

Connecticut Advanced Manufacturing Initiative: TAACCCT Round 4 Grant Evaluation

Final Report

Report to:
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EXECUTIVE SUMMARY

TAACCCT Program/Intervention Description and Activities

Through Round 4 Trade Adjustment Assistance Community College and Career Training funding from the U.S. Department of Labor, Manchester Community College (MCC) led a consortium of seven Connecticut community colleges to increase their institutional capacity to provide training in high-growth, high-demand advanced manufacturing sectors. The major strategies included:

- Expand the capacity of community college facilities to support more students and new certificate programs.
- Scale up industry-driven training programs resulting in credentials.
- Increase participant retention and accelerate participant completion with student supports.
- Strengthen and scale up the AMC sector-based approach to employment and training.

Hezel Associates implemented a mixed method evaluation, utilizing a combination of qualitative and quantitative methods to develop a comprehensive understanding of the implementation and outcomes of the project. Evaluation questions pertaining to program implementation quality and fidelity (i.e., Evaluation Questions 1 through 7) were addressed through a review of project documents, interviews with program staff and industry partners, focus groups with program participants, and a program participant questionnaire. In addition, the evaluation sought to provide summative feedback on the outcomes of the project (i.e., Evaluation Questions 8 through 10), which was largely achieved using extant data from a Round 4 National Outcomes Study, and applied descriptive statistics to inform understandings. The evaluation questions guiding this work are presented below.

1. How was the curriculum selected, used, or created?
2. How was the CAMI program managed and implemented, in terms of administrative structure and management, program design and delivery methods, and support services?
3. To what extent did the program complete proposed milestones with quality and as defined by the timeline?
4. How did CAMI colleges assess participants' abilities, skills, and interests to select participants into the grant program?
5. What advising strategies were used to provide career guidance for participants?
6. What contributions did each of the partners make in terms of (a) program design, (b) curriculum development, (c) recruitment, (d) training, (e) placement, (f) program management, (g) leveraging of resources, and (h) commitment to program sustainability?
7. To what extent has institutional capacity changed as a result of CAMI?
8. To what extent did the CAMI program increase the attainment of certifications, certificates, diplomas, or other recognized credentials?
9. What impact did CAMI programs have on participants' program completion, employment outcomes, and employment retention?
10. What are the factors that contribute to students' educational outcomes?

Implementation Findings

- Many programs are offering expanded manufacturing coursework and additional associate degrees or certificates which were initially made possible by the grant renovations to lab spaces. Renovations also allow for the expansion of program offerings and the capacity to handle more students. The addition of state-of-the-art lab equipment and expanded outreach on manufacturing careers and program offerings has greatly contributed to colleges' increased perception of manufacturing as a more viable career path. Additionally, the improved statewide collaboration and increased attention to student outcomes tracking will benefit colleges after the grant ends. Finally, sustainability will be supported by new partnerships developed through the grant with employers and community partners as they aim to change the perception of manufacturing in Connecticut.
- The development and implementation of training programs was based on critical relationships and ongoing collaboration with industry partners. Foundational competencies and credentials were identified as essential elements of one-year programs. The cohort structure and focus on hands-on learning were included as core elements of coursework. Finally, third-semester certificates were created, enabling participants to develop an area of specialty before entering the workforce. Students reported that hands-on training, basic manufacturing skills, and certifications/credentials are most beneficial to their careers. The programs developed meet targeted local and regional industry needs. Staff, employers, and students recognized that the programs and courses were developed using employer input, address employer needs, and give students appropriate training for the respective workplace.
- Program design and delivery methods differ at individual colleges as staff endeavor to coordinate their programs with local employer needs. The Advanced Manufacturing Center (AMC) model served as the basis for initial course offerings. This model was developed by Asnuntuck Community College (ACC) and adopted by consortium partners. Delivery methods varied between colleges with most having a cohort structure and some having condensed schedules for full time participants. In addition, CAMI colleges offered some online and hybrid courses. Investments in staff, equipment, and supplies, especially for colleges developing new programs, have expanded program access for students (i.e., day classes, night classes, accelerated courses).
- CAMI programs have not adopted a uniform assessment process, as institutions have established universal entry requirements for all incoming students. CAMI colleges assess students' English and math proficiency, review student transcripts, and often conduct interviews with interested students. Students who require remedial math or English improvement before entering a program are afforded the opportunity via boot camps or tutoring.
- The exact structure of career services varied depending on the college; however, common to most was the relationship between college staff and industry, the commitment of instructors, additional support staff (internship and employment coordinators), and an emphasis on career readiness and soft skills. Colleges provided students with

opportunities to receive career awareness support regarding résumés, mock interviews, soft skills, and internship and career placement. CAMI’s industry partners feel that today’s graduates have more knowledge than graduates of the past.

- With few exceptions, CAMI was implemented with fidelity and quality across the consortium. CAMI colleges completed nearly all of the milestones listed in the project work plan and mostly on the intended timeline. In addition, partner colleges were successful in meeting many of the milestones applicable to their varied roles and responsibilities.
- Additional staff (i.e., employment coordinators and tutors) were beneficial for increased outreach, recruitment, and educational assistance; many programs would like to again hire additional staff, pending available funds. Many of the participating colleges would like to expand manufacturing class and certificate program offerings but are constrained by state budgets. The increased marketing efforts were helpful in student recruitment, but budgets may not permit the continuation of those efforts.

Outcome Findings

- According to CAMI’s Annual Performance Reporting, 2,106 students were served; 952 students earned credentials (i.e., NIMS, OSHA, Lean Six Sigma); and 1,251 students completed a grant-funded program of study.

TAACCCCT Performance Outcomes	Y1	Y2	Y3	Y4	Total
1. Unique participants served	383	860	829	34	2,106
2. Total number completing Grant-funded program of study	0	286	378	587	1,251
3. Total number retained in their program of study	360	543	648	363	1,914
4. Total number retained in higher education programs	0	4	6	1	11
5. total numbers of credit hours completed (aggregate)	821	13,221	12,324	8,127	34,493
6. Total number of earned credentials	0	291	363	298	952
7. Total number pursuing further education	0	87	23	33	143
8. Total number employed after program of study	0	172	132	145	449
9. Total number employed after retained in employment after program of study completion	0	162	124	169	455
10. Total number of those employed at enrollment who receive a wage increase post-enrollment	1	34	37	31	103

- Students were offered opportunities for direct experiences with occupations related to their studies or career goals, including internships, apprenticeships, and clinical experiences. Moreover, industry professionals were deeply involved in the instructional components of students’ experiential learning (i.e., hosting site visits, visiting classrooms, serving as CAMI instructors), making educational experiences even more authentic and reflective of the real-world industrial context.
- Participants have earned a breadth and abundance of industry recognized certificates, licenses, or credentials as a result of completing required coursework. These highly valuable attainments increased candidates’ marketability and competitiveness.

- Occupational support structures were in place within CAMI programs, which provided students with career counseling and job search or placement assistance. Particular services surrounded résumé writing, job search navigation, job application completion, and mock interviewing. These efforts were well received, and likely had a positive influence on students' employment outcomes.
- Non-technical developmental preparations (i.e., study skills, workplace skills, general life skills) served as catalysts for career-readiness, equipping students with the confidence and capacity to effectively complete functions required of industry professionals.
- Overall, findings indicate that CAMI programming has had positive influences on participants' employment outcomes. The majority of participants are working for pay, earnings have increased, most of those employed are working full-time hours, and job positions are largely within relevant industries—all of which are illustrations of CAMI's realization of desired impacts.
- A minor limitation of the outcomes findings is extant wage data from the TAACCCT Round 4 National Outcomes Study were based solely on student self-reports. Data from the National Directory of New Hires, a national repository of employment information, were also intended to be incorporated to understand impacts. These data would have provided an additional perspective on employment outcomes but could not be obtained in time for this report. Further, only a subset of CAMI students participated in the National Outcomes Study, thus there is a chance that results might not fully reflect the CAMI population more generally. As such, it is important that considerations regarding limitations and associated implications are engaged during the consumption of conclusions derived from these data.

Conclusion

Strong industry partnerships, additional support staff, industry-aligned curriculum, and improvements to facilities and technology appear to have collectively contributed to positive programmatic outcomes. Employer guidance during the curriculum development and lab design processes were critical to ensuring students gained the experience required for their entrance into the workforce. Support staff—particularly, full-time tutors and advisors—were perceived to be helpful by program stakeholders, and deemed as highly valuable assets from program start to grant end. Across the consortium, lab facilities were renovated to accommodate new and revised programs developed through the grant, serving as an environmental context that could adequately support student learning and development. The foundational skills targeted through CAMI programming equipped participants with the proficiencies needed to successfully perform duties required of entry-level positions. Most notably, however, is that each of these individual program components acted in tandem to create a comprehensive whole. The intentionality behind CAMI's synchronous design structure coupled with the effectiveness of its integrated implementation supported the delivery of a strong program, and subsequently, realization of intended outcomes.

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INTRODUCTION

In September of 2014, the Connecticut Colleges and State Universities (CCSU) Connecticut Advanced Manufacturing Initiative (CAMI) project, led by Manchester Community College (MCC), received a grant award through the United States Department of Labor (DOL) Trade Adjustment Assistance Community College and Career Training (TAACCCT) program. The CAMI program consists of four overarching program goals: (a) expand the capacity of community college facilities to support more students and new certificate programs, (b) scale up industry-driven training programs resulting in credentials, (c) increase participant retention and accelerate participant completion with student supports, and (d) strengthen and scale up the Advanced Manufacturing Center (AMC) sector-based approach. Ultimately, the purpose of CAMI is to provide training and credentials to the TAA-eligible and veteran population, allowing them to seek employment in a growing industry within the region.

Hezel Associates served as the external evaluator for the 4-year grant, assessing the implementation and outcomes of grant activities. The evaluation aimed to address the following evaluation questions.

Implementation

1. How was the curriculum selected, used, or created?
2. How was the CAMI program managed and implemented, in terms of administrative structure and management, program design and delivery methods, and support services?
3. To what extent did the program complete proposed milestones with quality and as defined by the timeline?
4. How did CAMI colleges assess participants' abilities, skills, and interests to select participants into the grant program?
5. What advising strategies were used to provide career guidance for prospective and current CAMI participants?
6. What contributions did each of the partners (employers, workforce systems, other training providers and educators, philanthropic organizations, and others as applicable) make in terms of (a) program design, (b) curriculum development, (c) recruitment, (d) training, (e) placement, (f) program management, (g) leveraging of resources, and (h) commitment to program sustainability?
7. To what extent has institutional capacity changed as a result of CAMI?

Outcomes

8. To what extent did the CAMI program increase the attainment of certifications, certificates, diplomas, or other recognized credentials?
9. What impact did CAMI programs have on participants' program completion, employment outcomes, and employment retention?
10. What are the factors that contribute to students' educational outcomes?

This final, summative report discusses the implementation of the project over the 4-year grant period, as well as the outcomes of the project. This report includes evaluation methods, findings, conclusions, and recommendations based on the final synthesis of evaluation data.

METHODS SUMMARY

To address the evaluation questions, Hezel Associates implemented a mixed method evaluation, utilizing a combination of qualitative and quantitative methods to develop a comprehensive understanding of the implementation and outcomes of the project. Evaluation questions pertaining to program implementation quality and fidelity (i.e., Evaluation Questions 1 through 7) were addressed through a review of project documents, interviews with program staff and industry partners, focus groups with program participants, and a program participant questionnaire. Evaluation questions pertaining to program outcomes (i.e., Evaluation Questions 8 through 10) were addressed through quantitative analysis of extant student data from the college. A detailed description of the data collection and analysis processes applied throughout the evaluation is included as Appendix A. Final versions of each instrument are also included in the appendices (Appendix B through F).

FINDINGS

Findings are organized by priorities outlined by DOL, with sub-themes guided by evaluation questions. Specifically, the first section presents insights regarding implementation activities, with emphasis on strengthened institutional capacity, development and implementation efforts, partner involvements, quality and fidelity of program delivery, and operational strengths and weakness. The second section focuses on participants educational and employment outcomes.

Implementation Activities

Building Institutional Capacity

Hezel Associates researchers accounted for changes to institutional capacity and sustainability by assessing documentation and qualitative data from staff and employer interviews, and student focus groups (Evaluation Question 7). Based on interview data, institutional capacity for CAMI colleges to support Connecticut manufacturing has improved because of the TAACCCT grant. Investments in staff, equipment, and supplies, especially for colleges developing new programs, have expanded program access for students (i.e., day classes, night classes, accelerated courses).

New Technology and Equipment

One of the major goals of TAACCCT was to build the institutional capacity of community colleges. Many programs are offering expanded manufacturing coursework and additional associate degrees or certificates which were initially made possible by the grant. Stakeholders, including students, employers, and staff, recognize the importance of modernized tools and equipment to ensure industry-relevant training. Therefore, investments in equipment and facility upgrades through TAACCCT funding was an essential element of CAMI. Across the consortium, lab facilities were renovated to accommodate new and revised programs developed through the grant. In some instances, new labs were built. Additionally, up-to-date equipment was installed and necessary instructional supplies were purchased to support the new programs. Employers have described the updated labs as “state of the art.” Grant funded investments in facilities are making it possible for colleges to offer additional courses, expanding their student capacity. For example, one college hopes to add evening classes to accommodate additional students. Table 1 denotes student agreement with their college’s ability to provide training on new technologies. Most students agree that equipment and technology is preparing them for their career and that instructors have an appropriate amount of expertise to teach.

Table 1. Student Agreement with Training Capabilities

	Y2		Y3	
	n	%	n	%
Teaches the basic manufacturing skills	201	93.5	190	94.1
Instructors have appropriate expertise in equipment and technology	199	92.4	187	92.1
Equipment and technology is preparing me for my career	193	89.9	182	89.2
Equipment and technology used is up-to-date	187	87.1	177	86.3
Satisfied with the amount of hands-on training	184	85.6	162	79.0

Note. Percentages include those who selected *Somewhat Agree, Agree, or Strongly Agree*.

Institutional capacity was also impacted by increased communication and collaboration afforded through the grant between college partners. The CAMI Project Director urged CAMI schools to work with one another, sharing best practices. One respondent stated that “CAMI resources have allowed us to do things that were very difficult with one person, it helped tie together things on a statewide system that hasn’t happened before.” Increased coordination among colleges encouraged discussions of best practices and enhanced relationships between older advanced manufacturing programs and newly established ones. For example, the staff from the AMC at Asnuntuck Community College (ACC) could share their extensive manufacturing history with colleges like Middlesex Community College, which is in the process of establishing new programs. Collaboration included trainings, such as a web-based, professional development program for CAMI staff that focused on problem-based learning. The training was designed to be interactive, allowing for sharing of best practices among CAMI partners. This increased collaboration and communication strengthens the advanced manufacturing programs across the state. In addition, colleges refined their data management and tracking tools for documenting student outcomes to meet grant reporting requirements and some are planning implementation of those improved strategies for assessing student outcomes at some future date.

Scale-up and Sustainability

CAMI colleges designed new curricula with sustainability in mind, resulting in programs that are adaptable to future market conditions and employer needs. Multiple themes were unearthed during the analysis.

Partnerships between community colleges, local high schools, and industry organizations were identified as vital to sustainability. CAMI colleges prepared for the conclusion of the grant by strengthening partnerships with local industry groups like the Eastern Advanced Manufacturing Alliance (EAMA), developing pipelines with local school districts, and actively searching for funding opportunities to continue expanding their programs. Increasing partnerships with local industry organizations would ensure that colleges periodically update their equipment based on ongoing industry input. Employers believe that programs will need to revisit the issue of equipment needs every few years to stay relevant. Well-established connections to local employers have allowed colleges to respond to market conditions quicker than in the past. Industry advisory boards continue to meet (i.e., quarterly or biannually) to discuss and revise curriculum if needed. With continuing involvement from industry partners, CAMI colleges are committed to meeting the needs of their local “customer” (employer) base, shaping curriculum development or revisions around local market demands. Curriculum revisions may not happen

annually for all programs, but when changes are needed, CAMI colleges can adapt quickly due to the strength of their employer partnerships. If partnership relationships are consistently maintained, CAMI programs can flourish as the demand for qualified workers continues to grow in Connecticut.

Changing the perception of manufacturing in Connecticut was also a major theme that emerged. According to one employer, industry leaders push back against the idea that manufacturing is a “dark, dangerous, and dirty profession.” To combat this common view, colleges are making inroads with local high schools to educate students about manufacturing opportunities. Aside from the College Connections program, efforts are being made to engage parents, guidance counselors, and young students to correct misconceptions about manufacturing jobs. Compounding these efforts are traditional educational and professional trajectories that are still enforced as the norm (i.e., attending a 4-yr college). An employer commented, “We are diametrically opposed with the school system because they want their kids to go to college. They get judged on how many kids go to college, so we’ve got to change that formula somehow—that manufacturing or vocational college is just as good.”

Potential barriers to sustainability were identified as well. First, stakeholders would like more financial resources allocated to marketing the programs. They are concerned that potential students are unaware that a community college could be “20 minutes away, where students get trained in a year and probably can get a government grant to pay for it.” Students participants in focus groups agreed that programs are not sufficiently advertised. One stated that it takes “time to find out what the program consists of, you have to do some research.” Another potential barrier to sustainability mentioned is the ability for new and expanded programs to find qualified teachers to train students on the new equipment used by CAMI colleges. CAMI staff were also concerned, citing the master’s degree requirement for teachers as a barrier to hiring the most qualified individuals. To effectively expand the program, colleges will need to hire additional qualified instructors. Other recommendations for sustainability mentioned in staff and employer interviews included identifying additional funding sources for students, maintaining support staff (i.e., tutors, coordinators), more lab space, and increasing the number of incumbent workers.

Overall, renovations to lab spaces allow for the expansion of program offerings and the capacity to handle more students. The addition of state-of-the-art lab equipment and expanded outreach on manufacturing careers and program offerings has greatly contributed to colleges’ increased perception of manufacturing as a more viable career path. Additionally, the improved statewide collaboration and increased attention to student outcomes tracking will benefit colleges after the grant ends. Finally, sustainability will be supported by new partnerships developed through the grant with employers and community partners as they aim to change the perception of manufacturing in Connecticut. Marketing, finding qualified teachers, maintaining support staff, and funding are noted as potential barriers to sustainability.

Development and Implementation of Training Programs

Hezel Associates assessed the development and implementation of training programs by analyzing data related to Evaluation Questions 1, 3, 4, and 5. The development and implementation of training programs was based on critical relationships and ongoing collaboration with industry partners. Foundational competencies and credentials were identified as essential elements of one-year programs. The cohort structure and focus on hands-on learning

were included as core elements of coursework. Finally, third-semester certificates were created, enabling participants to develop an area of specialty before entering the workforce.

Curriculum Development

As part of the TAACCCCT grant, CAMI colleges reached out to involve local industry partners in the curriculum development process, resulting in Advisory boards composed of local employers representing companies that would benefit from CAMI’s training programs. Advisory board meeting participants discussed current and anticipated needs of local manufacturers, informing curriculum development, program design, and equipment purchases. Based on this input, CAMI was successful in aligning program design with employer needs and national standards. CAMI staff first assessed the skills that Connecticut manufacturers required of new employees, before soliciting advice regarding program design. Some CAMI colleges have industry advisory boards that work closely with their institutions. For example, employers informed staff at one college that laser technology is expanding. What followed was a discussion about how to provide students with fundamental knowledge-sets about laser technology specifically, but also the quickly advancing machine industry more generally. Thus, it was determined that it is important to build fundamentals in math skills, print reading, materials, and related competencies so that students are guided toward the right direction. Pre-existing industry organizations like the EAMA play a major role as well. EAMA, which consists of 48 industry partners, meets-with Quinebaug Valley Community College (QVCC) and Three Rivers Community College (TRCC) on a quarterly basis. Industry input is not limited to program design and curriculum; they also provide advice about equipment needs and lab design. Specific employers were identified such as Electric Boat, who consulted directly with one institution on “course flow” and identifying the “skills that need to be addressed.” The increase in employer outreach via CAMI has resulted in deeper partnerships between industry and CAMI partners.

Students were satisfied that their program aligned with industry skills and technologies. Table 2 denotes 94% of year 3 respondents agree that their program taught basic manufacturing skills and equipment is up to date.

Table 2. Student Agreement with Preparedness for Work Tasks

	Y2		Y3	
	n	%	n	%
Follow safety standards	193	92.2	204	93.1
Apply technical skills	196	93.7	205	92.7
Complete tasks that I’m assigned	184	87.9	204	89.7
Operate equipment used in industry	194	92.6	205	87.8
Apply math skills	187	89.5	204	87.7
Apply quality control knowledge	171	81.6	202	85.6
Work as a member of a team	166	79.6	202	83.2
Effectively communicate	166	79.3	201	83.1
Troubleshoot technical problems	154	73.9	199	80.9
Prioritize tasks	170	81.5	200	80.0
Manage my time	154	78.7	201	74.6
Lead groups of people	139	66.7	195	64.1
Apply writing skills	130	62.2	189	62.4

Note. Percentages include those who selected Somewhat Agree, Agree or Strongly agree.

Guided by local industry input and best practices, staff conceptualized new curricula to provide foundational workforce competencies and industry-recognized certifications. Employers identified basic manufacturing skills as the most crucial component of new curriculum (i.e., shop math, measurements). The foundational skills learned through CAMI programs provide students with basic tools for success in an entry-level position. Curricula for core courses such as blueprint reading and welding were adapted by CAMI colleges from existing national and Connecticut programs. Students who participated in focus groups were complimentary of the courses at their respective schools, highlighting the importance of hands-on experiences to their development. One commented that “everything meshes well together. Specifically, they expressed satisfaction that certifications embedded in the curriculum were included in tuition, even though the importance of certifications might not be relevant to a future employer’s needs. Students participating in focus groups were satisfied that their program would prepare them to enter the workforce. Specifically, they believed that industry certifications would impress employers. One commented that “employers sort résumés into two piles, one with NIMS and one without.” Students noted in survey responses that NIMS, Lean Six Sigma, and OSHA are the credentials they most expect to receive from their programs (See Table 8, Appendix G).

CAMI colleges were tasked with developing third-semester certificates tailored to local industry needs. Third-semester certificates were designed to reflect mastery of advanced skills built on the foundational skills learned in the first two semesters. Contextual factors at each school influenced the curriculum development process as new and revised CAMI curricula were created with input from local industry advisory boards. Consortium colleges were guided by best practices at other institutions across the country in the process of developing their third-semester certificates. Staff interviewees wanted their third-semester experience to be unique and differentiate it from other colleges. For example, one college focused on addressing the CNC programming skill gap for local industry, allowing students to potentially compete for positions as CNC inspectors. Although, CAMI colleges developed third-semester certificates, some colleges are not offering them yet. One staff member stated that his college “has not seen a large demand for third-semester certificates because most people want to find employment as fast as possible.” However, the college still plans to develop them in the future, as the program expands. To date, at least eleven third-semester certificates have been approved.

Overall, CAMI colleges developed and revised curricula that aligns with industry needs, particularly third-semester certificates. Employers want students with foundational technical skills and credentials, which CAMI programs aim to offer.

Delivery

Program design and delivery methods differ at individual colleges as staff endeavor to coordinate their programs with local employer needs. The Advanced Manufacturing Center (AMC) model served as the basis for initial course offerings. This model was developed by ACC and adopted by consortium partners. Delivery methods varied between colleges with most having a cohort structure and some having condensed schedules for full time participants. In addition, CAMI colleges offered some online and hybrid courses.

Some programs implemented a condensed schedule structure (6 hours per day, 5 days per week), which was suitable for many students. Some believe the structure is “too intense,” while others

prefer a concentrated workload. Staff were confident that the cohort structure and oversight of participants provided a “key to our success,” because students spend 35 hours a week on campus, and if a student is missing, advisors were notified. Finally, CAMI staff felt that daily supervision inherent in the condensed schedule allowed them to confidently recommend students to employers, because students had been observed to “arrive at 8:00 a.m. and consistently work all day.” Timeliness is a behavior that is reinforced within the model of the program.

CAMI colleges expanded their programs or anticipated doing so to include additional cohorts through various delivery methods (i.e., night classes, part-time, hybrid). One school offers an accelerated program. In another instance, a staff member noted that a new hybrid course was drawing little interest, a result that should be monitored as more courses are migrated online. A satisfied student in an accelerated program noted, “it is an accelerated class, packing as much stuff as possible into three semesters, the load is not too heavy and not light either.” The intensity of this model can be beneficial in securing an employment opportunity in the local area, due to the collaboration between the college and employers. The accelerated structure was the reason that some students selected the program

The structure provided by CAMI programs was judged as beneficial by most stakeholders. CAMI students remain with their cohort throughout the entire one-year program, which provides multiple opportunities to collaborate with their classmates on projects. Student focus group participants said they enjoyed working in groups and recognize the importance of developing team skills. Students expressed satisfaction with the cohort structure of AMC programs, noting that they “feel more comfortable” with people they know. Students view the cohort structure as a system of support, which allowed mutual trust to be developed through group projects. Table 3 displays students’ perceptions of the most beneficial aspects of the program. Not surprisingly, hands-on training basic manufacturing skills and passionate instructors were highlighted most.

Table 3. Student Perceptions of the Most Beneficial Aspects of the Program

	Y2 (n = 225)	Y3 (n = 209)
	%	%
Hands-on training	82.2	79.0
Basic manufacturing skills	72.4	72.7
Certification/credentials	60.4	56.9
Passionate instructors	48.4	44.5
Exposure to local employers	31.6	37.3
Connections of staff to industry	28.9	30.6
Accelerated schedule of program	34.2	29.7
Internship	28.0	29.7
Career advising	27.1	29.7
Other	2.7	29.2

Note. Respondents were allowed to select all that apply. Y2 Other responses included: Information, Metrology/CAD, Teacher help not all but one. Y3 Other response included: “resume writing.”

Overall, CAMI consortium members developed program content and models that align with industry needs and engaging in multiple types of delivery methods based on contextual factors at each college. Students report that hands-on training, basic manufacturing skills, and certifications/credentials are most beneficial to their careers.

Participant Assessment Practices and Procedures

CAMI colleges assessed multiple skill areas of incoming CAMI students including math and English proficiencies, soft skills, and technical aptitude. Assessment areas were not uniform across the consortium, with the exception of standard math and English testing. CAMI staff listed various types of assessment tools used for incoming students including Tests of Adult Basic Education (TABE), Accuplacer, and Comprehensive Adult Student Assessment System (CASAS). Table 4 details the percentage of students using assessment methods in Years 2 and 3.

Table 4. Prior Experience Assessment Methods

	Y2 (n = 222)	Y3 (n = 206)
	%	%
Math and English placement tests	71.6	68.0
Interviews with college staff	21.2	19.4
PLA	18.5	14.1
Technical skills test	22.5	11.2
None	9.5	12.1
Other	5.9	8.7

Note. Respondents could select more than one option. Y2 Other responses include: “already held degree,” “AP high school test credit and SAT scores,” “Math only,” “N/A,” “OPP,” “Previous Student Associates General Studies,” “Previous student college,” “Safety test,” “TABE Test,” “Transcripts,” “Transfer credits made it so no placement test needed,” “went to technical high school for this field.” Y3 Other responses include: “Previous Certificate,” “College,” “Key Testing,” “Transcript,” “Transcript and Resume,” “Associates Degree Transcript,” “Transcript,” “Transfer Credits,” “BA,” “Previous Experience,” “Work,”

Though not standardized, some CAMI programs require prospective students to interview with a staff member. This personal interaction provides a forum for staff to assess a student’s expectations and share information about programs of interest. Interview observations and discussions are used to determine a student’s “interest and ability to succeed” and “soft skill competency.” Most importantly, prospective students in need of remedial support were identified and offered opportunities to address deficiencies (i.e., Math Bootcamp and soft skills support). Connecting students with tutors was another option for students who did not perform well on entrance tests. Table 5 displays student satisfaction with various services offered to support CAMI students across the consortium. Overall, satisfaction with most items increased from Year 2 to Year 3 and students were more satisfied than not for all items.

Table 5. Student Satisfaction with Educational Support Services

	Y2		Y3	
	n	%	n	%
Peer mentoring	41	75.6	29	100
Scholarship money	51	86.3	56	94.6
Math bootcamp	24	70.8	9	88.9
Federal financial aid	99	83.8	76	88.2
Use of open lab time	112	91.1	97	87.6
Academic advising	68	76.5	51	82.4
Funding from an employer	26	73.1	20	80.0
Tutoring	35	71.4	33	78.8
Tooling U	74	67.6	69	68.1

Note. Percentages include those who selected *Somewhat Satisfied, Satisfied, or Very Satisfied.*

Overall, students differ in prior experience and skill levels before entering CAMI programs. CAMI programs have not adopted a uniform assessment process, as institutions have established universal entry requirements for all incoming students. CAMI colleges assessed students' English and math proficiency, review student transcripts, and often conduct interviews with interested students. Students who require remedial math or English improvement before entering a program are afforded the opportunity via boot camps or tutoring. Support staff, particularly full-time tutors and advisors, were deemed by CAMI college staff as extremely helpful from beginning to end of the grant program.

Prior Learning Assessment Protocols

Although no standardized Prior Learning Assessment (PLA) protocol was developed, consortium partners discussed PLA with statewide stakeholders. In Year 3 the CAMI leadership team hosted a two-day professional development event for the entire community college state system sponsored by the Council for Adult Education and Learning. Staff from QVCC held a seminar about PLA including information about working with local high schools to award credits. For incoming CAMI students, existing transcripts were assessed and used to offer students remedial courses, if necessary, or determine if they could receive credit for prior experience. Focus group participants were satisfied that past skill attainment and training was considered. For example, one student said that he "tested out of Geometric Dimension and Tolerancing." CAMI colleges are also utilizing PLA as a recruiting tool for technical high school students. For instance, QVCC allows technical high school students to test out of the first semester, except for one course, to give students a head start on completing the one-year certificate. For students who fail to meet basic entry requirements, a Math Boot Camp was available. One respondent noted that "of the 44 students they enrolled, 30 participated in a two-week math and English boot camp."

A contributing factor to the lack of statewide policy progress on PLA may be that certificate programs are only two semesters long with no general education requirements, leaving little room for someone to use PLA unless they had machining experience. However, people with machining experience do not need the program. Additionally, existing institutional practices across the consortium may prevent CAMI colleges from making major changes to their PLA processes.

Career Guidance and Support

CAMI students were the beneficiaries of a commitment to align Connecticut's manufacturing needs with community college programming. One component of this alignment was to provide students with extensive career advising and readiness support. The exact structure of career services varied depending on the college; however, common to most was the relationships between college staff and industry, the commitment of instructors, additional support staff (internship and employment coordinators), and an emphasis on career readiness and soft skills.

The relationship between industry and CAMI colleges was vital to curriculum development, but impacted career services as well. CAMI staff sought employer feedback to understand desired employee characteristics. According to employers and staff, foundational competencies coupled with soft skills training are the essential components needed to produce qualified candidates. Once hired, students can be paired with seasoned mentors to further develop company or industry specific skillsets. Also highlighted was the importance of workplace ethics such as

reporting on time. In fact, industry partners are now trying to determine ways of assessing work ethics and other soft skills during the interview process. Employers recognize that students will have the necessary technical competencies coming out of CAMI programs, but would also like to know if they have appropriate workplace skills. CAMI colleges offered multiple options for students to improve their soft skills, and the cohort structure of most programs provided students with consistent support.

The close relationships that colleges developed with industry was evident in the quality of instructors for CAMI courses. Students spoke highly of their instructors and were impressed by the years of manufacturing experience of some professors. Students used words such as “passionate”, “helpful”, and “knowledgeable”, when describing CAMI teachers. Instructors are skilled at communicating, answering questions, and delivering instruction. Due to the structure of CAMI programs, instructors interacted closely with students, even connecting them with employers and providing those employers with first-hand knowledge of a student’s performance in the program. For example, one student noted that he was hired for a position running CNC due to the efforts of a faculty member. According to staff, employers often call colleges looking for referrals of graduating CAMI students, because instructors know their students’ strengths and weaknesses, and can refer them to employers who will be the best fit for a specific opportunity. Because many instructors have had positive relationships with local companies, employers trust faculty input, which can be influential in facilitating a student being hired for a position or internship.

Internship and employment coordinators were designed to have vital roles in a CAMI student’s experience. These staff members interface with schools and companies on behalf of the program and students. They engaged school counselors, teachers, and parents in discussions about the value of a manufacturing career. Open houses, career days, and other related events were hosted to facilitate this endeavor. The overriding goal is to develop a pipeline of qualified students who have employment opportunities available when they graduate. Other supporting activities, such as career awareness courses, offered as credit or non-credit depending on the school, addressed these skills. They varied in intensity, but mostly focused on skills related to communication, team work, and other workplace competencies. Although the student population is diverse (i.e., age, experience), staff endeavor to develop a relationship and accommodate the needs of each student. For instance, the younger population of students may have no interview experience, so learning interview strategies (i.e., controlling nervousness, selecting attire, answering questions) is useful. If staff feel a student is not ready to move on from the career awareness course, they will continue to receive additional support through individual sessions or mentorship. Students were thankful for the résumé assistance as many had little experience creating one on their own. Some schools offer a résumé template that students can use when applying for a position, so potential employers will know they are a CAMI program student. According to survey data, students used résumé and mock interview services the most (See Table 9, Appendix F) and were most satisfied with one-on-one career advising (Table 6).

Table 6. Student Satisfaction with Career Services

	Y2		Y3	
	n	%	n	%
One-on-one career advising	44	75.0	57	89.5
Touring local employers' facilities	87	86.2	82	85.4
College internship placement	71	84.5	62	82.3
Résumé writing assistance	114	86.0	123	82.1
Interview practice	82	78.0	99	71.7
Job fairs	56	76.8	61	70.5

Note. Percentages include those who selected *Somewhat Satisfied*, *Satisfied*, or *Very Satisfied*.

Overall, CAMI colleges provided students with opportunities to receive career awareness support regarding résumés, mock interviews, soft skills, and internship and career placement. CAMI's industry partners feel that today's graduates have more knowledge than graduates of the past. One said, "What's happening today is they're advanced even further, and when they come out of community college, their technique and skills are so much better. They're more prepared."

Employer, Institutional, and Community Partnerships

Hezel Associates researchers accounted for contributions from partners through analysis of qualitative data collected through staff and employer interviews, student focus groups and program document review. The primary partners contributing across CAMI colleges are employers. As noted previously, schools convened with employers to gather input and feedback for the curricula being developed. Employers contribute to program design in a myriad of ways as well as supporting student outcomes. Finally, school districts continue to work with CAMI colleges to expand opportunities for College Connection students.

Employer

Some relationships between employers and CAMI partners existed before the TAACCCT grant. Through the grant, they have expanded their reach. Staff from one college reported that they have nearly 150 employer partners, while another described the relationship as "symbiotic." One employer described positive working relationship with the colleges, stating that "whenever you get educators and industry to sit across the table and work together and agree, that is a win-win."

Employer partners are heavily involved in the program design and curriculum development process. Their involvement is crucial to CAMI programs, and respondents expect the role of employers to grow in future years. Employers play a pivotal role in equipment procurement and lab design. Employers noted that recommendations are cost-effective, resulting in equipment that may not be as expensive as their companies' machines, but provides students with experience that will transfer to the workplace. One employer brought his team to campus and advised staff on "what type of equipment to buy and how to lay it out." Employers have also contributed to building program capacity by donating equipment and raw materials as well as cash contributions. Employers have even donated expensive machining equipment such as an Oracle Laser to support redesigned labs.

In addition to curriculum development, employers support student employment through attending open houses on college campuses, assisting with mock interviews, providing tours of their company's facilities, sending incumbent workers to complete courses, and asking for

referrals for students completing programs. Focus group data show that students are happy with the exposure they have to employers. For example, Naugatuck Community College (NVCC) holds a speaker series every Wednesday morning with employers from different companies who come to talk to their classes, which has led to internships for some students. MCC students enjoyed field trips they took to local companies to tour their facilities. Electric Boat is a large employer and provides “internships, tours, and speakers.”

Employers are also hiring interns from multiple programs. One company has a full-time recruiter who meets with prospective interns and employees, while other employers will recruit potential interns as early as possible to ensure they get one of the best students. In addition, employers regularly share job and internship openings to college coordinators through email. Finally, multiple colleges are finding success training incumbent workers. Most employers pay for workers’ schooling completely, while some have tuition reimbursement programs, with employees being compensated for tuition fees after successful completion of the program. Colleges are looking to increase the number of partnerships with companies to train incumbent workers in the future as they expand their programs.

Overall, relationships between the advanced manufacturing industry and CAMI colleges are strong. Pre-existing relationships between colleges and employers are being leveraged by stakeholders. CAMI staff are involving employers throughout the curriculum development process which will result in programs that teach skills that are in high demand. Employers support student employment in various ways, including providing internships and attending job fairs. Their guidance regarding equipment purchases and lab design are critical to ensuring students are experienced with the relevant equipment when they are eventually hired. The relationship between industry and CAMI partners is a driving force to the success of grant activities.

Institutional and Community

Resources provided by grant funding improved statewide communication for the CAMI network. The CAMI leadership team did an admirable job encouraging teamwork amongst CAMI institutions and this commitment to collaboration may pay dividends in the future. Partnerships between community colleges, local high schools, and industry organizations are vital to sustainability. For instance, employers would like to increase the number of partnerships between community colleges and industry organizations, as well as local high schools to “show younger students how important manufacturing is.” Employers are concerned that the perception of advanced manufacturing prevents people from pursuing careers in the field. CAMI staff are building a pipeline with local high schools to feed advanced manufacturing programs. CAMI colleges continue to develop important relationships with school districts to further expand the pool of potential students. Students completing College Connection programs will leave high school with certifications and credits towards a degree in hand.

Connecticut Workforce Investment Boards (WIBs) are contributing to CAMI as well. They have conducted presentations and are assisting with the recruitment of students. CAMI colleges provide the WIBs with information regarding college programs. The WIBs assist veterans and displaced workers with “financial counseling and paperwork.” Interviewees view the WIBs as partners, and communication with them is key to recruit students for CAMI programs. The level

of effectiveness of WIB involvement varied by college depending on the relationship with the WIB.

Overall, industry partners are involved in grant activities most prominently by providing feedback regarding program design and curriculum. CAMI staff are diligent at involving industry and seek to expand their role in the future through internships or other opportunities. Connecticut WIBs are playing their role as a recruiter and some constantly communicate with the schools.

Implementation Quality and Fidelity

Program management and implementation were assessed through analysis of program documentation and qualitative data from staff and employer interviews as well as student focus groups. These data provided evidence that CAMI colleges completed nearly all of the milestones listed in the project work plan and mostly on the intended timeline. In addition, partner colleges were successful in meeting many of the milestones applicable to their varied roles and responsibilities.

In terms of program management, the CPAM Project Director oversaw the project at the consortium-level while the seven colleges established internal teams to implement the project at the college-level. Partner colleges utilized program managers and coordinators, faculty, and other administrative staff to implement CAMI with fidelity and quality. Leadership led numerous webinars, info sessions, and workshops to train and assist staff on an ongoing basis.

CAMI leadership managed the grant exceptionally well with few minor exceptions. The Project Director was very effective in her role as the statewide coordinator. The Project Director and her team received high praise from community college partners and industry partners alike. The following section denotes specific strategies and accomplishments that staff endorsed as satisfied in terms of the management of the grant by the CAMI leadership team. Specifically, the Project Director and her staff have been “very supportive” and visited the colleges frequently. Communication and reporting support were two other areas highlighted by CAMI staff about grant leadership. One staff member remarked that the CAMI Project Director is “the best grant project director” he has ever worked with. Internal support from individual colleges’ administrations continues to be strong. Overall, CAMI grant leadership was very effective supporting and administering the grant for CAMI colleges.

Strategy 1

Strategy 1 for CAMI project implementation is to expand the capacity of college manufacturing facilities to support more students and new certificate programs. This strategy is broken down into two main activities: (a) renovate lab facilities to accommodate new equipment and programs, and (b) purchase and install equipment and instructional supplies to support new programs. A description of the findings for each of the two activities is included below. Overall, the evidence provided for Strategy 1 documents that CAMI staff are making progress to meet the milestones within or close to the expected timeframe.

Renovate lab facilities to accommodate new equipment and programs. This activity consisted of one milestone, which is to have all the renovations for the lab facilities completed by October

2015. During Year 1, CAMI staff also provided copies of purchase orders for engineering services for the TRCC and MCC AMCs. In Year 2, the following documents were provided: (a) additional purchase orders for materials, testing, design, and additional services agreed upon in the contract; (b) purchase requisitions, work contracts, authorizations for the Architects/Engineers to perform the agreed upon services at the AM centers; and (c) change order documents. All renovations to CAMI lab facilities were completed by the end of Year 3. CAMI staff are excited about the future with the new equipment.

Purchase and install equipment and instructional supplies to support new programs. There were two milestones for CAMI staff to meet in support of this activity. First, CAMI staff were expected to purchase all necessary equipment by the end of December 2015. During Year 1, documentation was provided that showed that CAMI staff had submitted equipment approval requests to the DOL. At that time, they expected that all equipment would be purchased by the end of the Fall 2015 semester. During Year 2, additional documentation was provided that showed that CAMI staff had submitted additional grant modification requests and equipment approval requests to the DOL. Additionally, approvals for the grant modifications and equipment purchases were also provided. During Year 1, the Project Director noted that CAMI staff planned to have the equipment installed before the start of the Spring 2016 semester. In Year 2, copies of bids, quotes, invoices, purchase requisitions, and purchase orders for parts, equipment, and the installation/set-up of parts for the projects were also provided. As of Year 3, both of these milestones were completed. The investments made in the program “can carry it” years in advance according to one staff member

Strategy 2

The focus of Strategy 2 is to scale up industry-driven training programs resulting in credentials. This strategy is comprised of four activities: (a) develop curricula and scale up delivery, (b) develop competency-based and hybrid manufacturing registered apprenticeships, (c) complete certifications (NIMS, AWS) for CAMI colleges, and (d) migrate courses to online and hybrid delivery. A description of progress towards the milestones of each of these four activities follows.

Develop curricula and scale up delivery. The first two milestones of this activity include hiring faculty and educational assistants, which is considered ongoing, and to complete all new curricula by the end of 2015. The documents provided by the Project Director in Year 1 included a grant-funded employee list, which demonstrated the hiring of faculty and educational assistants from August 2014 through April 2015. An updated list of grant-funded employees was provided during Year 2. Signed educational assistant appointment letters, dated March 2015 through June 2016 were also provided. This evidence documents progress towards the first milestone. In Year 1 and Year 2, documents also included course layouts for the one-year certificate program, showing CAMI staff are working towards finalizing curriculum. Additionally, in Year 2, applications for new program approval (Additive Manufacturing, Advanced Manufacturing, CAD/CAM) and a concept paper for a new program (Quality Inspection Certification Program) were also provided. Specific programs mentioned as being revised or developed include CAN, CNC programming, and Quality Inspection. New curriculum must be approved internally before being submitted to the Board of Regents. Individual schools have varying stages of internal review. Contextual factors influence the curriculum development process at each college, most

schools have accomplished or are near complete with their curriculum. Most curriculum-focused discussions with employers now revolve around expanding or revising programs to suit their needs. The third milestone of this activity is to increase the number of cohorts by 2015-2016. Most CAMI colleges expanded their programs to support additional cohorts in multiple ways (i.e., night classes, part-time).

Develop competency-based and hybrid manufacturing registered apprenticeships. The three milestones for this activity include: forming apprenticeship work groups by December 2014, establishing Registered Apprenticeship schedules by December 2014, and starting the Registered Apprenticeship trainings as of June 2015. CAMI staff provided an approval notice from the Connecticut Department of Labor for the colleges to offer registered apprenticeships. This approval was established as of August 2015.

Complete certifications (NIMS, AWS) for CAMI colleges. The first milestone of this activity is to have six of the colleges NIMS certified by September 2015. The Project Director provided documentation consisting of memoranda of understanding, marketing materials, and a list of students and faculty that have received NIMS credentials since October 2014. The documents provided are sufficient to show achievement of this milestone within the proposed timeline. The second milestone of this activity is to gain AWS certification for ACC by September 2015. As of Year 3, ACC was approved as a school where someone can complete an AWS exam, fulfilling this milestone.

Migrate courses to online and hybrid delivery. There are three milestones for this activity: (a) hire an online coordinator by January 2015, (b) complete all hybrid and online courses by the end of March 2016, and (c) evaluate and improve the courses by September of 2016. Though not completed by the expected date (during Year 1), documentation was provided that showed that CAMI staff had hired an online coordinator as of June 2015. In Year 2, CAMI staff provided a list of the hybrid/online courses that were available on SkillCommons as of September 1, 2016. Although this milestone was not completed by the proposed date (March 2016), this list is evidence that courses have now been migrated to a hybrid/online format. In Year 3, colleges made efforts to evaluate and improve their newly developed programs, including courses offered online. A CAMI staff member noted their new hybrid course was not drawing much interest, which may be something to monitor as more courses are migrated online.

Strategy 3

Strategy 3 focused on increasing participant retention and accelerating participant completion with student supports. This strategy is comprised of four activities: (a) recruit and orient participants to CAMI programs, (b) provide tutoring and online course modules that complement core courses, (c) provide PLA to participants, and (d) provide internship and job placement support. Findings based on the analysis of documentation for these four activities are detailed below.

Recruit and orient participants to CAMI programs. To complete this activity, the work plan stipulated that CAMI staff should hire Recruitment and Retention Coordinators at each WIB by January 2015. The memoranda of understanding provided by the Project Director to support progress toward this milestone show contracts were established with each WIB throughout the

spring and summer of 2015. The contracts establish an agreement to hire Recruitment and Retention Coordinators for the CAMI project. As of Year 3, this strategy was complete as recruitment coordinators were hired. Students reported learning about the program from a variety of sources and marketing efforts were made at the state level as well as the local level through print and radio advertisements. Marketing materials were also developed for CAMI colleges to use for events.

Provide tutoring and online course modules that complement core courses. In support of this activity, CAMI staff were expected to complete two milestones: (a) hire tutors and educational assistants by December 2014, and (b) purchase online course module licenses by January 2015. For the first milestone, the Project Director provided a grant funded employee list to document hiring of the tutors and educational assistants. This list shows they had been hiring tutors and educational assistants since August 2014 and continued to hire throughout Year 1. To demonstrate completion of the second milestone, the Project Director provided copies of an invoice and purchase order for ToolingU, software for the online course module. ToolingU was purchased in July 2015 according to these documents, slightly behind the proposed work plan date. Year 3 focus groups found that some students are completing Math Bootcamps, required by some CAMI colleges, while an option at others. Some students found the bootcamp to be helpful, as it helped them learn how to use cytometers, calipers, and other measurement tools. Others found it to be too basic, especially given that it was a non-credit course.

Provide PLA to participants. This activity consists of one milestone, which is to retain the PLA Coordinator from the TAACCCT Round 2 grant. In Year 2, the Project Director provided a budget modification request form. In the comments section of this form, the Project Director indicated that the reason for the modification was to transition the part-time employee to full-time in order to support PLA efforts. In Year 3, staff from QVCC held a seminar about PLA to share information, such as how to work with local high schools to award credits, resulting in more interest in using PLA by other colleges. PLA is being offered, but may not be consistent across colleges. For example, QVCC allows technical high school students to test out of the first semester, except for one course, to give students a head start on completing the one-year certificate. Additionally, in Year 3 the CAMI leadership team hosted a two-day professional development event sponsored by the Council for Adult Education and Learning for the entire community college state system.

Provide internship and job placement support. The milestone for this final activity of Strategy 3 is to hire Internship and Employment Coordinators by January 2015. Documentation shows the first Internship and Employment Coordinator was hired in June 2015 and the last coordinator was to be hired by October 2015. In Year 2, documentation was provided that confirmed that two additional internship and employment coordinators had been hired (appointments beginning May 2016 and July 2016). Although this milestone may not have been completed at all colleges by the proposed date (January 2016), it appears that it has been reached at this time. CAMI colleges are connecting employers to schools to offer paid and unpaid internships in addition to job placement support. Overall, this is an area of strength for CAMI schools as staff report great success with placing students before they complete their programs in some cases.

Strategy 4

For Strategy 4, CAMI staff are to strengthen and scale up the AMC sector-based approach to employment and training. The sole activity for this strategy is to increase employer involvement in all aspects of the college manufacturing programs. The first coordinator was hired as of June 2015, several months behind the expected date of January 2015. At that time, the Project Director noted that one additional coordinator would be hired by October 2015. In Year 2, signed Notices of Appointment/Exception Appointment were provided for two additional internship and employment coordinators. A signed Notices of Appointment for the original internship and employment coordinator, dated June 2016, was also provided. In Year 3, staff and employers reported strong relationships between colleges and employers developed as a result of advisory board meetings. In addition, many program instructors hail from industry. Industry partners meet with community college staff frequently, ranging from once per month to quarterly. Meetings will often include discussions about curriculum revisions or gaps in course offerings.

Strategy 5

The Project Director also provided documentation to demonstrate progress toward the Project Management and Evaluation activities outlined in the work plan. There are two activities for CAMI staff: (a) develop a plan to sustain the initiative after the grant ends, and (b) complete performance and financial reports and evaluation activities. A description of the findings for progress made toward each of these activities is included below.

Develop a plan to sustain the initiative after the grant ends. CAMI leadership began planning for sustainability early in Year 2 and has continued progress towards this goal. For example, the Project Director used evaluation findings to identify program components that were needed to sustain CAMI activities after the grant.

Complete performance and financial reports and evaluation activities. The work plan outlines five milestones for this activity. The first two milestones for this activity are to hire a Project Director by December 2014 and a project assistant by January 2015. Copies of employee contracts demonstrate completion of these two milestones; the Project Director and project assistant were hired in Year 1. The third milestone is to assign finance staff by December 2014. Though no evidence was provided to support completion of this milestone, the Project Director noted that they did assign finance staff to the CAMI project as of October 2014. The fourth milestone is to select an evaluator by the end of 2014. Evidence indicates that CAMI staff were able to procure the evaluator by January 2015. Lastly, the final milestone for this activity is to provide DOL reports and scorecards within federal deadlines. The Project Director provided copies of quarterly programmatic and fiscal DOL reports, demonstrating that CAMI staff successfully meeting this milestone within the appropriate timeline.

Participant Outcomes and Program Impacts

The CAMI program aimed to realize key outcomes relating to credential attainment and employment outcomes. The following sections detail students' achievement of these targeted outcomes, serving as an indication of student-level programmatic impact.

Core Targeted Programmatic Impacts and Outcomes

Hezel Associates was provided data from Abt Associates, a research firm that conducted the TAACCCT Round 4 National Outcomes Study. There were two sources of data stemming from

this work—a baseline and 12-month follow-up survey. Participants in the baseline study consisted of individuals who enrolled in a CAMI program between Fall 2016 and Fall 2017. The follow-up study was intended to measure outcomes 12 months post-enrollment. As such, it was administered to any individual who was enrolled in Fall 2016 or Spring 2017, and who had also participated in the baseline study. Findings from these surveys are presented below.

Baseline Outcomes Survey

In total, 359 CAMI students participated in the baseline outcomes study. Most students were from ACC (46.2%), followed by NVCC (21%), QVCC (20%), and MCC (12.5%). Further, more than 80% of participants represented Machining/Manufacturing Technology programs, followed by Computer Aided Manufacturing (11.7%), and Welding Technology (7.8%). Study participants were primarily male (88.9%), and were about 30 years of age on average (SD = 11.11). Students were also largely enrolled full-time (88.3%). The most important reason for students' decision to enroll in the program was for a career change (34.6%), followed by finding work (26.5%) and career advancement (22.1%). Other less popular rationale included educational advancement (8.1%), personal reasons (5.9%), and other factors (2.8%). Students' experience in industries related to their CAMI training ranged widely, with some only having just entered the industry a few short months ago and others encompassing more than 30 years of experience. Most, however, lacked prior industry experience (66.3%).

Fifty percent of students reported being currently employed, working at one or more businesses. Further, while 40% were unemployed at the time, they had worked one or more jobs during the prior 12 months. Few students (n = 11) had been out of work for longer than the previous 12-month period, and only 3% had never been employed. The hourly wage of those that were employed averaged about \$12.90 (SD = 3.63), while the mean hourly wage of those who were unemployed at the time of the study, but had worked within the last 12 months, was \$16.87 (SD = 7.38). The industries of the businesses within which participants worked ranged greatly, however more than 25% were in manufacturing. Additionally, more than 10% of participants' companies were from "Other Services" industries, which could include domains like automotive repair and maintenance or commercial and industrial machinery repair and maintenance. Further, 8.4% of businesses were in transportation and warehousing and 6.1% within construction. Other unrelated fields included retail (15.2%) and accommodation and food (11%). Nearly 64% of participants intended to be working for pay within the next few months, and expected to work about 30 hours per week (SD = 11.11).

12-month follow-up survey

In total, 140 students participated in the follow-up study, of which more than 70% had successfully finished taking required program courses. Only 20% withdrew without completing, and nearly 9% were still enrolled. During program enrollment, many students reported being offered opportunities for direct experiences with occupations related to their studies or career goals. Engaged experiential workforce opportunities included internships (65.2%), work study jobs (49.6%), apprenticeships (47%), and clinical experiences (31.7%). Moreover, industry professionals were deeply involved in the instructional components of students' experiential learning, as most students (78.1%) either visited or were visited by employers to learn about industry happenings. Some students were even taught by local employers (33.1%), making their educational experiences even more authentic and reflective of the real-world industrial context.

Related, 69% of survey participants reported earning industry recognized certificates, licenses, or credentials as a result of completing required coursework. These credentials are perceived as highly valuable attainments (among industry employers, program participants, and CAMI staff, alike), often increasing candidates' marketability and competitiveness. Some of the professional certifications identified as being earned included EMES Block; NIMS: Measurement, materials, and safety; Machine mathematics; OSHA-10; NIMS: Job planning, benchwork, and layout; Exelon; CNC1; Department of transportation 1" and up; Welding steel 1/8"–3/4"; Three-eighths structural steel SMAW certification in 1–4b position; Manual machining; CNC milling operator; and Information CAD. This diverse list of professional certifications earned by CAMI participants is demonstration of the collective richness, abundance, and breadth of knowledge acquired during the program, all of which is ready to be applied in practical industry settings.

Many occupational support structures were in place at CAMI institutions. More than half of students received career counseling more generally (51.9%), as well as job search or placement assistance more specifically (66.4%). Particular services received included help with creating or editing résumés, navigating the job search (i.e., figuring out different sources of information for job openings), using web-based job search engines (i.e., Monster), finding specific job leads, filling out job applications, and practicing for job interviews. These efforts were well received, and likely had a positive influence on students' employment outcomes. More than 80% of participants reported currently working for pay. On average, respondents earn \$17.68 per hour (SD = 5.85), and are working full-time at nearly 40 hours per week (M = 39.26, SD = 8.95). Most notably, about 60% of individuals indicated that their job is closely related to the education and training received as part of CAMI programming, with another 16.7% of jobs being somewhat related. Overall, findings from this follow-up survey indicate that CAMI programming has had positive influences on participants' employment outcomes. The majority of participants are working for pay, earnings have increased, most of those employed are working full-time hours, and job positions are largely within relevant industries—all of which are illustrations of CAMI's realization of desired impacts.

Realization of Additional Impacts and Outcomes

Programs supported student development through offering courses that focused on study skills, workplace skills, and general life skills, each of which addressed performance gaps identified by industry employers. More than 55% of students participated in these soft-skills oriented courses or trainings. Students exposed to these supports perceived offerings targeting career planning and finding or moving to a different job as getting *a great deal of attention* during instruction (59.5% and 65.8%, respectively). Related, acting professionally (64.5%), working in groups (51.3%), critical thinking and problem-solving (50%), staying motivated (43.8%), communicating well (41.3%), and managing time effectively (40.8%) were also heavily highlighted, all of which are significant skillsets for quality workplace performance. These non-technical developmental preparations served as catalysts for career-readiness, equipping students with the confidence and capacity to effectively complete functions required of industry professionals.

Limitations to Interpretations

A minor limitation of the outcomes findings is extant wage data from the TAACCCT Round 4 National Outcomes Study were based solely on student self-reports. Data from the National

Directory of New Hires, a national repository of employment information, were also intended to be incorporated to understand impacts. These data would have provided an additional perspective on employment outcomes but could not be obtained in time for this report. Further, only a subset of CAMI students participated in the National Outcomes Study, thus there is a chance that results might not fully reflect the CAMI population more generally. As such, it is important that considerations regarding limitations and associated implications are engaged during the consumption of conclusions derived from these data.

CONCLUSIONS

Overall, the CAMI grant created a great foundation for advanced manufacturing in Connecticut. Specific conclusions and recommendations for improvement and sustainability beyond the grant are as follows:

- Many programs are offering expanded manufacturing coursework and additional associates' degrees or certificates which were initially made possible by the grant renovations to lab spaces. Renovations also allow for the expansion of program offerings and the capacity to handle more students. The addition of state-of-the-art lab equipment and expanded outreach on manufacturing careers and program offerings has greatly contributed to colleges' increased perception of manufacturing as a more viable career path. Additionally, the improved statewide collaboration and increased attention to student outcomes tracking will benefit colleges after the grant ends. Finally, sustainability will be supported by new partnerships developed through the grant with employers and community partners as they aim to change the perception of manufacturing in Connecticut.
- Resources provided by grant funding improved statewide communication for the CAMI network. Local industry employers were crucial in decision making regarding curriculum changes. Additionally, consultation with other colleges helped steer expansion of existing programs and creation of new ones. The CAMI leadership team did an admirable job encouraging teamwork amongst CAMI institutions and this commitment to collaboration may pay dividends in the future. Partnerships between community colleges, local high schools, and industry organizations are vital to sustainability.
- Program design and delivery methods differ at individual colleges as staff endeavor to coordinate their programs with local employer needs. The AMC model served as the basis for initial course offerings. This model was developed by ACC and adopted by consortium partners. Delivery methods varied between colleges with most having a cohort structure and some having condensed schedules for full time participants. In addition, CAMI colleges offered some online and hybrid courses. Investments in staff, equipment, and supplies, especially for colleges developing new programs, have expanded program access for students (i.e., day classes, night classes, accelerated courses).
- The development and implementation of training programs was based on critical relationships and ongoing collaboration with industry partners. Foundational competencies and credentials were identified as essential elements of one-year programs. The cohort structure and focus on hands-on learning were included as core elements of coursework. Finally, third-semester certificates were created, enabling participants to develop an area of specialty before entering the workforce. Students reported that hands-on training, basic manufacturing skills, and certifications/credentials are most beneficial to their careers.
- Colleges provided students with opportunities to receive career awareness support regarding résumés, mock interviews, soft skills, and internship and career placement.

CAMI's industry partners feel that today's graduates have more knowledge than graduates of the past. Staff regularly e-mailed students with internship, apprenticeship, and job opportunities from local industry employers. Staff worked with workforce agencies to find opportunities for students, and to a lesser extent, workforce agencies sent students to the CAMI programs.

- CAMI programs have not adopted a uniform assessment process, as institutions have established universal entry requirements for all incoming students. CAMI colleges assess students' English and math proficiency, review student transcripts, and often conduct interviews with interested students. Students who require remedial math or English improvement before entering a program are afforded the opportunity via boot camps or tutoring. Support staff, particularly full-time tutors and advisors were deemed by CAMI college staff as extremely helpful from beginning to end of the grant program.
- The CPAM Project Director oversaw the project at the consortium-level while the seven colleges established internal teams to implement the project at the college-level. Partner colleges utilized program managers and coordinators, faculty, and other administrative staff to implement CAMI with fidelity and quality. The leadership staff were responsive and supportive, including leading numerous webinars, info sessions, and workshops to train and assist staff on an ongoing basis. CAMI colleges completed nearly all of the milestones listed in the project work plan and mostly on the intended timeline. In addition, partner colleges were successful in meeting many of the milestones applicable to their varied roles and responsibilities.
- Additional staff (i.e., employment coordinators and tutors) were beneficial for increased outreach, recruitment, and educational assistance; many programs would like to again hire additional staff, pending available funds. Many of the participating colleges would like to expand manufacturing class and certificate program offerings, but are constrained by state budgets. The increased marketing efforts were helpful in student recruitment, but budgets may not permit the continuation of those efforts.
- The exact structure of career services varied depending on the college; however, common to most was the relationships between college staff and industry, the commitment of instructors, additional support staff (internship and employment coordinators), and an emphasis on career readiness and soft skills.
- Students were offered opportunities for direct experiences with occupations related to their studies or career goals, including internships, apprenticeships, and clinical experiences. Moreover, industry professionals were deeply involved in the instructional components of students' experiential learning (i.e., hosting site visits, visiting classrooms, serving as CAMI instructors), making educational experiences even more authentic and reflective of the real-world industrial context.
- Participants have earned a breadth and abundance of industry recognized certificates, licenses, or credentials as a result of completing required coursework. These highly valuable attainments increased candidates' marketability and competitiveness.

- Occupational support structures were in place within CAMI programs, which provided students with career counseling and job search or placement assistance. Particular services surrounded résumés writing, job search navigation, job application completion, and mock interviewing. These efforts were well received, and likely had a positive influence on students' employment outcomes.
- Non-technical developmental preparations (i.e., study skills, workplace skills, general life skills) served as catalysts for career-readiness, equipping students with the confidence and capacity to effectively complete functions required of industry professionals.
- Overall, findings indicate that CAMI programming has had positive influences on participants' employment outcomes. The majority of participants are working for pay, earnings have increased, most of those employed are working full-time hours, and job positions are largely within relevant industries—all of which are illustrations of CAMI's realization of desired impacts.
- Strong industry partnerships, additional support staff, industry-aligned curriculum, and improvements to facilities and technology appear to have collectively contributed to positive programmatic outcomes. Employer guidance during the curriculum development and lab design processes were critical to ensuring students gained the experience required for their entrance into the workforce. Support staff—particularly, full-time tutors and advisors—were perceived to be helpful by program stakeholders, and deemed as highly valuable assets from program start to grant end. Across the consortium, lab facilities were renovated to accommodate new and revised programs developed through the grant, serving as an environmental context that could adequately support student learning and development. The foundational skills targeted through CAMI programming equipped participants with the proficiencies needed to successfully perform duties required of entry-level positions. Most notably, however, is that each of these individual program components acted in tandem to create a comprehensive whole. The intentionality behind CAMI's synchronous design structure coupled with the effectiveness of its integrated implementation supported the delivery of a strong program, and subsequently, realization of intended outcomes.

APPENDIX A: DETAILED METHODOLOGY

Hezel Associates implemented a mixed methods evaluation to conduct a formative and summative evaluation of the CAMI TAACCCT Round 4 project implementation and outcomes.

The evaluation was designed to answer the following questions.

Implementation

1. How was the curriculum selected, used, or created?
2. How was the CAMI program managed and implemented, in terms of administrative structure and management, program design and delivery methods, and support services?
3. To what extent did the program complete proposed milestones with quality and as defined by the timeline?
4. How did CAMI colleges assess participants' abilities, skills, and interests to select participants into the grant program?
5. What advising strategies were used to provide career guidance for prospective and current CAMI participants?
6. What contributions did each of the partners (employers, workforce systems, other training providers and educators, philanthropic organizations, and others as applicable) make in terms of (a) program design, (b) curriculum development, (c) recruitment, (d) training, (e) placement, (f) program management, (g) leveraging of resources, and (h) commitment to program sustainability?
7. To what extent has institutional capacity changed as a result of CAMI?

Impact/Outcomes

8. To what extent did the CAMI program increase the attainment of certifications, certificates, diplomas, or other recognized credentials?
9. What impact did CAMI programs have on participants' employment outcomes?
10. What are the factors that contribute to students educational/employment outcomes?

The following sections detail the data collection and analysis process applied throughout the evaluation.

Data Collection

Throughout the 4-year grant, Hezel Associates collected data from a variety of stakeholders using multiple methods. Each data collection method is described below.

Document Review

Hezel Associates developed the Document Review Framework (see Appendix B) to assess implementation fidelity. The framework is a matrix that outlines project activities, milestones, and deliverables stipulated in MCC's proposal to the DOL. The framework also includes space for evaluators to record the date each milestone was accomplished, the status of meeting the milestones, and the evidence provided to demonstrate meeting the milestones. This instrument allowed Hezel Associates to address evaluation questions 1 through 7.

The four main strategies analyzed are listed below.

- Expand the capacity of community college facilities to support more students and new certificate programs.
- Scale up industry-driven training programs resulting in credentials.
- Increase participant retention and accelerate participant completion with student supports.
- Strengthen and scale up the AMC sector-based approach to employment and training.

MCC shared various project-related documents with Hezel Associates over the 4-year period to demonstrate progress toward the overarching strategies. As documents were received, Hezel Associates logged the document title, date, and a brief description, and recorded notes in the framework describing how the documentation supports completion of or progress toward meeting the priorities.

Staff Interviews

Hezel Associates developed a semi-structured Staff Interview Protocol (see Appendix C) to guide conversations with project staff. The Staff Interview Protocol contains 13 open-ended items that address organizational structure and governance, curriculum development, program design, partner support, suggestions to strengthen the project, program sustainability, and overall impressions of the project. Interview items were aligned with evaluation questions 1, 2, 4, 5, 6, and 7.

There were four rounds of staff interviews throughout the project period, starting at the end of the Spring 2015 semester. Each round, the Project Director provided Hezel Associates with a contact list of individuals involved in the TAACCCT 4 project. The evaluator contacted each individual via email, describing the background of the evaluation and purpose of the interview, and asking for their availability to participate in an interview. A reminder email was sent a week later to those who had not yet responded. Once staff responded with dates and times they were available for an interview, the evaluator sent a confirmation email with a consent document attached. Interviews were recorded with participant permission and later transcribed for analysis. Table A1 displays the number of individuals recruited for each round of interviews, the number of individuals who participated, and the colleges represented.

Table A1. Staff Interview Participation Rate

Year	Recruited	Participated	Colleges
Spring 2015	14	11	7
Spring 2016	22	10	6
Spring 2017	22	7	5
Spring 2018	22	5	5

Employer Interviews and Focus Groups

Hezel Associates developed a semi-structured Employer Interview Protocol (see Appendix D) to guide conversations with employer partners. The open-ended questions were designed to obtain feedback from respondents regarding their role in curriculum development, interaction with CAMI students, and other contributions to CAMI programs, as well as the potential impact of CAMI on their industry. The protocol was adapted for one employer focus group and aimed to address evaluation questions 1 through 7.

There were three rounds of employer interviews/focus groups, starting in the Spring of 2016. For each round, the Project Director provided Hezel Associates with a contact list of local industry partners involved in the TAACCCT 4 project. The evaluator contacted each individual via email, describing the background of the evaluation and purpose of the interview, and asking for their availability to participate in an interview. A reminder email was sent a week later to those who had not yet responded. Once the employers responded with dates and times they were available for an interview, the evaluator sent a confirmation email with a consent document attached. Interviews were recorded with participant permission and later transcribed for analysis. Interviews were conducted with employers identified as contributors to the CAMI consortium by the CAMI staff. The employers represented all seven participating community colleges participating in CAMI. One employer focus group was conducted with 10 employers using the interview script. Interviews and focus group were recorded with the permission of the participants, and transcribed later for analysis. Table A2 displays the number of individuals recruited for each round of interviews, as well as the number of individuals who participated.

Table A2. Employer Partner Interview Participation Rates

Year	Recruited	Participated
2016	49	6
2017	49	13

Student Focus Groups

Hezel Associates developed a semi-structured focus group protocol to gather student perceptions of the TAACCCT Round 4 grant-funded programs. The protocol contained 10 open ended items, covering topics like course content, program structure, support services, and thoughts career opportunities. The Student Focus Group Protocol is included as Appendix E.

Hezel Associates conducted in-person focus groups in grant years 2, 3, and 4. The Project Director worked with consortium partners to recruit participants for the focus groups. Two Hezel Associates researchers visited the schools on a pre-scheduled date. One researcher conducted the focus group while the other supported by taking notes. Focus groups were recorded with the permission of the participants and transcribed later for analysis. Students who did not consent to participating in the focus group or being recorded were asked to leave before the session started. Table A3 displays the colleges represented by focus groups and the semester the focus group was conducted.

Table A3. Participating Colleges

School	Semester
Manchester Community College	Spring 2016
Asnuntuck Community College	Spring 2017
Quinebaug Valley Community College	Spring 2017
Naugatauck Valley Community College	Spring 2016
Three Rivers Community College	Spring 2017
Middlesex Community College	Spring 2018
Housatonic Community College	Spring 2018

Student Questionnaire

Hezel Associates developed a questionnaire for CAMI participants, which contained 23 questions. The questionnaire was designed to obtain feedback from students regarding their perceptions of CAMI curriculum and program design, demographic information, employment opportunities, support services, addressing evaluation questions 1, 2, 4, 5, 6, and 7. The questionnaire was administered twice by college coordinators at the end of the Spring semester of 2016 and 2017 at CAMI colleges in paper/pencil format. The surveys were then collected, batched, and mailed to Hezel Associates. Hezel Associates researchers built a datafile and manually entered the data to begin analysis activities. A total of 228 surveys were returned in Year 2 and 226 surveys in Year 3. The Student Questionnaire is included as Appendix F.

Data Analysis

Hezel Associates analyzed data from each data collection method separately, then summarized, compared, and synthesized findings to answer the evaluation questions. The analysis methods used for the evaluation are described in the following sections.

Document Review

Hezel Associates collected and sorted program documentation received from the Project Director, compiling a list of documents received, along with a brief description of the contents of each document. Once documents were collected and sorted, each document was compared against the Document Review Framework. Hezel Associates described document content and a description of what project staff have done to justify fulfilling project milestones under “Evidence.” The dates project staff fulfilled each milestone, based on document dates, were listed under “Date.” Hezel Associates marked the status for meeting the listed milestones as (a) “met with documentary evidence,” (b) “met through self-reporting,” (c) “not met,” or (d) “in progress.” In addition, for milestones that were met, Hezel Associates noted fidelity to the work plan timeline. Notes recorded under “Evidence” were analyzed for concepts related to evaluation questions 1 through 7.

Interviews and Focus Groups

Hezel Associates used an open-coding system that cultivated into an emergent scheme to guide interview and focus group analysis. This allowed for ideas and concepts to develop as the evaluator analyzed the data. Narrative from interview transcripts was parsed into bits of content and fit to the emergent coding system. The evaluator identified patterns, which became themes that represented the conceptual relationships between and/or among activities and related outcomes. This recursive process systematized turning bits of information into descriptions, raising descriptions to low-level inferences, and transforming inferences into higher-level interpretations, thus allowing for conclusions to be established.

Student Questionnaire

Descriptive statistics were used to analyze the Student Questionnaire. Some questions were also analyzed in cross tabulation with other variables, such as the college the respondent attended, to show a further breakout of those data points. These frequencies served the basis for generating several types of tables (Appendices F). Demographic data were also collected along with the survey responses to develop a more detailed profile of the participants (i.e., age, gender,

ethnicity, highest level of education, etc.). The respondent profile is available in Appendix G and contains the complete breakout of the responses to these questions.

Extant Student Data

Extant data from a TAACCCT Round 4 Outcomes Study were received from Abt Associates, including a baseline and 12-month follow-up survey. Descriptive statistics were performed on these data (i.e., frequency, percentage, mean, standard deviation), offering a snapshot of resulting participant outcomes.

APPENDIX B: DOCUMENT REVIEW FRAMEWORK

Strategy 1: Expand the capacity of college manufacturing facilities to support more students and new certificate programs				
<i>Associated costs – Equipment, instructional supplies, renovation</i>				
Activity 1.1: Renovate lab facilities to accommodate new equipment and programs				
Milestones	Proposed Date	Completion Date	Status	Evidence
a. Renovations completed	10/2015			
Activity 1.2: Purchase and install equipment and instructional supplies to support new programs				
Milestones	Proposed Date	Completion Date	Status	Evidence
a. Equipment (including new 3 rd semester equipment) purchased by 12/31/15	12/31/15			
b. Equipment (including new 3 rd semester equipment) installed by 3/31/16	3/31/16			
Strategy 2: Scale up industry-driven training programs resulting in credentials				
<i>Associated costs – Instructors, EAs, Online Course Coordinator, Credentialing Coordinator, professional development, curriculum development, tech HSs</i>				
Activity 2.1: Develop curricula and scale up delivery (i.e., third-semester certificates)				
Milestones	Proposed Date	Completion Date	Status	Evidence
a. Faculty + EAs hired (ongoing)	12/1/14-9/30/17			
b. All new curricula complete	12/31/15			
c. Colleges increase # of cohorts by 2015-2016	2015-2016			

Activity 2.2: Develop competency- based and hybrid manufacturing Registered Apprenticeships				
Milestones	Proposed Date	Completion Date	Status	Evidence
a. Apprenticeship WG formed	12/1/14			
b. 1 st RA Education Schedules	12/31/14			
c. RA trainings begin	6/30/15			
Activity 2.3: Complete certifications (NIMS, AWS) for CAMI colleges				
Milestones	Proposed Date	Completion Date	Status	Evidence
a. 6 colleges NIMS certified	9/30/15			
b. Asnuntuck AWS certified	9/30/15			
Activity 2.4: Migrate courses to online and hybrid delivery				
Milestones	Proposed Date	Completion Date	Status	Evidence
a. Online coordinator hired	1/1/15			
b. All hybrid/online courses complete	3/31/16			
c. Evaluate + improve	9/30/16			

Strategy 3: Increase participant retention and accelerate participant completion with student supports				
<i>Associated costs – Recruitment/Retention Coordinators, EAs, tutors, Internship/Employment Coordinators, online course modules, marketing</i>				
Activity 3.1: Recruit and orient participants to CAMI programs				
Milestones	Proposed Date	Completion Date	Status	Evidence
a. RR Coordinators hired at each WIB	1/1/15			
Activity 3.2: Provide tutoring and online course modules that complement core courses				
Milestones	Proposed Date	Completion Date	Status	Evidence
a. First tutors + EAs hired	12/1/14			

b. Online course module licenses purchased	1/1/15			
Activity 3.3: Provide PLA to participants (especially veterans)				
Milestones	Proposed Date	Completion Date	Status	Evidence
a. PLA Coordinator continues from Round 2 grant	10/1/14-9/30/17			

Strategy 4: Strengthen and scale up the AMC sector-based approach to employment and training				
<i>Associated costs – Internship & Employment Coordinators</i>				
Activity 4.1: Increase employer involvement in all aspects of college manufacturing programs				
Milestones	Proposed Date	Completion Date	Status	Evidence
a. IE coordinators hired	1/1/15			

Project Management & Evaluation				
<i>Associated costs – Third party evaluator, review of grant deliverables</i>				
Activity 5.1: Develop a plan to sustain the initiative after the grant ends				
Milestones	Proposed Date	Completion Date	Status	Evidence
a. Plan completed with early implementation in 2017	1/1/17			
Activity 5.2: Complete performance and financial reports and evaluation activities				
Milestones	Proposed Date	Completion Date	Status	Evidence
a. Project Director hired	12/1/14			
b. Project Assistant hired	1/1/15			
c. Finance staff assigned	12/1/14			
d. Evaluator selected	12/31/14			
e. Reports + Scorecard completed by federal deadlines	-			

APPENDIX C: STAFF INTERVIEW PROTOCOL

Organizational Structure/Management

To start off, I'd like to talk about the organizational structure and management of the CAMI project.

1. Please describe your role in the CAMI grant.
2. Have you received enough support from college leadership and CAMI leadership managing your grant?²
(Probe: budgeting, managing the grant, quality of training, project start-up, dissemination of information, delegation of responsibilities)
3. Have you had any interaction with other CAMI colleges?²
(Probe: any example?)

Curriculum Development

4. Could you tell me about where you are in curriculum development process? *(If not, skip to Program Implementation)*^{1, 2}
5. Please describe your role in curriculum development.^{1, 2}
6. *(If curriculum development has started)* Could you walk me through the curriculum development process?^{1, 2}
(Probe: how it was/will be selected/created/used, communication methods, plan for industry alignment, challenges, alignment with industry certifications)
7. *(If curriculum development not started yet)* Could you tell me about the certificates you are developing?¹
(Probe: how it will be selected/created/used, communication methods, plan for industry alignment)

Student Support

8. Can you describe your college's processes for assessing CAMI prospective students' skills and abilities?³
(Probe: soft skills, technical skills, changes since the start of the grant)
9. How does your college provide career guidance and advising for both prospective and current CAMI students?³
(Probe: differences from other students)
10. What kind of support do you plan to offer CAMI students inside and outside the classroom?

Partner Support

I'd like to know more about partner support...

11. Can you tell me about the contributions that partners have made or are planning to make to the program?⁴

(Examples—employers, workforce agencies, external education providers with program design, curriculum, recruitment, training, resources, or commitment to sustainability)

(Probe: factors impacting involvement, most and least critical contributions, challenges, successes)

Conclusion

12. Describe any capacity building within the college that you expect to see as a result of this project.⁵

(Probe: programmatic, procedural, cultural)

13. What is your overall opinion of the CAMI project?

APPENDIX D: EMPLOYER INTERVIEW PROTOCOL

Involvement in CAMI

14. To begin, tell me a little about your company/organization.
15. Please describe your involvement in the Advanced Manufacturing program at [COLLEGE]?^{1,2,4} (*Probe: new relationship or existing, frequency of meetings, factors impacting involvement, challenges to partnership*)
3. What contributions have you or your organization made to the program at [COLLEGE]?^{1,4} (*Probe: curriculum development, equipment, most and least critical contributions, partnerships, incumbent workers*)
4. How will the program affect your organization/company?⁴ (*Probe: need for workers, hiring of workers, different employee skill sets, current employee training*)
5. What skills do you look for when hiring new employees?⁴ (*Probe: soft skills, technical skills*)
6. What affect will this program have on advanced manufacturing in the entire region?^{2,5} (*Probe: building interest, changing perceptions, political implications, institutional capacity*)

Sustainability

7. What aspects of the advanced manufacturing programs are you most satisfied with/excited for?^s (*Probe: Focus on CAMI supported initiatives, apprenticeships*)
8. Do you plan on having incumbent workers from your organization receive training through the program?^s (*Probe: online training, hybrid courses, Tooling U*)
9. What do you think is needed to continue to improve the advanced manufacturing in your area?^s (*Probe: connections with high schools, marketing, partnerships, soft skills*)

Conclusion

10. What is your overall opinion of the CAMI project?
11. Do you have any suggestions for improving the project? (*Draw from any negative answers to previous question*)

APPENDIX E: PARTICIPANT FOCUS GROUP PROTOCOL

1. As I mentioned, we want to learn about your experiences in the Advanced Manufacturing program. To start off, I'd like to hear about your experiences enrolling in the program.^{s, 2}
(Probe: *why did you pick it, how did you hear about it*)
2. I know you all have different backgrounds and experiences. Did the college assess your skills or previous educational experience before you entered the program?⁴
(Probe: *PLA, Interviews, Boot Camp*)
3. I'm interested in the different ways students are learning advanced manufacturing. Can you describe the educational experience in this program?^{3, s, 1}
(Probe: *online learning, toolingU, hands-on classroom experience*)
4. What is your opinion of the way your program is structured?^{2, 1}
(Probe: *issues, benefits, hours, courses offered*)
5. What are some of the ways your program is preparing you for a career in Advanced Manufacturing?^{4, 5, s}
(Probe: *skills, career guidance, internships, job search, interactions with local employers*)
6. What aspect of the program is most important to your success?^{2, s}
(Probe: *hands-on experience, structure, curriculum, exposure to industry*)
7. What are your plans once you leave your program?
(Probe: *credentials, employers, career path*)
8. I'm interested to know what your perception of manufacturing was before you entered the program?^s
(Probe: *changes in perception, desire to learn more*)
9. What is your overall opinion of the program?
(Probe: *suggested changes*)

What else would you like to share about your program that we haven't talked about?

APPENDIX F: PARTICIPANT QUESTIONNAIRE

1. What is your date of birth? (MM/DD/YYYY) _____
2. What is your gender? Male Female Other Prefer not to answer
3. Which of the following best describes you? Mark ***all that apply***.
 - American Indian/Alaska Native Native Hawaiian/Other Pacific Islander
 - Asian White
 - Black/African American Prefer not to answer
 - Hispanic/Latino Other _____
4. At what college are you enrolled in your current Advanced Manufacturing program?
Write the full name (example: Asnuntuck Community College). _____
5. What is the name of the manufacturing program you are enrolled in? _____
6. What semester did you begin the program? Fall 2015 Spring 2016 Other _____
7. When will you complete the program? Spring 2016 Fall 2016 Other _____
8. **Before enrolling in your Advanced Manufacturing program, what was the highest level of education you completed?** Mark ***one*** choice.
 - Completed some high school Bachelor's (4-year) degree
 - High school diploma or equivalent Master's degree
 - Some college Doctoral degree
 - Earned a one-year (or less) certificate Other _____
 - Associate's (2-year) degree
9. **When enrolling in your Advanced Manufacturing program, in what way did the college assess your prior experience?** Mark ***all that apply***.
 - Math and English placement tests Technical skills test
 - Interview with college staff None
 - Prior Learning Assessment Other _____
10. **Why did you enroll in your current Advanced Manufacturing program?** Mark ***all that apply***.
 - Interest in the field 4-year school is too expensive
 - To gain new skills Recommended by family or friend
 - To pursue a new career The accelerated pace of the program
 - To receive higher wages Other _____
 - To receive a promotion
11. **What was your educational goal when you entered the program?** Mark ***one*** choice.
 - Complete 1-3 courses through my employer Transfer to a 4-year school for bachelor's degree
 - Complete a short-term certificate Eventually earn a Master's degree
 - Complete my apprenticeship training Other _____
 - Earn an associate's (2-year) degree

12. Which best describes your work experience before you began your Adv. Man. program? Mark one choice.

- I did not have any prior work experience in my field
- I had experience in an unrelated field
- I had experience in a field similar to my program

13. How would you describe the changes, if any, to your potential employment options as a result of your completion of this program? Mark one choice.

- My employment options are the same.
- I have fewer options for employment than before.
- I have more options for employment than before.
- Unsure

14. Which of the following, if any, did help or will help you get a job? Mark all that apply.

- Job placement help through the college
- Internship experience
- College-organized tour of employer facility
- Connection with an employer through a job fair
- Personal connection to an employer through friends or family
- Local workforce agency (Workforce Investment Board)
- None of the above
- Other _____

15. Did you or will you earn any of the following industry-recognized credentials or receive recognized training by one of the organizations listed below? Mark all that apply.

- American Welding Society (AWS)
- Lean Six Sigma
- Occupational Safety and Health Admin.(OSHA)
- National Career Readiness Certificate (NCRC)
- National Institute for Metalworking Skills (NIMS)
- MSSP–CPT (Certified Production Technician)
- SME–Certified Manufacturing Technologist (CMfgt)
- Other credential _____
- I did/will not earn any credentials
- Do not know

16. The aspects of the program that are most beneficial to you are... Mark all that apply.

- Amount of hands-on training
- Passion of my instructors
- Exposure to local employers
- Internship I found as a result of the program
- Basic manufacturing skills I learn
- Accelerated schedule of the program
- Certifications/credentials I will receive
- Career advising
- Connections college staff have to industry
- Other _____

17. Did you participate in an internship during your time in the manufacturing program?

- Yes
- No
- Does not apply

18. If you completed an internship last semester or you have an internship this semester, to what extent do you agree or disagree with the following statements?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
There was an identified mentor assigned to work with me at the internship site	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would accept a job offer from my internship site	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Skills learned in the lab helped me at my internship site	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am better prepared for work in the manufacturing field as a result of my internship	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would recommend this employer site to other students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19. To what extent do you agree or disagree with the following statements? Mark one choice for each statement.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree	Not applicable
a. Instructors have appropriate expertise in the equipment and technology used.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. The program teaches the basic manufacturing skills needed to get a job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. The equipment and technology used is up-to-date in the field of Advanced Manufacturing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. The equipment and technology is preparing me for my career.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. I am satisfied with the amount of hands-on training I received in my Advanced Manufacturing program.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20. To what extent do you agree or disagree your Advanced Manufacturing program prepared you with the ability to do the following in a work setting. Mark one choice for each statement.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree	Not applicable
a. Apply math skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Apply quality control knowledge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Apply technical skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Apply writing skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Effectively communicate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Lead groups of people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Manage my time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Operate equipment used in the industry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Prioritize tasks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. Troubleshoot technical problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. Complete tasks that I'm assigned	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l. Work as a member of a team	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m. Follow safety standards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21. Have you used any of the following educational services while enrolled in your advanced manufacturing program? How satisfied were you with the service?

	Did you use...				If yes, how satisfied were you with the service?						
	Yes	No	Unsure	Prefer not to answer	Very dissatisfied	Dissatisfied	Somewhat dissatisfied	Neutral	Somewhat satisfied	Satisfied	Very satisfied
a. Academic advising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Scholarship money	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Tutoring	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Federal financial aid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Peer mentoring	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Funding from an employer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Use of open lab time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. Math Bootcamp	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. ToolingU	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. Have you experienced any of the following career services? How satisfied were you with the service?

	Did you experience...				If yes, how satisfied were you with the service?						
	Yes	No	Unsure	Prefer not to answer	Very dissatisfied	Dissatisfied	Somewhat dissatisfied	Neutral	Somewhat satisfied	Satisfied	Very satisfied
a. Job fairs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Interview practice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. College internship placement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. One-on-one career advising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Résumé writing assistance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Touring local employers' facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21. Please write any additional comments or suggestions for your program in the space below. Thank you for taking the survey!

APPENDIX G: STUDENT SURVEY RESPONSES

Table 7. Credentials Expected to be Earned Through the Program

	Y2		Y3	
	n	%	n	%
Use of open lab time	119	65.2	116	64.4
Federal financial aid	98	53.8	88	48.9
ToolingU	71	39.1	77	41.6
Scholarship money	68	29.7	64	35.4
Academic advising	54	37.1	57	32.2
Tutoring	33	16.9	42	23.2
Peer mentoring	31	18.1	34	19.1
Funding from an employer	22	12.0	25	14.0
Math Bootcamp	19	10.3	10	5.6

Note. Respondents were allowed to select all that apply.

Table 8. Credentials Expected to be Earned Through the Program

	Y2 (n = 217)	Y3 (n = 209)
	%	%
NIMS	41.5	59.8
OSHA	40.6	44.5
Lean Six Sigma	17.1	18.2
SME	4.1	1.9
NCRC	1.4	1.4
MSSP-CPT	0.9	0.5
AWS	8.3	0.5
Will not earn any creds	5.5	7.2
Other	2.8	1.9
Do not know	31.3	21.1

Note. Respondents were allowed to select all that apply. Y2 Other responses include: "NDT Level 2," "OSHA IO." Y3 Other responses include: "Deans list," and "Heat Treat Cert."

Table 9. Students Receiving Career Services

	Y2 (n = 221)	Y3 (n = 209)
	%	%
Job placement assistance	57.0	60.3
Internship	47.1	45.3
Friends/family connection	27.1	26.2
Job fair	13.1	16.4
Facility tour	16.3	15.0
WIB	8.1	12.2
None	14.5	12.6
Other	4.5	3.7

Note. Respondents were allowed to select all that apply. Y2 Other includes: "Already employed," "Already had a job," "already worked in the field," "so paying tuition for me to attend," "didn't get that for ahead," "Job postings," "helping me out," "with résumé and telling us about jobs," "Self," "Self employed." Y3 Other responses include: "Personal connections to local business," "Internet, Self-employment," "Have a job in the field.," "Skill set acquired through certificate.," "Temp Agency," and "Not Sure."

Table 10. Student Participation in Internships

	Y2 (n = 177)	Y3 (n = 178)
	%	%
Yes	45.3	42.7
No	56.5	57.3

Table 11. Student Agreement with Internship Assessment Statements

	Y2		Y3	
	n	%	n	%
I would accept a job offer from my internship site.	56	80.1	70	73.7
I am better prepared for work in the manufacturing field as a result of my internship.	57	81.4	67	72.8
Skills learned in the lab helped me at my internship site.	56	79.7	65	70.7
I would recommend this employer site to other students.	53	75.7	64	68.8
There was an identified mentor assigned to work with me at the internship site.	46	65.7	57	59.4

Note. Percentages include those who selected *Agree* or *Strongly agree*.

Table 12. Student Anticipated Change in Employment Post-graduation

	Y2 (n = 219)	Y3 (n = 214)
	%	%
I have more options for employment than before.	70.3	79.4
My employment options were the same.	11.0	7.5
I have fewer options for employment than before.	1.8	0.9
Unsure	16.9	12.2

Table 13. Prior Experience Assessment Methods Use by Each College

	Total	Asnuntuck CC	Housatonic CC	Manchester CC	Middlesex CC	Naugatuck Valley CC	Quinebaug Valley CC	Three Rivers CC
	(n = 222)	(n = 85)	(n = 35)	(n = 7)	(n = 22)	(n = 21)	(n = 37)	(n = 13)
Year 2	%	%	%	%	%	%	%	%
Math and English	71.6	80.0	65.7	71.4	59.1	52.4	73.0	84.6
Technical skills test	22.5	18.8	74.3	42.9	4.5	4.8	5.4	0.0
Interviews	21.2	12.9	54.3	42.9	18.2	33.3	2.7	15.4
PLA	18.5	9.4	51.4	28.6	18.2	14.3	10.8	15.4
None	9.5	7.1	0.0	0.0	18.2	19.0	18.9	0.0
Other	5.9	4.7	0.0	14.3	18.2	4.8	2.7	15.4
Year 3	(n = 206)	(n = 56)	(n = 34)	(n = 0)	(n = 36)	(n = 55)	(n = 23)	(n = 1)
	%	%	%	%	%	%	%	%
Math and English	68.0	82.1	64.7	-	38.9	80.0	56.5	0
Technical skills test	11.2	7.1	20.6	-	11.1	12.7	4.4	0
Interviews	19.4	3.6	29.4	-	30.6	23.6	17.4	0
PLA	14.1	5.4	26.5	-	13.9	14.6	17.4	0
None	12.1	7.1	11.8	-	11.1	12.7	21.7	100
Other	8.7	1.8	5.9	-	30.6	3.6	8.7	0

Note. Y2 Other responses include: "already held degree," "AP high school test credit and SAT scores," "Math only," "N/A," "OPP," "Previous Student Associates General Studies," "Previous student college," "Safety test," "TABE Test," "Transcripts," "Transfer credits made it so no placement test needed," "went to technical high school for this field." Y3 Other responses include: "Previous Certificate," "College," "Key Testing," "Transcript," "Transcript and Resume," "Associates Degree Transcript," "Transcript," "Transfer Credits," "BA," "Previous Experience," "Work," "Had college course work done."

Table 14. Student Utilizing Career Services

	Y2		Y3	
	n	%	n	%
Résumé writing assistance	125	66.8	135	72.6
Interview practice	84	44.9	109	58.9
Touring local employers' facilities	88	47.0	92	49.2
Job fairs	56	30.0	71	38.0
College internship placement	67	35.6	67	36.6
One-on-one career advising	42	22.7	63	33.7

APPENDIX H: STUDENT SURVEY RESPONDENT PROFILE

The data presented in this appendix reflect information from students who completed the questionnaire in Year 3 and 4. The following tables display student ages, gender, and race/ethnicity. Most student participants were between the ages of 18 and 35, male, and identify as white.

Table 15. Student Age Ranges

	Y2 (n = 228)	Y3 (n = 215)
	%	%
18-24	47.8	37.7
25-35	26.8	28.8
36-45	9.6	10.7
46-56	6.6	7.4
Older than 56	2.6	7.0
Not answered	6.6	8.4

Table 16. Student Gender

	Y2 (n = 220)	Y3 (n = 203)
	%	%
Male	92.3	89.2
Female	7.7	10.8

Table 17. Student Ethnicity

	Y2 (n = 228)	Y3 (n = 213)
	%	%
White	64.5	60.1
Hispanic	13.6	16.9
Black	11.0	12.7
Asian	5.7	6.1
Native American	0.4	2.3
Hawaii Pacific	0.4	0.9
Other	2.6	3.3
Prefer not to answer	4.4	4.2

Note. Respondents were allowed to select all that apply.

Table 18. Student College Distribution

	Y2 (n = 226)	Y3 (n = 226)
	%	%
Asnuntuck	38.5	28.4
NVCC	16.4	26.0
Middlesex	15.9	17.2
Housatonic	10.2	16.7
Quienebaug	9.3	10.7
Three Rivers	6.2	0.5
Manchester	3.5	0.5

Table 19. Highest Level of Prior Education

	Y2 (n = 221)	Y3 (n = 211)
	%	%
Master's degree	0.0	1.0
4-year degree	6.8	9.0
2-year degree	3.2	9.0
1-year certificate	1.4	2.8
Some college	29.9	30.8
High school diploma	55.2	44.6
Some high school	2.7	1.4
Other	0.9	1.4

Note. Y2 Other includes: "Still in high school," "TWL + DIE at wilcox tech." Y3 Other includes: "Porter and Chester Institute," "Tool and Die," "G.E.D.," "1."

Table 20. Prior Employment Experience

	Y2 (n = 222)	Y3 (n = 213)
	%	%
I had experience in an unrelated field.	35.6	41.3
I had experience in a similar field.	33.8	32.9
I did not have any prior experience in my field.	30.6	25.8

Table 21. Reason for Enrollment

	Y2 (n = 227)	Y3 (n = 215)
	%	%
To gain new skills	67.0	64.7
Interest in field	68.7	62.8
To pursue new career	59.5	51.6
To receive higher wages	47.6	48.4
Recommended by family	26.9	30.7
Accelerated pace of the program	26.0	16.3
4-year school is too expensive	15.0	11.6
To receive a promotion	11.0	10.2
Other	4.8	3.7

Note. Respondents were allowed to select all that apply. Y2 Other includes: "Accomplish a dream," "All the above," "Better Myself," "Company suggested it," "Hands on," "Likes math," "Take class w/ spouse," "Work @ Pratt & Whitney thought it would be useful," "work recommended." Y3 Other includes: "USDOL CAMI," "Employment," "Laid off," "Gain self worth," "self confidence," "self esteem," "Knowledge," "TAA Program w/ prior experience in the field.," "To receive higher pay."

Table 22. Educational Goals

	Y2 (n = 224)	Y3 (n = 213)
	%	%
Complete a short-term certificate	48.7	49.0
2-year degree	26.8	23.2
Transfer to 4-year school	17.0	11.0
Apprenticeship training	8.0	8.0
Earn a master's degree	4.5	4.6
Complete 1 to 3 courses through my employer	4.5	1.3
Other goal	9.4	3.0

Note. Y2 Other responses include: "Certificate, Certificate + specialize," "Certificate Program," "Complete Course," "Expand current knowledge," "Find a career i would be happy doing everyday.," "full time employment," "Gather information," "get a job," "I want to continue my training when i have the money." "The TAA grant is paying for the certificate but nothing past that.," "make money," "None," "Upskilling to improve self employment possibilities." Y3 Other responses include: "Employment," "Get a job," "Complete 30 credits in technical training/trades.," "Experience."