12 months pre program				6 months post program			
	Employed (%)		Unknown (%)		Employed (%)		Unknown (%)	
Unique participants (N=631)	**341**	**(54.0)**	**290**	**(46.0)**	**270**	**(42.8)**	**361**	**(57.2)**
Marital status								
Married	82	(59.0)	57	(41.0)	57	(41.0)	82	(59.0)
Not married	242	(52.5)	219	(47.5)	197	(42.7)	264	(57.3)
Unknown	17	(54.8)	14	(45.2)	16	(51.6)	15	(48.4)
Education								
High school diploma or less	237	(52.7)	213	(47.3)	190	(44.2)	260	(57.8)
Associate degree or certification	68	(64.2)	38	(35.9)	48	(45.3)	58	(54.7)
Bachelor's or graduate degree	34	(50.0)	34	(50.0)	30	(44.1)	38	(55.9)
Unknown	2	(28.6)	5	(71.4)	2	(28.6)	5	(71.4)
First generation college student								
No	228	(54.2)	193	(45.8)	189	(42.3)	289	(57.7)
Yes	86	(52.1)	79	(47.9)	59	(33.2)	141	(66.8)
Unknown	27	(60.0)	18	(40.0)	22	(48.9)	23	(51.1)
Ex offender								
No	308	(54.9)	253	(45.1)	244	(43.5)	317	(56.5)
Yes	28	(50.9)	27	(49.1)	22	(40.0)	33	(60.0)
Unknown	5	(33.3)	10	(66.7)	4	(26.7)	11	(73.3)
Veteran								
No	330	(54.5)	276	(45.5)	260	(42.9)	346	(57.1)
Yes	8	(40.0)	12	(60.0)	8	(40.0)	12	(60.0)
Unknown	3	(60.0)	2	(40.0)	2	(40.0)	3	(60.0)

There are nearly no sociodemographic factors that improve the likelihood of participants finding employment within six months of last micro-credential completion (N = 665[59]). The model is *not* shown to be a reliable estimator of the odds of a finding employment (LR = 8.15; p-value = 0.7737). Only college students who are not first-generation are shown to be statistically significantly different from their peers, who are 49% more likely to be employed six months after completion (OR = 1.49; p-value = 0.0254).

Table 34: Likelihood of Finding Employment Within Six Months of Last Micro-Credential Completion

	Odds Ratio	95% Confidence Interval		p value
		Lower	Upper	
Age group				
17-29 (ref)	-	-	-	-
30-39	0.96	0.62	1.47	0.8374
40-49	1.14	0.71	1.83	0.5809
50-59	0.84	0.47	1.50	0.5574
60-74	0.95	0.39	2.36	0.9181
Race/Ethnicity				
Other (ref)	-	-	-	-
White, non Hispanic	0.94	0.67	1.31	0.6970
Sex				

[59] Among the 766 participant-pathway enrollees who completed at least one micro-credential, 101 are missing demographic data, leaving 665 of the original 766 for statistical analysis. A second (unreported) analysis confirms all findings are robust to the inclusion of "Unknown" categories for each variable with missing data.

	Odds Ratio	95% Confidence Interval		p value
		Lower	Upper	
Female (ref)	-	-	-	-
Male	0.95	0.67	1.36	0.7907
Marital status				
Not married (ref)	-	-	-	-
Married	0.82	0.55	1.24	0.3500
Education				
High school diploma or less (ref)	-	-	-	-
Associate degree or certification	1.08	0.70	1.67	0.7276
Bachelor's or graduate degree	1.03	0.59	1.80	0.9250
First generation college student				
Yes (ref)	-	-	-	-
No	1.49	1.05	2.13	0.0254
Ex offender				
Yes (ref)	-	-	-	-
No	1.21	0.68	2.18	0.5172
Veteran				
Yes (ref)	-	-	-	-
No	1.08	0.45	2.60	0.8723

Wage Gains or Losses

Of the 631 participants who completed at least one micro-credential, 348 were employed twelve months before enrolling in their first micro-credential. Three months after completing their final micro-credential, 328 were employed; after six months, 270 were employed. The mean quarterly wage for employed participants was $5,862.54 a year prior to enrollment. Three months after the latest micro-credential completed, this number had increased to $6,666.78 and was $6,573.55 six months post-program.

When calculating mean wage gains or losses, only students with both pre-program and post-program wages were included in the analyses at each post-program quarter (223 at three months post-program and 183 at six months post-program). The results of paired t-tests for micro-credential completers employed after exiting programs are presented.

The mean quarterly wage gain for the 223 participants three months after completion was $583.22. This increase is marginally statistically significant; the p-value of 0.0521 indicates that one would see a change in wages of this magnitude about five percent of the time, if it were in fact by random chance rather than an effect of the program. The mean quarterly wage gain for the 183 participants six months after completion was $801.50. This increase is highly statistically significant; the p-value of 0.0178 indicates that one would see a change in wages of this magnitude less than two percent of the time, if it were in fact by random chance rather than an effect of the program. In addition to the increase in wages, the standard deviation of wages also decreased from around $4,700 to $4,200. This indicates that the increase was accompanied by a steadying of wages.

Table 35: Wage Gains by Time

	N	Mean ($)	Standard Dev	Ave Wage Gain ($)	t	df	p value
Pre 12 months	341	$5,862.54	$4,666.32				

	N	Mean ($)	Standard Dev	Ave Wage Gain ($)	t	df	p value
Post 3 months	328	$6,666.78	$4,292.08	$583.22[a]	1.95	222	0.0521
Post 6 months	270	$6,573.55	$4,224.19	$801.50[b]	2.39	182	0.0178

[a] Post 3 months – Pre 12 months (N = 223)
[b] Post 6 months – Pre 12 months (N = 183)

Among the 766 participant-pathway enrollments for which at least one micro-credential was completed, 267 were employed three months after completion *as well as* one year prior to enrollment and 207 were employed six months post-program *as well as* one year prior to enrollment. These counts include multiple observations of the 223 and 183 unique participants reported in Table 33. While the average wage gains after three months were $479.66, participants in the Bucks partnership saw the largest wage increase – more than triple the average – at $1,639.63. By six months, those in the Bucks partnership were still nearly triple the $734.60 average, at $1946.40. In five of the seven partnerships, average wages continued to rise during the first half year post graduation, while average wages decreased for the Westmoreland and Northampton/Lehigh partnerships. This could be further evidence of continued economic hardships affecting the workforces in these regions in general.

Wage gains increased generally with an increase in the number of micro-credentials completed, indicating the relationship may be linear between micro-credentials and wage gains irrespective of pathway.

Table 36: Mean Quarterly Wage Changes by Partnership

	Mean Quarterly Wage Changes	
	3 months post N = 267	6 months post N = 207
All Participant Pathways	$ 479.66	$ 734.60
Partnership		
Allegheny	$ 669.26	$1,065.59
Bucks	$1,639.63	$1,946.40
Delaware	-$ 272.00	$2,027.40
Montgomery	-$ 159.37	$ 344.06
Northampton/Lehigh	-$1,480.57	-$1,993.00
Philadelphia	$ 243.09	$ 725.62
Westmoreland	$ 597.28	-$ 319.77
Micro credentials completed		
1-2	$ 386.34	-$ 241.05
3-7	$ 90.35	$ 390.25
8-12	$ 830.82	$1,715.28

For the remaining demographic data, the table reports counts and percentages out of the 223 (183) participants from Table 34 employed one year before as well as three (six) months after their respective programs.

Individuals employed in the public administration field had the largest post-program wage changes on average, with a mean increase of $4,474 at six months post-program. Three other industries had above-average wage gains which included manufacturing, wholesale trade, transportation warehousing, and professional, scientific, & technical services. Industries with average wage losses were admin & support for waste management, health care & social assistance, and accommodation & food services.

Wage gains appeared to decrease with age of the participant, with those 50 and older experiencing a loss, on average. Males experienced much larger wage gains than females, and White, non-Hispanic participants experienced larger wage gains than their minority peers. Those who were unmarried also experienced larger wage gains, as did first generation students and those with less education. Ex-offenders and non-veterans also saw larger wage gains. This suggests that the programs helped some of the demographics most in need of economic opportunities (young aged individuals, ex-offenders, first generation students), but those in better economic positions (White Males) also did well.

Table 37: Mean Quarterly Wage Changes by Factor

	Mean Quarterly Wage Changes	
	3 months post N = 223	6 months post N = 183
Unique participants	**$ 583.22**	**$ 801.47**
Post industry code[60]		
31-33 Manufacturing	$2,270.28	$2,325.65
42 Wholesale trade	**	$1,952.40
44-45 Retail trade	$ 15.24	$ 460.47
48-49 Transportation warehousing	-$ 590.10	$2,521.34
54 Prof, scientific, & tech services	-$ 121.33	$2,248.73
56 Admin & support waste mgmt	-$1,339.64	-$ 957.68
61 Educational services	$ 999.57	$ 414.20
62 Health care & social assistance	$ 281.23	-$ 80.92
72 Accommodation & food services	-$ 78.43	-$ 930.88
92 Public administration	$2,006.00	$4,474.20
Age group		
17-29	$1,501.68	$1,819.66
30-39	$1,101.91	$1,294.83
40-49	$ 617.95	$ 137.05
50-59	-$ 971.35	-$1,000.73
60-74	-$2,075.09	-$1,777.33
Unknown	-$ 825.00	N/A
Sex		
Female	$ 37.43	$ 222.32
Male	$1,051.69	$1,241.40
Race/Ethnicity		
White, non Hispanic	$ 653.57	$ 792.77
Other	$ 431.36	$ 717.06
Unknown	$1,261.00	$1,890.83

[60] Cells are suppressed if a cell has less than five individuals, including zero. Industries with less than 5 individuals are removed from the table. These industries and NAICS codes are: 11 Ag, Forestry, Fishing & Hunting; 21 Mining; 23 Utilities; 51 Information; 52 Finance and insurance; 53 Real estate rental & leasing; 55 Management – companies & enterprises; 71 Arts, entertainment, and recreation; and 81 Other services.

	Mean Quarterly Wage Changes	
	3 months post N = 223	6 months post N = 183
Unique participants	$ 583.22	$ 801.47
Marital status		
Married	$ 25.85	$ 110.87
Not married	$ 805.96	$1,052.62
Unknown	$ 225.62	$ 283.25
Education		
High school diploma or less	$ 951.41	$1,122.40
Associate degree or certification	$ 381.79	$ 438.84
Bachelor's or graduate degree	-$1,230.44	-$ 459.00
Unknown	$ 164.00	-$ 5.00
First generation college student		
No	$ 657.21	$ 732.39
Yes	$ 780.79	$1,013.15
Unknown	-$ 616.44	$ 807.73
Ex offender		
No	$ 511.16	$ 666.22
Yes	$1,609.50	$2,482.07
Unknown	-$1,339.50	-$ 5.00
Veteran		
No	$ 654.18	$ 825.29
Yes	-$1,713.00	$ 119.60
Unknown	-$1,339.50	-$ 5.00

The Evaluation Team conducted a regression to determine if there are any sociodemographic factors that improve the mean wages earned at jobs six months after last micro-credential completion (N = 236[61]). The baseline enrollee is a 17-29-year-old minority Male who has a high school education at most. He is unmarried and is neither a first generation student, an ex-offender, nor a veteran. His estimated wages are $5,183.30 per quarter six months after completing his program.

The results of the age group estimates indicate that, holding all his other demographics equal, he would likely earn more money if he were older. Those that fit his description but are in their 30s are expected to make an additional $1,366.16 per quarter (p-value = 0.04), increasing to an additional $1,903.75 for those in their 50s (p-value = 0.03). Furthermore, White, non-Hispanics are expected to earn an additional $987.58 over their minority counterparts (p-value = 0.07). Females are expected to earn $1,948.11 less, on average, than their male counterparts at the six-month mark post-program (p-value 0.0007). Married enrollees make an average of $1,793.19 more than the unmarried at the six-month mark (p-value = 0.005), and those with at least a bachelor's degree make an average of $3,281.19 more than those with only a high school diploma or less (p-value = 0.0001). First generation student status, ex offender status, and veteran status do not appear to significantly impact expected earnings. Because these are raw wages rather than wage gains, we cannot attribute the difference in wages to participation in the program; rather, these

[61] The 236 observations are obtained by taking one wage from each of the 270 students who completed at least one micro-credential and were employed six months after exiting their program, minus the 34 missing demographic data. A second (unreported) analysis confirms all findings are robust to the inclusion of "Unknown" categories for each variable with missing data.

significances reveal the current average wages in the environments in which participants find work after graduating.

Table 38: Factors that Improve Mean Wages Earned at Jobs Six Months after Last Micro-Credential Completion

Intercept	Estimated Wages	t	p value
	$5,183.30	8.84	
Age group			
17-29 (ref)	-	-	-
30-39	$1,366.16	2.06	0.0404
40-49	$1,552.32	2.31	0.0215
50-59	$1,903.75	2.17	0.0306
60-74	$ 15.53	0.01	0.9911
Race/Ethnicity			
Other (ref)	-	-	-
White, non Hispanic	$ 987.58	1.79	0.0746
Sex			
Male (ref)	-	-	-
Female	-$1,948.11	-3.44	0.0007
Marital status			
Not married (ref)	-	-	-
Married	$1,793.19	2.83	0.0050
Education			
High school diploma or less (ref)	-	-	-
Associate degree or certification	$ 183.93	0.29	0.7743
Bachelor's or graduate degree	$3,281.19	3.93	0.0001
First generation college student			
No (ref)	-	-	-
Yes	$ 323.22	0.58	0.5591
Ex offender			
No (ref)	-	-	-
Yes	-$ 139.91	-0.15	0.8789
Veteran			
No (ref)	-	-	-
Yes	$1,152.88	0.86	0.3908

A further investigation into the impact of these factors on actual wage *gains* reveals that the program appears to be equally effective for all demographics. The average wage gain of $1,924.77 is not altered at a statistically significant level by age race, sex, marital status, education, or status as a first generation college student, ex-offender, or veteran. However, the wage gains taken in tandem with other results seen throughout the analyses seem to suggest that the program benefited students under 40 more than those 40 and over; while older workers still out-earned younger workers, the younger workers may have closed the wage gap a bit. These findings together also suggest that the wage gap between white, non-Hispanics and minorities widened, as did the wage gap between males and females. The wage gap appears to have been narrowed based on marital status and education. Reducing the wage gap for younger employees and those with less prior education, while not statistically significant, are nevertheless encouraging.

Table 39: Impact of Factors on Actual Wage Gains

Intercept	Estimated Gains	t	p value
	$1,924.77	2.20	
Age group			
17-29 (ref)	-	-	-
30-39	$ 568.68	0.58	0.5653
40-49	-$1,040.86	-1.16	0.2478
50-59	-$1,743.31	-1.56	0.1199
60-74	-$2,917.52	-1.80	0.0741
Race/Ethnicity			
Other (ref)	-	-	-
White, non Hispanic	$ 107.10	0.13	0.8934
Sex			
Male (ref)	-	-	-
Female	-$ 536.52	-0.67	0.5059
Marital status			
Not married (ref)	-	-	-
Married	-$ 401.78	-0.46	0.6469
Education			
High school diploma or less (ref)	-	-	-
Associate degree or certification	-$ 447.55	-0.54	0.5919
Bachelor's or graduate degree	-$1,581.01	-1.34	0.1835
First generation college student			
No (ref)	-	-	-
Yes	$ 29.86	0.04	0.9692
Ex offender			
No (ref)	-	-	-
Yes	$ 910.70	0.71	0.4789
Veteran			
No (ref)	-	-	-
Yes	-$2,994.69	-1.60	0.1121

CONCLUSIONS

The outcomes with predictive analysis study demonstrated positive wage and employment outcomes for micro-credential participants; though, it is important to note that due to the study design, these results cannot be directly attributed to the program as the study does not allow for claims of causality. Overall, the majority of participants were able to complete at least one micro-credential in each pathway in which they enrolled, and many participants persisted to complete more than one micro-credential. Of the 848 participant-pathway enrollments,[62] more than two-thirds completed the pathway in which they enrolled. Although grant staff reported that participant retention was a challenge, more than two-thirds of participants at four of the seven partnerships completed the pathway in which they enrolled, and only one partnership had less than half of participants complete the pathway.

[62] If a student enrolled in multiple pathways, they were counted as an enrollment for each pathway in which they enrolled. Of the 685 participants, 554 (80.1%) enrolled in one pathway, 99 (14.5%) enrolled in two, and 32 (4.7%) enrolled in three.

The goal of *Micro-credentials: Opportunity through Stackable Achievements* was to provide short-term training in high-demand industries to participants with barriers. Statistical analyses demonstrated that White, non-Hispanic individuals were significantly more likely to complete their pathway compared to minority students. However, other factors such as education, first generation college student, ex-offender, and veteran status were not significant predictors of pathway completion. The data further show that ex-offenders were significantly less likely to persist to the second micro-credential in the pathway, which could suggest that when participants were able to persist to the second micro-credential, they were just as likely as their peers to complete the entire pathway.

Six months after participants exited the program (either through pathway completion or exiting in the middle of the pathway), participants were less likely to be employed than they were twelve months prior to program enrollment. Decreases in pre- to post-program employment were present for all groups of students and there were no sociodemographic factors that improved the likelihood of participants finding employment. Slightly more than one-tenth of participants had a positive change in employment from pre- to post-program (i.e., from unknown to employed), and the majority of participants had no change in their employment status. Participants were less likely to be employed in the food service and retail industries post-program compared to pre-program and were more likely to be employed in the manufacturing field. As noted in the Limitations section, post-program employment and wage data are not complete due to delays in data availability and future research could examine participant outcomes once employment data are fully entered in the UI system.

While employment rates decreased, participants who were employed both pre- and post-program had highly significant quarterly wage gains post-program, both at three- and six-months post-program. On average, participants had an increase of $801.50 in quarterly wages. Additionally, six months after program exit wage gains increased as the number of micro-credentials increased. While the various sociodemographic groups have significantly different post-program wages, there are no significant differences in wage gains across the groups. This suggests that while overall earnings varied by group, sociodemographic factors did not influence the amount of change in post-program wages, demonstrating that the micro-credential model can be beneficial for a variety of students in a variety of settings, regardless of prior education, age, or other factors. Additionally, there were wage gains for participants in most industries, including four industries with above-average wage gains (public administration, manufacturing, wholesale trade, transportation warehousing, and professional, scientific, & technical services).

Overall, the micro-credential model appears to facilitate student success in program persistence, completion, and wage increases. While overall employment rates decreased from pre- to post-program, the design examined only 12-months pre-program employment status and due to the design of the initiative, participants could have had different employment statuses upon enrollment compared to a year prior to enrollment.

Limitations

Limitations for the outcome evaluation included the following elements:

Non-attributable results. The first major limitation, inherent in a one-group pretest-posttest outcomes study design, is that any results observed cannot be attributed to the intervention. Alternative explanations for observed results cannot be ruled out with this study design, and it is possible a control group would have experienced the same outcomes. The single group study faced several different types of threats,

though historical and maturation threats would be the most likely case for this initiative. However, the results of the study can still be useful for program administrators and contribute to the evidence base for higher education interventions for low-skill populations with barriers to employment. In the absence of access to data for a comparison group that is relatively similar to the participants, this design offers the most flexibility and can produce valid results, even if causality cannot be attributed.

Historical effects. Historical effects occur when some alternative event or innovation happens concurrently with program implementation. This event might have had some influence on the outcome variables, though the change is incorrectly attributed to the intervention. This is of particular concern because of the variability and influence that greater economic conditions have on the outcome of interest (i.e., wages). The availability of job changes over time; what may look like a program impact (or absence of one) could be entirely or partly the result of changing conditions outside the micro-credential programs. Since there was no external comparison group that was experiencing the counterfactual condition at the same time, the Evaluation Team cannot rule out the possibility that historical effects were influencing the outcomes of interest.

Data reporting timeline. Available data on employment and wage gain outcomes may not fully capture all outcomes. Generally, state UI data is lagged at least several months. The delay in the Commonwealth receiving this data from employers, and transferring it to the Evaluation Team, means that participants that completed the programs during Q3 or Q4 2018 might not have complete post-program data. During the evaluation design phase, the Evaluation Team anticipated that programming would be offered until the end of the grant period (i.e., through September 2019) and this would result in the exclusion of participants from analyses related to wage and employment changes. While programming ended in December 2018, data availability was still a limitation of the study.

Data availability. In addition to the limitations related to the reporting timeline for wage and employment data, there were limitations related to the wage data. For wage data, wages were only available as summative calendar quarter wages, rather than for a specific month of the year. Therefore, changes in wages could have been minimized or magnified as data for pre- and post-program were for the calendar quarter that was a year prior to enrollment and six months following latest micro-credential completion.

Selection bias. Selection bias is common in any form of design that does not involve random sampling or random assignment. Selection bias in the enrollment process could have distorted inferences to the larger population.[63] Any time an evaluator does not randomly assign individuals, one runs the risk of systematic differences between groups due to selection bias. Thus, the Evaluation Team can only make inferences from this sample to the larger population that would have similar demographics, experiences, skills, and motivations to the participants in this study.

Duplicated Counts. In some cases, the results reported the same individual multiple times. Although this presented the possibility that results were skewed by multiple responses from the same individual, this was minimized as much as possible by including only one observation per participant wherever pathway-level outcomes were not required. In the case of pathway-level outcomes, some observations were repeated twice or three times, but these represented a small portion of the overall observations and hence were not likely to significantly inflate test statistics. The models were complex enough and the sample sizes small

[63] Gertler, P.J., Martinez, S. Premand, P., Rawlings, L.B. & Vermeersch, C.M.J. (2011). *Impact Evaluation in Practice*. Washington DC: The International Bank for Reconstruction and Development/ The World Bank.

enough such that controlling for repeated measures for 685 individuals was not feasible if tests were to converge.

Statistical models proposed. Lastly, there were limitations in the statistical models proposed. Many factors may have affected statistical results, and so the Evaluation Team strongly encourages exercising caution when drawing conclusions from the results of statistical analyses. Precise limitations may vary by study, design, and method, but general advice for interpreting statistical results is that the results should only be seen as evidence toward the existence of a particular phenomenon, and should not be concluded to be factual, but rather probabilistic under the modeling assumptions.

COST EVALUATION

COST EVALUATION

INTRODUCTION

Purpose and Background

Different types of cost analyses have increasingly been integrated into program evaluations to help investors (e.g., the government or private funders) understand the true costs of the services provided and in some forms of analysis, the individual and societal benefits accrued because of these investments. The results can be used to inform policy decisions about the types of programs and strategies to prioritize. For human service programs, there are four main types of cost analyses used.[64] For the *Micro-credentials: Opportunity for Stackable Achievements* evaluation, investment cost analysis, cost allocation analysis, and a basic form of cost effectiveness analysis were applied.

(1) **Investment Cost Analysis:** This type of cost analysis involves calculating all the expenses required to implement and operate a given program. Investment cost analyses are known as the most basic form of analysis and serve as the foundation for other types of analyses. One important principle for this foundational analysis is that costs include all resources used, not just money spent.[65] That is, not all program costs are reflected in direct expenditures. For instance, most programs require resources such as space and facilities, staff support, supplies and materials, and participant contributions that are not directly purchased. Organizations implementing programs also often receive contributions from external partners. This creates an opportunity cost for society since resources could be used in other ways. For example, a business that dedicates employee time to a project could have used that resource for revenue-producing activities, or a business that donates equipment to a program could have sold it for fair market value. Investment cost analyses develop methods for quantifying the value of resources used for the program, outside of direct expenditures.

(2) **Cost Allocation Analysis:** Cost allocation analyses can determine the cost of a program or initiative per participant or per outcome. These analyses can also estimate expenses for different components of programs and look at all resources invested in a program (direct monetary resources) as well as the value of matching and in-kind contributions.

(3) **Cost Effectiveness Analysis:** Cost effectiveness analyses compare the costs and outcomes of two or more programs and can be used to determine the best use of resources by comparing the cost per outcome achieved. This type of analysis does not quantify the benefits of outcomes achieved, and therefore, cannot provide indication of whether the benefits of the program exceeded the amount of investment.

(4) **Cost Benefit Analysis:** The most sophisticated type of cost analysis – cost benefit analyses – are used to compare the economic value of programs. This analysis puts a dollar value both on the investment into the program and the outcomes achieved. This type of analysis ***does*** quantify the benefits of outcomes achieved and is most useful to policymakers and the public in determining

[64] The Four Types of Cost Analysis Used in Human Service Programs. http://www.homevisitcosts.com/what-is-cost-analysis.php. Accessed October 2018.

[65] Calculating the Costs of Child Welfare Services Workgroup (2013). *Cost analysis in program evaluation: A guide for child welfare researchers and human service providers.* Washington, DC: Children's Bureau, Administration for Children and Families, U.S. Department of Health and Human Services.

the value of programs (i.e., whether the benefits of the program exceed the amount of investment).

The purpose of this component of the evaluation is to help the U.S. Department of Labor (USDOL) and other stakeholders understand the extent of the Department's investment into the initiative as well as the value of the contributions of the grant recipients and partners. The cost evaluation also provides the cost of the initiative by participant and by certain key outcome measures (i.e., micro-credential completion, persistence in a micro-credential pathway, completion of a micro-credential completion pathway, continuation to a credit academic program, and post-completion employment status).

DESIGN SUMMARY

For the initiative's evaluation, investment cost analysis, cost allocation analysis, and a basic form of cost effectiveness analysis methods were applied. Costs included are discussed at length in the following sections, and include direct grant expenditures, matching costs for all implementation partners, and the value of in-kind contributions from external partners. Grant expenditures cost categories include personnel costs, fringe, equipment and supplies, participant support, travel, and contractual costs. The value of participants' time is not considered a cost in the context of this analysis. The partnerships did not include overhead or indirect cost rates in their grant budgets; therefore, the value of what these costs would have been if charged directly are accounted for in a methodology described in the Valuation Methods for Matching and In-Kind Contributions section.

Cost data was captured from the entire implementation period of the project for the period when expenditures were incurred and contributions were made (October 1, 2015-December 31, 2018). Outcomes data, including completion of micro-credentials, program retention, continuation to credit academic programs, and post-micro-credential completion employment are measured in the same program implementation timeline. Lag inherent in administrative employment and higher education outcome data sources may underestimate certain outcomes. See the discussion in the Limitations section.

Some matching and in-kind contribution data are missing for the Philadelphia partnership (see the Limitations section for more details), which could lead to underestimates in the total resources invested in that program.

Research Questions

The research questions for the cost study are:

(1) What is the cost of the overall initiative and the cost of individual partnerships' programs per participant?
(2) What is the cost of the overall initiative and the individual partnerships' programs per successful outcome (including micro-credential completion, persistence in a micro-credential pathway, completion of a micro-credential pathway, continuation to a credit academic program, and post-micro-credential completion employment?)
(3) How did the overall cost per participant and costs per outcome of the programs vary between the partnerships?

METHODOLOGY

Investment Cost Analysis

The task of determining the comprehensive value of resources invested into programs like *Micro-credentials: Opportunity for Stackable Achievements* is complex, because not all program costs are reflected simply by looking at financial reports for the grants that fund them. When sound accounting practices are employed to track expenses and the categories under which they are classified (e.g., staff salaries and wages, staff fringe benefits, supplies and equipment, training costs, supportive services costs, and contract costs), it is relatively straightforward to understand the dollar value of direct grant expenditures on these items. Over the course of program implementation, however, the recipient institutions and their partners typically incur costs that are not reflected in accounting or grant expenditure reports. These costs fall into two categories: matching costs and in-kind costs. The key difference between matching and in-kind contributions are the source from which they originate. These two types of costs are described in greater detail below.

Matching and In-Kind Costs

- Matching costs are the costs that the institution or agency receiving federal funds has agreed to pay or ends up paying because these costs are not accounted for specifically in grant budgets.[66] These costs tend to include office space for grant staff, utility and operational costs, and time administrators and finance staff dedicated to program oversight and management.

When institutions receiving federal funds include an indirect, or fiscal and administrative (F&A), rate calculation in grant program budgets, this is intended to help them recoup some of these matching costs. The indirect, or F&A, rate varies by recipient institution and is determined through an agreement between the institution receiving funds and a federal agency.

F&A costs are defined in federal code as: "Costs that are incurred for common or joint objectives and therefore cannot be identified readily and specifically with a particular sponsored project, an instructional activity, or any other institutional activity."[67] F&A rates are determined between federal agencies and recipient organizations periodically using a variety of documentation. Typically, the direct cost basis for the F&A rate calculation is a percentage of total salaries in the grant budget.

Examples of the types of costs F&A rates are intended to account for in grant budgets include:

- Depreciation and interest costs associated with the institution's physical facilities;
- Operating and maintenance costs such as utilities, security, and custodial costs; and
- Functions common and essential to multiple programs, such as organizational administration, payroll, purchasing, and accounting services.

None of the recipient partnerships involved in the initiative (the community colleges nor the WDBs) included an F&A rate in their program budgets. Therefore, the costs that F&A rates were intended to account for in grant budgets—including office space for grant-related staff, operations and maintenance costs of facilities, utilities, and administrative and fiscal support for the program—are not reflected in

[66] CFR §200.29. Title II, Subtitle A, Chapter II, Part 200 Subpart A, http://www.ecfr.gov/cgi- bin/retrieveECFR?gp=&SID=479f19eda63c916a950646200c1cc7d7&mc=true&r=SECTION&n=se2.1.200_1403
[67] CFR §200.420. Title II, Subtitle A, Chapter II, Part 200, Subpart E, https://www.ecfr.gov/cgi-bin/text-idx?SID=2745768de5e9e933c1f6d2a722e0c734&mc=true&node=sg2.1.200_1419.sg16&rgn=div7

partnerships' grant expenditure reports. Some partners, particularly the community colleges, also utilized a significant amount of space for program classes and lab instruction without accounting for the costs of that space in the grant budget. The Valuation Methods for Matching and In-Kind Contributions includes an explanation of the preliminary methodology used to assign a value to partnerships' matching and in-kind contributions to the program.

Some of the initiative's partnerships relied on external partners to make significant contributions to the program.

- Third-party in-kind contributions are the value of non-cash contributions (e.g., property or services) that (a) benefit a federally-assisted project or program; and (b) are contributed by non-federal third parties, without charge, to a non-federal entity under a federal award,"[68] according to federal code.

In the case of this initiative, most partnerships designed their interventions around significant employer and business partner support for curriculum development and review, exposing participants to career opportunities, and recruitment. This support may come in the form of donated time, space, and materials. The Valuation Methods for Matching and In-Kind Contributions section includes an explanation of the methodology used to assign dollar values to partnerships' matching and in-kind contributions to the program.

Valuation Methods for Resources Invested (Program Costs)

Data Sources and Collection

Three primary data sources were used to capture inputs necessary to determine the total resources invested in the initiative at the partnership and aggregate levels: Department financial reports; partnerships' fiscal agent (WDB) reports that separated salary and fringe expenditures by fiscal year; and data collection questionnaires from the community colleges, completed on an annual basis, that were designed to capture additional matching and in-kind contributions to the program. These data sources are described in greater detail below:

PA Department Financial Reports

To track monthly grant expenditures by partnership and provide a further breakdown by community college and WDB, the Department provided an Accrued Expenditure report. This report highlights more detailed data from Financial Status Reports (FSRs), which are submitted by the partnership fiscal agents on behalf of both the community college and WDB on a quarterly basis. These reports provided data on monthly and cumulative expenditures in both the administrative and program categories for all members of the partnership—the community colleges, the WDB, and the Department. The Department also provided all quarterly FSRs, which broke down partners' quarterly expenditures into more detailed line items, including program salaries and fringe under the program category.

Partnership Fiscal Agent Reports

The fiscal agents for the partnerships—in most cases, the WDBs—provided separate accounting reports that specified the salary and fringe expenditures for both the colleges and WDBs by fiscal year. The WDBs also provided their fringe and indirect rates to help determine a valuation of contributions that were typically covered by F&A rates in grant-funded programs. Several WDB's reported that they did cost

[68] CFR §200.96. Title II, Subtitle A, Chapter II, Part 200 Subpart A, http://www.ecfr.gov/cgi-bin/text- idx?SID=8d44616d4292598f3b75c696d046754a&mc=true&node=se2.1.200_196&rgn=div8

allocation for grants and did not have a negotiated indirect rate with a federal agency. In these cases, an average of the other WDB's reported indirect rates was used to approximate the value of matching contributions to the program (see section below).

Data Collection Questionnaires

To collect inputs necessary for the calculations to quantify the value of matching and in-kind contributions, the Evaluation Team administered data collection questionnaires for the community colleges to complete on an annual basis, covering federal fiscal years 2016, 2017, and 2018. See Appendix G for this questionnaire. However, there were limitations to using this self-reported data to determine the value of matching and in-kind contributions, including human error in reporting certain inputs and non-standardized methods of using the questionnaire format. Additionally, one community college declined to use the reporting format, and another community college used an alternative valuation method for the space used for program classes.

The WDBs were not asked to complete these questionnaires as their roles in the programs were primarily administrative or recruitment-related in nature. Therefore, the value of their matching contributions is estimated using their F&A rates multiplied by total salaries by fiscal year to capture costs F&A were typically intended to cover. The WDBs did not conduct training as a part of this program at their facilities, and in-kind contributions were received primarily at the college, where training and most participant interaction took place for most partnerships.

Valuation Methods

Grant Expenditures

The Department-provided Accrued Expenditure reports highlighted data on monthly expenditures in administrative and program categories for all organizations involved in the project—the Department, the community colleges, and the WDBs. This monthly expenditure data was aggregated to produce overall expenditure totals and expenditure totals by fiscal year.

Matching Contributions

Three sub-categories of possible matching contributions were identified for this analysis:

(1) **Estimate of Costs Typically Covered by F&A Rates.** Because none of the community colleges or WDBs included indirect costs in their grant budgets, this calculation was intended to account for the value of program staff's office space; operating and maintenance costs such as utilities, security, and custodial costs; depreciation and interest rates of facilities; and reasonable administrative and finance functions dedicated to supporting the programs. Partnership fiscal agent reports were used to isolate salary and fringe expenses from total program expenses.

The calculation to value the cost incurred by the partnerships typically covered by F&A rates required three pieces of data: annual salary and fringe costs, fringe rates (to determine the share of the costs that were salary – the figure that generally serves as the basis of the indirect cost calculation), and indirect rates. In three instances,[69] the WDBs reported that they did not have a negotiated indirect cost rate with a federal agency and did cost allocation for grants. In these cases, the average of the other indirect costs rates reported by the other WDBs was used as a proxy.

[69] The three WDB's that reported no indirect rate were the Bucks, Northampton/Lehigh, and Westmoreland partnerships.

The calculation process to determine the value of costs covered by F&A rates is as follows:

a) **Determine the share of salary vs. fringe reported by fiscal year:** [Total Grant Salary and Fringe Costs by Fiscal Year] / (1+Fringe Rate) = Total Grant Salaries by Fiscal Year
b) **Determine an approximate value of matching contribution typically covered by F&A rates:** [Total Grant Salaries by Fiscal Year] x [Negotiated F&A rate] = Estimate of Value of Costs Covered by F&A Rates

(2) **Value of Non-Grant Administrator and Fiscal Staff Time (Over 15% Annually) and Faculty or Clerical Staff Time.** Most of the value of time non-grant-compensated administrators and fiscal staff contributed to the initiative was accounted for under the F&A rate. However, if the colleges indicated that administrators or fiscal staff spent over 15% of their time in a given fiscal year working on the program, this was classified as a contribution over and above what would be customary and intended to be covered by the F&A rate; therefore, the percentage of time that exceeded 15% was accounted for separately in this subcategory. Faculty and clerical staff time spent supporting the program was generally not accounted for in an F&A rate, so if the colleges reported that these positions that were not covered under grant salaries and dedicated time to program development and support, the value of that time was included separately as well. The calculations used to assign valuation are:

- Non-Grant Administrator or Fiscal Staff Time Valuation by Fiscal Year Calculation

[Total Percentage of Time Spent on Program-15%] x [(Annual Salary) + (Annual Salary x Fringe Rate) + (Annual Salary x F&A Rate)] = Value of Contributed Time

- Non-Grant Faculty or Clerical Staff Time Valuation by Fiscal Year Calculation

[Total Percentage of Time Spent on Program] x [(Annual Salary) + (Annual Salary x Fringe Rate) + (Annual Salary x F&A Rate)] = Value of Contributed Time

(3) **Value of College Facility Classroom or Lab Space.** The value of the space used for the initiative was not accounted for in grant expenditures or the other matching cost subcategories and was considered separately. The theory behind the valuation of the space used to implement the training for the programs was that there was an opportunity cost associated with space usage—that is, the institution could have used the space for other internal activities or allowed external entities to use it for a fee. Colleges were asked to report an estimated rate of what they would charge external partners to rent the space used for training on an hourly or daily basis, and how many hours or days it was used for training. The calculation used to assign valuation is:

- Training Space Valuation by Fiscal Year Calculation

[Estimate of hourly or daily rental rate] x [Total number of hours/days space used for training] = Value of Contributed Space

One college chose a different methodology for reporting the value of space. The calculation used to assign valuation of classroom space for the Montgomery partnership project is:

- Alternative Training Space Valuation by Fiscal Year Calculation

[Total grant expenditures] x [F&A rate] = Value of Classroom Space

In-Kind Contributions

Three sub-categories of possible in-kind contributions were identified for this analysis:

(1) **Business/Employer Partner Time.** Business and employer partners contributed significantly to many of the partnerships' programs through curriculum development, working with participants on employability skills, exposing participants to job opportunities, and hiring activities. The colleges were asked to report on the number of hours business and employer partners contributed to these program activities each fiscal year. To capture the value of the time these contributed each fiscal year, an hourly estimated rate of $73.21 was used. This rate was determined by averaging hourly wage data for different management occupations in the state of Pennsylvania in 2016.[70] This average wage figure was then increased by 25% to account for the cost of fringe benefits. While this hourly rate will have varying degrees of accuracy for all the individuals/job titles that contributed time to the programs, it is a reasonable estimate. The calculation is as follows:

- Valuation of Business/Employer Partner Time by Fiscal Year Calculation

[Total Hours Contributed by Business/Employer Partners] x [$73.21] = Value of Contributed Time

(2) **Value of Supply or Equipment Donations.** The Evaluation Team anticipated that some business and employer partners might contribute supplies or instructional equipment to the colleges to use in training. Colleges were asked to report on any supplies or equipment donated each fiscal year and obtain an estimated fair market value from the donor. (No contributions were reported in this category.)

(3) **Value of Business Partner Facility Space.** The Evaluation Team anticipated that some business and employer partners might allow participants to use their facility space such as manufacturing bays, to the colleges to use in training. Colleges were asked to report on any space business and employer partners may have contributed over the fiscal year, the number of hours participants used the space, and obtain an estimate of an hourly rental rate from the business. (No contributions were reported in this category.)

Cost Allocation Analysis and Cost Per Outcome Analysis

The cost allocation and cost per outcome analyses quantifies the number of participants served and the cost per outcome relative to the value of the inputs and resources used to implement the initiative. Two general concepts were addressed via these analyses—the total costs of the program itself that are associated with a given participant (the allocation) and the costs of the program that are associated with a successful event (the outcome). In addition to the overall program, the analyses are used to identify allocation and outcome differences among the participating institutions. However, these findings should be interpreted with caution due to the limitations of the data collection methods for valuation of matching and in-kind contributions to the program. Total costs were calculated for each of the seven implementation sites over the course of the project and disaggregated to average cost per participant and successful outcome (cost per micro-credential earned, employed participant, etc.).

[70] Source: Emsi (Economic Modeling Specialists International). Data pulled in 2017.

Data Sources and Collection

The Valuation Methods for Resources Invested (Program Costs) section includes a more detailed discussion of how information was collected to determine the value of the resources invested in each of the programs for the final analysis. Three primary data sources were used to capture inputs necessary to determine the total resources invested in the program at the partnership and aggregate levels: Department financial reports; partnerships' fiscal agent (WDB) reports that separated salary and fringe expenditures by fiscal year; and data collection questionnaires from the community colleges, completed on an annual basis, that were designed to capture the value of additional matching and in-kind contributions to the program.

The Evaluation Team tracked participant numbers and outcomes across all partnerships using data reported by the colleges, the Department's Unemployment Insurance database, and the National Student Clearinghouse. More details about the mechanics of that data collection can be found in the Outcomes Evaluation section.

Analysis Methods

Cost Allocation

The total costs were compared to the number of participants to calculate the aggregate Cost Allocation metric, as follows. This calculation was applied to each partnership's program and the overall initiative. Department administrative costs were evenly split across all partnership programs.

- Overall Project Cost Allocation Calculation

[Overall Cost Allocation] = {[Total Grant Expenditures] + [Total Value of Matching Contributions] + [Total Value of In-Kind Contributions] + [Total Department Costs]} / [Total Participants Number]

- Partnership Program Cost Allocation Calculation

[Partnership Program Cost Allocation] = {[Total Partnership Grant Expenditures] + [Total Partnership Value of Matching Contributions] + [Total Partnership Value of In-Kind Contributions] + [Total Department Costs/7]} / [Total Partnership Participants Number]

Cost Per Outcome

The cost per outcome analysis separates the raw number of program participants from the number of successful program outcomes. In the most basic sense, a successful outcome was associated with successfully completed micro-credentials. Additional outcomes considered included: persistence in a micro-credential pathway, completion of a micro-credential pathway, continuation to a credit academic program, and post-micro-credential completion employment. This calculation was applied to each partnership's program and the overall initiative. Department administrative costs were evenly split across all partnership programs.[71]

- Overall Project Cost Per Outcome Calculation

[Cost Per Outcome] = {[Total Grant Expenditures] + [Total Value of Matching Contributions] + [Total Value of In-Kind Contributions] + [Total Department Costs]} / [Total Successful Outcomes]

[71] Results of the cost per outcome analysis are not presented in this annual report but will be presented in the final report.

- Partnership Program Cost Allocation Calculation

[Partnership Program Cost Allocation] = {[Total Partnership Grant Expenditures] + [Total Partnership Value of Matching Contributions] + [Total Partnership Value of In-Kind Contributions] + [Total Department Costs/7]} / [Total Successful Outcomes]

Limitations

There are two major limitations to these methods of assigning dollar value to matching and in-kind contributions, and therefore, the investment cost analysis. Limitations of the administrative data sources used in the outcomes study have implications for the results of the cost study. Finally, the inherent limitation of the cost allocation and cost per outcome study is discussed.

Self-Reported Contribution Data

While direct expenditures on salary and fringe used to estimate the value of some matching contributions to the programs originated from administrative accounting sources at the level of the Department or the programs' fiscal agent, the remainder of the data inputs used to calculate the value of matching and in-kind contributions were self-reported. Even though the partnerships received guidance on what should be considered a matching or in-kind contribution and how to collect the inputs, it is likely that contributions were over- or under-estimated in some cases due to human error. Overestimation of the value matching and in-kind contributions inflates the cost of the program and, therefore, the final cost per participant and cost per outcome. Conversely, underestimation of matching and in-kind contributions deflates the cost of the program and, therefore, the final cost per participant and cost per outcome.

Missing Contribution Data

The Philadelphia partnership chose not to use the reporting format for additional matching and in-kind contributions for any fiscal years provided by the Evaluation Team; therefore, that data is missing. Furthermore, some WDB entities reported that they used cost allocation methods for grant budgets and did not have a negotiated indirect rate; therefore, for the valuation of matching costs calculation, an average of the other WDB's indirect rates was used as a proxy.

Outcomes Data Limitations and Cost Study Implications

Limitations inherent in the outcomes data sources, particularly with administrative sources used to ascertain participants' employment status pre- and post-program and continuation to higher education programs, may over- or under-estimate outcomes observed. This, in turn, can cause bias in the cost study. If outcomes are over-estimated due to data source limitations, the cost per outcome calculation is artificially deflated; conversely, if outcomes are under-estimated, the cost per outcome is artificially inflated.

Specifically, state Unemployment Insurance data (used as the source for outcome data on pre-and post-program wage changes) is typically lagged at least several months. The delay in the Commonwealth receiving these data from employers, and transferring it to the Evaluation Team, means that participants that completed the programs during Q3 or Q4 2018 might not have complete post-program data, which could under-estimate post-completion employment and therefore, inflate the cost per outcome. During the evaluation design phase, the Evaluation Team anticipated that programming would be offered until the end of the grant period (i.e., thru September 2019) and this would result in the exclusion of participant outcomes from analyses related to wage and employment changes. While programming ended in

December 2018, data availability was still a limitation of the study. The same limitation of lag exists for National Student Clearinghouse data.

Additionally, the state Unemployment Insurance system does not capture all types of employment. Certain employers are not required to report data, and if participants were employed out of state during program entry or upon program completion, the state unemployment data source does not capture this. Therefore, to be most accurate and precise, the outcomes study and the cost study treat cases of participants that were not found in the system for the quarter preceding program entry as "Unknown," rather than a positive definitive indication that they were unemployed in that time period. Although it was likely that they were unemployed, it is impossible to know for sure.

Limited Ability of Analysis Method to Determine the Value of the Program

The inherent limitation of a cost allocation and cost per outcome analysis is that these methodologies cannot produce an estimate of the value and the benefit of a program. Cost allocation and cost per outcome studies simply provide information about how much the program costs to implement per participant, and how much it costs to achieve a given outcome. A cost per outcome analysis does not quantify the benefits of the outcomes observed because of the resources invested in the program.

A more sophisticated cost benefit analysis methodology also allows a calculation of the net benefit observed because of a program, considering when program benefits accrue, as well as its net cost. Cost benefit analyses gives the public and policymakers information about whether the positive results of a program (its benefits) outweigh the resources invested (costs), and therefore facilitates informed decision-making about what types of initiatives may be worth a certain amount of investment in the future. Because cost allocation and cost per outcome analyses do not offer any valuation of the benefits a program creates, such studies should not be used to determine if the investment in program was worth the results it produced, or if those resources would have been better applied elsewhere. It is outside the scope of the cost evaluation to offer an assessment of the value of the initiative (whether initiative benefits exceeded costs). Therefore, these findings should only be used in the limited context of understanding the cost of the initiative relative to the number of participants and participant outcomes, not to make any value judgements about whether program benefits exceeded program costs.

FINDINGS

Investment Cost Analysis

This analysis presents the following findings:

- Total resources invested to date in the initiative;
- Total direct expenditures (grant dollars) invested to date in the initiative, and direct expenditures as a share of total resources invested across fiscal year and partnerships;
- The total value of matching contributions invested to data in the initiative, matching costs as a share of total resources invested across fiscal years and partnerships, and the breakout of matching cost categories; and
- The total value of in-kind contributions invested to data in the initiative, in-kind contributions as a share of total resources invested across fiscal years and partnerships, and the breakout of in-kind cost categories.

The Philadelphia partnership chose not to use the standard reporting methodology for valuation of matching and in-kind contributions. Where missing data is noted, current resource investment data is likely underestimated.

Total Value of Resources Invested

A total of $5,383,336.69 was invested into the initiative. This figure includes direct grant expenditures and the value of matching and in-kind contributions. The table below details the resources invested by each partnership and by the Department by federal fiscal year.

Table 40: Total Value of Resources Invested

Partnership	2016	2017	2018	2019	Total
Department	$7,827.09	$30,072.62	$137,082.75	$71,507.54	$246,490.00
Allegheny	$63,364.88	$283,511.90	$208,159.48	$182,281.25	$737,317.50
Bucks	$1,757.04	$317,260.01	$594,542.12	$21,092.00	$934,651.18
Delaware	$0.00	$238,569.32	$258,056.66	$97,163.78	$593,789.77
Northampton/Lehigh	$50,295.97	$243,453.33	$257,422.75	$135,054.34	$686,226.38
Montgomery	$11,174.39	$313,870.56	$287,202.28	$216,477.88	$828,725.10
Philadelphia	$27,269.61	$200,526.93	$387,829.99	$144,683.60	$760,310.13
Westmoreland	$20,577.03	$84,527.44	$236,379.46	$254,342.69	$595,826.63
				TOTAL	$5,383,336.69

Total Grant Expenditures

According to accrued expenditure data current as of March 2019 (program implementation ceased in December 2018), a total of $4,225,440.77 was invested into the initiative in the form of federal grant dollars. This includes expenditures from the community colleges and WDBs. The Department's grant expenditures were the lowest and of the partnership programs, the Delaware partnership had spent the least in grant dollars ($424,497.86), while the Bucks partnership had spent the most ($775,265.64). The Bucks and Westmoreland partnerships received extra grant dollars after the Department reallocated funds toward the end of the project, releasing them from partnerships that did not plan to use their entire allocation. Expenditures tended to be lowest in FFY 2016 when the programs were not yet fully staffed and launched, and then generally increased across fiscal years, in some cases dipping slightly in FFY 2018.

Some partnerships chose to stop enrolling participants during 2018 so they could focus on employment placement, which required fewer overall resources. However, many partnerships in FFY 2019 were prioritizing educating as many students as possible, which may explain a slight increase in grant expenditures as it encompasses the last months of grant implementation. See the table below for details of the breakout of grant expenditures by partnership and by the PA Department.

Table 41: Total Grant Expenditures

Partnership	2016		2017	2018	2019	Total
Department	$7,827.09		$30,072.62	$137,082.75	$71,507.54	$246,490.00
Allegheny	*CC*	$9,666.50	$173,017.63	$147,435.44	$127,445.43	$490,946.30
	WDB	$3,550.12	$18,075.48	$317.55	$11,438.15	
Bucks	*CC*	$0.00	$263,499.00	$351,306.81	$0.00	$775,265.64
	WDB	$0.00	$12,721.83	$147,738.00	$0.00	
Delaware	*CC*	$0.00	$192,094.99	$174,060.12	$58,342.75	$424,497.86
	WDB	$0.00	$0.00	$0.00	$0.00	

Partnership		2016	2017	2018	2019	Total
Northampton Lehigh	*CC*	$21,560.00	$140,848.00	$140,251.00	$37,566.00	$461,976.00
	WDB	$13,377.00	$47,048.00	$33,589.00	$27,737.00	
Montgomery	*CC*	$0.00	$181,425.07	$176,139.85	$142,435.08	$611,264.97
	WDB	$0.00	$52,375.50	$16,027.08	$42,862.39	
Philadelphia	*CC*	$17,245.87	$135,353.37	$246,369.42	$81,031.34	$650,000.00
	WDB	$2,257.07	$31,213.75	$95,762.91	$40,766.27	
Westmoreland	*CC*	$0.00	$34,777.00	$164,936.00	$195,287.00	$565,000.00
	WDB	$20,015.00	$42,562.00	$64,276.00	$43,147.00	
					GRAND TOTAL	$4,225,440.77

Overall, grant expenditures accounted for almost 79% of the total resources invested in the initiative. Grant expenditures as a share of total resources invested in partnerships' programs ranged from 66.6% (Montgomery partnership) to 94.8% (Westmoreland partnership). See table below for details of partnerships' grant expenditures as a share of total investment in their programs.

Table 42: Grant Expenditures as a Share of Value of Total Resources Invested

Partnership	Total Grant Expenditures	Total Resources Invested	Grant Expenditures as % of Total Resources Invested
Department	$246,490.00	$246,490.00	100%
Allegheny	$490,946.30	$737,317.50	66.6%
Bucks	$775,265.64	$934,651.18	82.9%
Delaware	$424,497.86	$593,789.77	71.5%
Northampton/Lehigh	$461,976.00	$686,226.38	67.3%
Montgomery	$611,264.97	$828,725.10	73.8%
Philadelphia	$650,000.00	$760,310.13	85.6%
Westmoreland	$565,000.00	$595,826.63	94.8%
TOTAL	$4,225,440.77	$5,383,336.69	78.5%

Value of Matching Contributions

Through the end of the implementation period (December 2018), a total of $1,113,896.71 had been invested into the initiative in the form of matching contributions from grantee institutions. The value of matching contributions ranged from just under $31,000 (Westmoreland partnership) to almost $210,000 each (Montgomery and Lehigh/Northampton partnerships) over four fiscal years. Three categories of matching costs were measured.

- **Category 1 Contributions:** Estimate of costs typically covered by F&A rates (colleges and WDBs)
- **Category 2 Contributions:** Value of non-grant administrator and fiscal staff time (over 15% annually) and faculty or clerical staff time; and
- **Category 3 Contributions:** Value of college facility classroom or lab space.

The methodology for determining the value of these matching contributions is outlined in the calculations specified in the Valuation Methods section.

Three partnerships – Allegheny, Northampton/Lehigh, and Montgomery – reported matching contributions in Category Two (additional value of staff time contributed to program outside of what the F&A rate is intended to cover). All partnerships except Philadelphia and Westmoreland reported matching contributions in the form of college facility classroom or lab space. See the table below for details of the matching contributions by partnership.

Table 43: Value of Matching Contributions

Partnership/Matching Category		2016	2017	2018	2019	Total
Allegheny	*1*	$40.36	$23,166.29	$20,784.03	$11,301.64	$246,371.20
	2	$50,107.90	$58,665.59	$38,553.80	$32,096.03	
	3	$0.00	$10,586.90	$1,068.66	$0.00	
Bucks	*1*	$0.00	$25,932.50	$68,798.03	$21,092.00	$137,422.54
	2	$0.00	$0.00	$0.00	$0.00	
	3	$0.00	$7,200.00	$14,400.00	$0.00	
Delaware	*1*	$0.00	$19,774.33	$34,046.54	$34,861.03	$169,291.91
	2	$0.00	$0.00	$0.00	$0.00	
	3	$0.00	$26,700.00	$49,950.00	$3,960.00	
Northampton/Lehigh	*1*	$5,075.18	$45,273.54	$47,823.16	$60,381.83	$209,828.01
	2	$407.11	$407.11	$422.57	$0.00	
	3	$7,900.00	$7,900.00	$27,137.50	$7,100.00	
Montgomery	*1*	$0.00	$22,712.23	$36,741.60	$31,180.41	$209,846.29
	2	$2,961.03	$0.00	$0.00	$0.00	
	3	$8,213.36	$52,233.05	$55,804.61	$0.00	
Philadelphia	*1*	$7,766.67	$33,959.81	$45,697.66	$22,885.99	$110,310.13
	2	*Missing*	*Missing*	*Missing*	*Missing*	
	3	*Missing*	*Missing*	*Missing*	*Missing*	
Westmoreland	*1*	$562.03	$7,188.42	$7,167.46	$15,908.69	$30,826.63
	2	$0.00	$0.00	$0.00	$0.00	
	3	$0.00	$0.00	$0.00	$0.00	
					TOTAL	$1,113,896.71

Overall, the value of matching contributions accounted for 20.7% (just over one-fifth) of the total resources invested in the initiative. The value of matching contributions as a share of total resources invested in partnerships' programs ranged from 4.4% (Westmoreland partnership) to 29.7% (Allegheny partnership). See the table below for details of partnerships' grant expenditures as a share of total investment in their programs.

Table 44: Value of Matching Contributions as a Share of Value of Total Resources Invested

Partnership	Total Value of Matching Contributions	Total Resources Invested	Matching Contributions as % of Total Resources Invested
Allegheny	$246,371.20	$737,317.50	**33.4%**
Bucks	$137,422.54	$934,651.18	**14.7%**
Delaware	$169,291.91	$593,789.77	**28.5%**
Northampton/Lehigh	$209,828.01	$686,226.38	**30.6%**
Montgomery	$209,846.29	$828,725.10	**25.3%**
Philadelphia	$110,310.13	$760,310.13	**14.5%**
Westmoreland	$30,826.63	$595,826.63	**5.2%**
TOTAL	**$1,113,896.71**	**$ 5,383,336.69***	**20.7%**

**Figure includes L&I grant expenditures ($246,900), not shown in table.*

Value of In-Kind Contributions

Through the end of the implementation period (December 2018), a total of $43,999.21 had been invested into the initiative in the form of in-kind contributions. The value of in-kind contributions ranged from $0.00 (Allegheny, Delaware, Philadelphia, and Westmoreland partnerships) to almost $22,000.00 (Bucks partnership) over four fiscal years. Data were collected on three categories of in-kind contributions:

- **Category 1 Contributions:** Business/employer partner time;
- **Category 2 Contributions:** Value of supply and equipment donations; and
- **Category 3 Contributions:** Value of business partner facility space.

All in-kind contributions reported fell into Category 1 (the value of business/employer partner time spent working on the program). None of the partnerships reported any in-kind contributions in the form of equipment, supplies, or space. The table below details in-kind contributions by partnership.

Table 45: Value of In-Kind Contributions

Partnership	2016	2017	2018	2019	Grand Total
Allegheny	$0.00	$0.00	$0.00	$0.00	$0
Bucks	$1,757.04	$7,906.68	$12,299.28	$0.00	$21,963.00
Delaware	$0.00	$0.00	$0.00	$0.00	$0
Northampton/Lehigh	$1,976.67	$1,976.67	$8,199.52	$2,269.51	$14,422.37
Montgomery	$0.00	$5,124.70	$2,489.14	$0.00	$7,613.84
Philadelphia	*Missing*	*Missing*	*Missing*	*Missing*	*Missing*
Westmoreland	$0.00	$0.00	$0.00	$0.00	$0
				TOTAL	$43,999.21

Overall, the value of in-kind contributions accounted for just under 1% (0.8%) of the total resources invested in the initiative. The value of in-kind contributions as a share of total resources invested in partnerships' programs ranged from 0% (Allegheny, Delaware, Philadelphia, and Westmoreland partnerships) to 2.3% (Bucks partnership). See the table below for details of partnerships' in-kind contributions as a share of total investment in their programs.

Table 46: Value of In-Kind Contributions as a Share of Value of Total Resources Invested

Partnership	Total Value of In Kind Contributions	Total Resources Invested	In Kind Contributions as % of Total Resources Invested
Allegheny	$0	$737,317.50	0%
Bucks	$21,963.00	$934,651.18	2.3%
Delaware	$0	$593,789.77	0%
Northampton/Lehigh	$14,422.37	$686,226.38	2.1%
Montgomery	$7,613.84	$828,725.10	0.9%
Philadelphia	$0	$760,310.13	0%
Westmoreland	$0	$595,826.63	0%
TOTAL	$ 43,999.21	$ 5,383,336.69*	0.8%

**Figure includes L&I grant expenditures ($246,900), not shown in table.*

Cost Allocation Analysis

The cost allocation calculation provides an estimate of the value of inputs and resources invested by the federal government, implementing institutions, and external partners per participant, at the level of the partnerships and the overall initiative. While cost allocation analyses cannot provide information about the relative value of the initiative because the method does not consider program outcomes nor quantify their benefits, it does provide information on the amount of resources invested per participant.

As of the end of program implementation (December 2018) 700 unique participants had been served by the initiative. Taking into consideration the total investment in the initiative ($5,383,336.69 – including direct grant expenditures and the value of matching and in-kind contributions), the initiative's cost per participant was $7,690.48. The table below provides details of the resources invested by each partnership per participant.

Table 47: Cost Allocation (Cost Per Participant)

Partnership	Resources Invested	Share of PA Department Resources Invested*	Total Resources Invested	Unique Participants	Cost Per Participant
Allegheny	$737,317.50	$35,212.85	$772,530.35	125	$6,180.24
Bucks	$934,651.18	$35,212.86	$969,864.04	133	$7,292.21
Delaware	$593,789.77	$35,212.85	$629,002.62	36	$17,472.30
Northampton/Lehigh	$686,226.38	$35,212.86	$721,439.24	88	$8,198.17
Montgomery	$828,725.10	$35,212.86	$863,937.96	83	$10,408.89
Philadelphia	$760,310.13	$35,212.86	$795,522.99	140	$5,682.31
Westmoreland	$595,826.63	$35,212.86	$631,039.49	95	$6,642.52
TOTAL	**$5,136,846.69**	**$246,490.00**	**$5,383,336.69**	**700**	**$7,690.48**

**The PA Department spent $246,490 in grant funds administering the initiative. This amount was split seven ways and allocated equally to the partnerships' programs for this calculation (due to rounding, two partnerships were allocated $0.01 less than the other five).*

Four of the partnerships' programs had lower costs per participant than the overall initiative's average cost per participant (Allegheny, Bucks, Philadelphia, and Westmoreland) and three had higher costs per participant than the overall average (Delaware, Northampton/Lehigh, and Montgomery). The Delaware partnership had the highest per-participant cost figure ($17,472.30), and the Philadelphia partnership had the lowest ($5,682.31)—although Philadelphia did not report certain categories of matching and in-kind cost data, so this figure may be artificially low.

Cost Per Outcome Analysis

The cost per outcome analysis provides an estimate of the amount of resources necessary to achieve a given program outcome at the level of the partnerships and the overall initiative. Cost per outcome analyses cannot provide information about the relative value of the initiative because the method does not quantify program benefits and therefore does not produce a cost-benefit ratio.

Five distinct outcomes were measured as a part of the cost-per-outcome analysis:

- Cost per completed micro-credential;
- Cost per instance of persistence in a micro-credential pathway;
- Cost per instance of completion of a micro-credential pathway;
- Cost per instance of continuation to a for-credit education program,
- Cost per instance of post-micro-credential completion employment.

The results of each cost per outcome analysis should be considered in isolation from the others.

Cost per Completed Micro-Credential

As of the end of program implementation (December 2018), participants had completed a total of 3790 micro-credentials. Taking into consideration the total investment in the initiative ($5,383,336.69 – including direct grant expenditures and the value of matching and in-kind contributions), the initiative's cost per completed micro-credential was $1,420.41. The table below provides details.

Table 48: Cost Per Outcome (Completed Micro-Credential)

Partnership	Total Resources Invested	Completed Micro Credentials	Cost Per Completed Micro Credential
Allegheny	$772,530.35	248	$3,115.04
Bucks	$969,864.04	1022	$948.99
Delaware	$629,002.62	136	$4,625.02
Northampton/Lehigh	$721,439.24	243	$2,968.89
Montgomery	$863,937.96	448	$1,928.43
Philadelphia	$795,522.99	1091	$729.17
Westmoreland	$631,039.49	602	$1,048.24
TOTAL	**$5,383,336.69***	**3790**	**$1,420.41**

**Includes the share of the Department's administrative costs allocated across the seven partnerships*

Three of the partnerships' programs had lower costs per completed micro-credential than the overall initiative's average cost per completed micro-credential (Bucks, Philadelphia, and Westmoreland) and four had higher costs per participant than the overall average (Allegheny, Delaware, Northampton/Lehigh, and Montgomery). The Delaware partnership had the highest cost per completed micro-credential figure ($3,115.04), and the Philadelphia partnership had the lowest ($729.17)—although Philadelphia did not report certain categories of matching and in-kind cost data, so this figure may be artificially low.

Since the design, content, subject matter, and length of individual micro-credentials varied substantially between partnerships, it is difficult to use the individual partnerships' cost per micro-credential completed metric as a true indicator to compare cost-effectiveness between programs. For example, with partnerships

where more micro-credentials were completed and therefore there was a lower cost per micro-credential completed, it may simply reflect a shorter micro-credential course duration and less content broken up into more micro-credentials. See Appendix D for a list of micro-credentials by partnership.

Cost per Instance of Persistence in a Micro-Credential Pathway

As of the end of program implementation (December 2018), there were 598 instances of participants persisting in a micro-credential pathway. "Persistence" is defined as completing the first micro-credential in the pathway and enrolling in the next one. Micro-credentials with only one in the pathway are not considered for this analysis. If participants persisted in more than one pathway with more than one micro-credential, all instances are considered in this analysis.

Taking into consideration the total investment in the initiative ($5,383,336.69 – including direct grant expenditures and the value of matching and in-kind contributions), the initiative's cost per instance of persistence in a micro-credential pathway was approximately $9,002.24. The table below provides details.

Table 49: Cost Per Outcome (Instance of Persistence in a Micro-Credential Pathway)

Partnership	Total Resources Invested	Instances of Persistence in a Micro Credential Pathway	Cost per Instance of Persistence in a Micro Credential Pathway
Allegheny	$772,530.35	55	$14,046.01
Bucks	$969,864.04	132	$7,347.45
Delaware	$629,002.62	27	$23,296.39
Northampton/Lehigh	$721,439.24	87	$8,292.41
Montgomery	$863,937.96	81	$10,665.90
Philadelphia	$795,522.99	133	$5,981.38
Westmoreland	$631,039.49	83	$7,602.89
TOTAL	**$5,383,336.69***	**598**	**$9,002.24**

**Includes the share of the Department's administrative costs allocated across the seven partnerships*

Four of the partnerships' programs had lower costs per instance of persistence in a micro-credential pathway than the overall initiative's average cost (Bucks, Northampton/Lehigh, Philadelphia, and Westmoreland) and three had higher costs than the overall average (Allegheny, Delaware, and Montgomery). The Delaware partnership had the highest cost per instance of persistence in a micro-credential pathway figure ($23,296.39), and the Philadelphia partnership had the lowest ($5,981.38)—although Philadelphia did not report certain categories of matching and in-kind cost data, so this figure may be artificially low.

Since the design, content, subject matter and length of individual micro-credential pathways varied substantially between partnerships, it is difficult to use the individual partnerships' cost per instance of micro-credential pathway completion metric as a true indicator to compare cost-effectiveness between programs. The pathways covered different subject matter and were of different lengths and levels of rigor. See Appendix D for a list of pathways and micro-credentials by partnership.

Cost per Instance of Completion of a Micro-Credential Pathway

As of the end of program implementation (December 2018), there were 587 instances of participants completing micro-credential pathway. "Completion" is defined as successfully finishing all micro-credentials in a given pathway. Micro-credentials with only one in the pathway are not considered for this analysis. If participants completed more than one pathway with more than one micro-credential, all instances are considered in this analysis.

Taking into consideration the total investment in the initiative ($5,383,336.69 – including direct grant expenditures and the value of matching and in-kind contributions), the initiative's cost per instance of completion of a micro-credential pathway was approximately $9,170.93. The table below provides details.

Table 50: Cost Per Outcome (Instance of Completion of a Micro-Credential Pathway)

Partnership	Total Resources Invested	Instances of Completion of a Micro Credential Pathway	Cost per Instance of Completion of a Micro Credential Pathway
Allegheny	$772,530.35	71	$10,880.71
Bucks	$969,864.04	121	$8,015.41
Delaware	$629,002.62	10	$62,900.26
Northampton/Lehigh	$721,439.24	64	$11,272.49
Montgomery	$863,937.96	59	$14,643.02
Philadelphia	$795,522.99	128	$6,215.02
Westmoreland	$631,039.49	134	$4,709.25
TOTAL	**$5,383,336.69***	**587**	**$9,170.93**

**Includes the share of the Department's administrative costs allocated across the seven partnerships*

Three of the partnerships' programs had lower costs per instance of completion of a micro-credential pathway than the overall initiative's average cost (Bucks, Philadelphia, and Westmoreland) and four had higher costs than the overall average (Allegheny, Delaware, Montgomery, and Northampton/Lehigh). The Delaware partnership had the highest cost per instance of completion of a micro-credential pathway figure ($62,900.26), and the Westmoreland partnership had the lowest ($4,709.25).

Since the design, content, subject matter and length of individual micro-credential pathways varied substantially between partnerships, it is difficult to use the individual partnerships' cost per instance of micro-credential pathway completion metric as a true indicator to compare cost-effectiveness between programs. The pathways covered different subject matter and were of different lengths and levels of rigor. See Appendix D for a list of pathways and micro-credentials by partnership.

Cost per Instance of Continuation to a Higher Education Credit Education Program

As of the end of program implementation (December 2018), there were 58 known instances of participants continuing their education in a higher education credit academic program. Continuation to both two and four-year academic programs is considered.

Taking into consideration the total investment in the initiative ($5,383,336.69 – including direct grant expenditures and the value of matching and in-kind contributions), the initiative's cost per instance of continuation to a higher education program was approximately $92,816.15. The table below provides details.

Table 51: Cost Per Outcome (Instance of Continuation to a Higher Education Credit Program)

Partnership	Total Resources Invested	Instances of Continuation to a 2 Year Program	Instances of Continuation to a 4 Year Program	Total Instances of Continuation to Higher Education	Cost per Instance of Continuation to Higher Education
Allegheny	$772,530.35	18	4	22	$35,115.02
Bucks	$969,864.04	0	0	0	-
Delaware	$629,002.62	8	0	8	$78,625.33
Northampton/Lehigh	$721,439.24	5	2	7	$103,062.75
Montgomery	$863,937.96	4	1	5	$172,787.59
Philadelphia	$795,522.99	5	4	9	$88,391.44
Westmoreland	$631,039.49	7	0	7	$90,148.50
TOTAL	$5,383,336.69*	47	11	58	$92,816.15

**Includes the share of the Department's administrative costs allocated across the seven partnerships*

Four of the partnerships' programs had lower costs per instance of continuation to a higher education program than the overall initiative's average cost (Allegheny, Delaware, Philadelphia, and Westmoreland) and two had higher costs than the overall average (Montgomery and Northampton/Lehigh). The Bucks partnership's program had no known instances of continuation to a higher education program. The Montgomery partnership had the highest cost per instance of continuation to a higher education program ($172,787.59), and the Allegheny partnership had the lowest ($35,115.02).

One significant limitation to the data source for this outcome measure (the National Student Clearinghouse) is that there is a lag time for when data becomes available. Therefore, the data source may not have captured all instances of participants continuing to two- or four-year programs after completing micro-credential pathways, particularly the participants who completed pathways late during the implementation period. Instances of continuation to higher education programs may be underestimated due to this data source limitation, potentially over-inflating the cost per outcome figure.

Cost per Instance of Post-Micro-Credential Completion Employment

As of the end of program implementation (December 2018), there were 87 known instances of participants that went from "Unknown" for employment prior to the program to known employment post-program completion. Because the state Unemployment Insurance system does not capture all employment (some employers are not required to report these data, and out-of-state employment is not counted), the cost study treats cases of participants that were not found in the system for the quarter preceding program

entry as "Unknown," rather than a positive definitive indication that they were unemployed in that time period. Although it was likely that these participants were unemployed, it is impossible to know for sure.

Taking into consideration the total investment in the initiative ($5,383,336.69 – including direct grant expenditures and the value of matching and in-kind contributions), the initiative's cost per instance of continuation to a higher education program was approximately $92,816.15. The table below provides details.

Table 52: Cost Per Outcome (Instance of Status Change of "Unknown")

Partnership	Total Resources Invested	Total Instances of "Unknown" to "Employed"	Cost per Instance of Post Completion Employment from "Unknown" Status
Allegheny	$772,530.35	8	$96,566.29
Bucks	$969,864.04	26	$37,302.46
Delaware	$629,002.62	0	-
Northampton/Lehigh	$721,439.24	14	$51,531.37
Montgomery	$863,937.96	12	$71,994.83
Philadelphia	$795,522.99	23	$34,587.95
Westmoreland	$631,039.49	4	$157,759.87
TOTAL	**$5,383,336.69***	**87**	**$61,877.43**

**Includes the share of the Department's administrative costs allocated across the seven partnerships*

Three of the partnerships' programs had lower costs per instance of participants transitioning from unknown to known employment status pre to post program than the overall initiative's average cost (Bucks, Northampton Lehigh, and Philadelphia) and four had higher costs than the overall average (Allegheny, Montgomery and Westmoreland. The Delaware partnership's program had no known instances of transition to unknown to known employment status pre-to post-program. The Westmoreland partnership had the highest cost per instance of transition to unknown to known employment status pre-to post-program ($157,759.87), and the Philadelphia partnership had the lowest ($34,587.95).

One significant limitation to the data source for this outcome measure (the state Unemployment Insurance system) is that there is a lag time for when data becomes available. Therefore, the data source may not have captured all instances of participants going from unknown to known employed status after completing micro-credential pathways, particularly the participants who completed pathways late during the implementation period. Instances of transition from unknown to known employment status may be under-estimated due to this data source limitation, potentially over-inflating the cost per outcome figure.

CONCLUSION

The findings presented above are useful to understand the extent of resources invested in the initiative and, to some extent, the initiative's cost effectiveness around certain outcomes. However, as mentioned previously, this analysis cannot offer value judgements about the program's benefit to participants, implementing institutions, employers, and society. A more sophisticated cost benefit analysis methodology would have allowed for a calculation of the net benefit observed because of a program, considering when program benefits accrue, as well as its net cost.

Because cost allocation and cost per outcome analyses do not offer any valuation of the benefits a program creates, such studies should not be used to determine if the investment in program was worth the results it produced, or if those resources would have been better applied elsewhere. It is outside the scope of this study to offer an assessment of the value of the initiative (whether initiative benefits exceeded costs). Therefore, the findings should only be used in the limited context of understanding the cost of the initiative relative to the number of participants and participant outcomes, not to make any value judgements about whether program benefits exceeded program costs.

Further research on this initiative or other similar initiatives should take the value of the benefits realized as a result of the outcomes into consideration, so a sound value judgement can be made that will inform policymakers and the public about whether the program is worth the investment. Such a study would consider the same costs that this study considered (and perhaps additional costs not considered such as the value of participant time) but would also consider potential benefits that accrue from the outcomes noted. These benefits could include but are not but not limited to:

- Individual, familial, and societal benefits of participant post-completion employment (including averted or reduced social assistance costs for those earning income that were not before completing the program);
- Increased long-term earning potential as a result of additional education and accrued experience for participants and the implications for their families and society;
- Employment retention and reduced cost of turnover for employers; and
- More intangible social benefits such as reduced crime as a result of employment.

Such cost-benefit analysis must be paired with an impact study design to ensure that the outcomes measured are attributable to the initiative within a reasonable margin of error. Despite the inherent methodological limitations of this study, it does offer a fuller picture of resources expended than would have been possible if considering grant expenditures alone, and a limited understanding of certain measures of cost-effectiveness.

CONCLUSIONS

CONCLUSIONS

LASTING EFFECTS OF THE GRANT

It is beyond the scope of this evaluation to make value judgments about whether the degree of tangible and intangible success obtained as a result of this initiative was sufficient to warrant the amount of public investments made, or to otherwise draw conclusions about the benefit of the initiative. Qualitative evidence suggests, however, that effects of the initiative are likely to continue through the end of the grant and beyond.

Capacity Building

This initiative facilitated capacity building at the partnerships by allowing staff and instructors to test programming innovations, enhance student services to provide students with more comprehensive support, and diversify short-term program offerings into areas colleges had not yet explored. While some programmatic elements of these innovations will last, even more so the effects will be on the partnerships' capacity to offer enhanced and expanded micro-credentials.

Stakeholder Engagement and Collaboration

Because project success was heavily dependent on partnerships with employers, community partners, and between the college and WDB, the grant aided in increased connections between these entities. Partner engagement findings are qualitatively described in the Partner Engagement section of this report.

Enhanced Programming and Services

Significant investments in the micro-credential program offerings and support services offered, and in curriculum and program development, will continue to benefit the partnerships. Interviewed participants found the expansive support services and program offerings as unique and valuable components. Similarly, regional partners and instructors noted that the program offerings and support services enhanced through the grant provided relevant and much-needed training and support for the target population.

INITIATIVE SUSTAINABILITY

By the end of the grant-funded period (December 2018), most partnership leadership determined next steps for the grant components. Due, in part, to the funding from USDOL, and investments and donations from partners, partnerships were able to expand and enhance program offerings and delivery methods (e.g., online), comprehensive student support services, and meaningful learning experiences through work-based training. With this, partnerships indicated sustaining most, if not all, of the grant components and will continue to expand program offerings and partnerships moving forward. Moving beyond the grant, grant leadership anticipate the following:

Enhanced and Expanded Programs

All partnerships emphasized the need to continue the micro-credential programs in some form beyond the grant. For many partnerships, this includes expanding current program offerings due to the success experienced through the grant and needs identified by employers and students. The ability to meet the needs of individuals with barriers to education, a significant population across

Pennsylvania, has been a significant advantage to program implementation. Partnerships were able to launch short-term programs that expedited student time to completion, a need identified by non-traditional students and local employers. Moving beyond the grant, many partnerships will continue to improve current micro-credential programs and will continue exploring additional offerings.

Additional Employer Partnerships

Partnerships established several connections with local employers and organizations that will likely continue post-grant. These relationships resulted in hiring commitments and work-based training opportunities (e.g., internships). Partnerships noted that these relationships were a significant success from the grant as it enabled the colleges and WDBs to expand the nature of the relationships with the community as well as explore new partnerships.

Utilizing Support Best Practices

Most partnerships noted a need to continue expanding the support services available to students beyond the grant. Building off the best practices used in the grant (e.g., one-on-one support, leveraging community resources), partnerships will continue to work to remove barriers to education for students. Partnerships cited opportunities to utilize community resources (e.g., housing assistance and childcare) to help students succeed in the programs at the colleges.

Strengthened College/WDB Relationship

Several partnerships reported that the grant provided intentional opportunities for the colleges and WDBs to collaborate. While many cited working together prior to the grant, most indicated that the grant has helped expand and strengthen these partnerships. Many partnerships reported that they were already seeking opportunities to continue working together and anticipate continuing to build upon the relationship that was established through this grant.

Additional Funding and Investments

To continue grant components beyond the grant, and to further expand and enhance components launched through the grant, partnerships are exploring other opportunities for additional funding and investments. For instance, many partnerships noted leveraging WDB funds to help ensure that the programs continue beyond the grant. Other partnerships noted college interest in supporting the programs as they have been a success in serving a variety of populations. Partnerships also noted opportunities to leverage relationships with the community to help fund the programs moving forward. Because of the benefits the programs brought to the partnerships, students, and local community, all partnerships are interested in continuing the programs moving forward.

IMPLICATIONS FOR FUTURE RESEARCH

A review of the evaluation findings and limitations suggests several directions for possible future research. The following studies would provide additional insight into the effects of the WIF-funded programs:

(1) Whether a longer post-program observational window would reveal impacts of greater magnitude;
(2) A more sophisticated cost benefit analysis methodology would have allowed for a calculation of the net benefit observed because of a program, considering when program benefits accrue, as well as its net cost;

(3) The extent to which participants are employed in program-related industries and any variations; and
(4) Examination of additional sociodemographic participant factors.

Following the first suggestion would require extending the post-program observational period for the purposes of examining outcomes beyond the first quarter following program completion. Employing an extended post-program observational period would answer questions about whether the effects of WIF-funded programs were different over the short and longer terms. Hypothetically, it seems reasonable to expect that the influence of the programs would not manifest in the first quarter post completion. This empirical question would be worth investigating.

Further research on this initiative or other similar initiatives should take the value of the benefits realized as a result of the outcomes into consideration, so a sound value judgement can be made that will inform policymakers and the public about whether the program is worth the investment. Such a study would consider the same costs that this study considered (and perhaps additional costs not considered such as the value of participant time) but would also consider potential benefits that accrue from the outcomes noted. These benefits could include but are not limited to:

- Individual, familial, and societal benefits of participant post-completion employment (including averted or reduced social assistance costs for those earning income that were not before completing the program);
- Increased long-term earning potential as a result of additional education and accrued experience for participants and the implications for their families and society;
- Employment retention and reduced cost of turnover for employers; and
- More intangible social benefits such as reduced crime as a result of employment.

Such cost-benefit analysis must be paired with an impact study design to ensure that the outcomes measured are attributable to the initiative within a reasonable margin of error.

The third suggestion would require more similar micro-credential programs, as employment rates in some industries were too low to report or extrapolate findings. As some target industries for some of the programs could not be examined, there was no direct analysis of the extent to which micro-credential participants enrolled in relevant fields. However, if the micro-credential programs had similar target industries across all institutions, researchers could examine the extent to which the micro-credentials structure prepares participants for employment in general, or if it increases employment in the target industries.

Collecting more detailed participant demographics (e.g., English Language Learning, out-of-school youth, etc.) is difficult for college staff as this information is self-reported by participants. However, more detailed data on these demographics of participants in targeted populations could further examine any differences between groups in successful program and employment outcomes. This process could be facilitated by all involved partnerships targeting the same specific groups to ensure that the sample size for each category is robust enough for analysis. While WDBs might capture some of these data due to federal funding requirements (e.g., out-of-school youth), data systems for WDBs and colleges are not connected and require matching participants across the systems.

APPENDICES

APPENDIX A: IMPLEMENTATION EVALUATION METHODS

INTRODUCTION

The implementation evaluation began in May 2016 and continued through December 2018[72] to document program progress, to monitor program outcomes, and to provide recommendations for continuous improvement of program operations. Throughout the execution of the evaluation, and especially through the implementation evaluation, the Evaluation Team employed principles of a utilization-focused evaluation framework.[73] The substantiated assumptions[74] of utilization-focused evaluations are: (1) intended users are more likely to utilize evaluation findings if they understand and value the evaluation's process; (2) intended users are more likely to understand and value the evaluation's process if they are engaged in evaluation decisions; (3) engaged intended users both enhance the credibility of evaluation findings and possess greater capacity for utilizing findings to improve the project; and (4) capacity for utilizing findings relies heavily on a collaborative, functional relationship between intended users and evaluators.

Additionally, the formative component of the evaluation offered real-time feedback as the project rolled out, as opposed to only offering feedback retrospectively, through regular calls and annual reports following evaluation site visits. This provided the Evaluation Team the opportunity to identify early evidence of strengths and areas for growth throughout the development and implementation of the project.

RESEARCH QUESTIONS

The table below summarizes the research questions examined through the implementation evaluation, including ties to data sources and collection tools/protocols, and analysis methods. Further details on data sources and collection plans, analysis methods, and potential limitations of the implementation evaluation are described in subsequent sections.

Table 53: Implementation Evaluation Research Questions, Data Sources, and Analysis Methods

Research Question	Data Sources and Collection	Analysis Methods
How closely did the partnerships implement the *Micro credentials: Opportunities through Stackable Achievements* program according to the original plans? What factors caused major deviations from the work plans, and how did these deviations impact project progress?	• Bimonthly implementation calls • In-person interviews and focus groups • Document review • Curriculum study (including surveys)	• Document themes, interpret, and report on qualitative data • Review documents to verify changes

[72] Grant implementation occurred through December 2018, with January 1 through September 30 reserved for evaluation activities.
[73] Patton, M.Q. (2012) *Essentials of Utilization-Focused Evaluation*. Thousand Oaks, CA: Sage.
[74] Brandon, P., Smith, N., Trenholm, C., and Devaney, B. (2010). The Critical Importance of Stakeholder Relations in a National, Experimental Abstinence Education Evaluation. *American Journal of Evaluation*, 31, 4: 517-531.
Patton, M. Q. (2012). *Essentials of utilization-focused evaluation*. Thousand Oaks, CA: Sage.
Taut, S. (2008). What have we learned about stakeholder involvement in program evaluation? *Studies in Educational Evaluation*, 34.

Research Question	Data Sources and Collection	Analysis Methods
How did local dynamics, context, and existing relationships and alliances shape and impact the micro credential and support service design and delivery of each partnership's program?	• Bimonthly implementation calls • In-person interviews and focus groups • Document review • Curriculum study (including surveys)	• Document themes, interpret, and report on qualitative data • Review documents to verify changes
Who were the main stakeholders and decision makers in each partnership's program? How did roles, level, and nature of involvement of different types of stakeholders vary among the partnerships?	• Bimonthly implementation calls • In-person interviews and focus groups • Document review	• Document themes, interpret, and report on qualitative data • Review documents to verify gathered information
How were support service assessment protocols and academic readiness assessments selected and implemented at the different partnerships?	• Bimonthly implementation calls • In-person interviews and focus groups • Document review • Curriculum study (including surveys)	• Document themes, interpret, and report on qualitative data • Review documents to verify gathered information
How did each of the partnerships approach design and delivery of support services to participants?	• Bimonthly implementation calls • In-person interviews and focus groups • Document review	• Document themes, interpret, and report on qualitative data • Review documents to verify gathered information
How do the different partnerships' capacities and abilities to collaborate effectively with industry and support service partners evolve over the course of the project? What factors support or hinder this ability?	• Bimonthly implementation calls • In-person interviews and focus groups • Document review	• Document themes, interpret, and report on qualitative data • Review documents to verify gathered information
How did the PA Department of Labor & Industry's interagency committee support project implementation at each college? What specific interagency committee contributions were most valuable to certain partnerships?	• Bimonthly implementation calls • In-person interviews and focus groups	• Document themes, interpret, and report on qualitative data

Research Question	Data Sources and Collection	Analysis Methods
How do micro credentials address the needs of employers?	• Bimonthly implementation calls • In-person interviews and focus groups • Curriculum study (including surveys)	• Document themes, interpret, and report on qualitative data
How has employer recognition of micro credentials changed throughout and following the program's completion?	• Bimonthly implementation calls • In-person interviews and focus groups • Curriculum study (including surveys)	• Document themes, interpret, and report on qualitative data
What are the factors underlying the micro credential curriculum design process that were considered and were significant in promoting or hindering the development of the curriculum?	• Bimonthly implementation calls • In-person interviews and focus groups • Curriculum study (including surveys)	• Document themes, interpret, and report on qualitative data
How effective is the micro credentialing curriculum in meeting the needs of participants who have barriers to employment (i.e., content accuracy, depth, and scope)?	• Bimonthly implementation calls • In-person interviews and focus groups • Curriculum study (including surveys)	• Document themes, interpret, and report on qualitative data

DATA SOURCES AND COLLECTION

Data for the implementation evaluation were collected from the following sources:

- Bimonthly implementation calls with the Department and partnerships
- In-person interviews and focus groups with the Department, college staff and faculty/instructors, WDB staff, program participants, and community partners/employers
- Initiative documents such as curriculum, program-related brochures and promotional materials, and other documents
- Curriculum study, which also included surveys to program participants, college administrators, college faculty/instructors, and community partners/employers (see Appendix E for aggregate survey report)

Implementation Evaluation Calls

Regular implementation evaluation calls between the Evaluation Team and partnerships took place bimonthly until December 2018, when project implementation ceased. Grant leadership at both the college and WDB participated in these calls. Quarterly calls with the Department also occurred throughout the project.

The implementation evaluation calls enabled grant leadership and the Department to provide the Evaluation Team with timely information regarding the project's processes, progress, obstacles, and successes at each of the seven partnerships. These findings were elaborated upon during site visit

interviews and focus groups, but calls provided stakeholders an opportunity to recall events and challenges more frequently than annual visits.

Members of the Evaluation Team maintained detailed notes from each call. These notes were stored on TPMA servers and provided a timeline of relevant occurrences used as a reference point for staff, faculty, instructor, and employer interviews as well as participant focus groups.

In-Person Interviews and Focus Groups

A series of site visits occurred throughout the project, with annual visits in July 2017 and July/August 2018. The Evaluation Team visited each partnership as well as the Department. The Evaluation Team developed interview discussion guides that directed each of the visits with each partnership. These guides were originally developed prior to the July 2017 visit and then modified for the July/August 2018 visit to target themes and issues that had emerged throughout implementation, as well as program sustainability and overarching lessons learned.

The Evaluation Team visited the seven partnerships, and Department, and conducted interviews and focus groups with stakeholder groups outlined in the table below. This table outlines a cumulative estimate for all seven partnerships, including the Department.

Table 54: Implementation Evaluation Interview Stakeholder Groups and Description

Stakeholder	Description	Totals
Project leadership (including college, WDB, and Department)	The Evaluation Team conducted semi-structured 60-90-minute interviews with project leadership to discuss program activities and progress, collaboration/partnerships, resources utilized, lessons learned, challenges and successes, and sustainability/future goals. This group, in some cases, also included college Presidents and other administrators.	>25 interviews
Program faculty and instructors	As available, 30-60-minute semi-structured small group and individual interviews were conducted with program faculty and instructors that were charged with teaching the programs to participants. Discussions centered on curriculum, program activities, challenges and successes, resources utilized, modifications to structure, and lessons learned.	>50 interviews
Program staff	Semi-structured 30-45-minute small group and individual interviews were held with various staff involved with the grant-funded programs. These staff included recruitment staff, PA CareerLink staff, support service staff, administrative assistants, and other relevant staff. Discussions focused on topics such as program involvement, challenges and successes within program and role, progress, modifications, lessons learned, and sustainability.	>100 interviews
Program participants	The Evaluation Team held semi-structured 30-minute focus groups with grant participants while on site. Discussions focused on the individual's career goals, program experience and satisfaction, suggestions for improvement, and overall feedback.	>20 focus groups
Community partners	Semi-structured 45-60-minute group and individual interviews were held with community partners, including employers and community-based organizations that provide support to the program. These discussions focused on program engagement, impacts on organization/business, perceived challenges, and overall satisfaction.	>20 interviews

Interviews were semi-structured with open-ended questions used for probing and conversational inquiry. In line with the principles of applied thematic research, this interview approach enabled participants to speak about experiences in their own words, free of the constraints imposed by fixed-response questions. Inductive probing allowed the Evaluation Team to clarify statements, meaning, and the feelings associated with the experiences, to promote accuracy in detailed observational notes. This interview framework also provided the means to "[learn] from participants' talk and dynamically [seek] to guide the inquiry in response to what is being learned."[75]

To increase validity of the interviews, the Project Managers from the Evaluation Team participated in every site visit and in the implementation evaluation calls, document review, and report writing. This consistency helped build and preserve institutional knowledge across visits. Additionally, two members of the Evaluation Team were present for each visit, with one member facilitating the discussion and another taking verbatim notes to ensure context and meaning were not lost. These methods are consistent with recommendations made by qualitative researchers.[76]

Document Review

The Evaluation Team reviewed a variety of program documents including, but not limited to:

- Quarterly program narrative reports submitted to the Department;
- Promotional materials highlighting the programs (e.g., brochures, flyers, and handouts);
- Curriculum materials provided by each partnership;
- Original grant narratives from each partnership; and
- Training, process flow, and marketing and outreach documents prepared internally by partnership staff.

These documents provided additional context and information by which to evaluate initiative implementation at each stage – challenges, successes, unintended consequences (both positive and negative), and the reasons for accelerated or delayed progress at each partnership. Context from these documents informed questions for bimonthly implementation evaluation calls, in-person interview and focus group discussion guides, and content within evaluation reports.

Analysis Methods

Thematic Analysis

A general inductive thematic approach[77] was used to analyze the qualitative data generated from the interviews and focus groups. This approach was selected because of its usefulness in drawing clear links between research questions or objectives and data collection results. The analytical framework used for this analysis included a time-dependent gradient (pre-project, changes occurring in each year of implementation, and post-project scaling) and a program-dependent gradient (analyzing the program components across sites). Units of analysis included the programs, project leadership (including the

[75] Guest, G., MacQueen, K.M., and Namey, E.E. (2011). *Applied Thematic Analysis*. Thousand Oaks, CA: Sage.
[76] Kidd, P. S. & Parshall, M. B. (2000). Getting the focus and the group: Enhancing analytical rigor in focus group research. *Qualitative Health Research,* 10, 3: 293-308.
[77] Thomas D. R. (2006). A general inductive thematic approach for analyzing qualitative evaluation data. *American Journal of Evaluation*, 27: 237-245.

colleges, WDBs, and the Department), partnership staff, college faculty/instructors, participants, and community partners (including employers).

Emerging themes were developed according to the analytical framework and through a review of (1) the notes taken during bimonthly calls; (2) grant and partnership documents; (3) detailed notes taken during site visits; and (4) the Evaluation Team's extensive experience with technical training programs and the body of evaluation knowledge built through their work. Guidance about what was important came from the grant narratives, Evaluation Design Report, and calls that occurred throughout the grant period. Following the initial theme development, additional Evaluation Team members reviewed the results, adding contextual details and examples. These themes were divided into five categories:

(1) Interim Progress: Documentable steps that had been taken to advance or achieve grant outcomes, deliverables, milestones, and/or goals, fidelity to the original model and changes that occurred over time;
(2) Accelerators/Strengths: Factors that had enhanced grant progress and improved the ability of grant staff to carry out grant components, focused on internal factors (program design, modifications, implementation, and application);
(3) Barriers/Challenges: Persistent difficulties grant staff faced in accomplishing grant activities;
(4) Recommendations: Opportunities the Evaluation Team identified for improving progress toward grant outcomes at a consortium-level (in interim reports), and recommendations for other educational institutions looking to start similar programs and initiatives; and
(5) Sustainability: Components of the initiative that will continue once funding ends.

The results were again compared to the analytical framework and the anticipated reporting elements. The final step in the analysis was to send the results to partnership leadership and the Department for clarification and additional contextual details. Partnerships only reviewed content relevant to their partnership, while the Department reviewed deliverables in their entirety.

To strengthen the accuracy and credibility of implementation study findings, the Evaluation Team relied on triangulation and collaborative inquiry. By comparing findings based on different data sources and using approaches that incorporated both evidence and negative evidence, the Evaluation Team created a robust and dynamic depiction of implementation.[78] By presenting findings to initiative stakeholders for elaboration, corroboration, and modification, the Evaluation Team confirmed and updated analyses. Additionally, by sharing findings with intended users as they emerged, the Evaluation Team built a collaborative relationship with stakeholders that encouraged higher quality first-person data and increased the likelihood that the evaluation could produce timely, user-relevant findings.[79]

Reporting

Data were interpreted, analyzed, and included in two interim reports (submitted in December 2017 and 2018) and the final report (finalized by September 2019). The reports contained the results of the qualitative analysis (including consortium- and partnership-level challenges and successes),

[78] Brewer, J. and Hunter, A. (2006). *Foundations of multimethod research: Synthesizing styles*. Thousand Oaks, CA: Sage.
[79] Cousins, J.B. and Earl, L. M. (1992) The Case for Participatory Evaluation. *Educational Evaluation and Policy Analysis*, 14(4), 397-418.
Cousins, J. B. and Whitmore, E. (1998). Framing participatory evaluation. *New Directors for Evaluation*, 80. 5-23.
Greene, J.G. (1998). Stakeholder participation and utilization in program evaluation. *Evaluation Review*, 12. 91-116.
Reineke, R. A. (1991). Stakeholder involvement in evaluation: Suggestions for practice. *American Journal of Evaluation*, 12. 39-44.
Sturges, K.M. (2013). Building consensus in (not so) hostile territory: Applying anthropology to strategic planning. *Practicing Anthropology*, 35, 1: 35-39.

recommendations for improvement, rationale for recommended modifications, and curriculum study findings. These results were compared over time and each report was reviewed for member checking, factual verification, and elaboration on findings and recommendations. Subsequently, reports were submitted to the Workforce Innovation Fund National Evaluation Coordinator (WIF NEC).

LIMITATIONS

Limitations for the implementation evaluation included the following elements:

Partial and Biased Findings

Qualitative and perceptual research methods offer good insights but are, by nature, partial and biased. To attempt to address this limitation, the Evaluation Team took advantage of opportunities to embed a mixed-methods approach into the evaluation to enable the triangulation of data.[80] Triangulating results from multiple sources, such as comparing findings among stakeholder interviews with document reviews, creates more credible findings and is considered critical to the validity and reliability of findings. Findings that have been corroborated through triangulation tend to be more robust.[81]

Selection Bias

To address the threat of non-response and non-consent, and to improve the likelihood that sufficient data could be collected to draw valid conclusions, the Evaluation Team relied on purposive and convenience sampling coordinated by project staff. Through this, however, selection bias is introduced into the findings. Participants and community partners more interested in providing feedback or more involved in the program may have chosen to participate in interviews at a higher rate than less interested or less engaged participants and community partners, and project staff responsible for coordinating interviews may have selected only those cases where they anticipated participation. These biases were strengthened due to the nature of the initiative, as it was a grant that targeted individuals with barriers to education and employment, meaning these individuals are difficult to reach. Therefore, selection bias could have become more apparent as project staff may have selected participants that were more engaged and/or on campus at the time.

However, evaluator focus groups held during class time and neutral/critical feedback from participants and community partners as well as surveys as part of the curriculum study (see Appendix E for aggregate survey report), supported the notion that these research participants were chosen primarily for their willingness to participate in the study rather than the likelihood they would cast the program in a favorable light.

Research Extrapolation

Analyses conducted with an interpretive and analytical framework, influenced by phenomenology, suffer from the threat that researcher extrapolation and interpretation may go too far beyond what is present in, and supported by, data.[82] Indeed, the recommendations provided in evaluation reports are based on a

[80] Brewer, J. and Hunter, A. (2006). *Foundations of multidimensional research: Synthesizing styles*. Thousand Oaks, CA: Sage.
[81] Denzin, N. K. (1978). *The research act: A theoretical introduction to sociological methods* (2nd edition). New York, NY. McGraw-Hill.
Harry, B., Sturges, K.M., & Klinger, J.K. (2005). Mapping the process: An exemplar of process and challenge in grounded theory analysis. *Educational Researcher*, 34, 2: 3-13.
Patton, M.Q. (2001). Evaluation, Knowledge Management, Best Practices, and High-Quality Lessons Learned. *American Journal of Evaluation*. 22(3). 329-336
Patton, M.Q. *Qualitative Research & Evaluation Methods* (4th edition). Thousand Oaks, CA. SAGE Publications, Inc., 2015.
[82] Guest, G., MacQueen, K.M. & Namey, E.E. (2011). *Applied thematic analysis*. Thousand Oaks, CA. SAGE Publications, Inc.

combination of what was learned and supported by data, and the experiences and findings of the evaluator's previous knowledge designing, implementing, and evaluating various training programs.

Respondent Order Effect

For site visits, the Evaluation Team conducted focus groups with initiative participants at all partnerships. During these group interviews, participants more interested in sharing their opinions of the program may have spoken up at a greater rate than other students. This may have created a pecking order bias by participants self-selecting their response order (i.e. certain participants go first, and others go last). Receiving a range of feedback from participants, from positive to critical, supports the notion and that a spectrum of student experiences was captured, however, it is possible that bias related to the participant response ordering was introduced into the evaluation.

APPENDIX B: OUTCOMES EVALUATION METHODS

DESIGN SUMMARY

The outcomes and predictive analysis study design for *Micro-credentials: Opportunity through Stackable Achievements* consisted of a one-group (participant) study, analyzing micro-credential and career pathway completion outcomes and changes in employment status and wages from twelve months before the participants enrolled in a college's micro-credentialing program and six months after exiting the program. Assessing participants' earning and wages twelve months before enrollment allowed the Evaluation Team to look at multiple quarterly wages and observe the possible incidence of Ashenfelter's dip (decline in participants' mean earnings in the period prior to enrollment in education and training programs[83]).

The Evaluation Team merged administrative data collected by the community colleges, National Student Clearinghouse data, and wage and employment data from the Commonwealth's Unemployment Insurance data system to answer the research questions. By documenting the number and type of micro-credentials each participant completes, and the rate of persistence along the micro-credentialing career pathways, the Evaluation Team explored the differences in participant outcomes by institution, field of study, program dosage, and demographics (e.g., gender, age range, race, and ethnicity). Predictive models were constructed to determine whether there are sociodemographic variables that contributed to the likelihood of employment, wage increase, and completion of micro-credentials pathways.

The Evaluation Team conducted an evaluability assessment prior to grant implementation which revealed non-existence of suitable comparison groups across implementation sites (as similar as possible to the participants in terms of observable characteristics and variables, but also those that are unobservable, to limit the impact of endogeneity on the observed results) and impaired feasibility of accessing data for potential groups. Therefore, the Evaluation Team, in partnership with the Department, decided to conduct an outcomes analysis with predictive analytics in lieu of an impacts study design. While the Evaluation Team considered conducting an impacts analysis with traditional pathways students as control group, there were two major reasons why they were not optimal controls, and therefore any study results comparing their outcomes to participant outcomes likely would not have reflected the true impact of *Micro-credentials: Opportunity through Stackable Achievements*:

(1) To accurately assess impact of the program on employment and wages post-completion, the participants and controls must be training for same types of jobs. While the community colleges were developing some of the micro-credentials in sectors/disciplines that already existed, and traditional pathway students were taking classes in these in these areas, the micro-credential and traditional pathways had different trajectories and intermediate goals. The end goal may be the same—for example, as micro-credentials were aligned with career pathways, the occupation(s) at the end of the pathway may have been the same for both the micro-credentialed and traditional students. However, it may have taken more time for a participant not on that traditional path to meet that end goal, and he/she/they may have worked a series of jobs along the way, whereas traditional students were more likely to be able to start working in that occupation immediately after finishing their full course of study in one continuous block of time.

[83] Heckman, J. J., & Smith, J. A. (1999). The pre-program earnings dip and the determinants of participation in a social program – Implications for simple program evaluation strategies. Retrieved from http://athens.src.uchicago.edu/jenni/dvmaster/FILES/ash_dip.pdf

(2) Across implementation sites, the targeted participant population faced barriers to education and employment that many traditional pathway students did not face, making the two groups fundamentally different. This fundamental difference could not completely be mitigated using methods like propensity score matching.

This type of analysis is common in educational research of this type, where assignment to control and treatment groups is not possible due to ethical concerns.

Data Sources

Since micro-credential programs are, for the most part, non-credit, there is variability in how the data are collected and what data are collected from the participants at each partnership. To help overcome this potential barrier, the Evaluation Team created intake forms and individualized Excel spreadsheets to collect micro-credential participant data. The Evaluation Team required the following data points to be collected by each partnership at minimum and allowed partnerships to add additional datapoints for internal reporting and tracking purposes (e.g., disconnected youth status):

Student Demographic Data	Micro Credential Data
Last Name	Name of Micro-Credential Enrolled In
First Name	Date of Enrollment/Micro-Credential Start Date
Social Security Number	Micro-Credential Completion Status
Age	Incomplete/Withdrawal Status
Ethnicity	Date of Micro-Credential Completion
Race	Industry Certification Earned
Gender	Continuation to For-Credit Educational Program
Marital Status	
Year of High School Graduation/GED Completion	
Highest Level of Education Attained Prior to Enrollment	
First Generation College Student	
Ex-Offender Status	
Veteran Status	
Referral Source	

In addition to the demographic and enrollment data collected by the colleges, Unemployment Insurance (UI) data were collected by the Commonwealth of Pennsylvania. Since the data consists of personally identifiable information (PII), before the data were made available to the Evaluation Team, the PII was removed and a Random ID was assigned to each participant and added to the dataset

Sampling Design

No weighting or clustering was necessary in sampling. Eligibility for inclusion in the analyses varied based on outcomes and predictor variables. For example, in research questions 1, 3, and 8, all students were included if they enrolled in a single pathway, regardless of completion (N = 848 observations of participants enrolling in a pathway). For research question 2, the eligibility for inclusion is limited to only the 635 observations from pathways that required more than one micro-credential. For research questions 9 and 11, the sample includes only the 729 enrollments with complete demographic data. For research question 10, both requirements hold—observations required enrollment in a pathway with more than one micro-credential as well as complete demographic information—reducing the sample size to 559. For research

question 13, the 200 enrollments at the Philadelphia Partnership were excluded from the sample, along with those missing demographic data; this left a sample of 555.

The requirement for inclusion in the sample for research question 4 was the completion of at least one micro-credential. Students failing to complete a single enrollment did not undergo the treatment and hence are not appropriate for inclusion in the analysis of the impact of the programs. In all, 766 pathway enrollments resulted in at least one micro-credential completion. This sample was further reduced for research question 7, where only the 267 enrollments for students who were employed 12 months before were eligible for inclusion and only the 207 enrollments for students who were employed six months after were eligible for inclusion. Because research questions 5 and 6 did not require analysis at the pathway level, redundant demographic observations for students enrolling in two or three pathways were deleted, reducing the 766 to 631 for research question 5, and reducing the 267 (pre-program) and 207 (post-program to 223 and 183, respectively, for research question 6. This reduction at the level of unique individuals is also used for the demographic variables in RQ 7.

Research question 6 also utilizes slightly larger samples of 341, 328, and 270 when reporting raw average quarterly wages for individuals 12 months pre, three months post, and six months post, respectively. For the raw averages, inclusion in the sample only required employment at the individual time point, whereas the count of 223 and 183 required employment at 12 months pre as well as three- and six-months post, respectively. Research question 12 began with the 766 enrollments that resulted in completion of at least one micro-credential, but added the requirement of no missing demographic data, leaving a sample of only 665. The sample for research question 14 included the 270 individuals with employment 6-month post, minus 34 missing demographic data. The sample was further reduced for the second analysis in research question 14, to include only those of the 183 individuals with pre-12 and post-6 wage data, minus participants with missing demographic information.

Response rates were very good, with only a few of the 685 participants missing necessary information. For research questions 1-8, all observations were valid and included all necessary fields. For research questions 9-14, those failing to disclose demographic information were not included in the reported analysis. Gender was unreported for 2 participants; marital status for 33, education level for 12, first generation college student for 54, conviction status for 19, race/ethnicity for 22, and age for 3. In all, 91 participants did not disclose all of their demographic information. Robustness checks were completed to ensure that the inclusion of these unknown predictors did not substantially change the findings. In other words, each binary logistic regression was run a second time including all respondents with the addition of "Unknown" categories for each demographic; magnitudes and significant findings were then compared between the two models.

Statistical Methods

The Evaluation Team used different statistical methods depending on the nature of the research question. For participant demographics and to answer research questions 1 – 8, the Evaluation Team conducted a one group post-test design study with descriptive analyses and reported descriptive statistics. To answer these questions, the Evaluation Team investigated a single group (students who enrolled in at least one pathway at one of the seven partnerships). In this case, the treatment is considered to be enrollment in a pathway and the post-test outcome is whether or not the participant completed at least one micro-credential, persisted beyond the first micro-credential, completed the entire pathway, or received an industry-recognized credential.

For research question 4, the Evaluation Team utilized a one group pre-post design. Here, a single group of participants is analyzed using inferential statistics to determine the effect of treatment (i.e., completing at least one micro-credential) on the outcome of employment. A pre-post design requires an outcome measurement before and after the treatment; here, the pre-test outcome is employment status 12 months prior to enrollment and the post-test outcome is employment status either three months or six months after completion. This methodology is used again for research question 6 to describe the impact of treatment (i.e., completing at least one micro-credential) on the outcome of differences in quarterly wage gains. Hence, wages are collected 12 months prior as the pre-treatment outcome and three- or six-months post as the post-treatment outcome.

Research questions 5 and 7 extends research questions 4 and 6 to non-equivalent control group pre-post designs to make descriptive statements about the impact of various demographic factors on post-pathway employment and wage gains. Questions 12 and 14 further extend the same design in order to make inferential statements about the impact of the same demographic factors on these two outcomes. In these cases, the treatment and control assignment of the variables can be found by looking for the "ref" category in the binary logistic regression output.

For research questions 9-11 and 13, the Evaluation Team utilized a non-equivalent control group design to make inferential statements about the impact of various demographic factors on the same four outcomes as research questions 1-3 and 8. Here, the Team considers demographic factors to be treatments/controls. For example, the "control" is female and the "treatment" is male; the "control" is aged 17-29, and the "treatments" are other age ranges; the "control" is minority status and the "treatment" is white, non-Hispanic status, etc. In each case, the "control" is labeled in the output as "ref" for "reference category." Once again, the post-test outcomes are: completion of at least one micro-credential, persistence beyond the first micro-credential, completion of the entire pathway, or receipt of an industry-recognized credential as being four treatments (one per research question). This method was used again for research question 14 with the post-test outcome being average wage six months after completing the final micro-credential.

Methods used in inferential testing include matched t-tests (RQ 6), binary logistic regressions (RQs 9-13), and ordinary least squares multiple regression (RQ 14). For all tests, regardless of the type of test statistic computed, the *p*-value represents the probability of observing a test statistic as large (or larger) than that of the magnitude observed, given that there truly is no treatment effect. A cutoff of .05 was chosen by the Evaluation Team prior to analysis to limit the probability of a false claim of significance to 5%. All descriptive and statistical analyses were conducted using SAS version 9.4 (SAS Institute Inc., Cary, NC).

Matched t-Test

A matched *t*-test compares the mean changes between control and treatment:

$$\mu_d \stackrel{?}{=} 0,$$

where $\mu_d = \frac{1}{N}\sum_{i=1}^{N}(x_{T,i} - x_{C,i})$ represent the average change in x for all individuals i in the population before treatment C versus after treatment T. Hence, the t-tests for RQ 6 compare wages before and after participation in the partnership. The test statistic represents how many standard deviations the mean difference is from the hypothesized value of 0, which would indicate no change.

OLS Multiple Linear Regression

An ordinary least squares multiple linear regression is an extension of a *t*-test that allows groups to have an infinite number of levels. For example, in the *t*-test above, observations were limited to treatment or control. In RQ 14, there are many predictor variables and two (education level and age) have multiple levels. Hence, a more complex model is required to accommodate the many levels. The aim of the multiple regression is to minimize sum of the squared distances between the predicted outcome and the observed outcome, where the predicted outcome can be represented as

$$\mu_{y|x_1,\ldots,x_k} = \beta_0 + \beta_1 x_1 + \cdots + \beta_k x_k,$$

which is the average value of y given a set of values for each of the k predictors x. The xs represent predictor variables for the outcome and the βs represent their respective coefficients derived from a multiple linear regression. The errors to be minimized can be represented as

$$\varepsilon_i = y_i - \mu_{y|x_1,\ldots,x_k}.$$

The test statistics for this test include an *F* statistic (the ANCOVA test statistic) that compares the entire model above to simply predicting the average value of y, regardless of the predictors (i.e., guess μ_y 100% of the time), and individual *t* statistics for each of the βs for predictor variable xs. Hence, these *t* statistics tell the number of standard deviations each β is from the hypothesized value of 0, which would indicate no impact on y from the x. For RQ 14, the estimates for the βs represent the estimated average impact on wages that result from being in one demographic group versus the baseline group.

Binary Logistic Regression

A binary logistic regression compares the probability of a dichotomous outcome, given a set of predictors. The log-odds of observing a "success" (outcome = 1) is the log of the probability of observing a success divided by the probability of observing a failure (outcome = 0).

$$\ell = ln\frac{p}{1-p} = \beta_0 + \beta_1 x_1 + \cdots + \beta_k x_k,$$

where the xs represent predictor variables for the outcome and the βs represent their respective coefficients derived from a multiple linear regression. The test statistics for this test include a likelihood ratio (LR) that compares the entire model above to simply predicting the most common outcome for each observation, regardless of predictors (i.e., guess success 100% of the time if the number of success observed is greater than 50%), and individual *t* statistics for each of the βs for predictor variable xs. As with a linear regression, these *t* statistics tell the number of standard deviations each β is from the hypothesized value of 0, which would indicate no impact from the x. Because this type of regression gives output in the form of log odds, the βs are typically converted back to an odds ratio (OR) for ease of interpretation, by exponentiating both sides of the equation. Hence:

$$\frac{p}{1-p} = \exp\left(\beta_0 + \beta_1 x_1 + \cdots + \beta_k x_k\right).$$

Additional, 95% confidence intervals (CI) for the odds ratios were calculated and reported.

APPENDIX C: CURRICULUM STUDY RUBRIC

I. CURRICULUM DEVELOPMENT AND SUPPORT

This section is essential to curriculum development. Evidence may be presented from related documents, such as a curriculum development plan or a professional development plan for teachers or instructors. Emphasis is placed on triangulation; therefore, many factors should be reviewed for evidence from several different sources before coming to a conclusion.

Table 55: Curriculum Rubric

The following are important aspects of curriculum development and should be evidenced.	Yes, there is evidence.	No, there is not evidence.	Comments/ Next Steps
A. A philosophy and/or mission statement about the teaching and learning of all students across all courses and the curriculum development.			
B. An overall plan for curriculum development exists, involves stakeholders and indicates where each curriculum area is in the development, implementation, or evaluation cycle with timelines. Plans for data-driven evaluation of the curriculum at the college level and for the content area are also included.			
C. A defined model governs the curriculum.			
D. A system to orient instructors and administrators in the use of the curriculum includes professional development and training of new staff as needed.			
E. After training, program is well laid out and intuitive. Distinctive materials are worth the time to implement because they are effective.			
F. A list of current references guided the curriculum development.			
G. A plan showing alignment with a standards-based student profile.			
H. Industry engagement in selecting or defining the curriculum prior to enrolling students.			

Note. Supplemented through a variety of collection methods:

- *Documentation of process of working with industry and getting input on: curriculum design and content, materials, integration of workplace skills and hands-on project-based learning, and transition to the workforce*
- *Course outlines or maps w/content detail, syllabi, and competencies*
- *Materials (to the extent possible) like textbooks, articles, worksheets, and online curricula*
- *Relevant industry standards and competencies*
- *Observation of teaching methods, classrooms, and facilities*
- *Interviews w/instructors, students, counselors, and administrators*
- *Surveys*

II. CURRICULUM COMPONENTS

This section is essential to evaluating the curriculum and its components. Emphasis is placed on triangulation; therefore, many factors should be reviewed for evidence from several different sources before coming to a conclusion.

Table 56: Curriculum Rubric (continued)

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
	5	4	3	2	1	
FOCUS CONTENT ACCURACY: To what extent does the curriculum integrate accurate content? **Possible Indicator(s):** absence of content errors and clear explanation of concepts and strategies.						
Content Accuracy –what students should know (key knowledge).	Content is accurate with credible authorship and reviewers.	Content is accurate without credible authorship and reviewers.	Some inaccuracies are found.	Many inaccuracies are found.	There is no reason to be confident about the accuracy of the content.	
FOCUS DEPTH: To what extent does the curriculum integrate and support depth of knowledge and workplace skills? **Possible Indicator(s): a)** learner expectations state what students should know and be able to do by the end of each module/course/program, **b)** learner expectations are prioritized to reflect program goals, **c)** learner expectations are included and organized into modules/themes/units (based on curriculum model as appropriate) for a set period of time, **d)** curriculum align with the current state/national/industry standards and expectations, **e)** curriculum align with formative and summative assessments, **f)** curriculum align with other used resources, **g)** learner expectations are organized in						

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
stated levels of priority form most important to the least important based on the big ideas, **h)** level of industry engagement in selecting or defining the curriculum prior to enrolling students and **i)** there are opportunities for assessment of selected general education skills.						
Content Depth –what students should know (key knowledge) and should be able to do (key skills).	Content coverage is rich. Opportunities to explore depth of content are numerous.	Content is covered and there are adequate opportunities to explore content in depth.	Content coverage is superficial but there are few opportunities to explore content in depth.	Content coverage is weak and there is only one opportunity to explore content in depth.	Significant amounts of important content are not covered and there are no opportunities to explore content in depth.	
Standards Coverage -the matching of nationally recognized academic standards, and industry recognized standards and practices selected by the college.	Demonstrates thorough and documentation of formal alignment of the curriculum to standards and practices. **AND** Thoroughly covers all applicable standards	Demonstrates documented alignment of the curriculum to standards and practices **AND** Thoroughly covers some of the standards and	Demonstrates documented alignment of the curriculum to standards and practices **AND** Addresses standards but does not meet the intention of the	Has limited alignment of the curriculum to standards and practices **OR** Does not thoroughly address the standards or meet	Has no alignment of the curriculum to standards and practices **AND** Does not address any industry standards and practices.	

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
Note. Supplemented through instructor interview.	and meets the intention of the industry standards and practices.	meets the intention of the industry standards and practices.	industry standards and practices.	the intention of the industry standards and practices.		
Workplace Competencies – what students should be able to do (key skills) as a result of this instruction, specific to micro-credential.	The materials are excellent at developing workplace skills.	The materials are good at developing workplace skills.	The materials are adequate at developing workplace skills.	The materials are weak at developing workplace skills.	The materials do not develop workplace skills.	
Access to In-Depth Understanding *Note. Supplemented through instructor interview.*	The materials are excellent at supporting in-depth understanding and has several documented varieties of opportunities within the curriculum for applied or project-based learning that	The materials are good at supporting in-depth understanding and have documented opportunities within the curriculum for applied or project-based learning.	The materials are adequate at supporting in-depth understanding and have documented opportunities within the curriculum for applied or project-based learning.	The materials are weak at supporting in-depth understanding and lacks documented opportunities within the curriculum for	The materials do not support in-depth understanding and lacks documented opportunities within the curriculum for applied or project-based learning.	

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
	show complexity and depth			applied or project-based learning.		
FOCUS SCOPE AND SEQUENCE: To what extent is the order in which skills and concepts sequenced along a continuum of development? **Possible Indicator(s): a)** within micro credential clusters, skills and concepts evolve sequentially from level to level and/or module to module, **b)** skills and concepts are sequenced along a continuum of development, **c)** big picture ideas/concepts are stated for each module/unit/theme, **d)** timelines are included for each module/unit/theme, and **e)** a curriculum matrix (graphic) scope and sequence showing either topical, thematic or skill development.						
Content Scope	Thoroughly covers foundational concepts. **AND** Meets requirements listed in "Accomplished," and alignment as shown in the syllabus. The syllabus includes details on assessment	Covers key concepts. **AND** Meet requirements listed in "Proficient," and course descriptions indicate where courses fall within the program of	Covers some key concepts. **AND** All courses have a syllabus meet requirements listed in "Developing," and are designed to the level	States but does not clearly cover foundational concepts. **AND** At least 50% of the courses have a syllabus, but existing course syllabi do not	Does not address any of the foundational concepts. **AND** Course syllabi do not exist for any courses.	

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
	and grading; rework policies (i.e. redoing substandard work); and standards-based assignments and project outlines with real-world problems/hands-on experience. Examples of assignments, projects and assessments are designed to help students meet standards. Each syllabus contains an example of an authentic project to be assessed by a panel of judges.	study; contain descriptions of anchor assignments and projects for each course in the sequence; and examples of assignments, projects and assessments are designed to help students meet standards.	of learning needed to meet standards.	include necessary elements, such as: course description, instructional philosophy, course goals, major course projects, project outlines, instructional delivery plan, assessment plan.		

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
Real World Connection – engage students in ways to help them understand the reality of the profession they seek. Instruction should be related to workplace needs. Materials should use tasks that are real activities that people perform while "on the job."	The materials are excellent at engaging the student in real world tasks.	The materials are good at engaging the student in real world tasks.	The materials are adequate at engaging the student in real world tasks.	The materials are weak at engaging the student in real world tasks.	The materials do not engage the student in real world tasks.	
General Education Integration –integrate general education skill such as English, technology, written and oral communication.	Materials are excellent at integrating general education skills.	Materials are good at integrating general education skills.	Materials are adequate at integrating general education skills.	Materials are weak at integrating general education skills.	Materials do not integrate general education skills.	
Students Learning Trajectories –the order in which skills and concepts are sequenced along a continuum of development.	Carefully develops incremental concepts along student's learning trajectories.	Follows student learning trajectories within sections or subjects.	Organizes content mostly by subject rather than student learning trajectories.	Does not use student learning trajectories effectively to organize content.	Concept development runs counter to student learning trajectories.	

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
FOCUS ACTIVITIES AND INSTRUCTION: To what extent do activities and instruction models appropriate work habits in industry, and program content/learning is consistent with industry practices? **Possible Indicator(s): a)** Lessons that support instructional outcomes and reflect important concepts, **b)** instructional maps that include relationships to prior learning, **c)** activities that represent high level thinking, **d)** opportunities for varied approaches and choice for students, **e)** use of varied resources, **f)** thoughtfully planned learning groups, **g)** structured lesson plans, **h)** information about common misconceptions and teaching strategies to address them, **i)** suggestions for teaching strategies to support students who struggle, **j)** suggestions for teaching strategies to support the extension of the learning beyond the lesson objectives, **k)** specific strategies to address ELL students or students experiencing learning or social emotional difficulties, **l)** activities sequenced to target the content in the student expectations, **m)** activities promoting higher order thinking and problem solving, **n)** opportunities for authentic application of new learning in and out of the classroom, **o)** specific activities to address 21st century skills (e.g. communication, creativity, problem solving, self direction, etc.), **p)** ways to use information and technology to enhance learning, increase productivity and promote creativity, **q)** suggested resources aligned with the content in the student expectations, **r)** a variety of resources that address skill level readiness of students, **s)** suggested print and non print resources, **t)** suggested learning supplies and equipment resources (e.g. manipulatives, technology, etc.), and **u)** explanations for the use of included resources.						
Lesson Plan Model –the plan to provide cognitive experiences that help students perceive, process, rehearse, store, and transfer new knowledge or skills.	Lesson plan design includes effective concept introduction, practice, summarizing, and assessment of key	Lesson plan design organizes lesson into stages of introduction, development, and assessment.	Lesson plan design omits important features critical to concept understanding.	Lesson plan design distracts from the development of concept development.	Lesson plan design is nonexistent or impedes concept development.	

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
	concepts and essential skills.					
Teaching Methods –the plan for and the actions by the instructor to engage students in learning the content.	Employs effective, innovative, and engaging teaching methods that are founded in pedagogy and andragogy research. **AND** Has consistent hands-on/project-based and related theory instruction to ensure student mastery of core skills and/or meet	Employs effective traditional teaching methods. **AND** Has hands-on/project-based instruction or field/work-site and related theory instruction to ensure student mastery of core skills and/or meet applicable industry minimums.	Employs some ineffective teaching methods. **BUT** Has hands-on/project-based instruction and related theory instruction to ensure student mastery of core skills and/or meet applicable industry minimums.	Employs mostly ineffective teaching methods. **AND** Lacks hands-on/project-based instruction and related theory instruction to ensure student mastery of core skills and/or meet applicable industry minimums. **OR**	Employs consistent ineffective teaching methods. **AND** Lacks hands-on/project-based instruction and related theory instruction to ensure student mastery of core skills and/or meet applicable industry minimums. **OR**	

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
	applicable industry minimums. **AND** Provide students with career-based or field/work-site experiences that are aligned to technical knowledge or skills.	**OR** Provide students with career-based or field/work-site experiences that are aligned to technical knowledge or skills.		Does not provide students with career-based or field/work-site experiences aligned to technical knowledge or skills.	Does not provide students with career-based or field/work-site experiences aligned to technical knowledge or skills.	
Instructional Materials – materials that support learning and actively engage all students, not limited to textbooks, worksheets, articles, and online curricula.	Materials are excellent at supporting effective instructional strategies that actively engage all students.	Materials are good at supporting effective instructional strategies that actively engage all students.	Materials are adequate at supporting effective instructional strategies that actively engage all students.	Materials are weak at supporting effective instructional strategies that actively engage all students.	Materials do not support effective instructional strategies that actively engage all students.	

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
Facilities, Equipment, and Industry-Related Supplies *Note. Supplemented through student and instructor interview and classroom observation.*	Provides all students access to program-specific, state-of-the-art equipment and/or workstations; **AND** Facilities, equipment, and supplies allow all students to master and enhance skills and complete applicable contact hours.	Not Applicable	Provides all students access to program-specific equipment and/or workstations; **AND** Facilities, equipment, and supplies allow all students to attain skills or complete applicable contact hours.	Not Applicable	Does not provide all students access to program-specific equipment and/or workstations; **OR** Facilities, equipment, and supplies do not allow students to attain skills or complete applicable contact hours.	
Problem Solving –develop problem solving and critical thinking (e.g. materials encourage students to learn how to approach problems, to think both creatively and	Materials are excellent at developing problem solving and critical thinking skills.	Materials are good at developing problem solving and critical thinking skills.	Materials are adequate at developing problem solving and critical thinking skills.	Materials are weak at developing problem solving and critical thinking skills.	Materials do not develop problem solving and critical thinking skills.	

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
analytically, and to make knowledge-based decisions).						
Personal Qualities –personal qualities required for employment (e.g. character traits, behaviors and attitudes that are needed for personal growth and professional development such as responsibility, self-management, and integrity).	Materials are excellent at developing personal qualities needed for professional employment.	Materials are good at developing personal qualities needed for professional employment.	Materials are adequate at developing personal qualities needed for professional employment.	Materials are weak at developing personal qualities needed for professional employment.	Materials do not develop personal qualities needed for professional employment.	
Diversity –reflection of the experiences and perspective of different cultural and socioeconomic groups.	Materials are excellent at reflecting perspectives of different cultural and socioeconomic groups.	Materials are good at reflecting perspectives of different cultural and socioeconomic groups.	Materials are adequate at reflecting perspectives of different cultural and socioeconomic groups.	Materials are weak at reflecting perspectives of different cultural and socioeconomic groups.	Materials do not reflect perspectives of different cultural and socioeconomic groups.	

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
FOCUS ASSESSMENTS: To what extent do the assessments and required activities measure the adequacy of the student's knowledge acquisition and skills required in the workforce? **Possible Indicator(s): a)** lesson plans indicating correspondence between assessments and instructional outcomes, **b)** assessment types suitable to the style of outcome, **c)** varied performance opportunities for students, **d)** modified assessments available for individual students, **e)** expectations clearly written with descriptors for each level of performance, **f)** formative assessments designed to inform minute to minute decision making by the teacher during instruction, and **g)** students assessing their own work against established criteria.						
Assessments –the ways to measure and monitor adequacy of student's knowledge and skills in the workplace, alongside guide instructional decisions.	Pre-assessments are excellent at measuring the knowledge and skills required in the program or workplace. Program retention exceeds 95%	Pre-assessments are good at measuring the knowledge and skills required in the program or workplace. Program retention is 75-94%	Pre-assessments are adequate at measuring the knowledge and skills required in the program or workplace. Program retention is 60-74%	Pre-assessments are weak at measuring the knowledge and skills required in the program or workplace. Program retention is 50-59%.	The pre-assessments do not measure the knowledge and skills required in the program or workplace. Program retention is below 50%.	
Assessments Continued	Ongoing assessments are excellent at measuring the knowledge and skills	Ongoing assessments are good at measuring the knowledge and	Ongoing assessments are adequate at measuring the knowledge and skills	Ongoing assessments are weak at measuring the knowledge	The ongoing assessments do not measure the knowledge and skills	

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
	required in the workplace.	skills required in the workplace.	required in the workplace.	and skills required in the workplace.	required in the workplace.	
Assessments Continued	90-100% of students in the program take a post assessment; **OR** Pass rates on post assessments exceed 90%.	75-89% of students in the program take a post assessment; **OR** Pass rates on post assessments are 75-89%	50-74% of students in the program take a post assessment; **OR** Pass rates on certification exams are 60%-74%	25-49% of students in the program take a post assessment; **OR** Pass rates on post assessments are 50-59%.	Less than 25% of students in the program take a post assessment; **OR** Pass rates on post assessments are <50%.	
Technical Assessments – National, state, and/or local assessments that provide ongoing information on student attainment of the necessary knowledge and skills for entry and advancement in	Has at least three varieties of assessment types for students to demonstrate their technical proficiency;	Not Applicable	Has at least two varieties of assessment types for students to demonstrate their technical proficiency;	Not Applicable	Has a single assessment type for students to demonstrate their technical proficiency; **OR**	

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
postsecondary education and careers in their chosen field of study.	**AND** Assesses student technical skill attainment through at least three formal and/or informal opportunities; **AND** Has an established schedule for measurement of student technical attainment.		**AND** Assess student technical skill attainment through at least two formal and/or informal opportunities; **AND** Has an established schedule for measurement of student technical attainment.		Assesses student technical skill attainment through a single opportunity; **OR** Has no established schedule for measurement of student technical attainment.	
National and/or Industry-Approved Technical Skills – leads to industry certification that has value in the workplace.	Provides student with the opportunity to earn relevant nationally-recognized	Not Applicable	Provides students with the opportunity to earn relevant nationally-recognized	Not Applicable	Does not provide students with the opportunity to earn relevant nationally-recognized or	

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
	or industry-approved credentials; **AND** Systematically tracks the number of students who took the assessment and succeeded and uses that data for program improvement.		or industry-approved credentials; **AND** Tracks the number of students who took the assessment and succeeded.		industry-approved credentials; **OR** Does not keep track of the number of students who took the assessment and succeeded.	
FOCUS PROGRESS MONITORING: To what extent is student learning and progress monitoring and what is the level of flexibility in the curriculum to help students achieve program instructional outcomes? **Possible Indicator(s): a)** adjustment of instruction and/or curriculum in response to evidence of understanding (or lack of it), **b)** citations of adjustments that draw on a repertoire of strategies, **c)** routines and systems that track student completion, **d)** systems of information regarding student progress against instructional outcomes, **e)** processes of maintaining accurate non instructional records, **g)** frequent information provided regarding the instructional program and student progress, **h)** regular participation with colleagues and industry sectors to share and plan for student success, **i)** participation in professional development, and **j)** participation in learning networks with colleagues that incorporate freely shared insights.						

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
Professional Development – training provided to program's teachers or instructors in the academic and technical knowledge and skills aligned to industry standards in areas to which they are assigned. *Note. Supplemented through instructor interview.*	Is taught by instructors that hold program-specific credentials or certificates; **AND** Is being taught by instructors that have industry experiences or technical training in the field within the last 5 years; **AND** Instructors have received PD on the integration of academic and technical instruction in the last 3 years including training in	Not Applicable	Is taught by instructors that hold program-specific credentials or certificates **OR** Is being taught by instructors that have industry experiences or technical training in the field; **AND** Instructors have received PD on both academic and technical instruction in the last 3 years including training in	Not Applicable	Is taught by instructors that do not hold program-specific credentials or certificates; **AND** Is being taught by instructors that have not had industry experiences or technical training in the field; **OR** Instructors have not received PD on both academic and technical instruction in the last 3 years including training in	

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
	national/state standards.		national/state standards.		national/state standards.	
Ease of Use –factors related to organization and usability.	Design facilitates use. After training, program is well laid out and intuitive. Distinctive materials are worth the time to implement because they are effective.	Design helps in organization of content. Program requires little or no training because it is like other programs we have used.	Design does not help or distract from use. Some materials in the program will not be used because they are unnecessarily confusing and ineffective.	Design distracts from ease of use. Most materials are not effective and not worth the effort it will take to learn how to use them.	Design hinders use. Even after training, program is unnecessarily confusing and ineffective.	
Program Philosophy	Program has a sound philosophy grounded in credible evidence, research, and/or	Program philosophy is sound and based on credible	Program philosophy is not strong and is not clearly evident.	Program philosophy is not apparent.	Program philosophy reflects ineffective practices.	

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
	experience. The philosophy is evidenced throughout the program.	information, but the philosophy is only evidenced in specific locations.				
Accountability and Evaluation - Systems and strategies to gather quantitative and qualitative data on both program of study components and student outcomes to aid ongoing efforts to develop and implement program.	Prioritizes and regularly evaluates disaggregated student outcome and achievement data **AND** Has a systematic process for the review of a variety of student data to support students' needs and inform program changes.	Not Applicable	Evaluates disaggregated student outcome and achievement data **AND** Reviews a variety of student data to support students' needs and/or program changes.	Not Applicable	Does not evaluate disaggregated student outcome and achievement data **OR** Does not review student data to support students' needs or inform program changes.	

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
Micro-credential Completion – requirements to receive micro-credential.	Requirements for successful completion (e.g. passing grades of courses, work term completion) of the program are sufficient and validated through employers.	Requirements for successful completion (e.g. passing grades of courses, work term completion) of the program are present, and validation through employers is presently pending.	Requirements for successful completion (e.g. passing grades of courses, work term completion) of the program are present, but not validated through employers.	Requirements for successful completion (e.g. passing grades of courses, work term completion) of the program are insufficient.	Requirements for successful completion (e.g. passing grades of courses, work term completion) of the program are not present or validated through employers.	
Supplemental and Support Services –enable students to access academic, personal/social and career supports to maximize their potential for success.	Has a clear and well-documented system for addressing the needs of all students, including special populations; **AND**	Not Applicable	Has a system for addressing the needs of all students, including special populations; **AND** Offers formal and/or informal post-	Not Applicable	Has no system for addressing the needs of all students, including special populations **OR** Offers no formal and/or informal goal-	

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
Note. Supplemented through student, instructor, and counselor interview.	Offers regular formal and informal post-secondary goal-setting opportunities that connect current study to future career and training opportunities.		secondary goal-setting opportunities that connect current study to future career and training opportunities.		setting opportunities that connect current study to future career and training opportunities.	
Supplemental and Support Services Continued	Has a connection to the counseling/Academic Advisor program and the counseling and career planning services are provided throughout the program of study; **AND** Is well described in the published program of	Not Applicable	Has a connection to the counseling/Academic Advisor program and the counseling and career planning services are a part of the program of study; **AND** Is described in the published program of study.	Not Applicable	Does not have a connection to the counseling/Academic Advisor program and does not provide students with counseling and career planning services; **OR** Is not described in the published program of study.	

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
	study and clearly communicates its value to students.					
Construct Linkages with the Private Sectors – opportunities to earn industry-recognized credentials and formal articulation agreements with higher education and business partners that earn students college access and/or access to postsecondary training programs or job placement.	Offers and communicates multiple, relevant opportunities for all students to earn industry-recognized credentials, postsecondary credit and/or advanced standing in training programs or jobs; **AND** Maintains formal articulation	Offers and communicates multiple, relevant opportunities for all students to earn industry-recognized credentials, postsecondary credit and/or advanced standing in training programs or jobs; **AND**	Offers and communicates at least one opportunity for all students to earn industry-recognized credentials, postsecondary credit and/or advanced standing in training programs or jobs; **AND** Maintains or shows progress toward	Offers and communicates at least one opportunity for all students to earn industry-recognized credentials, postsecondary credit and/or advanced standing in training programs or jobs; **AND**	Does not have opportunities for all students to earn relevant credentials, postsecondary credit and/or advanced standing in training programs or jobs; **OR** Established linkages for employment are not available.	

Criteria	**Distinguished**: Items consistently and significantly exceeded basic level of expectation or adequate development toward achieving standard of performance.	**Accomplished**: Items exceeded basic level of expectation or adequate development toward achieving standard of performance most of the time.	**Proficient**: Items met basic level of expectation or adequate development toward achieving standard of performance.	**Developing**: Items need more development to demonstrate level of expectation or adequate development toward achieving standard of performance.	**Not Demonstrated**: Items do not demonstrate level of expectation or adequate development toward achieving standard of performance.	**Comments** Describe the evidence that supports your rating.
	agreements with partners for students' postsecondary benefit. Established linkages for employment are available that include school to work transition, career counseling, and two or more formal or informal agreements with partners for job placement.	Maintains formal articulation agreements with partners for students' postsecondary benefit. Established linkages for employment are available that include school to work transition, career counseling, at least one formal or informal agreement with partners for job placement opportunities.	establishing within the year, formal articulation agreements with partners for students' postsecondary benefit. Established linkages for employment are available that include school to work transition, career counseling, without job placement.	Established linkages for employment are minimal.		

Criteria adapted from:

- Pennsylvania Department of Education (2016). *Approved Program Evaluation Checklist*: *Vocational Education Standards*. Retrieved from http://www.education.pa.gov/Documents/K-12/Career%20and%20Technical%20Education/Program%20Approval/Approved%20Program%20Evaluation%20Checklist.pdf
- U.S. Agency for International Development (n.d.). *Workforce Development Program Guide*. Retrieved from www.equip123.net/docs/e3-programguidesworkforcedevelopment.pdf
- U.S. Department of Education, Office of Vocational and Adult Education. (2010). *Career and Technical Programs of Study: A Design Framework*. Washington, DC: U.S. Department of Education. Retrieved from http://cte.ed.gov/file/POS_Framework_Unpacking_1-20-10.pdf.

APPENDIX D: PARTNERSHIP PROGRAMS AND MICRO-CREDENTIALS LIST

PROGRAMS AND CURRICULUM

Across the seven partnerships, the curriculum utilized was selected by each college to ensure that participants graduating from the programs were ready to compete for entry-level positions or continue their education to earn a certificate and/or degree. All seven community colleges implemented curricula with varying structures that included the incorporation of competency-based instruction, acceleration of student learning, and comprehensive supports. Colleges used technology integration as a means for personalizing learning and expanding opportunities to demonstrate mastery of skills, career connections including thematic and contextualized learning experiences, and active employer engagement to strengthen curricula and authentic learning.

The seven colleges identified the following programs of study and curriculum for the final year of implementation of this program, which are outlined in greater detail below.

Bucks Partnership

Table 57: Bucks Pathway

Program Details	Industrial Maintenance Program	Metalwork Program
Duration	12 weeks, 288 hours	12 weeks, 288 hours
Curriculum Summary	Existing curriculum drawn from college TAACCCT grant and includes AMATROL e-learning and weekly employer facility tours with students.	
Program Changes	Modified to include additional Programmable Logic Controller (PLC) training, based on employer feedback. Additionally, made schedule modifications to accommodate lab availability hours and increased hands-on learning at the request of the local employers. Began offering the program at second location.	

Allegheny Partnership

Table 58: Allegheny Pathway

Program Details	Patient Care Technician	Health Information Technology	Computer User Network Support
Duration	30 hours, 1 week	144 hours	160 hours + 40 hours
Curriculum Summary	Pre-approved Department of Education Nursing curriculum.	Adapted and augmented existing curriculum components to fit micro-credential tracks.	
Program Changes	Each program now requires TABE testing pre-requisite of 11th grade math and English, plus students must pass a computer literacy test. Several students were enrolled directly into the Certified Nurse Aide program (168 hours).	Modified to include six micro-credentials: Microsoft Office for Healthcare, Medical Terminology; Introduction to Health Care Statistics; Introduction to Databases; Building Databases; and Applying Databases.	Now includes a boot camp to help students prepare for the A+ certifications, an additional 40 hours of instruction for CompTIA Network+ Certification. New textbook adoption noted.

Philadelphia Partnership

Table 59: Philadelphia Pathway

Program Details	Work Readiness Workshops (21st Century Skills)	Technical Programs
Duration	Keyboarding & Computer Skills (3 hrs.) Intro to Computers & Internet (6 hrs.) Intro to MS Word (6 hrs.) Critical Thinking Skills (6 hrs.) Building Effective Teams (6 hrs.) Problem Solving (6 hrs.) Business Writing That Works (12 hrs.) Email Etiquette (6 hrs.) Communication Strategies (6 hrs.) 57 classroom hours, plus scheduled Orientation to Careers sessions and upskilling/practice sessions in the computer lab	**Safety Inspection Mechanic**: 28 hours **Emission Inspector**: 28 hours **Nurse Aide:** 124 hours **Dental Assistant**: 112 hours **Pharmacy Technician**: 50 hours **Bookkeeping Clerk**: 45 hours **Advanced Manufacturing**: **Electro-Mechanical Tech**: 404 hours **CNC Precision Machining**: 210 hours **Gas Distribution Pipeline Mechanic**: 192 hours
Curriculum Summary	Existing curriculum from various programs was broken into smaller components for 21st Century Skills training.	
Program Changes	No significant changes	Added two curricula (Welding 300 hours and Pharmacy Technician 50 hours) as options in Phase 2. Additionally, computer lab sessions increased from 8 hours per week to 2 days per week, 4 hours each day

Delaware Partnership

Table 60: Delaware Pathway

Program Details	CNC Metalworking
Duration	**Evening session**: 10-11 months (4 hours, 2 times a week)
Curriculum Summary	Existing curriculum from college's AAS in Advanced Technology degree and Computer Numerical Controls (CNC) Operator program.
Program Changes	A new textbook was adopted to target more relevant industry content. The college also began development of online course components, which will likely be implemented beyond the grant period.

Montgomery Partnership

Table 61: Montgomery Pathway

Program Details	Medical Billing	Office Assistant/ Customer Service	CNC Machine Operator	Payroll Technician
Duration	165 hours	145 hours	210 hours	136 hours
Curriculum Summary	Existing curriculum from college's credit-bearing courses that has been organized differently for non-credit bearing courses made accessible to students through Blackboard, allowing students to earn badges as they complete certain modules.			
Program Changes	Billing Receptionist option was added to increase job opportunities for students based on needs identified by employers.	No significant changes	No significant changes	No significant changes

Northampton/Lehigh Partnership

Table 62: Northampton/Lehigh Pathway

Program Details	Advanced Manufacturing
Duration	180 hours (20 hours/week for 9 weeks)
Curriculum Summary	180 Skills industry-defined, academic-aligned, WIOA-ready, education with modifications based on local employer job descriptions – accessible on the web. Included elements of the Ice House Entrepreneurial curriculum.
Program Changes	Modification to the delivery of program modules allowed some to be solely online with three in person modules in order to enable earlier employment. Additionally, a new location was opened to serve students in a different area of the county.

Westmoreland Partnership

Table 63: Westmoreland Pathway

Program Details	Pre Employment	Welding	Machining	Culinary
Duration	9 days	10 weeks, 80 hours	1 week, 40 hours	2 weeks, 50 hours
Curriculum Summary	Internally designed to provide a foundational level of skills to participants. Upon completion of this training, students move into Machining and Welding programs.	Existing curriculum from college TAACCCT grant with AWS and NIMS components available in an online format and an added pre-employment orientation.		Existing curriculum from college's credit bearing Culinary Arts and Hospitality program.
Program Changes	No significant changes	No significant changes	No significant changes	Newly added based on needs identified by employers and ability to expedite launch.

MICRO-CREDENTIAL OFFERINGS

The collaboration between the partnerships, which was prioritized in this grant, helped facilitate development of the micro-credentials that integrated certificates, badges, and opportunities to embed college credit. These micro-credential offerings, by partnership, are outlined in greater detail below:

Table 64: Micro-credentials by Partnership

Partnership	Description
Bucks Partnership	
Certificates	Forklift Safety
Badges	N/A
Industry Certifications	OSHA 10, National Institute for Metalworking Skills (NIMS) Level 1
College Credit	N/A
Allegheny Partnership	
Certificates	Activities of Daily Living, Medical Terminology, Information Technology (IT) Essentials Part 1, IT Essentials Part 2, Office Technology, Computer Technology, Computer Networking, Cyber Security, Microsoft Office for Healthcare, Medical Terminology; Introduction to Health Care Statistics; Introduction to Databases, Building Databases, and Applying Databases
Badges	N/A
Industry Certifications	Phlebotomy, Electrocardiography (EKG) Technician, Nurse's Aide, CompTIA A+, CMAA, Network +, and Security +
College Credit	N/A
Philadelphia Partnership	
Certificates	End-of-workshop certificates are earned for each of the 21st Century Skills programs. To earn the Technology Digital Badge, students need to earn certificates for Keyboarding & Computer Skills, Intro to Computers & Internet, and Intro to MS Word. To earn the Teamwork Digital Badge, students need to earn certificates for Critical Thinking Skills, Building Effective Teams, and Problem Solving. To earn the Communication Digital Badge, students need to earn certificates for Business Writing That Works, Email Etiquette, and Communication Strategies. ACT WorkKeys NCRC® National Career Readiness Certificate OSHA 10 Certificate (for Gas Pipeline trainees)
Badges	Technology, Teamwork, Communication, and Ready to Work (4 badges). Students who earn the Technology, Teamwork, and Communication Digital Badges automatically earn the Ready to Work Digital Badge.
Industry Certifications	Emissions Inspector Certification (PennDOT) Safety Inspection Mechanic Training - Certified Safety Inspection Mechanic (PennDOT) Nurse Aide Registry (Pennsylvania Department of Health) Pharmacy Technician Certification, CPhT – Certified Pharmacy Technician (PTCB - Pharmacy Technician Certification Board or NHA -National Healthcareer Association) Dental Assistant Certification (NELDA – National Entry Level Dental Assistant) PMMI (Packaging Machinery Manufacturers Institute) Mechatronics Certification Tests:

Partnership	Description
	• Fluid Power 1 • Industrial Electricity • Mechanical Components 1 • Programmable Logic Controllers (PLCs) 1 CNC - preparation for NIMS (National Institute for Metalworking Systems) Bookkeeping - CPB Certification, Certified Public Bookkeeper (NACPB - National Association of Certified Public Bookkeepers)
College Credit	Welding and Electro-Mechanical training are worth 12 credits for students that enroll in Technical Studies at the College. Credit is also conferred to those that continue education (Phase 3) via the college's credit proficiency certificates which flow directly into associate degree programs.
Delaware Partnership	
Certificates	N/A
Badges	End of course badges of completion (e.g. Math for Occupational Technologies; Prints, Layout, and Measurement for Machining; Basic Technical Skills; Manufacturing Processes; Machining Technology; CNC Machine Tool Operations; and CNC Programming and Advanced Operations)
Industry Certifications	NIMS Four Level 1 certifications
College Credit	Academic credits can be awarded through Prior Learning Assessment process through the Assessment Services department of the college
Montgomery Partnership	
Certificates	Certificates of Completion for all four programs
Badges	End of module completion badges varied by program from 2 up to 12 badges
Industry Certifications	Microsoft Office Specialist - Word, Certified Biller Coder Specialist, Fundamental Payroll Certification
College Credit	Prior learning awarded for Engineering Tech AAS degree, Management AAS degree, Health Service Management AAS degree, Accounting AAS degree, Office Management Certificate, and Payroll Specialist Certificate of Completion
Northampton/Lehigh Partnership	
Certificates	End of module certificates (e.g. Is Manufacturing Right for Me, Safety and Quality First, Working with Equipment and Tools, Manufacturing Processes and Production, and Transitions to College or Work)
Badges	50 modules of instruction to earn 12 digital badges (from 180 Skills)
Industry Certifications	OSHA 10, NIMS
College Credit	Dean will award 3 credits if student continues at the college
Westmoreland Partnership	
Certificates	AC/DC Electrical, Blueprint Reading, Computers 101, HAZMAT Spill Prevention and Response, Lean Manufacturing, Mechanical Drive Systems, Shop Math, Workplace Communication/Conflict Resolution
Badges	N/A
Industry Certifications	OSHA 10, American Welding Society (AWS), ServSafe, AHA Heartsaver CPR
College Credit	N/A

APPENDIX E: CURRICULUM STUDY SURVEY SUMMARIES

Summaries of survey results are provided on the following pages for both student and instructor responses (gathered throughout the evaluation period).

STUDENT SURVEY REPORT

2019

JANUARY

ALL PARTNERSHIPS

DATA PREVIEW

Performance Tiers	Intervene 0-24%	Watch 25-49%	Reinforce 50-74%	Model 75-100%

SCOPE AND SEQUENCE

FOCUS: To what extent is the order in which skills and concepts sequenced along a continuum of development?

ACTIVITIES AND INSTRUCTION

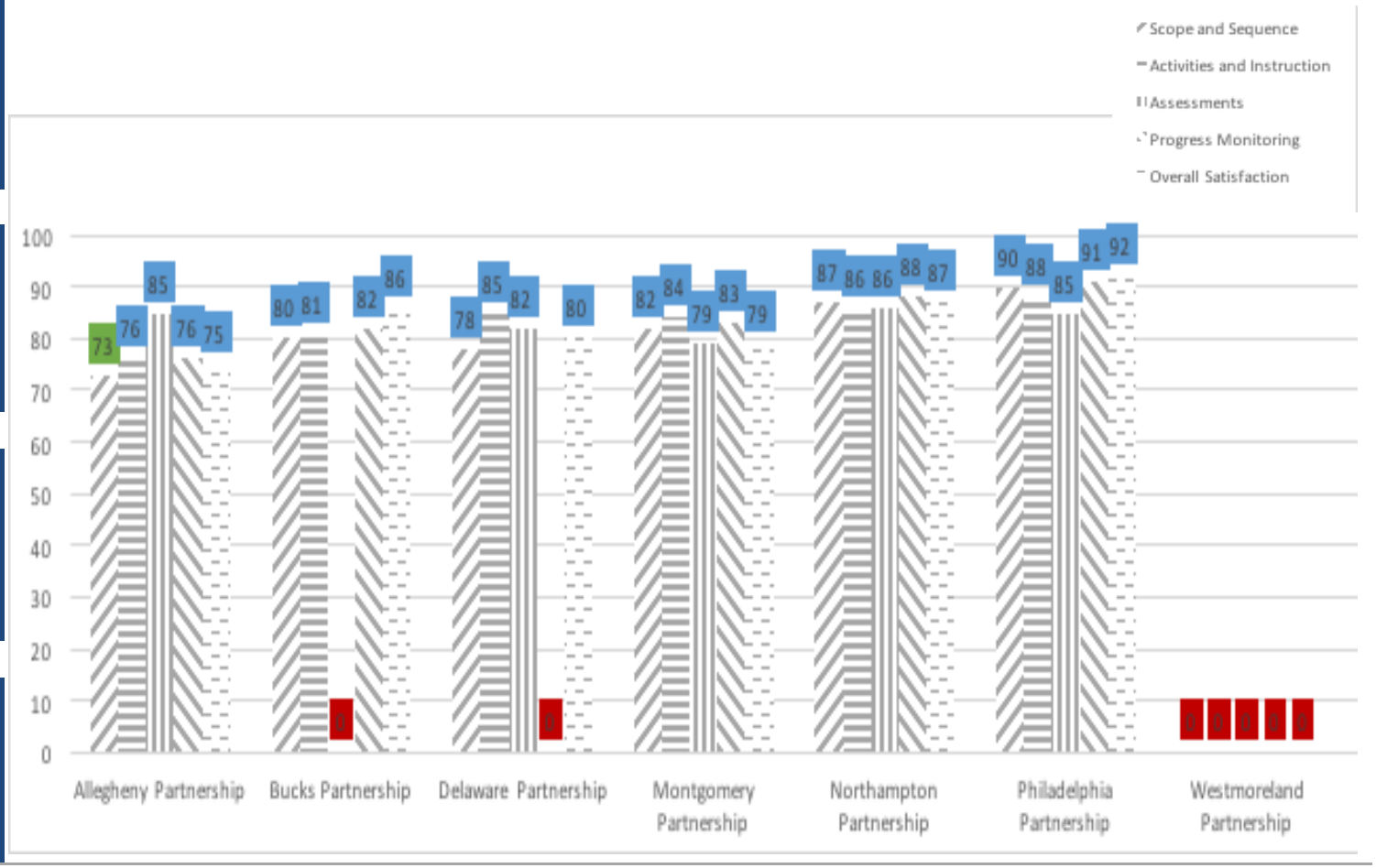
FOCUS: To what extent do activities and instruction models appropriate work habits in industry, and program content/learning is consistent with industry practices?

ASSESSMENTS

FOCUS: To what extent do the assessments and required activities measure the adequacy of the student's knowledge acquisition and skills required in the workforce?

PROGRESS MONITORING

FOCUS: To what extent is student learning and progress monitoring and what is the level of flexibility in the curriculum to help students achieve program instructional outcomes?



Note. Numeric values represent percentages based on student perceptions. Total # of surveys submitted impacts validity of data: Allegheny (13), Bucks (49), Delaware (5), Montgomery (38), Northampton (59), Philadelphia (68), and Westmoreland (0). Data not received for areas indicated by (0).

ITEM ANALYSIS

0- Strongly Disagree 1- Disagree 2- Neutral 3- Agree 4- Strongly Agree

#	Question	Allegheny Partnership A	%	Bucks Partnership A	%	Delaware Partnership A	%	Montgomery Partnership A	%	Northampton Partnership A	%	Philadelphia Partnership A	%	Westmoreland Partnership A	%
Scope and Sequence															
1	The curriculum in this course/module has helped me learn new skills and information to prepare me for employment upon completion of the program.	3.00	75%	3.40	85%	3.20	80%	3.58	90%	3.58	90%	3.66	92%	N/A	#VALUE!
2	The course/module workload is manageable.	2.69	67%	3.34	84%	3.80	95%	3.03	76%	3.47	87%	3.72	93%	N/A	#VALUE!
3	The instructor allowed adequate time to cover the information in the course/module.	2.92	73%	2.94	74%	3.80	95%	3.00	75%	3.42	86%	3.66	92%	N/A	#VALUE!
4	The course/module was well organized (e.g., timely access to materials, notification of changes, student expectations clearly presented, etc.).	2.38	60%	2.91	73%	3.00	75%	3.08	77%	3.44	86%	3.63	91%	N/A	#VALUE!
5	The teacher passed out a syllabus or provided online access at the beginning of the course/module.	3.33	83%	3.16	79%	3.20	80%	3.50	88%	3.53	88%	3.52	88%	N/A	#VALUE!
6	The course/module included information and resources for those students who plan on obtaining a degree after completion of the program.	2.55	64%	2.91	73%	2.60	65%	3.11	78%	3.22	81%	3.52	88%	N/A	#VALUE!
7	The course/module objectives and goals were clear.	3.15	79%	3.17	79%	2.60	65%	3.28	82%	3.46	87%	3.68	92%	N/A	#VALUE!
8	At the beginning of the course, I understood the grading and completion requirements to earn micro-credentials (e.g., pass, fail, A, B, or C).	3.17	79%	3.35	84%	2.80	70%	3.51	88%	3.58	90%	3.35	84%	N/A	#VALUE!
9	I find connections between what I am learning in the micro-credential course/module and what I am learning in my field/work experiences.	3.09	77%	3.35	84%	N/A	###### ##	3.28	82%	3.48	87%	3.54	89%	N/A	#VALUE!
10	The micro-credential course/module at my college is current and up-to-date with industry standards and practices.	2.85	71%	3.29	82%	3.20	80%	3.51	88%	3.52	88%	3.61	90%	N/A	#VALUE!
Activities and Instruction															
11	The learning and teaching methods encouraged participation (e.g., debates, problem solving exercises, small group discussions, group presentations, hands-on experiences, etc.).	3.23	81%	3.36	84%	3.40	85%	3.39	85%	3.42	86%	3.55	89%	N/A	#VALUE!
12	The assignments and activities helped me to better understand the coursework.	3.08	77%	3.26	82%	3.20	80%	3.38	85%	3.44	86%	3.58	90%	N/A	#VALUE!
13	This course/module helped me learn how to approach problems, to think both creatively and analytically, and to make knowledge-based decisions.	2.85	71%	3.22	81%	3.00	75%	3.22	81%	3.39	85%	3.60	90%	N/A	#VALUE!

14	This course/module promotes diversity and reflected the experiences and perspective of groups with different cultural and socioeconomic backgrounds.	2.92	73%	2.20	55%	3.00	75%	3.34	84%	3.40	85%	3.52	88%	N/A	#VALUE!
15	I was provided access to state-of-the-art equipment and/or work stations.	2.17	54%	2.74	69%	3.00	75%	3.36	84%	3.26	82%	3.26	82%	N/A	#VALUE!
16	The facilities, equipment, and supplies allowed me to master and enhance skills and complete applicable contact hours.	2.62	66%	3.63	91%	3.20	80%	3.22	81%	3.26	82%	3.34	84%	N/A	#VALUE!
17	I was trained to safely use the equipment in this course/module.	3.00	75%	3.11	78%	4.00	100%	3.48	87%	3.51	88%	3.28	82%	N/A	#VALUE!
18	The course/module textbook and other resource materials used in this course were appropriate and helpful to my learning process.	2.77	69%	2.89	72%	3.40	85%	3.33	83%	3.38	85%	3.49	87%	N/A	#VALUE!
19	Learning resources were varied (books, online, live chat, etc.) and useful.	2.85	71%	3.06	77%	2.60	65%	3.31	83%	3.09	77%	3.42	86%	N/A	#VALUE!
20	Opportunities were available to me to participate in hands-on/project-based experiences related to the course/module I am currently enrolled in.	3.00	75%	3.50	88%	3.40	85%	3.34	84%	3.46	87%	3.52	88%	N/A	#VALUE!
21	The course/module stimulated my interest and thought on the subject area.	3.15	79%	3.37	84%	3.60	90%	3.54	89%	3.40	85%	3.54	89%	N/A	#VALUE!
22	I am satisfied with the instructor who teaches the course/module.	3.62	91%	N/A	#####	4.00	100%	3.19	80%	3.53	88%	3.63	91%	N/A	#VALUE!
23	The instructor was responsive to student needs and problems.	3.62	91%	3.42	86%	4.00	100%	3.30	83%	3.60	90%	3.66	92%	N/A	#VALUE!
24	The instructor was consistent throughout the course.	3.69	92%	3.28	82%	3.60	90%	3.16	79%	3.66	92%	N/A	######	N/A	#VALUE!
25	I feel I participated actively in the course.	3.31	83%	3.65	91%	3.80	95%	3.78	95%	3.59	90%	3.75	94%	N/A	#VALUE!
Assessments															
26	The methods of testing were clearly explained and relevant.	3.50	88%	N/A	#####	3.40	85%	3.22	81%	3.39	85%	3.52	88%	N/A	#VALUE!
27	Feedback on tests was timely.	3.33	83%	N/A	#####	3.20	80%	3.14	79%	3.46	87%	3.33	83%	N/A	#VALUE!
28	Feedback on tests was helpful for me to guide my learning.	3.33	83%	N/A	#####	3.20	80%	3.09	77%	3.53	88%	3.34	84%	N/A	#VALUE!

Progress Monitoring

29	Upon successful completion of this program, I will earn at least one industry-recognized certification.	N/A	######	3.52	88%	N/A	######	3.57	89%	3.60	90%	N/A	###### #	N/A	#VALUE!
30	An adequate amount of information regarding all micro-credential tracks at this college was provided to me during orientation/advising sessions before enrolling in this course/module.	2.92	73%	2.95	74%	N/A	######	3.25	81%	3.45	86%	3.53	88%	N/A	#VALUE!
31	I received an adequate amount of information about potential career paths and feel confident that I will be able to make good decisions about my future employment opportunities.	2.31	58%	3.47	87%	N/A	######	3.42	86%	3.43	86%	3.61	90%	N/A	#VALUE!
32	I am satisfied with the selection of certifications in the micro-credential program.	3.08	77%	3.30	83%	N/A	######	3.28	82%	0.46	12%	3.62	91%	N/A	#VALUE!
33	I plan to continue on to the next course/module in the micro-credential track.	3.46	87%	2.78	70%	N/A	######	3.15	79%	3.54	89%	3.73	93%	N/A	#VALUE!
34	If available, I would be interested in taking another, more advanced certificate or degree program of study like this one to enhance my skills in this career area.	3.23	81%	3.49	87%	N/A	######	3.37	84%	3.49	87%	3.62	91%	N/A	#VALUE!
35	I would recommend this program to others.	3.15	79%	3.57	89%	N/A	######	3.25	81%	3.64	91%	3.72	93%	N/A	#VALUE!

Attendance

36	Approximate your own attendance during this course/module.														
	(1)Less than 20% (2)20%-40% (3)41%-60% (4)61%-80% (5)81%-100%	4.92	98%	4.98	100%	4.80	96%	4.97	99%	4.95	99%	4.92	98%	N/A	#VALUE!

Note. Percentages indicated in "Item Analysis" are the converted average (n/4).

Open Response

Allegheny Partnership

37 What did you enjoy most about the course/module?

The new information, skills I've learned
The knowledge that I am receiving is extremely helpful
Learning new things
Class participation
Hands on experience, learning the wealth of information that employers do not WANT to teach/train
Interacting with fellow students and the instructors.
Instructor's ability to simplify the course to create a better understanding
Hands on practice and practice tests.
the teacher sense of caring.
My class mates. All adults
Hands on work; access to CompTIA testing

38 Is this course different than you expected? 46% Yes 54% No

I expected it to be intimidating but teacher made it very interesting.
I thought it would be rigorous courses ending in employment. It's not as advanced as I'd hoped.
Course too long, too much info & student bullied by admin into certification tests
I expected to be finished by now.

39 What/Who has helped you most to identify/select your career choice at the institution?

The field I am working now is Health Care, I needed to learn what other opportunities I have

40 Has the career guidance provided during this course/module helped you achieve your employment goals? What steps have you taken to accomplish your career goals at this

I hope so. Helped a lot. I am looking into pursuing the degree program at CCAC. I hope to obtain employment. No. Honestly, it brought to light that one needs a higher skill set to really get into the field. Due to financial difficulty, I unfortunately cannot just move into a degree program at this time. No/None. Becoming certified has helped me advance at my current job. Guidance was not provided. What career guidance I'm currently looking. Not yet. I have tried to participate in every activity to get the best out the program.

41 What would be the most effective sources of information about micro-credential courses and industry programs for you (e.g., website, flyers, staff, etc.)?

Staff, instructor, books, website; A little bit of everything; all of it; The CCAC website, Facebook, email. Electronic means are best as I don't usually pay much attention to "junk" mail that comes to the house. Teachers and coworkers. Information that I found i.e. Textbook that was shared with class not provided at beginning of course. Folks who work in the industry to give us ideas about jobs in the industry. My class mates

42 What are your immediate plans after this micro-credential course/module?

Find an appropriate carrer; implement my knowledge to my work field and get promoted; Obtain work; To possibly pursue a degree program; to obtain employment; Try to find a position at a local healthcare facility. Obtain employment; Continue studying for additional certifications. Resting because this course is going to be 9 months long than start on another series of classes in field that I was in for over 22 years; to get a job; not sure. Get a job. Hopefully get a job.

42 Do you have additional feedback regarding your experience in the micro-credential course/module?

I hope that additional micro-credential programs are made available
Please change the location. Walking up to the top floor may be challenging for some. Move classes to ground level since the elevator is not available.
Great instructors. There should be community partners with 4ments to at least interview for positions at the end. If some courses are structured as simply as going through a PowerPoint presentation and then doing an online test, there should be an option to do that from home. Necessary materials including books, flash drives, log ins should be figured out before classes start.
Course lengthened and more career path guidance in this field
It's a helpful program, but was too short.
They need better organization and materials for study.
Just be careful in picking text books
Introduction of potential employers during the course and specifically related job fairs with access to HR people should be made available. Giving us the coursework, then sending us out on our own to sink or swim isn't helpful. When regular college students are in programs, such things are made available to them. We should have the same opportunities.

OVERALL SATISFACTION **3.00 75%**

Three (3) students indicated employment in current area of study at the time of survey

Bucks Partnership

37 What did you enjoy most about the course/module?

The opportunity to work in the machine shop; Hands on training in shop; The hands-on work at the tech school. The demos from the tech school instructors; excellent instruction; overall; Learning new things; Everything was new to me, so I enjoyed the exposure to all of the new concepts. LEARNING ABOUT MACHINE SHOP and welding; Variety of material; EVERYTHING; being able to take a tour of the different companies and see our options for employment. also loved the hands-on portion of the course as well. the electrical, blueprints, & PLCs; hands on work; Introduction to basic electrical concepts; The hands-on training; the hands-on application; Learning the electrical side of IM; the hands on; I liked the electrical side of the course the most. Teachers and staff; Math and challenge of course; Teachers and interaction with students...hands on work; Openness of the class; the hands-on part of the course. teacher's knowledge; hands on part; The Instructors; the patience of the teachers; learning life lessons; being hands-on; Refresher of past schooling, Time on a Tig welder to learn the basics of the process. Welding, Plant/Job tours, and Job placement; autoCAD; being in a hands-on learning environment; Textbook study and class discussion. Tours to companies. hands on training; Milling

38 Is this course different than you expected? 22% Yes 78% No

I expected better training to better place us in the metalworking field
More needed. Hands on and theory
It taught me a lot
Expected to do more hands-on training
More hands-on work. Amount of math seemed unnecessary compared to hands on needed.
Wasn’t sure what to expect
this was totally new for me, so I didn't know exactly what to expect
I think it should be called "Intro" to Industrial Maintenance
I expected the BCCC staff in charge of job placement would have more communication with us.
More book, less hands-on process than expected.
I thought this course would be more on welding then machining

39 What/Who has helped you most to identify/select your career choice at the institution?

Numerous help wanted signs in machining field; Staff and instructors; administration; All the instructors; Being able to visit multiple employers on facility tours, and see what I am looking for in a new employer. myself and the instructors; staff and instructors; The placement services are very helpful. Only by learning hands on did I find what interested me the most and that was the electrical side; Teachers were both great and a lot of help; Both teachers; not one person...I was tested at CareerLink and had an aptitude for manufacturing. I received a flyer about the course and spoke to several people from BCCC workforce development; all three instructors were very helpful; internet; friend; The instructors; instructors and advisors; parents; My instructors; reading blue prints. I was already in line for a job when I came in

40 Has the career guidance provided during this course/module helped you achieve your employment goals? What steps have you taken to accomplish your career goals at this

Yes, my resume was sent out. I have interviewed and will be working. I have the credentials to take the next step. job placement. Staff did a great job contacting the companies and advising us. It has been very helpful. I've gone on several interviews, and will continue to apply to relevant employers if I don't get an offer. It has helped me get interviews with companies that are in the field. Yes, they have helped achieve my employment goals. Interviewing advice. I practiced people skills and tried to learn as much as possible from the course. work hard; Yes. Better evaluating what experiences employers have to offer. I have sent out more resumes and have gotten better at getting interviews; Interviews so far. Yes, applied to jobs outside of the program. Not yet. Yes, I showed up to the interviews. Yes. I would of liked to see more one on one time with Steph about doing resumes and Interview prep. Still unemployed. I have applied to many different jobs. Everything; working on it; It somewhat has but I feel like I was left in the dark about potential employers and job descriptions when I was led to believe that more of that information would be transparent and communicated with us. I had to do a lot of research at the last minute about potential job opportunities and their descriptions on my own. I have an interview Monday. Not yet but I’m optimistic and I’ve been putting in more apps attended multiple interviews. I’ve gone on several job interviews since the class started; Still interviewing; Yes, and I practice welding at any given chance. Not quite yet, but I feel confident it will; yes, I feel with the guidance provided allowed me to reach where i needed to be and apply myself to the field; Job placement is very helpful; updated resume interviewing skills; I do not have the job yet.

41 What would be the most effective sources of information about micro-credential courses and industry programs for you (e.g., website, flyers, staff, etc.)?

Staff; e mail; More text book; Emails and flyers; website, word of mouth; books; newspaper ads and online websites; staff; website; Walk in; flyers, website, Facebook; Website and flyers
Website; Websites. Website. Website; All of the above & word of mouth. word of mouth
the instructors, and the hands on with the material. career link; website; all the above
Newspaper for initially finding out about the program and then BCCC staff for additional information. Careerlink; web; mail paper; Staff; Blueprint reading; websites; websites staff and text book; website; staff

42 What are your immediate plans after this micro-credential course/module?

To take further courses to gain employment better suited for my skills. Begin work in machine shop, thanks to this course providing me with the knowledge to be hired. Work. Work at a machine shop in the summer then go for my associates degree in Engineering Technology. Employment. To start my new career. I plan to become employed, or continue seeking employment, depending on the news I get next week; get a job in the field. Work. Start my new job as metal fabricator and welder. try to get a job that i enjoy. Work. Seek related work and consider additional online certification. Get a job and continue my education. Get a job in the field and continue education. Get a job and continue education. Employment. To get a job. Full time employment. Start new career. Keep searching for a job. work in this field. to find employment, or further my education in my field of study. look for employment. go back to school. Work; find a job; Employment, life/financial stability, further education. get a job and further my education. start a career n save some money; work in a job which interview was provided through the course; get a job in the industry; Full time employment in a prototyping/welding fabricating shop; Going to work; Start working; start my job; Advance to a CNC operator. Employment. Getting a job

43 Do you have additional feedback regarding your experience in the micro-credential course/module?

Modern employers have a need for employees well versed in CNC automated machining. More focus on CNC machines would be an asset to both job applicants and the employers. Evaluations of instructors should not have been administered by the instructors returned to the instructors and read by instructors while in class. This was one of the best decisions of my life. I thought it was a good course but I would of liked it to be a little longer. also make a program for after this one. I learned a lot of stuff. The internet connection is really slow, so time is wasted trying to get amatrol to work; Some instructors better than others. Progression was more consistent first half of course. Some of the information was taught to fast and for someone coming into this program that has no background experience it can be challenging. Most of the teachers were great. But the class as a whole struggled working with one teacher. Make it a bit lo never and add some more selection of IM based education. Some of the instructors assumed that we knew more than we did Teachers were great teachers and I valued their time. Teacher assumes we know more than we do. One instructor is just not a good instructor. I would not recommend bringing him back. Hand on work should be done with smaller groups of 2 or 3 people at most to fully understand what we were doing. In groups of 5 or 6 a couple of people understand and the rest are sometime left in the dark. Great class. individual workstations for students; Amatrol is not a straight forward web based learning tool for this program. it is not consistent with modern lingo or proper wording. it is too confusing, and is not a good learning tool. teachers were very knowledgeable. The BCCC personnel responsible for job placement seems to be juggling too many tasks and I believe that the BCCC personnel that assists with the job placement was lacking communication with me even after reaching out was meeting with them the information/questions that I had were not clearly answered or not answered at all and I was told I could have further meetings with them but those meetings did not take place. Good program. Need more time to work on the micro-credential. Especially forklift, blue print, hand tool use.

OVERALL SATISFACTION	**3.44**	**86%**

Five (5) students indicated employment in current area of study at the time of survey

Delaware Partnership

37 What did you enjoy most about the course/module?

Trigonometry
The help my teacher gave me when I did not understand the material.
The equipment provided in the shop. Good Instructor
I enjoyed both lectures and workshop activities but would like more integrated Lecture/Workshop activity with more testing and feedback
One on one help and friendly, understanding professor

38 Is this course different than you expected? 40% Yes 60% No

I expected more shop work.
length of course & amount of mathematics

39 What/Who has helped you most to identify/select your career choice at the institution?

My teacher. I have field experience in manufacturing but not directly as a machinist and I want the ability to do so. The fact that the institution has a rather good range of machine tools with good instructors plus the availability of grant money. The professor opened my eyes to how wide the usage for this course is

40 Has the career guidance provided during this course/module helped you achieve your employment goals? What steps have you taken to accomplish your career goals at this

Made sure I was getting good grades and attend class as much as I was able to. If I leave my current employer at the end of this course, I have selected a number of companies I would have interest in pursuing. Since I am only half way through the course, I have yet to interview for positions. Still in progress but professor has set up interviews with Boeing

41 What would be the most effective sources of information about micro-credential courses and industry programs for you (e.g., website, flyers, staff, etc.)?

Word of mouth and mail.
The website, and flier that gets mailed to home residents
I would use all of the above plus information interviews with companies in the field.
Online and newspaper ads

42 What are your immediate plans after this micro-credential course/module?

To get a job in the field of study so I can start my new career.
Hopefully use this course as a stepping stone to being considered at one of the companies I have in ming
To use the knowledge and skill I acquire in the machine tool and manufacturing industry.
Start applying for a new CAREER

43 Do you have additional feedback regarding your experience in the micro-credential course/module?

I am grateful and the pace is good. The blueprint module had a book that did not have the odd questions with answers in the back of the book like most do. Maybe could of did a little better explaining some math conclusions. Otherwise dependent on the instructor for correct answers. It was OK however. Pretty good over all. Mr. Kauffmann is very knowledgeable and has a wealth of experience going back to the 60's. Good offer by the school over all and the grant made this possible. I think that the classroom and workshop labs could be enhanced by the use of online training modules like some of the materials available from the Society of Manufacturing Engineers and other training sources and publishers in the machine tool field. I think we should've started with the amatrol books be it helped w basic layout and then branched out from there.

OVERALL SATISFACTION **3.20 80%**

One (1) student indicated employment in current area of study at the time of survey

Montgomery Partnership

37 What did you enjoy most about the course/module?

Learning the new concepts and being able to help my classmates out. Learning. Ability to learn hands on with the machines we would be seeing in the field. learning a new vocation in a growing industry. the hands-on training, although limited. Learning how technical operating CNC mills and lathes really are. How informative the course was. Medical Insurance. I like learning about coding and insurance. Learning New Things; Typing/Excel/learning about Medicare coverage and different laws; real world experience; Learning about medical insurance and how it affects everyone. Learning content ...getting good grades. Once I learned the books I enjoyed them. Practical discussions of the course/module. opportunity to learn Word 2016 and brush up on my Customer service skills; learning WORD; The knowledge obtained from each course. Instructor lecture; I enjoyed learning new interesting info on medical practices. Classmates; The Instructors and their knowledge of the work. The instructors, their experience, knowledge, and allowing interactive participation. Learning coding. Open discussions in class; I like the teaching approach. He allows for discussion and he is very thorough. class discussions with instructor and classmates; About 80% of course work was completely new to me and I enjoy learning new things. 3 instructors. Loved going in to classes, stimulated to learn.

38 Is this course different than you expected? 38% Yes 62% No

I expected A LOT hands on experience with the machines. I was expecting to learn more hands-on skills. I was expecting it to be less enthusiastic, but it ended up being fun and interesting. A lot of medical info. I did not know I was going to be eligible for the MOS test. However, I know now how limited I was. Speed and heavy concentration for absorption. I thought that more time would be spent on excel and word. Had a lot more information to learn them i realized or there was class time for. Not knowing, Medical Billing or Coding. It is more in-depth than I had expected, but I enjoy it! Complex.

39 What/Who has helped you most to identify/select your career choice at the institution?

Instructors and Staff; Careerlink; MC3; Everyone I've been in contact with thus far; all the teachers were encouraging; Montco Cty CareerLink coach; A combination of Career Link, The administrator at Montco and my job Supervisor, and my job counselor. Myself; Myself because the medical industry is always growing. The instructor(s) with the information that was provided to me. the instructor; Just taking the course is guiding me into what job I will apply for and which jobs I do not want to apply to. PA Careerlink; Husband; Teacher in the CPT Coding class; CareerLink; college website; program director; PHILA U

40 Has the career guidance provided during this course/module helped you achieve your employment goals? What steps have you taken to accomplish your career goals at this

I have nearly met all of my employment goals with Suzanne Holloman and Lori Finn's expertise and experience. CareerLink has supplied a lot of assistance as well but Suzanne and Lori have been hands-on, supportive, and instrumental in preparation and during for my employment search. N/A not missing class. I am in the process. I feel I am/was an ideal fit for this coursework due to my experience in related fields. After spending several months in the course I feel that there was an opportunity to learn considerably more than what was offered in the time allotted. I am hesitant to enter the workforce in this field due to feeling very inadequate with my knowledge of CNC operations. yes, gave me confidence in my job search. Yes, it has given me more information and aided me on what I want and look for in a job. Still unemployment. MC3. Still applying to jobs. Yes having the communications with the Director of the Program helped me in my decision to move forward with the program. I have gained a heightened interest in putting my skills and training in this field to use. One of those ways is reaching out to people that are currently in the role I am seeking. In other words, networking with people in the profession. MC3. Coding ..Microsoft. Mostly to keep working hard. I'm determined to do well on the MOS test. Then I will think about another course Suzanne mentioned. No, but I have sought employment on my own through job boards. The Program Director has been very helpful in providing guidance in order to find employment; not yet. did resume and learned about resources to help job search. i take extra time with 2 other students to go over all work together. Employee has not been pursued as yet. Yes, the instructor provided excellent info to be able to seek employment in this field. Yes complete updated resume. Not as of yet but I am still in the process. I have been looking into internships and part time jobs in the medical field. The course is not finished yet. Working on that now. Not yet; but we are not finished with the course yet. Yes. Looking into further courses. Yes. Offered a job starting 11/1/17 where I will be doing medical front desk and assisting with billing. Not yet. not yet, but hopefully it will after be completing the course. I applied for some jobs with current working resume. I was offered an opportunity for an internship and have reached out on my own.

41 What would be the most effective sources of information about micro-credential courses and industry programs for you (e.g., website, flyers, staff, etc.)?

Staff, website, flyers, unemployment agencies, MC3, timing of the course, Career link, all unemployment people should be made aware of these courses etc thru career link. should be all mandated take job search class, Flyers in high traffic areas. The power point slides and one-on-one instructor taught. I think all the different ways to advertise about micro-credential courses should be used because many people do not know about them.

40 What are your immediate plans after this micro-credential course/module?

To possibly get an internship/job that I enjoy, to gain experience in an office environment. Although, I will be searching for other positions while working, a possible job offer at the conclusion of my internship/probationary period wouldn't hurt. But even if the job offer doesn't happen, a good reference and a lot of gained experience to continue to build my resume and confidence of finding a position that works for me; work in the CNC. Entry level employment at a company that is willing to train me on how to use CNC machines. land that new job in the exciting work of CNC operator. look for work; start a career in the trade; To go for my cpt certification; Seek employment; to take the test; to gain stable employment; Start a medical receptionist job; To gain experience as performing duties of a medical coder. Take my test. Get a job. Go to the gym. Sign up for another Micro-Credential course at Montco. To seek employment right away and take certification exam. Although at this stage I feel there are still gaps in my knowledge, that could have been addressed as part of this course, I intend to do all I can to fill in the gaps and find employment. gain employment; Getting employed by a hospital. Look for employment as a medical biller and study and take the CPC exam; some credit course. To look for a position or internship and to possibly come back to MontCo for another certificate. To secure a fulltime position in the Medical or Pharmaceutical Industry. Getting a job as medical billing specialists. Unsure, but interested in Medical Billing positions. Get into a hospital setting. To work in medical office and assist with billing. plan on looking for employment within this field and hopefully enrolling in more programs like this to enhance my skills. pursuing employment in this field. to obtain employment; Find work

42 Do you have additional feedback regarding your experience in the micro-credential course/module?

My comments exceed the allotted number of words. It doesn't tell me what the allotment is. Call me if you really want to know. Lab time should have been prioritized over using class time to read text books. I can read at home. I cannot practice on a CNC machine at home. this is a very important job training program that is a great benefit to society to improve the tax base of Montgomery co. PA. Teacher was a really nice guy with lots of experience in the field. however, he does not know how to teach properly, and at times seemed to be lacking motivation to teach. Enjoyed the course very much, extremely disappointment. The program is an excellent platform to learn the field. The instructors are well-qualified and bring to the classroom a perspective that is, from a student's opinion, very practical and relevant since they are seasoned in the field. I would highly recommend this program to others. The advantage of being in a classroom setting was key and extremely beneficial given the fact that there are many online programs. Because it is a lot of work in a short time the books should be gotten, given before class. The teacher should have an easy temperament, not given to moods or easily hampered by stress. They must be able to take a licking and keep on ticking as they say, or at least not let the students see them sweat. Yes. 1/2 of the class was unfamiliar with Microsoft Office. The Instructor admitted she is a "google girl". She was learning (with us) Microsoft Office 2016. We were unable to get answers to our questions, and challenges resolved. There was evidence of inadequate preparation on her part. if any student is unable to achieve moderate understanding of concepts taught they should be removed from class not stay and hold up class agenda and make experience of learning inadequate for remaining students. not enough time in course to learn all curriculum because enormous amount time spent helping one person during class hours...just not fair. Overall it was very good and successful! I suggest that this course be offered in the future with 1 module at a time. The current structure of 3 three classes at one time is a lot to take in all at once. A lot of work to be done in a little time. Grateful for the opportunity under the grant and CareerLink, because I would not have been able to afford it on my own. Too much information at one time. Modules should be broken down before moving on to the next segment. I'm just glad it was offered and I could afford to enroll. 1. The book 3-2-1 is not a well-organized text. I suggest looking into another for the next session. 2. Strategies for Success probably could have been just 1 session instead of two. Although Ann Miller was excellent, some of her activities were not necessary for the adults in this program, as most of us aren't looking for the college experience.

OVERALL SATISFACTION **3.15 79%**

Three (3) students indicated employment in current area of study at the time of survey

Northampton Partnership

37 What did you enjoy most about the course/module?

mock interviewing; everything was straight forward and quick to pick up; hands on and the online; Resume writing skills, interview sessions with dialogue, writing resumes, cv's and actual interviews with different staff; everything I was able to learn; Hands on; content; everything; Hands on training; learn different skills; real life experience that the staff brought; Q&A, Involved Discussions and Experience; learning from the instructors; the depth of module; Hands on training; the lab work; Work material; it was on a computer which means no books to carry; I worked on my resume. resume writing and review/ plant tours; How to resume and how to prepare interview; interactions with the teachers/coaches; In Depth refresher in Manufacturing; excited for my New Career in Manufacturing; Touring the factories and learning new companies; Fab Lab; hope; plant tours, auto cad intro; I'm getting an overview of the manufacturing format. Workplace Organization; flexibility to study at home or school; How to safe at the work place; the fact that it exists; QUA-1002 Quality Systems - ISO 9000; I got to express my needs and desires of my future to my teachers and show then my art. the freedom to learn at my own pace; Fab Lab using all the tools; It is close to what I studied in college. combination of hands-on/online/teachers; the osha class; More of the hands-on work experience. Using the dell computers in room 635. The modules and my fellow classmates; Learning new skills; I enjoyed the friends I made in class and the Fab Lab with the hands-on tools. get to know about safety. Explanation of the PLC; Every step of the course. the online material used and FAB LAB; experience were great; Lab work with machine operations: wood working, CNC, PLC, 3D printers and hands on and measurement tools; the fab lab; how indepth it is; very detailed

38 Is this course different than you expected? 31% Yes 69% No

Very realistic to cv's, resumes and interview process; Too much 180 skills; A lot more 180 than hands on work; I gain more relevant experience. Very thorough; touching on more subjects than I thought; Work-real life education; in depth in Electronics and Binary code; I didn't know what to expect. So I was very pleased; was expecting more hands on time; there are so much mauls, organizations, procedures, with a lot of different word. I was pleasantly surprised. I would have like a teacher to go through some of the material. I was expecting more hands-on time in Fab Lab. more organized than I thought they would be. less hands on direct applications. I didn't think it was mostly computer work

39 What/Who has helped you most to identify/select your career choice at the institution?

My instructor; every aspect was helpful; all the instructors; Family; both material and Instructors; fellow; Training in the 180s. Staff were all very helpful in revamping my resume; everybody in the course; the instructors have both touched on web sites to research career options; instructor has helped me to understand a little better about different type of manufacturing. it was a Job Fair; staff helped me in setting a goal for my career, Justin B showed me the wonders of a 3D Printer and helped me in the Fab Lab. recruiter for micro credential program at Career Link; The whole staff. Feedback from the instructors and hands-on experiences; program coordinator

40 Has the career guidance provided during this course/module helped you achieve your employment goals? What steps have you taken to accomplish your career goals at this

yes, I have an interview already; resume and job interviewing practice helped me out a lot; fine tune my resume and job search. Yes. The complete application processes. Interviews. Learned a lot of new things. Good attendance and good behavior. I am waiting till I finish this program to start applying for jobs that best use what I learned during this program. Effective Resume Writing; yes, going to advance my education. Just keep continuing to be show good attendance. Yes. Courses and Resume. I've actually revised my resume to highlight my manufacturing experience. Yes, I have more opportunity to find the job. yes, completed course work 180 Skills. Yes, help me prepared for my interviews. I've applied to Uline. Yes. Update my technical skills. I have not received any full-time employment yet, but this program had helped me see more clearly of the possibilities. It is helping me to achieve my related career goals. Taking this micro-cred is really good step at advancing to great opportunities. I have not reached a point where I am utilizing this course for employment yet. no, I have yet to seek employment. Took some computer training; Decision, courage. yes, I am constantly learning new things related to my field. no I am still unsure Tours, discussions, online learning, and independent job searches. not yet I have not received replies from places I applied to

41 What would be the most effective sources of information about micro-credential courses and industry programs for you (e.g., website, flyers, staff, etc.)?

flyers, website; website and flyers; know mare safety, organization and quality control; Career Builder ; flyers; Indeed; Staff; staff; web site or flyers; Staff I get info better when I hear it from the staff, but sometimes I do quite hear it yet so i'll have to ask to repeat it sometimes; flyers; websites; website, social media page (Facebook), flyers; website; so far it is already effective - restate your question, please; flyers; When I first came in, Michelle showed me that when I complete I'll receive employment in a good-payed job for my career; website and flyers

42 What are your immediate plans after this micro-credential course/module?

get a QC job; find steady employment and continue my education; get a job; Obtain employment with a sponsor company; get a better job; Update my resume and look for employment in the manufacturing; take more courses; I am working at a job after this course. follow up on the mini interviews from career day; either find a job or continue with some other training program. Start working at my new job to make enough to live on my own while working on my graphic novels. get a job. To start working at my new job, To save up money for my own place, and find a art program while working on my graphic novels. Obtain a better paying job so I could pay to go back to school. look for a job in manufacturing that allow me to move up in my career. Completed my 4 year degree. I was hoping classes were not broken up but I will be back in school in January. I will have to finish classes online and still continue with the fab lab.

43 Do you have additional feedback regarding your experience in the micro-credential course/module?

very good refresher course, and a good foundation for starter; A big opportunity to start a career; if the sections had the same number of pages of info n test questions. for example, one section was 42 pages of info with 20 questions for the test n another section was 20 pages with 15 questions. This is an excellent course. great course to start u off in manufacturing. each chapter should be a set number of pages n the tests limited to 15 questions to speed things up. more correlation between the modules and the interactive FAB lab sections and trying to keep everyone at the same level would have been nicer. I really enjoyed the CAD section. would have liked more hands-on training. some pages need to be more specific about the questions, and some - about the answers, just to be consistent. the 180skills testing was more in-depth that probably would ever be used on a real job and the testing was on items that seemed to be minutiae. I found the plant tours very valuable, the more the better. Some. I would like to know how my teacher think I'm doing over all. Some chapters need to be revised for mistakes. In general, the program makes all the sense and, hopefully, employers know about its existence as well. the online training is boring and hard to focus on, the questions on the tests are sometimes on irrelevant items that aren't worth remembering. I understand this program was developed with input from manufacturers. That makes it very relevant to job opportunities in our area. Occasionally, the classroom instructor was long-winded (repeating same information several times) and the time would have been better spent continuing our on-line instruction. Micro-cred gives great possibilities in manufacturing businesses. Awesome opportunity, Thank You. would it be possible to add SAP to the course? Excellent breakdown on topics. would of liked more direct lab work tied to 180 curriculum

OVERALL SATISFACTION **3.47 87%**

Three (3) students indicated employment in current area of study at the time of survey

Philadelphia Partnership

37 What did you enjoy most about the course/module?

Communication strategies/Critical thinking; I've gained a substantial amount of useful information from this course which will I can always refer to; to guide me along the path to my career. Super Knowledgeable Instructor; It refreshed me on basic computer literacy; Learning how to navigate Microsoft Word; interaction; learning short cuts to the tools of programs I use. All the material and information the professor gave us. Cooperation and it was flexible. The professors; The lessons; The Teacher and classmates. The classroom experience was amazing and very empowering. Thank you!
The teacher used examples to explain concepts. Interactive Learning and Exciting Teacher The systematic way it was introduce and the simplistic way it was taught. Hands on activities. Applying the lessons in my writing. Very interesting. The course material. Learning something new. building my confidence; the one on one time; Learning new skills

38 Is this course different than you expected? 31% Yes 69% No

Expected to learn basic problems to help take the Tabe test; much better than I thought; Yes, but in a very good positive way. It was more educative. There's way more opportunities than I expected. Much better and more self-awareness than I expected, but I'm so thankful. Thank you! More useful than I expected. It was more beneficial. It was better and more informative; more detailed. I received a lot of excellent information. all business minded and professional. I thought we were going to just jump right into do CAN. I didn't expect the instructors to be so caring and supportive. it was more than I expected. It was very informative

39 What/Who has helped you most to identify/select your career choice at the institution?

College Advisor, Instructor/Faculty, Staff person, Family Member, Friend, Feedback and Observations from Staff were very helpful and appreciated, myself

40 Has the career guidance provided during this course/module helped you achieve your employment goals? What steps have you taken to accomplish your career goals at this

I'm currently not looking for a job, but the information provided to me in this course will be very helpful when the time comes. Attending the one month training program , starting my course in full. I'm not sure yet, didn't reach that point. Yes, this has helped me apply better critical thinking skills in my professional and personal life. Thank you!

41 What would be the most effective sources of information about micro-credential courses and industry programs for you (e.g., website, flyers, staff, etc.)?

College catalog, College staff/faculty, PA Career Link, Students, Family and friends, School Website

42 What are your immediate plans after this micro-credential course/module?

Continue my education; Find a job; Re-enroll in college and apply my newly taught technology skills to my career.

43 Do you have additional feedback regarding your experience in the micro-credential course/module?

No, every course and instructor were above and beyond my expectations. Very friendly, favorite instructor. The course is great. I've been satisfied by the course presented. It has been a great start to reentry to education. I have learned and gained valuable information and skills for the work place. It's was educative and motivative. These courses are so helpful in discovering myself so I can work and live at a higher potential. Thank you!!! The training was very enlightening and informative. Very engaging. I am interested in a follow-up. And also, information about other training sent including internships and grants. awesome classes, more people should know about this program. the program is a great idea. more people should know about this program. This program is a great idea. I'm anticipating being prepared and equipped with what I need to advance to the Dental Assistant program and further. excellent program. The instructor was amazing! Her directions were so easy to follow and it was also fun. Very memorable

OVERALL SATISFACTION	3.68	92%

No students indicated employment in current area of study at the time of survey

Westmoreland Partnership

No data

INSTRUCTOR SURVEY REPORT

2019

JANUARY

ALL PARTNERSHIPS

DATA PREVIEW

Performance Tiers	Intervene 0-24%	Watch 25-49%	Reinforce 50-74%	Model 75-100%

SCOPE AND SEQUENCE

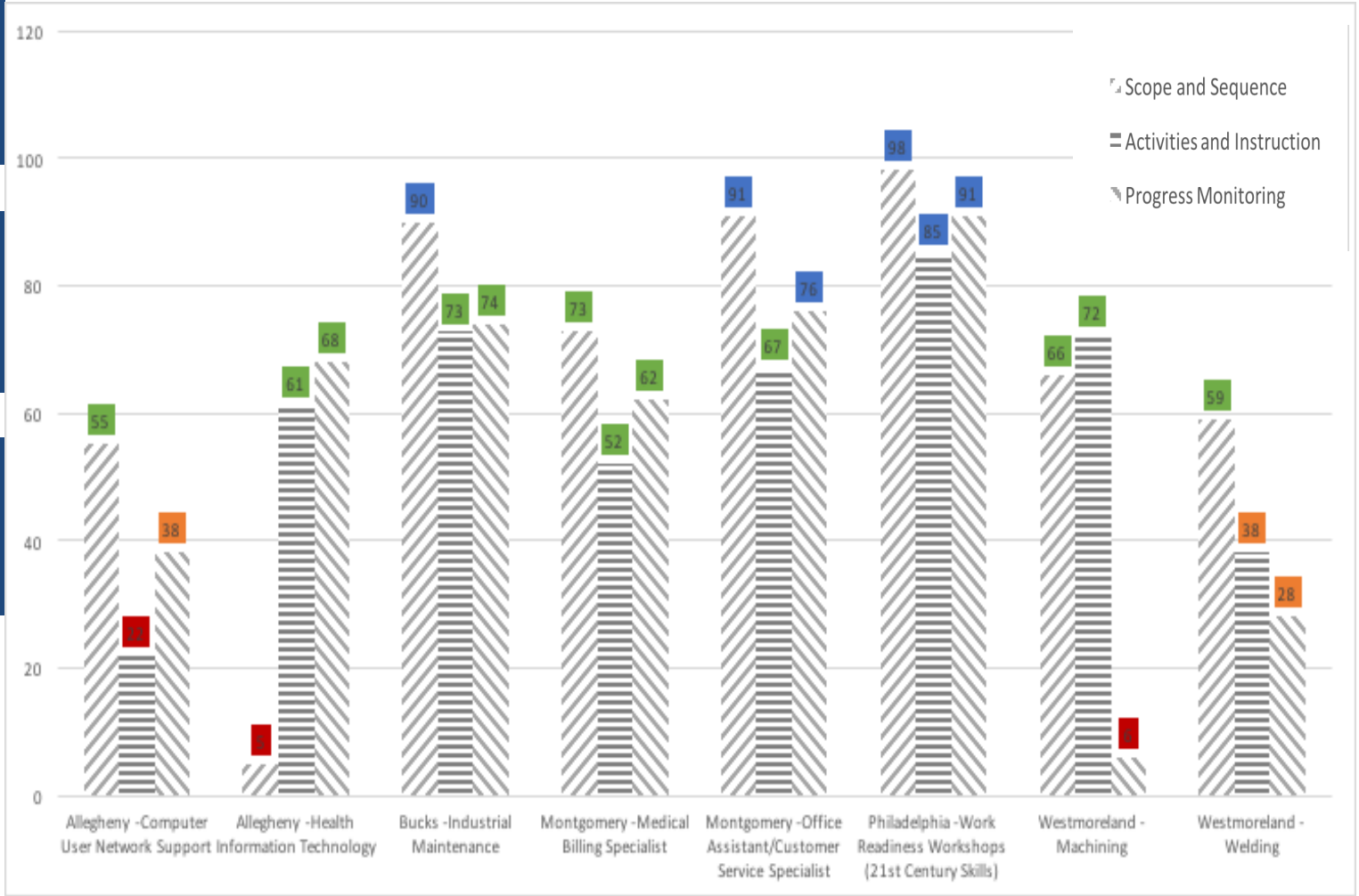
FOCUS: To what extent is the order in which skills and concepts sequenced along a continuum of development?

ACTIVITIES AND INSTRUCTION

FOCUS: To what extent do activities and instruction models appropriate work habits in industry, and program content/learning is consistent with industry practices?

PROGRESS MONITORING

FOCUS: To what extent is student learning and progress monitoring and what is the level of flexibility in the curriculum to help students achieve program instructional outcomes?



ITEM ANALYSIS

0- Strongly Disagree 1- Disagree 2- Neutral 3- Agree 4- Strongly Agree

		Allegheny Partnership				Bucks Partnership		Montgomery Partnership				Philadelphia Partnership		Westmoreland Partnership			
		Computer User Network Support		Health Information Technology		Industrial Maintenance		Medical Billing Specialist		Office Assistant/ Customer Service Specialist		Work Readiness Workshops (21st Century		Machining		Welding	
#	Question	A	%	A	%	A	%	A	%	A	%	A	%	A	%	A	%
Scope and Sequence																	
1	The course includes information for those students who plan on obtaining employment after completion of the program.	4.00	100%	3.00	75%	3.86	97%	3.62	91%	4.00	100%	4.00	100%	2.67	67%	3.00	75%
2	The course includes information for those students who plan on obtaining a degree after completion of the program.	3.00	75%	2.67	67%	3.20	80%	2.96	74%	4.00	100%	3.75	94%	2.00	50%	2.00	50%
3	Important occupational trends are considered in curriculum and course planning and implementation.	3.00	75%	3.29	82%	4.00	100%	3.43	86%	4.00	100%	3.80	95%	2.00	50%	2.00	40%
4	The current schedule is meeting the needs of the student population and programs.	3.00	75%	3.00	75%	3.29	82%	3.10	78%	4.00	100%	3.60	90%	2.33	58%	1.00	20%
5	Hands-on/Program-based activities are embedded into the curriculum and support instruction.	0.00	0%	3.00	75%	3.86	97%	2.29	57%	4.00	100%	4.00	100%	2.00	50%	3.00	60%
6	Career-based/Fieldwork experiences are embedded into the curriculum and support instruction.	0.00	0%	2.38	60%	3.80	95%	2.06	52%	3.00	75%	4.00	100%	2.50	63%	2.00	40%
7	In the programs you teach, administer, or provide guidance, the courses help students to learn new skills and information to prepare them to each a micro-credential.	3.00	75%	3.22	81%	4.00	100%	3.41	85%	4.00	100%	4.00	100%	3.00	75%	3.00	60%
8	In the programs you teach, administer, or provide guidance, the courses help students learn how to approach programs, to think both creatively and analytically, and to make knowledge-based decisions.	3.00	75%	3.33	83%	3.71	93%	3.35	84%	4.00	100%	4.00	100%	3.00	75%	3.00	60%
9	In the programs you teach, administer, or provide guidance, the courses help students develop character traits, behaviors, and attitudes that are needed for personal growth and professional development such as responsibility and self-management	1.00	25%	3.33	83%	3.29	82%	2.54	64%	3.00	75%	4.00	100%	3.33	83%	2.00	40%
10	In the programs you teach, administer, or provide guidance, the courses are aligned with national industry assessment objectives.	4.00	100%	3.00	75%	3.29	82%	3.43	86%	3.00	75%	4.00	100%	3.00	75%	2.00	40%
11	The curriculum is varied to accommodate needs, interests, and abilities of students.	0.00	0%	2.67	67%	3.29	82%	1.98	50%	3.00	75%	4.00	100%	3.00	75%	3.00	60%
Activities and Instruction																	

12	Student learning activities commensurate with current practices in business, industry, or technology.	0.00	0%	2.88	72%	3.57	89%	2.15	54%	4.00	100%	4.00	100%	3.00	75%	2.00	50%
13	A variety of instructional materials are available and used to accommodate student differences, such as varying reading levels and learning styles.	0.00	0%	2.11	53%	3.29	82%	1.80	45%	3.00	75%	3.80	95%	3.00	75%	2.00	50%
14	Available resources are appropriate for students and enable me to use a variety of teaching methods.	0.00	0%	2.57	64%	2.86	72%	1.81	45%	4.00	100%	3.80	95%	3.00	75%	3.00	75%
15	The instructional strategies provide the students with skills that will enable them to keep pace with the changing workplace and to have upward mobility in employment opportunities.	1.00	25%	2.78	70%	0.14	4%	2.31	58%	4.00	100%	4.00	100%	3.00	75%	2.00	50%
16	Students have maximum use and benefit of an up-to-date classroom reference/technical library.	1.00	25%	2.89	72%	3.00	75%	2.30	58%	3.00	75%	4.00	100%	3.00	75%	2.00	50%
17	My classroom is equipped with technology current and relevant to my subject area.	1.00	25%	3.00	75%	2.71	68%	2.24	56%	4.00	100%	3.80	95%	3.33	83%	2.00	50%
18	Tools and/or equipment, provided in the instructional areas, are comparable to those used in the business and industry.	2.00	50%	3.00	75%	2.57	64%	2.52	63%	3.00	75%	4.00	100%	3.33	83%	2.00	50%
19	The facilities, equipment, and supplies allow students to master and enhance skills and complete applicable contact hours.	1.00	25%	2.67	67%	2.43	61%	2.03	51%	3.00	75%	4.00	100%	3.50	88%	3.00	75%
20	All safety protective equipment, including fire extinguishers, are accessible, and the proper usage of all equipment is included in curriculum materials.	4.00	100%	3.00	75%	3.29	82%	3.30	83%	N/A	#####	4.00	100%	2.67	67%	2.00	50%
21	Appropriate safety principles are taught and practiced.	4.00	100%	2.17	54%	3.86	97%	3.43	86%	N/A	#####	4.00	100%	3.00	75%	3.00	75%
22	Students actively participate in industry-sponsored micro-credential activities.	0.00	0%	2.71	68%	2.86	72%	1.86	47%	3.00	75%	3.75	94%	3.00	75%	3.00	75%
To what extent are the following resources of local/area business and industry utilized (Very frequently =4; moderately =3, occasionally =2, seldom =1, or never =0)?																	
23	Arrange and/or conduct student tours at business and industry sites.	0.00	0%	2.14	54%	3.86	97%	2.00	50%	1.00	25%	2.00	50%	3.00	75%	N/A	######
24	Arrange for students to job shadow at business and industry (non-paid).	0.00	0%	1.29	32%	1.83	46%	1.04	26%	1.00	25%	2.00	50%	3.00	75%	N/A	######
25	Have business and industry representatives participate in course delivery.	0.00	0%	1.57	39%	1.83	46%	1.13	28%	3.00	75%	2.67	67%	3.00	75%	N/A	######
26	Arrange for staff externships at business and industry sites.	0.00	0%	1.57	39%	2.33	58%	1.30	33%	1.00	25%	2.67	67%	3.00	75%	N/A	######
27	Have business and industry representatives to discuss and identify occupational competencies.	0.00	0%	1.71	43%	3.14	79%	1.62	41%	3.00	75%	2.67	67%	3.00	75%	N/A	######
28	Meet with business and industry representatives to identify examples, activities, and problems that should/could be incorporated into the program/course curriculum.	0.00	0%	1.57	39%	2.71	68%	1.43	36%	3.00	75%	2.67	67%	3.00	75%	N/A	######

29	Use equipment owned or given by local business and industry.	0.00	0%	1.71	43%	2.00	50%	1.24	31%	1.00	25%	2.00	50%	2.33	58%	N/A		######
30	Link employers who are industry-specific occupations with students in micro-credential programs.	0.00	0%	2.00	50%	3.00	75%	1.67	42%	3.00	75%	2.67	67%	2.67	67%	N/A		######
	Level of agreement to whether the following are assessed/identified: 0- Strongly Disagree 1- Disagree 2- Neutral 3- Agree 4- Strongly Agree																	
31	Students' occupational skills	1.00	25%	2.88	72%	3.43	86%	2.43	61%	3.00	75%	3.75	94%	3.00	75%	3.00		75%
32	Students' needs, interest, and abilities	1.00	25%	2.67	67%	3.29	82%	2.32	58%	3.00	75%	3.75	94%	3.00	75%	2.00		50%
33	Curriculum needs	1.00	25%	2.88	72%	3.14	79%	2.34	59%	4.00	100%	3.80	95%	3.00	75%	2.00		50%
34	Diversity and cultural differences	1.00	25%	2.78	70%	2.86	72%	2.21	55%	3.00	75%	3.40	85%	2.67	67%	2.00		50%
35	Facility/Equipment needs	1.00	25%	2.89	72%	2.29	57%	2.06	52%	3.00	75%	3.60	90%	2.67	67%	3.00		75%
36	Job placement opportunities for students	1.00	25%	2.63	66%	3.50	88%	2.38	60%	3.00	75%	3.75	94%	2.00	50%	N/A		######
37	Local labor market needs	3.00	75%	2.67	67%	3.33	83%	3.00	75%	3.00	75%	3.40	85%	2.50	63%	3.00		75%
38	Entrance and program requirements for degree-seeking students	1.00	25%	3.00	75%	3.00	75%	2.33	58%	3.00	75%	3.75	94%	2.00	50%	N/A		######
Progress Monitoring																		
39	My classes are held at times and in locations that are convenient for most of the students enrolled in the micro-credential courses/programs.	4.00	100%	3.11	78%	3.43	86%	3.51	88%	4.00	100%	4.00	100%	3.67	92%	3.00		75%
40	Administrators are knowledgeable of the college and micro-credential curriculum.	4.00	100%	2.75	69%	3.29	82%	3.35	84%	3.00	75%	4.00	100%	3.00	75%	1.00		25%
41	I am involved in the college's planning and continuous improvement discussions around the micro-credential programs.	2.00	50%	2.60	65%	3.00	75%	2.53	63%	4.00	100%	3.75	94%	2.50	63%	2.00		50%
42	I am involved in the selection and acquisition of current instructional materials and supplies necessary to conduct a quality program of instruction, including applied activities.	3.00	75%	2.40	60%	3.00	75%	2.80	70%	4.00	100%	3.60	90%	3.00	75%	N/A		######
43	There is an established advisory committee that works with my subject area.	2.00	50%	2.50	63%	2.57	64%	2.36	59%	2.00	50%	3.67	92%	2.00	50%	N/A		######
44	Advisory committee input is solicited and utilized to update the course and to ensure relevance to current technology practices in business and industry and for improvement of the micro-credential programs.	2.00	50%	2.60	65%	3.00	75%	2.53	63%	2.00	50%	3.67	92%	3.00	75%	N/A		######
45	Industry partners worked with me to develop the micro-credential courses/program at this college.	0.00	0%	3.00	75%	2.29	57%	1.76	44%	3.00	75%	4.00	100%	2.00	50%	N/A		######
46	Staff input was solicited and utilized for improving the micro-credential courses/program at this college.	1.00	25%	2.60	65%	3.29	82%	2.30	58%	3.00	75%	3.60	90%	2.50	63%	N/A		######
47	I am provided with opportunities to participate in professional development activities that enhance teaching effectiveness and knowledge of and/or skills in state-of-the-art practices in business, industry, and technology.	0.00	0%	2.33	58%	2.50	63%	1.61	40%	1.00	25%	3.40	85%	2.00	50%	N/A		######

48	Frequent communication occurs between instructors and administration regarding the micro-credential programs.	1.00	25%	2.50	63%	3.29	82%	2.26	57%	3.00	75%	4.00	100%	2.67	67%	N/A	######
49	I would like to have more training and differentiated teaching strategies for the micro-credential program.	4.00	100%	3.17	79%	2.43 2.29	######	3.20	80%	3.00	75%	1.67	42%	3.00	75%	4.00	100%
50	I have been provided with training opportunities to fully utilize the latest technology for my program area.	0.00	0%	2.33	58%	2.83	71%	1.54	39%	2.00	50%	3.40	85%	2.67	67%	N/A	######
51	Information on current and emerging occupations in business and industry is collected and reviewed periodically to determine the need for continuation of specific micro-credential certifications.	N/A	######	2.60	65%	3.00	75%	2.72	68%	4.00	100%	3.50	88%	2.67	67%	N/A	######
52	The micro-credential curriculum plan is revised, monitored, and reviewed periodically by employers.	N/A	######	2.25	56%	3.50	88%	2.63	66%	3.00	75%	3.67	92%	2.33	58%	N/A	######
53	An atmosphere of respect and trust exists between staff and administration, instructors, and students within the micro-credential program.	0.00	0%	3.00	75%	3.14	79%	2.19	55%	4.00	100%	3.80	95%	3.33	83%	N/A	######
54	I am aware of the philosophy and/or mission statement about the teaching and learning of all students for the micro-credential program at this college.	4.00	100%	2.86	72%	3.14	79%	3.33	83%	4.00	100%	3.80	95%	3.00	75%	2.00	50%
55	Assessment data are used to improve the micro-credential program.	1.00	25%	2.67	67%	2.71	68%	2.13	53%	3.00		3.60	90%	3.00	75%	2.00	50%
56	Student performance is monitored in a variety of ways.	1.00	25%	3.00	75%	3.43	86%	2.48	62%	4.00		3.80	95%	2.67	67%	3.00	75%
57	An employer/training sponsor evaluation of acquired student competencies is performed each grading period for each student enrolled in the micro-credential program.	0.00	0%	3.20	80%	2.60	65%	1.93	48%	1.00		4.00	100%	2.00	50%	2.00	50%
58	Effective and frequent communication occurs with students.	1.00	25%	3.00	75%	3.71	93%	2.57	64%	4.00		4.00	100%	2.67	67%	3.00	75%

Open Response

59 Please describe the commendable components of the program (e.g., strengths around program design, delivery, assessment, partnership, etc.).

Allegheny
Computer User Network Support If administered properly, the program could provide great new employment opportunities for students with appropriate backgrounds.
Health Information Technology "NEED MORE HELP FOR STUDENTS. Instruction given on the key core skillset(s) needed for job. The instructors knowledge and communications with students. interactive learning Critical thinking with projects. The instructors were AMAZING. Clearly knowledgeable about the real world and very encouraging we had two very good teachers. The design of the curriculum was excellent. The classroom we ended up in the second module was fantastic with all state of the art equipment. Myself and the other intructor in my program worked very well together. "

Bucks
Industrial Maintenance "concentration of teaching subject matter required by industry. Hands on ,and up to date training program are spo on. The curriculum is designed and driven by local manufacturers' needs software,classrooms,technology Blended learning and instructor autonomy . Strong instructors, great software to enhance teaching, administrative support"

Montgomery
Medical Billing Specialist "administration is always looking for outside company's to come in and talk to students about what to expect upon graduation Foundation for the Field . Students are able to experience multiple facts of their new industry while exploring college level studies."
Office Assistant/Customer Service Specialist Program design and delivery

Westmoreland
Machining "Hands on approach with equipment. Real life examples, gain credentials, Biggest strength I think is hands on machining"

60 Please describe the program components requiring improvements (e.g., challenges around program design, delivery, assessment, partnership, etc.).

Allegheny
Computer User Network Support We need to have access to not only equipment, but also software (including practice testing software) to help facilitate the course. For more than the first month or so we had nothing but text books (and computers that we did not have administrative rights to). Also, need to be more selective during student application/interview process. Many students had little to no computer skills at all when entering the program.
Health Information Technology "LAST TEACHER WAS UN WILL TO GO OVER ANY BEFORE WORK. Login problems, book came late, limited lab. Some program supports were unorganized (books, bus passes, blackboard). Having an actual employer speak about the micro-credential . The organization of the program and the communication between our instructors and ccac Assessment needs to be followed up on and followed through. There were students in the program that did not have the ability to be successful. We also did not get employers in the industry involved for externships. This would have been a great opportunity for the students. "

Bucks
Industrial Maintenance "equipment upgrades for more hands on. Need better facilities and upgraded equipment. could use more equipment. The Amatrol software is not liked by the students. Need better facilities and upgraded equipment"

Montgomery
Medical Billing Specialist "program could be a little longer to include more detailed information, Continue Field Technology integration into coursework
Office Assistant/Customer Service Specialist More placement opportunities for paid work and/or unpaid internships

Westmoreland
Machining : Keep including hands on activities

61 What is your recommended action to improve the micro-credential program based on the challenges discussed above?

Allegheny

Computer User Network Support Have two tracks: One for those with IT experience and one for those with no experience who are looking to learn things like basic computer usage and MS Office.

Health Information Technology "SEEK MORE HELP. Tutoring in lab or library . A basic level of student knowledge is required to start the sponsoring people should come around more. needs to be more organized coming into the program; we were given our books late. Don't allow students in the program who don't qualify for it or have a seperate program to help them get to the level they need to be at to be successful. It would also help to develop relationships with Healthcare Organizations so that externships or work related experience can be incorporated into the program. "

Bucks

Industrial Maintenance "request budgetary allotment to continually improve/replace class equip. Work with Amatrol to provide missing or broken parts to equipment and to purchase duplicate equipment so students can have even more hands on. I have spent money out of my own pocket to buy materials and to make copies. A dedicated copy machine would be greatly appreciated. Build a facility specific to the Industrial Maintenance program and update equipment"

Montgomery

Medical Billing Specialist "if the program was longer we would be able to cover more CPT coding in a more detailed way

Westmoreland

Machining: Involve OSHA class in planning as much as possible

62 Please list any additional comments about the program below.

Allegheny

Computer User Network S upport Needs to be more effective communication between administration, faculty, and students. Many times I have sent emails with questions that have gone unanswered, which can make it difficult to facilitate the course. Also, when materials are needed for the class, it would be great if there was a way that purchasing could be expedited.

Health Information Technology "ITS NOT ALLOWING ME TO LEARN WITH IN TIMING AND HELP. More hours of accessibility to use the computers to complete work. Great concept. Most of the students did learn many skill sets to allow them to start a carreer in Healthcare IT. "

Bucks

Industrial Maintenance "Program serves most well. Needs more public announcement. Even though this survey addresses primarily instruction, we should have our own facility . I am honored to be a part of it. PLCs should be updated, school to work coordinator is wonderful, great administrative support"

Montgomery

Medical Billing Specialist "i think this is a great program for students just starting out in the medical billing and coding field."

Note. Percentages indicated in "Item Analysis" are the converted average (n/4).

APPENDIX F: ADDITIONAL OUTCOMES TABLES

STUDENTS WHO COMPLETED AT LEAST ONE MICRO-CREDENTIAL

Total enrollments for each partnership are listed in the Sub-total rows. Enrollments are broken down within each partnership to display the number of enrollments per pathway. The *Overall* column indicates the total number of student-pathway enrollments at a partnership or partnership-pathway. These are comprised of (a) students in the *1+* column, who completed at least one micro-credential toward pathway completion; and (b) students in the *None* column, who enrolled in a pathway but did not complete any micro-credentials. The percentage of students who completed at least one micro-credential versus those who completed none are shown in parentheses next to each count. Sub-total counts are not necessarily comprised of unique students, as nearly a third of students enrolled in more than one pathway (of 632 unique participants, 528 (83.5%) participated in one pathway, 74 (11.7%) in two, and 30 (4.7%) in three).

Table 65: Completed Micro-Credential Enrollment by Partnership and Pathway

		Completed Micro Credential Enrollment				
		1+		None		Overall
		N	(%)	N	(%)	N
All participant pathways (N=848)		766	(90.3)	82	(9.7)	848
Partnership	Pathway					
Allegheny	Computer User Network Tech	40	(85.1)	7	(14.9)	47
	Health Information Tech	18	(69.2)	8	(30.8)	26
	Patient Care Tech	39	(81.3)	9	(18.8)	48
	Sub total	97	(80.2)	24	(19.8)	121
Bucks	Industrial Maintenance	57	(100.0)	0	(0.0)	57
	Metal Working	75	(98.7)	1	(1.3)	76
	Sub total	132	(99.3)	1	(0.8)	133
Delaware	CNC Operator Metalworking	24	(85.7)	4	(14.3)	28
	Sub total	24	(85.7)	4	(14.3)	28
Montgomery	CNC Operator	14	(93.3)	1	(6.67)	15
	Medical Billing	38	(95.0)	2	(5.00)	40
	Office Assistant	21	(100.0)	0	(0.00)	21
	Payroll Tech	7	(100.0)	0	(0.00)	7
	Sub total	80	(96.4)	3	(3.61)	83
Northampton/Lehigh	Advanced Manufacturing	76	(86.4)	12	(13.6)	88
	Sub total	76	(86.4)	12	(13.6)	88
Philadelphia	Advanced Manufacturing	11	(78.6)	3	(21.4)	14
	Automotive Tech	0	(0.0)	1	(100.0)	1
	Business Technology	7	(77.8)	2	(22.2)	9
	Health Care	29	(80.6)	7	(19.4)	36
	Workforce Readiness	139	(99.3)	1	(0.7)	140
	Sub total	186	(93.0)	14	(7.0)	200
Westmoreland	Certified Welder	53	(77.9)	15	(22.1)	68
	Culinary	14	(77.8)	4	(22.2)	18
	NIMS Machining I	35	(94.6)	2	(5.4)	37

		Completed Micro Credential Enrollment				
		1+		None		Overall
		N	(%)	N	(%)	N
All participant pathways (N=848)		766	(90.3)	82	(9.7)	848
	Pre Employment Manufacturing	69	(95.8)	3	(4.2)	72
	Sub total	171	(87.7)	24	(12.3)	195

Students Who Continued Education Beyond First Micro-Credential

For all pathways requiring more than one micro-credential, persistence was tracked and total enrollments for each partnership are listed in the Sub-total rows. Persistence-tracked pathway enrollments are also broken down within each partnership to display the number of enrollments per pathway. The *Overall* column indicates the total number of tracked student-pathway enrollments at a partnership or partnership-pathway. These are comprised of (a) students in the *Yes* column, who completed at least one micro-credential toward pathway completion and then went on to enroll in a second micro-credential; and (b) students in the *No* column, who enrolled in only one micro-credential despite additional micro-credentials being available within their chosen pathway. The percentage of students who persisted versus those did not are shown in parentheses next to each count. Sub-total counts are not necessarily comprised of unique students, as nearly a third of students enrolled in more than one pathway (of 632 unique participants, 528 (83.5%) participated in one pathway, 74 (11.7%) in two, and 30 (4.7%) in three). Pathways with only one micro-credential include Westmoreland's Welding and Machining pathways; Allegheny's Patient Care Technician pathway; and Philadelphia's Advance Manufacturing, Automotive Tech, Business Tech, and Health Care pathways.

Table 66: Persistence by Partnership and Pathway

		Persisted				
		Yes		No		Overall
		N	(%)	N	(%)	N
All participant pathways (N=635)		584	(92.0)	51	(8.0)	635
Partnership	Pathway					
Allegheny	Computer User Network Tech	40	(85.1)	7	(14.9)	47
	Health Information Tech	18	(69.2)	8	(30.8)	26
	Sub total	58	(79.5)	15	(20.6)	73
Bucks	Industrial Maintenance	57	(100.0)	0	(0.0)	57
	Metal Working	75	(98.7)	1	(1.3)	76
	Sub total	132	(99.3)	1	(0.8)	133
Delaware	CNC Operator Metalworking	24	(85.7)	4	(14.3)	28
	Sub total	24	(85.7)	4	(14.3)	28
Montgomery	CNC Operator	14	(93.3)	1	(6.7)	15
	Medical Billing	38	(95.0)	2	(5.0)	40
	Office Assistant	21	(100.0)	0	(0.0)	21
	Payroll Tech	7	(100.0)	0	(0.0)	7
	Sub total	80	(96.4)	3	(3.6)	83
Northampton/Lehigh	Advanced Manufacturing	76	(86.4)	12	(13.6)	88
	Sub total	76	(86.4)	12	(13.6)	88

		Persisted				
		Yes		No		Overall
		N	(%)	N	(%)	N
All participant pathways (N=635)		584	(92.0)	51	(8.0)	635
Philadelphia	Workforce Readiness	132	(94.3)	8	(5.7)	140
	Sub total	132	(94.3)	8	(5.7)	140
Westmoreland	Culinary	14	(77.8)	4	(22.2)	18
	Pre Employment Manufacturing	68	(94.4)	4	(5.6)	72
	Sub total	82	(91.1)	8	(8.9)	90

Proportion of Students Who Completed Pathway

Total enrollments for each partnership are listed in the sub-total rows. Enrollments are also broken down within each partnership to display the number of enrollments per pathway. The *Overall* column indicates the total number of student-pathway enrollments at a partnership or partnership-pathway. These are comprised of (a) students in the *Yes* column, who completed the pathway; and (b) students in the *No* column, who enrolled in a pathway but did not complete it. The percentage of students who completed a pathway versus those who did not are shown in parentheses next to each count. Sub-total counts are not necessarily comprised of unique students, as nearly a third of students enrolled in more than one pathway (of 632 unique participants, 528 (83.5%) participated in one pathway, 74 (11.7%) in two, and 30 (4.7%) in three).

Table 67: Proportion of Students Who Completed Pathway by Partnership

		Completed Micro Credential Enrollment				
		1+		None		Overall
		N	(%)	N	(%)	N
All participant pathways (N=848)		587	(69.2)	261	(30.8)	848
Partnership	Pathway					
Allegheny	Computer User Network Tech	17	(36.2)	30	(63.8)	47
	Health Information Tech	15	(57.7)	11	(42.3)	26
	Patient Care Tech	39	(81.3)	9	(18.7)	48
	Sub total	71	(58.7)	50	(41.3)	121
Bucks	Industrial Maintenance	53	(93.0)	4	(7.0)	57
	Metal Working	68	(89.5)	8	(10.5)	76
	Sub total	121	(91.0)	12	(9.0)	133
Delaware	CNC Operator Metalworking	10	(35.7)	18	(64.3)	28
	Sub total	10	(35.7)	18	(64.3)	28
Montgomery	CNC Operator	14	(93.3)	1	(6.7)	15
	Medical Billing	32	(80.0)	8	(20.0)	40
	Office Assistant	8	(38.1)	13	(61.9)	21
	Payroll Tech	5	(71.4)	2	(28.6)	7
	Sub total	59	(71.1)	24	(28.9)	83
Northampton/Lehigh	Advanced Manufacturing	64	(72.7)	24	(27.3)	88
	Sub total	64	(72.7)	24	(27.3)	88
Philadelphia	Advanced Manufacturing	11	(78.6)	3	(21.4)	14

		Completed Micro Credential Enrollment				
		1+		None		Overall
		N	(%)	N	(%)	N
All participant pathways (N=848)		587	(69.2)	261	(30.8)	848
	Automotive Tech	0	(0.0)	1	(100.0)	1
	Business Technology	7	(77.8)	2	(22.2)	9
	Health Care	29	(80.6)	7	(19.4)	36
	Workforce Readiness	81	(57.9)	59	(42.1)	140
	Sub total	128	(64.0)	72	(36.0)	200
Westmoreland	Certified Welder	53	(77.9)	15	(22.1)	68
	Culinary	14	(77.8)	4	(22.2)	18
	NIMS Machining I	35	(94.6)	2	(5.4)	37
	Pre Employment Manufacturing	32	(44.4)	40	(55.6)	72
	Sub total	134	(68.7)	61	(31.3)	195

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WAGE GAINS BY SEGMENT

Among the 766 participant-pathway enrollments for which at least one micro-credential was completed, 267 (207) were employed three (six) months after completion *as well as* one year prior to enrollment In Panel A, mean quarterly gains are listed for these participant-pathway enrollments by each partnership and by the number of micro-credentials completed. Gains are also broken down by the number of micro-credentials completed. The counts in Panel A include multiple observations of the 223 (183) unique participants. In Panel B, mean quarterly gains for these unique participants are broken down by various other demographics. Totals are listed in the Sub-total rows. In addition to means, minimum and maximum values are also reported, as well as the number of observations included in the calculation.

Table 68: Mean Quarterly Wages by Pathway Enrollments by Partnership and Micro-Credentials Completed (Panel A)

Panel A	Mean Quarterly Wages							
	3 months post N = 267				6 months post N = 207			
	Mean	Min	Max	N	Mean	Min	Max	N
All participant pathways	$ 479.66	-$14,434	$10,622	267	$ 734.60	-$14,886	$12,486	207
Partnership								
Allegheny	$ 669.26	-$ 5,450	$ 8,065	35	$1,065.59	-$ 8,131	$11,729	32
Bucks	$1,639.63	-$14,434	$10,622	62	$1,946.40	-$12,901	$12,486	57
Delaware	-$ 272.00	-$ 7,712	$ 8,244	7	$2,027.40	-$ 1,404	$ 8,664	5
Montgomery	-$ 159.37	-$12,257	$ 7,536	43	$ 344.06	-$10,004	$ 7,632	34
Northampton/Lehigh	-$1,480.57	-$14,147	$ 6,977	21	-$1,993.00	-$14,886	$ 6,809	15
Philadelphia	$ 243.09	-$ 8,513	$ 6,687	46	$ 725.62	-$ 6,004	$ 6,211	34
Westmoreland	$ 597.28	-$10,266	$ 8,551	53	-$ 319.77	-$11,694	$ 8,551	30
Micro credentials completed								
1 2	$ 386.34	-$ 7,319	$ 8,551	76	-$ 241.05	-$11,694	$11,729	55
3 7	$ 90.35	-$14,147	$ 8,244	81	$ 390.25	-$14,886	$ 8,664	72
8 12	$ 830.82	-$14,434	$10,622	110	$1,715.28	-$12,901	$12,486	80

Table 69: Mean Quarterly Wages for Unique Participants by Demographics

Panel B	3 months post N = 223				6 months post N = 183			
	Mean	Min	Max	N	Mean	Min	Max	N
All participant pathways	$ 583.22	-$14,434	$10,622	223	$ 801.47	-$14,886	$ 12,486	183
Post Industry code								
11 Ag, Forestry, Fishing, Hunting	**	**	**	**	**	**	**	**
21 Mining	**	**	**	**	**	**	**	**
23 Utilities	**	**	**	**	**	**	**	**
31 33 Manufacturing	$2,270.28	-$14,434	$10,622	62	$2,325.65	-$12,901	$12,486	54
42 Wholesale trade	**	**	**	**	$1,952.40	-$ 4,497	$ 6,948	5
44 45 Retail trade	$ 15.24	-$ 6,110	$ 4,640	25	$ 460.47	-$ 5,304	$ 6,168	17
48 49 Transport warehousing	-$ 590.10	-$ 5,003	$ 4,005	10	$2,521.34	$ 917	$ 3,430	6
51 Information	**	**	**	**	**	**	**	**
52 Finance and insurance	**	**	**	**	**	**	**	**
53 Real estate rental & leasing	**	**	**	**	**	**	**	**
54 Prof, science, & tech services	-$ 121.33	-$10,375	$ 8,065	12	$2,248.73	-$ 8,773	$ 7,632	11
56 Admin & support waste mgt	-$1,339.64	-$12,257	$ 6,773	28	-$ 957.68	-$10,004	$ 4,585	28
61 Educational services	$ 999.57	-$ 2,375	$ 6,089	7	$ 414.20	-$ 1,763	$ 1,730	5
62 Health care & social assist	$ 281.23	-$ 6,630	$ 6,687	39	-$ 80.92	-$ 5,075	$ 5,781	25
71 Arts, entertainment, & rec	**	**	**	**	**	**	**	**
72 Accom. & food services	-$ 78.43	-$10,266	$ 3,117	14	-$ 930.88	-$11,068	$ 6,342	17
81 Other services	**	**	**	**	**	**	**	**
92 Public administration	$2,006.00	-$ 6,182	$ 7,201	5	$4,474.20	-$ 4,427	$11,729	5
Age group								
17 29	$1,501.68	-$ 8,863	$ 9,822	84	$1,819.66	-$ 9,791	$11,729	76
30 39	$1,101.91	-$ 7,712	$10,622	46	$1,294.83	-$ 7,398	$12,486	35
40 49	$ 617.95	-$12,257	$ 8,065	42	$ 137.05	-$11,694	$ 6,628	37
50 59	-$ 971.35	-$14,434	$ 7,536	40	-$1,000.73	-$12,901	$ 7,632	26
60 74	-$3,304.60	-$14,147	$ 3,591	10	-$1,777.33	-$14,886	$ 1,239	9

Panel B	3 months post N = 223				6 months post N = 183			
	Mean	Min	Max	N	Mean	Min	Max	N
All participant pathways	$ 583.22	-$14,434	$10,622	223	$ 801.47	-$14,886	$ 12,486	183
Unknown	**	**	**	**	**	**	**	**
Sex								
Female	$ 37.43	-$14,147	$ 7,536	103	$ 222.32	-$14,886	$11,729	79
Male	$1,051.69	-$14,434	$10,622	120	$1,241.40	-$12,901	$12,486	104
Race/Ethnicity								
White, non Hispanic	$ 653.57	-$14,434	$10,622	130	$ 792.77	-$14,886	$12,486	111
Other	$ 431.36	-$10,375	$ 8,551	87	$ 717.06	-$ 9,791	$ 7,622	66
Unknown	$1,261.00	-$ 2,975	$ 7,201	6	$1,890.83	-$ 8,131	$11,729	6
Marital status								
Married	$ 25.85	-$14,434	$ 8,923	54	$ 110.87	-$14,886	$12,486	39
Not married	$ 805.96	-$12,257	$10,622	156	$1,052.62	-$11,694	$11,729	132
Unknown	$ 225.62	-$10,266	$ 5,376	13	$ 283.25	-$11,068	$ 6,628	12
Education								
High school diploma or less	$ 951.41	-$12,801	$ 9,822	150	$1,122.40	-$11,694	$11,729	124
Associate degree or certification	$ 381.79	-$ 8,903	$ 8,923	47	$ 438.84	-$ 8,773	$12,486	38
Bachelor's or graduate degree	-$1,230.44	-$14,434	$10,622	25	-$ 459.00	-$14,886	$ 9,511	20
Unknown	**	**	**	**	**	**	**	**
First generation college student								
No	$ 657.21	-$14,434	$10,622	153	$ 732.39	-$14,886	$12,486	127
Yes	$ 780.79	-$10,375	$ 8,244	52	$1,013.15	-$ 7,740	$ 8,664	41
Unknown	-$ 616.44	-$ 6,110	$ 5,376	18	$ 807.73	-$ 7,398	$ 6,628	15
Ex offender status								
No	$ 511.16	-$14,434	$ 9,822	203	$ 666.22	-$14,886	$12,486	168
Yes	$1,609.50	-$ 5,842	$10,622	18	$2,482.07	-$ 6,265	$ 8,812	14
Unknown	**	**	**	**	**	**	**	**
Veteran status								
No	$ 654.18	-$14,434	$10,622	216	$ 825.29	-$14,886	$12,486	177
Yes	-$1,713.00	-$ 6,856	$ 5,376	5	$ 119.60	-$11,694	$ 6,628	5

Panel B	3 months post N = 223				6 months post N = 183			
	Mean	Min	Max	N	Mean	Min	Max	N
All participant pathways	$ 583.22	-$14,434	$10,622	223	$ 801.47	-$14,886	$ 12,486	183
Unknown	**	**	**	**	**	**	**	**

** Data are suppressed where N < 5, including zero

INDUSTRY-RECOGNIZED CREDENTIALS EARNED

Total enrollments for each partnership are listed in the sub-total rows. Enrollments are also broken down within each partnership to display the number of enrollments per pathway. The *Overall* column indicates the total number of student-pathway enrollments at a partnership or partnership-pathway. These are further delineated by the number of credentials the student achieved in the pathway, from zero to four (maximum available). Sub-total counts are not necessarily comprised of unique students, as nearly a third of students enrolled in more than one pathway (of 632 unique participants, 528 (83.5%) participated in one pathway, 74 (11.7%) in two, and 30 (4.7%) in three). N/A indicates additional credentials were not available for the pathway.

Table 70: Industry-Recognized Credentials Received by Partnership and Pathway

		Number of Industry Credentials Received					
		0	1	2	3	4	Overall
All participant pathways (N=848)		445	190	136	63	14	848
Partnership	**Pathway**						
Allegheny	Computer User Network Tech	40	3	1	1	2	47
	Health Information Tech	22	4	N/A	N/A	N/A	26
	Patient Care Tech	16	32	N/A	N/A	N/A	48
	Sub total	78	39	1	1	2	121
Bucks	Industrial Maintenance	2	0	55	N/A	N/A	57
	Metal Working	1	1	74	N/A	N/A	76
	Sub total	3	1	129		N/A	133
Delaware	CNC Operator Metalworking	10	1	4	1	12	28
	Sub total	10	1	4	1	12	28
Montgomery	CNC Operator	15	N/A	N/A	N/A	N/A	15
	Medical Billing	9	31	N/A	N/A	N/A	40
	Office Assistant	5	16	N/A	N/A	N/A	21
	Payroll Tech	7	N/A	N/A	N/A	N/A	7
	Sub total	36	47	N/A	N/A	N/A	83
Northampton/Lehigh	Advanced Manufacturing	13	75	N/A	N/A	N/A	88
	Sub total	13	75	N/A	N/A	N/A	88
Philadelphia	Advanced Manufacturing	14	N/A	N/A	N/A	N/A	14
	Automotive Tech	1	N/A	N/A	N/A	N/A	1
	Business Technology	9	N/A	N/A	N/A	N/A	9
	Health Care	36	N/A	N/A	N/A	N/A	36
	Workforce Readiness	140	N/A	N/A	N/A	N/A	140
	Sub total	200	N/A	N/A	N/A	N/A	200
Westmoreland	Certified Welder	54	14	N/A	N/A	N/A	68
	Culinary	5	13	N/A	N/A	N/A	18
	NIMS Machining I	37	N/A	N/A	N/A	N/A	37
	Pre Employment Manufacturing	9	0	2	61	N/A	72
	Sub total	105	27	2	61	N/A	195

APPENDIX G: MATCHING AND IN-KIND DATA COLLECTION QUESTIONNAIRE

OCTOBER 1, 2017-SEPTEMBER 30, 2018

Please complete this worksheet for FFY 2018.

General Questions

(1) What is your institution's fringe rate?[84]
(2) What is your institution's overhead rate?[85]

Matching Contribution Valuation Questions

(1) Did any staff, administrators, or faculty member at your institution not paid by the WIF grant dedicate time to the WIF project in the FFY 2018? If so, please list the individual(s) titles, annual salary, and an estimated percent of their time they dedicated to the WIF project in FFY 2018. (If not applicable, please skip to #2.)

Position/Title	Annual Salary	% of Time Dedicated to WIF Project in FFY 2018

(2) Did any WIF-grant funded staff use office space in the FFY 2018 that was not charged to the grant? If so, please indicate the individual(s) titles and annual salary. (If not applicable, please skip to #3.)

Position/Title	Annual Salary	% of Time Charged to the Grant

(3) In the FFY 2018, did the WIF program use any space for instruction (classroom or lab facilities) that was not charged to the grant? If so, please list each classroom or lab space, the number of hours the space was used in FFY 2018, and the rate that your institution would charge an outside organization to rent similar classroom or lab space on an hourly basis.[86] (If not applicable, please skip to the next section.)

Name of Classroom/Lab Space	Hourly Rental Rate	Number of Hours Used in the 2018 Federal Fiscal Year

[84] The fringe rate accounts for the cost of benefits (such as health insurance and 401K contributions) and employer-paid payroll taxes and FICA. The fringe rate is often used when developing grant proposals and you should be able to obtain this information from your accounting or grants department.
[85] The overhead rate accounts for what is needed to support daily operations and includes things like space, utility and office supply charges. You should be able to obtain this information from your accounting or grants department.
[86] This information is likely available from your facilities management department at your institution. If not, you may estimate what a reasonable rental rate would be based on your knowledge of the local market.

Name of Classroom/Lab Space	Hourly Rental Rate	Number of Hours Used in the 2018 Federal Fiscal Year

In-Kind Contribution Valuation Questions

(1) In the FFY 2018, did any partners external to your institution and the WDB (e.g., community and employer partners) contribute time to the WIF project? If so, please list the title of each external partner and the number of hours he/she contributed to the project in the last quarter/federal fiscal year. (If not applicable, please skip to #2.)

Company	# of Employee Reps	Number of Hours Contributed in the 2018 Federal Fiscal Year

(2) In the FFY 2018, did external partners donate any equipment or supplies to the WIF project? If so, please list each piece of equipment and supply category and the value of the donation.[87] (If not applicable, please skip to #3.)

Supplies or Equipment Donated	Value

(3) In the FFY 2018, did external partners provide facility space for WIF program instruction and activities? If so, please list the name of each partner-provided facility space and the estimated value of the facility space donation.[88]

Name of Facility Space	Estimated Value of Facility Space Donation

[87] Obtain an estimated value of each supply or equipment donation from the donor.
[88] Obtain an estimated value of each supply or equipment donation from the donor.