

Accelerated Pathways in Advanced Manufacturing TAACCCT Round 3 Final Evaluation Report

Report to:
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EXECUTIVE SUMMARY

The Community College of Rhode Island (CCRI) implemented a project focused on developing pathways for individuals interested in pursuing advanced manufacturing careers. The Accelerated Pathways in Advanced Manufacturing (APAM) project, funded by the U.S. Department of Labor's (USDOL's) Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant program, was intended to address both a skills gap in the advanced manufacturing field and a high statewide unemployment rate.

Program Description

Beginning in 2014, the APAM grant team focused on creating a series of advanced manufacturing programs using employer input, as well as increasing CCRI's capacity for supporting students in transferring and earning credits from prior experiences. As outlined in the project work plan, strategies included (a) creating a statewide Education Commons to serve as an intake center and resource for adult workers; (b) developing opportunities for students' career advancement through design of career pathways leading to "stackable" credentials; (c) building capacity for identifying labor market needs and ensuring that programs are streamlined to address those needs; and (d) fostering local, regional, and national partnerships that link skills gaps to program planning.

Specifically, the APAM team engaged local industry to provide insight into skills needed for advanced manufacturing workers by executing a Developing a Curriculum (DACUM) process. Through this process, several employers and APAM staff and faculty convened with the purpose of discussing skills needed for employment and aligning that with existing course/program competencies. Using this input, gaps were identified in existing curricula. The APAM team then developed a new associate's degree and three new certificate programs that centered around those gaps, which included design, machining, and quality control. These programs integrate extensive hands-on training using new equipment and software, purchased as part of the grant.

To support not only advanced manufacturing students, but all CCRI students, the team researched and developed a new prior learning assessment (PLA) process. Now part of the application process for all incoming CCRI students, the Accelerator tool allows students to complete an online assessment to identify their experiences that may be eligible for credits, which is then followed up with one-on-one advising. The types of experiences eligible for credits for prior experiences (e.g., various exams, military training credit) increased from 5 methods to 15, giving students more options. The new process is intended to increase student retention and completion rates.

Finally, major APAM project goals were to increase institutional capacity and facilitate new partnerships that further local, regional, state, and national goals in terms of workforce development, particularly in the advanced manufacturing field. APAM's work toward engaging industry, developing new programs, and revising student supports such as PLA, aligned with the state of Rhode Island's postsecondary education and workforce development goals. These goals included improving articulation and transfer between state colleges, and the Manufacturing Initiative, aimed at increasing the number of skilled workers in the industry.

Evaluation Design

The APAM team partnered with Hezel Associates to evaluate the fidelity of grant activity implementation and progress toward completion of deliverables and impacts on participating students. The evaluation was guided by the following nine research questions focused on implementation and student outcomes.

Project Implementation

1. How was the program managed and implemented?
2. How was the curriculum selected, used, or created?
3. How did grantees assess participants' abilities, skills, and interests to select participants into the grant program?
4. To what extent were credit for prior learning protocols implemented?
5. 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?
6. To what extent was institutional capacity changed?

Project Impact

7. To what extent did the APAM program increase the attainment of certifications, certificates, diplomas, or other recognized credentials?
8. To what extent did APAM program activities increase student retention rates for Trade Adjustment Assistance (TAA)-eligible workers and other adults?
9. To what extent did the APAM program improve participants' employment outcomes?

The evaluation team utilized a mixed method approach, using both qualitative and quantitative data. Data sources included employer and industry stakeholder interviews in Years 3 and 4, annual in-person and telephone discussions with project staff and faculty, a student questionnaire implemented in Year 4, two student focus groups in Year 4, and program documents from all grant years. Student outcome data (i.e., certificate attainment, retention, and employment) were not available because programs started in Year 3, not giving enough time for students to achieve retention, completion, or employment outcomes. Therefore, project impact evaluation questions were only partially addressed by data from sources used in the implementation evaluation.

Each year, data were analyzed and triangulated to determine annual findings. In the fourth year of the grant all data were synthesized to culminate in overall findings for the entire APAM project.

Findings

The evaluation of the APAM project found that:

- Mid-grant changes in CCRI and grant leadership appear to have resulted in increased progress of grant activities and fostering of new partnerships with industry and other colleges.
- Local employers are pleased with the newly developed advanced manufacturing certificate and associate's degree programs, believing that the curricula reflect the skills

they seek in employees. They expect that these programs will ultimately result in a more skilled workforce.

- Advanced manufacturing programs consist of substantial hands-on and experiential work in order to prepare students for the workplace. Students are able to practice on up-to-date machinery and software programs that are used in the industry.
- Outreach to potential and current students, including open houses, career fairs, and expansion of advertising, increased under the grant. Staff believe that these activities are increasing enrollment.
- The new Liston Campus advanced manufacturing lab in Providence expands the reach of the new programs, as it has the potential to draw students from an untapped population.
- Enrollment in the Poised for Success course, intended to help students identify their skills and interests and relate those to a career pathway, has been low.
- Changes made to the PLA processes have the potential to help many students, as well as increase retention and program completion across CCRI. These changes include a more student-friendly platform and enhanced options for credit awards.
- Local advanced manufacturing employers have been actively working with APAM staff and faculty to train and employ qualified candidates, giving regular feedback on curricula and attending career fairs. Many of these employers intend on continuing their relationship with CCRI post-grant.
- The APAM program activities align with statewide priorities regarding articulation, higher education, and workforce development.

Conclusions

In terms of policy implications, the work from the APAM project has the potential to inform college-level and other statewide initiatives aimed at education and workforce development. In particular, the PLA system revisions were recognized by Council for Adult and Experiential Learning (CAEL), a national organization that assists higher education institutions in aligning education to career opportunities. CCRI's PLA process was developed with CAEL's assistance and they have expressed interest in expanding the finished product as a model for other colleges to follow nationally. As more Accelerator metrics become available, the outcomes of this work will be more apparent, allowing for further revisions and adaption into other contexts.

Additionally, the APAM team's commitment to employer engagement in the curriculum development and revision process is a process that could be replicated in other colleges. Through the DACUM process and continued convening of the Advisory Board, industry partnerships helped shape the advanced manufacturing programs by addressing skills needed and ensuring equipment and software aligned with the workplace. CCRI has identified the Advisory Board as an important tool to sustain the integrity of the programs, and intends to hold meetings beyond the grant funding. Currently, faculty and some staff maintain relationships with industry, though it could be a challenge to continue these and establish new partnerships without a staff member dedicated to this task. Without regular and frequent interactions between CCRI and those companies, partnerships could become ineffective and the college could lose valuable insight into industry trends. That said, a new grant awarded in early 2017 may allow CCRI to create this position and maintain those industry relationships.

Based on the evaluation findings, Hezel Associates offers the following recommendations to CCRI for program improvement and sustainability:

- Communicate availability of the Poised for Success course in order to increase enrollment. This course has the potential to address soft skill gaps employers identified; therefore, increased enrollment could develop more skilled workers.
- Maintain communication and involvement with advanced manufacturing employers, through a dedicated staff member.
- Determine metrics and processes to measure success of programs and support services, such as employment outcomes (e.g., wage changes) and student/faculty perceptions of PLA processes.

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INTRODUCTION

The Community College of Rhode Island's (CCRI's) U.S. Department of Labor (USDOL) Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant focused on developing advanced manufacturing career pathways for adult workers. The Accelerated Pathways in Advanced Manufacturing (APAM) project intended to improve intake assessment tools and prior learning protocols; further develop and modify credentials with substantial input from industry; provide avenues for CCRI to better identify and monitor labor market needs; and bring this work to the local, regional, and national stage to foster relationship-building and long-lasting partnerships.

Over the four-year grant period, APAM staff developed three certificate programs and an associate's degree program in advanced manufacturing, to be included in the Engineering and Technology Department's offerings. These were created with substantial input from local employers, and required investment in new, state-of-the-art equipment and machines to support student learning. To provide additional benefits for students, the APAM project team also overhauled the prior learning assessment (PLA) processes for all of CCRI, with the intent to help incoming students gain the appropriate credits for their prior experiences and further facilitate retention and completion.

These new programs, as well as the PLA changes, aligned with statewide workforce development and postsecondary education priorities in Rhode Island. The APAM team has helped to bring together CCRI, local four-year institutions, advanced manufacturing employers, and the state government to further training and employment opportunities for Rhode Island residents.

The APAM team partnered with Hezel Associates to conduct an external evaluation for the grant period. Through a mixed methods approach, Hezel Associates has provided formative findings to further project improvement and assist APAM in meeting USDOL requirements. The following report reflects final evaluation findings and recommendations generated from all four grant years. The following questions guided the evaluation and are discussed in this report:

Project Implementation

1. How was the program managed and implemented?
 - 1.1. How were programs and program designs improved or expanded using grant funds?
 - 1.2. What delivery methods were offered?
 - 1.2.1. To what extent was technology-enabled instruction integrated into the new and enhanced programs?
 - 1.3. What was the program administrative structure?
 - 1.4. What support services and other services were offered?
2. How was the curriculum selected, used, or created?
 - 2.1. How has experiential learning (e.g., Bootcamps) been integrated into the new and enhanced programs?
3. How did grantees assess participants' abilities, skills, and interests to select participants into the grant program?
 - 3.1. What assessment tools and processes were used?
 - 3.2. Who conducted the assessment?

- 3.3. How were the assessment results used?
- 3.4. Were the assessment results useful in determining the appropriate program and course sequence for participants?
- 3.5. Was career guidance provided and, if so, through what methods?
 - 3.5.1. Was the Poised for Success career prep course implemented as intended?
- 4. To what extent were credit for prior learning protocols implemented?
- 5. 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?
 - 5.1. What factors contributed to partners' involvement or lack of involvement in the program?
 - 5.2. Which contributions from partners were most and least critical to the success of the grant program?
- 6. To what extent was institutional capacity changed?
 - 6.1. How were protocols for credit for prior learning institutionalized?
 - 6.2. How has experiential learning been integrated into all CCRI programs?
 - 6.3. To what extent have career advising changes been incorporated throughout CCRI?
 - 6.4. To what extent have intake assessment changes been incorporated throughout CCRI?
 - 6.5. How has the Academic Program Review been implemented and how has it been integrated into other areas at CCRI?
 - 6.6. Were new interdisciplinary liberal arts courses created, and if so, how were they integrated into pathways?
 - 6.7. To what extent were professional development activities for faculty and representatives from industry offered and utilized?
 - 6.8. To what extent was awareness of adult learners' needs changed for CCRI faculty and staff?

Project Impact

- 7. To what extent did the APAM program increase the attainment of certifications, certificates, diplomas, or other recognized credentials?
- 8. To what extent did APAM program activities increase student retention rates for Trade Adjustment Assistance (TAA)-eligible workers and other adults?
- 9. To what extent did the APAM program improve participants' employment outcomes?

The findings in this report are separated by research question.

METHODS

The evaluation of the APAM project was designed to provide formative and summative findings for APAM grant staff. This evaluation was a mixed methods study. The following section outlines those data collection and analysis methods used throughout the life of the project.

Instrumentation and Data Collection

The following instruments and data collection methods were developed and used by Hezel Associates for the APAM program evaluation.

Document Review Framework

In an effort to examine APAM project activities' fidelity to the proposed project implementation, evaluators reviewed project documents to determine the alignment of actual project activities with milestones identified in the work plan. APAM's work plan was adapted to serve as a framework to align project documents with proposed strategies and activities. Corresponding research questions were noted for each strategy and activity in the framework. Using the framework as a guide, Hezel Associates and APAM project staff identified appropriate documents for review, including meeting minutes, course syllabi, and marketing materials. Relevant documents were transferred to evaluators via email or were retrieved directly from the CCRI website. The framework, with final status and evidence noted, is included as Appendix A.

Program Staff and Faculty Interviews

In Years 2 and 3, evaluators interviewed staff and faculty associated with the APAM project. In Year 2, a 12-question protocol was created to guide interviews, included in Appendix B. Participant contact information was provided for six individuals by the Project Director. The evaluation team recruited and conducted interviews with those six individuals in February 2015. A document with consent language, explaining the risks and benefits of participating in the research, was emailed to each interviewee prior to the interview. Interview questions focused on curriculum design, administrative structure, partner contributions, and institutional capacity. Researchers took notes during the interviews and the interview audio was recorded, with participant permission. Interview recordings were later transcribed.

In Year 3, the evaluator visited CCRI in July 2016 to meet in person with various program staff and faculty. Each meeting included the evaluator and one or two staff/faculty members involved with APAM. Conversations in these meetings were loosely structured, and were guided by one to two questions focused on status of work plan activities that the interviewee was most knowledgeable about. The evaluator interviewed seven members of the APAM team over the course of one day. The evaluator took handwritten notes during interviews and converted these into digital transcripts on a later date. To collect further project information, staff provided written responses to interview questions via email in November 2016. Guiding questions were updated from the Year 2 protocol to reflect developments in the project, and are included in Appendix B. Responses were collected from three project staff members, all of which were new to the project and were not interviewed in Year 2.

Employer/Industry Stakeholder Interviews

Employers and industry stakeholders involved with the APAM project were interviewed in Years 3 and 4. In Year 3, a six-question protocol (Appendix C) was developed to guide interviews.

Contact information for 15 employers was provided by APAM staff. Hezel Associates attempted to recruit all 15 for interviews; however, based on interviewee response and availability, researchers conducted telephone interviews with nine individuals. While not all 15 were interviewed, the sample consisted of a variety of company sizes, technical areas, and number of years in business, and is likely representative of the population. Interviews were conducted in March and April 2016, each taking approximately 15 minutes. A document with consent language, explaining the risks and benefits of participating in the study, was emailed to each interviewee prior to the interview. Each interview was digitally recorded, with interviewee permission, and then transcribed to be used for analysis.

In Year 4, questions in the interview protocol were updated to shift focus to the future, beyond the grant (Appendix C). APAM staff provided contact information for five employers. Due to low interviewee response and lack of availability, only two interviews were conducted, in February and March 2017. Each was approximately 15 minutes. A document with consent language, explaining the risks and benefits of participating in the study, was emailed to each interviewee prior to the interview. Each interview was digitally recorded, with interviewee permission, and then transcribed to be used for analysis.

Participant Questionnaire

A questionnaire was developed by Hezel Associates to solicit current APAM students' perceptions of aspects of their program and support services, as well as their plans to complete their education. The questionnaire consisted of 29 items, specifically focused on (a) program enrolled and current status, (b) how they heard about the program, (c) their experiences with prior learning assessment, (d) course format and content, (e) equipment used in the program, (f) their expectations of completing their program and when, (g) career fairs, (h) the Poised for Success course, and (i) overall program perceptions. Item types varied, with some asking respondents to select one or more answers from an option list and others on a 7-point scale, ranging from *strongly disagree* to *strongly agree*. A series of demographic/characteristic questions were also included, which covered gender, race/ethnicity, age, TAA status, and veteran status. Three open-ended questions asked respondents to comment on CCRI's advanced manufacturing instructors and coursework, as well as their experience at CCRI in general. This instrument is included as Appendix D.

The questionnaire was administered online using the Qualtrics survey program. CCRI provided a list of 508 student emails, consisting of all students who participated in an advanced manufacturing program from 2012 to 2017. Hezel Associates programmed the questionnaire and sent it via email to the list of 508 in late April 2017. The APAM Project Director sent a reminder in early May. A total of 16 students completed the questionnaire (3% response rate). This low response rate was likely due to conflict with students' end of year activities, such as final exams. Demographic and other characteristics collected from the questionnaire are included in Appendix F. Other data from the questionnaire are included in corresponding sections of the report.

Student Focus Groups

In order to gain more in-depth information regarding student perceptions of the APAM programs, Hezel Associates conducted two focus groups with current students at the CCRI campus in April 2017. These were guided by an eight-question protocol, which asked students

about their experiences with (a) the enrollment process, (b) prior learning, (c) their specific program, (d) support services, and (e) future career opportunities and plans, and how their program has influenced those plans. This protocol is included as Appendix E.

Focus groups were conducted during class time and each lasted 30 minutes. The first consisted of five students and the second of six students. Consent documents were provided to the students for review prior to the start of each focus group. One evaluator facilitated and recorded each focus group. Recordings were later transcribed for analysis.

Student Data

Student outcome data such as certificate attainment, retention, and employment, were not available for the evaluation. New programs started in Year 3, not giving enough time for students to achieve retention, completion, or employment outcomes. Therefore, project impact evaluation questions were only partially addressed by data from sources used in the implementation evaluation.

Data Analysis

Researchers examined implementation fidelity to the project work plan and timeline by categorizing and reviewing project documents. Once documents were reviewed, progress was recorded in the Document Review Framework under the corresponding strategy and activity. The status was recorded including whether or not the milestone was met and if it was met within the proposed timeframe.

To analyze the interview narrative record, researchers used a preordinate scheme, based on the research questions, to fit content and themes. Narrative was reviewed and segments were parsed and assigned to the appropriate research question. Under each research question, similar segments were grouped and themes emerged. These themes were then used to answer the corresponding research question. Focus group narrative was analyzed in a similar manner.

Analysis of Participant Questionnaire data consisted of calculation of descriptive statistics. Frequencies were calculated for all items, and means/standard deviations were determined for scale items.

Findings across all data collections were triangulated (compared and contrasted), based on the research questions, to determine overall findings for the program.

Limitations

Considering the limited sample size of data from the student questionnaires and the use of qualitative data findings from interviews and focus groups, the reader should use caution when estimating the extent to which opinions formed through these data can speak for the population as a whole. The findings from these data are intended to provide feedback on the APAM project activities only. Additionally, the lack of student-level data limits the ability to make statements about impact or outcomes of the APAM program on students.

FINDINGS

As evidenced by data collected throughout the project, APAM activities were largely completed. Leadership changes in Year 3 appear to have driven the progress, which included additional program development, renewed outreach to prospective students, PLA process changes, and active engagement with local advanced manufacturing employers. Much of the progress has the potential to create long-lasting institutional changes at CCRI. The following describes findings in more detail, separated by research question.

Program Management and Implementation

The management structure and program delivery of the APAM project, as intended and as implemented, is described in the following section.

Project Administration

While most Round 3 grants were awarded funds in October 2013, the APAM project funding release was delayed due to a USDOL-required resubmittal of the proposal. The grant was approved in March 2014, and funds were released in June 2014. Therefore, grant start-up activities began at least 6 months later than intended, which caused delays in several activities. Despite the timing setback, the initial project team, consisting of a Project Director, a Vice President of Academic Affairs, a Project Manager, and two career specialists, accomplished some of the Year 1 and 2 activities on the scheduled timeline. These included creation of a design team, development of the Poised for Success course, and implementation of the Manufacturing Bootcamp. The two part-time career specialists were to focus on academic and career advising for APAM students; however, the majority of students they worked with through the summer of 2016 intended to pursue programs other than advanced manufacturing.

The structure of the APAM program administration underwent major changes at the close of 2015 and in early 2016. In terms of overall leadership for the college, Rhode Island's Council on Postsecondary Education appointed a new president of CCRI in December 2015. Moreover, a new Vice President of Academic Affairs, who spearheads the APAM program, and a new APAM project director were appointed in early 2016. A PLA and Career Advancement Coordinator was also hired to facilitate PLA changes, and an Outreach Coordinator was hired to organize marketing and manage connections with manufacturing employers. In early 2017, more staffing changes occurred, with the PLA and Career Advancement Coordinator taking over as APAM project director and one of the two career specialists moving into the role of the PLA and Career Advancement Coordinator. The other career specialist was hired as a general advisor, assisting all CCRI students. Additionally, the Outreach Coordinator position was eliminated in March 2017.

The initial staffing changes (in 2016) appeared to be positive for the APAM program, as indicated by the renewed focus and progress on completing grant deliverables. Some employers interviewed mentioned this change in leadership and expressed optimism that it will result in a culture at CCRI that is more engaged with the local advanced manufacturing industry.

However, the loss of the Outreach Coordinator was viewed as a setback, particularly by students. From the Summer of 2016 until March 2017, the Outreach Coordinator was active in informing

potential students not only about existing programs, but the newly offered certificates and associate’s degree programs. Methods of outreach included:

- Creation and sharing of a video via YouTube that highlights the new advanced manufacturing programs and student successes¹
- Two APAM open house events in the Summer of 2016 and one in the Fall 2016 Semester, which aimed to inform and recruit new students into all APAM programs
- A career fair in the Fall of 2016, which gave enrolled advanced manufacturing students an opportunity to meet local employers and learn about the new APAM programs
- Expansion of the APAM marketing campaign through formal advertising, such as radio and billboards

Staff reported that these outreach activities resulted in increased inquiries from potential students, resulting in new student enrollment. Specifically, the open houses resulted in 6 to 8 new student enrollments per event, according to staff. In addition to general outreach, the Outreach Coordinator worked directly with Davies Career and Technical High School to garner student interest. Outreach and marketing was seen a new venture for CCRI as a whole, as it was not viewed as a necessity in the past.

Students who responded to the questionnaire indicated that their main method of learning about their APAM program was through the CCRI website. The following figure also shows that some heard about it through their employer, CCRI faculty, and other websites. None indicated methods such as brochures/flyers, through alumni, CCRI email, veteran services organizations, or workforce/unemployment agencies.

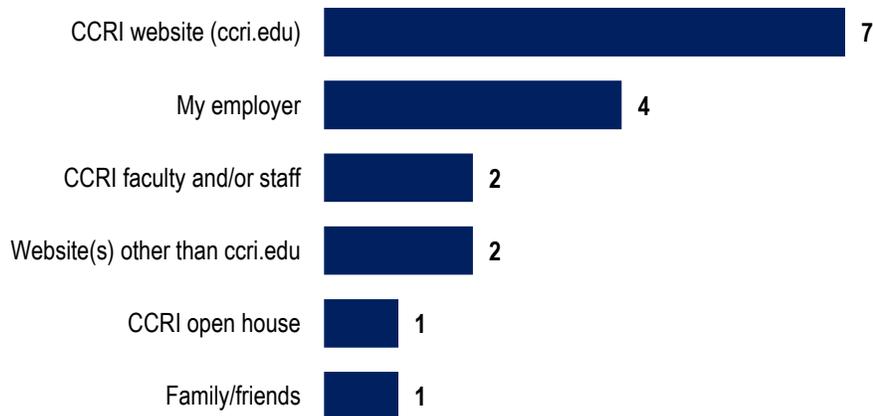


Figure 1. How Students Learned about APAM Programs (n = 16)

Note. Respondents were able to select more than one option.

Students who participated in the focus groups explained that the Outreach Coordinator also facilitated connections between enrolled students and local companies, helping them to secure internships and permanent employment. They expressed concern about losing those connections after her departure, noting that it left a “huge void.” They believe that someone needs to be a “liaison between industry and students” and are unclear how these relationships will be

¹ <https://www.youtube.com/watch?v=JaFcDfmvUvU>

maintained in the future. However, according to project staff, a new grant awarded to CCRI may fund a position similar to the Outreach Coordinator, reestablishing the connection between industry and students (see more details in the *Institutional Capacity and Statewide Policy* section).

Program Changes

Three new certificate programs and one associate's degree program were developed and currently have enrolled students (described in more detail in the *Curriculum Development* section). Courses in these programs incorporate substantial hands-on work, using new equipment and software purchased as part of the grant. Most courses consist of in-person instruction in a lab setting, as indicated by student focus groups, the questionnaire, and discussions with project staff. Students who responded to the questionnaire agreed that this method of instruction was appropriate for the content.

Also of note, new advanced manufacturing lab space at CCRI's Liston campus in Providence was retrofitted and opened for courses in the Spring of 2017. An open house was held in December 2016 to launch the site. This event was attended by students, project staff and program faculty, industry representatives, the president of CCRI, and the Director of the Rhode Island Department of Labor and Training (RIDLT). This was not specifically a deliverable of the TAACCCT grant, but expands CCRI's capacity to offer advanced manufacturing courses in an urban location to a population not previously served, potentially increasing enrollment.

Also under this grant, the APAM staff built the Education Commons, a webpage housed within the CCRI website intended to inform prospective students and incumbent workers of various prior learning assessment methods and educational pathway options. Content includes links to placement testing information, available educational pathways, career opportunities, as well as links to external sites like the RIDLT.

Curriculum Development

A goal of the APAM project was to develop new certificate programs and non-credit courses in advanced manufacturing, housed within CCRI's Engineering and Technology Department, that address industry needs. Three new certificate programs and an associate's degree program were developed in the 2015-16 academic year, approved in the summer of 2016, and offered to students in the Fall 2016 Semester.

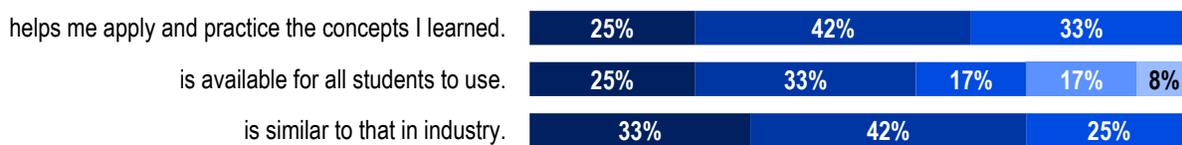
The development process for the new programs took place in Year 3. CCRI contracted with Worldwide Instructional Design System (WIDS) to guide the Developing a Curriculum (DACUM) process. This method includes multiple stakeholders and is designed to graphically connect specific occupational duties to curricula, helping to identify competencies needed for employment. According to program documents, the in-person DACUM meeting took place in October 2015 and was attended by nine local employers. The process allowed the employers to express their opinions on what skills would be needed for an advanced manufacturing technician position. Additional feedback was generated via one-on-one meetings between employers and CCRI. This culminated in a "crosswalk," a table indicating the extent to which skills employers desire are addressed in current courses. The result of this process was proposed changes in the curriculum to address employers' appeal to delineate design, machining skills, and quality

measurement. This is reflected in the new certificate programs, as the Manufacturing Design and Rapid Prototyping program (ETMD) focuses on design, Advanced Manufacturing Machining (ETMM) emphasizes machining skills, and Manufacturing Automation and Quality (ETMQ) concentrates on quality. All courses required for these certificate programs are also required or electives of the new Advanced Manufacturing Technology associate’s degree (ETMA), and students of this program can focus on one or more of the three tracks. Therefore, the delineation employers were asking for is now a part of CCRI advanced manufacturing programs. Further, the ETMA program has been submitted to the Association of Technology Management and Applied Engineering (ATMAE) for accreditation; approval is expected in November 2018.

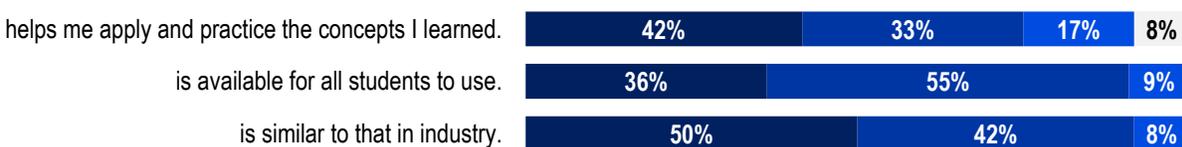
Most employers interviewed confirmed their involvement in the DACUM process or that they had given informal feedback on the curriculum. Several voiced positive opinions regarding the curriculum, stating that it is addressing the “majority of our needs.” However, they also indicated a strong desire for more soft skills training, as many candidates for positions are lacking problem solving abilities, capabilities to communicate effectively (in both written and verbal form), and the inclination towards teamwork. This aspect could partially be addressed by the Poised for Success course, intended to build career awareness and develop work readiness, including soft skills. This non-credit course was available to students beginning in the Spring 2016 Semester (more detail regarding this course is provided in the *Intake Assessment and Career Guidance* section); however, enrollment has been low.

The equipment and software used was viewed favorably by students from both the focus group and questionnaire, as shown in Figure 2, where almost all agreed that they helped them apply and practice what they learned, were readily available for use, and similar to that in industry. Moreover, it was mentioned in the student focus groups that CCRI has more up-to-date equipment than nearby colleges with similar programs.

The equipment used in the programs...



The software used in the programs...



Strongly Agree
 Agree
 Somewhat Agree
 Neither agree nor disagree

 Somewhat Disagree
 Disagree
 Strongly Disagree

Figure 2. Student Perceptions of APAM Equipment and Software (n = 12)

All APAM certificate and associate’s degree programs were designed to integrate hands-on experiences to allow students to practice on software and machines that are used by industry. To support this, APAM staff equipped the advanced manufacturing labs with up-to-date technology, such as computer numerical control (CNC) machines, 3-D printers, and mills; and use a variety of software in the courses, such as SolidWorks and MasterCam. Students participating in the focus groups confirmed that they “do a lot of hands-on in manufacturing on the manual machines.” Some students observed that the APAM machines are similar, but more advanced, than that they have seen used in local industry. However, they believe the skills they are learning will still translate into the workplace.

Regarding software, some employers interviewed felt that students do not need to learn certain programs, while others did (e.g., AutoCAD vs. SolidWorks and CAMWorks); however, these preferences seem to be dependent on individual employers. One suggestion made by a few employers to ensure the best alignment with industry needs was for CCRI instructors to regularly visit their companies to see firsthand the processes and equipment used in the workplace. That way, they can use it to inform their lesson planning and “bring it back into the classroom.”

Most students who responded to the questionnaire agreed that they participated in hands-on work in their courses and that it simulates real world examples (see Figure 3), consistent with experiential learning principles (Schwartz, 2012). Eighty percent of respondents also agreed that what they learned is similar to what they will do in a job setting, also a key tenet of experiential learning.

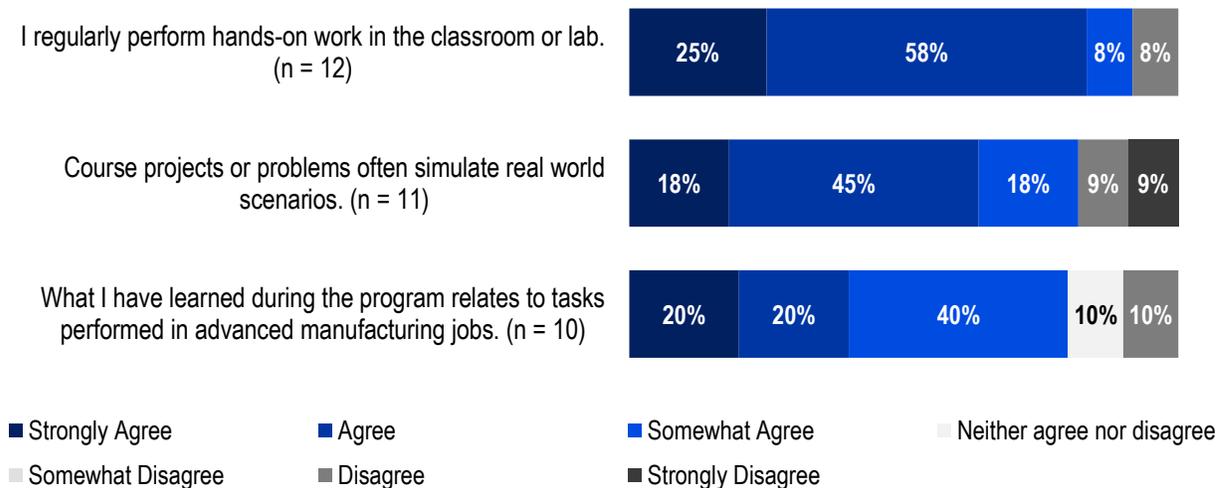


Figure 3. Perceptions of Hands-on Coursework

Finally, the Manufacturing Skills Bootcamp, a free, 60-hour, non-credit course that integrated hands-on experiences to introduce students to advanced manufacturing was developed and offered beginning in Summer 2014. However, this course was discontinued and the content is now taught in the Introduction to Manufacturing Processes course, a required course for the ETMA degree and most of the certificate programs.

Intake Assessment and Career Guidance

An intended activity of the grant, according to the APAM work plan, is to develop intake assessment tools that help to “identify adults’ assets and potential challenges in meeting goals” related to higher education. Part of this process involved assessment of prior learning and work experience, which is discussed in the following section, *Credits for Prior Learning*.

Another aspect of intake assessment is the Poised for Success course, developed under the grant. This hybrid (online and face-to-face), non-credit course is intended to give students an opportunity to explore their career interests, both self-directed and with the guidance of a career specialist. It consists of five phases, which are: *Understanding Your Profiles*, *Choosing Education Pathway Clusters*, *Exploring Your Soft Skills*, *Building Your Portfolio*, and *Planning for What’s Next*. After each phase is completed, the student is required to meet with a career specialist to review the results of the profiles, assessments, and worksheets related to each phase. Student learning outcomes include (a) an understanding of his or her own personal preferences, interests, and skills; (b) knowledge of the career options that reflect those preferences, interests, and skills; (c) ability to determine strengths and areas for development for particular career goals; and (d) familiarity with the education pathway options at CCRI, and how they relate to their preferences, interests, skills, and career goals.

While this course was created as part of the APAM project and was specifically marketed to potential advanced manufacturing students, it is not content-specific and is available to all CCRI students. It is intended to help ensure that students who decide to pursue any educational pathway have the desire and ability to succeed in that particular field.

This course was developed in Year 2 and was offered to students beginning in the Spring 2016 Semester. As of the summer of 2016, staff reported that only one student had enrolled, despite career specialists sending several emails and reminders to students to encourage them to sign up and begin the course. Only one student who completed the questionnaire was familiar with the course, but did not enroll. Therefore, it is not known if and how this course will benefit CCRI students.

Credits for Prior Learning

The APAM program also sought to create standards and a more streamlined process for PLA, ultimately implementing these throughout CCRI and statewide. In Year 3, a specialist with expertise in PLA was hired as the PLA and Career Advancement Coordinator to facilitate these changes. To begin, the team performed a gap analysis comparing what the CCRI PLA procedures were intended to be to how they were actually being implemented. This helped identify areas for improvement and guided the development of the new procedures. Overall, the new policies and procedures for PLA at CCRI, collectively called the Accelerator, are intended to be more student-driven, rather than faculty/staff-driven; more collaborative between advisors and students; and better documented.

To develop the new process, the team worked with the Council for Adult and Experiential Learning (CAEL), a national organization that assists higher education institutions in aligning

education to career opportunities. CCRI started with the existing CAEL PLA Accelerator², which allows students to complete an online form regarding their past education and work experiences and then generates a report that can be used to guide advisement for course and program enrollment. The team customized this tool to align with CCRI's specific needs, making more than 20 improvements.

The typical application process for a prospective CCRI student involves the submittal of transcripts from previous education and the completion of an Accuplacer test, a nationally recognized assessment used to determine if students need to complete developmental courses in reading, writing, math, and/or computer skills. The CCRI Accelerator tool is intended to be a third part of the application and intake process. Built into the online form are learning outcomes for all courses that fall within 12 different CCRI programs. Students can click through the learning outcomes of courses in programs that are of interest to them. For those learning outcomes, they are able to select responses such as "is like me" or "is not like me." Once complete, a report is generated summarizing their selections. This report is intended to be used as a guide for one-on-one advising, where a counselor or an academic advisor will review the results with the student and identify where and how they could be awarded credits for prior learning that will count towards a particular program. The advisor will then direct the student to the appropriate place and staff/faculty in order to begin the process of earning the credits.

Originally, there were five different methods eligible credit for prior learning; with the changes, there are now fifteen. These include methods such as College-Level Examination Program (CLEP) tests, which are nationally recognized and transfer to many institutions nationwide, and Departmental Challenge Tests, which will transfer to other local colleges. These are arranged in a hierarchy, encouraging students to pursue the award of credits through means that are more likely to be nationally-recognized first, to give them the most benefit if they intend to transfer.

Because of the new methods, staff and faculty involved in advisement require training and resources to be able to implement this process correctly. To address this, documents illustrating the process flows for each of these methods were developed for advisors to use as guides. Detailed instructions were generated and are available to advisors as well. Project staff created a training video on the new process, which is shared with advisors.

According to project staff, the previous process was reactive, where students were not always aware that they could get credits for past experiences or how to get approval for them, and advisors did not always emphasize its availability, so it was not consistently implemented. Now that the Accelerator will be inserted into the intake process, it will allow for more proactive discussions between students and advisors. Counselors, who interact with students early in their application process, are also involved in the process. Between the counselors and advisors, each student will receive multiple reminders to complete the Accelerator form and will be encouraged to discuss options on several occasions.

This new process was piloted and tested in the Fall 2016 Semester to address any problems with implementation. It was approved by the CCRI Academic Advisory Council and the President's

² <http://www.cael.org/higher-education/pla-accelerator>

Council in early 2017. Full roll out of the Accelerator³ and accompanying processes, including offering it to prospective students and ongoing training of advisors, occurred in the Spring 2017 Semester.

Another new aspect of the PLA process is the integration of built-in metrics to assess how broadly the college is reaching its students and how well they are meeting students' needs. Part of the gap analysis allowed the team to understand how many students were seeking and being awarded credits prior to the Accelerator implementation. The Accelerator is able to give CCRI staff useful and quickly generated measures of how many students complete the process, which can be compared to previous data. The goal is to see an increase in use of the PLA system, which should result in more credits being awarded for prior experiences. Furthermore, they hope to see not only more credits awarded, but more credits being awarded for courses that directly relate to a degree program, as opposed to elective credits.

Preliminary data provided by staff show that they are serving 40% more military personnel each month since implementation of the Accelerator, which has resulted in award of twice the number of credits compared to previous years. In fact, they claim to be on track to triple that number by next year, for military personnel. For all students, more than 300 people have completed the Accelerator since implementation, compared to 700 who pursued prior learning credits over the past three years. About 100 students have been advised in-person since implementation.

Those who completed the Participant Questionnaire reported that their prior learning was mainly assessed through a review of previous transcripts, while most of the other methods available were not used (see Figure 4). Most were awarded one to three credits. These students likely pursued these credits prior to the implementation of the Accelerator, when the various methods were not as emphasized as they are currently. That said, approximately half of respondents who pursued a credit award agreed that the process was fair, efficient, and easy to understand (Figure 5). Almost three-quarters agreed that they were awarded the appropriate amount of credits. This is a small sample of students, and may not be representative of all students who pursued credits for prior learning.

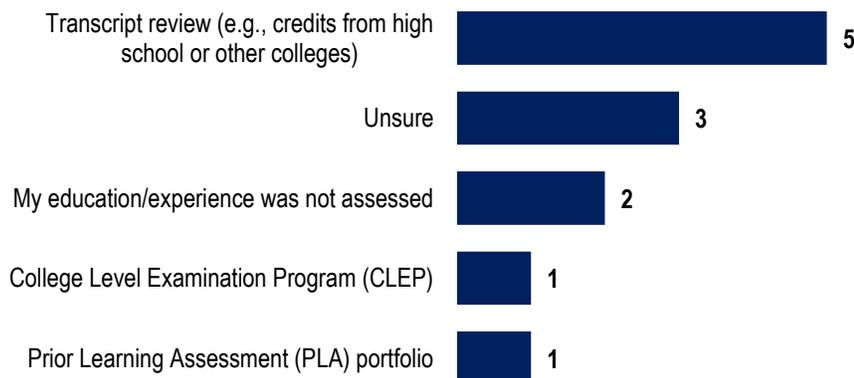


Figure 4. Students' Method of Prior Learning Assessment (n = 10)

Note. Respondents were able to select more than one option.

³ <https://www.ccri.edu/priorlearning/>

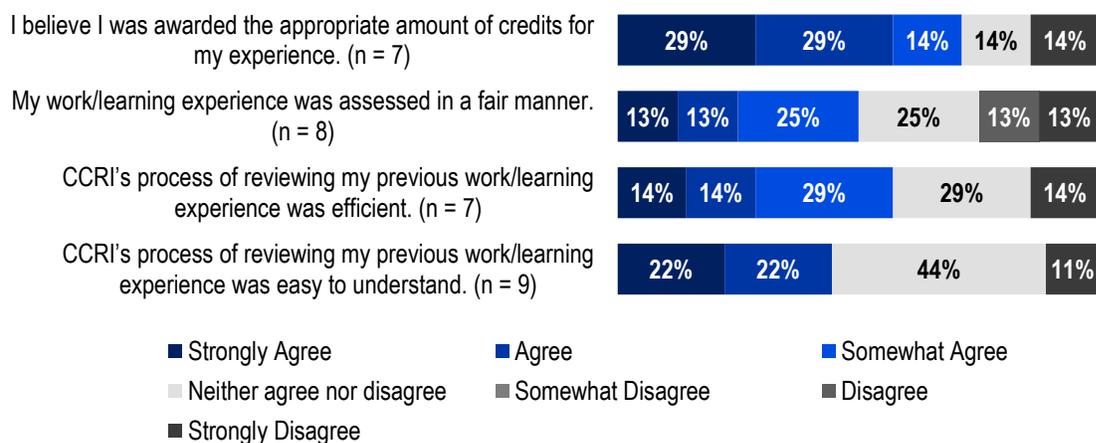


Figure 5. Students’ Perceptions of the PLA Process

Information about the new Accelerator is currently being advertised to new and prospective students. The 2017-18 CCRI course catalog was updated from previous years to include more succinct and specific information on PLA processes, in order to alert prospective and current students to its availability. Further, project staff developed content that is included in CCRI’s Financial Aid TV, which is a series of short videos to help new and prospective students navigate the admissions and financial aid process. The Accelerated Pathway series, developed by grant staff, consists of 10 brief (<2 minute) videos that cover the different types of PLA options available, such as CLEP testing, credits for military training, credits for corporate training, and portfolio review. A link is also on the Education Commons webpage.

The project team expects this new process to garner positive outcomes for students. As asserted by staff and posited by Klein-Collins (2010), students who undergo PLA and are awarded credits tend to be more likely to persist, will take more courses, and are more likely to graduate. The process is expected to not only benefit CCRI students, but has shown to be an innovative method for PLA that CAEL has expressed interest in expanding nationally. These changes were presented by CCRI at the November 2016 *Recognizing and Evaluating Credit for Prior Learning Summit*, organized by the Rhode Island Office of the Postsecondary Commissioner. CAEL and American Council on Education (ACE) also presented at this event, which was attended by local colleges, including the University of Rhode Island (URI) and Rhode Island College (RIC).

Staff hope that other schools will benefit from this, particularly URI and RIC, where many CCRI students transfer credits. Staff report that collaboration with these two colleges regarding PLA is progressing, and are hopeful to move it further at an upcoming meeting with the RI Postsecondary Commissioner. Finally, staff shared that the Rhode Island governor’s office is on board with and “excited about” the PLA changes at CCRI.

Partner Contributions

APAM staff and faculty have worked extensively with partners in the Rhode Island advanced manufacturing field. These partners were not only integral in the curriculum development process, but also contribute on an ongoing basis to keep programs current.

Advisory Board

The Engineering and Technology Department held its first Advisory Board meeting in early 2016, and held an additional two in 2016. As reflected among employers interviewed, the Advisory Board consists of a variety of companies, ranging from very large to small, focusing on different aspects of manufacturing and product development, including ship building, precision machining, and tool and die. Some of those have established relationships with the college and have worked with them for several years, while others are relatively new partners. Many are members of other associations or organizations involved in manufacturing, such as makeRI, a non-profit made up of small to mid-sized Rhode Island manufacturers focused on finding skilled employees, and Davies Technical School, a career and technical high school in Lincoln, Rhode Island.

Those interviewed were generally enthusiastic about being a part of the Advisory Board, but offered some suggestions for moving forward. When board members were interviewed (in Year 3), only one meeting had been held and some believed that it would only occur once per year. At the time, they emphasized the importance of meeting more regularly. However, the Advisory Board did in fact meet more frequently later in Year 3 and into Year 4. They also suggested that these meetings be less of a formal meeting and more like “working committees,” where attendees address problems and determine solutions.

A small number of employers in Year 3 described a disconnect between CCRI and their companies, which they believe is partially due to a cultural difference between academic institutions and industry, as they operate on different timelines, with differing communication methods, and have different measures for success. Employers would like to see more consideration of industry timelines, as well as a focus on measures such as employment, employment retention, and wages of graduates, in addition to typical college measures, like enrollment and completion. They noted that this could be resolved by CCRI more actively listening to their opinions. However, these opinions were expressed shortly after the initial APAM management changes, and many were optimistic that those changes will result in a culture at CCRI that is more engaged with advanced manufacturing employers than previously encountered.

In addition to the Advisory Board meetings, CCRI hosted the *Education and Employment Symposium* in the fall of 2016. The 200 people in attendance included CCRI staff and faculty, Advisory Board members and employers from advanced manufacturing and other industries (e.g., healthcare, hospitality), individuals from the governor’s Workforce Board, and the Director of RIDLT. Advisory Board members and employers led panel discussions regarding job trends and the future of local industries, as well as how employers and educational institutions can collaborate to provide effective training and prepare students for the workforce.

Essentially, employers shared a desire to be more actively involved in CCRI's process of curriculum development and other aspects of program design, as they are concerned with the limited pool of qualified candidates to fill open positions at their companies. They noted that they "open up" their factories to give tours to CCRI classes, which keeps them involved in the programs. In addition, the CNC Practicum course, a requirement of the ETMA program, consists of a capstone project at a local manufacturing firm; however, it is not clear how many firms participate.

That said, some students in the focus groups expressed concern that companies were not familiar with nor involved in the APAM programs. They stated that some companies were made aware of the programs in the beginning of the grant, but were not sending employees to the programs or hiring as promised. In fact, some students learned that companies who were nearby were not aware of the advanced manufacturing programs at CCRI, and were instead sending their incumbent workers out of state for training. Students worry that there is a misalignment between CCRI and some advanced manufacturing companies, which could hinder their employment opportunities.

Regardless of the extent of the working relationship between the majority of the employers interviewed and CCRI, they are eager to maintain the partnership in the long-term. Some view CCRI as an "essential piece of the puzzle" for ensuring a continuous skilled workforce in the Rhode Island manufacturing industry. They not only find the relationship vital, but would like to be even more involved as these programs progress.

Incumbent Worker Training and Hiring

Employers have largely been using CCRI advanced manufacturing programs for incumbent worker training. Many have tuition reimbursement programs, and have sent current employees to gain an associate's degree, to attend the previously offered Manufacturing Skills Bootcamp, or to take individual courses such as CNC Machining.

Project staff have discussed the PLA process changes with local and regional employers, encouraging them to communicate the opportunity to earn credits at CCRI based on work experience to their own employees. Moreover, project staff have recognized the importance of aligning corporate trainings with CCRI's and other institutions' credit systems, in advanced manufacturing and other industries. They have worked with the governor's office in the hopes of focusing on the top 15 largest employers in the state in order to encourage them to have their in-house trainings reviewed by the ACE. Review and approval by ACE would give CCRI and firms the ability to align learning outcomes and streamline the process for CCRI to award credits for these types of trainings. A relationship already exists between CCRI and a large locally-headquartered company, which consists of an articulation agreement that allows students to gain credits toward a degree when they complete the company training. Additional companies with articulation agreements to that end would help incumbent workers gain college credits and put them further ahead on an educational pathway. Staff noted that they have "made some headway" on this, particularly because of support from the governor's office, but caution that an ACE evaluation is expensive, so companies are somewhat reluctant to move forward.

According to employers interviewed, the labor market in Rhode Island has undergone substantial transition over the past several years, particularly since the recession of 2008. Industries including textiles, shoes, and jewelry have waned, while “clean manufacturing,” including biotech and pharmaceuticals, as well as ship building and composites, have grown. Employers stressed that the manufacturing industry in Rhode Island is hiring “by the thousands.” However, they emphasized that while the larger companies are hiring more people, small manufacturing companies are an important part of the equation, as the larger companies rely on these to build supporting components or to provide maintenance and repair. Therefore, there are a multitude of “cascading positions in manufacturing support that roll out into the communities,” creating a robust labor market. Not only are these jobs opening up, but employers claim that the manufacturing industry has higher pay and better benefits than many other fields.

Many of those interviewed often have job openings, and some have hired directly from CCRI’s programs. In fact, one company regularly contacted the CCRI Outreach Coordinator when there was a job opening, and was given a list of candidates that may be a good fit. Project staff reported that 13 local advanced manufacturing employers attended the career fair in October 2016, and that several attended the open houses, demonstrating an interest in CCRI students. A few employers also expressed a willingness to host apprenticeships in the near future. According to project staff, five employers are currently developing plans to provide advanced manufacturing internships.

Employers noted that industry certifications and credentials are important to show a candidate’s technical capabilities. Employers are looking for an understanding of digital technology and the ability to operate machinery. However, the demand is not limited to technical skills, as several employers stressed the desire for their workers to have abilities like problem solving, teamwork, and communication, as well as fundamental characteristics such as punctuality, reliability, and accountability.

Most employers interviewed see the APAM program as an opportunity for the manufacturing industry in Rhode Island to increase its skilled workforce. They believe that outreach to potential students, like those in high school, is key to communicating the opportunities available in the advanced manufacturing industry and to bring new people into these jobs. And, as long as there is “consistent engagement” between CCRI and the industry, they believe “there is no better mechanism than an effective community college to help kids find a better way to get [a degree].”

Institutional Capacity and Statewide Policy

Many of the systems and procedures developed under the APAM grant are intended to reach beyond the advanced manufacturing programs and be integrated institution-wide. The new Accelerator system for PLA is applicable to all of CCRI, not just the students in the APAM programs; therefore, its implementation will provide more opportunities to benefit from prior learning to all students. Project staff commented that the development process and implementation of the Accelerator has helped to shift the CCRI staff and faculty culture to be more proactive and student-focused, while also empowering students to explore opportunities on their own. It has also brought a more centralized mindset regarding PLA to CCRI, which will give students more consistent and accurate information. Outside of CCRI, staff hopes that URI and RIC consider adopting it, and that it ultimately becomes a “guide for PLA across the state.”

With the state-level buy-in to the changes, CAEL interest, and the Accelerator system's ability to generate useful metrics, statewide or even national expansion is possible.

The two career specialist positions, intended to assist advanced manufacturing students with academic and career, were discontinued. Over the course of the grant, they worked with CCRI students from all programs, as there were few advanced manufacturing students seeking assistance. In Year 4, one career specialist was hired as an advisor in the Advising and Counseling Center, to work with all CCRI students, while the other transitioned into the PLA and Career Advancement Coordinator.

Additionally, project staff indicated that three of the four intended interdisciplinary liberal arts courses were developed: Guitar Building, Foundations for Success: Healthcare, and Sociology of Groups in the Workplace. The Sociology of Groups in the Workplace course can be used as an elective for the advanced manufacturing degree programs. Staff had initial conversations with various CCRI academic departments about a fourth course; however, interest was low; therefore, they only developed the three.

A professional development workshop for faculty and industry was held as intended in February 2016. A presenter from College for America spoke on the topics of competency-based education and its relationship to industry partnerships and workforce development. Several faculty and department heads attended, and staff noted it as an informative event. Staff intend to continue faculty professional development post-grant, though it is not clear what this will entail.

According to APAM staff, CCRI's president has expressed a commitment to continually revise and establish new career pathways for advanced manufacturing programs. This echoes priorities from the Rhode Island's Governor's Office, where they have recently launched the Rhode Island Manufacturing Initiative. This initiative will provide various economic supports for workforce development in manufacturing, but most notable for CCRI is the Rhode Island Promise program, which allows Rhode Island high school graduates to attend CCRI for free (RI Office of the Postsecondary Commissioner, 2017). Focus group students mentioned that CCRI's low cost compared to nearby colleges with similar programs (e.g., NE Tech) was a benefit, so a no-cost program would be even more appealing. They expect that this will ultimately encourage more enrollment in advanced manufacturing programs and increase the number of available workers in the industry. As expressed by local industry partners, the field is growing and is in need of capable workers; therefore, this initiative, coupled with the APAM work, could reap positive benefits statewide.

APAM staff have also stated a commitment to continued work with industry partners. They have noticed that faculty in the Engineering and Technology Department have become more active in networking with industry employers and trade associations, due to the grant work. They also intend to maintain regular Advisory Board meetings with established and new partners. Interviewed employers in Years 3 and 4 voiced enthusiasm about continuing a relationship with CCRI, which will ultimately help them by creating a larger and more talented pool of candidates to access for filling open positions.

The APAM team initially intended to create the RI Education Articulation Council, which would have consisted of employers and postsecondary institutions in the state. The purpose of the group was to build support systems statewide for supporting individuals in training for and finding jobs. According to staff, this council was not officially convened at CCRI; however, officials in the governor's office expressed interest in adopting the model and overseeing it themselves. While not a formal group, under the management of the governor's office and the RI Office of the Postsecondary Commissioner, employers and colleges (a) passed and implemented a transfer policy between CCRI, RIC, and URI⁴, which streamlines the credit transfer process for students; (b) helped to convene the PLA Summit, discussed previously; and (c) have had several meetings to update and improve articulation agreements between postsecondary institutions and high schools. Though CCRI does not lead this charge, staff believe their work under the APAM grant was the impetus for its accomplishments. They expect to continually work together with industry, other RI colleges, and the state to improve the college experience for students.

Staff also mentioned that CCRI is currently discussing the potential to partner with RIC to develop a 2+2 program, where CCRI advanced manufacturing associate's degree graduates would automatically be accepted into RIC's Engineering Technology bachelor's degree program. Both schools are interested, and the proposal will likely be presented to CCRI's Governance Committee in the fall of 2017.

Finally, staff indicated that the Round 3 TAACCCT grant activities positioned CCRI to be awarded a New Skills for Youth grant from JP Morgan Chase and the Council of Chief State School Officers in early 2017. This will continue much of the work regarding career pathways established in the APAM program by supporting student tuition costs. They expect this to further increase enrollment in the advanced manufacturing programs. Additionally, this new grant may allow CCRI to hire an industry liaison, similar to the previous Outreach Coordinator position.

Overall, institutional capacity at CCRI has changed in several ways due to the APAM TAACCCT grant. The collaboration between the state, CCRI, other state colleges, and industry has focused on improving students' experiences while in college by improving articulation, transfer, and PLA. Furthermore, development of programs that match industry needs help to ensure employment of graduates.

Student Outcomes

Limited data were available to determine the impact of the APAM program on student academic and employment outcomes, including retention, certificate attainment, and employment.

Retention

According to the Participant Questionnaire, most (9 of the 13 respondents) intend on completing their program. However, only one-third believe they will complete it on time (within one year/two semesters for a certificate or two years/four semesters for an associate's degree). Those who do not plan to complete on time noted that they were part-time students, were too busy to take the full course load, or still needed to complete course exams.

⁴ <http://www.ritransfers.org/>

Of note, students from the focus groups reported that enrollment in the programs, particularly Introduction to CNC Manufacturing and CNC Manufacturing and 3D-Modeling, is low. They shared that courses are often cancelled because of low enrollment, meaning they may need to postpone taking a required course until a later semester, extending their time to completion. One student “waited a year and a half “before he was able to take a course he needed. However, with the tuition assistance provided by the New Skills for Youth grant, staff hope to see increased enrollment in all advanced manufacturing programs.

Attainment of Credentials

No data were available regarding student completion, as many were enrolled in the associate’s degree program and therefore have not yet completed. Focus group students stated that they are mainly in the programs to build new skills or refresh with new technology, regardless of the credential earned.

Employment

Students who participated in the focus groups believed that their programs, particularly the Introduction to CNC Manufacturing program, will be beneficial in helping them find employment. In general, students feel like they are being prepared for a job in advanced manufacturing and would recommend these programs to others. This is displayed in Figure 6, showing how students responded to the Participant Questionnaire.

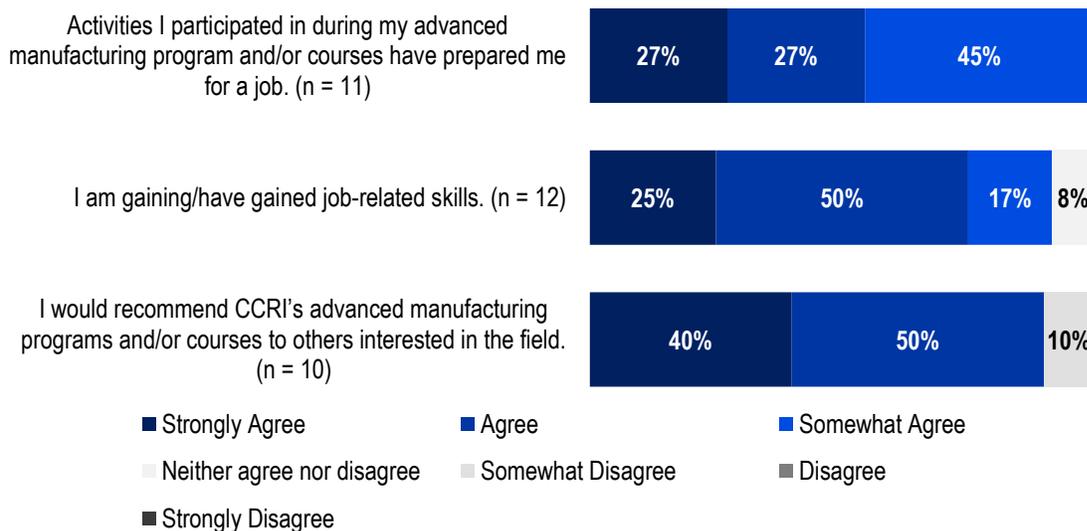


Figure 6. Students’ Job-Related Perceptions

That said, focus group participants expressed concern about the available employment, noting that they do not see many jobs open, especially in 3-D modeling. However, this does vary by location, as some cities or metropolitan areas tend to have more openings than others. They also explained that the advanced manufacturing industry is currently made up of older employees, and expect there to be more open positions as those individuals retire. One student stated, “I feel like in the next ten years there’s going to be a great shortage. Because it’s either 21 years olds or people getting ready to retire [in the workforce now].”

CONCLUSIONS

Overall, the APAM project was completed as intended. The changes in CCRI advanced manufacturing programs and student supports, as well as the increased work with industry partners, align with statewide priorities. These have the potential to improve postsecondary education processes and the skills of advanced manufacturing job candidates throughout Rhode Island. Specific conclusions from the four-year TAACCCT grant are as follows:

- **Changes in CCRI and grant leadership in Year 3 appear to have resulted in increased progress of grant activities and fostering of new partnerships.** While the APAM project underwent multiple staff changes over the course of the grant, new team members refocused the work on items that were lagging, such as the PLA updates. Therefore, the team accomplished most of the activities and deliverables as intended. This, coupled with a renewed emphasis on workforce development and articulation at the state and college-level, increased CCRI's capacity in several areas. In particular, they have formed new relationships with local advanced manufacturing companies, as well as strengthened existing ones, and have made progress on work with RIC and URI to ease the transfer process for students.
- **Local employers are pleased with the newly developed advanced manufacturing certificate and associate's degree programs.** The curriculum reflects employers' needs, as many were involved in the development process by identifying the skills they require in their employees. They believe that a continued partnership between CCRI and the industry will ultimately increase the skilled workforce in advanced manufacturing in Rhode Island.
- **Programs consist of substantial hands-on and experiential work.** APAM programs were designed to train students for the advanced manufacturing workforce. Integral to that training is the ability to operate equipment and software used in industry. Curricula for the new programs plan for students to have extensive practice on machinery, such as CNC machines, 3-D printers, and mills; as well as with programs like SolidWorks and MasterCam. CCRI's investment in new equipment and software under the TAACCCT grant has made this aspect of the training possible. Students found the ability to practice on the machines useful and expect it will help them find employment.
- **Outreach to potential and current students increased under the grant.** The Outreach Coordinator was employed only a short time, but facilitated an increase in the promotion of APAM programs during her term. This included events, like open houses and career fairs, and expansion of advertising. These activities were geared toward bringing in new students, as well as establishing and maintaining relationships with employers. Staff indicated that student enrollment increased due to the increased outreach. That said, it is not clear if or how the outreach will be continued now that the coordinator position has been eliminated. However, the New Skills for Youth grant may allow for the hiring of an industry liaison, which would reestablish relationships between industry and CCRI.
- **The new Liston Campus advanced manufacturing lab has the potential to draw students from an untapped population.** The recently opened advanced manufacturing lab space in Providence is intended to bring in new students from an urban area. This is a new location for these programs and should expand the reach of the advanced manufacturing programs, potentially increasing enrollment.
- **Enrollment in the Poised for Success course has been low.** As of the Summer of 2016, only one student had enrolled in the Poised for Success course, despite informal staff outreach efforts.

- **The changes made to the PLA processes have the potential to help many students, as well as increase retention and program completion across CCRI.** The new Accelerator tool is designed to give students more options to gain credits for prior learning. This integrates more structured interactions between the student, counselors, and advisors, but also allows students to explore how their prior experiences relate to CCRI programs on their own. The new system also has built-in metrics, so staff can better understand how students use it and how it impacts them. It is anticipated that students will be awarded more credits prior to enrollment than before, making them more likely to persist in and complete their program. Preliminary data indicate that students are using the tool more than traditional means in the past, and credits awarded due to the new process have increased. Not only is CCRI potentially improving its students' outcomes, but is leading the charge in expanding these processes to other colleges in the state.
- **Local advanced manufacturing employers of varying sizes and specialties have been actively involved in working with APAM staff and faculty to help train qualified candidates.** Several advanced manufacturing employers participate in the APAM Advisory Board, where they have shared their desired skills and abilities of job candidates with staff and faculty. Some of these employers provided substantial input during the DACUM process, which resulted in development of new CCRI programs that reflected their feedback. A few firms have partnered with CCRI to send their incumbent workers to training. Several companies have attended advanced manufacturing career fairs, and have also expressed interest in internship and apprenticeship opportunities.
- **The APAM program activities fit into statewide priorities regarding articulation, higher education, and workforce development.** The State of Rhode Island has established several priorities for developing its workforce and emphasizing the role of its colleges in the process. With the help of the TAACCCT grant, CCRI has been integral to progressing this agenda. PLA process improvements will likely help enroll and retain students, as well as simplify transfer to other colleges, aligning with the governor's office work to streamline articulation. And, CCRI's investments in advanced manufacturing programs and equipment provide support for the state's Manufacturing Initiative, intended to increase the number of skilled workers in the industry.

RECOMMENDATIONS

Based on evaluation findings for the APAM project, Hezel Associates offers the following recommendations for program improvement and sustainability beyond the grant.

- **Communicate availability of the Poised for Success course.** Employers expressed a concern about new hires' lack of soft skills, such as communication, problem-solving, and teamwork. The Poised for Success course is intended, in part, to address these skills and help students make better decisions regarding their educational and career pathways by allowing them to explore their own interests and skills. It has the potential to improve those skills, or at minimum let students identify weaknesses in those areas so they can focus on improvement during their program. However, CCRI students are not taking advantage of this course, as enrollment is low. The lack of enrollment could be due to several factors, such as (a) lack of knowledge that it exists among students and/or faculty and staff, (b) unclear understanding of how it could be beneficial, (c) lack of interest because it is not required and non-credit, (d) time involved in completing the course, or (e) other unknown reasons. Surveying groups of students (e.g., all incoming students, students who were aware of the course and opted not to take it) and/or staff and faculty to determine their perceptions of the course could help staff to develop a strategy to increase enrollment in the course. Staff and faculty could also consider making this course required for certain programs, and/or establishing it as for-credit. This, in conjunction with increased outreach to new students, including straightforward ways to navigate to information on CCRI's website, could help boost enrollment.
- **Maintain communication and involvement with advanced manufacturing employers.** A key to the success of the APAM project was guidance from and collaboration with local advanced manufacturing companies and associations. Their input on curriculum, during the DACUM process and Advisory Board meetings, has helped to align coursework with industry needs, with the ultimate goal of employing graduates. Further, their involvement in career fairs and communicating with faculty to find job candidates likely helped advanced manufacturing students gain employment. While it was observed that faculty are interacting with employers more than the past due to the grant work, the loss of the Outreach Coordinator as an intermediary between employers and faculty could be an impediment to communication. Some interviewed employers were skeptical about interactions with CCRI, as they had somewhat poor experiences in the past. This appears to have improved under the grant, with a new college administration and grant team. However, lapses in communication could negatively affect partnerships. Effective partnerships between colleges and companies must have frequent and regular communication, with employers providing repeated guidance on industry changes (Adams, 2015). Therefore, it is important to keep up the momentum generated in the last four years. Faculty are encouraged to continue their own relationships with industry, but creating a more formal position to assist with maintaining, as well as creating new relationships, is recommended. This appears to be in process, with the New Skills for Youth grant awarded in 2017, which may allow for the hiring of an industry liaison. CCRI should consider ways to continue this position after this new grant ends.
- **Determine metrics and processes to measure success of programs and support services.** Measuring impacts on students after they leave an advanced manufacturing program would help to identify needed program revisions and/or develop information to be used in marketing campaigns. In particular, employment outcomes, such as whether graduates gained

relevant employment (or a promotion if an incumbent worker) or whether they received a pay increase from before their program are important to understanding impact of programs. This should extend beyond the TAACCCT grant, and could be institutionalized in an exit survey administered to students shortly after they graduate.

Additionally, the metrics that will be generated from the PLA Accelerator tool will be beneficial to understanding how the new processes impact students in terms of number served and number of credits awarded. Further, these metrics could be tied to overall CCRI retention and completion rates, to determine if there is an impact. It would also be useful to understand how students, as well as staff and faculty involved, perceive the process. This could identify adjustments to potentially improve processes, or help to gather more in-depth information on impacts. Surveys or interviews with those who had experienced the PLA process could be informative in that regard.

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APPENDIX A: DOCUMENT REVIEW

Start-Up Activity: Recruit staff for key positions essential for creating and implementing the Strategies						
Activity	RQ	Year(s)	Milestone	Time Period	Status	Evidence
1. Hire Project Manager	5.3	1	Project manager hired	4/14	Met outside of timeframe	TAACCCT III Program Director; Susan McKenna, hired 11/2014; Project director replaced February 2016 (interim position); February 2017, Dr. Douglas Flor (PLA Coordinator) became Project Director
2. Hire adult learning/career specialists knowledgeable about credentialing and careers in advanced manufacturing	5.3, 5.4	1	Staff hired	6/14	Met outside of timeframe	TAACCCT III Career Specialist; TAACCCT III Manual-Table of Contents; hired 2/3/15; staff/faculty interviews
3. Create key elements of Education Commons with on-line portal options	5.4	1	Key elements identified	4/14	Met outside of timeframe	CreditPriorLearning_Webpage; staff/faculty interviews
	5.4	1	Portal Solutions identified and assessed	4/14	Met outside of timeframe	Y3Q1performance report; staff/faculty interviews; https://www.ccri.edu/acadaffairs/educationcommons.html#

Strategy 1: Create a statewide Education Commons that serves as an intake center and resource for adult workers and focuses on the following:						
Activity	RQ	Year(s)	Milestone	Time Period	Status	Evidence
1. Create design team with representatives from key stakeholders (employers, RIMES & RIMA, labor organizations, adult learning specialists, etc.) to outline key components of the Education Commons	5.3, 5.4	1	Design Team convened	4/14	Met with no indication of timeframe	CCRI Mfg Meeting Agenda_18Nov2014; GL TACT II Meetings
	5.4, 6		Project Groups aligned with Key elements convened (e.g., PLA Taskforce; Intake Assessment Taskforce; etc.)	5/14	Met outside of timeframe	Y3Q1performance report
	6		Key Components articulated	8/14	Met outside of timeframe	Y3Q1performance report
	6		Prototype online portal developed and made 'live'	9/14	Met outside of timeframe	TAACCCT III edu-commons-full-page: Prototype developed; https://www.ccri.edu/acadaffairs/educationcommons.html#
2. Research, select, and pilot broader selection of intake assessment tools (goal is to identify adult's assets and potential challenges in meeting goals)	6	1, 2	Current intake assessment tools assessed and compared with national innovations	5/14	Met outside of timeframe	TAACCCT III Bootcamp Intake; FINALReport_CreditAwardedPriorLearning2015 0402; staff/faculty interviews
	6		New intake assessment tools selected and piloted	9/14	Met outside of timeframe	Y3Q1performance report; FINALReport_CreditAwardedPriorLearning2015 0402; staff/faculty interviews
	6.3, 6.4, 9.4		Intake assessment tools assessed	5/15	Met outside of timeframe	Y3Q1performance report; staff/faculty interviews

Strategy 1: Create a statewide Education Commons that serves as an intake center and resource for adult workers and focuses on the following:						
Activity	RQ	Year(s)	Milestone	Time Period	Status	Evidence
	6, 9.4		Intake assessment tools revised and implemented	9/15	Met outside of timeframe	Y3Q1performance report; CreditPriorLearning_Webpage; staff/faculty interviews
3. Research “best practices” for assessing prior learning	7	1	Best practices researched and cross-walked with the current practices of other colleges & universities	7/14	Met outside of timeframe	TAACCCT3EvaluationUpdate_20150727: met with CAEL consultant (Summer 2015); Chart of Next Steps for CPL Project 10_03_2015: meetings and next steps established; PLACoordJobPosting, Y3Q1performance report: hired PLA Coordinator May 2016; Recognizing and Evaluating Credit for Prior Learning Summit Agenda
4. Establish protocols for awarding credit for prior learning	7	1, 2, 3	Based on goodness of fit between best practices for assessing prior learning and current practices of RI colleges & universities, protocols for awarding credit for prior learning established	12/14	Met outside of timeframe	Y3Q1performance report; staff/faculty interviews
	7		Protocols piloted, reviewed and revised as necessary	9/15; 9/16	Met outside of timeframe	Portfolio Assessment Pre- and Post; staff/faculty interviews

Strategy 1: Create a statewide Education Commons that serves as an intake center and resource for adult workers and focuses on the following:						
Activity	RQ	Year(s)	Milestone	Time Period	Status	Evidence
5. Develop statewide standards for Prior Learning Assessments, establishing agreements to ensure transfer of credits and a more streamlined pathway to obtain credits and credentials	7, 9.1	2, 3	Standards created and published onto online portal	5/15	Met outside of timeframe	<i>Y3Q1performance report: discussions; staff/faculty interviews; CreditPriorLearning_Webpage</i>
	7, 9.1		Manual for awarding PLA credit created	9/15	Met outside of timeframe	<i>Y3Q1performance report; staff/faculty interviews</i>
	7, 9.1		Marketing materials developed and distributed	9/15	Met outside of timeframe	<i>PLAchart; staff/faculty interviews: Media blitz in March to CCRI and public; Recognizing and Evaluating Credit for Prior Learning Summit Agenda</i>
	7, 9.1		Training curriculum for new PLA Standards created and piloted on Advisors & Counselors	12/15	Met outside of timeframe	staff/faculty interviews
	9.1		Training Curriculum shared with RI colleges & universities	5/16	Met outside of timeframe	<i>Recognizing and Evaluating Credit for Prior Learning Summit Agenda</i>
6. Create career preparation success course (Poised for Success)	6.5.1, 9.3	1, 2, 3	Poised for Success course created and available to students	9/14	Met outside of timeframe	<i>P for S Draft; Conceptual Model for Poised for Success Course 11_28_2014; P for S Draft 11_28_2014; Conceptual Model for Poised for Success Course 03_19_2015; PoisedforSuccess_Registration_Jan2016; PoisedforSuccess_Webpage; staff/faculty interviews</i>

Strategy 1: Create a statewide Education Commons that serves as an intake center and resource for adult workers and focuses on the following:						
Activity	RQ	Year(s)	Milestone	Time Period	Status	Evidence
	6.5.1, 9.3		Course piloted, reviewed and revised as necessary	9/15; 9/16	Met within timeframe	<i>Overview for Group Reviews - IT 02_18_2015; Overview for Group Reviews from Advising Perspective 03_08_2015</i>

Strategy 2: Ensure students' opportunities for career advancement and upward mobility through design of coherent career pathways leading to "stackable" credentials – multilevel, industry recognized credentials reflecting attainment of the knowledge and skills required at different stages of a career (AACC recommendation)

Activity	RQ	Year(s)	Milestone	Time Period	Status	Evidence
1. Design new and modify existing stackable, latticed credentials that approach 90% of higher "goodness of fit" as defined by the Rhode Island Manufacturing Extension Service (RIMES), Workforce Strategy Center	4, 5.1	1, 2, 3	Revise current CCRI programming for "goodness of fit"	5/15	Met outside of timeframe	<i>Education Pathways Cluster, TAACCCT III ENGR Systems ladder, TAACCCT III Tech Studies ladder</i>
	4, 5.1		2 new certificate programs developed and approved	Prog-1: 5/15; Prog-2: 9/16	Met within timeframe	<i>ETCA certificate course outcomes; ETCI certificate course outcomes; ETST program course outcomes CertificatePrograms_website20141125; Curriculum-Committee-Overview: approved and available to students Y3Q1performance report; A.S.-Degree-Certificates-01; Certificate-Design-Rapid-Prototype-01; Certificate-Manufacturing-Automation-01; Certificate-Manufacturing-Machining-01; Curriculum-Committee-Overview; Degree-Manufacturing-Technology-01; 2016_ENGR-CurriculumSht-ETMA-Prf3; 2016_ENGR-CurriculumSht-Certificates-Prf3; DegreeProposal_Jul2016 CCRI_2016-17; CCRI_2017-18: offered</i>
	4, 5.1		Non-credit courses created based on industry need and compiled for PLA credit	12/15; 9/16	Met within timeframe	<i>TAACCCT III Bootcamp syllabus ETCN-1000; syllabus_bootcampFALLIII; Electrical course materials</i>

Strategy 2: Ensure students' opportunities for career advancement and upward mobility through design of coherent career pathways leading to "stackable" credentials – multilevel, industry recognized credentials reflecting attainment of the knowledge and skills required at different stages of a career (AACC recommendation)						
Activity	RQ	Year(s)	Milestone	Time Period	Status	Evidence
	4, 5.1		Marketing materials to expand use of pathway programs created	1/15	Met within timeframe	TAACCCT II Bootcamp PR; 2014 Introduction to Manufacturing Skills-2; 2016_CCRI-TAACCCT-III-CareerFair; OpenHouseFlyer_Summer2016; October Open House Flyer Final; Oct 7 Mfg Career Fair Flyer; YouTube video: https://www.youtube.com/watch?v=JaFcDfmvUvU
2. Hire liaison/recruiters/job developers to coordinate recruiting both potential students and employers and to work with statewide referral agencies	5.1, 9.3	1	Staff hired	6/14	Met outside of timeframe	TAACCCT III Job Developer_Recruiter; Y3Q1performance report: Hired 11/13/14; staff/faculty interviews: Outreach Coordinator hired May 2016, left March 2017
3. Host 2-3 job fairs/career opportunities each year to publicize opportunities for TAA-eligible workers	5.4, 8, 9.3	1, 2, 3, 4	2-3 events scheduled annually	5/14; 10/14; 5/15; 10/15; 5/16; 10/16	Met within timeframe	Y3Q1performance report: Open house, 8/14; Tours of Integrated Manu Labs, 11/14; Open house 8/15; Manu Day, 10/1/15; 2016_CCRI-TAACCCT-III-CareerFair: 4/27/16; OpenHouseFlyer_Summer2016 (2 events); October Open House Flyer Final; Oct 7 Mfg Career Fair Flyer. October 2016; staff/faculty interviews
	5.4, 9.3		Marketing materials to publicize events created	4/14; 9/14; 4/15; 4/16	Met within timeframe	2016_CCRI-TAACCCT-III-CareerFair; OpenHouseFlyer_Summer2016 (2 events); October Open House Flyer Final; Oct 7 Mfg Career Fair Flyer. October 2016
4. Identify manufacturing companies that are willing to provide on-site contextualized learning opportunities	4.1, 8	1, 2, 3	Firms identified & reviewed	12/14; 12/15; 9/16	Met within timeframe	GL TACT II Meetings; Y3Q1performance report: apprenticeship discussions
	4.1, 8		Marketing materials targeted to industry created	12/14; 12/15; 9/16	Met within timeframe	YouTube video: https://www.youtube.com/watch?v=JaFcDfmvUvU ; staff/faculty interviews

Strategy 2: Ensure students' opportunities for career advancement and upward mobility through design of coherent career pathways leading to "stackable" credentials – multilevel, industry recognized credentials reflecting attainment of the knowledge and skills required at different stages of a career (AACC recommendation)						
Activity	RQ	Year(s)	Milestone	Time Period	Status	Evidence
5. CCRI establish opportunities for students enrolled in Davies Career-Tech High School to attend CCRI-hosted manufacturing-related job fairs	8, 9.3	1	Annual opportunity created	9/14	Met outside of timeframe	Y3Q1 performance report: Open house, 8/14; Tours of Integrated Manu Labs, 11/14; Open house 8/15; Manu Day, 10/1/15; 2016_CCRI-TAACCT-III-CareerFair: 4/27/16; OpenHouseFlyer_Summer2016 (2 events); October Open House Flyer Final; Oct 7 Mfg Career Fair Flyer. October 2016; staff/faculty interviews
6. Develop/implement use of contextualized learning strategies in conjunction with program content	4.1, 9.2	1, 2, 3	Manufacturing Boot Camp designed and implemented	9/14	Met within timeframe	TAACCT II Bootcamp PR; TAACCT III Bootcamp Intake; TAACCT III Bootcamp Post Intake; TAACCT III Bootcamp syllabus ETCN-1000; 2014 Introduction to Manufacturing Skills-2; syllabus_bootcampFALLIII DISCONTINUED, as per: http://ccri.edu/enqt/tiles/MNFG.html (noted 11/17/16); content absorbed into ETME-1020
	4.1, 9.2		Contextualized bridge curriculum for advanced manufacturing designed, piloted, and adopted	Pilot: 5/15; Adopt: 5/16	Met within timeframe	TAACCT II Bootcamp PR; TAACCT III Bootcamp Intake; TAACCT III Bootcamp Post Intake; TAACCT III Bootcamp syllabus ETCN-1000; 2014 Introduction to Manufacturing Skills-2; syllabus_bootcampFALLIII
7. Expand CCRI's existing distance learning platforms by creating more options for completing course work: integrate use of MOOCs, digital tutoring programs, adaptive learning	5.2.1	1, 2, 3	Hybrid course solutions developed, piloted, & adopted (e.g., incorporation of Kahn Academy content)	Pilot: 9/14; Adopt: 9/15	Met outside of timeframe	Y3Q1 performance report: Faculty Learning Community being developed, accelerated pathway to Technical Math

Strategy 2: Ensure students' opportunities for career advancement and upward mobility through design of coherent career pathways leading to "stackable" credentials – multilevel, industry recognized credentials reflecting attainment of the knowledge and skills required at different stages of a career (AACC recommendation)

Activity	RQ	Year(s)	Milestone	Time Period	Status	Evidence
	5.2.1		Fast-track developmental education solutions, piloted & adopted (e.g., Quantway/ Statway)	Pilot: 5/15; Adopt: 5/16	Met outside of timeframe	<i>2015_ALP-Poster-Prf1-1; ALP COHORT FLOWCHART AY2014 2015; ALP Report text April 20 2015 DRAFT1</i>

Strategy 3: Build community college capacity for accurately identifying unfilled labor market needs and for ensuring that career education and training programs are streamlined to address those high-need areas. Develop technology-based tools that will help local colleges access labor market data to identify and monitor skills gaps in their regions. (AACC recommendation).

Activity	RQ	Year(s)	Milestone	Time Period	Status	Evidence
1. Enhance CCRI's Academic Program Review process to incorporate guidelines for assessing currency of existing curriculum and for anticipating changes in the related industries.	4, 9.5	2, 3	CCRI's Academic Program Review process enhanced	5/15	Met within timeframe	<i>Y3Q1performance report; staff/faculty interviews: Using Burning Glass</i>
	4, 9.5		CCRI revised Academic Program Review		Met within timeframe	<i>Y3Q1performance report; staff/faculty interviews</i>
	4, 9.5		Implement CCRI revised Academic Program Review process revised based on assessment of pilot	9/16	Met within timeframe	<i>Y3Q1performance report</i>
2. Seek ABET accreditation for Engineering Systems Technology Program.	4, 9.5	2, 3		9/15	Met outside of timeframe	<i>Y3Q1performance report; staff/faculty interviews: Pursuing ATMAE, 2/2016; formal application 3/2016</i>
3. Engage a DACUM consultant	4	2, 3			Met within timeframe	<i>Invitation to DACUM Participant_ CCRI 10_01_2015; CCRI Final Report on DACUM for Advanced Manufacturing 01_10_2016; DegreeProposal_Jul2016</i>
4. Create series of interdisciplinary liberal arts course offerings that focus on the changing nature of the world; e.g., climate change, changes across the lifespan, changes brought about by a global economy, etc.	4, 9.6	2, 3	Four interdisciplinary liberal arts courses/modules established and integrated into pathway (2 courses developed)	5/15; 9/16	3 courses: Met outside of timeframe 4 th course: Not met	<i>Y3Q1performance report; Guitar Course; staff/faculty interviews: Electric guitar course proposed fall 2016; Liberal Arts804 course, 2/2016; Course1_Guitar, Course2_Healthcare; Course3_Sociology</i>

Strategy 3: Build community college capacity for accurately identifying unfilled labor market needs and for ensuring that career education and training programs are streamlined to address those high-need areas. Develop technology-based tools that will help local colleges access labor market data to identify and monitor skills gaps in their regions. (AACC recommendation).

Activity	RQ	Year(s)	Milestone	Time Period	Status	Evidence
5. Provide professional development workshops for faculty and representatives from related industries regarding the role of external advisory boards in identifying new trends	4, 9.7	2, 3	Workshop materials & curriculum designed	5/15	Met outside of timeframe	<i>TAACCCT3EvaluationUpdate_20150727</i> : process of creating training (Summer 2015); <i>Y3Q1performance report</i> : April 2016 AB PD; <i>CBE Invitation</i>
	4, 9.7		Two workshops held annually	9/16	Not met: One held	<i>Y3Q1performance report</i> : April 2016 AB PD; staff/faculty interviews
6. Formalize and recognize important role of external advisory board members through new CCRI annual symposium focusing on Education and Employment Opportunities of the Future	4	2, 3	Annual symposium established and coordinated to take place as part of Statewide Manufacturing Day festivities	10/14	Met outside of timeframe	<i>GL TACT II Meetings</i> : Lab open house, 10/3/14; staff/faculty interviews: 1 st meeting occurred early 2016; <i>2016 Education and Employment Symposium</i>

Strategy 4: Mobilize powerful local, regional, and national partnerships (involving community colleges, employers, and government agencies) to accomplish a collaborative agenda that:

- Ensures that program planning targets skills gaps
- Promotes the associate degree as a desired employment credential
- Established alternative models for completing skills-based credentials, including classroom instruction, online learning, credit for prior-learning, and on-the-job learning
- Develops a national credentialing system. (AACC Recommendation)

Activity	RQ	Year(s)	Milestone	Time Period	Status	Evidence
1. Convene employers, especially those serving on CCRI's Advisory Boards, to attend CCRI's newly created annual symposium on <i>Education and Employment Opportunities of the Future</i>	8	2, 3	Annual symposium established and coordinated to take place as part of Statewide Manufacturing Day festivities	10/14	Met outside of timeframe	<i>GL TACT II Meetings: Lab open house, 10/3/14; staff/faculty interviews; Y3Q1performance report: National Manu Expo (2015)</i>
2. Create a state-based Advisory Group to guide the development of expanded learning opportunities and credentialing; e.g., Registered Apprenticeship, Credit for Prior Learning, etc.	4, 8	2	State-based Advisory Group created	1/15	Met outside of timeframe	<i>staff/faculty interviews: 1st meeting occurred March 2016; Advisory Board Agenda 3.1; AdvanceBoard Meeting-Agenda-June 9-2016; Advisory Board LABELS</i>
3. Create and convene the new RI Education Articulation Council – a statewide advisory group of employers and representatives from RI's post-secondary institutions (public, private, and proprietary) to build the State's capacity for supporting workers in continuing their education and finding meaningful work	8, 9	2	New RI Education Articulation Council convened	1/15	Met outside of timeframe	<i>Y3Q1performance report: Meeting with RI Postsecondary Commissioner, 2/2016; staff/faculty interviews</i>

Strategy 4: Mobilize powerful local, regional, and national partnerships (involving community colleges, employers, and government agencies) to accomplish a collaborative agenda that:

- Ensures that program planning targets skills gaps
- Promotes the associate degree as a desired employment credential
- Established alternative models for completing skills-based credentials, including classroom instruction, online learning, credit for prior-learning, and on-the-job learning
- Develops a national credentialing system. (AACC Recommendation)

Activity	RQ	Year(s)	Milestone	Time Period	Status	Evidence
4. Establish work-based learning opportunities for program participants	8	1, 2, 3	Increased number of work-based learning opportunities	9/16	Met within timeframe	<i>Y3Q1 performance report: State Apprenticeship approval, 11/2014; CCRI_2017-18: ETCN2500 capstone at a manufacturing firm (140 hours)</i>
5. Develop common protocols for work-based learning and identify key requirements that lead to awarding of credit	7, 9.1	1, 2	Creation of a set of protocols	9/15	Met outside of timeframe	<i>Y3Q1 performance report: Listing of experiential opportunities; CreditPriorLearning_Webpage</i>

APPENDIX B: FACULTY AND STAFF INTERVIEW PROTOCOL

CCRI TAACCCT Round 3 Faculty and Staff Interview Protocol Years 2 and 3

Format	<p>Qualitative research to collect opinions, and will span a broad range of issues regarding:</p> <ul style="list-style-type: none">• Organizational structure/governance• Curriculum development• Program design• Partner support• Broader view/future <p>Semi-structured interview protocol outlines pre-determined questions, and allows the interview to probe and pursue unplanned tangents as conversations warrant.</p> <p>Respondents will be recruited via email.</p>
Targets	<p>Respondents will be faculty and staff members involved in program development.</p>
Research Questions	<p>Interview questions will address Research Questions 4, 5, 6, 7, and 9.</p>
Timeline	<p>Interviews will take approximately 45-60 minutes and will be conducted by telephone.</p>

Initial Recruiting Email

The Community College of Rhode Island (CCRI) has partnered with Hezel Associates, a research firm in Syracuse, NY, to conduct the independent evaluation of the USDOL TAACCCT Round 3 grant awarded to CCRI for the advanced manufacturing programs.

As a part of our responsibilities, we will be conducting phone interviews with representatives from the CCRI Round 3 programs to better understand the grant activities. You have been selected as a potential participant due to your involvement in the grant activities. The purpose of our study is to provide feedback to the CCRI Team responsible for implementing activities outlined in the grant.

Telephone interviews will require 45-60 minutes. We are scheduling interviews between Monday February 23, 2015 and Friday February 27, 2015. Please respond to this email with times and dates that you are available to participate in an interview during this timeframe. We will send you a return email confirming your scheduled interview.

This study is being coordinated with Dr. Cathy L. Livingston, TAACCCT-3 Team Lead at CCRI. If you have any questions about the evaluation or interviews, she can be reached by email at clivingston@ccri.edu. You are also welcome to contact me if you need more specific information regarding details of the evaluation study.

Thank you in advance for your support.
Sincerely,

Sarah Stewart

Senior Research Analyst
Hezel Associates, LLC
731 James Street, Suite 410
Syracuse, NY 13203
315-422-3512 x211
Sarah@hezel.com
www.hezel.com

Pre-Interview Confirmation (via email), with Informed Consent Attachment

Thank you for agreeing to participate in the CCRI TAACCCT Round 3 grant (Advanced Manufacturing) evaluation process.

Your interview has been scheduled for: [INSERT DATE/TIME]

We will call you at [INSERT PHONE #]. We expect the interview will last 45 minutes to 1 hour.

Your individual responses will be kept confidential and aggregated for the report. No personally identifying information will be reported, and we will make every effort to protect your identity when we present our findings. Please review the Informed Consent document attached to this email prior to the interview.

If you have any questions about the evaluation or your participation feel free to contact myself, or the TAACCCT-3 Team Lead, Dr. Livingston.

Thank you for your participation,

Sarah Stewart

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Interviewer Instructions

ITEMS IN ITALICS SHOULD NOT BE READ TO INTERVIEWEE

NOTE: Faculty and staff may not know the “APAM” program by name. Alternatives are: Advanced Manufacturing program option, TAACCCT 3 grant, Manufacturing Bootcamp, Intro to CNC Manufacturing Certificate, CNC Manufacturing and 3-D Modeling Certificate, or Registered Apprenticeship in Manufacturing.

Phone Interview Introduction

Hello, this is _____ from Hezel Associates. I’m calling about the interview we have scheduled to discuss your involvement in the advanced manufacturing programs.

Is now still a convenient time to talk?

As a reminder, your responses will be kept confidential and aggregated for the report. No personally identifying information will be reported, and we make every effort to protect your identity when we present our findings. You can stop the interview at any time and skip any questions you are not comfortable answering. You can also choose to withdraw your responses.

Have you read the informed consent document that was emailed to you?

IF NOT, GO OVER THE MAJOR SECTIONS WITH THEM, ESPECIALLY BENEFITS AND RISKS.

Do you have any questions about the consent form or the study?

Do you agree to participate in the interview?

I would like to record our interview to support my note-taking, and the recording will not be used for any other purpose. May I have your permission to record our conversation?

IF PARTICIPANT DECLINES RECORDING, RESEARCHER WILL TAKE NOTES.

Year 2 Questions⁵

Organizational Structure/Governance

To start off, I'd like to talk about the organizational structure and governance of CCRI's Advanced Manufacturing program options outlined in the TAACCCT-3 grant.

1. Please describe your role in the Advanced Manufacturing program options or in supporting the implementation of the TAACCCT-3 grant.
2. Can you explain the organizational structure of the TAACCCT-3 grant?
(*Probe: implementation of strategies, leadership, administrative structure*)^{5, 5.3}

Curriculum Development

Next, I'd like to know more about curriculum development...

3. Please describe your role in curriculum development.
(*If not involved in curriculum development, skip to Program Design section*)
4. Could you walk me through the curriculum development process?
(*Probe: how it was/will be selected/created/used, communication methods, plan for industry alignment, challenges, successes*)⁴
5. (*If curriculum development not started yet*) What is your plan for curriculum development?
(*Probe: how it will be selected/created/used, communication methods, plan for industry alignment*)⁴

Program Design

Shifting now to the program design...

6. Could you describe the program(s) you are involved in?
(*Probe: existing program changes, improvement, expansion, delivery method, administrative structure, student intake, prior learning*)^{5.1, 5.2, 5.2.1, 6, 7}
7. What services for students are offered or will be offered as a result of the TAACCCT-3 grant?^{5.4}

Partner Support

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

8. Can you tell me about the contributions that partners have made or are planning to make to the program?^{8, 8.1, 8.2}
(*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*)

⁵ Superscript numbers refer to corresponding research question(s).

Conclusion

9. Describe any capacity building within your department that you expect to see as a result of this project.

(Probe: programmatic, procedural, cultural) ⁹

What about within CCRI?

Statewide?

10. Can you describe any plans for sustaining your program once the grant is over?

11. What is your overall opinion of the advanced manufacturing/TAACCCT-3 grant programs?

Do you have any suggestions for improving the project?

(Draw from any negative answers to previous question)

Thank you, that's it for my questions,

12. Is there anything else you'd like to say about the program in general?

Year 3 Questions

1. Describe the Education Commons. (*probe: components, student and faculty access, development process*)^{5.4}
2. Describe changes to the PLA process. (*probe: broadness of the changes [institution-wide?]*)^{7, 9.1}
 - a. How are the changes being communicated to potential students?⁷
3. How have you changed your intake process? (*probe: broadness of the changes [institution-wide?]*)^{6.1-6.4, 9.4} How does it relate to PLA changes?
4. Describe the status of the new programs (Advanced Manufacturing Technology AS; Manufacturing Design and Rapid Prototyping, Manufacturing Automation and Quality, Advanced Manufacturing Machining certs). (*probe: development process, instructor capacity, student recruitment, student enrollment*)^{4, 5.1}
5. How have you worked with employers? (*probe: program/curriculum development, on-site learning for students, other*)⁸
6. How have you integrated new/enhanced hybrid courses into the programs? How has this changed accessibility for students?^{5.1, 5.2}
 - a. If not, are there plans to do so in the future?
7. How has the Academic Review process been changed due to grant work? How widespread are these changes (e.g., department-, institution-wide)?^{9.5}
8. Describe the liberal arts courses that have been developed/enhanced under the grant. How are they integrated into other programs/pathways, including advanced manufacturing?^{9.6}
9. How have you worked with postsecondary institutions?⁸
10. How has CCRI culture changed because of the grant?^{9.8} (*probe: department-level, administrative, student perceptions, staff and faculty perceptions of students/adult workers*)
11. Anything else to add?

APPENDIX C: EMPLOYER/INDUSTRY STAKEHOLDER INTERVIEW PROTOCOL

CCRI TAACCCT Round 3 Employer/Industry Stakeholder Interview Protocol Years 3 and 4

Format	<p>Qualitative research to collect opinions, and will span a broad range of issues regarding:</p> <ul style="list-style-type: none">• Organizational structure/governance• Curriculum development• Program design• Partner support• Broader view/future <p>Semi-structured interview protocol outlines pre-determined questions, and allows the interviewer to probe and pursue unplanned tangents as conversations warrant.</p> <p>Respondents will be recruited via email.</p>
Targets	<p>Respondents will be employer and industry stakeholders involved in program development.</p>
Research Questions	<p>Interview questions will address Research Questions 4, 5, and 8.</p>
Timeline	<p>Interviews will take approximately 20-30 minutes and will be conducted by telephone.</p>

Initial Recruiting Email

The Community College of Rhode Island (CCRI) has partnered with Hezel Associates, a research firm in Syracuse, NY, to conduct the independent evaluation of the USDOL TAACCCT Round 3 grant awarded to CCRI for Advanced Manufacturing programs.

As a part of our responsibilities, we will be conducting phone interviews with employers and other stakeholders from the CCRI Round 3 programs to better understand how grant activities align with industry needs. You have been selected as a potential participant due to your involvement in the grant activities. The purpose of our study is to provide feedback to the CCRI Team responsible for implementing activities outlined in the grant.

Telephone interviews will require 20-30 minutes. We are scheduling interviews between [DATE] and [DATE]. Please respond to this email with times and dates if you are available to participate in an interview during this timeframe. We will send you a return email confirming your scheduled interview.

This study is being coordinated with Dr. Thomas Sabbagh, TAACCCT-3 Program Manager at CCRI. If you have any questions about the evaluation or interviews, she can be reached by email at tsabbagh@ccri.edu. You are also welcome to contact me if you need more specific information regarding details of the evaluation study.

Thank you in advance for your support as we move forward with this important study.
Sincerely,

[Signature Block]

Pre-Interview Confirmation (via email), with Informed Consent Attachment

Thank you for agreeing to participate in an interview about CCRI's advanced manufacturing programs.

Your interview has been scheduled for: [DATE/TIME]

We will call you at [PHONE #]. We expect the interview will last 20 to 30 minutes.

Your individual responses will be kept confidential and aggregated for the report. No personally identifying information will be reported, and we will make every effort to protect your identity when we present our findings. Please review the Informed Consent document attached to this email prior to the interview.

If you have any questions about the evaluation or your participation, feel free to contact me or the Program Manager Dr. Sabbagh at tsabbagh@ccri.edu.

Thank you for your participation,

[Signature Block]

Interview Instructions

ITEMS IN ITALICS SHOULD NOT BE READ TO INTERVIEWEE

NOTE: Employers may not know the “APAM” program by name. Alternatives are: Advanced Manufacturing program, Manufacturing Bootcamp, Intro to CNC Manufacturing Certificate, CNC Manufacturing and 3-D Modeling Certificate, or Registered Apprenticeship in Manufacturing.

Phone Interview Introduction

Hello, this is _____ from Hezel Associates. I’m calling about the interview we have scheduled to discuss your involvement in CCRI’s advanced manufacturing programs.

Is now still a convenient time to talk?

As a reminder, your responses will be kept confidential and aggregated for the report. No personally identifying information will be reported, and we will make every effort to protect your identity when we present our findings. You can stop the interview at any time and skip any questions you are not comfortable answering. You can also choose to withdraw your responses.

Have you read the informed consent document that was emailed to you?

IF NOT, GO OVER THE MAJOR SECTIONS WITH THEM, ESPECIALLY BENEFITS AND RISKS.

Do you have any questions concerning the consent form or the study?

Do you agree to participate in the interview?

I would like to record our interview to support my note-taking, and the recording will not be used for any other purpose. May I have your permission to record our conversation?

IF PARTICIPANT DECLINES RECORDING, RESEARCHER WILL TAKE NOTES.

Year 3 Questions⁶

Involvement in the program

1. To begin, please tell me a little about your company/organization.
2. Please describe your involvement in the Advanced Manufacturing programs at CCRI. ^{8, 8.1, 8.2}
(Probe: new relationship or existing, curriculum development, factors impacting involvement, most and least critical contributions, challenges, successes)
3. What are your future plans for involvement with the Advanced Manufacturing programs? ^{8, 8.1, 8.2}
(Probe: curriculum development, hiring, factors impacting involvement)
4. How has/will the program affect your organization?
(Probe: hiring of workers, different employee skill sets, current employee training)
5. How do you envision the Advanced Manufacturing programs fitting into the future labor market in your region?

Conclusion

6. What is your overall opinion of CCRI's Advanced Manufacturing programs? ⁸
What about the curriculum specifically?
7. Do you have any suggestions for improving the project?

Thank you, that's it for my questions,

8. Is there anything else you'd like to say about the Advanced Manufacturing programs?

⁶ Superscript numbers refer to corresponding research question(s).

Year 4 Questions

1. To begin, please tell me a little about your company/organization.
2. Please describe your involvement in the Advanced Manufacturing programs at CCRI.^{8, 8.1, 8.2}
(ask a-c if not addressed in initial answer)
 - a. Are you on the Advisory Board? *(if no, skip to b)* Describe how the Advisory Board functions. *(probe: purpose, meeting frequency, interactions with other employers)* How satisfied are you with the board?
 - b. Has your company attended any CCRI career fairs? *(if no, skip to c)* What was the experience like? Did you see results (e.g., promising candidates, subsequent hiring)?
 - c. Are you aware of any CCRI marketing or advertising for the advanced manufacturing programs? *(probe: quality, effectiveness)*
 - d. Describe how you interact with current students in the advanced manufacturing programs, if at all (e.g., internships, student on-site visits, staff classroom visits).^{4.1}
3. Outside of the Advisory Board, what is your (and/or your company's) communication with the CCRI advanced manufacturing staff and faculty like? *(probe: frequency; purpose; THEN quality: successes; challenges)*^{5.3}
4. Did you assist with curriculum development? How so? *(probe: which programs, DACUM, accreditation)*⁴
5. Have you hired any recent graduates of CCRI's advanced manufacturing programs? Have any of your current employees enrolled in advanced manufacturing courses or programs in the last three years? *(if no to both, skip to 6)*³
 - a. Do you find that the curriculum is preparing individuals with the appropriate skills for your workplace? In what ways? *(probe: what skills are present or lacking [technical and soft skills]; what program experiences are beneficial or not [e.g., online coursework, experiential learning])*
6. What are your future plans for involvement with CCRI's advanced manufacturing programs, staff, and faculty? *(probe: any changes needed to improve partnership, incumbent employee training)*

Thank you, that's it for my questions,

7. Is there anything else you'd like to say about CCRI's advanced manufacturing programs?

APPENDIX D: PARTICIPANT QUESTIONNAIRE

CCRI TAACCCT Round 3 Participant Questionnaire Year 4

Email to potential respondents

Subject: Advanced Manufacturing Questionnaire

Hello,

As you are a current or former student who has been involved in advanced manufacturing programs and/or courses at CCRI, we'd like to invite you to complete a brief questionnaire.

The purpose of this questionnaire is to assist us in understanding the impact of the advanced manufacturing programs/courses at CCRI. Your feedback is important and will potentially help acknowledge the importance of the programs and also will be used to improve these programs.

Please answer the following questions as honestly as possible. The online form should take about 10 minutes to complete. After you have reviewed the Informed Consent information below, you may click this link to begin:

https://survey.co1.qualtrics.com/jfe/form/SV_eb7yDG9sGFHclz7

Thank you for your participation!

Informed Consent

Completing this questionnaire is not anticipated to pose any risk to you. Your participation is strictly voluntary and you may withdraw your participation at any time without penalty.

All information collected will be used for research purposes only. Because this questionnaire is anonymous, there will be no connection to you specifically in the results or in future publication of the results. If you have any questions, contact the Accelerated Pathways in Advanced Manufacturing project's Interim Program Manager, Douglas Flor, at dflor@ccri.edu.

Additionally, if you have any concerns about your treatment as a participant in this study, please contact Hezel Associates' external institutional review board (IRB), Solutions IRB, at participants@solutionsirb.com or 1.855.226.4472.

By clicking the questionnaire link above, you are verifying that you have read the explanation of the study, and that you agree to participate. You also understand that your participation in this study is strictly voluntary.

Sarah (Stewart) Singer

Research Associate

Hezel Associates, LLC

731 James Street, Suite 410

Syracuse, NY 13203

315-422-3512

Sarah@hezel.com

1. CCRI Advanced Manufacturing Program Participant Questionnaire

Thank you for participating in this survey! Hezel Associates is looking for feedback on the advanced manufacturing program(s) in which you took courses at CCRI. Your feedback will potentially help improve these programs.

This questionnaire will take approximately 10 minutes to complete. Be assured that your individual responses are confidential and will be reported only as part of group feedback.

© CCRI, 2017

This questionnaire was prepared as a work for hire by Hezel Associates for the Community College of Rhode Island, with funding provided by the US Department of Labor.

Page break

2. Are you 18 years of age or older?

- Yes
- No *[Go to Termination Page]*

[Required question]

Page break

3. What is your involvement with the advanced manufacturing programs at CCRI?

- I am officially enrolled in an advanced manufacturing program (certificate and/or associate's degree).
- I am officially enrolled in program that is not advanced manufacturing, but have taken one or more advanced manufacturing courses.
- I was officially enrolled in the advanced manufacturing program at CCRI, but am now in a different program at CCRI.
- I am not officially enrolled in any program, but will be changing my major to advanced manufacturing shortly. *[Go to Q5; skip Q14-Q17]*
- I am not officially enrolled in any program and have taken one or more advanced manufacturing courses. *[Go to Q5; skip Q14-Q17]*
- I have not been involved with the advanced manufacturing programs or courses at CCRI. *[Go to Termination Page]*

[Required question]

4. In which program are you/were you officially enrolled in at CCRI? *Mark all that apply.*

- CNC Manufacturing and 3D Modeling certificate (ETCA)
- Introduction to CNC Manufacturing certificate (ETCI)
- Manufacturing Design and Rapid Prototyping certificate (ETMD)
- Advanced Manufacturing Machining certificate (ETMM)
- Manufacturing Automation and Quality certificate (ETMQ)
- Advanced Manufacturing Technology associate's degree (ETMA)
- Engineering Systems Technology associate's degree (ETST)
- Other _____

Page break

5. How did you initially hear about the advanced manufacturing program(s) or courses?

Mark all that apply.

- Brochures/flyers
- CCRI alumni
- CCRI faculty and/or staff
- CCRI open house
- CCRI website (ccri.edu)
- Email from CCRI
- Family/friends
- My employer
- Newspaper
- Radio ads
- Social media (e.g., Facebook, Twitter, LinkedIn)
- TV ads
- Veteran services organization
- Website(s) other than ccri.edu
- Workforce or unemployment agency
- Other _____

Page break

Prior Learning

6. When you enrolled in the program or course(s), did CCRI review your past education, work experience, or military service for credits?

- Yes
- No (*skip Q7-Q9*)
- Unsure

[Required question]

Page break

7. What forms of prior learning, if any, were identified as possible areas for you to receive credits? Mark all that apply.

- College Level Examination Program (CLEP)
- Corporate-sponsored training
- DANTES Subject Standardized Test(s)
- Department of Defense Service members Opportunity College (DoD SOC) Programs
- Departmental challenge exam(s)
- Military training and experience
- Prior Learning Assessment (PLA) portfolio
- Standardized Credit Awards for workplace training
- Transcript review (e.g., credits from high school or other colleges)
- UExcel® and/or Excelsior College® Examination(s)
- Unsure
- Other_____
- My education/experience was not assessed (*skip Q8-Q9*)

Page break

8. How many prior learning credits did you receive from any of the areas mentioned in the previous question?

- 0-3
- 4-6
- 7-9
- 10-12
- 13-15
- 16-18
- 19-21
- 22-24
- 25-27
- 28-30
- Assessment still pending
- Unsure
- Other_____

Page break

9. Please indicate your level of agreement or disagreement with the following items regarding credits for work experience or military service:

	Strongly Agree	Agree	Some-what Agree	Neither Agree nor Disagree	Some-what Disagree	Disagree	Strongly Disagree	Not Applicable
CCRI's process of reviewing my previous work/learning experience was easy to understand.								
CCRI's process of reviewing my previous work/learning experience was efficient.								
My work/learning experience was assessed in a fair manner.								
I believe I was awarded the appropriate amount of credits for my experience.								

Page break

Your Program

The following questions are about your program and/or courses.

10. What types of advanced manufacturing courses have you taken? *Mark all that apply.*

- In-person instruction (where the instructor teaches the class face-to-face)
- Hybrid (a mix of in-person instruction and online coursework)
- Fully online (entire course is online with limited to no in-person instruction)
- Other _____

11. To what extent do you agree or disagree with the following statement?

	Strongly Agree	Agree	Some-what Agree	Neither Agree nor Disagree	Some-what Disagree	Disagree	Strongly Disagree	Not Applicable
The types of courses I have taken (in-person instruction, hybrid, online) have been appropriate for the content being taught.								

Page break

12. To what extent do you agree or disagree with the following statements about your advanced manufacturing program and/or courses?

	Strongly Agree	Agree	Some-what Agree	Neither Agree nor Disagree	Some-what Disagree	Disagree	Strongly Disagree	Not Applicable
I regularly perform hands-on work in the classroom or lab.								
Course projects or problems often simulate real world scenarios.								
Opportunities for internships are available to me.								
I learned useful skills during my internship that I would not have learned in the classroom. <i>(If you did not participate in an internship, please select Not Applicable)</i>								

	Strongly Agree	Agree	Some-what Agree	Neither Agree nor Disagree	Some-what Disagree	Disagree	Strongly Disagree	Not Appli-cable
What I have learned during the program relates to tasks performed in advanced manufacturing jobs.								

Page break

13. To what extent do you agree or disagree with the following statements about equipment and software used in your advanced manufacturing program and/or courses?

	Strongly Agree	Agree	Some-what Agree	Neither Agree nor Disagree	Some-what Disagree	Disagree	Strongly Disagree	Not Appli-cable
The equipment we use in the program helps me apply and practice the concepts I learned.								
The software we use in the program helps me apply and practice the concepts I learned.								
There is enough equipment available for all students to use.								
Software is available for all students to use.								
The equipment used in the program is similar to that in industry.								
The software used in the program coursework is similar to that in industry.								

Page break

14. Did you or do you expect to complete your program?

- Yes (*skip Q15*)
- No
- Unsure

[Required question]

Page break

15. Why not? _____ (*skip Q16-Q17*)

Page break

16. Did you or do you expect to complete your program on time (e.g., one year/two semesters for certificate programs; two years/four semesters for associate's degree programs)?

- Yes (*skip Q17*)
- No
- Unsure

Page break

17. Why not? _____

Page break

Overall program perceptions

18. To what extent do you agree or disagree with the following statements about your overall experience with advanced manufacturing programs and/or courses at CCRI?

	Strongly Agree	Agree	Some-what Agree	Neither Agree nor Disagree	Some-what Disagree	Disagree	Strongly Disagree	Not Applicable
I am gaining/have gained job-related skills.								
Activities I participated in during my advanced manufacturing program and/or courses have prepared me for a job.								

	Strongly Agree	Agree	Some-what Agree	Neither Agree nor Disagree	Some-what Disagree	Disagree	Strongly Disagree	Not Applicable
I would recommend CCRI's advanced manufacturing programs and/or courses to others interested in the field.								

Page break

Career Guidance

19. Did you attend any of the Engineering & Technology or advanced manufacturing career fairs at CCRI?

- Yes
- No (*skip Q20*)
- Unsure

[Required question]

Page break

20. At the career fair(s)...

	Strongly Agree	Agree	Some-what Agree	Neither Agree nor Disagree	Some-what Disagree	Disagree	Strongly Disagree	Not Applicable
I learned about jobs in the industry I am interested in.								
I learned about employers in the industry I am interested in.								
I made connections with potential employers.								
I applied for a specific job with one of the companies in attendance.								

Page break

21. Are you familiar with the non-credit Poised for Success course at CCRI?

- Yes
- No (*skip Q22-Q23*)
- Unsure

[Required question]

Page break

22. Did you complete the non-credit Poised for Success course?

- Yes, I completed the course.
- I enrolled in the course, but did not complete it.
- I did not enroll in this course. (*skip Q23*)
- Unsure (*skip Q23*)

Page break

23. Because of the Poised for Success course...

	Strongly Agree	Agree	Some-what Agree	Neither Agree nor Disagree	Some-what Disagree	Disagree	Strongly Disagree	Not Applicable
I better understand my own career preferences.								
I am aware of more career options that reflect my preferences.								
I can determine my own strengths and areas for improvement related to my career goals.								
I became familiar with the educational pathways available at CCRI.								

Page break

The following questions are intended for research purposes, so we can better understand students' needs and interests.

24. What is your gender?

- Male
- Female
- Prefer not to answer

25. Check as many of the following areas that best describe you.

- American Indian/Alaska Native
- Asian
- Black/African American
- Hispanic/Latino
- Native Hawaiian/Other Pacific Islander
- White
- Prefer not to answer
- Other _____

26. Upon entering your program, did either of these apply to you?

	Yes	No	Unsure	Prefer not to answer
Trade Adjustment Assistance (TAA)-eligible				
Veteran or Spouse eligible for Priority of Service				

27. What is your age? *Numeric responses only.*

Page break

28. Please share any additional comments you may have about your experience with the instructors of the advanced manufacturing program(s) at CCRI:

29. Please share any additional comments you may have about your experience with the coursework in the advanced manufacturing program(s) at CCRI:

30. Please share any additional comments you may have about your experience at CCRI, in general:

Completion Page

Thank you for completing the questionnaire!

Termination Page

Unfortunately, your responses do not meet the criteria for this questionnaire. Thank you for participating!

APPENDIX E: STUDENT FOCUS GROUP PROTOCOL

Community College of Rhode Island Accelerated Pathways in Advanced Manufacturing Focus Group Protocol

Focus Group Introduction

My name is _____. I am here representing Hezel Associates, the company conducting a third party evaluation of the USDOL funded TAACCCT grant here at CCRI. The grant is being used to develop career pathways in advanced manufacturing.

We have been collecting data in a number of ways from different people involved in the project, so you may see an online survey from us as well. With this focus group, we are hoping to get a better idea of your experiences in the advanced manufacturing programs.

As a reminder, your responses will be kept confidential and aggregated for the report. No personally identifying information will be reported, and we make every effort to protect your identity when we present our findings. You can end your participation at any time and skip any questions you are not comfortable answering. You can also choose to withdraw your responses.

Has everyone had a chance to read through and sign the informed consent document?

Are there any questions about the consent, our study, or the project?

Let's start off with introductions around the room.

**Community College of Rhode Island
Accelerated Pathways in Advanced Manufacturing
Focus Group Protocol**

Introduction: As I mentioned, we want to learn about your experiences in CCRI advanced manufacturing programs. To start off, I'd like to hear about your experiences enrolling and participating in the programs.

Questions⁷

1. Tell me about enrolling in the program. (*Probe: why did you pick it*)⁶
 - a. Can you describe the process for enrolling? (*Probe: assessments*)⁶
2. Did you receive credit for prior learning or experience? (*Probe: if attempted and no credit received, military experience*)⁷
 - a. Can you describe the process for receiving credit? (*Probe: perceptions, timing*)⁷
3. Tell me about your experience in your program (*Probe: courses-online, in-person, hybrid; hands-on, simulations, equipment, interactions with employers or industry experts*)^{4.1, 5.2, 5.2.1, 8}
 - a. What is your opinion of the equipment and technology used in program? (*Probe: issues, benefits*)^{4.1}
 - b. What aspect of the program is most important to your success?
4. What kinds of support has the college provided to you since your enrollment? (*Probe: counseling, career guidance, Poised for Success course*)^{5.4, 6.5, 6.5.1}
 - a. What was your experience with this support?^{5.4, 6.5, 6.5.1}
5. What are your career plans, and have they changed, since enrolling in the program? (*Probe: earn credentials, employers, career path, enrollment in further programming*)^{1, 2, 3}
6. What are some of the ways the program will help (has helped) you with your career? (*Probe: skills, career guidance, internships, job search, connections to and interactions with local employers*)³
7. What is your overall opinion of the program? (*Probe: suggested changes*)
8. What else would you like to share about your program that we haven't talked about?

⁷ Superscript numbers refer to corresponding research question(s).

APPENDIX F: PARTICIPANT QUESTIONNAIRE RESPONDENT CHARACTERISTICS

Sixteen students who participated in an advanced manufacturing program from 2012 to 2017 responded to the Participant Questionnaire. Of these, 12 answered the demographic items, as shown in the following table. All were male and the majority were white; and ages ranged from 19 to 56, with an average age of 29 years old.

Table 1. Respondent Characteristics

Characteristic (<i>n</i> = 12)	Respondents
Gender	
Male	12
Female	0
Ethnicity ¹	
American Indian or Alaska Native	2
Asian	1
Black or African American	1
Hispanic or Latino	4
Native Hawaiian or Pacific Islander	0
White	8
Other	0
TAA	0
Veteran	2
Age	
Mean (Standard Deviation)	29.5 (11.11)

¹Respondents were able to select more than one response

Most respondents (10) were either enrolled in an advanced manufacturing program or had taken at least one advanced manufacturing course at CCRI. The other six were enrolled in an advanced manufacturing program at one point, but are now enrolled in another program (Table 2). Almost half of respondents were or are enrolled in the Engineering Systems Technology associate's degree, while the rest were divided among the Advanced Manufacturing Technology associate's degree and various certificate programs (Table 3).

Table 2. APAM Program Enrollment Status

Enrollment status	Number of respondents (<i>n</i> = 16)
I am officially enrolled in an advanced manufacturing program (certificate and/or associate's degree).	5
I am officially enrolled in program that is not advanced manufacturing, but have taken one or more advanced manufacturing courses.	4
I was officially enrolled in the advanced manufacturing program at CCRI, but am now in a different program at CCRI.	6
I am not officially enrolled in any program, but will be changing my major to advanced manufacturing shortly.	0
I am not officially enrolled in any program and have taken one or more advanced manufacturing courses.	1
I have not been involved with the advanced manufacturing programs or courses at CCRI.	0

Table 3. Program Enrolled

Program Enrolled	Number of responses (n = 16)
CNC Manufacturing and 3D Modeling certificate (ETCA)	3
Introduction to CNC Manufacturing certificate (ETCI)	3
Manufacturing Design and Rapid Prototyping certificate (ETMD)	1
Advanced Manufacturing Machining certificate (ETMM)	0
Manufacturing Automation and Quality certificate (ETMQ)	0
Advanced Manufacturing Technology associate's degree (ETMA)	3
Engineering Systems Technology associate's degree (ETST)	7
Other ¹	1

Note. Respondents were able to select more than one response

¹ETUT Tech