Southeastern Economic and Education Leadership Consortium (SEELC)

Final Evaluation Report

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SEELC FINAL EVALUATION REPORT

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Authors: Ama Takyi-Laryea, Anamita Gall, Molly Chamberlin, Laura Naughton, and Bethany Garling Spychala
Principal Investigator: Keith M. Sturges
Research Support: Enzo Ferroggiaro, Jeffery Taylor, Aikaterini Passa

Table of Contents

Executive Summary

This final evaluation report describes the major findings related to the Southeastern Economic and Education Leadership Consortium (SEELC) mixed-methods evaluation that measured the implementation and outcomes of the program's planned interventions on student outcomes. This report provides a summative description and assessment of the SEELC program to the U.S. Department of Labor (DOL) and other relevant stakeholders.

SEELC Program Intervention Description and Activities

In 2013, SEELC—representing six community and state colleges across three states—received a grant of more than $12.6 million through the DOL Trade Adjustment Assistance Community College and Career Training (TAACCCT) program. The Consortium included Northeast State Community College (Northeast), Palm Beach State College (Palm Beach), Pellissippi State Community College (Pellissippi), Polk State College (Polk), Randolph Community College (Randolph), and Vance-Granville Community College (Vance-Granville). SEELC sought to improve education and training opportunities for trade adjustment assistance (TAA)-eligible workers[1], veterans, and other adults who have been unemployed for long periods. It also sought to facilitate a permanent change in its approach to serving employers, workers, and the community at large.

SEELC grant developers referred to State labor market data, as well as feedback from Workforce Investment Board (WIB) partners in each college service area to identify three industries in which SEELC target populations can obtain high-wage, high-demand jobs. They determined that the welding, computer-integrated machining, and advanced manufacturing technology industries offered these opportunities. Interventions were planned using three evidence-based innovations that have proven effective in other similar populations. SEELC grant developers used the three innovations outlined in Exhibit ES-1 to address workforce gaps and improve education and training opportunities in its three target industries.

Exhibit ES-1: SEELC Evidence-based Program Design Elements

Evidence-based Innovation	SEELC Program Design
Innovation 1: Create national standards based on career pathway opportunities for workers in welding, machining, and advanced manufacturing.	Align community college program to national industry standards and certifications to improve successful labor market outcomes.
Innovation 2: Provide ongoing career support, such as post-program assessment of competencies to facilitate immediate work readiness and job placement.	Use competency assessments with validated tools to provide a career readiness baseline for all program students and student supports, such as recruitment, retention, and completion coaches.
Innovation 3: Use a regionally based economic approach to address workers' skills needs, demonstrating the community college's leadership role in economic and workforce development.	Promote the development of a regionally based economic and education collaborative council, including collaborative policy groups, to integrate strategies and create economic clusters.

Members of SEELC used TAACCCT Round 3 funds as a means of systems change. Its various community colleges, coming from diverse economic and demographic settings, led integrated regional economic and workforce development efforts to improve student skills and employment opportunities and to foster a business growth climate. SEELC used a series of interventions to bring about this change, including pre-

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[1] Trade Adjustment Assistance (TAA) for Workers is a federally funded program, with no costs to employers, that helps workers who are adversely affected by foreign imports or job shifts to a foreign country. https://www.doleta.gov/programs/factsht/taa.cfm

and post-assessments, coaching, stacked and latticed courses, articulation and transferability agreements, and online courses. Exhibit ES-2 below provides a high-level overview of SEELC's programmatic activities.

Exhibit ES-2: High Level Programmatic Activities

	Innovation 1	Innovation 2	Innovation 3
Northeast	**Career Pathways:** Enhanced welding, machining, and advanced manufacturing programs through alignment with American Welding Society (AWS) and National Institute for Metalworking Skills (NIMS) credentials and new equipment. **Accredited Testing Facilities (ATF):** Completed ATF. **Applied Credit:** Established new 2+2 articulation agreement; utilized existing college agreements.	**Student Support Services:** Provided students with coaching support. Integrated WorkKeys[2] assessments into SEELC programs.	**Employer and Industry Engagement:** Added new partners; grant staff report that new equipment has increased employer respect for the programs.
Palm Beach	**Career Pathways:** Enhanced welding and machining programs through AWS Sense Level 2 and NIMS certifications and new equipment. **ATF:** Completed ATF. **Applied Credit:** Internal articulation between Associate's and Bachelor's service management degrees updated during grant period.	**Student Support Services:** Provided students with coaching support. WorkKeys available for students but not integrated into SEELC programs.	**Employer and Industry Engagement:** Improved relationships with the workforce board and new ATF anticipated to increase local partnerships.
Pellissippi	**Career Pathways:** Created new welding program; enhanced machining program through equipment; created advanced manufacturing megalab and created additive manufacturing program. **ATF:** Pursuing ATF. **Applied Credit:** Established new 2+2 articulation agreement; utilized existing college agreements.	**Student Support Services:** Provided students with coaching support. WorkKeys available for students but not integrated into SEELC programs.	**Employer and Industry Engagement:** Added new partners in welding; grant staff report that new equipment has increased employer respect for the programs.
Polk	**Career Pathways:** Created new Computerized Numerical Control (CNC) machining program and aligned to NIMS, enhanced welding and advanced manufacturing through new equipment. **ATF:** Did not pursue an ATF. **Applied Credit:** Established non-credit to credit articulation for advanced manufacturing and machining; utilized exiting college agreements.	**Student Support Services:** Provided students with coaching support. Did not integrate WorkKeys for students.	**Employer and Industry Engagement:** Leveraged employer relationships for equipment and program design; added new partner through Metalworking Technical Evaluation Committees (MET-TEC).
Randolph	**Career Pathways:** Enhanced existing welding, machining, and advanced manufacturing programs through equipment. **ATF:** Pursuing ATF. **Applied Credit:** Created non-credit to credit crosswalk; utilized existing college agreements.	**Student Support Services:** Provided students with coaching support. WorkKeys available for students but not integrated into SEELC programs.	**Employer and Industry Engagement:** Developed regional collaborative to formalize systems to build industry partnerships.
Vance-Granville	**Career Pathways:** Created two-year welding program, created mechatronics program. **ATF:** Did not pursue an ATF. **Applied Credit:** Established new 2+2 articulation agreement; utilized existing college agreements.	**Student Support Services:** Provided students with coaching support. Integrated WorkKeys assessments into SEELC programs.	**Employer and Industry Engagement:** Increased number of interactions with employers, including increased attendance at college events as part of recruitment efforts.

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2 ACT® WorkKeys is a system of assessments and curriculum that build and measure essential workplace skills that can affect job performance and increase opportunities for career changes and advancement. http://www.act.org/content/act/en/products-and-services/workkeys-for-job-seekers.html

Evaluation Design Summary

The SEELC external program evaluation assessed how well SEELC program components were implemented, noted implementation and contextual challenges, documented mid-course corrections and decisions, and determined student outcomes attributable to the SEELC program. The evaluation team used a mixed-methods evaluation design that incorporates an implementation study and an outcomes study to evaluate the program. This section summarizes major findings from these two studies, shares recommendations of program staff for future community college-based manufacturing workforce development programs, and considers sustainability plans for SEELC programs at their respective colleges.

Implementation Study

The implementation study documented program progress, monitored program outcomes, and provided recommendations for continuous improvement of program operations. The evaluation team primarily focused the formative and summative evaluation on the development of SEELC training programs and on the contextual factors influencing implementation. The implementation evaluation was intended to be a key element in learning lessons along the way to enhance program implementation and results in real-time. Guided by the SEELC program logic model (see Appendix H), the implementation evaluation addressed 12 main questions (see Exhibit ES-3):

Exhibit ES-3: Implementation Study Research Questions

Identify critical components and describe implementation at each site over time.
1. How is the curriculum selected, used, modified, or created?
2. How are programs improved or expanded using grant funds? What delivery methods are offered? What is the program administrative structure? What support or other services are offered?
3. Is an in-depth assessment of students' abilities, skills, and interests conducted to select students into the grant program? What assessment tools and processes are used to screen the students? Are the assessment results useful in determining the appropriate program and course sequence for students?
4. What contributions does each partner (e.g., employers, workforce system, others) make in terms of program design, curriculum development, recruitment, training, placement, program management, leveraging resources, and commitment to program sustainability?

Assess the fidelity of implementation and intervention over time.
5. How closely do the programs replicate the major and ancillary components of the SEELC program model?
6. What are the variations in implementation across sites?

Understand successes and challenges to implementation.
7. What program outputs are generated throughout the life of the grant? What barriers hinder output achievement? What factors unexpectedly improve output achievement?
8. What are the successes and obstacles to program performance?
9. How should program processes, tools, or systems be modified to improve performance?
10. What factors contribute to partners' involvement or lack of involvement in the program? Which contributions from partners are most critical to the success of the grant program? Which contributions from partners have less of an impact?
11. How satisfied are program partners, staff, and students with the program? Why?

Examine institutional capacity-building.
12. How can the program expand or enhance institutional capacity? What are the most promising programmatic components to use institution-wide? Consortium-wide? Why?

Outcome Study

The outcome study examined the effect of the program on students' outcomes—completion, credential attainment, employment placement, and wages. The outcomes evaluation used a pre–post outcomes analysis to estimate the association between TAACCCT-funded interventions and student outcomes. A comparison analysis viewed outcomes for those who took either a pre- or post-WorkKeys assessment with those who did not take an assessment at any point during their training. The outcome study addressed six main questions (see Exhibit ES-4):

Exhibit ES-4: Outcomes Study Research Questions

Persistence.
1. To what extent do the pre- and post-program competency assessments increase graduation and retention rates relative to the comparison group?
2. To what extent do pre- and post-program competency assessments increase certification rates relative to the comparison group?
3. To what extent do pre- and post-program competency assessments improve mastery of industry and occupational skills or other program-related credentials relative to the comparison group?

Employment/Career Outcomes
4. To what extent do the pre- and post-program competency assessments lead to higher quality employment outcomes (e.g., employment rates and earnings, promotions) relative to the comparison group?
5. Do the pre- and post-program competency assessments decrease the time lapse between graduation/completion and job placement? Do they decrease the time needed to attain credentialing?
6. Do the pre- and post-program competency assessments put students on stable and strong career pathways, as defined by increases in promotions and benefits, as well as declines in the receipt of public assistance?

Data sources supporting the evaluation findings were:

1) SEELC Efforts to Outcomes (ETO®) database for student tracking;
2) Student online baseline and follow-up surveys;
3) Secondary data such as labor market data;
4) Site visits observations;
5) Interviews with SEELC program staff and other key stakeholders (employers, faculty, leadership);
6) Student focus groups; and
7) Meeting notes.

Analyses of these data provided evidence of program implementation and the effect the program had on student outcomes.

Outcomes Study Findings

As of July 2017, the six SEELC colleges had met and exceeded their enrollment goal by enrolling 2,074 unique students into the three programs of study: welding, machining, and advanced manufacturing. The Consortium as a whole exceeded its targets for all DOL outcome measures (see Exhibit ES-5), except for employment measures 7 and 8 (students who become employed one quarter after program completion, and students who remain employed three quarters after exiting the program) primarily because the majority of those students—nearly 60% (of those who had intake data)—were employed at intake (incumbent workers), and those measures only pertained to those who were unemployed (non-incumbent) at intake.

Exhibit ES-5: SEELC Performance Measures

DOL Outcome Measure	Target	July 2017	Percentage of Goal Achieved
1. Unique students receiving services under SEELC	1736	2074	119.6%
2. Students who have completed a grant-funded program of study	1074	1127	104.9%
3. Students retained in grant-funded programs of study	522	1886	361.3%
4. Total number of students completing credit hours	935	1913	204.6%
5. Total number of earned credentials	1329	1513	115.2%
6. Total number of students enrolled in further education after completion	277	381	137.5%
7. Students who become employed one quarter after program completion	991	172	17.4%
8. Students who remain employed three quarters after exiting the program	787	38	4.8%
9. Students employed at program enrollment who receive a wage increase	377	405	107.4%

Source: SEELC Program Tracking Data

Of the three pathways offered, most of those enrolled entered the advanced manufacturing programs of study. All colleges participating in the SEELC consortium offered programs in advanced manufacturing that catered to local industry demand and thus allowed greater flexibility, variety, and quantity of courses offered.

Completion & Skill Attainment

Program Completion and Credential Attainment. At the conclusion of the evaluation period (July 2017), a majority of students were still engaged in the process of pursuing a degree or certification, but high percentages of students had completed an industry-recognized credential (see Exhibit ES-6). Regardless of pathway, students tended to complete industry-recognized credentials at a higher rate than certifications or degrees regardless the program of study. This may be related to that fact that, attaining a degree or certification required more time than an industry-recognized credential, as most students were still progressing toward degree or certification attainment at the end of the evaluation period.

Exhibit ES-6: Completion and Credential Attainment

Colleges	Total (n=1265)	Northeast State Community College, TN (n=422)	Pellissippi State Community College, TN (n=221)	Randolph Community College, NC (n=260)	Polk State College, FL (n=250)	Vance-Granville Community College, NC (n=36)	Palm Beach State College, FL (n=76)
Degree							
Completed	10%	14%	11%	<1%	14%	0%	na
In-progress	84%	83%	73%	95%	83%	100%	na
Incomplete+	6%	3%	16%	4%	3%	0%	na
Certification							
Completed	35%	19%	54%	37%	20%	43%	40%
In-progress	57%	74%	28%	56%	70%	57%	52%
Incomplete+	8%	7%	18%	7%	9%	0%	7%
Industry Credential							
Completed	60%	7%	75%	90%	74%	na	65%
In-progress	33%	93%	0%	10%	15%	na	32%
Incomplete+	7%	0%	25%	0%	11%	na	2%

Source: SEELC ETO Database. Note: +Incomplete include students who withdrew/dropped out

WorkKeys Assessment, Completion, and Credential Attainment. Completion of the WorkKeys assessment did not have an effect on any credential completion. One of the goals of the WorkKeys assessment was to

provide a job readiness baseline for all students and develop a career guide for students focused on their individual education or training needs. Based on the analysis, the assessment may have provided a roadmap towards completion for some students but did not have a significant impact on completion. Taking the assessment did not have a positive effect on attaining a certificate or the completion of a degree. Due to the requirement of the WorkKeys assessment by local employers, however, and even though taking the assessment did not affect the certification completion rate, students who took the assessment, and also attained a certificate, were well positioned to obtain a job with local employers.

Student Employment Outcomes

Employment at Enrollment. According to ETO intake data (N=1697), most SEELC students were incumbent workers (already employed) at the time of enrollment into SEELC training programs (64%, n=1061), and only 3% identified as TAA-eligible[3] (n=65). Slightly more than half of those with employment history data, who were employed at intake, worked part time (56%, n=204). Slightly more than half of SEELC survey respondents (n=34) reported that they had at least a one year of experience in a related field when they enrolled. SEELC colleges, therefore, had to offer a range of courses that trained those new to the industry (48%) and upskilled those who had work experience.

Post-program Employment and Wages. Overall, SEELC completers (students who successfully completed a program of study) gained employment soon after exit, with 70% (n=385) gaining employment by the first quarter after completion. Non-incumbent worker employment outcomes were promising, with 38% employed at the first quarter in mostly full-time employment (82%) in a job related to their training program (87%). A large percentage of those who were employed at enrollment received a wage increase (80%). The encouraging uptake of SEELC completers into new hiring positions and increasingly higher wages suggests that completers had marketable in-demand skills that were sought after by employers (see Exhibit ES-7).

Exhibit ES-7: Employment Placement at Completion

Employment Status at Completion	Percentage
Employment Placement per Quarter after Completion (n=550)	
Employed Q1	35%
Employed Q2	9%
Employed Q3	12%
Employed Q4	9%
During the program/at exit	35%
Type of Employment (n=209, all completers)	
Full time	83%
Part time	17%
Job Relevancy (n=276, all completers)	
Yes	83%
No	17%

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[3] A TAA-eligible worker is a worker who benefits from Trade Adjustment Assistance (TAA) for Workers, a federally funded program. With no costs to employers, the program that helps workers who are adversely affected by foreign imports or job shifts to a foreign country. https://www.doleta.gov/tradeact/docs/program_brochure2014.pdf

Employment Status at Completion	Percentage
Received a wage increase (n=312)	80%
Unemployed at Enrollment (non-incumbent completers)	
Employed during program/exit (n=23)	15%
Employed at Q1 (n=60)	38%
Type of Employment (n=66, non-incumbent completers)	
Full time	82%
Part time	18%
Job Relevancy (n=75, non-incumbent completers)	
Yes	87%
No	13%
Averages for all Completers	
Mean number of hours worked per week (n=24)	33 hours/week
Median hourly wage (n=391)	$13.50/hour (sd=6.16)

Source: SEELC ETO Database, Online Student Baseline Survey (2015-2017)

Post-program Employment and Wages by Program Pathway. Completers within the welding and machining pathway were significantly more likely than those who chose the advanced manufacturing pathway to be employed by the first quarter after their program of study completion. The higher employment rate, especially for welding, was probably influenced by the high percentage of incumbent workers (70%) in that career pathway. Median hourly wages for those who enrolled in the machining pathway ($15) were significantly higher than the other two pathways ($13, for welding and $12 for advanced manufacturing).

Post-program Employment and Wages by Type of Credential. Median wages did not differ by the type of credential attained or whether students completed or did not complete a credential. Those who completed a professional certificate, however, were significantly more likely to be placed in employment by the first quarter after program completion (57%) compared to those with industry credentials (49%) and degrees (38%). The percentage of completers who experienced a wage increase was significantly (p=0.03) higher for those who earned a certificate or industry credential than those who earned a degree. This finding could be due to the shorter duration of certificate and credential programs that allows a completer to more quickly enter the job market and gain wages. Degree programs are longer, and the evaluation team may not have observed as many completers within the lifecycle of the grant.

WorkKeys Assessment and Post-Program Employment and Wages. Taking the WorkKeys assessment did not have a positive effect on employment in the first quarter or affect whether a student received a wage increase. Taking the WorkKeys assessment, however, had a positive impact on hourly wages. When controlling for select demographic variables and baseline wage, non-Hispanic, incumbent students who took the assessment had a significant mean hourly wage difference of $2.36 over those who did not. Major employers that required the assessment within the vicinity of the three colleges that implemented the assessment (Northeast, Randolph, and Vance-Granville) may have had higher paying positions than other employers in the local area (see Exhibit ES-8).

Exhibit ES-8: Effect of WorkKeys Assessment on Employment and Wages

	Observed Wages			Regression		
Employment Outcomes	Did not take assessment ($)	Took assessment ($)	Difference	Coefficient (assessed)	p-value	Cohen's d (effect size)
Post-program Wages (n=124)	$14.15	$16.51	$2.36	2.54	0.05	0.42

Source: SEELC ETO Database, Online Student Baseline Survey (2015-2017)

Implementation Study Findings

SEELC brought together six colleges with different contexts and local needs to develop programs across three pathways—welding, machining, and advanced manufacturing (Innovation 1), implement enhanced student services (Innovation 2), and engage partners for better-informed programs and positive student results (Innovation 3). While grant staff at each college implemented the components of the SEELC grant to best meet their needs, the components of the SEELC grant remained the same across the Consortium. The following descriptive findings present the background and contextual factors within which the three innovations and their associated program components were implemented, and provide an overview of program implementation, program modifications, and successes and challenges during program implementation.

Program Development and Modifications (Innovation 1)

Career Pathway Development. Career pathway development generally was carried out with fidelity to Innovation 1. The SEELC colleges implemented program components in welding, machining, and advanced manufacturing as described in the grant narrative, with the exception of the implementation of an Accredited Testing Facility (ATF) at each campus. As a consortium, Innovation 1 provided common threads among the colleges, along the three selected pathways as they sought to align and engage with the American Welding Society (AWS) and the National Institute for Metalworking Skills (NIMS), the welding and machining industry credentialing bodies of choice, respectively.

Program Modifications. Grant staff across the Consortium reported on the flexibility of the SEELC grant, which allowed them to tailor program modifications to meet the needs of their colleges and, in particular, the needs of their local businesses and industries. These adaptations included the contexts of individual colleges and the needs of students and employers they serve, which meant grant implementation took different forms at each college. In all cases, colleges created or modified curriculum in some combination of welding, machining, and advanced manufacturing (although two colleges opted out of one pathway each), added equipment, aligned their curricula to industry standards (AWS SENSE and NIMS), and funded program delivery.

Program Modifications, Challenges, and Successes. Grant staff were able to develop and modify their programs by engaging with local employers and industry experts in key decision making around program curricula creation and enhancement and equipment purchases. Flexibility in design also allowed each college to meet local needs. SEELC leadership negotiating as a single coordinating body, contracting and working with NIMS and AWS, rather than each institution pursuing partnerships with these organizations, eased alignment and agreement with these credentialing bodies. Generating support from college leadership also buoyed the SEELC programs. At the same time, the SEELC colleges also experienced challenges as they worked to enhance their programs. Program development and modifications were negatively affected by strict college hiring restrictions and internal hiring processes, difficulty collaborating with AWS, difficulties implementing the ATF due to space limitations and leadership turnover.

Program Delivery

The Consortium operated flexibly, which allowed each college's grant staff to implement SEELC program pathways in ways that fit the needs and structures of each institution. In implementing SEELC programs, grant staff worked to provide students with opportunities for hybrid learning in specific programs and classes and created pathways for students to continue their education upon SEELC program completion.

Program Delivery Models

The use of hybrid courses[4] across the Consortium varied, and instructors reported that the hands-on nature of the advanced manufacturing programs limited the number of courses that could be offered via a hybrid model. Hybrid courses, designed to improve access to education and address time and transportation barriers, proved a challenge in courses with heavy hands-on components, leading some colleges to abandon the strategy. The SEELC program provided flexibility for participating colleges to interpret the grant narrative as was conducive to their institutional needs and realities. Across three common pathways of welding, machining, and advanced manufacturing, academic structure varied widely, from traditional semester-based, for-credit programs to Open Entry/Early Exit (OE/EE) format, to non-credit boot camp-style trainings adapted to meet specific and changing employer needs. Staff at each college pursued strategies to encourage students to continue their education, through articulation agreements and/or credit for prior learning, although the details of those arrangements also varied.

Support Services (Innovation 2)

Innovation 2 linked the colleges in a shared effort to reconfigure support services for students in grant-funded programs and applied effort toward helping students prepare for and find related employment. Support services offered during the SEELC programs were perceived as meeting student needs and, with the exception of WorkKeys assessments, generally were implemented with fidelity to the original grant plan.

Student Support Approaches and Outputs. The focus of student support services was both internal (current student success) and external (prospective student recruitment), with the emphasis for each varying by institutional need. Each SEELC college approached its student support services staffing structure differently, based on student needs and in response to turnover. In most cases, colleges assigned the responsibility of interacting with students and improving student outcomes to the completion coach, while the data collection and tracking role was designated to the outcomes and data specialist.

Student Support Successes and Challenges. Despite variations across the Consortium, students described the services provided by these support staff as critical to the success and retention of SEELC students, and this is reflected in the positive association between student contact with a support services staff member and completion of a degree or certificate and a wage gain. Colleges did not experience the same consortium-wide success in implementing the WorkKeys assessment. Instead, colleges struggled to communicate the value of the assessment to regional employers and students or to incentivize WorkKeys participation. Two factors made tracking students more difficult for SEELC staff, primarily, the outcomes and data specialist. First, every participating consortium member described some degree of difficulty in working with the ETO database, complaining that the software was unintuitive. Secondly, staff turnover in the completion coach and outcomes and data specialist positions impacted every SEELC college and significantly impacted student tracking and retention practices throughout the life of the grant.

Employer and Industry Engagement (Innovation 3)

Employer and Industry Engagement. Each SEELC college staff engaged a variety of employer, college, and industry partners throughout the life of the grant. Generally, colleges engaged industry partners by inviting them to participate on advisory committees or to attend industry mixers and job fairs, and by working to build individual relationships with key stakeholders in the region. SEELC consortium grant staff also engaged employer partners in curriculum development, inviting them to share recommendations for specific course topics and program equipment. In addition to engaging employer partners, staff at SEELC colleges developed and enhanced relationships with Workforce Investment System stakeholders. For many, this meant reinvigorating relationships that had dwindled or gone sour. Internal partnerships were equally significant in implementing SEELC programming. Grant staff engaged college leadership and

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[4] A hybrid approach to course delivery combines face-to-face classroom instruction with online activities.

specific departments to develop partnerships that would generate understanding and buy-in, creating opportunities to leverage internal resources, share information, and expedite internal processes.

Employer Engagement Successes and Challenges. Externally, staff utilized employer advisory councils and committees, industry mixers, job fairs, and program instructors to engage employer partners in program implementation and solicit important feedback to inform curricula design and equipment purchases. Generally, grant staff that reported experiencing higher levels of success in their employer partnership efforts also reported identifying one or two key partners that served as champions for their program, directly feeding students into the program, hiring program completers, and bringing other employer partners to the table. Employer engagement was a struggle for some colleges' staff. It was difficult for grant staff to keep employers engaged with the program because of program delays or frequent requests from the college. Colleges also continually struggled to communicate the value of industry credentials to employers who either had not heard of the credential or preferred to administer their own in-house testing.

Looking Forward

Program Sustainability. College staff expressed confidence that most courses enhanced or established under the grant will be sustained with both internal and external funding streams. In addition, across all consortium colleges, college leadership and grant staff expressed intentions to sustain other grant components that were deemed beneficial to the institution, particularly the coaching model and student supports. Colleges were most likely to maintain program components that existed prior to the grant that were modified to increase effectiveness through aligning them to third-party credentials. Colleges are least likely to sustain hybrid learning beyond the grant and, in many instances, it was a model that was the least adapted across the colleges. All colleges except Pellissippi indicated they would sustain the career readiness service delivery components.

Recommendations for Replication. Grant staff and college leadership encouraged future institutions to evaluate their internal capacity to support a prospective grant before submitting a proposal for funding. Internal checks could involve assessing businesses and open positions in their region to absorb the completers that would come out of a particular program and using an internal grant readiness checklist in conjunction with any grant proposals they consider submitting.

Program staff also encouraged future institutions to develop a thorough understanding of their own internal policies and procedures, as well as how to navigate these processes. Many staff specifically recommended having the institution's human resources department prepare specifications for grant positions that can be posted the moment that grant activities can begin. Preparing in advance to navigate internal policies and procedures should simultaneously involve generating strong internal buy-in from other leadership and staff throughout the institution. Internal stakeholders are required to help secure classroom and office space, move internal processes along more quickly, and assist the grant team in promoting grant-funded programming.

Future institutions were advised to maintain strong data-tracking procedures to reflect, accurately, grant activities and progress, and to ensure continuity and precision of data tracking in the event of staff turnover. Staff also recommended cross-training to soften the effect of staff turnover and guarantee resiliency in the grant team and program during periods of transition.

Summary

The SEELC program was first, and foremost, a regional workforce development program. The goal of implementing the program, guided by the three innovations, was to train TAA-eligible workers, veterans, and other adults and upskill those who were already engaged in the labor market and connect them to

better paying jobs. SEELC grant staff were successful in enrolling students into training programs and supporting them towards credential attainment. The SEELC program equipped students with industry-recognized degrees, certifications, and credentials to make them more marketable to employers. The results show that when SEELC completers did find employment after program exit, the jobs were full-time positions that were relevant to their program of study. This success suggests that SEELC completers had marketable skills that were in demand in the labor market. Other positive results include higher wages for those who took the WorkKeys assessment and those who enrolled in welding. The SEELC grant staff employed a variety of approaches to implement successful programs that achieved these outcomes, including garnering support from college leadership, aligning their curricula to industry standards (thus increasing the relevancy and branding of their programs), purchasing equipment, and increasing the capacity of their internal staff through professional development activities. Staff indicated that most of the SEELC program components will be retained. Future community college-based workforce development programs can draw from the SEELC program experience in the areas of program modifications, student supports, and employer engagement. Future research should include an extended tracking of student outcomes beyond the life of the grant, as most SEELC students were still in the process of gaining a credential at the end of the evaluation period and thus their outcomes could not be measured.

Introduction

Program Overview

In 2013, the Southeastern Economic and Education Leadership Consortium (SEELC), representing six community and state colleges across three states, received a grant of more than $12.6 million through the U.S. Department of Labor (DOL) Trade Adjustment Assistance Community College and Career Training (TAACCCT) program. SEELC was designed to use grant funds to improve economic opportunity by enhancing individuals' job skills and creating regional networks of economic and workforce development. SEELC staff used these funds to enhance programs of study and supports to address these improvements. The Consortium sought to accomplish this vision of training low-skilled individuals and creating job opportunities by targeting three in-demand industries: welding, computer-integrated machining, and advanced manufacturing, across all the SEELC locales.

Because the SEELC consortium crosses state lines, it has unique opportunities and challenges. The Consortium is made up of six community and state colleges in three states: Florida, North Carolina, and Tennessee. The Consortium includes Northeast State Community College (Northeast), Palm Beach State College (Palm Beach), Pellissippi State Community College (Pellissippi), Polk State College (Polk), Randolph Community College (Randolph), and Vance-Granville Community College (Vance-Granville). The unique local contexts of these colleges vary, from the lack of jobs and mass layoffs in the rural setting of Vance-Granville to the larger and older Palm Beach with institutional connections to the local community and business partners. Exhibit 1 provides an overview of the colleges.

Exhibit 1: Overview of SEELC Colleges

College	Student Population	Core Region	Brief Description of College
Pellissippi	~12,500	Knox and Blount Counties, TN.	Pellissippi serves the community by providing college-level and non-credit courses, and learning support instruction using a variety of delivery methods, including distance learning.
Northeast	7,646	Carter, Johnson, Sullivan, Unicoi and Washington Counties, TN.	Northeast serves individuals residing in areas where low-income levels and low educational attainment are a persistent problem.
Randolph	~12,700	Randolph County, NC.	Randolph is one of two community colleges in North Carolina that met "Exceptional Institutional Performance (EIP)" standards for NC's 58 community colleges for the last four years. Randolph provides education and increased skills to students to help them gain industry-recognized credentials that lead to improved wage levels.
Vance-Granville	17,705	Granville, Henderson, Franklin & Warren Counties, NC.	Vance-Granville serves an area in rural NC with high unemployment due to plant closures and mass layoffs. Programs of study focus on improving job skills or back-to-work opportunities.
Palm Beach	49,030	Palm Beach, FL.	Palm Beach, the first community college in FL, is linked to the community through strong partnerships and provides Associate's and Bachelor's degrees, professional certificates, and workforce training.
Polk	23,755	Polk County, FL.	Polk is an open-access, public college offering workforce-related associate's degrees, college certificates, post-secondary vocational certificates, and six bachelor's degree programs.

Source: SEELC 2012 TAACCCT grant proposal; SEELC colleges' respective websites.

Program Design & Implementation

SEELC's design goal was to use grant funds to support three major innovations, which would later become as mandatory aspects of the SEELC grant.

Innovation 1: Develop national standards-based career pathway opportunities. The Consortium sought to accomplish this vision by developing or enhancing programs in welding, machining, and advanced manufacturing, three in-demand industries across all the SEELC communities. Within these pathways, staff at SEELC colleges identified gaps in their academic and training programs around teaching capacity, equipment capacity, program alignment, stacked and latticed credentials, transferability, and articulation agreements.

Innovation 2: Develop ongoing career support, including post-program assessment of competencies to facilitate immediate work readiness and job placement. The Consortium's plan to accomplish this vision included utilizing a completion coach and outcomes and data specialist at each college to assist with tuition resources; track students as they go through the program, offering supports to mitigate challenges and coordinating with other resources; and collaborate with faculty to address academic issues to students' success. Furthermore, the Consortium aimed to support this vision through technology-enabled learning, including procurement of Real Weld systems.

Innovation 3: Develop a regionally based economic approach to addressing worker skill needs, demonstrating the community college leadership role in economic and workforce development. The directive of each SEELC college under this innovation was to promote the development of a regionally based economic and education collaborative, including developing integrated strategies for working with business, industry, education, and economic development organizations.

Program Components

SEELC leadership and grant staff worked together to determine which efforts under the grant were to be uniform across all colleges and where there was flexibility for grant staff to meet the unique needs of their colleges. The Consortium navigated program delivery models as appropriate for each institution, with varying equipment needs at and differing state policy issues.

While grant staff at each college implemented the components of the SEELC grant to best meet their needs, the components of the SEELC grant remained the same across the Consortium. The SEELC components were aligned with the three innovations of the grant (Exhibit 2).

Exhibit 2: SEELC Innovations and Program Components

Evidence-based Innovation	SEELC Program Design
Innovation 1: Create national standards based on career pathway opportunities for workers in welding, machining, and advanced manufacturing.	Align community college program to national industry standards and certifications to improve successful labor market outcomes.
Innovation 2: Provide ongoing career support, such as post-program assessment of competencies to facilitate immediate work readiness and job placement.	Use competency assessments with validated tools to provide a career readiness baseline for all program students and student supports, such as recruitment, retention, and completion coaches.
Innovation 3: Use a regionally based economic approach to address workers' skills needs, demonstrating the community college's leadership role in economic and workforce development.	Promote the development of a regionally based economic and education collaborative council, including collaborative policy groups, to integrate strategies and create economic clusters.

Development of Career Pathways

Career pathways were developed and enhanced across the Consortium in welding, machining, and advanced manufacturing. Grant staff implemented degree programs and credentials in a combination of these disciplines, which allowed each college to offer programming that best fit the institution and the needs of local businesses. These enhancements included embedding industry-recognized credentials, aligning curricula to national industry standards, creating new programs, and increasing equipment capacity.

Creation of Accredited Testing Facilities (ATF)

Each consortium college was expected to implement an ATF on campus during the SEELC grant. An ATF is a facility for testing and qualifying welders. The process to become an ATF requires creating specific quality assurance processes, including developing a quality manual that outlines the activities and processes for testing welders in the facility and meets the standards of the American Welding Society (AWS). In order to test and qualify welders, each ATF also must have a certified welding inspector (CWI) to perform the tests. Once the components and requirements are in place, AWS performs a site visit to inspect the facility and identify areas for improvement before certification. After the identified improvements are completed, AWS issues a certificate for the approved ATF, at which time the ATF can begin testing and qualifying welders in specific welds.

Opportunities to Apply Credit

Throughout the grant period, grant staff worked with college leadership and staff to create opportunities for applying credit earned through the SEELC programs. These opportunities included articulation agreements and prior learning assessments (PLAs). In some cases, internal articulation agreements (within the individual college) already existed before the grant, including statewide articulation of certain industry-recognized credentials. Grant staff also sought to establish external articulation agreements to allow students to articulate credit from the SEELC programs to other two- and four-year institutions. PLAs provided students with the opportunity to use their previous experience to test for credit in specific disciplines.

Student Support Services

Student support services were offered throughout the consortium by completion coaches and outcomes and data specialists. In some cases, these two positions served distinctly different roles, in which completion coaches primarily supported students from program recruitment through program completion, while outcomes and data specialists entered and tracked student data through databases using, mainly, Efforts to Outcomes (ETO®). In other instances, grant staff shared the responsibilities of the two roles. Student support services typically included student enrollment and scheduling, advising, career readiness services, and connecting students to job opportunities.

Employer and Industry Engagement

Grant staff engaged employers and industry partners in a variety of ways throughout the implementation of the grant-funded programs. Those colleges that purchased new equipment solicited feedback from local employers prior to purchase. Employers also were involved in the development of new programs, and they attended advisory committee meetings and job fairs. Grant staff engaged industry partners through existing industry meetings and, in some cases, provided new opportunities for these industries to work together.

Program Components by College

The Implementation Study Findings section of this report elaborates on the ways the main components of the SEELC grant were implemented across the Consortium. Exhibit 3 outlines the high-level programmatic activities for each of the components across the Consortium.

Exhibit 3. High Level Programmatic Activities

	Innovation 1	Innovation 2	Innovation 3
Northeast	**Career Pathways:** Enhanced welding, machining, and advanced manufacturing programs through alignment with AWS and National Institute for Metalworking Skills (NIMS) credentials and new equipment. **ATF:** Completed ATF **Applied Credit:** Established new 2+2 articulation agreement; utilized existing college agreements.	**Student Support Services:** Provided students with coaching support. Integrated WorkKeys assessments into SEELC programs.	**Employer and Industry Engagement:** Added new partners; grant staff report that new equipment has increased employer respect for the programs.
Palm Beach	**Career Pathways:** Enhanced welding and machining programs through AWS Sense Level 2 and NIMS certifications and new equipment. **ATF:** Completed ATF **Applied Credit:** Internal articulation between associate's and bachelor's service management degrees updated during grant period.	**Student Support Services:** Provided students with coaching support. WorkKeys available for students but not integrated into SEELC programs.	**Employer and Industry Engagement:** Improved relationships with the workforce board and new ATF anticipated increasing local partnerships.
Pellissippi	**Career Pathways:** Created new welding program; enhanced machining program through equipment; created advanced manufacturing megalab and created additive manufacturing program. **ATF:** Pursuing ATF **Applied Credit:** Established new 2+2 articulation agreement; utilized existing college agreements.	**Student Support Services:** Provided students with coaching support. WorkKeys available for students but not integrated into SEELC programs.	**Employer and Industry Engagement:** Added new partners in welding; grant staff report that new equipment has increased employer respect for the programs.
Polk	**Career Pathways:** Created new Computer Numerical Control (CNC) machining program and aligned to NIMS, enhanced welding and advanced manufacturing through new equipment. **ATF:** Did not pursue an ATF **Applied Credit:** Established non-credit to credit articulation for advanced manufacturing and machining; utilized exiting college agreements.	**Student Support Services:** Provided students with coaching support. Did not integrate WorkKeys for students.	**Employer and Industry Engagement:** Leveraged employer relationships for equipment and program design; added new partner through Metalworking Technical Evaluation Committees (MET-TEC); employers are excited about the CNC program in particular.
Randolph	**Career Pathways:** Enhanced existing welding, machining, and advanced manufacturing programs through equipment. **ATF:** Pursuing ATF **Applied Credit:** Created non-credit to credit crosswalk; utilized existing college agreements.	**Student Support Services:** Provided students with coaching support. WorkKeys available for students but not integrated into SEELC programs.	**Employer and Industry Engagement:** Developed regional collaborative to formalize systems to build industry partnerships.
Vance-Granville	**Career Pathways:** Created two-year welding program, created mechatronics program. **ATF:** Did not pursue an ATF **Applied Credit:** Established new 2+2 articulation agreement; utilized existing college agreements.	**Student Support Services:** Provided students with coaching support. Integrated WorkKeys assessments into SEELC programs.	**Employer and Industry Engagement:** Increased number of interactions with employers, including increased attendance at college events as part of recruitment efforts.

Report Purpose & Organization

This SEELC external program evaluation assessed how well the program implemented its components, examined its implementation and contextual challenges, documented mid-course corrections and decisions, and determined student outcomes attributable to the SEELC program. It is the second and final summative evaluation report for the SEELC TAACCCT-funded programs. It builds on and references the interim report submitted to DOL in 2015, which provided a detailed analysis of the SEELC program implementation from its initial stages to full implementation. This first section of the report presents the evaluation design detailed in the evaluation design submitted to DOL in 2014, followed by a summary of the methodology and research questions for the Outcome and Implementation study. The findings from the Outcome study precede the Implementation findings, in the next section, as this report focuses primarily on how the SEELC programs fared in terms of student outcomes. The implementation study findings retrospectively help illustrate the actions and contexts that lead up to the outcomes. The final sections look beyond SEELC's funding period and describe sustainability forecasts based on discussions with program staff and present recommendations for other institutions interested in pursuing a similar program design and DOL stakeholders.

Outcome Study

The evaluation team used a quasi-experimental design to perform the outcome study. Using a comparison cohort, the evaluation team was able to account for the complexity of the various program elements that were implemented in the Consortium, while still allowing for the rigorous collection and analysis of data to demonstrate outcomes. The evaluation team used quantitative indicators extracted from SEELC's ETO database as well as survey data to determine whether pre-program competency assessments improved students' completion and credential attainment rates, and whether post-program assessments affected employment outcomes, as compared to the comparison group. Program staff used the ETO database to store student data, such as demographic data, and track student outcomes, such as credential attainment and course completion. The survey data gathered student employment, educational, and program perception data at baseline and follow-up.[5]

Outcome Research Questions

Exhibit 4 presents research questions that guided the outcome study and the data sources that were accessed and collected to answer those questions.

Exhibit 4: Outcome Research Questions[6]

Research Question	Data Sources	Data Collection Method
Persistence		
To what extent do the pre- and post-program competency assessments increase graduation and retention rates relative to the comparison group?	▪ Treatment and comparison students ▪ Program coordinators ▪ Recruitment, retention, and completion coaches ▪ Outcomes and data specialists	▪ Extant student data ▪ Pre-program assessment scores ▪ Pre-program test scores ▪ Student surveys ▪ Interviews
To what extent do the pre- and post-program competency assessments result in decreased time to achieve certification relative to the comparison group?	▪ Treatment and comparison students ▪ Program coordinators ▪ Recruitment, retention, and completion coaches	▪ Extant student data ▪ Pre-program assessment scores ▪ Pre-program test scores ▪ Student surveys

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[5] See Appendix A.1 for a detailed description of data sources.
[6] *See Appendix A.1 for a detailed description of data sources.

Research Question	Data Sources	Data Collection Method
	▪ Outcomes and data specialists	▪ Interviews
To what extent do pre- and post-competency assessments result in increases in the number and percent of students who pursue additional education relative to the comparison group?	▪ Treatment and comparison students ▪ Program coordinators ▪ Recruitment, retention, and completion coaches ▪ Outcomes and data specialists	▪ Extant student data ▪ Pre-program assessment scores ▪ Pre-program test scores ▪ Student surveys ▪ Interviews
To what extent do pre- and post-competency assessments increase certification rates relative to the comparison group?	▪ Treatment and comparison students	▪ Extant student data ▪ Pre-program assessment scores ▪ Pre-program test scores ▪ Student surveys ▪ Other extant data – licensure and certification exam scores or pass rates
To what extent do pre- and post-competency assessments improve mastery of industry and occupational skills or other program-related credentials relative to the comparison group?	▪ Treatment and comparison students ▪ Consortium program design manager ▪ Employers ▪ Recruitment, retention and completion coaches ▪ Outcomes and data specialists	▪ Extant data – licensure and certification exam scores or pass rates ▪ Interviews
Employment/Career Outcomes		
To what extent do the pre- and post-program competency assessments lead to higher quality employment outcomes (e.g., employment rates and earnings, promotions) relative to the comparison group?	▪ Treatment and comparison students ▪ Unemployment Insurance records ▪ Project managers ▪ Completion coaches ▪ Outcome specialists ▪ Work Investment Boards (WIBs) ▪ Employers	▪ Extant data – ETO, surveys ▪ Unemployment Insurance data ▪ Interviews
Do the pre- and post-program competency assessments decrease the time lapse between graduation/completion and job placement? Do they decrease the time needed to attain credentialing?	▪ Treatment and comparison students ▪ Project managers ▪ Recruitment, retention, and completion coaches ▪ Outcomes specialist	▪ Extant data – ETO, surveys ▪ Interviews
Do the pre- and post-program competency assessments put students on stable and strong career pathways, as defined by increases in promotions and benefits, as well as declines in the receipt of public assistance?	▪ Treatment and comparison students ▪ Project managers ▪ Recruitment, retention, and completion coaches ▪ Outcomes specialists	▪ Extant data – ETO, surveys ▪ Interviews

Outcome Design and Methodology

In 2014, the evaluation team outlined a plan to use the quasi-experimental comparison cohort methodology design, to evaluate programs supporting the welding, machining, and advanced manufacturing technology industries. Using this design, the outcomes study would assess what impact taking the WorkKeys assessment had on student outcomes by comparing four groups of students exposed to either:

1. Treatment 1 (T1) pre-program assessment only;
2. Treatment 2 (T2) post-program assessment only;
3. T3 (i.e., T1 and T2); and
4. Comparison (C1) – neither pre- nor post-program assessment.

This methodology to use WorkKeys was proposed as the evaluation team identified assessment as being a relatively more distinct program service or factor as compared to the coaching or curriculum being implemented. WorkKeys assessments measure essential workplace skills and provide test-takers with a score that can then be matched to job opportunities with employers that use WorkKeys to score their job openings. Administration of this work-readiness assessment, however, was not standard practice across the Consortium for a number of reasons; including the fact that the administration of WorkKeys was optional to students and administering the assessment depended largely on its prevalence among industry partners.[7] According to July 2017 ETO data on WorkKeys administration, only three colleges were administering the assessment: Vance-Granville, Northeast, and Palm Beach. As of July 2017, only 115 students out of the 2,074 unique students enrolled had taken the WorkKeys assessment at any point in time during their training (See Exhibit 5).

Exhibit 5: WorkKeys Implementation Sites

Site	Total Number Enrolled	Total Number Taking Assessment	% Taking Assessment
Vance-Granville	197	45	23%
Northeast	501	60	12%
Palm Beach	219	10	5%
Total	917	115	13%

Source: SEELC ETO Database.

Given the low number of students taking the assessment, the evaluation team conducted the following outcome analyses with the available data:

- A pre–post outcome analysis to estimate the association between TAACCCT-funded interventions and student outcomes. The pre–post design estimates the difference in student outcomes before and after their involvement with TAACCCT. This analysis uses test of association such as chi-square and t-tests.
- A comparison analysis using propensity score regression compares the outcomes of the students that took, either a pre- or post-WorkKeys assessment, with those who did not take an assessment at any point during their training. This analysis was restricted to students in those two groups from the three colleges that implemented the assessment: Vance-Granville, Northeast, and Palm Beach. This analysis compares outcomes for those students that took the WorkKeys assessment versus those who did not, and it measures the impact of taking the assessment on student outcomes.[8]

Outcome Study Limitations

Study design

For most students in the program, the evaluation used a pre-test, post-test design, that examined changes over time. Without a comparison group to estimate what would have happened had the student not participated in the program, it is unclear how much of the change that occurred was due to the program. For example, if a student's wage increased, it is possible it could have occurred simply because time had passed since they started the program, rather than due to the training itself. Outside of the sub-study looking at the effect of assessment on student outcomes, this report can only present associations between program components and student outcomes and thus, it cannot claim causality in those cases.

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[7] See Appendix D: Design Modifications.

[8] See Appendix D: Design Modifications, for a detailed description of design changes, and Appendix E: Propensity Score Regression Methodology for a detailed description of the analysis).

Comparison group

The creation and use of the comparison group in the sub-study had some limitations. First, in attempting to control for differences between the two groups, the analysis only used the student characteristics of gender, age, race/ethnicity, and a few baseline variables. There are potentially other differences between the two groups that were not controlled for.

Inconsistent data entry

Although the Consortium had a centralized data system using ETO, program staff sometimes entered data differently. For example, in terms of wages, some colleges entered the actual wage when they had that information, while others were only told of a wage increase by an employer. In order to flag a wage increase, a value of $1/hour was entered at baseline, and a wage of $2/hour was entered at follow-up.

Missing Data in ETO

Data on student assessments is largely missing in ETO. The lack of data is due primarily to the late implementation and use of the WorkKeys assessment tool. Another inconsistency was recording the frequency with which students met with student coaches. Although program staff were encouraged to document their contact with students (frequency and duration), they did not consistently record their interactions. Missing data led to small sample sizes for statistical estimation and thus limited the quantity and type of analysis the evaluation team carried out.

Survey Nonresponse

The online retrospective surveys and baseline surveys had consistently low response rates for all cohorts (18% and 11% respectively). Although the evaluation team shortened the original survey significantly, provided incentives in the way of a raffle for $100 gift cards, and sent out reminders, the response rates remained low throughout the project. The low response rates (i.e., smaller sample size) affected the ability to perform more rigorous tests on outcomes such as wages and income because without access to administrative data such as unemployment insurance (UI), the evaluation team was heavily reliant on the self-reported data that are collected on these student surveys. The survey data thus represents only a sample of the TAACCCT students and, in some cases, were not used.

Self-reported data.

Due to the lack of administrative data, such as UI data, all employment and wage information is self-reported (including information extracted from ETO). In some cases, program staff contacted employers and were told if the SEELC completer received a wage increase or not. Self-reported data often suffers from social desirability bias and thus may skew responses.

Outcome Study Findings

One of the key program goals of the SEELC program was to improve education and training opportunities for approximately 1,736 trade adjustment assistance (TAA)-eligible workers, veterans, and other adults identified in various regions in Florida, North Carolina, and Tennessee. SEELC member institutions surpassed that target and many other DOL performance targets as of July 2017 (Exhibit 6). The Consortium, as a whole, exceeded its targets for all DOL outcome measures, particularly when measuring the number of students retained in grant-funded programs and total number of students completing credit hours (361% and 205%, respectively). SEELC colleges did not meet employment measures 7 and 8, primarily because the majority of their students, nearly 60 percent, were employed at intake (incumbent workers) and those measures only pertained to those who were unemployed (non-incumbent) at intake.

Exhibit 6: SEELC Performance Measures

DOL Outcome Measure	Target	July 2017	Percentage of Goal Achieved
1. Unique students receiving services under SEELC	1736	2074	119.57%
2. Students who have completed a grant-funded program of study	1074	1127	104.9%
3. Students retained in grant-funded programs of study	522	1886	361.3%
4. Total number of students completing credit hours	935	1913	204.6%
5. Total number of earned credentials	1329	1513	115.2%
6. Total number of students enrolled in further education after completion	277	381	137.5%
7. Students who become employed one quarter after program completion	991	172	17.4%
8. Students who remain employed three quarters after exiting the program	787	38	4.8%
9. Students employed at program enrollment who receive a wage increase	377	405	107.4%

Source: SEELC Program Tracking Data, SEELC ETO Database

The summative evaluation findings presented in this section seek to expand upon the results of the performance measures by taking an in-depth look at SEELC students, their characteristics, participation, credential attainment, and the factors that relate to their employment and wage outcomes. Two kinds of outcomes analyses are presented in this section: 1) univariate results and tests of association (chi-square and t-tests) that were run on the entire sample to better understand the factors associated with outcomes, and 2) an analysis on the impact of taking the WorkKeys assessment conducted using regression models with propensity score covariates. A composite score, a propensity score, was created for both treatment and comparison group students using demographic variables, and that score is used as one of the predictors in a regression model.[9] Data for the analysis come from three sources: the SEELC ETO database and online survey and program documentation.[10] Outcomes findings are organized around these major areas: students, completion, and skill attainment and employment outcomes.

Students, Completion, and Skill Attainment

SEELC students enrolled in a number of programs of study within the three different pathways.[11] SEELC consortium colleges offered training courses that were aligned with industry standards to equip students with in-demand and relevant skill sets. This section presents the number of students enrolled, what pathway they enrolled into, and their completion and credential attainment. Each subsection will address a specific descriptive research question. The section also includes an examination of the effect of taking the WorkKeys on credential attainment and addresses the three main outcome research questions below:

> RQ1: To what extent do the pre- and post-program competency assessments increase completion rates relative to the comparison group? Did the effect of completion rates differ by type of credential?

> RQ2. To what extent do pre- and post-competency assessments improve mastery of industry and occupational skills or other program-related credentials relative to the comparison group?

> RQ3: To what extent do the pre- and post-program competency assessments lead to higher quality employment outcomes (e.g., employment rates and earnings) relative to the comparison group?

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[9] See Appendix D, for a detailed description of the propensity score regression methodology.
[10] See Appendix A.1, for a detailed description of data sources for the Outcome study.
[11] See Appendix F, for a list of SEELC courses offered by consortium members.

Program Enrollment

As of July 2017, the Consortium had met and exceeded its goal by enrolling 2,074 unique students into the three pathways—welding, machining, and advanced manufacturing. All but one of the member colleges had surpassed their individual enrollment targets (Exhibit 7).

Exhibit 7: Enrollment by College

Colleges	Total Enrollment in All Programs		
	Students enrolled	Enrollment Target	% of Target
Northeast State Community College, TN	501	425	118%
Palm Beach State College, FL	219	150	146%
Pellissippi State Community College, TN	421	342	123%
Polk State College, FL	412	202	204%
Randolph Community College, NC	327	290	113%
Vance-Granville Community College, NC	195	327	60%
Totals	**2074**	**1736**	**120%**

Source: SEELC Program Tracking Data, SEELC ETO Database

Students enrolled into the three career pathways that were targeted by this grant. Program staff tracked program pathways and status in ETO. Of the total number of students enrolled (N=2074), the ETO database had program status data on 63 percent of students (n=1308). The program status data indicated the program pathway of the students, credential the student was pursuing, and the status of credential attainment (completed, in-progress). Most students entered the Advanced Manufacturing pathway (59%); about a quarter took courses in welding (26%), and the reminder trained in machining (15%) (See Exhibit 8). Under the advanced manufacturing umbrella, students could take a wider variety of training courses that allowed flexibility and adaptability in the work place; this could explain the larger number of students that enrolled in that pathway. With an advanced manufacturing credential, students could cast a broader net when searching for job opportunities, therefore, giving SEELC students an advantage.[12]

Exhibit 8: Enrollment by Program Pathway

Career Pathway	n	Percent
Advanced Manufacturing	771	59%
Machining	200	15%
Welding	337	26%
Totals	**1308**	**100%**

Source: SEELC ETO Database

Characteristics of Students

According to an analysis of ETO data, the majority of the SEELC students identified as non-Hispanic (88%), white males. Specifically, about two-thirds of the students were White (76%), followed by Black or African American (8%), the second largest racial group. The majority of students were male (93%), which is not surprising as men typically pursue career pathways in welding, machining, or advanced manufacturing. Regarding age, 60% were younger than 30. In addition, 12% of students identified as being veterans (See Exhibit 9).

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[12] See Appendix F: SEELC Training Courses by Pathway.

Exhibit 9: SEELC Demographics

Characteristic	Percent (%)
Race (n=2059)	
American Indian or Alaskan Native	<1%
Asian	<1%
Black or African American	8%
White	76%
Multiracial	2%
Ethnicity (n=2059)	
Hispanic	9%
Non-Hispanic	88%
Gender (n=2085)	
Female	6%
Male	93%
Age (n=2067)	
Younger than 18	<1%
18–21	26%
22–29	34%
30–39	20%
40–49 (n=1621)	12%
50+	8%

Source: SEELC ETO Database, SEELC Online Baseline Survey

Additional information on students was garnered from a baseline survey that students took upon entering the program. A total of 30 students responded to the online baseline survey (11% response rate). Analysis of the survey data revealed that many incoming students, 40 percent, reported that they had only a high school diploma or equivalent. In addition, 37% indicated they had previously taken some college classes, 16% had an Associate's degree, and seven percent had a Bachelor's degree or higher. The majority of SEELC students therefore had some post-secondary education that would serve them well in the more rigorous programs of study.

Program Completion and Credential Attainment

The SEELC data system, ETO, contained program status data on 1,265 students, and Exhibit 10 provides a breakdown of the status of credential attainment by college. Few students completed their degrees. Students from Northeast and Polk had the highest degree completion rate at 14%. The low rate of students completing a degree may be attributable to the fact that degree programs are typically longer than other credential programs, and some of the colleges did not offer degree programs. Most students who are pursuing a degree or certification are in progress of attaining their credentials. Most colleges had high percentages of students that completed an industry-recognized credential: Randolph has a 90% completion rate for those pursuing an industry credential, and Pellissippi and Polk are at about 75% completion rate for industry credentials.

Exhibit 10: Enrollment & Completion by School[13]

Credential	Total (n=1265)	Northeast State Community College, TN (n=422)	Pellissippi State Community College, TN (n=221)	Randolph Community College, NC (n=260)	Polk State College, FL (n=250)	Vance-Granville Community College, NC (n=36)	Palm Beach State College, FL (n=76)
Degree							
Completed	10%	14%	11%	<1%	14%	0%	N/A
In-progress	84%	83%	73%	95%	83%	100%	N/A
Incomplete[+]	6%	3%	16%	4%	3%	0%	N/A
Certification							
Completed	35%	19%	54%	37%	20%	43%	40%
In-progress	57%	74%	28%	56%	70%	57%	52%
Incomplete[+]	8%	7%	18%	7%	9%	0%	7%
Industry Credential							
Completed	60%	7%	75%	90%	74%	na	65%
In-progress	33%	93%	0%	10%	15%	na	32%
Incomplete[+]	7%	0%	25%	0%	11%	na	2%

Source: SEELC ETO Database.

Credential Attainment by Career Pathway

The rate of completion is similar to the previous discussion that examined the data by career pathway. Except for those seeking credentials, many students remained in-progress for attaining a degree or certification (See Exhibit 11). More than three quarters (76%, n=152) of machining students completed their industry credential. Students could attain industry credentials on their path towards certification and degree attainments and so the duration for attaining industry credentials were typically shorter. Equipping students with these credentials in a short time frame meant students could re-enter the workplace better trained and more attractive to employers.

Exhibit 11: SEELC Completion by Pathway

Credential	Advanced Manufacturing (n=771)	Machining (n=200)	Welding (n=377)
Degree			
Completed	11%	8%	7%
In-progress	82%	87%	85%
Incomplete	6%	5%	8%
Certificate			
Completed	41%	28%	32%
In-progress	51%	66%	57%
Incomplete	8%	5%	11%
Industry Credential			
Completed	55%	76%	62%
In-progress	39%	17%	32%
Incomplete	5%	7%	8%

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[13] +Incomplete include students who withdrew/dropped out.

Source: SEELC ETO Database.

The Effect of WorkKeys Assessment on Completion and Credential Attainment

RQ1. To what extent do the pre- and post-program competency assessments increase completion and retention rates relative to the comparison group?

The evaluation team undertook analyses to answer the research question stated above and examine the effect of taking the WorkKeys assessment on student outcomes using the comparison cohort design. The team conducted this analysis by identifying assessment as being a relatively more distinct program service, or factor, as compared to the coaching or curriculum being implemented. The team therefore selected WorkKeys assessment as the intervention for analysis[14]. The team created a dummy variable or flag to indicate whether a student took the assessment at any point while enrolled in a TAACCCT-funded program. Exhibit 12 presents regression results for the effect of the assessment on any credential completion and type of credential.

After controlling for demographic characteristics, results show that taking the assessment does not seem to have an effect on completion of any credential (p=0.76). Of the total number of students that have program status information in the three WorkKeys implementation sites (N=917), 58 percent had data on program status (n=534). Of those who had program status information, 23% (n=125) of those who did not take WorkKeys, had completed some type of credential—degree, certificate, or industry credential, compared to 17% of those who had taken WorkKeys. While, the difference between those who took the assessment and attained a credential and those who did not is more than five percentage points the difference is not statistically significant. One of the goals of the WorkKeys assessment was to "provide a career readiness baseline for all students, and develop a roadmap for each student focused on the education and training gaps needing to be addressed." Based on the results presented in Exhibit 12, it seems that the assessment may have provided a roadmap towards completion for some students but did not have a significant impact on completion.

Exhibit 12: Effect of Assessment on Completion[15]

Completion (any credential)	Observed Percentages (n=486)			Logistic Regression		
	Did not take assessment (%)	Took assessment	Difference	Logit Coefficient (assessed)	p-value	Cohen's d (effect size)
Completed[a]	23%	17%	-6.18	0.10	0.77	-0.004

Source: SEELC ETO Database.

RQ1a: Does the effect of assessment on completion differ by type of credential?

The evaluation team conducted additional analysis to estimate the effect of taking the assessment on the different types of credentials. Taking the assessment did not seem to have a positive effect on attaining a certificate or the completion of a degree. More than 80% of the students who indicated that they were pursuing a degree were still "in-progress" at the end of the evaluation period. Only nine percent (n=46) had completed. Thus, the effect of taking the assessment on degree attainment may not be reflected in these

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[14] ACT® WorkKeys is a system of assessments and curriculum that build and measure essential workplace skills that can affect job performance and increase opportunities for career changes and advancement. http://www.act.org/content/act/en/products-and-services/workkeys-for-job-seekers.html

[15] Effect estimates are average effects of taking an assessment (treatment group) versus the comparison group (did not take an assessment).

[a] See Appendix E for PSM Regression approach

analyses. Students who took the assessment—and also earned a certificate—were well positioned to gain employment with local employers, but according to the results in Exhibit 13, taking the assessment did not affect the certification completion rate.

Exhibit 13: Effect of Assessment on Completion by Type of Credential[16]

Completion by credential	Observed Percentages			Logistic Regression		
	Did not take assessment (%)	Took assessment (%)	Difference	Logit Coefficient (assessed)	p-value	Cohen's d (effect size)
Degree (n=325)	12.82%	13.46%	0.64%	0.57	0.19	-0.02
Certificate (n=152)	34.32%	25.30%	9.02%	0.01	0.98	-0.01
Industry Credential (n=58)	Not calculated due to small sample size					

Source: SEELC ETO Database.

Student Employment Outcomes

The SEELC training programs were designed to train and upskill TAA-eligible, dislocated, and unemployed and underemployed workers in the area of welding, machining, and advanced manufacturing, and connect them to in-demand and better paying jobs in their respective labor markets. These programs were therefore designed to be employment training programs to get people employed. Most students who enrolled at SEELC colleges were incumbent workers who sought re-training or re-certification to enter into better paying jobs. The analysis presented in this section focuses on employment at baseline, employment after program completion, and wage increase. Where applicable, results are reported by program pathway: welding, machining, and manufacturing, and by type of credential. The impact of assessment on employment and wages is presented as part of the sub-study. Data on student employment history, placement, and retention was tracked by program staff in ETO during and up to four quarters after program completion. The evaluation team also collected employment data via online surveys.

Employment at Enrollment

The evaluation team extracted data on employment at enrollment or baseline from a variety of different sources. According to program administrative data collected at intake (N=1697), the majority of SEELC students were incumbent workers at the time of enrollment into SEELC training programs (64%, n=1062), and only five percent (n=65) identified as being TAA-eligible (see Exhibit 14). In addition, the evaluation team extracted data on student baseline employment status at intake from both the ETO database and the online baseline survey (N=366). Slightly more than half of those employed at intake worked part time (56%, n=204). At the time of enrollment, students worked an average of 32 hours per week and earned a median hourly wage of $9.07. The online survey asked students for their employment status at baseline. Survey respondents who indicated they were employed at intake (90%, n=76) also reported that they had experience in a related industry. In addition, 35% (n=32) of students reported that they had experience with manufacturing, production, installation, or welding; 23% (n=21) of students reported they had experience in construction or transportation. In a follow-up question asking about their years of experience, 48% (n=32) of survey respondents indicated they had less than one year of experience, and 24% (n=16) indicated that they had more than five years of experience. SEELC programs therefore needed to offer a range of training programs including entry-level courses that catered to those new to the industry and more advanced courses for those who needed to specialize and upskill.

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[16] Effect estimates are average treatment effects of taking an assessment (treatment group) versus the comparison group (did not take an assessment).

Exhibit 14: Student Employment Status at Enrollment[17]

Employment Status at Enrollment	Percentage
Type of worker	
Incumbent workers (n=1062)	64%
TAA-eligible (n=65)	5%
Type of Employment+ (n=366)	
Fulltime	44%
Part-time	56%
Years of Experience	
Less than 1 Year (n=32)	48%
1–3 years (n=12)	18%
3–5 years (n=7)	10%
5 + years (n=16)	24%
Means	
Average number of hours worked per week (n=366)	32 hours /week
Median hourly wage(sd) (n=829)++	$9.07/hour (sd=7.48)

Source: SEELC ETO Database, Student online baseline survey.

Employment at Program Completion

SEELC staff tracked students for up to four quarters after program completion.[18] By spring 2017, 70% (n=386) of SEELC completers reported being employed one quarter after completion (Exhibit 15). Most completers were employed full time (83%, n=173), at exit, and in jobs related to their training program (83%, n=204). In addition, 82 percent of students who were not employed at intake were placed into full time employment during the program or at program exit (n=54). Following program completion, SEELC completers earned a median wage of $13.52 and worked 33 hours per week on average. This uptake of SEELC completers into full-time jobs that are relevant to their program of study, during or soon after exit, suggests that SEELC completers had marketable skills that were in-demand in the labor market.

Exhibit 15: Employment Placement at Completion

Employment Status at Completion	Percentage
Employment Placement, All Completers (n=550)	
Employment placement quarter (n=550)	
Employed Q1	35%
Employed Q2	9%
Employed Q3	12%
Employed Q4	9%
During the program/at exit	35%
Type of Employment (n=209)	
Fulltime	83%
Part time	17%

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[17] +Students are considered full time if they worked 35 hours+ per week. ++Outliers (wages less than $3, more than $100) were removed from the data before analysis was performed.

[18] This measure reflects the quarter in which program staff connected with students and recorded their employment status, and is a proxy for when SEELC graduates were actually placed in employment.

Employment Status at Completion	Percentage
Job relevancy (n=276)	
Yes	83%
No	17%
Received a wage increase (n=312)	80%
Unemployed at enrollment	
Employed during program/exit (n=23)	15%
Employed at Q1 (n=60)	38%
Type of Employment (n=66)	
Full time	82%
Part time	18%
Job relevancy (n=75)	
Yes	87%
No	13%
Averages for all Completers	
Mean number of hours worked per week (n=24)	33 hours/week
Median hourly wage (sd) (n=391)	$13.52/hour (sd=6.16)

Source: SEELC ETO Database, Online Baseline Survey

The Effect of WorkKeys Assessment on Employment and Wages

> RQ2: To what extent do the pre- and post-program competency assessments lead to higher quality employment outcomes (e.g., employment rates and earnings) relative to the comparison group?

Taking the WorkKeys assessment did not have a positive effect on employment in the first quarter (See Exhibit 16). When controlling for whether the student was an incumbent worker or not, taking the WorkKeys assessment did not have a positive effect on employment outcomes. Taking the assessment did not increase a student's chances of obtaining employment in the first quarter after completion, which is actually a positive finding: not taking the assessment did not put students at a disadvantage to gaining employment in the first quarter. The significance testing for wage increase could not be performed because there were too few students within this subsample that did not get a wage increase (n=6).

Exhibit 16: Effect of Assessment on Employment and Wages[19]

	Observed Percentages			Logistic Regression		
Employment Outcomes*	**Did not take assessment (%)**	**Took assessment (%)**	**Difference**	**Logit Coefficient (assessed)**	**p-value**	**Cohen's d (effect size)**
Employment at Q1 (n=90)*	54%	20%	4%	-1.55	0.02	-0.85
Wage Increase (n=128)*	90%	100%	10%	-	-	-

Source: ETO Database and Student online surveys.

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[19] *See Appendix E for PSM Regression approach.
+Indicates number of observations used in regression.
Notes: A p value indicates if the observed value of a test statistics (i.e., Chi-Square) is not due merely to chance. For instance, a p value of 0.001 indicates that one in thousand tests, the observed value of a test statistics will be due to change. Typically, a p value of 0.05 or smaller is preferred; The Cohen's d effect sizes (d=) show the magnitude (in absolute value) of the difference between the two assessment group, those who took the assessment and those who did not on student outcomes. Effect size range by Cohen's definition: trivial (<.20), small (.20 to .49), medium (.50 to .79), and large (>.79). The Cohen's d effect size calculations were based on the online effect size calculator for binary proportions available at: http://campbellcollaboration.org/escalc/html/EffectSizeCalculator-Home.php

Taking the WorkKeys assessment had a positive impact on post-program hourly wages. When controlling for select demographic variables and baseline wage, non-Hispanic, incumbent students who took the assessment had a significant mean hourly post-program wage difference of $2.36 over those who did not (p=0.05, see Exhibit 17). Major employers within the vicinity of at the three college that implemented the assessment—Northeast, Randolph and Vance-Granville—required the assessment and may have had higher-paying positions that required that assessment than other employers in the local area. The small sample size that took the assessment and had a higher post-program wage (n=23) could affect the significance level, but the effect size (d=0.42) indicates that the effect is strong enough that the differences between the two means cannot be due to chance.

Exhibit 17: Effect of Assessment on Employment and Wages[20]

Employment Outcomes *	Observed Percentages			Regression		
	Did not take assessment ($)	Took assessment ($)	Difference	Coefficient (assessed)	p-value	Cohen's d (effect size)
Post-program Wages (n=124)	$14.15	$16.51	$2.36	2.54	0.05	0.42

Source: ETO Database and Student online surveys.

Career Pathway and Employment

According to the three strategic innovations of SEELC, its training programs were required to design career pathway opportunities (Innovation 1) and support those along the pathway with ongoing career support (Innovation 2) with a focus of addressing worker skills needs using an economic approach (Innovation 3). The career pathways—welding, machining, and advanced manufacturing—were specifically chosen and designed to address employer demand and workers' skills gaps within the region. This section presents the employment and wage outcomes by career pathway. It also examines the results using contextual labor market information.

Most SEELC students enrolled in advanced manufacturing training courses (59%, n=771) followed by welding courses (26%, n=337) and then machining courses (15%, n=200) (See Exhibit 18). Following program completion, students who chose machining (88%, n=57) and welding (79%, n=131) career pathways were significantly more likely to be employed by the first quarter than those completers who chose the advanced manufacturing career pathway (54%, n=131).[21]

Exhibit 18: Post-program Employment by Career Pathway[22]

Career Pathway	Percentage of those who indicated a pathway %, (n)	Employed During Program + Q1+ %, (n)	Employed Fulltime %, (n)	Non-Incumbent Worker Employed, Q1+ %, (n)	Job Relevant to Training %, (n)	Median Wage $, (n)	Wage Increase %, (n)
Advanced Manufacturing	59% (771)	54% (131)	89% (70)	47% (39)	85% (99)	$12 (54)	90% (156)
Machining	15% (200)	88% (57)	87% (40)	77% (17)	87% (34)	$15 (58)	93% (40)
Welding	26% (337)	79% (103)	82% (37)	38% (10)	80% (37)	$13 (97)	86% (88)
Differs significantly by career pathway++	Yes ***	No	Yes **	No	Yes *	No	

Source: SEELC ETO Database.

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[20] *See Appendix E. The regression models used a propensity score covariate estimated using the following dummy variables: Hispanic, male, single, white. Other predictor variable is pre-program/baseline wage. +Indicates number of observations used in regression.

[21] Significance: p<0.0001.

[22] Difference is statistically significant at: *p<0.10 level; **p<0.05 level; ***p<0.01 level. +Category includes people who employed during the program.

Looking specifically at those who were unemployed at intake, employment participation rates are noticeably different for welding pathway students (38% for unemployed vs. 79% for total welding pathway). Incumbent workers, who make up 70 percent of students that chose the welding pathway, could be driving up the higher employment rate, since they were the ones already employed during the program. The employment rate for students who were unemployed at intake and who chose the machining pathway remained strong at 77% (n=17). Machining completers also earned significantly (p=0.09) more at a median hourly wage of $15/hour compared to welding students at $13/hour (n=97) and advanced manufacturing students at $12/hour (n=54).[23] Once completers in all three pathways gained employment, more than 80% worked full-time in jobs that were relevant to their training program and had a wage increase. Although these percentages did not differ significantly by program pathway, they still indicate the SEELC students, in general, were successful at finding full-time employment at higher wages.

Credential and Employment

According to the SEELC grant narrative, a major challenge across the entire consortium for TAA-eligible and displaced workers is the lack of educational attainment. SEELC workforce training programs emphasized nationally recognized industry credentials for welding, machining, and advanced manufacturing to address students' skills gaps and make them employable. This section examines the association between employment and wage outcomes and credential attainment using program status tracking data.

According to the results in Exhibit 19, the status (completed, in-progress, incomplete) of the credential attainment was not significantly associated with wages. Although wages tended to be higher when a student completed or was in progress of completing the credential compared to students who dropped out or withdrew, the difference was not significant. The same is true when examining the proportion that received a wage increase for those pursing a certificate; however, 95% of those who completed an industry credential had a wage increase compared to 67% of those who did not complete, a significant difference. The lack of a significant difference in median wages between those who completed a credential (degree, certificate, industry credential) and those who dropped and withdrew, may be attributable partially to the fact that most students were incumbent workers and they already had paying jobs. The credential type may reflect more positively on wage increases in the future, especially for those who complete a degree after the end of the grant period.

Exhibit 19: Wages by Status of Credential Attainment[24]

Status of Credential Attainment	Median Wage ($, sd)	Wage Increase (%)
Degree		
Completed (n=75)	$14 (sd=5.9)	84%
In progress (n=644)	$14 (sd=5.9)	89%
Incomplete (withdrew/dropped) (n=52)	$12 (sd=5.5)	100%
Certificate		
Completed (n=144)	$16 (sd=5.4)	94%
In progress (n=236)	$14 (sd=7.9)	90%
Incomplete(withdrew/dropped) (n=34)	$12 (sd=7.4)	88%

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[23] Significance: p=0.09.
[24] Notes: Difference is statistically significant at: *p<0.10 level; **p<0.05 level; ***p<0.01 level.

Industry Credential		
Completed (n=196)	$14 (sd=4.8)	95%
In progress (n=108)	$13 (sd=6.1)	75%
Incomplete(withdrew/dropped) (n=22)	$14 (sd=2.1)	67%***

Source: SEELC ETO Database.

SEELC students had the opportunity to earn degrees, certificates, and other industry-recognized credentials in all three career pathways. Median hourly wages across all three credentials were not significantly different by type of credential attained. Those who completed a professional certificate (60%, n=196) were significantly (p=0.03) more likely to be placed in employment by the first quarter after program completion compared to those with industry credentials (43%) and degrees (38%) (See Exhibit 20). Only 10% of those seeking degrees completed, mainly because degrees typically required more time to complete. Generally, courses to attain certificates and other industry credentials were short-term. Thus, students (especially incumbent workers) could enroll, earn a certificate or credential, and re-enter the labor market within a shorter timeframe with those newly acquired skills and command a higher wage. That could be a factor in explaining why the percentage of completers who experienced a wage increase was significantly (p=0.03) higher for those who earned a certificate or industry credential than those who earned a degree.[25] Degree programs generally take two years to complete and this analysis may not have tracked all degree-seeking completers within the life of the grant.

Exhibit 20: Employment and Wages by Credential Completion[26]

Completed Credential	Percent Complete (%)	Fulltime Employment	Employment at Q1	Median Hourly Wage ($, sd)	Wage Increase (%)
Degree	10% (n=75)	100 (n=10)	38% (n=15)	$14 (sd=5.9)	84% (n=26)
Professional Certificate	35% (n=144)	90% (n=55)	60%(n=46)	$15 (sd=5.4)	94% (n=44)
Industry Credential	60% (n=196)	91% (n=39)	43%(n=41)	$14 (sd=4.8)	95% (n=71)
Differs significantly by completed Credential+		No	Yes **	No	Yes **

Source: SEELC ETO Database.

The relationship between credential attainment and level of wages seems to differ by career pathway (See Exhibit 21). SEELC graduates who attained degrees and certificates in welding had significantly higher average wages than those who attained other industry credentials, at $14, $14, and $8, respectively. The type of credential earned did not seem to be related to wages in the other two pathways, machining and advanced manufacturing. Throughout the program site visits, both students and program staff noted that the welding industry paid well and often recruited students while in the program. The difference in wage between welding and the two pathways could be a result of the strong demand for welders. The proportion of those with a wage increase was not associated with the type of credential SEELC graduates attained as they completed their study in the three career pathways.

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[25] Significance: p=0.03.

[26] For significance testing by degree attained, if a student had multiple credentials, completion was prioritized in this order: degree, certification, and credential (e.g., if a student earned both a degree and a credential, that student was assigned the degree). Difference is statistically significant at the: *p<0.10 level; **p<0.05 level; ***p<0.01 level.

Exhibit 21: Employment, Wage by Credential Attainment and Career Pathway[27]

Career Pathway	Median Wage (sd)	Differ Significantly by Credential	Wage Increase (%)	Differ Significantly by Credential
Welding				
Degree (n=8)	$14 (sd=1.9)		100%	
Professional Certificate (n=47)	$14 (sd=2.6)	Yes **	97%	No
Industry Credential (n=56)	$8 (sd=6.7)		100%	
Machining				
Degree (n=10)	$14 (sd=1.0)		100%	
Professional Certificate (n=25)	$16 (sd=4.3)	No	100%	Not tested, small sample
Industry Credential (n=24)	$18 (sd=4.4)		100%	
Advanced Manufacturing				
Degree (n=57)	$14 (sd=7.1)		80%	
Professional Certificate (n=58)	$17 (sd=5.9)	No	100%	No
Industry Credential (n=88)	$15 (sd=4.8)		86%	

Source: SEELC ETO Database.

Outcome Study Conclusions

According to administrative intake data (N=1697), the majority of SEELC students were incumbent workers at the time of enrollment into SEELC training programs (64%, n=1061), and only three percent (n=65) identified as TAA-eligible. Slightly more than half of those with employment history data, who were employed at intake worked part time (56%, n=204). Slightly more than half SEELC survey respondents (n=34) reported that they had at least a one year of experience in a related field when they enrolled. SEELC colleges therefore had to offer a range of training courses that trained those new to the industry (48%) and upskilled those who had work experience.

Overall, SEELC completers gained employment soon after exit, with 70% gaining employment by the first quarter after completion. Non-incumbent employment outcomes were promising with 38% employed at the first quarter in mostly full time employment (82%) and in a job related to their training program (87%). A large percentage of those who were employed at enrollment received a wage increase (80%). Students who took the WorkKeys assessment were at a greater advantage of earning higher wages than those who did not in the implementation sites. Did SEELC students find employment and better wages after completion? Yes, the encouraging uptake of SEELC completers into new hiring positions and increasingly higher wages suggests that completers had marketable in-demand skills that was sought after by employers.

Completers within the machining and welding pathway were significantly more likely than those who chose the advanced manufacturing pathway to be employed by the first quarter. The higher employment rate, especially for welding, was probably influenced by the high percentage of incumbent workers (70%) in that career pathway. Median hourly wages for those who enrolled in the machining pathway ($15) were significantly higher than the other two pathways ($13 for welding and $12 for advanced manufacturing).

Median wages did not differ by the type of credential attained or whether students completed or did not complete a credential. Those who completed a professional certificate, however, were significantly (p=0.03)

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[27] For significance testing by degree attained, if a student had multiple credentials, completion was prioritized in this order: degree, certification, and credential (e.g., if a student earned both a degree and a credential, that student was assigned the degree). Difference is statistically significant at the: * p<0.10 level; **p<0.05 level; ***p<0.01 level.

more likely to be placed in employment by the first quarter after program completion (57%) compared to those with industry credentials (49%) and degrees (38%).[28] The percentage of completers who experienced a wage increase was significantly (p=0.03) higher for those who earned a certificate or industry credential than those who earned a degree. This finding could be due to the shorter duration of certificate and credential programs that allows a completer to quickly enter the job market and gain wages. Degree programs are longer, and the evaluation team may not have observed as many completers within the life of the grant.

Employment outcomes for SEELC completers are related to both the factors examined above and contextual factors that existed in the local areas and broader states. How well SEELC graduates did in the labor market now and will do in the future depends also on labor market projection in the manufacturing sector. The evaluation team gathered employment projections data was using eREMI, a labor market analysis tool from Regional Economic Models, Inc. (REMI), and wages were gathered from the Bureau of Labor Statistics (BLS) 2015 Wage Databook.[29] Job projections throughout the United States in the sectors of welding, machining, and advanced manufacturing show very little growth and, in some instances, declines in growth between 2016 and 2021.[30]

Implementation Study

The implementation evaluation began January 2014 and continued through March 2017[31] to document program progress, monitor program outcomes, and provide recommendations for continuous improvement of program operations. The evaluation team conducted a formative evaluation that was focused on the development of the SEELC training programs and on the contextual factors influencing implementation.

Implementation Research Questions

Exhibit 22 presents research questions that guided the implementation evaluation and provided a normative basis for the evaluation.

Exhibit 22: Implementation Research Questions

Research Questions	Data Sources	Data Collection Methods
Identify Critical Components And Describe Implementation At Each Site Over Time.		
How is the particular curriculum selected, used, modified, or created?	▪ Key documents like lesson plans, syllabi ▪ SEELC staff, faculty ▪ Students	▪ Document review ▪ Interviews ▪ Focus groups
How are programs improved or expanded using grant funds? What delivery methods are offered? What is the program administrative structure? What support or other services are offered?	▪ Grant documents ▪ SEELC staff ▪ Data systems like student support systems	▪ Document review ▪ Program staff interviews ▪ Tracking data
Is an in-depth assessment of students' abilities, skills, and interests conducted to select students into the grant program? What assessment tools and processes are used to screen the	▪ SEELC staff ▪ Students ▪ Selection criteria ▪ Data systems	▪ Interviews ▪ Focus groups ▪ Student surveys

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[28] Significance: p=0.03.

[29] The regions selected for this analysis consist of a set of adjacent counties, provided by each college, and can include the colleges' localities; regions where the students are finding jobs, and locations of employer partnerships that have developed since the time of application. See Appendix G for full Labor Market Information analysis.

[30] See Appendix G: LMI Data Table by College.

[31] SEELC grant implementation took place up to March 30, 2017. April 1, 2017 through September 30, 2017 was additional time for evaluation analysis and reporting.

Research Questions	Data Sources	Data Collection Methods
students? Are the assessment results useful in determining the appropriate program and course sequence for students?		▪ Strengths, Weaknesses, Opportunities and Threats (SWOT) ▪ Document review ▪ Tracking data
What contributions does each partner (e.g., employers, workforce system, others) make in terms of program design, curriculum development, recruitment, training, placement, program management, leveraging resources, and commitment to program sustainability?	▪ Program partners ▪ SEELC staff ▪ Key documents	▪ Interviews ▪ Document review
Assess The Fidelity Of Implementation And Intervention Over Time.		
How closely do the programs replicate the major and ancillary components of the SEELC program model?	▪ SEELC staff ▪ Key documents	▪ Interviews ▪ Document review
What are the variations in implementation across sites?	▪ SEELC staff ▪ Key documents	▪ Interviews ▪ Document review ▪ SWOT
Understand Successes And Challenges To Implementation.		
What program outputs are generated throughout the life of the grant? What barriers hinder output achievement? What factors unexpectedly improve output achievement?	▪ Data system ▪ SEELC staff, leaders, faculty ▪ Students	▪ Tracking data ▪ Interviews ▪ Focus groups ▪ Survey
What are the successes and obstacles to program performance?	▪ SEELC staff, leaders, faculty ▪ Documents	▪ Interviews ▪ SWOT analysis
How should program processes, tools, or systems be modified to improve performance?	▪ Data system ▪ SEELC staff ▪ Key documents	▪ Tracking data ▪ Interviews ▪ Document review
What factors contribute to partners' involvement or lack of involvement in the program? Which contributions from partners are most critical to the success of the grant program? Which contributions from partners have less of an impact?	▪ Program partners ▪ SEELC staff, leaders, faculty ▪ Documents	▪ Interviews ▪ SWOT analysis
How satisfied are program partners, staff, and students with the program? Why?	▪ Program partners ▪ SEELC staff ▪ Students	▪ Interviews ▪ Focus groups ▪ Student surveys
Examine Institutional Capacity Building.		
How can the program expand or enhance institutional capacity? What are the most promising programmatic components to use institution-wide? Consortium-wide? Why?	▪ SEELC staff, leaders, faculty ▪ Key documents	▪ Interviews ▪ Document review

Implementation Design & Methodology

The implementation evaluation was intended to be a key element in learning lessons along the way to enhance program implementation and results in real time. Evaluation feedback was provided through analysis of the following primary categories:

- Progress toward achieving certain program outcomes or milestones.
- Program accelerators, barriers, and environmental factors.
- How strategies or activities not successfully implemented could be adapted or modified to the realities of the circumstances surrounding the project.
- Context for sustaining certain project activities.

To gather information on these categories, the evaluation team relied on first-person accounts of grant experiences gathered via conference calls, phone and in-person interviews, and program document reviews:

- Monthly (in 2015) and quarterly (in 2016 and 2017) implementation update calls with the project director and grant staff at each college and with consortium leadership.
- In-person and phone interviews with SEELC staff and instructors and college leadership, staff, and faculty, and students.
- SEELC documents, including quarterly program reports, data dashboards, and SEELC outcomes analysis reports.

The implementation evaluation allowed the evaluation team, grant staff, and SEELC stakeholders to better understand the program's core activities and descriptively evaluate how the operations of SEELC functioned. The evaluation placed the outcomes of the intervention into context with the implementation process and examined whether the program was implemented as designed. This allowed the evaluation team to uncover any potential threats to the validity of the study and helped program staff understand how the process might be modified to produce greater results.

Analysis Methods

To conduct a descriptive analysis of program implementation and the contextual factors influencing implementation, the evaluation team placed qualitative data generated from interviews into a matrix listing responses by interview question (row) and college/program role (column). Program roles included grant staff, grant instructors (identified by pathway), consortium leadership, college staff, and students. Based on student responses, the team identified key words and listed them in the appropriate column and row. The team then grouped key words across colleges, programs, and roles to identify commonalities and differences. Furthermore, responses associated with key words were identified as positive, negative, or neutral to assist in identifying perceived successes and challenges.

Once groupings were identified based on review of interview data, the evaluation team augmented the information with a review of

1. The notes taken during monthly (later quarterly) implementation update calls;
2. Detailed notes taken during site visits (conducted during July 2015 and September 2016), including direct quotes;
3. SEELC documents, including quarterly reports;[32] and
4. The team's extensive experience with technical training programs and the body of evaluation knowledge built through their work.

Furthermore, the team used these sources to develop and refine interview and focus group questions for each site visit, including areas that might need further exploration. Guidance about what was important came from the grant narrative, research questions, and calls that had occurred throughout the grant period. The following descriptive categories are used in the report:

- <u>Progress</u> – Documentable steps taken to advance or achieve grant outcomes, deliverables, milestones, and/or goals.
- <u>Accelerators/Strengths of Progress</u> – Documentable achievements along with contextual factors that enhanced grant progress and improved the ability of grant staff to carry out grant initiatives, focused on internal factors (program design, modification, implementation, and application)

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[32] The most recent quarterly report available for review was from June 30, 2017.

- <u>Barriers/Challenges to Progress</u> – Documentable shortcomings in achievements, along with contextual factors that hindered grant progress and delayed or prevented grant staff from carrying out grant initiatives.
- <u>Recommendations</u> – Opportunities the evaluation team identified for improving progress toward grant outcomes (in interim reports) and recommendations for other educational institutions looking to start similar programs.
- <u>Sustainability</u> – Components of the program that are planned to continue once funding ends.

The final step in the analysis was to send the summarized results to the Consortium director and grant leadership at each college for clarification and additional contextual details.

To strengthen the accuracy and credibility of implementation study findings, the evaluation team relied on triangulation, including reviewing outcomes data and identifying the ways in which information from the outcome data corroborated or conflicted with information from the implementation study, as well as 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. By presenting findings to SEELC 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 the evaluation could produce timely, user-relevant findings.

Reporting of Results

Data were reviewed, interpreted, and included in the interim report in 2015, and in this final report. The reports contain the results of the analysis and recommendations for program enhancements (interim report only) and lessons learned. The Consortium's director conducted an in-depth review of these reports, as well as grant staff for member checking, factual verification, and elaboration on findings and recommendations. Subsequently, the consortium director submitted the reports to DOL. Moreover, during the implementation period, the director developed Quarterly reports providing programmatic updates and data on specific concepts, including an updated labor market analysis for the industries related to the SEELC program.

Limitations

The following presents the main elements of limitations for the implementation evaluation as well as the steps that were taken to mitigate the limitations:

<u>Limited Data Sources</u> – When possible, the evaluation team used data triangulation to verify narratives and other information shared by key stakeholders. Triangulating data from multiple sources, such as comparing findings among stakeholder interviews with outputs and outcomes data, creates more credible evaluation results. The evaluation team was often was faced with a limited number of data sources, however. The Consortium director and grant staff provided a majority of information to the evaluation team, and the evaluators were unable to triangulate some of this information due to a lack of other sources, including missing or incomplete data.

<u>Partial and Biased Findings</u> – Qualitative and perceptual research methods offer good insights, but are, by nature, partial and biased. For this study, perceptual information (data gathered through focus groups and interviews with staff, stakeholders, and students) was the primary mechanism by which information was obtained to gauge successes and challenges of the project. The evaluation team was faced with a limited number of additional data sources (quantitative and qualitative) to support these findings. To attempt to address this limitation, the evaluation team used data triangulation whenever possible, including interviewing multiple stakeholders.

<u>Respondent Order Effect</u> – During site visits, the evaluation team conducted group interviews for students within the chosen classes. At these group interviews, students more interested in sharing their opinions of the program may have spoken up at a greater rate than other students. This imbalance may have created a pecking-order bias by students self-selecting their response order (i.e., certain students go first and others go last). Receiving a range of feedback from students, from positive to critical, supports the notion that a spectrum of student experiences was captured. However, it is possible that bias related to the student response ordering was introduced into the evaluation.

<u>Researcher Extrapolation</u> – Analysis conducted with an interpretive analytical framework suffers from the threat that researcher extrapolation and interpretation may go too far beyond what is present in, and supported by, the data.[33] Indeed, the recommendations provided in this report are based on a combination of what was learned and supported by data and the experiences and findings of the evaluators' previous experience designing, implementing, and evaluating various workforce development programs.

Implementation Findings

Grant staff across the SEELC consortium utilized similar strategies to address each innovation, although the Consortium model allowed for flexibility and variety, recognizing differences across colleges. This section of the report highlights the variety of ways in which components were executed throughout the grant period. Findings are separated into five main areas:

- Program Development and Modifications
- Program Delivery
- Support Services
- Employer, College, and Industry Engagement
- Program Sustainability

Program Development and Modifications

RQ1. How was the particular curriculum selected, created or modified?

RQ5. How closely do the programs replicate the major and ancillary components of the SEELC program model?

RQ6. What are the variations in implementation across sites?

RQ7. What program outputs are generated throughout the life of the grant? What barriers hinder output achievement? What factors unexpectedly improve output achievement?

RQ8. What are the successes and obstacles to program performance?

<u>Career pathway development was carried out with fidelity to the Innovation 1 program components outlined in the grant application, with the exception of the implementation of an ATF at each campus and a few other, minor components</u>. Innovation 1 is to develop national standards-based career pathway opportunities. The SEELC colleges together implemented 16 new or modified sets of programs: six welding pathways (one at each college), five machining pathways

| **Program Components:** |
| 1. **Development of Career Pathways** |
| 2. **Creation of Accredited Testing Facilities (ATF)** |
| 3. Opportunities to Apply Credit |
| 4. Student Support Services |
| 5. Employer and Industry Engagement |

(all colleges except Vance-Granville), and five advanced manufacturing pathways (all colleges except Palm Beach). Of these 16 sets of pathways, SEELC colleges implemented all key components for 10 pathways

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[33] Guest, G., MacQueen, K.M., & Namey, E.E. *Applied Thematic Analysis*. Thousand Oaks, CA. SAGE Publications, Inc., 2011.

and the majority of key components for six. ATF accreditation proved the most difficult component to meet and the one with the largest number of colleges unable to complete by the end of the grant period. Had that component been met, the Consortium would have met all key components in 14 of the 16 pathways.

Fidelity of Implementation and Variations across Sites

Program modifications were tailored to meet the needs of each college and, in particular, the needs of local businesses and industries. Four colleges created entirely new academic and training programs, and all colleges utilized grant funds to enhance existing programs. Staff and instructors at colleges that created new programs worked with local employers and industry experts to tailor the programs to local needs. Those colleges that elected to enhance existing programs also engaged in discussions with local industry to ensure alignment. All six colleges successfully embedded certifications in programs they offered. Certifications were similar but not identical, across sites. All five of the six colleges that offered machining established MET-TEC, but not all five were able to become NIMS accredited during the period of performance.

Additional details about these variations are offered in each of the pathway sections that follow, and Exhibit 23 presents summaries of the program modifications made throughout each pathway across the Consortium. It demonstrates the variation of the program components for Innovation 1 and where colleges stood at the end of the grant. Green indicates meeting all of the key components outlined in the grant proposal, yellow indicates meeting some (e.g., three out of four innovations), and red indicates meeting half of the key components outlined in Innovation 1.

Exhibit 23: Pathway Program Modification Components Status

	Northeast	Palm Beach	Pellissippi	Polk	Randolph	Vance-Granville
Welding	**GREEN** ▪ Existed before the grant ▪ Purchased new equipment, including Real Weld ▪ Certified ATF ▪ Aligned to AWS SENSE	**YELLOW** ▪ Existed before the grant ▪ Purchased new equipment, including Real Weld ▪ Did not use Real Weld virtual welders ▪ Certified ATF ▪ Aligned to AWS SENSE 2	**YELLOW** ▪ Created a new welding program ▪ Purchased new equipment, including Real Weld ▪ Pursuing ATF ▪ Aligned to AWS SENSE 1	**YELLOW** ▪ Existed before the grant; offered through Traviss Center[34] ▪ Purchased new equipment, including Real Weld ▪ Did not pursue ATF ▪ Aligned to AWS SENSE	**YELLOW** ▪ Existed before the grant ▪ Purchased new equipment, including Real Weld ▪ Pursuing ATF ▪ Aligned to AWS SENSE	**YELLOW** ▪ Existed before grant, significantly enhanced program offerings, including two-year degree program ▪ Purchased new equipment ▪ Did not pursue ATF ▪ Aligned to AWS SENSE
Machining	**GREEN** ▪ Existed before grant ▪ Purchased new equipment ▪ Secured NIMS accreditation ▪ Established MET-TEC	**GREEN** ▪ Existed before grant ▪ Purchased new equipment ▪ NIMS accredited before grant ▪ Established MET-TEC	**GREEN** ▪ Existed before grant ▪ Purchased new equipment ▪ Secured NIMS accreditation ▪ Established MET-TEC	**YELLOW** ▪ Created new CNC machining program ▪ Purchased new equipment ▪ Pursuing NIMS accreditation ▪ Established MET-TEC	**GREEN** ▪ Existed before grant ▪ Purchased new equipment ▪ NIMS accredited before grant ▪ Established MET-TEC	**N/A – does not offer machining**

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[34] Traviss Center is a technical training provider affiliated with Polk County Public Schools.

	Northeast	Palm Beach	Pellissippi	Polk	Randolph	Vance-Granville
Advanced Manufacturing	**GREEN** ▪ Existed before grant, added new training program ▪ Purchased new equipment ▪ Offered OSHA* 30 Industry certs.	**N/A – does not offer advanced manufacturing**	**GREEN** ▪ Existed before grant, created new additive manufacturing program ▪ Purchased new equipment ▪ Offered Programmable Logic Controller (PLC), and Siemens Industry certs.	**GREEN** ▪ Existed before grant ▪ Purchased new equipment ▪ Offered Manufacturing Skills Standards Council (MSSC) Certified Production Technician (CPT) Industry certs.	**GREEN** ▪ Existed before grant ▪ Purchased new equipment ▪ Offered PLC, Siemens and Fuji Automatic Numerical Controls (FANUC) Industry certs.	**GREEN** ▪ Created new mechatronics program ▪ Purchased new equipment ▪ Offered PLC, Siemens and FANUC Industry certs.

* Occupational Safety and Health Administration (OSHA)

Welding Program Modifications

<u>While all colleges met more than half of the key components, the Consortium made the least amount of collective progress among all three pathways in welding, primarily due to ATF implementation.</u> Exhibit 24 provides a summary of program modifications across the welding programs, in the following categories: Curriculum development, Real Weld purchase, AWS SENSE alignment, and ATF certification. This exhibit incorporates a color rating that serves as a visual reference for how many of the key components the colleges met. Green shows colleges where all components were achieved, Yellow depicts where more than half of the components were achieved, and Red is less than half.

Exhibit 24: Overview of Welding Program Components and Modifications

College	Rating	General/Curriculum Modification	ATF Certification
Northeast	**GREEN**	✓ Program existed before the grant ✓ Purchased new equipment (Real Weld virtual welder impact tester, wrap-around bend fixture, other welding supplies) ✓ Aligned to AWS SENSE	✓ Certified ATF
Palm Beach	**YELLOW**	✓ Program existed before the grant ✓ Did not utilize Real Weld virtual welders ✓ Purchased new equipment (Lincoln VRTEX, ARC gas welders, electrical service labs) ✓ Aligned to AWS SENSE 2	✓ Certified ATF
Pellissippi	**YELLOW**	✓ Created new program ✓ Purchased new equipment (Real Weld virtual welder, other welding supplies) ✓ Aligned to AWS SENSE 1	✓ Pursuing ATF, plan to complete by September 2017
Polk	**YELLOW**	✓ Program existed before the grant, offered through the Traviss Center ✓ Purchased new equipment (Real Weld virtual welder, welding sticks, other welding supplies) ✓ Aligned to AWS SENSE before the SEELC grant	✓ Did not pursue ATF due to welding running through Traviss Center
Randolph	**YELLOW**	✓ Program existed before the grant ✓ Purchased new equipment (Real Weld virtual welder, bend test machine) ✓ Aligned to AWS SENSE before the SEELC grant	✓ Pursuing ATF, plan to complete by September 2017
Vance-Granville	**YELLOW**	✓ One-year certificate program existed before the grant added two-year degree program ✓ Purchased new equipment (Real Weld virtual welder, other welding supplies) ✓ Aligned to AWS SENSE	✓ Did not pursue ATF due to space constraints on campus

Curriculum Development and Modifications and Credential Alignment

All colleges aligned their curricula to AWS SENSE levels and engaged employers in curriculum design and modification. Grant staff and faculty across the Consortium reported working with local employers and industry experts to ensure that appropriate and relevant skills were covered when developing new programs (Vance-Granville and Pellissippi) and modifying existing programs. Grant staff and instructors aligned welding curricula to the AWS SENSE program, which is a set of AWS-endorsed standards for welding instruction.

Equipment

Equipment purchased for the welding programs enhanced the classroom experience for students. Per grant staff, much of the equipment purchased replaced older equipment and expanded program capacity. Instructors and students expressed satisfaction about new machine purchases, indicating that equipment reflected what they would see in the real world. New equipment also allowed instructors to provide more hands-on learning opportunities. All of the colleges except Palm Beach purchased the Real Weld virtual welder; Palm Beach purchased the Lincoln VRTEX. Welding instructors across the Consortium reported virtual trainers were beneficial mainly during the first months of the program, as they allowed students to get the basic feel for welding and saved on materials. Virtual welders were not a substitute for real welding experience, however, as both instructors and students reported that experience in the shop and the skills gained from real application of what students practiced virtually were irreplaceable.

Accredited Testing Facilities

ATF implementation was the least consistent program component across consortium colleges. It also demonstrated differences across colleges, both in starting points and in college leadership and grant staff's perceptions of local needs. While two colleges, Palm Beach and Northeast, became certified ATFs during the grant, grant staff and college leadership at Polk and Vance-Granville ultimately decided not to pursue implementation. Polk's welding program was offered through the Traviss Center, the technical training provider affiliated with Polk Public Schools; thus, grant staff had limited capacity to influence ATF attainment. Staff at Vance-Granville reported space and capacity limitations, so they decided not to pursue an ATF. The other two colleges, Pellissippi and Randolph, were still pursuing implementation as of August 2017.

Relevance of Credentials

Across the Consortium, students reported that for entry-level job candidates who do not have experience in the industry, AWS credentials they earned through the SEELC programs would allow them to demonstrate that their training is relevant and valuable. According to outcome data, while those who completed the SEELC program with only an industry credential in welding had lower median wages at exit than those earning degrees or certificates, all of the industry credential earners did report wage gains, which may in part indicate the value of the credential. Exhibit 25 provides an overview of the relevance of AWS credentials, as reported by instructors, grant staff, and employers.

Exhibit 25: Reported Relevance of Credentials in Local Industries

Credentials	Northeast	Palm Beach	Pellissippi	Polk	Randolph	Vance-Granville
AWS	Employers want to see candidates' skills and want students to pass their internal tests; credential may assist in getting a test.	The ATF will make credentials more relevant.	Employers want to see candidates' skills and want students to pass their internal tests; credentials may assist in getting a test.	AWS credentials are relevant in the area.	Employers want to see candidates' skills and want students to pass their internal tests.	Employers want to see candidates' skills and want students to pass their internal tests; credentials may assist in getting a test.

Machining Program Modifications

<u>Of the three pathways, the Consortium made the second-greatest amount of collective progress in achieving components of machining, after advanced manufacturing</u>. Four of the five colleges met each key component. All of the colleges, except Vance-Granville, offered machining programs; however, only Polk created a new program under the grant. While Randolph's machining program was already aligned with NIMS before the grant, staff at the remaining four colleges—Northeast, Palm Beach, Pellissippi, and Polk—worked to align curricula with the NIMS credentials. Of the four colleges that were not NIMS-accredited prior to the grant (Northeast, Pellissippi, Randolph, and Polk), three had achieved accreditation by the end of the grant, with the fourth (Polk) aiming to achieve accreditation by the end of September of 2017. Grant staff and instructors established MET-TEC, made up of local employers, to validate that parts made by students met NIMS standards.

Exhibit 26 provides a summary of program modifications across the machining programs, in the following categories: Curriculum development, Equipment purchase, NIMS alignment, NIMS accreditation, and Establishment of MET-TEC. This exhibit incorporates a color rating which serves as a visual reference for how many of the key components the colleges met. Green shows colleges where all components were achieved, Yellow depicts where more than half of the components were achieved, and Red is less than half.

Exhibit 26: Overview of Machining Program Components and Modifications

College	Rating	General/Curriculum Modification
Northeast	**GREEN**	✓ Program existed before the grant ✓ Purchased new equipment (lathes and mills) ✓ Aligned curriculum to NIMS ✓ Achieved college-wide NIMS accreditation ✓ Established MET-TEC
Palm Beach	**GREEN**	✓ Program existed before the grant ✓ Purchased new equipment ✓ Aligned curriculum to NIMS ✓ Established MET-TEC ✓ Hosted NIMS training for consortium faculty
Pellissippi	**GREEN**	✓ Program existed before the grant ✓ Purchased new equipment (lathes and mills) ✓ Aligned curriculum to NIMS ✓ Achieved college-wide NIMS accreditation ✓ Established MET-TEC
Polk	**YELLOW**	✓ Created a new CNC machining program ✓ Purchased new equipment (two CNC machines) ✓ Aligned CNC curriculum to NIMS ✓ Still pursuing NIMS accreditation (hope to accomplish by September 2017) ✓ Established MET-TEC
Randolph	**GREEN**	✓ Program existed before the grant ✓ Purchased new equipment (CNC machine, plasma cutting table, cutting tools, lathes and mills and materials) ✓ Hosted NIMS training for consortium faculty ✓ Aligned to NIMS before the SEELC grant ✓ Already have NIMS accreditation ✓ MET-TEC already existed
Vance-Granville	**N/A**	N/A – does not have a machining program

Curriculum Development and Modifications and Credential Alignment

Grant staff at Polk implemented a new, non-credit CNC machining program. For this program, the *Immerse to Learn* software was selected, which includes more than 90 hours of coursework aligned to NIMS. Additionally, grant staff utilized the short-term training curricula designed by NIMS, *Skills Right Now*, for CNC operator training. Grant staff reported creating the outline for the CNC class from this curriculum, and the CNC instructor was then able to further develop the curriculum to suit his needs for the class. According to the instructor, the curriculum was specifically designed to teach students the manual processes prior to moving on to the CNC machines.

All machining programs were aligned to NIMS credentials. The SEELC embedded a relationship with NIMS into its grant and developed an agreement that would allow for the testing fees for NIMS credentials to be paid through a flat fee at the Consortium level. Curricula were designed to prepare students to test for NIMS credentials throughout machining courses. Grant staff and instructors established MET-TEC, made up of local employers, to validate that parts made by students meet NIMS standards. Once a part is approved, a student is permitted to complete the related credentialing examination.

Equipment

Machining programs were enhanced through new equipment. Across the Consortium, machining instructors reported that the new equipment, including lathes, mills, CNC machines, and other equipment,

added capacity to machining labs, and students were excited to use new equipment. Students reported that the machines, especially Haas CNC machines, are used by industry, and the hands-on learning provided in their courses would help prepare them for employment opportunities in the field.

Relevance of Credentials

The relevance of NIMS credentials in the areas surround the Consortium colleges varied. Consortium leadership indicated that the NIMS credential may be more valued in areas with a lot of government contracting, but that it does not carry as much weight in the private sector. Grant staff at three colleges (Randolph, Northeast, and Palm Beach) indicated that in areas where NIMS was not well known, they were able to explain the skills that are connected to a credential, which helped employers understand the credentials and what they meant. Once employers understood the skills encompassed in the credentials, they began to view them with a higher regard. Across the Consortium, students reported that for entry-level job candidates without experience in the industry, the NIMS credentials would demonstrate to employers the relevance and value of their training. The outcomes data appear to support this notion—in machining, individuals who completed with only an industry certification had a higher median wage than those completing certificates and degrees, and 100% demonstrated wage increases.

Exhibit 27 provides an overview of the relevance of credentials for local industry, as reported by instructors, grant staff, and employers.

Exhibit 27: Reported Relevance of Machining Credentials in Local Industries

Credentials	Northeast	Palm Beach	Pellissippi	Polk	Randolph	Vance-Granville
NIMS	Employers are interested in NIMS; increased knowledge of NIMS has improved relevance.	Credentials are relevant for employers – seen as a set of skills that are understood within the industry.	NIMS has added credibility to the program because NIMS is a national organization.	A shortage of CNC machinists has made credentials less vital, though they are widely accepted.	Relevance varies by employer. Instructors communicated to employers the skills involved in NIMS credentials.	N/A

Advanced Manufacturing Programs

Of all pathways, the Consortium made the greatest amount of collective progress in achieving components of advanced manufacturing. All five colleges met all components in advanced manufacturing. The SEELC grant did not have a national industry certification standard for advanced manufacturing programs to align to, and as such, advanced manufacturing programs across the Consortium were varied in the curricula and industry credentials offered. Programs had in common a focus on technology in manufacturing and included combinations of robotics, programmable logic controls, 3-D printing, mechatronics, and other innovations.

Exhibit 28 provides a summary of program modifications across the advanced manufacturing programs, in the following categories: Curriculum development, Equipment purchased, and Credentials offered. This exhibit incorporates a color rating which serves as a visual reference for how many of the key components the colleges met. Green shows colleges where all components were achieved, including enhancing advanced manufacturing programs through new curriculum, equipment, or industry-recognized certifications. Because all components were achieved across all colleges, each college is portrayed as green.

Exhibit 28: Overview of Advanced Manufacturing Program Components and Modifications

College	Rating	General/Curriculum Modification
Northeast	GREEN	✓ Added new program for advanced helicopter maintenance in collaboration with local employer ✓ Purchased new equipment (robotics equipment, card sets and trainers for electro-mechanical program) ✓ Offered OSHA 30 certifications
Palm Beach	N/A	N/A – does not have an advanced manufacturing program that is part of the SEELC grant
Pellissippi	GREEN	✓ Implemented an additive manufacturing program ✓ Added equipment for megalab (3-D printers, mechatronics training system, robotics trainer) ✓ Offers PLC and Siemens industry certifications
Polk	GREEN	✓ Engineering technology existed before grant ✓ Created a Precision Maintenance Measurement and Instrumentation (PMMI) program to offer in local prison ✓ Added Certified Reliability Maintenance Technician (CRMT) training for industry partners Offered MSSC CPT certification ✓ Offered OSHA 30 certification
Randolph	GREEN	✓ Program existed before grant ✓ Purchased new equipment (card sets and trainers for mechatronics and electrical systems programs) ✓ Offers PLC, Siemens, and FANUC industry certifications
Vance-Granville	GREEN	✓ Implemented a new mechatronics two-year degree program ✓ Purchased new equipment (robotics equipment, PLCs, mechatronics lab equipment) ✓ Offers PLC, Siemens, and FANUC industry certifications

Curriculum Development for New Programs

Three colleges implemented new advanced manufacturing programs. For Pellissippi's additive manufacturing program and Vance-Granville's mechatronics degree, faculty and staff reported that program plans had been developed prior to the grant, and they were simply awaiting funding to provide the equipment and faculty needed for implementation. At Northeast, a new aviation certification was developed in collaboration with a local employer, Bell Helicopter. Grant staff at Polk were able to offer a PMMI training and added a CMRT training for industry partners.

Equipment

Equipment purchases increased opportunities for applying learning. Grant staff and instructors indicated that new equipment purchases allowed for increased hands-on learning opportunities, particularly around electronic systems and robotics. Small equipment purchases allowed Pellissippi to open a megalab, which includes a significant amount of the advanced manufacturing equipment at one of its campuses. Grant staff report the megalab has drawn employers to campus because the space can provide the education needed for the area's new technology businesses.

Relevance of Credentials

<u>Unlike the other technical program areas, advanced manufacturing lacks a singular national certification to which all colleges are aligning curricula and instruction.</u> According to outcomes data, while 100% of SEELC students who completed industry certifications in welding or machining reported wage increases at exit, only 86% of those in advanced manufacturing reported such increases. This finding may in part be a function of the lack of singular national certification, regional preferences, or some combination thereof. These credentials were included in programs at an institutional level and not at a consortium-wide level like the AWS and NIMS credentials. Employers reported that they felt the skills gained by participating in an advanced manufacturing program are more valuable than credentials, especially as there is no consensus among employers around any advanced manufacturing certification that all students need to gain employment.

Exhibit 29 provides an overview of the relevance of credentials for local industry, as reported by instructors, grant staff, and employers.

Exhibit 29: Reported Relevance of Credentials in Local Industries

Credentials	Northeast	Palm Beach	Pellissippi	Polk	Randolph	Vance-Granville
Advanced Manufacturing	OSHA 30 is the most relevant credential for employers.	N/A	Employers are more interested in an associate's degree than industry credentials.	Employers value MSSC credentials because they show students have basic knowledge and safety training.	Any credential can help students get an interview, but there is not a specific credential that is relevant.	Credentials offered are not relevant in the area. High demand for employees outweighs the value of credentials.

Program Development and Modification Successes

Engaging Employers in Curricula Development

Grant staff across the Consortium engaged local employers and industry experts in key decision making around program curricula creation and enhancement and equipment purchases. For grant staff at two colleges, Northeast and Polk, these conversations resulted in the development of specific programs to address unique and pressing regional needs. Grant staff at all colleges that pursued NIMS accreditation formed MET-TECs that included new employer partners as curricula and equipment advisors. Pellissippi worked closely with employer partners through their employer advisory council to identify priorities for their welding program. Grant staff and instructors at Randolph utilized their employer advisory committees and strong existing relationships to obtain input on specific skills in demand for the industries. Grant staff at Vance-Granville described inviting employer partners to the table and said that utilizing their feedback served as an important opportunity for the college and the grant-funded program to "prove themselves." This generated buy-in and strengthened partnerships that they believe will remain intact for the life of the grant and beyond.

Flexibility in Design to Meet Each College's Local Needs

Although SEELC colleges worked toward a common set of pathways, SEELC objectives were designed to be applied to the local context and thus varied in application. Grant staff and college leadership reported this as a key benefit, and said the ability to modify program curricula and equipment purchases to reflect the specific needs and feedback of employer-partners resulted in strengthened relationships with those employers. As described previously, welding, machining, and advanced manufacturing each looked slightly different at each college, and the types and amount of equipment consortium members purchased varied

by program type and size. Furthermore, colleges created new programs to meet local employer needs and created and adapted curriculum to ensure alignment with industry partners.

Designing NIMS and AWS Partnerships at the Consortium, Rather than Institution Level

One of the main goals of TAACCCT grants was to increase the number of workers who attain industry-recognized credentials that match the skills needed by employers. SEELC sought to fulfill this goal by offering employer-driven programs and aligning not only its programs, but also the Consortium as an entity, with the prominent manufacturing credentialing bodies AWS and NIMS. The Consortium program managers reported that the primary benefit that they observed was the ease of a single coordinating body contracting and working with NIMS and AWS rather than each institution pursuing partnerships with these organizations. Program managers also noted that certain colleges would not have been ready to collaborate with these organizations at the beginning of the grant, as they had not yet created their programs.

Generating Support from College Leadership

Overall, grant staff reported high levels of college leadership support for SEELC funded programs. Although not located on the main campus, grant staff at Northeast stated that they felt supported by leadership throughout the grant. Grant staff at Vance-Granville said that while large-scale grants were new for Vance-Granville, college leadership was excited about the grant and eager to support the program and grant staff. Staff at Pellissippi echoed this sentiment and reported that while they encountered internal challenges in key policies around hiring and grant staff salaries, the college was eager to address any issues. Grant staff at Polk described their college leadership as supportive and committed to achieving success in their grant and said this enthusiasm motivated them to be successful. Grant staff at Randolph stated that they had good relationships with other college staff and "never felt like we weren't part of the college." Grant staff at Palm Beach indicated that generating buy-in from college leadership early in the grant "helped secure space for offices and classrooms and helped move internal processes along more quickly."

Program Development and Modification Challenges

Timeline Delays

Strict college hiring restrictions and internal hiring processes acted as a barrier to progress at all consortium colleges.

The top three issues were 1) slow hiring processes, which caused delays in already-short grant timelines; 2) institutions' minimum education requirements and the resulting inability to find candidates with the right combination of both industry experience and advanced education; and 3) wage competition, which was exacerbated by the minimum education requirements. At two colleges, grant staff reported seeking the help of college leadership to expedite the hiring process, which was described as "too long, and too much time [was] lost." Grant staff at Pellissippi reported that they were required to obtain special permissions to hire welding instructors that did not have Masters' degrees. Staff at Polk acutely felt the wage and experience issues, where guidelines for hiring and compensation are determined primarily by a candidate's advanced degree and not the advanced technical certifications the instructor would be responsible for teaching. Due solely to this inability to find a qualified instructor who also met the college's hiring criteria, the delivery of Polk's CNC program was delayed until August 2016, when an instructor was finally hired. Pellissippi's struggle to secure Southern Association of Colleges and Schools (SACS) accreditation created barriers to timely implementation of the new welding program and delayed student recruitment. This meant the welding program did not fully launch until the fall 2016 semester, at which point grant staff were required to

revise the previously developed curricula to adapt to changing needs and priorities and reinvigorate the community and employer relationships that they had built two years before.

Difficulty Collaborating with AWS

Consortium leadership reported that working with AWS was more challenging than working with NIMS. The Consortium was unable to set up a flat-fee structure, which made it difficult to anticipate costs. Additionally, instructors and grant staff who worked to align welding programs to AWS SENSE reported that some of the information was "vague" or "could be more detailed," as staff were required to do further research to understand the requirements to become properly accredited. Staff noted that having a single point of contact at AWS would have been helpful, as staff did not know to whom to turn for assistance. Staff members also reported that having a seminar regarding implementation of the SENSE program, whether in-person or online, could have helped college staff better understand the program's implementation.

ATF Challenges

Implementing an ATF proved challenging across the Consortium, with only two colleges successfully implementing during the grant period. Colleges described space limitations, leadership turnover, and lack of institutional buy-in as key challenges. Grant staff also described the task of implementing an ATF as administratively burdensome, as it included the development of manuals, equipment and supply storage procedures, and management/staffing plans. Two colleges ultimately chose not to pursue an ATF, and two others are continuing to pursue an ATF as of August 2017 but have seen progress limited by space-sharing requirements and concerns that an ATF may not be necessary due to another ATF in the region.

Program Delivery

> RQ2. How are programs improved or expanded using grant funds? What delivery methods are offered? What is the program administrative structure? What support or other services are offered?

> RQ7. What program outputs are generated throughout the life of the grant? What barriers hinder output achievement? What factors unexpectedly improve output achievement?

> RQ8. What are the successes and obstacles to program performance?

Each college delivered pathway models in ways that fit its needs and structures (See Exhibit 30). This effort was part of Innovation 1 to develop national standards-based career pathway opportunities. Grant staff worked to offer SEELC programs through delivery models that best suited their own institutions, provided students with opportunities for hybrid learning in specific programs and classes where it made the most sense, and created pathways for students to continue their education upon completion of their SEELC programs.

Program Components:
1. Development of Career Pathways
2. Creation of Accredited Testing Facilities (ATF)
3. **Opportunities to Apply Credit**
4. Student Support Services
5. Employer and Industry Engagement

Program Delivery Models

Exhibit 30: Program Delivery Structures

	Welding	Machining	Advanced Manufacturing
Northeast	Traditional	Traditional	Traditional
Palm Beach	Postsecondary Adult Vocational (PSAV) program	PSAV program	N/A
Pellissippi	Traditional	Traditional	Traditional
Polk	Provided through Traviss Center	Boot Camp Style	Open Entry/Early Exit
Randolph	Traditional	Traditional	Traditional
Vance-Granville	Traditional	N/A	Traditional

Program Delivery Outputs

Development of Hybrid Courses

Exhibit 31 provides a summary of hybrid courses offered at each college, by pathway. Green shows where at least one hybrid course is offered in all pathway programs, Yellow depicts where at least one hybrid course is offered in at least one program, and Red depicts colleges where no hybrid courses were reported.

Exhibit 31: Hybrid Courses Offered

	Rating	Welding	Machining	Advanced Manufacturing
Northeast	YELLOW	Lectures for Blueprint Reading are online	None developed	Lectures for Blueprint Reading are online
Palm Beach	YELLOW	Hybrid courses identified	No plans to offer hybrid courses	N/A
Pellissippi	YELLOW	Still exploring hybridization opportunities	Still exploring hybridization opportunities	Lectures are online
Polk	YELLOW	Few hybrid courses	Hybrid courses identified	Engineering technology has hybrid courses
Randolph	YELLOW	Hybrid courses identified	No hybrid courses	No hybrid courses
Vance-Granville	GREEN	Lectures for Blueprint Reading and Symbols are online	N/A	Offered hybrid summer course

Hybrid course offerings varied across the Consortium, limited by the hands-on nature of programs. Because the programs at Palm Beach are offered through a clock-hour based Postsecondary Adult Vocational (PSAV) program, federal financial-aid laws dictate that all coursework must be completed in-person, which, grant leadership reported, has resulted in not utilizing hybrid courses in that college. Grant staff and instructors at Randolph also reported not utilizing hybrid courses because there is too much hands-on work required in each course. Instructors at Pellissippi, Northeast, and Vance-Granville offered online versions of Blueprint Reading and Symbols courses, for which there was not a significant hands-on component.

Opportunities for Applying Credit

Grant staff at each college followed the articulation and Prior Learning Assessment (PLA) processes established by their colleges for applying credit for students' previous educational attainment and work experiences. With the exception of Pellissippi and Northeast, consortium colleges offered non-credit to credit pathways. While some colleges created new articulation agreements with four-year colleges, others continued to utilize agreements currently in place. Exhibit 32 provides a description of the PLAs and

articulation agreements in use at each consortium college. New articulation agreements, including 2+2 agreements[35] established during the SEELC grant are bolded.

Exhibit 32: PLAs and Articulation Agreements

	PLAs	Non-Credit to Credit Articulation	External Articulation Agreements
Northeast	Provides PLAs by exam and experience	N/A	Offers 2+2 across state institutions
			Has articulation agreement with Tennessee College of Applied Technology (TCAT).
			Established a 2+2 agreement with University of Arkansas Ft. Smith for advanced technologies programs
Palm Beach	Has undertaken the development of new methods of applying PLAs	**Updated internal articulation between associate's and bachelor's service management degrees during grant period**	Continues to offer articulation agreements established prior to the grant
			Has several agreements with FAU, but nothing direct for the trades
Pellissippi	Used credit-for-life assessments; **developed PLA with Denso (local employer)**	N/A	Continues to offer 2+2 with Austin Peay **Established Morehead State 2+2 articulation agreement**
Polk	Does not accept PLAs for associate's degrees	**Complemented advanced manufacturing and machining non-credit programs with internal mechanical design and fabrication degree pathway**. Between articulated credit for MSSC and NIMS, a student could articulate up to 24 credits.	Continues to offer articulation agreements in place prior to the grant: state agreement for MSSC/CPT that all schools must accept 15 credits; local articulation for NIMS (adds 9 credits); 2+2 program throughout the state
Randolph	Utilizes credit-for-life system	**Created a non-credit to credit crosswalk that includes technical programs**	Continues to offer Comprehensive Articulation Agreement (CAA) and Independent Comprehensive Articulation Agreement (ICAA) and is working on other articulation agreements
			Has reverse transfer program between community college system and 16 colleges in the North Carolina university system – if students complete an associate's degree at Randolph, they can transfer to any of the 16 colleges as a junior bachelor's degree student
Vance-Granville	Uses a test-on-demand model. Anyone who comes in with a military background can test out of classes through challenge exams. No other PLA plans currently in place.	**Offers schoolwide continuing education to credit bearing agreement; up to 9 credits possible to transfer from continuing education**	**Established an articulation agreement with East Carolina University (ECU) for mechatronics**

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[35] 2+2 agreements are designed so that a student can earn a two-year degree from a community college so that they can move on to earn a four-year college degree.

Program Delivery Successes

Open-Entry/Early-Exit

For its engineering technology degree program, Polk offers courses through an Open-Entry/Early-Exit (OE/EE) format. In the OE/EE format, students are not bound to a traditional educational setting and schedule, so they can complete coursework online, at their own pace and schedule, and then use labs for practice and testing. Grant staff reported this format provides non-traditional students the opportunity to increase skills and knowledge in a flexible manner and tends to match the self-motivated perspective often held by returning students. Grant staff also noted this model is good for employers because employees can take courses outside of work hours. This model also allows incumbent workers to receive additional academic and training opportunities in their chosen fields.

Articulation Agreements

Grant staff at some SEELC colleges were able to enhance and expand articulation agreements for technical programs at their colleges, including new agreements for new program pathways, agreements with new institutions of higher education, and agreements with employers for apprenticeships. As noted, three colleges established new agreements for non-credit to credit articulation, which allow individuals who complete continuing education (non-credit) programs to obtain credit toward associate's degrees, and three colleges established new 2+2 articulation agreements (associate's to bachelor's degree) with four-year colleges.

Program Delivery Challenges

Incorporation of Hybrid Courses

A common struggle for colleges across the Consortium was the difficulty in incorporating hybrid-learning opportunities. Grant staff and instructors at both Vance-Granville and Pellissippi described a sentiment echoed across the Consortium: that the application of hybrid learning in technical programs is necessarily limited. For Vance-Granville, grant staff and instructors said training and assessing learning on heavy machinery is difficult if students are not present in class to work with equipment or have the opportunity to be observed and critiqued. Staff at Pellissippi added that implementing hybrid-learning classes could be difficult for students because these courses were largely self-directed and text-based, and many of their students had limited reading skills. Palm Beach chose not to incorporate elements of hybrid learning into its programs because it operated on a clock-hour format, restricting the school from counting students' online, work at home as class time toward the completion of program hours.

Support Services

RQ2. How are programs improved or expanded using grant funds? What delivery methods are offered? What is the program administrative structure? What support or other services are offered?

RQ3. Is an in-depth assessment of students' abilities, skills, and interests conducted to select students into the grant program? What assessment tools and processes are used to screen the students? Are the assessment results useful in determining the appropriate program and course sequence for students?

RQ5. How closely do the programs replicate the major and ancillary components of the SEELC program model?

RQ6. What are the variations in implementation across sites?

RQ7. What program outputs are generated throughout the life of the grant? What barriers hinder output achievement? What factors unexpectedly improve output achievement?

RQ8. What are the successes and obstacles to program performance?

<u>Support services were perceived as meeting student needs and, with the exception of WorkKeys assessments, generally were implemented with fidelity to the original grant plan</u>. These were in an effort to address Innovation 2: Develop ongoing career support, including post-program assessment of competencies to facilitate immediate work readiness and job placement. Grant staff offered supports to students and leveraged existing campus services for work readiness and job placement. Student support services ranged from registration assistance to referrals to existing campus and community services to hosting resume writing workshops and connecting students to job opportunities in the community. Each college also collected and tracked data on student outcomes.

Program Components:
1. Development of Career Pathways
2. Creation of Accredited Testing Facilities (ATF)
3. Opportunities to Apply Credit
4. **Student Support Services**
5. Employer and Industry Engagement

Staffing Model

<u>Each SEELC college approached its student support services staffing structure differently, based on student needs and in response to turnover</u>. As Exhibit 33 shows, some colleges elected to make the positions largely independent of one another. These colleges assigned the responsibility of interacting with students and improving student outcomes to the completion coach, while the data collection and tracking role was designated to the outcomes and data specialist. Other colleges elected to share responsibilities between the two staff members, both working directly with students on a regular basis; in this model, student support services staff still maintained areas of unique responsibility while also sharing responsibilities for tasks such as referral to college services and visiting classrooms to enroll students into the grant program. As the grant matured and staff turnover occurred, grant staff at Randolph, Northeast, Pellissippi, and Palm Beach began sharing roles and responsibilities that were originally separate so that students could continue receiving services.

Exhibit 33: Staffing Structure & Responsibilities Across the Consortium

	Staff Structure	Responsibilities
Northeast	Initially one full-time completion coach, one full-time outcomes and data specialist; Structure changed to two part-time completion coaches and one part-time outcome and data specialist.	Perform student intake; refer students to student services; advise students; track data; share job postings.
Palm Beach	Began as two advisor specialists with some overlapping but mostly distinct responsibilities; became two outcomes and data specialists who share focus data entry, completion coaching, and student advising.	Perform student intake; track data. Student support services have not been a key priority due to staff turnover; instead, has referred students to tutoring services.
Pellissippi	Initially one completion coach and one outcomes and data specialist; after staff turnover, this became one retention, recruitment, and completion coach and one job placement and retention specialist and one outcomes and data specialist.	Perform student intake; refer students to student services, track data.
Polk	One recruitment, retention, and completion coach and one outcomes and data specialist	Perform student intake, refer students to academic support, track data; provide resume support

Randolph	One outcomes and data specialist; one recruitment, retention, and completion coach; after turnover, the outcomes and data specialist and project manager shared coaching responsibilities.	Perform student intake, provide student services, recruit from community; track data, provide resume support, conduct mock interviews.
Vance-Granville	Initially one data and outcomes specialist and one completion coach. Structure changed to two full-time advisor specialists with shared responsibilities.	Conduct student registration; prepare students for KeyTrain and WorkKeys; provide information and support to students; conduct outreach and recruitment; engage in regular communication with instructors.

Assessments and Outputs

WorkKeys was integrated across the Consortium with varying levels of consistency. Grant staff reported that the frequency of use of WorkKeys was dependent on the relevance of the scores in hiring practices of local employers. In communities where employers do not use WorkKeys scores, grant staff reported a lack of student interest in WorkKeys. This is supported by the output data; as of July 2017, only 115 SEELC students (out of 2,074 students) at three colleges (Northeast, Vance-Granville, and Palm Beach) had participated in WorkKeys. While a major employer for Northeast (Eastman) requires WorkKeys for employment, the other colleges did not have such employer partnerships. Thus, it is not surprising that Northeast students made up more than half (52%) of the total WorkKeys students. Staff at Vance-Granville helped gain some buy-in for the test by informing students that the assessment score could apply anywhere in the country and was beneficial even if local employers did not take advantage of the skills scores. Approximately, 45 students took WorkKeys, representing about one-quarter of Vance-Granville's total SEELC enrollment.

Exhibit 34 provides a summary of the extent of WorkKeys integration across the Consortium. Green shows colleges where WorkKeys was integrated into implementation of the SEELC programs, and Red depicts colleges where WorkKeys was offered but not integrated into SEELC programs.

Exhibit 34: Extent of WorkKeys Integration Across the Consortium

	Rating	Extent of Use
Northeast	GREEN	Skills scores are by a major local employer; most advanced manufacturing and electro-mechanical students took WorkKeys. Students could test at community testing locations, or at campus testing site. Students utilized KeyTrain for practice.
Palm Beach	RED	Not utilized by employers. Testing not offered on campus.
Pellissippi	RED	Did not integrate WorkKeys assessments Not utilized by employers. Testing not offered on campus.
Polk	N/A	Designed to be the intra-consortium comparison group; intentionally did not administer WorkKeys. Utilized Florida Ready to Work.
Randolph	RED	Not utilized by employers. Testing not offered on campus.
Vance-Granville	GREEN	Skills scores were not utilized by local employers, but students took assessment because skills scores are portable. Students took assessment on campus during a scheduled class time.

**Other Student Support Approaches and Outputs**

Recruitment

Overall, the SEELC consortium exceeded its goals in unique students served (119.5% of goal), which demonstrates the Consortium-level success in student recruitment efforts. Staff reported engaging in recruitment for grant programs depending on each college's needs. Some grant staff focused their recruitment efforts on students who had already enrolled at the college, particularly at Northeast, Pellissippi, Polk, and Palm Beach. Randolph and Vance-Granville focused recruitment efforts internally as well as externally in the community, recruiting new students into both the college and the grant programs. The colleges that reported a primary focus on internal recruitment tended to have more success in meeting enrollment goals. To illustrate, the four colleges that recruited internally met enrollment targets at rates ranging between 118 and 204 percent of the original goal, while Randolph and Vance-Granville had rates of 113 and 60 percent, respectively.

Program Support Services

Completion coaches visited classes or connected via social media or email to describe the services available to students who participate in the grant, including sharing information about programming, assessment opportunities, and academic support. As shown in Exhibit 35, according to the student survey administered at or near program entry, 91%(n=89) of respondents indicated they were informed about their program of study when recruited, and 86% of respondents indicated program staff were guiding them through their program of study. Across all institutions, grant staff referred students to services such as tutoring, financial aid, and career guidance.

Exhibit 35: Students' Perception of SEELC Program Services During Baseline (n=89)
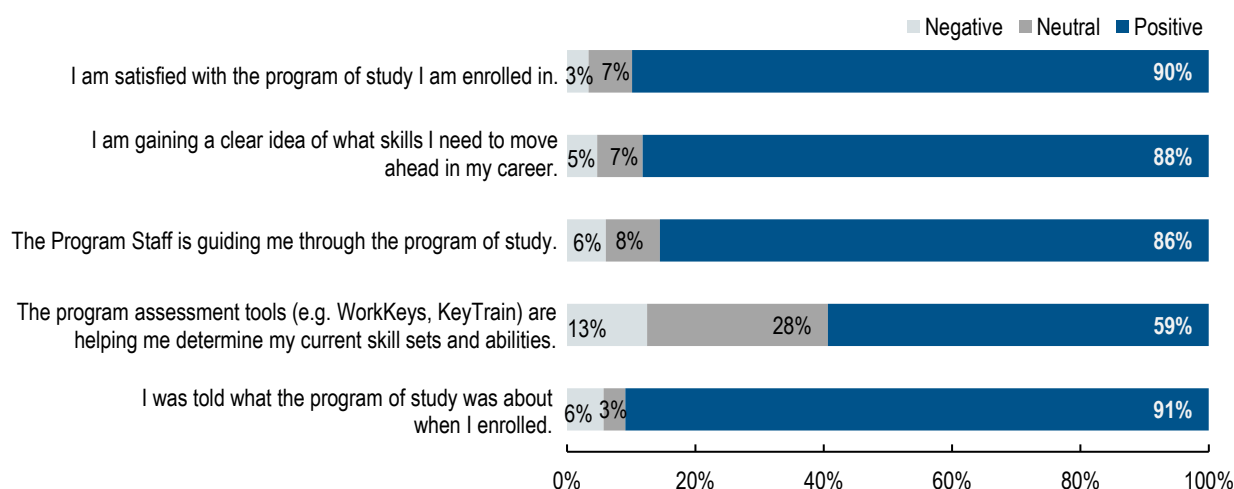
According to ETO data, completion coaches reached out to students largely via email (95%), as well as by meetings (3%), phone (2%), and text messages (<1%). In interviews, Coaches reported casting a wide net to connect with students. Per ETO, this is supported in that 60% (n=1,253) of SEELC students were "touched"—contacted either via email, phone, text or in-person—by a completion coach or other program staff. In focus groups, students reported the supports coaches provided helped them succeed in their classes and prepared them for employment opportunities. As Exhibit 36 indicates, however, the results of the outcomes analysis based on coaching contact were mixed. To illustrate, SEELC students who had any type of contact with a completion coach were significantly more likely to complete a degree or certificate than students who were not contacted by a completion coach. Furthermore, students contacted by a completion coach were significantly more likely to have a wage increase. Conversely, those who did not

have contact with a coach were significantly more likely to complete a credential or to be employed in the first quarter. It is possible that individuals pursuing a credential were less likely to be contacted or interact with coaches, due to the short nature of their programs.

Exhibit 36: Student Contact[36]

Contact with Completion Coach/Staff	Students with Contact (%)	Completed Degree (%)	Completed Certificate (%)	Completed Credential (%)	Employed in Q1 (%)	Median Wage ($, sd)	Wage Increase (%)
Had Contact (n=1253)	60%	23%	38%	39%	31%	$14 (sd=6.4)	86%
Did Not Have Contact (n=846)	40%	8%	24%	68%	43%	$13 (sd=5.3)	69%
Differ Significantly by Student Contact		Yes***	Yes**	Yes***	Yes***	No	Yes***

Source: SEELC ETO Database.

Job Readiness & Placement Services

In addition to program support, grant staff offered services such as resume workshops, interviews, and job fairs to enhance job readiness and assist with placement. As Exhibit 37 shows, the majority of students completing the exit survey (95%) indicated that they gained a clear idea of about the skills they needed to move ahead in their careers.

Exhibit 37: Students' Perceptions of Program Services During Follow-up (n=20)
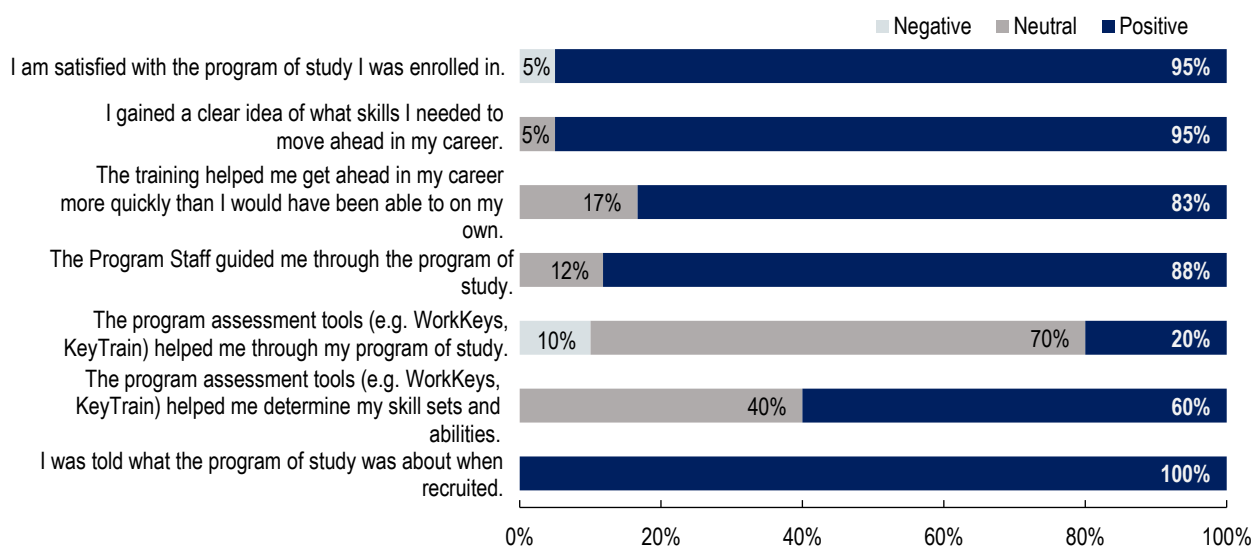
During interviews, grant staff noted the bulk of their work with students was to better prepare them for jobs and link them to employers, as opposed to directly helping them find jobs. To illustrate, one staff member noted, "Somehow in a student's mind, they expect us to get them a job. We try to change their mindset that we give them the tools and things they need for opportunities, but we don't get them a job". This role of the coach (providing support, but not actually obtaining jobs for students) is supported by the outcome data. To

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[36] For significance testing by degree attained, if a student had multiple credentials, completion was prioritized in this order: degree, certification, and credential (e.g., if a student earned both a degree and a credential, that student was assigned the degree). Difference is statistically significant at the: *p<0.10 level; **p<0.05 level; ***p<0.01 level.

illustrate, 84% percent of SEELC students said they got jobs based on their own merit, while only 20% indicated their jobs came from referrals or coaching (see Exhibit 38).

Exhibit 38: Student Job Placement Type

Employment Placement Type	Percent of Students (%)
Direct Assistance (n=41)	11%
Own merit (n=323)	84%
Referrals/coaching (n=20)	20%

Source: SEELC ETO Database.

Support Services Successes

Completion Coaches Supporting Student Success

Across the Consortium, grant staff reported that student support services implemented through the grant benefited student enrollment, retention, and completion in SEELC programs. As of August 2017, the Consortium has exceeded its enrollment targets (119.5% of target), in part, attributable to coaches' recruitment efforts. The Consortium also exceeded its goals for the number of students completing a TAACCCT-funded program of study (104.9% of target) and the number of students still retained in their programs of study (361.3% of target). Furthermore, based on outcomes analyses, contact with a coach was associated with higher levels of degree and certificate completion (although it was not associated with higher levels of industry certification completion).

Job Preparedness Assistance

Grant staff helped prepare students for employment through mock interviews (sometimes conducted with employer partners), resume writing, and connecting students to job opportunities (through on-campus career services, job fairs, employer partners, workforce boards, and websites). While the students contacted by a coach were not associated with higher levels of employment in the first quarter than individuals not contacted by a coach, those receiving coaching services were more likely to have earned a wage increase. Successes associated with the job preparedness may currently be more anecdotal than supported by outcomes data because of the number of students still enrolled in their programs of study (84% of degree seekers and 57% of certificate seekers, per ETO data).

Support Services Challenges

Utilization of WorkKeys

While consortium members reported being successful in providing meaningful student support services to SEELC students, only two colleges, Northeast and Vance-Granville, successfully incorporated the WorkKeys assessment into their programs. For grant staff at Palm Beach, where only 10 students took the assessment, the most difficult hurdle was identifying an appropriate time for students to take the assessment, as their clock-hour format required students to make up any classroom time spent to take the assessment, and it was difficult to engage students outside of regularly scheduled class time. Consortium members at Randolph, Polk, and Pellissippi reported that the WorkKeys assessment was simply not relevant in the hiring process for local employers, making it difficult to prioritize or incentivize its use. As such, these colleges reported zero SEELC students utilizing the assessment.

ETO Data Tracking

Every consortium member described some degree of difficulty in working with the ETO database. Common complaints were that the software was unintuitive, the process for running reports was cumbersome, the reports generated often had errors, and the software support staff were inconsistent in their responses to

questions or requests for assistance. The outcomes and data specialist at Northeast reported that attending the first ETO training at the beginning of the grant would have been more appropriate for the outcomes and data specialists to attend, rather than the program manager, so that they could have familiarized themselves with the software earlier. Randolph reported that members of their grant staff found it necessary to work closely with ETO software support staff to develop workarounds that could streamline the reporting process and generate information they found useful.

Staff Turnover

Staff turnover in the completion coach and outcomes and data specialist positions impacted every college. Grant staff at Palm Beach felt this turnover acutely, as none of the original grant staff team remained at the college by Fall 2016. Grant staff stated the most significant impact of this turnover was inconsistent data collection and retention practices throughout the grant. This challenge required current grant staff to shift what they deemed a significant amount of energy from student support services to reviewing program data for consistency and accuracy. Across the Consortium, grant staff reported that vacancies in the completion coach position resulted in other staff taking the tasks of supporting students, even when their relationships with students were less well developed than those of separated staff.

Employer and Industry Engagement

> RQ4. What contributions does each partner (e.g., employers, workforce system) make in terms of program design, curriculum development, recruitment, training, placement, program management, leveraging resources, and commitment to program sustainability?

> RQ10. What factors contribute to partners' involvement or lack of involvement in the program? Which contributions from partners are most critical to the success of the grant program? Which contributions from partners have less of an impact?

Employer partners contributed to programs in a variety of ways throughout the Consortium. This was an effort to meet the goals of Innovation 3, to develop a regionally based economic approach to addressing worker skill needs, demonstrating the community college leadership role in economic and workforce development. Employer partners offered feedback for new program creation, including reviewing curricula as well as providing input for equipment purchases. Grant staff also engaged with employers to provide information to students about potential job opportunities. Exhibit 39 provides a breakdown by college of the ways in which partners contributed to program design and management, recruitment, training, and placement, and resources and sustainability.

Exhibit 39: Partner Contributions by College

College & Partners	Program Design/Management	Recruitment, Training & Placement	Resources/ Sustainability
Northeast Eastman, Dontar, AO Smith, Bell Helicopter, Electro Mechanical, FL Smidth	**New programs:** Added Aviation program (with input from Bell Helicopter); OSHA certifications **Curriculum/Equipment:** Regularly used for alignment; advised on purchases **Advisory:** Existing committees offer ongoing feedback	Co-op opportunities with Eastman – former SEELC students began trainee positions in spring 2017 Primarily utilized career services on campus to connect with employers	Eastman began providing paid employee training program slots for SEELC students in Q4 of 2017

Palm Beach Logus Microwave, Krieger Machining, Bobby Soles; Workforce Board	**Curriculum/Equipment:** Used for curriculum "tweaks"; advised on equipment purchases for machining **Advisory:** Business advisory group offered feedback	Offered resume workshop and interview skills courses through workforce board Machining instructor took student to visit local employers	Employer partners loaned CNC lathes for two years at no cost Bollinger Shipyards LLC reached out to send welders to ATF
Pellissippi DENSO, Y12, Green Mountain Coffee, Arconic (formerly Alcoa), Oak Ridge	**New programs:** Welding added based on employer demand **Curriculum/Equipment:** Reviewed new welding curriculum; provided feedback for advanced manufacturing course; advised on equipment purchases **Advisory:** New committee for welding, ongoing for other pathways.	DENSO offered internships for welding students Coaches worked with college placement office to identify employment opportunities Employers connected with faculty to notify of job opportunities	Employer partners donate new and used equipment Arconic awarded advanced manufacturing scholarships in May 2017
Polk Per grant staff, most influential varies by job needs and advisory board participation; Workforce board	**New programs:** CNC created to meet employer demand **Curriculum/Equipment:** Advised on curriculum design for CNC/advised on equipment purchases **Advisory:** Meet regularly, participation varies	Employers met with students at lunch; excited about CNC program	Working with workforce board to offset credential costs after the grant
Randolph Energizer, Dart, PEMMCO, TechnoMart	**Curriculum/Equipment:** Feedback used for machining curriculum changes; advised on equipment purchases **Advisory:** Existing committees offer ongoing feedback	Employers attended job fairs for students; sent information about open jobs Grant staff engaged employers in creation of job posting website	Plan to continue job fairs and internships after grant
Vance-Granville Altech, Revlon	**New programs:** Mechatronics and welding degree added based on employer demand **Curriculum/Equipment**: Helped develop mechatronics curriculum; identified necessary skills for welding program; not involved in equipment purchases **Advisory:** Existing committees offer ongoing feedback	Faculty took students on "field trips" to visit employers Employers attended career fairs for students; email job openings Exploring apprenticeship opportunities	

Four of the six consortium colleges had strong partnerships with employers prior to the grant. These colleges continued to work with existing partnerships and, as they aligned curriculum with industry credentials and created new programs, they were also able to build new partnerships. Staff at Vance-Granville and Palm Beach reported new employer partnerships through the creation of their mechatronics and welding programs. Exhibit 40 shows how employer partnerships were added or strengthened over the course of the grant.

Exhibit 40: Employer Partnership Changes Over Time

	Employer Partnerships (beginning of grant)	Partnerships Added or Strengthened	Employer Partnerships (end of grant)
Northeast	Strong – active advisory committees in place for all pathways; multiple long-time partners; employers supportive of grant activities.	MET-TEC resulted in new partners, including Twin City Machining, Wright Tool & Engineering, Snap On New aviation program strengthened partnership with Bell Helicopter.	Strong – added new partners; grant staff report that new equipment has increased employer respect for the programs.
Palm Beach	Limited – only two active partners, but does use business advisory group.	Grant staff leveraged SEELC grant to reconnect with workforce board. Created new partnership with Logus Microwave through business advisory group; voluntarily measures parts for NIMS certification. Bollinger Shipyards LLC reached out in spring summer 2017 about utilizing new ATF for testing employees.	Emerging – improved relationships with the workforce board; Logus Microwave is new partner. New ATF may create additional opportunities for partnerships. Per faculty, still struggling with intermittent and sporadic involvement on advisory committees.
Pellissippi	Strong – nine active employer partnerships at beginning of grant, most in consortium.	AES Seal – offered some apprenticeships. Creation of new welding program added new partners (Friends of Welding, Y12).	Strong – added new partners in welding; grant staff report that new equipment has increased employer respect for the programs.
Polk	Strong – member of Manufacturing Supply Chain Alliance; multiple ongoing partnerships through Corporate College.	Developed CNC program to meet heavy employer need. Added Key Safety Systems to MET-TEC committee and advisory board.	Strong – leveraged employer relationships for equipment and program design; added new employer partnership; employers are excited about the CNC program in particular.
Randolph	Strong – multiple ongoing partnerships; employers actively attend job fairs and participate in advisory sessions.	Regional collaborative developed to formalize systems to build industry partnerships. Developing new partnerships for internships and apprenticeships.	Strong – formalized processes for building partnerships; leveraged existing relationships.
Vance-Granville	Limited – two major partners at beginning of the grant, Revlon and Altech.	Interactions with employers have grown, including increased attendance at college events as part of recruitment efforts. Dill Air Control Products has expressed interest in developing apprenticeships for mechatronics Revlon has committed support to ongoing employee training.	Strong – have increased to seven major partners with others engaging in college events; strengthened relationship with Revlon; utilized recruitment efforts and targeted focus on employers interested in welding and mechatronics.

Factors Contributing to Employer Involvement

Existing Partnerships. Four of the six colleges reported starting the grant with strong employer relationships and all four reported even stronger partnerships by grant end. Staff were able to leverage these partnerships early to inform program development and build on them for instructor identification, job fairs, and recruitment of additional employers once they saw action and results from the partnerships.

Persistent effort. Efforts to establish the MET-TEC, a key component of Innovation 1, resulted in new employer partnerships even at colleges that reported strong existing relationships. Similarly, the requirement to align curricula to NIMS, as staff reported, "required us to reach out to more employers than the 'usual suspects,' so we gained new partners." Persistent efforts in employer engagement refined processes within the colleges, which institutionalized some practices and made it routine to consult employers as the program progressed.

Communicating the intent to align programs to employer needs. Grant staff reported that the alignment of SEELC program equipment and curricula with industry needs strengthened their relationships with employers. Grant staff at Pellissippi also reported working with employers to establish articulation agreements for customized training and apprenticeship programs. Staff at Vance-Granville perceived that enhanced employer relationships resulted from creating new programs (such as the mechatronics program) designed to meet industry needs. Revlon began sending employees to Vance-Granville once the mechatronics program was established. Grant staff at Northeast noted that engaging employers in the curriculum alignment process has helped "employers know better what the college does. They can see the benefit of our programs."

Perceived Impact of Partner Contributions – Most Impactful

Employer feedback on program development and implementation. For colleges that had limited relationships with employers at the beginning of the grant (Palm Beach and Vance-Granville), grant staff reported employer feedback on curriculum development and equipment purchases had a strong impact in enhancing and growing existing and new relationships with employers, as well as improving the colleges' reputation with employers.

Opportunities for career placement. Grant staff reported partners' contributions in and support of students' job placement efforts and internships were beneficial to the program. Students reported feeling that there would be many job opportunities available for them upon program completion, and they also appreciated opportunities the college offered (and embraced by employers) to visit local industry. Based on outcomes data, 70% of SEELC students were employed in the first quarter after completion.

Perceived Impact of Partner Contributions – Least Impactful

Intermittent or changing feedback and priorities from employers. Grant staff reported that the least beneficial partners were those who had changes in their own companies and either did not have time to participate in meetings or faced staffing reductions and were not interested in hiring SEELC candidates. Furthermore, grant staff and instructors noted that smaller organizations tended to not be involved, as they had many competing priorities.

Successes

Customizing Programs to Meet Specific Employer Needs

Grant staff and instructors reported designing programs to meet specific employer needs, which generated buy-in with regional employers. Employer feedback was gathered formally and informally through one-on-one interviews, advisory boards and committees, and industry networking events. For some colleges, such as Vance-Granville, these conversations resulted in minor curricula or scheduling revisions to accommodate specific employer needs. Vance-Granville tailored its mechatronics curricula to meet the needs of Revlon, a local manufacturing plant that began paying the fees for its incumbent staff to complete the mechatronics program at Vance-Granville. For others, such as Polk (CNC Machining) Northeast (Bell Helicopter), and Pellissippi (Welding), these conversations resulted in new, specialized programs to meet local employer needs. In addition to making curricula design and revision decisions to account for employer needs, grant staff also used employer feedback to inform decisions about equipment purchasing.

Utilizing Instructors to Strengthen College Relationships with Employers

Faculty at consortium colleges frequently came from industry, and often, they had cultivated or could build a variety of employer partnerships. To illustrate, staff at Pellissippi indicated that "the employers sometimes reach out to the professors; they have a working relationship with [industry]." The advanced manufacturing instructor at the college worked directly with employers in revising curriculum to meet employer needs. At Palm Beach, grant staff worked with faculty to identify the most engaged partners and worked together to

find more partners that were interested in Palm Beach's programs. At Randolph, instructors went so far as to connect with every welder in the county that they could identify in the area to speak to them about their individual insights and needs. At Vance-Granville, the line of communication was so strong that several industry employers began regularly calling the welding instructor to share new ideas and request information about soon-to-graduate students who may be eligible for job placement.

Challenges

Persistent Effort Required to Engage Employer Partners

Initially, grant staff at three colleges described struggling to gain traction with regional employer partners to develop collaborations, gather employer input, and generate buy-in for SEELC programs. These colleges also initially described the challenge of identifying employer champions to push sector partnerships forward and motivate other partners to engage with their programs. Despite this hurdle, each SEELC college that described identifying and engaging employer partners as an early challenge ultimately reported being able to develop meaningful partnerships. For Pellissippi and Polk, it was necessary to reenergize employer partners after their initial excitement dissipated due to significant program implementation delays. Grant staff at Vance-Granville said that while bringing partners to the table was initially a challenge, they have been able to "prove themselves" through their flexibility and the performance of their students.

Staff and leadership at two colleges reported struggling against partner fatigue, with employer participation and excitement dropping off throughout the life of the grant. Grant staff and college leadership at Vance-Granville and Randolph attributed this situation to uncoordinated outreach efforts within their institutions. Staff and leadership at Vance-Granville reported that various college representatives at the college were reaching out to the same employers, sometimes within the same week, making a variety of requests without the other party's knowledge. This confusion, they said, led to partner frustration, disengagement, and a sense that the college "didn't know what it was doing." Leadership at Vance-Granville addressed this issue by creating a standing meeting where college program heads meet to discuss their respective outreach goals and schedules and can coordinate their partner communication efforts.

Efforts to engage workforce boards.

TAACCCT funds provided an opportunity for workforce staff to be onsite at a college, to offer student screening and assessment, and/or to help with resume writing and job placement. While staff at Palm Beach were able to develop a new relationship with their local workforce board, other colleges found that workforce boards had competing priorities and had difficulty engaging them for grant efforts, including recruitment support. For example, Vance-Granville staff reported that working with the local workforce board was a challenge, and that they were unable to develop a relationship with staff at the WIB or communicate with them consistently.

Implementation Study Conclusions

SEELC brought together six colleges with different contexts and local needs to develop programs across three pathways (Innovation 1), implement enhanced student services (Innovation 2), and engage partners for better-informed programs and better student results (Innovation 3). SEELC colleges generally implemented each innovation with fidelity to the original grant, supporting positive outcomes for program completers as described in this section.

For Innovation 1, SEELC colleges implemented six welding pathways, five machining pathways, and five advanced manufacturing pathways. Of these 16 sets of pathways, SEELC colleges were successful at meeting all key components for 10 of them and the majority of key components for six. The colleges had collective success mostly in advanced manufacturing, where they met all the components, followed by machining, where every college but one met all desired components. Welding proved to have the most

challenges in implementation, primarily due to difficulties in ATF implementation. At of the end of the grant, only two colleges had succeeded in becoming an ATF, with two continuing to pursue and two having decided not to pursue at all. As part of Innovation 1, the Consortium staff at SEELC colleges were offered flexibility by the consortium to create and modify curricula based on local employer feedback, and each college purchased equipment designed to reflect skills that students would need in the workplace. Efforts to align curricula and equipment with employer needs appears to have supported student success, with 70% of SEELC students gaining employment by the first quarter after completion, and 83% of exit survey completers indicating that their programs of study helped them get ahead in their careers.

Innovation 2 linked the colleges in a shared effort to reconfigure support services for students in grant-funded programs and applied effort toward helping students prepare for, and find, related employment. While SEELC colleges were not able to implement WorkKeys assessments in the manner initially envisioned by the grant, all colleges were successful at implementing student support services. The completion coach role was widely identified as a success of the grant, as coaches assisted in student recruitment and enrollment, helping the consortium exceed its enrollment targets (119.5% of goal). Outcomes analysis also supports first-person reports of success in the coaches' other set of responsibilities, to direct students to support services such as tutoring and financial aid and help prepare students for career opportunities. Contact with a coach was associated with higher levels of degree and certificate completion, with 23% of degree seekers and 38% of certificate seekers who had contact with a coach completing their programs, compared to 8% and 24%, respectively, of those who did not have coach contact. Furthermore, 86% of completers who had contact with coaches experienced wage increases, compared to 69% of those with no coach contact. Grant staff and faculty also credit coaches with improved program retention, which is reflected in 84% of SEELC degree-seekers still enrolled in their programs as of the end of the grant.

Innovation 3 challenged all colleges to increase and improve connections to industry, no matter the strength of their existing relationships. While grant staff across the Consortium initially described developing partnerships as a challenge, each was able to identify and strengthen key relationships that offered critical feedback around curricula design and equipment purchasing; advanced internal processes; and brought other important partners to the table. Grant staff engaged employer partners in program implementation and solicited feedback through employer advisory councils and committees, industry mixers, job fairs, and individual conversations. Throughout the life of the grant, consortium members worked to address and mitigate challenges in maintaining employer engagement and educating employers on the value of adopting industry-recognized credentials into their hiring processes. Through these efforts, grant staff and instructors at SEELC colleges created new relationships and deepened existing connections that they described as assets that will continue beyond the life of the grant.

Looking Forward

Program Sustainability

> RQ12. How can the program expand or enhance institutional capacity? What are the most promising programmatic components to use institution-wide? Consortium-wide? Why?

Decision makers at most SEELC colleges began holding formal discussions regarding program sustainability in the fall of 2016, and in the spring of 2017, grant program staff completed a questionnaire indicating what program components they believe would be sustained at their colleges. The questionnaire asked about the program modification components and service delivery components and also asked staff to share their thoughts on the top three best practices that emerged from the grant. Exhibit 41 outlines the

sustainability ratings across the colleges' program modifications components, and Exhibit 42 outlines the sustainability ratings across the colleges' service delivery components.

College staff expressed confidence that the majority of courses enhanced or established under the grant will be sustained (Exhibit 41). Colleges plan to sustain courses of study funded under the grant with both internal and external supports. At Pellissippi, the program manager is developing a budget for the welding program that will enable college leadership and the department to plan for the cost of program materials, supplies, and equipment moving forward. Staff at Polk are working with CareerSource to leverage Workforce Innovation and Opportunity Act (WIOA) funding that will offset student costs for the CNC program, to ensure that it remains free to students after the grant ends.

Exhibit 41: Program Modifications Sustainability[37]

Program Modifications		Northeast	Palm Beach	Pellissippi	Polk**	Randolph	Vance-Granville*
Welding	Certificate	-	-	-	-	-	Likely
	AWS aligned Certificate	Likely	Likely	-	Uncertain	Likely	
	Associate's Degree	-	-	-	-	-	Likely
	AWS aligned Associates Degree	-	-	Likely	-	-	-
	AWS accreditation^	Likely	Likely	Likely	-	-	-
	ATF	Likely	Likely	Likely	Unlikely	-	-
Machining	Certificate	Likely	-	-	Likely	-	N/A
	NIMS Certificate	Likely	Likely	Uncertain	-	Likely	
	Associate's Degree	Likely	-	-	Likely		
	NIMS aligned Associate's Degree	Likely	-	-	Likely	Likely	
	NIMS accreditation	Likely	Likely	-	-	Likely	
	MET-TEC	Likely		-	-	Likely	
Advanced Manufacturing	Certificate	Likely	N/A	Maybe	Unlikely	Likely	Likely
	Associate's Degree	-		Maybe	Likely	Likely	-
	Third Party Certificate	Likely		Maybe	Likely	Likely	
	Third Party aligned Associate's Degree	Likely		Likely	Likely	Likely	-

Colleges were most likely to maintain components that existed prior to the grant were modified to increase effectiveness through aligning them to third party credentials. Grant staff and leadership at Randolph, Northeast, and Palm Beach have indicated that they intend to maintain the opportunity for students to earn industry-recognized credentials, including NIMS and OSHA 30, after the grant ends. Northeast, Palm Beach, and Randolph are examples where existing programs were enhanced through TAACCCT funds and are likely to be sustained after the grant. Palm Beach grant staff shared that they plan to enter into a direct agreement with NIMS as they expand this partnership. While Pellissippi intends to continue offering NIMS certifications, grant staff and college leadership are still determining how they will cover the assessment fees. Conversely, Vance-Granville has indicated that while it intends to maintain components of AWS SENSE in the welding program curricula, the college does not anticipate maintaining AWS SENSE certification after the grant ends.

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[37] Score rating from sustainability questionnaire: Likely = 7–10; Maybe = 4–6; Unlikely = 1–3; "-" indicates a component not pursued or attained during the grant; N/A indicates a component that was not part of grant application.
Shading = existing program
*Vance-Granville is the only institution to offer a diploma instead of associate's degree. **Polk grant staff were unable to comment on grant-funded welding programs, as they were offered through the Traviss Center, which is separate from the department that administered most of the grant components. ^Three colleges, Polk, Randolph and Vance-Granville, did not pursue establishing an ATF.

ATF

Establishing the ATF took time and resources at SEELC member colleges and, therefore, it is a component that will be sustained at the colleges. Randolph, the only college in pursuit of an ATF, has indicated that it expects to continue to do so after the grant period. In the questionnaire, Northeast indicated that it did secure ATF accreditation in 2017 and plans to maintain it. Palm Beach plans to maintain the ATF that was implemented under the SEELC grant. College leadership described that they intend to maintain the structure that allows individuals to complete ATF testing in the evenings and offers them an opportunity to practice on the equipment prior to testing.

Service Delivery Sustainability

Service delivery of program components was an important aspect of the TAACCCT grant and was customized based on the various institutions localities, needs, and perhaps even organizational culture. Exhibit 42 provides an overview of the service delivery components across the colleges and grant staff ratings of these components sustainability after the grant.

Exhibit 42: Service Delivery Sustainability[38]

Program Modifications		Northeast	Palm Beach	Pellissippi	Polk	Randolph	Vance-Granville
Distance Learning integration		Unlikely	Unlikely	Likely	-	Uncertain	Likely
Employment Supports	Coaching Services	Maybe	Likely	Unlikely	Unlikely	Likely	Likely
	Career Readiness	Likely	Likely	Unlikely	Likely	Likely	Likely
	Job Placement	Likely	Likely	Unlikely	Likely	-	Likely
Academic Supports & Credentialing Offerings	Academic Plan Guidance	Likely	Likely	Likely	Unlikely	-	Maybe
	Remediation testing	Likely	Likely	Likely	Unlikely	-	Likely
	Prior Learning Assessments	Likely	-	Likely	-	-	-
	Articulation Agreements	Maybe	Likely	Likely	Unlikely	Likely	Likely

Distance learning is least likely to be sustained beyond the grant and, in many instances, it was a model that was the least adapted across the colleges. Only two of the six colleges indicated they will continue integrating distance learning into their programs or sustain them after the grant. This decision is perhaps reflective of the industries these program pathways are in: welding, machining, and advanced manufacturing are sectors where hands-on learning is a critical aspect of instruction. Palm Beach indicated that the U.S. Department of Education regulations prohibit online and hybrid offerings.

Coaching, Career, and Job Placement Supports

All of the colleges except Pellissippi indicated they would sustain the career readiness service delivery components. While the retention, recruitment, and completion coach roles officially ended on March 2017, according to the most recent quarterly report for the SEELC consortium, four colleges have elected to retain the positions to finalize deliverables and gather follow-up data. While the two other colleges indicated a desire to retain the position, they have not officially done so as of June 2017. Notably, Pellissippi indicated that it is unlikely to maintain coaching, career, or job placement supports. Conversely, Northeast, Palm Beach, and Vance-Granville indicated they would either "likely" or "maybe" maintain these supports.

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[38] Score rating from sustainability questionnaire: Likely = 7–10; Maybe = 4–6; Unlikely = 1–3; "-" indicates a component not pursued or attained during the grant; N/A indicates a component that was not part of grant application.
Shading = Service existed prior to grant.

Northeast indicated that these services predated the grant, thus suggesting there may already have been institutional buy-in to maintain and enhance these components at the college. Palm Beach reported that developing the program pathway model has helped with developing coaching services. Vance-Granville intends to maintain the coaching structure in its upcoming grant project designs, and college leadership is currently working to imbed elements of the completion coach model into their existing advising and recruitment model. In addition to the SEELC colleges that are maintaining the completion coaches, college leadership at Randolph intends to maintain the SEELC website job board that it created to assist current students in identifying jobs and recruit prospective students for the program. Polk does not intend to maintain a student support position, but it plans to imbed student support services into the services already offered to students through the college, outside of the SEELC grant.

Four out of six colleges reported that the would "likely" or "maybe" maintain service delivery components related to academic guidance, remediation testing, and PLAs, while five out of six indicated they would either "likely" or "maybe" maintain the articulation agreements created for their colleges. None of the colleges offered additional comments on these components.

Building & Expanding Institutional Capacity

Grant staff at Pellissippi and Vance-Granville both noted that they are eager to sustain the momentum and energy around large-scale grants that was generated through the SEELC grant. For both of these colleges, the SEELC grant is the largest grant they have received. This required their respective institutions to develop new policies and processes to better understand and implement large grants. Grant staff said that it also gave college leadership and staff the confidence to continue pursuing large grant opportunities. Vance-Granville created a standing grants committee to continue planning and coordinating the efforts of future large grant opportunities at the college. Additionally, Vance-Granville hired a dean of enrollment and recruitment, and SEELC grant staff have been involved in developed new recruitment strategies for the college as a result of the successful recruitment efforts within the SEELC program.

Leadership saw value in grant-funded profession development activities for instructors. Leadership at Northeast stated that the knowledge that instructors gained through the professional development at the Certified Welding Inspector (CWI) Certified Welding Educator(CWE) training will continue to inform instruction long after the SEELC grant ends. Instructors at Northeast reported that the professional development they received through the grant would continue to inform their instruction long after the grant is over, and that the professional development that they received has made them better educators.

Across all consortium colleges, college leadership and grant staff expressed intentions to sustain grant components deemed beneficial to the institution, particularly the coaching model and student supports. Grant staff at many SEELC colleges have indicated that they would like to retain most, if not all, programs that were established or enhanced through the SEELC grant. Several staff reported that they also hope to retain the completion coaches, or some similar student support model. Palm Beach has indicated that it will continue operating the ATF established through the grant. Generally, SEELC colleges expressed a desire to continue to leverage the internal momentum and increased institutional capacity generated by implementation of the SEELC grant.

Stakeholder Recommendations for Replication

> RQ9. How should program processes, tools, or systems be modified to improve performance?

During the September 2016 onsite visits and the SEELC convening in Gatlinburg, in Spring 2017, SEELC consortium members offered a variety of recommendations to future institutions that may choose to implement similar programs. Recommendations from the SEELC grant staff are presented as follows:

Evaluate Internal Capacity Before Applying for Grant Funding

Grant staff and college leadership at Vance-Granville, Randolph, and Palm Beach encouraged future institutions to evaluate their internal capacity to support a prospective grant before submitting a proposal for funding. Grant staff at Vance-Granville suggested institutional decision makers at colleges considering similar kinds of grants to make sure that they have businesses and open positions in their region to support the completers that would come out of a particular program. College leadership at Palm Beach recommended that future institutions consider completing an internal grant readiness checklist in conjunction with any grant proposals they consider submitting. Stakeholders at both of these institutions encouraged future institutions to consider the physical space that is available to them before they propose a specific program, as technical programs often require significant classroom space. In addition, grant staff at Pellissippi noted that future institutions should consider the cost of implementing new programs before applying for grant programming, with the reminder that upfront equipment costs for technical programs can be significant.

Assessing the extent to which colleges can leverage their internal resources may also put the college at an advantage during the initial stages of the grant. Northeast leveraged services provided by the career center, TAA office, Veterans' office, and its institutional research and analytics departments.

Prepare in Advance to Navigate Internal Policies and Procedures

Consortium members encouraged future institutions to create a planning period for themselves between grant award and the start of grant activities. As part of the planning period, future institutions should take time to develop a thorough understanding of internal policies and procedures, as well as how to navigate these processes. Staff at Pellissippi, Northeast, and Polk shared that institutions should understand that extra time might need to be allocated to move through approval processes for hiring staff and acquiring budget and budget modification approvals. Grant staff emphasized the importance of "hitting the ground running" to initiate institutional processes and quickly hire members of the grant team. Grant activities frequently must move at a quick pace, which may not always match the necessary timelines for institutional processes. College leadership at Palm Beach specifically recommended having the institution's human resources department prepare a position that can be posted the moment that grant activities can begin. Northeast recommended that one of these initial positions be one for a person dedicated to aligning curricula and pursuing industry certifications and coordination of NIMS and AWS ATF accreditations.

Generate Internal Buy-In

College leadership and grant staff at each participating college emphasized the importance of generating strong internal buy-in from other leadership and staff throughout the institution. Internal stakeholders are required to help secure classroom and office space, move internal processes along more quickly, and assist the grant team in promoting grant-funded programming. College leadership at Palm Beach recommended making a rigorous effort early on to generate support and buy-in from senior administration. Grant staff at Vance-Granville suggested developing a grant team that includes non-grant staff that would be impacted by the grant to ensure that they, the non-grant staff, fully understand the purpose of the grant and activities that will be happening throughout the grant implementation process.

Document the Original Vision

Grant staff at both Pellissippi and Randolph described the importance of understanding the original vision for a grant-funded program, including the reasoning for including specific curriculum elements or purchasing various pieces of program equipment. Grant staff stated that a lot of new and changing information passes through during the life of a grant, and that it is easy to get lost in the details. Grant staff recommended keeping detailed records throughout curriculum and program development to ensure that

future individuals involved with the grant can clearly understand and carry out the program as it was envisioned. Grant staff at Vance-Granville recommend the integration of program planning and curriculum so that there is no disconnect and they are seamless in providing the best training to get people employed.

Maintain Strong Data Tracking Processes

Grant staff across the Consortium also reminded future institutions to develop clear and consistent data tracking systems early on. This approach will ensure that they are able to reflect accurately on grant activities and progress and that data can continue to be tracked accurately in the event of staff turnover. Grant staff at Pellissippi also encouraged future institutions to identify internal key players in accessing student data to speed up the process of gathering student information. One way Northeast did this was to implement the KeyTrain assessment (preparation for WorkKeys) in grant-supported classes; use that as a way to recruit, enroll, and track students during their program of study.

Cross-Train Grant Staff

Grant staff at Vance-Granville and Palm Beach recommend that stakeholders at institutions likely to undertake efforts that are similar to SEELC consider cross-training members of their grant team to ensure that, even in the case of staff turnover, internal knowledge is still retained and the grant team will have some understanding of the responsibilities to be filled. Grant staff and leadership described cross-training as offering a resiliency to the grant team that ensures that the grant will continue functioning smoothly despite transition.

Evaluation Summary Conclusions

The SEELC external program evaluation assessed how well SEELC program components were implemented, examined implementation and contextual challenges, documented mid-course corrections and decisions, and determined student outcomes attributable to the SEELC program. The evaluation team used a mixed-methods evaluation design—an implementation study and outcomes study—to evaluate the program. This section summarizes major findings from these two studies, shares recommendations of program staff for future community college-based manufacturing workforce development programs, and looks into sustainability plans for SEELC programs at their respective colleges.

Outcomes Study Findings

As of July 2017, the six SEELC colleges had met and exceeded their enrollment goal by enrolling 2,074 unique students into the three programs of study: welding, machining, and advanced manufacturing. The Consortium, as a whole, exceeded its targets for all DOL outcome measures (see Exhibit 43), except for employment measures 7 and 8 (students who become employed one quarter after program completion, and students who remain employed three quarters after exiting the program) primarily because the majority of their students, nearly 60% (of those that had intake data), were employed at intake (incumbent workers) and those measures only pertained to those who were unemployed (non-incumbent) at intake.

Exhibit 43: SEELC Performance Measures

DOL Outcome Measure	Target	July 2017	Percentage of Goal Achieved
1. Unique students receiving services under SEELC	1736	2074	119.57%
2. Students who have completed a grant-funded program of study	1074	1127	104.9%
3. Students retained in grant-funded programs of study	522	1886	361.3%
4. Total number of students completing credit hours	935	1913	204.6%
5. Total number of earned credentials	1329	1513	115.2%

6. Total number of students enrolled in further education after completion	277	381	137.5%
7. Students who become employed one quarter after program completion	991	172	17.4%
8. Students who remain employed three quarters after exiting the program	787	38	4.8%
9. Students employed at program enrollment who receive a wage increase	377	405	107.4%

The students who enrolled in the traditionally male-dominated manufacturing SEELC programs, were mostly young males. Most of those enrolled entered the advanced manufacturing programs of study. All colleges participating in the SEELC consortium offered programs in advanced manufacturing, which catered to industry demand and thus allowed greater flexibility, variety, and quantity of courses offered.

Completion and Skill Attainment

Program Completion and Credential Attainment. At the conclusion of the evaluation period (July 2017), most students were still in progress of pursuing a degree or certification, but high percentages of students had completed an industry-recognized credential. Credential attainment did not vary by pathway; students tended to complete industry-recognized credentials at a higher rate than certifications or degrees regardless of the program of study (welding, machining, or manufacturing). Typically, attaining a degree or certification required more time than an industry-recognized credential as most students were still progressing toward degree or certification attainment at the end of the evaluation period.

WorkKeys Assessment, Completion, and Credential Attainment. Completion of the WorkKeys assessment did not have an effect on any credential completion. Some of the goals of the WorkKeys assessment were to provide a job-readiness baseline for all students and develop career guides for individual students focused on their education or training needs. Based on the analysis, the assessment may have provided a road map towards completion for some students, but did not have a significant impact on completion. Taking the assessment did not have a positive effect on attaining a certificate or the completion of a degree. Due to the requirement of the WorkKeys assessment by local employers, however, even though taking the assessment did not affect the certification completion rate, students who took the assessment and also gained a certificate were well positioned to gain employment with local employers.

Student Employment Outcomes

Employment at Enrollment. According to ETO intake data (N=1697), most SEELC students were incumbent workers (were already employed) at the time of enrollment into SEELC training programs (64%, n=1061), and only three percent (n=65) identified as TAA-eligible. Slightly more than half of those with employment history data who were employed at intake, worked part time (56%, n=204). Slightly over half of SEELC survey respondents (n=34) reported that they had at least a one year of experience in a related field when they enrolled. SEELC colleges therefore had to offer a range of training courses that trained those new to the industry (48%) and upskilled those who had work experience.

Post-program Employment and Wages. Overall, SEELC completers (students who successfully completed a program of study) gained employment soon after exit, with 70% gaining employment by the first quarter after completion. Non-incumbent employment outcomes were promising, with 38% employed at the first quarter, in mostly full-time employment (82%), and in a job related to their training program (87%). A large percentage of those who were employed at enrollment received a wage increase (80%). The encouraging uptake of SEELC completers into new hiring positions and increasingly higher wages suggests that completers had marketable in-demand skills that were sought after by employers.

Post-program Employment and Wages by Program Pathway. Completers within the machining and welding pathway were significantly more likely than those who chose the advanced manufacturing pathway to be employed by the first quarter after their program of study completion. The higher employment rate,

especially for welding, was probably influenced by the high percentage of incumbent workers (70%) in that career pathway. Median hourly wages for those who enrolled in the machining pathway ($15) were significantly higher than the other two pathways ($13 for welding and $12 for advanced manufacturing).

Post-program Employment and Wages by Type of Credential. Median wages did not differ by the type of credential attained or whether students completed or did not complete a credential. Those who completed a professional certificate, however, were significantly (p=0.03) more likely to be placed in employment by the first quarter after program completion (57%) compared to those with industry credentials (49%) and degrees (38%). The percentage of completers who experienced a wage increase was significantly (p=0.03) higher for those who earned a certificate or industry credential than those who earned a degree. This finding could be due to the shorter duration of certificate and credential programs that allows a completer to quickly enter the job market and gain wages. Degree programs are longer, and the evaluation team may not have observed as many completers within the lifecycle of the grant.

WorkKeys Assessment and Post-Program Employment and Wages. Taking the WorkKeys assessment did not have a positive effect on employment in the first quarter or affect whether a student received a wage increase. Taking the WorkKeys assessment, however, had a positive impact on hourly wages (See Exhibit 44). When controlling for select demographic variables and baseline wage, non-Hispanic, incumbent students who took the assessment had a significant mean hourly wage difference of $2.36 over those who did not. Major employers that required the assessment within the vicinity of the three colleges that implemented the assessment (Northeast, Randolph, and Vance-Granville) may have had higher paying positions than other employers in the local area.

Exhibit 44: Effect of Assessment on Employment and Wages

Employment Outcomes	Observed Wages			Regression		
	Did not take assessment ($)	Took assessment ($)	Difference	Coefficient (assessed)	p-value	Cohen's d (effect size)
Post-program Wages (n=124)	$14.15	$16.51	$2.36	2.54	0.05	0.42

Implementation Study Findings

SEELC brought together six colleges with different contexts and local needs to develop programs across three pathways—welding, machining, and advanced manufacturing (Innovation 1), implement enhanced student services (Innovation 2), and engage partners for better-informed programs and positive student results (Innovation 3). While grant staff at each college implemented the components of the SEELC grant to best meet their needs, the components of the SEELC grant remained the same across the Consortium.

The descriptive findings that follow present the background and contextual factors within which the three innovations and their associated program components were implemented and provides an overview of program implementation, program modifications, successes and challenges during program implementation.

Program Development and Modifications

Career Pathway Development. Career pathway development generally was carried out with fidelity to Innovation 1. The SEELC colleges implemented program components in welding, machining, and advanced manufacturing, as described in the grant narrative, with the exception of the implementation of an ATF at each campus. As a consortium, Innovation 1 provided common threads among the colleges, along the three selected pathways as they sought to align and engage with AWS and NIMS, the welding and machining industry credentialing bodies of choice, respectively.

Program Modifications. Grant staff across the Consortium reported the flexibility of the SEELC grant allowed them to tailor program modifications to meet the needs of their colleges and, in particular, the needs of their local businesses and industries. These adaptations included the contexts of individual colleges and the needs of students and employers they serve, which meant grant implementation took different forms at each college. In all cases, colleges created or modified curriculum in some combination of welding, machining, and manufacturing (although two colleges opted out of one pathway each); added equipment; aligned their curricula to industry standards (AWS SENSE and NIMS) and funded program delivery.

Program Modifications, Challenges and Successes. Grant staff were able to develop and modify their programs by engaging with local employers and industry experts in key decision making around program curricula creation and enhancement and equipment purchases. Flexibility in design also allowed each college to meet their local needs. SEELC leadership negotiating as a single coordinating body contracting and working with NIMS and AWS, rather than each institution pursuing partnerships with these organizations, eased alignment and agreement with these credentialing bodies. Generating support from college leadership also buoyed the SEELC programs. The SEELC colleges also experience challenges as they worked to enhance their programs. Program development and modifications were negatively affected by strict college hiring restrictions and internal hiring processes; difficulty collaborating with AWS; difficulties implementing the ATF due to space limitations and leadership turnover.

Program Delivery

The Consortium operated flexibly, which allowed each college's grant staff to implement SEELC program pathways in ways that fit the needs and structures of each institution. In implementing SEELC programs, grant staff worked to provide students with opportunities for hybrid learning in specific programs and classes and created pathways for students to continue their education upon SEELC program completion.

Program Delivery Models. The use of hybrid courses across the Consortium varied, and instructors reported that the hands-on nature of the advanced manufacturing programs limited the number of courses that could be offered via a hybrid model. Hybrid courses, designed to improve access to education and address time and transportation barriers, proved a challenge in courses with heavy hands-on components, leading some colleges to abandon the strategy. The SEELC program provided flexibility for participating colleges to interpret the grant narrative as was conducive to their particular institutional needs and realities. Across three common pathways of welding, machining, and advanced manufacturing, academic structure varied widely, from traditional semester-based, for-credit programs to OE/EE format, to non-credit boot camp-style trainings adapted to meet specific and changing employer needs. Staff at each college pursued strategies to encourage students to continue their education, through articulation agreements and/or credit for prior learning, although the details of those arrangements also varied.

Support Services

Innovation 2 linked the colleges in a shared effort to reconfigure support services for students in grant-funded programs and applied effort toward helping students prepare for, and find, related employment. Support services offered during the SEELC programs were perceived as meeting student needs and, with the exception of WorkKeys assessments, generally were implemented with fidelity to the original grant plan.

Student Support Approaches and Outputs. The focus of student support services was both internal (current student success) and external (prospective student recruitment), with the emphasis for each varying by institutional need. Each SEELC college approached its student support services staffing structure differently, based on student needs and in response to turnover. In most cases, colleges assigned the responsibility of interacting with students and improving student outcomes to the completion coach, while the data collection and tracking role was designated to the outcomes and data specialist.

Student Support Successes and Challenges. Despite variations across the Consortium, students described the services provided by these support staff as critical to the success and retention of SEELC students, and this is reflected in the positive association between student contact with a support services staff member and completion of a degree or certificate, and with a wage gain. Colleges did not experience the same consortium-wide success in implementing the WorkKeys assessment. Instead, colleges struggled to communicate the value of the assessment to regional employers and students, or to incentivizing WorkKeys participation. Two factors made tracking students more difficult for SEELC staff, primarily, the outcomes and data specialist. First, every participating consortium member described some degree of difficulty in working with the ETO database, complaining that the software was unintuitive. Secondly, staff turnover in the completion coach and outcomes and data specialist positions impacted every SEELC college and significantly impacted student tracking and retention practices throughout the life of the grant.

Employer and Industry Engagement

Employer and Industry Engagement. Each SEELC consortium college staff engaged a variety of employer, college, and industry partners throughout the life of the grant. Generally, colleges engaged industry partners by inviting them to participate on advisory committees or to attend industry mixers and jobs fairs and by working to build individual relationships with key stakeholders in the region. SEELC consortium grant staff also engaged employer partners in curriculum development, inviting them to share recommendations for specific course topics and program equipment. In addition to engaging employer partners, staff at SEELC colleges developed and enhanced relationships with Workforce investment System stakeholders. For many, this meant reinvigorating relationships that had dwindled or gone sour. Internal partnerships were equally significant in the implementation of SEELC programming. Grant staff engaged college leadership and specific departments to develop partnerships that would generate understanding and buy-in, creating opportunities to leverage internal resources, share information, and expedite internal processes.

Employer Engagement Successes and Challenges. Externally, staff utilized employer advisory councils and committees, industry mixers, job fairs, and program instructors to engage employer partners in program implementation and solicit important feedback to inform curricula design and equipment purchases. Generally, grant staff that reported experiencing higher levels of success in their employer partnership efforts also reported identifying one or two key partners that served as champions for their program, directly feeding students into the program, hiring program completers, and bringing other employer partners to the table. Employer engagement was a struggle for some colleges staff. It was difficult for grant staff to keep employers engaged with the program because of program delays or frequent requests from the college. Colleges also continually struggled to communicate the value of industry credentials to employers who either had not heard of the credential, or preferred to administer their own in-house testing.

Looking Forward

Program Sustainability. College staff expressed confidence that most courses enhanced or established under the grant will be sustained with both internal and external funding streams. In addition, across all consortium colleges, college leadership and grant staff expressed intentions to sustain other grant components that were deemed beneficial to the institution, particularly the coaching model and student supports. Colleges were most likely to maintain program components that existed prior to the grant that were modified to increase effectiveness through aligning them to third-party credentials. Colleges are least likely to sustain distance learning beyond the grant and, in many instances, it was a model that was the least adapted across the colleges. All of the colleges except Pellissippi indicated they would sustain the career-readiness service delivery components.

Recommendations for Replication. Grant staff and college leadership encouraged future institutions to evaluate their internal capacity to support a prospective grant before submitting a proposal for funding. Internal checks could involve assessing businesses and open positions in their region to support the completers that would come out of a particular program and using an internal grant readiness checklist in conjunction with any grant proposals they consider submitting.

Program staff also encouraged future institutions to develop a thorough understanding of their own internal policies and procedures, as well as how to navigate these processes. Many staff specifically recommended having the institution's human resources department prepare specifications for grant positions that can be posted the moment that grant activities can begin. Preparing in advance to navigate internal policies and procedures should simultaneously involve generating strong internal buy-in from other leadership and staff throughout the institution. Internal stakeholders are required to help secure classroom and office space, move internal processes along more quickly, and assist the grant team in promoting grant-funded programming.

Another advice for future institutions is to maintain strong data-tracking procedures to reflect, accurately, grant activities and progress, and to ensure continuity and precision over data tracking in the event of staff turnover. Staff also recommended cross-training to soften the effect of staff turnover and ensure resiliency to the grant team and program during periods of transition.

The SEELC program was first and foremost a regional workforce development program. The goal of implementing the program, guided by the three innovations, was to train TAA-eligible workers, veterans, and adults and upskill those who were already engaged in the labor market and connect them to better paying jobs. SEELC grant staff were successful in enrolling students into training programs and supporting them towards credential attainment. The SEELC program equipped students with industry-recognized degrees, certifications, and credentials to make them more marketable to employers. The results show that when SEELC completers did find employment after program exit, the jobs were full-time positions that were relevant to their program of study. This suggests that SEELC completers had marketable skills that were in demand in the labor market. Other positive results include higher wages for those who took the WorkKeys assessment and those who enrolled in welding. The SEELC grant staff employed a variety of approaches to implement successful programs that achieved these outcomes including garnering support from college leadership, aligning their curricula to industry standards (thus increasing the relevancy and branding of their programs), purchasing equipment, and increasing the capacity of their internal staff through professional development activities. Staff indicated that most of the SEELC program components will be retained. Future community college-based workforce development programs can draw from the SEELC program experience in the areas of program modifications, student supports, and employer engagement. Future research should include an extended tracking of student outcomes beyond the life of the grant as most SEELC students were still in the process of gaining a credential at the end of the evaluation period and thus their outcomes could not be measured.

APPENDICES

APPENDIX A.1: OUTCOME STUDY DATA SOURCES

Data Source	Description
Extant Data	
Student intake and tracking database (ETO)	The evaluation team gained access to the SEELC colleges' tracked students gathering data during intake or enrollment, during training, and six months post-program. These data include demographics, duration of time in cohort, program of study and classes attended, educational attainments/certifications, participation in training, work history, and job placement, wages, and retention.
Unemployment Insurance (UI) administrative data	UI wage records include employment, employment retention, and earnings for each student, including reference year/quarter, employee Social Security number, wages earned in specific reference year/quarter, and the industry code (North American Industry Classification System). The evaluation team was only able to gain UI data for Palm Beach, as the college was able to establish an agreement with its local WIB to get the data.
Primary Data	
Student and program graduate surveys	The evaluation team developed survey instruments with input from the SEELC colleges and administered a baseline during the first three weeks of classes and two post-program follow-up surveys at six months and 12 months. The surveys were web-based surveys disseminated via email to all student students; the only exception was Vance-Granville, where the program staff provided students with a paper survey that was completed and mailed to the evaluation team.

APPENDIX A.2: IMPLEMENTATION DATA SOURCES

Data Source	Description
Primary Data	
Implementation update calls	The evaluation team gathered qualitative data tracking program implementation progress through monthly calls in 2015 and quarterly calls in 2016 and 2017.
Program documents	The evaluation team reviewed reports developed by the Consortium director for DOL submission.
SEELC consortium annual meetings	The evaluation team attended the annual SEELC consortium meetings and participated in them to share evaluation updates and to gather additional data. Additionally, participating in these meetings allowed the evaluation team to conduct a data validity check.
Program site visits (program staff and instructor interviews and student group interviews)	The evaluation team gathered qualitative data during two site visits to the colleges in June of 2015 and May-June of 2016. During these visits, the evaluation team conducted interviews with program staff, college level administrators, and instructors to learn their perceptions of the programs implementation process. It also conducted group interviews with students to learn their perceptions of the program components.

APPENDIX B: SURVEY RESPONSE RATES

School	Retrospective	Responses	Baseline	Responses	Follow-Up	Responses
Granville	16	-	145	42 (29%)	42	4 (10%)
Northeast	66	6 (9%)	324	19 (6%)	19	3 (16%)
Palm Beach	9	-	84	6 (7%)	6	3 (50%)
Pellissippi	9	7 (78%)	276	39 (14%)	39	9 (23%)
Polk	111	4 (4%)	286	17 (6%)	17	2 (12%)
Randolph	65	8 (12%)	233	17 (7%)	17	3 (18%)
Total	**276**	**25 (9%)**	**1348**	**140 (10%)**	**140**	**24 (17%)**

APPENDIX C: DATA COLLECTION TIMELINE

Cohort	Semester	Retrospective	Baseline Survey	Follow-up Survey
Retrospective	Fall 2013–Spring 2015	September 2015	-	-
2.0	Fall 2015 (August–December)	-	September 2015	March 2016
2.0	Spring 2016 (January–May)	-	March 2016	September 2016
2.0	Fall 2016 (August–December)	-	September 2016	March 2017
2.0	Spring 2017 (January–May)	-	March 2017	July 2017

Data Collection Tool	Data Gathered	Dates
Retrospective Survey ▪ Web-based ▪ Conducted via email	Pre- and post-program employment status, education and credential attainment, wages, program enrollment, experience and satisfaction, evaluation assessments, employment benefits, and public assistance benefits.	September 2015
Baseline Survey ▪ Beginning of semester ▪ Web-based ▪ Conducted via email[39]	Employment status, wages, program experience and satisfaction, employment benefits, and public assistance benefits.	September 2015, March 2016, September 2016, and March 2017
Follow-up Survey ▪ Three months after end of first semester ▪ Web-based ▪ Conducted via email	Employment status, wages, program, completion, program experience and satisfaction, employment benefits, and public assistance benefits.	March 2016, September 2016, March 2017, and July 2017

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[39] Starting Fall 2016, Vance-Granville proctored the baseline survey in person with college staff assistance.

APPENDIX D: DESIGN MODIFICATIONS

In 2014, the evaluation team outlined a plan to use the quasi-experimental, comparison cohort methodology design to evaluate programs supporting the welding, computer-integrated machining, and advanced manufacturing technology industries. Using this design, the outcomes study would assess what impact participation in the SEELC program has had on student outcomes by comparing 4 groups of students exposed to either:

1. Treatment 1 (T1) pre-program assessment only
2. Treatment 2 (T2) post-program assessment only
3. T3 (i.e., T1 and T2)
4. Comparison (C1) – neither pre- nor post-program assessment

Thus, the methodology was dependent on whether the SEELC grantees used the WorkKeys and Ready to Work assessments proposed in their grant proposal and initial program design. WorkKeys assessments measure essential workplace skills and provide test-takers with a score that can then be matched to job opportunities with employers that use WorkKeys to score their job openings. In some cases, grant staff were able to offer WorkKeys to students during class. In other communities, WorkKeys was offered at the local WIB. The SEELC program was designed for students across the Consortium to be exposed to WorkKeys, with the exception of Polk. Polk was envisioned to serve as an intra-consortium control group to study the effects of WorkKeys on student outcomes.

The use of WorkKeys was proposed as the evaluation team identified assessment as being a relatively more distinct program service or factor as compared to coaching or curriculum implementation. During the course of the grant, however, WorkKeys was implemented to varying degrees throughout the Consortium. Administration of this work-readiness assessment was not standard practice across the Consortium for a number of reasons:

1. Administration to students depended largely on its prevalence among industry partners. Colleges that provided the assessment have large employers in the area that require WorkKeys for employment. In regions where there is not a large contingency of employers utilizing WorkKeys, grant staff emphasized the test's general importance since a future local employer or an employer in a different area may require the test.
2. The administration of WorkKeys was optional to students and the grantees. It was not a requirement; therefore, grantees could choose to administer the assessment or not.
3. Some SEELC colleges have career workforce partners that administered the assessment; therefore, they referred students to these partners for testing.

According to July 2017 ETO data on WorkKeys administration, only three colleges were administering the assessment: Vance-Granville, Northeast and Palm Beach. As of July 2017, only 115 students out of the 2,074 unique students enrolled, had taken the WorkKeys assessment at any point in time during their training (See Exhibit D.1).

Exhibit D.1: WorkKeys Implementation Sites

Site	Total Number Enrolled	Total Number Taking Assessment	% Taking Assessment
Granville	197	45	23%
Northeast	501	60	12%
Palm Beach	219	10	5%
Total	**917**	**115**	**13%**

Source: SEELC ETO Database.

Evaluation Design Challenge

Given the low number of students taking the WorkKeys assessment, the proposed evaluation design of studying the effect of taking the assessment on the outcomes for the four different groups is not be feasible for a number of reasons, given that the assessment was not a requirement:

- First, the sample sizes are too small to make statistical inference about the effect of assessments on student outcomes;
- Second, The samples are also concentrated in only three colleges and any findings resulting from this analysis would not be generalizable to the Consortium as a whole (very little value add to the stakeholders); and
- Third, students did not randomly take the test. Test takers took the test because a local employer in the area required it. Therefore, taking the assessment would be directly linked to the possibility of employment, which would bias any kind of causal investigation into the impact of the assessment on employment.

For these reasons, the evaluation team conducted the following outcome analyses with the available data:

(1) A pre-post outcome analysis to estimate the association between of TAACCCT-funded interventions and student outcomes. The pre-post design estimates the difference in student outcomes before and after their involvement with TAACCCT. This analysis uses tests of association, such as chi-square and t-tests.

(2) A comparison analysis using propensity score regression analysis that compares outcomes for those who either took a pre- or post-WorkKeys assessment with those who did not take an assessment at any point during their training. This analysis is restricted to students in those two groups from the three colleges that implemented the assessment: Vance-Granville, Northeast, and Palm Beach. This analysis compares outcomes for those students that took the WorkKeys assessment versus those who did not and measure the impact of taking the assessment on student outcomes.

APPENDIX E: PROPENSITY SCORE COVARIATE IN A REGRESSION

A. Effect of Taking an Assessment on Post-program Wages

Due to the limited availability of baseline measures, the following five variables were considered for inclusion in a propensity score. Prior to the creation of the logit model to create the propensity score, the evaluation team conducted statistical tests (chi-square and t-test) to examine any significant difference between the groups—those who took the assessment and those who did not, on the chosen variables:

1. Hispanic: dummy for whether a student identified as Hispanic
2. Male: dummy for male student
3. Single; dummy for single
4. Incumbent worker: dummy for incumbent worker
5. Age: continuous student wage variable

Prior to the creation of the logit model, the evaluation team conducted statistical tests (Fisher's exact test because of the small sample sizes and t-test for continuous variables) to examine any significant difference between the groups—those who took the assessment and those who did not. Exhibit E.1, shows the variables used to create a propensity score for estimating the effect of taking an assessment on post-program wages.

Exhibit E.1: Test of Difference between Assessment Groups, Where Post-program Wage (Dependent Variable) and Pre-program Wage (Predictor) Is Not Missing

Components of Score	Did not take the assessment (n=115)*	Took the assessment (n=23)*	Difference within assessment groups (p-value)
Hispanic			
Yes (n=6)	5.22%	0%	0.59
No (n=132)	94.78%	100%	
Male			
Yes (n=133)	96.52%	95.65%	1.00
No (n=5)	3.48%	4.35%	
Single			
Yes (n=117)	84.96%	91.30%	0.53
No (n=19)	15.04%	8.70%	
White			
Yes (n=129)	92.98%	100%	0.60
No (n=8)	7.02%	0%	
Incumbent worker			
Yes (n=135)	99.12%	100%	1.00
No (n=1)	0.88%	0%	
Age (mean, years)	25.9	24	0.27

Source: ETO Data System, Online Student Survey Data.
*Frequencies reflect the number of students in the three WorkKeys implementation colleges that had both a pre- and post-wage.

The evaluation team found no significant differences between the two groups on all variables. However, the score estimation was limited to non-Hispanic incumbent workers, because of the small sample sizes for Hispanic and non-incumbent workers (i.e., the six Hispanic cases and one non-incumbent were removed from the estimation of the propensity score). The analyses therefore makes inferences to non-Hispanic

incumbent workers. Once the score was created, the logit of the score was then estimated to normalize the distribution of the score. The resulting logit of the propensity score was used as a predictor in the model regression model. Other predictors were the key explanatory variable, the assessment dummy flag, and the pre-program baseline wage. The outcome or dependent variable in the model was the post-program wage.

B. Effect of Taking an Assessment on Wage Difference

The evaluation team undertook the same procedures and variables as explained in the previous section when creating the propensity score to estimate the effect of assessment on whether a student received a wage increase after program exit. For the estimation of this propensity score, however, the sample was restricted to cases with a non-missing wage difference dummy flag. For the model, the assessment flag and propensity score covariate was regressed on post-program employment in the first quarter.

C. Effect of Taking an Assessment on Employment in the First Quarter

The evaluation team undertook the same procedures and variables as explained in the previous section when creating the propensity score to estimate the effect of assessment on employment in the first quarter. The estimation of the score was restricted to cases with non-missing wage difference dummy flag. For the model, the assessment flag and propensity score covariate was regressed on post-program employment in the first quarter.

D. Effect of Taking an Assessment on Completion

The evaluation team undertook the same procedures and variables as explained in the previous section when creating the propensity score to estimate the effect of assessment on completion. The variables used to estimate the score were dummy variables for male, age, single, and white. The Hispanic (p=0.08) dummy variable was shown to be differ significantly between the two groups and had a small sample so the analyses was restricted to non-Hispanic students (See Exhibit E.5). For the model, the assessment flag, propensity score covariate, were regressed on whether a student completed any type of credential (degree, certificate or industry credential).

Exhibit E.5: Effect of Taking an Assessment on Completion

Components of Score	Degree (n=491)			Certificate (n=248)			Industry Credential (n=70)[a]		
	Did not take assessment (n=135)	Took assessment (n=25)	p-value	Did not take assessment	Took assessment	Difference (p-value)	Did not take assessment	Took assessment	Difference (p-value)
Non-Hispanic	89.47	10.53	0.16	88.28	11.72	0.60	100	0	0.96
Male	89.92	10.08	0.89	88.70	11.30	0.60	95.6	4.41	0.88
Single	89.06	10.94	0.40	89.60	10.40	0.29	94.92	5.08	1.0
White	89.15	10.85	0.133	87.95	12.05	0.48	95.71	4.29	1.0
Age (mean, years)	29.57	26.96	0.11	30.17	27.17	0.20	29.51	21.00	0.02

Notes: Effect estimates are average treatment effects of taking an assessment (treatment group) versus the comparison group (did not take an assessment).

[a]Due to small cell sizes, propensity score was created and analysis was run excluding Hispanic, non-White, female. Inferences will be made to non-Hispanic, white males.

APPENDIX F: PROGRAMS OFFERED BY SEELC COLLEGES

School	Pathway	Certificate
Vance-Granville	Machining	–
	Manufacturing	–
	Welding	▪ Basic Welding Certificate ▪ Welding Certification Practices Certificate ▪ Welding Diploma
Northeast	Machining	▪ Machine Tool Operations Certificate
	Manufacturing	▪ Chemical Process Operations Certificate ▪ Construction Electricity Certificate ▪ Aviation Maintenance Technology ▪ Industrial Operations Certificate
	Welding	▪ Combination Welding Certificate
Palm Beach	Machining	▪ Machining – 1500 Hour PSAV
	Manufacturing	–
	Welding	▪ Welding – 1200 Hour PSAV
Pellissippi	Machining	–
	Manufacturing	▪ Additive Manufacturing Certificate ▪ Electronics Technology Certificate ▪ Industrial Automation Certificate ▪ Industrial Maintenance Technology Certificate ▪ NAMII (National Additive Manufacturing Innovation Institute) Technology Certificate
	Welding	–
Polk	Machining	▪ CNC Operator Certificate
	Manufacturing	▪ CNC Fabricator Certificate ▪ CNC Operator Certificate ▪ Engineering Technology Support Specialist Certificate
	Welding	–
Randolph	Machining	▪ Accelerated Machining Certificate ▪ Programming Turning & Milling Certificate – C50210TM ▪ Computer-Integrated Machining Certificate – C50210 ▪ Computer-Integrated Machining Diploma – D50210
	Manufacturing	▪ Electrical Systems Technology Certificate – C35130 ▪ Electrical Systems Technology Diploma – D35130 ▪ Electrical Systems Technology PCL Certificate – C35130A ▪ Electrical/Electronics Diploma – D35220 ▪ Industrial Systems Technology Diploma – D50240 ▪ Mechatronics Engineering Technology Certificate – C40350 ▪ Mechatronics Engineering Technology Diploma – D40350
	Welding	▪ Welding Technology Certificate – C50420 ▪ Welding Technology Diploma – D50420

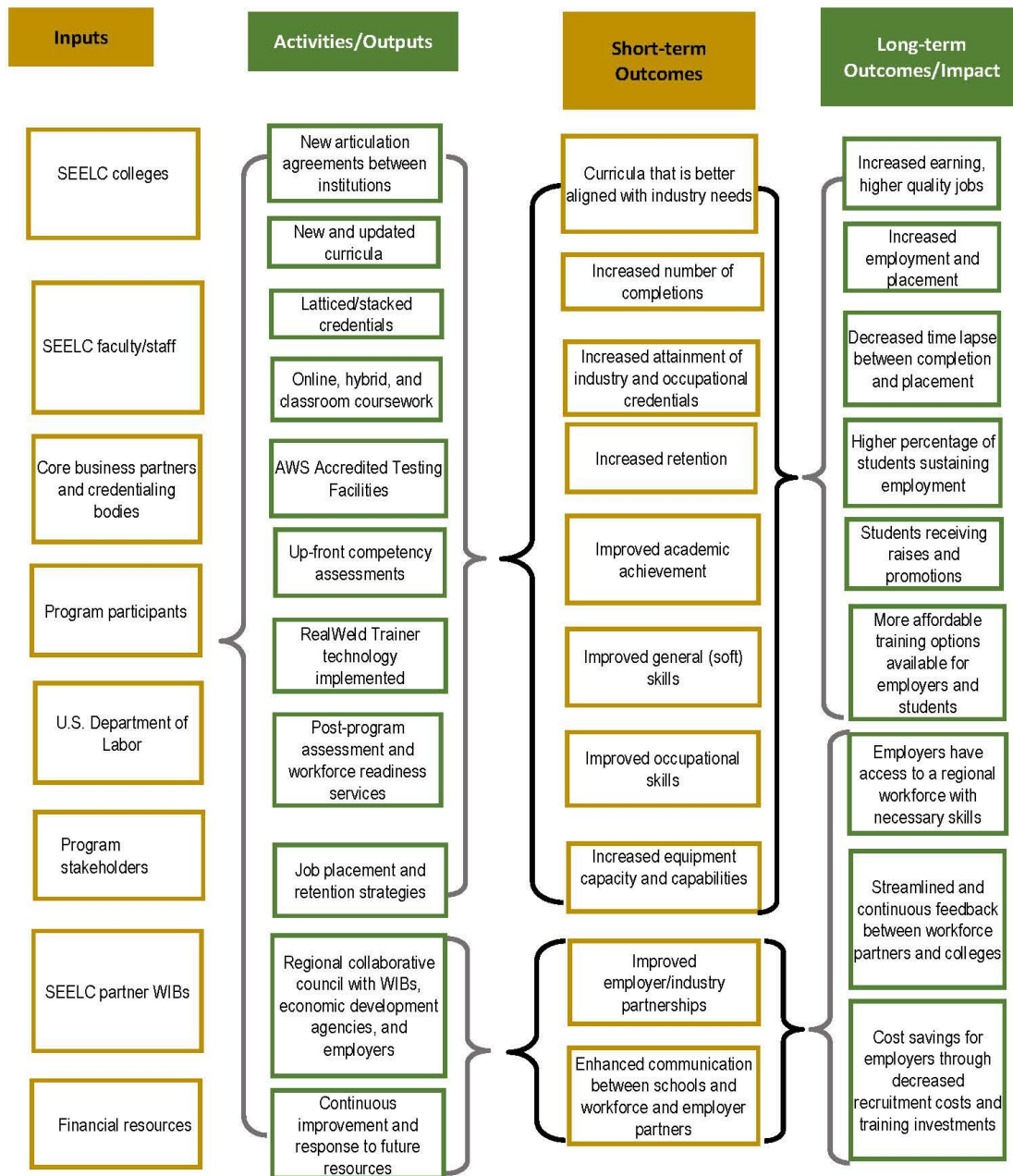| School	Pathway	Credential
Vance-Granville	Machining	–
	Manufacturing	–
	Welding	–
Northeast	Machining	▪ NIMS Machining Level 1
	Manufacturing	▪ NC3 Multimeter Certification ▪ OSHA 30 ▪ Aerospace Soldering J-STD-001F Certified IPC Trainer
	Welding	▪ AWS SENSE Certificate ▪ AWS B2.1 Performance Qualification (10 different credentials available) ▪ AWS D1.1 Certification (8 different credentials available)
Palm Beach	Machining	▪ Job Planning Benchwork and Layout ▪ Measurement Material and Safety ▪ Turning Operations: Turning Between Centers
	Manufacturing	–
	Welding	▪ Certified Associates Welding Inspector – CAWI ▪ Certified Welder ▪ Welder-Level 1 certification ▪ Welder-Level 2 certification
Pellissippi	Machining	–
	Manufacturing	▪ Robotics Certification
	Welding	▪ Certified Welder
Polk	Machining	▪ Measurement Material and Safety
	Manufacturing	▪ CPT [NIMS] Measurement ▪ Material and Safety ▪ 30 Hour Training Course
	Welding	▪ API 1104 Credential ▪ Certified Welder ▪ D1.1 3G MIG Welding Certification ▪ D1.1 4G SMAW ▪ Sense Programs Entry Level Welder Certificate ▪ Welder Helper ▪ Welder, Flux ▪ Cored Arc ▪ Welder, Gas-Metal Arc ▪ Welder, Shielded Metal Arc
Randolph	Machining	▪ CNC Milling: Operations
	Manufacturing	▪ Robotics Certification
	Welding	–

School	Pathway	Diploma
Vance-Granville	Machining	–
	Manufacturing	–
	Welding	▪ Welding Technology
Northeast	Machining	▪ Machine Tool, A.A.S
	Manufacturing	▪ Electrical, A.A.S. ▪ Electromechanical, A.A.S ▪ General Technology, A.A.S ▪ Manufacturing Engineering Technology, A.A.S ▪ Manufacturing Technology ▪ Aviation Technology
	Welding	▪ Machine Tool, A.A.S
Palm Beach	Machining	–
	Manufacturing	–
	Welding	–
Pellissippi	Machining	▪ Electrical Engineering Concentration, A.A.S. ▪ Manufacturing Concentration, A.A.S. ▪ Mechanical Engineering Concentration, A.A.S.
	Manufacturing	▪ Advanced Manufacturing, A.A.S. ▪ Automated Industrial Systems Concentration, A.A.S. ▪ Electrical Construction Management Concentration, A.A.S. ▪ Electrical Engineering Concentration, A.A.S. ▪ Industrial Maintenance Concentration, A.A.S. (Mechatronics) ▪ Manufacturing Concentration, A.A.S. ▪ Mechanical Engineering Concentration, A.A.S.
	Welding	▪ Welding Technology, A.A.S.
Polk	Machining	▪ Engineering Technology Associate Degree specialization in Advanced Technology
	Manufacturing	▪ Engineering Technology Associate Degree specialization in Advanced Technology ▪ Engineering Technology Associate Degree specialization in Mechanical Design and Fabrication
	Welding	–
Randolph	Machining	▪ Computer-Integrated Machining Associate in Applied Science Degree-A50210 ▪ Mechatronics Engineering Technology Associate in Applied Science Degree -A40350
	Manufacturing	▪ Electrical Systems Technology Associate in Applied Science Degree -A35130 ▪ Electrical/Electronics Technology Associate-A35220 ▪ Mechatronics Engineering Technology Associate in Applied Science Degree -A40350
	Welding	–

APPENDIX G: LABOR MARKET INFORMATION (LMI) DATA TABLE BY COLLEGE

Occupation	Projected new jobs growth	Projected replacement jobs	Projected total job openings 2016-2021 (new + replacement jobs)	College regional AVE Wages 2015	US AVE wages 2015
Northeast[1]					
Industrial machinery installation, repair, and maintenance workers (SOC: 49-9041)	2	104	106	$46,540	$50,160
Welding, soldering, and brazing workers (SOC: 51-4121)	10	113	123	$35,510	$40,970
[1] LMI for Northeast, looks at job growth in the following counties in Tennessee (TN): Hawkins, Johnson, Sullivan, Unicoi, and Washington, as well as Scott and Washington County, VA. Wage data for Northeast is pulled from Bureau of Labor Statistics (BLS) data on the Kingsport-Bristol-Bristol TN-VA region.					
Palm Beach[2]					
Industrial machinery installation, repair, and maintenance workers (SOC: 49- 9041)	57	145	202	$44,180	$50,160
Welding, soldering, and brazing workers (SOC: 51-4121)	27	230	257	$38,200	$40,970
[2] LMI for Palm Beach looks at job growth in the following counties Palm Beach County, FL and Jackson County, Mississippi (MS) to reflect an existing partnership with Ingalls Shipbuilding, a division of Huntington Ingalls Industries located in Pascagoula, MS. Wage data for Northeast is pulled from BLS data on the Miami-Fort Lauderdale-West Palm Beach, FL region.					
Pellissippi[3]					
Industrial machinery installation, repair, and maintenance workers (SOC: 49-9041)	64	262	326	$48,790	$50,160
Welding, soldering, and brazing workers (SOC: 51-4121)	67	242	309	$37,810	$40,970
[3] LMI for Pellissippi looks at job growth in the following areas: Knoxville-Morristown-Sevierville, Metropolitan Area. Wage data for Pellissippi is pulled from BLS data on the Knoxville, TN region.					
Polk[4]					
Machine tool cutting setters, operators, and tenders, metal and plastic (SOC: 51-4011)	1	139	140	$33,270	$38,720
Welding, soldering, and brazing workers (SOC: 51-4121)	6	290	296	$36,540	$40,970
Machinists (SOC: 51-4041)	133	481	614	$36,920	$41,900
[4] LMI for Polk looks at job growth in the following areas: Polk, Hillsborough, and Orange counties. Wage data for Polk is pulled from BLS data on the Lakeland-Winter Haven, FL region.					

Occupation	Projected new jobs growth	Projected replacement jobs	Projected total job openings 2016-2021 (new + replacement jobs)	College regional AVE Wages 2015	US AVE wages 2015
Randolph[5]					
Computer control programmers and operators (SOC: 51-4011)	-3	18	15	$40,550	$38,720
Machinists (SOC: 51-4041)	-4	30	26	$37,190	$41,900
Welding, soldering, and brazing workers (SOC: 51-4121)	16	32	48	$37,920	$40,970
[5] LMI for Randolph looks at job growth in Randolph County. Wage data for Randolph is pulled from BLS data on the Greensboro-High Point, NC region.					
Vance-Granville[6]					
Engineering Technicians, except drafters (SOC: 17-3020)	72	234	306	$53,070	$58,490
Industrial Machinery Mechanics (SOC: 49-9041)	67	101	168	$52,380	$51,470
Industrial Maintenance Technician (49-9041)	75	132	207	$47,630	$50,160
Welders, Cutters, Solderers & Brazers (SOC: 51-4121)	127	156	283	$34,780	$40,970
[6] LMI for Vance-Granville looks at job growth in the Franklin, Granville, Vance, Wake, and Warren counties. Wage data for Vance-Granville is pulled from BLS data on the Durham-Chapel Hill, NC region.					

APPENDIX H: SEELC PROGRAM LOGIC MODEL

Inputs

- SEELC colleges
- SEELC faculty/staff
- Core business partners and credentialing bodies
- Program participants
- U.S. Department of Labor
- Program stakeholders
- SEELC partner WIBs
- Financial resources

Activities/Outputs

- New articulation agreements between institutions
- New and updated curricula
- Latticed/stacked credentials
- Online, hybrid, and classroom coursework
- AWS Accredited Testing Facilities
- Up-front competency assessments
- RealWeld Trainer technology implemented
- Post-program assessment and workforce readiness services
- Job placement and retention strategies
- Regional collaborative council with WIBs, economic development agencies, and employers
- Continuous improvement and response to future resources

Short-term Outcomes

- Curricula that is better aligned with industry needs
- Increased number of completions
- Increased attainment of industry and occupational credentials
- Increased retention
- Improved academic achievement
- Improved general (soft) skills
- Improved occupational skills
- Increased equipment capacity and capabilities
- Improved employer/industry partnerships
- Enhanced communication between schools and workforce and employer partners

Long-term Outcomes/Impact

- Increased earning, higher quality jobs
- Increased employment and placement
- Decreased time lapse between completion and placement
- Higher percentage of students sustaining employment
- Students receiving raises and promotions
- More affordable training options available for employers and students
- Employers have access to a regional workforce with necessary skills
- Streamlined and continuous feedback between workforce partners and colleges
- Cost savings for employers through decreased recruitment costs and training investments

ICF