

Pima County Community College District

**The Arizona Aviation, Mining and  
Manufacturing Program (AAMMP Up)  
TAACCCT Grant**

FINAL REPORT  
September 14, 2018





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## The Arizona Aviation, Mining and Manufacturing Program (AAMMP Up) TAACCCT Grant FINAL REPORT

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## EXECUTIVE SUMMARY

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### **The Arizona Aviation, Mining and Manufacturing Program (AAMMP Up)**

In September 2014, Pima Community College (PCC) received a Round 4 Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant from the U.S. Department of Labor (DOL) to develop a new, industry-requested, degree pathway in industrial technology, welding, and aviation, known as the Arizona Aviation, Mining and Manufacturing Program (AAMMP Up). The goals of the AAMMP Up program were to improve education and training in the mining/extraction, manufacturing, and aviation sectors for TAA-eligible workers, veterans, and low-skilled, unemployed, and underemployed adults; develop shorter credential options to accelerate employment; and develop a new certificate–degree pathway in industrial technology.

To that end, PCC proposed to create an industry-aligned degree pathway to high-skilled, high-paying jobs by adding new courses and certification options to the college’s existing programs in Welding, Aviation, Electrical and Instrumentation (E&I) Technology, Industrial Maintenance Mechanic, and Mechatronics. In addition to providing opportunities for a short-term route to employment, AAMMP Up programs would provide students with a path from entry-level training to an Associate of Applied Science (AAS) degree over two years. Plans included developing four short-term, stackable certificates in Welding, and a short-term Aviation Technology training program targeting active and newly discharged military with experience as aircraft mechanics who need licensure to work in a civilian job. AAMMP Up funds would also be used to purchase equipment for training students in the specific job skills needed by local employers.

As a result of changes in the local labor market and industry needs, certain components of the plan were changed once the grant was underway. For example, because of a drop in copper prices and resulting job cutbacks in the region’s copper mines, PCC decided in the fall of 2016 not to implement the planned Industrial Maintenance Mechanic certificate. Similarly, the proposed E&I degree was designed largely for employment with Tucson Electrical Power (TEP), which no longer has hiring needs in this area. As a result, AAMMP Up developed certificates in E&I instead of an AAS degree in E&I as initially planned.

### **Evaluation of AAMMP Up**

In 2015, PIMA Community College (PCC) contracted with IMPAQ International (IMPAQ) to conduct an evaluation of the AAMMP Up program. To address the study research questions, IMPAQ designed and implemented a mixed-methods evaluation design with complementary qualitative and quantitative components. The qualitative component consisted of an Implementation Study; the quantitative component involved an Outcomes Assessment. The overall goals of the evaluation were to provide PCC with information on program implementation activities throughout the grant period and identify successes and challenges, to document the rates of outcomes achievement, and to identify the types of participants most likely to achieve targeted outcomes. This report presents IMPAQ’s evaluation findings and conclusions.

## **Implementation Study (Qualitative Component)**

The Implementation Study sought to answer research questions associated with seven broad areas: (1) program context; (2) program design and service delivery strategy; (3) program participation; (4) partnerships; (5) program management and sustainability; (6) program outcomes; and (7) promising practices and lessons learned. Relying on the following data sources, we assessed and documented implementation of AAMMP Up:

- Program document reviews
- Site visits, including semi-structured interviews with program staff and key stakeholders
- Focus groups with program participants
- Participant survey

## **Outcomes Assessment (Quantitative Component)**

For the Outcomes Assessment, IMPAQ analyzed research questions related to the educational and labor market outcomes of participants, as follows:

- What are the sociodemographic characteristics of participants (e.g., gender, race, age, education)?
- What is the employment history of participants prior to program enrollment (e.g., employment status, earnings, industry)?
- What is the rate of program completion?
- What were the participants' educational achievements, including credentials earned and continued enrollment in education?
- What were the participants' labor market outcomes, including employment and quarterly earnings?
- Are differences in program completion, and participant educational and labor market outcomes, associated with participant sociodemographic characteristics and employment history?

The Outcomes Assessment was developed using descriptive and multiple regression analyses of participant characteristics and outcomes. The Outcomes Assessment relied on two main sources: (1) PCC data and (2) data from Pima Community One-Stop (PCOS), the DOL workforce development career center for the region. PCC data included baseline data on participants' characteristics and employment history, their program completion status, and their educational outcomes. PCOS provided Unemployment Insurance (UI) wage record data for AAMMP Up completers, enabling us to track individual employment outcomes.

## Implementation Study Findings

### *Grant Start-Up and Implementation*

- AAMMP Up aligned its training programs to local labor market needs.
- The program used its grant funding to develop new curricula and redesign existing curricula to align with industry needs.
- The program used its grant funding to expand the capacity of PCC's training programs.
- The AAMMP Up program implemented/enhanced both academic services and non-academic support services to assist students in completing their programs of study.

### *Program Successes*

- Development of new relationships and strengthening of existing ones with employers, workforce development professionals, and other key partners.
- Flexibility to modify program components when changes in local economic conditions and labor demand became evident.
- Three AAMMP Up programs—Welding, Part 65, and Mechatronics—institutionalized at the college, and National Center for Construction Education and Research (NCCER) certification added to the Welding program.

### *Program Challenges*

- Implementation delays due to PCC issues with the Arizona Higher Learning Commission (HLC) over compliance matters.
- Collapse of mining industry in the area, which necessitated elimination of the Mining part of the program.
- Staff turnover in the Program Manager position and at PCOS.
- Part 65 recruitment issues early in the grant period.

## Participant Outcomes

Exhibit ES.1 shows the key outcomes required in the DOL Solicitation for Grant Applications (SGA). Where an outcome is blank, it was due to lack of data.

**Exhibit ES.1: Participant Outcomes**

SGA Outcome	Number of Participants
Total Unique Participants Served	403
Total Number of Participants Completing a TAACCCT-Funded Program of Study	208
Total Number of Participants Still Retained in Their Program of Study or Other TAACCCT-Funded Program	41
Total Number of Participants Completing Credit Hours	–
Total Number of Participants Earning Credentials*	208
Total Number of Participants Enrolled in Further Education	1
Total Number of Participants Employed After TAACCCT-funded Program of Study Completion	56
Total Number of Participants Retained in Employment After Program of Study Completion**	35
Total Number of Participants Employed at Enrollment Who Received a Wage Increase Post-Enrollment***	15

Source: PCC data.

\*For this report, this is defined as the number of participants earning at least one credential, which is equivalent to program completion.

\*\*For this report, this refers to the subset of the 56 employed participants who were already employed before/during the AAAMP Up program and who remained employed following their exit from the program. This number was determined by comparing the UI data with PCC data, and includes (a) participants who stayed with the same employer, (b) participants who switched employers upon exit, and (c) those who had multiple jobs before, during, or after participating in the program. Six participants who found employment post-exiting PCC were dropped from this analysis because they were not present in the UI data and their employment status before/during the program was not determinable.

\*\*\*This number does not include the six participants who were not present in the UI data.

## Program Completion

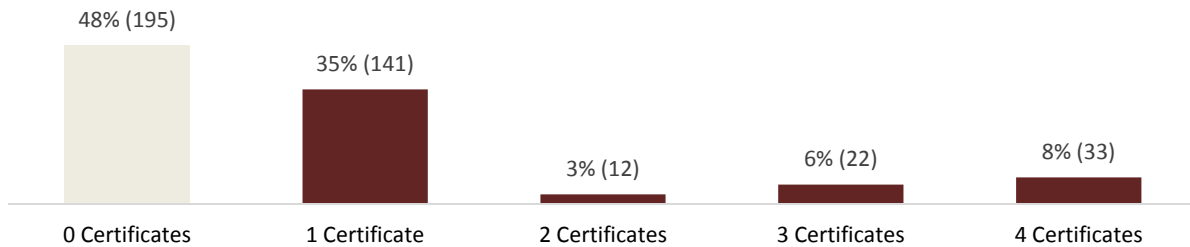
The AAMMP Up program defines “completers” according to the program requirements for each grant-funded program type (namely, Welding, Part 65, Mechatronics, NC3, and E&I). Individuals are considered as program completers if they earned at least one credential or certificate through the program. Out of 403 program participants who were enrolled, Exhibit ES.2 shows that a little over half (52 percent, or 208) were designated as completers of program requirements; 195 participants were designated non-completers, as they earned no certificates.

## Educational Outcomes

We considered two types of educational outcomes. First, we considered the number of certifications/credentials earned by program participants. As shown in Exhibit ES.2, 35 percent (141) of participants earned one certificate while in the program, three percent (12) had two, and 14 percent (55) earned three or more.



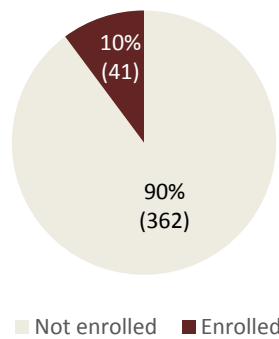
### Exhibit ES.2: Number of Certifications/Credentials Earned



Note: Data from PCC. Sample proportion is reported.

We also considered students' ongoing pursuit of education, e.g., their efforts to complete stackable credentials. For this, we combined continued enrollment in the AAMMP Up program and enrollment in further education, as both were considered relevant by program staff for measuring continued enrollment in education. As seen in Exhibit ES.3, 41 individuals (10 percent of total participants) availed themselves of additional education.

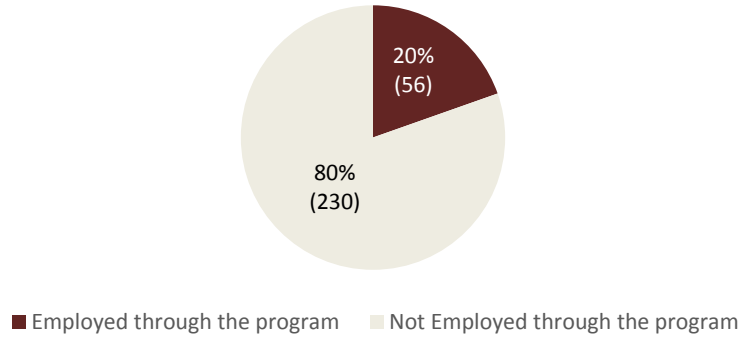
### Exhibit ES.3: Ongoing Enrollment in Education



### Labor Market Outcomes

Employment status was identified based on a combination of unemployment insurance (UI) wage data and self-reported employment in the PCC data, and is presented for participants who fully exited the program (that is, those who are no longer enrolled in PCC). Of 403 students, 286 exited the PCC system. As seen in Exhibit ES.4, of the 286 exiters, 56 individuals (or 20 percent of participants) reported having gained employment through the program.

### Exhibit ES.4: Post-Program Employment Status



Wage analysis was restricted to the 46 of 56 employed individuals for whom we received UI records. As shown in Exhibit ES.5, average quarterly earnings post-program exit were \$10,885. There was substantial variation in individuals’ earnings, which ranged from \$1,663 to \$36,969.

### Exhibit ES.5: Post-Exit Earnings by Program Participants

Outcome	Number
<b>Average Quarterly Earnings</b>	<b>\$10,885</b>
Standard Deviation	\$5,770
Median	\$10,230
Minimum	\$1,663
Maximum	\$36,969
<b>Total Participants with Earnings Data</b>	<b>46</b>

Note: Data from UI records. This data is limited in that it doesn’t permit us to distinguish between participants employed for a full quarter from those employed for just part of the quarter.

### Limitations

Primary limitations of the Outcomes Assessment include relatively small sample sizes and the self-reported nature of participants’ employment status. For example, UI records were available for only a subset of program participants. As a result, employment status was identified using a combination of UI data and self-reported employment status. It is possible that some participants may have attained employment but did not report that they had; because of this, employment status is likely to be underestimated.

Furthermore, although UI wage data is considered to be an excellent data source for its accuracy and comprehensiveness, there are known limitations to the use of UI wage data in tracking students’ success in the labor market. These limitations include coverage (the UI data do not include individuals in military and federal civilian employment, self-employment, and out-of-state jobs) and lack of information on start date within a quarter, number of hours worked to earn the total wages in a quarter, and specific occupations within a given industry. Notably, the

availability of UI quarterly earnings data in the UI database generally lags two quarters from the end of a quarter.<sup>1</sup>

Additionally, the Outcomes Assessment cannot be used to establish a causal link between program participation and participant outcomes. In developing the evaluation design, we determined that an experimental design was not possible, due to a program structure that did not permit random assignment to treatment and control groups. Nor was a quasi-experimental study of the AAMMP Up program feasible for a number of reasons. In addition to sample sizes being insufficient to conduct a quasi-experimental analysis and detect statistically significant effects, a suitable comparison group was not available. Few programs are offered by PCC outside of AAMMP Up that provide similar training or attract a similar student population. Comparing or matching new AAMMP Up students to past students in PCC aviation, industrial mechanics, and other classes was not considered an effective strategy either, as AAMMP Up was designed to attract a different population from those of previous courses. Drawing comparison groups from neighboring colleges was also not feasible, as many AAMMP Up courses (such as those in diagnostics, industrial safety, and large electrical distribution systems) were unique to PCC, which made finding similar programs for comparison difficult.

## Key Lessons Learned

Lessons learned included:

**Industry and local workforce partners should be involved early in the implementation process.** For AAMMP Up, strong partnerships with industry and the workforce development system were critical to curriculum development, equipment procurement, and worker/student participation in classes and other training. Active engagement with industry and workforce partners early in implementation helped AAMMP Up realize the full potential of the partnerships by promoting buy-in from all partners from the beginning and allowing for successful leveraging of new and existing relationships with employers to develop industry-relevant programs.

**Effective alignment of training programs to local labor market needs demands flexibility and nimbleness.** Changes in the economy and labor market, particularly the sharp decline of the mining industry in the area, caused program staff to have to refocus the planned classes and certificates and restructure the overall AAMMP Up programs in major ways. The likelihood that such unanticipated situations will occur underscores the need for flexibility in program development and responsiveness to changing labor markets.

**It is important to plan for sustainability not only of program components but also the necessary administrative and management structures that support program implementation and collaboration among partners.** Strong college organizational structures and procedures are crucial to effective grant management and to supporting collaboration across colleges and

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<sup>1</sup> Feldbaum, M. & Harmon, T. (2012). Using Unemployment Insurance Wage Data to Improve Program Employment Outcomes: A Technical Assistance Guide for Community and Technical Colleges. The Collaboratory and FHI360.

industry partners. Several respondents told us that effective grant implementation was greatly assisted by the commitment of senior administrators at PCC to the goals and objectives of AAMMP Up. Moreover, college grant managers and AAMMP Up program staff developed procedures (e.g., for documenting program activities and reporting) and operated within a structure that facilitated efforts to create new college programs and modify existing ones. Making AAMMP Up an institutional priority will be critical to its sustainability.

## CHAPTER 1: INTRODUCTION

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### 1.1 Background

In September 2014, Pima Community College (PCC) received a Round 4 Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant from the U.S. Department of Labor (DOL) to develop a new, industry-requested, degree pathway in industrial technology, welding, and aviation, known as the Arizona Aviation, Mining and Manufacturing Program (AAMMP Up). DOL's TAACCCT grants provided eligible institutions of higher education with funds to expand their existing career training programs and develop new opportunities for adults to acquire the skills, degrees, and credentials needed for employment in high-wage, high-skill occupations. The goals of the AAMMP Up program were to improve education and training in the mining/extraction, manufacturing, and aviation sectors for TAA-eligible workers, veterans, and low-skilled, unemployed, and underemployed adults; develop shorter credential options to accelerate employment; and develop a new certificate–degree pathway in Industrial Technology.

In March 2015, PCC contracted with IMPAQ International, LLC (IMPAQ) to evaluate the AAMMP Up program. IMPAQ's independent, third-party evaluation of AAMMP Up had two components:

- *An Implementation Study* to examine the steps taken by PCC to create and run the AAMMP Up program, assess the degree to which the program's implementation proceeded as planned, and provide an in-depth understanding of the AAMMP Up program overall.
- *An Outcomes Assessment* to provide rigorous analyses of the services received by AAMMP Up program participants and of participants' characteristics and educational and labor market outcomes.

### 1.2 Report Purpose and Structure

The purpose of this final report is to present the results of IMPAQ's evaluation of AAMMP Up and to draw conclusions from the findings that may suggest recommendations for program replication and sustainability. Chapter 2 of this report presents a summary of the evaluation design and methodology. The Implementation Study is summarized in Chapter 3. Baseline characteristics of participants are described in Chapter 4 and participant outcomes in Chapter 5.

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## CHAPTER 2: EVALUATION DESIGN AND METHODOLOGY

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This chapter presents an overview of the evaluation design and methodology for the qualitative and quantitative components of this study. The qualitative component of the evaluation, the Implementation Study, was designed to document program implementation and identify implementation challenges, best practices, and lessons learned that can inform future entrepreneurial training programs. The quantitative component, the Outcomes Assessment, was designed to understand the characteristics of program participants, quantify the rates of outcomes achievement, and assess what sociodemographic characteristics are most closely related to outcomes; it consists of descriptive and multiple regression analyses of baseline characteristics and outcomes of program participants. Sections 2.1 and 2.2 present the methodology for the qualitative and quantitative components of the study, respectively, including research questions, data sources, and analyses. Detailed findings from both study components are presented in subsequent chapters.

### 2.1 Implementation Study (Qualitative Component)

The qualitative Implementation Study provides essential information for interpreting the outcomes of program participants. The overall objective of the Implementation Study was to develop an in-depth understanding of AAMMP Up and explore program successes and challenges. We have examined the activities undertaken by PCC to create and run the AAMMP Up program, assessed the degree to which the program's implementation proceeded as planned, and identified program challenges and promising practices.

#### 2.1.1 Research Questions

The Implementation Study examined seven broad areas that address the objectives of this evaluation: (1) program context; (2) program design and service delivery strategy; (3) program participation; (4) partnerships; (5) program management and sustainability; (6) program outcomes; and (7) promising practices and lessons learned. In this section, we provide detailed research questions associated with these study areas.

##### *Program Context*

- How does AAMMP Up address regional labor market needs?
- Did the economic situation change in the targeted area during the course of the program? If so, how did this change affect program design and implementation?

##### *Program Design and Service Delivery Strategy*

- What are the key components of AAMMP Up, and how were they delivered?
- How did information about the local and regional labor market influence the design of AAMMP Up?
- What new programs, courses, and/or curricula were created using grant funds? How were the particular curricula selected, used, and/or created? What resources were used? Who was involved in developing the curriculum?

- How were existing programs, courses, and/or curricula improved or expanded using grant funds?
- What types of training strategies (e.g., contextualized learning, hands-on learning opportunities) were offered through AAMMP Up?
- To what extent were online or technology-enabled strategies integrated into AAMMP Up?
- What supportive services were provided to program participants? Was career guidance provided—and, if so, through what methods?

#### *Program Participation*

- Who participated in AAMMP Up, and how were participants recruited?
- How satisfied were program participants with AAMMP Up? What aspects of the program were participants dissatisfied with, if any (e.g., enrollment process, curriculum, training, opportunity for hands-on learning, employment assistance)?

#### *Partnerships*

- What contributions did partners make in terms of (1) program design; (2) curriculum development; (3) recruitment; (4) training; (5) placement; (6) program management, including providing ongoing advice and guidance; (7) leveraging of resources; and (8) commitment to program sustainability?
- What entities (e.g., local employers and industry, public workforce system, state and local governments) participated as partners in AAMMP Up?
- What was the nature of the collaboration with the different partners (e.g., Memoranda of Understanding, Industry Advisory Council, etc.)?
- What factors contributed to partners' involvement or lack of involvement in the AAMMP Up program?
- Which contributions from partners were most critical to the success of the AAMMP Up program? Which contributions from partners had less of an impact?
- Were partners satisfied with their involvement with the AAMMP Up program?

#### *Program Management and Sustainability*

- What institutional management practices led to successful implementation of the AAMMP Up program and allowed for leveraging other funding during and beyond the TAACCCT grant period?
- Where did the AAMMP Up program fit in the PCC organizational/departmental structure?
- What types of leveraged resources were provided by program partners and other funding sources?
- How did the type and level of leveraged resources affect program success?
- Did the grantee develop a formal plan for sustainability? What components of the AAMMP Up program can and will be sustained?
- What funding sources will sustain the program?

### *Program Outcomes*

- Did AAMMP Up meet its goals for updating existing certification and degree programs in aviation, mining, and manufacturing, creating new certifications, training students and local industry employees, and creating articulation agreements with local universities?
- Did the AAMMP Up program result in relevant, industry-recognized, stackable, portable certificates and credentials?
- To what extent was articulation with other institutions increased through the grant?
- In what respect was the program able to achieve its objectives and in what areas did it fall short?

### *Promising Practices and Lessons Learned*

- What lessons can the field learn from AAMMP Up program implementation?
- What promising practices were most important to the program's success? To what extent are these promising practices transferable? To what extent are these promising practices sector specific?
- What challenges were faced during AAMMP Up program implementation? How were they addressed?

### **2.1.2 Data Sources**

Our data sources for the qualitative component of the evaluation were:

- Program document reviews
- Site visits, including semi-structured interviews with program staff and key stakeholders, shown in Exhibit 2.1
- Focus groups with program participants
- Participant survey

**Exhibit 2.1: Stakeholder Groups and Interviewees**

<b>Stakeholder Group</b>	<b>Interviewees</b>
<b>AAMMP Up Program Staff/Faculty</b>	<ul style="list-style-type: none"><li>▪ AAMMP Up Program Manager</li><li>▪ AAMMP Up instructors</li><li>▪ Administrative support staff</li></ul>
<b>Pima College Administration</b>	<ul style="list-style-type: none"><li>▪ Workforce and Business Development administrator</li><li>▪ Data manager</li><li>▪ Grants Resource Office (GRO)</li></ul>
<b>American Job Centers</b>	<ul style="list-style-type: none"><li>▪ Pima County One-Stop employment specialist for AAMMP Up</li></ul>
<b>Local Employers/Industry</b>	<ul style="list-style-type: none"><li>▪ Employers involved in program and curriculum development</li></ul>

Data collection for the qualitative analysis is described in the next section.



## **Document Review**

The IMPAQ team collected and reviewed a variety of program documents and artifacts throughout the course of the evaluation to further our understanding of AAMMP Up program development and implementation. The documents included in our review included work plans; copies of reports submitted to DOL as part of grantee reporting requirements, including Quarterly Performance Reports (QPRs) and Annual Performance Reports (APRs); and other program documentation. Of particular importance to our evaluation are the DOL QPRs, which track key milestones associated with program implementation and provide evidence regarding their achievement. Information from these documents will be combined with the other data collected for the Implementation Study to inform our understanding of the AAMMP Up program, its key components, and its service delivery strategies.

## **Preliminary Telephone Interviews**

Before beginning formal data collection, IMPAQ conducted telephone interviews with individuals involved with AAMMP Up program development and implementation to gain a range of perspectives on early implementation issues, including project management and student service delivery. In July and August 2015, the IMPAQ team conducted interviews with key college/program staff, instructors, and employer and workforce partners who were involved with AAMMP Up program development and the TAACCCT Round 4 grant. We conducted telephone conversations, each lasting approximately 45 minutes, with five key program staff members and one industry partner who were able to help us understand the early development of the AAMMP Up program. From these conversations, we gained understanding of the goals of the grant, key features of the program, and contextual factors that may have influenced early implementation of AAMMP Up.

## **Site Visits and Focus Groups**

IMPAQ conducted two site visits over the course of the project, both of which consisted of interviews, both telephone and in-person, with relevant college staff and faculty and with workforce development, industry, and community partners; focus groups with students participating in the program; and on-site review of program documentation and student files. Several interviews were conducted by phone to accommodate the schedules of the respondents. Detailed schedules for the two visits are included in Appendix A.

We conducted each interview in a semi-structured manner to ensure comparability across interview participants. During the first site visit, we closely followed an interview guide (see Appendix B) that covered the following topics: program context; program design and service delivery strategy; program participation; partnerships; program management and sustainability; program outcomes; and promising practices and lessons learned. The interviews in the second site visit were less formal than those in the first, primarily because the services funded directly by the grant had ended (or were ending), and many of the questions on the protocol about the implementation process were no longer relevant. During the site visits, all interviews were audio recorded with permission of the interviewee and internal summaries were compiled based on

field notes and reference to the audio recordings. If needed, team members followed up with the relevant interviewee or site visit liaison to clarify issues or solicit additional information.

**Site Visit #1:** The first site visit was conducted early in the grant, to assess the early stages of project start-up. In October 2016, the IMPAQ team conducted a one-and-a-half-day site visit. The IMPAQ team conducted 10 interviews: three interviews with AAMMP Up staff; three interviews with college faculty; three interviews with administrators; and one interview with a representative from Pima County One-Stop (PCOS), a key workforce development partner. Eight of the ten interviews were completed in person during the site visit and the other two were completed via telephone.

During the site visit, the IMPAQ team also conducted two student focus groups, one with students enrolled in the Part 65 Aviation course and one with students pursuing an AAS degree in welding. Eight students participated in the Part 65 focus group and nine students participated in the welding focus group. As with the interviews, we used a focus group protocol to guide the discussion. The protocol covered the following topics: career goals; the recruitment and enrollment process; instruction and curriculum; job placement and career services; program satisfaction; and recommendations

**Site Visit #2:** The second site visit took place in January 2018, after most program services had concluded. In a two-day visit, IMPAQ staff visited several PCC campuses and the district office, and conducted interviews with program staff, faculty, and college administrators along with a focus group with four Welding students. We also conducted a review of program documents and of a small sample of student case files. AAMMP Up program staff provided IMPAQ with a flash drive containing all program documentation, including monthly and quarterly reports to DOL. As with the first visit, follow-up telephone interviews were conducted with respondents who were unavailable at the time of the in-person visit. During the site visit, IMPAQ finalized arrangements for obtaining participant tracking data, district administrative data for served students, and UI wage data.

### **Web-Based Student Survey**

We collected student perspectives on their experience with AAMMP Up and on the program's implementation through two web-based surveys, one for Part 65 participants and one for CAD/Welding participants. Survey instruments may be found in Appendices C and D, respectively. We worked collaboratively with the AAMMP Up staff to create survey items that were relevant to the AAMMP Up program. Over the course of the grant, we emailed links to students as they completed their courses. Response rates were quite low, even with multiple attempts at follow-up. We attempted to administer the survey again with the entire database of AAMMP Up enrollees after program services had ceased, with very little success.

#### **2.1.3 Data Analysis**

Our approach to analysis of the implementation data was descriptive. Following each site visit, we compiled all interview notes as quickly as possible to minimize recall error. If the review of

interview notes revealed any gaps in knowledge or suggested additional questions, the site visit team would follow up with the relevant interviewee or site visit liaison to clarify issues or solicit additional information. From the site visits, phone interviews, and our review of program documents, we constructed a descriptive narrative of the AAMMP Up program design and goals. This description was complemented by an overview of program participation data available from administrative records.

## **2.2 Outcomes Assessment (Quantitative Component)**

The quantitative component of the evaluation was designed to provide detailed analyses of participants in the AAMMP Up program, including their characteristics and outcomes. Outcomes that we measured included likelihood of program completion (that is, obtaining at least one certification/credential through the program), number of certifications/credentials, likelihood of continued enrollment in education, likelihood of employment, and quarterly post-program earnings. This study also assessed how participant outcomes relate to individual characteristics. Although this study cannot serve to establish a direct causal relationship between participant outcomes and program participation, the results provide critical information for assessing the potential effects of the program on participant outcomes.

### **2.2.1 Research Questions**

Research questions focused on participant characteristics and their outcomes of interest. Research questions included the following:

- What are the sociodemographic characteristics of participants (e.g., gender, race, age, education)?
- What is the employment history of participants prior to program enrollment (e.g., employment status, earnings, industry)?
- What is the rate of program completion?
- What were the participants' educational achievements, including credentials earned and continued enrollment in education?
- What were the participants' labor market outcomes, including employment and quarterly earnings?
- Are differences in program completion, and participant educational and labor market outcomes, associated with participant sociodemographic characteristics and employment history?

### **2.2.2 Data Sources**

The quantitative component of this evaluation required baseline data on demographic and socioeconomic characteristics, and data on post-program outcomes. The Outcomes Assessment relied on two main sources: (1) PCC data and (2) data from Pima County One-Stop (PCOS), the DOL workforce development career center for the region. PCC data included baseline data on AAMMP Up participant characteristics and employment history that were collected at the time

of the individual's program application. PCC data also included information on educational outcomes, including credentials earned and enrollment in further education. Finally, PCC data contained information on the characteristics of individuals who did not enroll in AAMMP Up, but who benefited from the grant program by participating in college programs that were supported by the grant. PCOS provided Unemployment Insurance (UI) wage record data for AAMMP Up completers, enabling us to track individual employment outcomes.

### 2.2.3 Data Analysis

Our quantitative data analyses consisted of both descriptive and multiple regression analyses, as summarized below.

**Descriptive Analysis.** Using PCC and PCOS data, the IMPAQ team developed descriptive analyses of individuals' characteristics and outcomes attained.

- *Analysis of Characteristics:* The PCC data were used to provide descriptive analyses of the baseline (time of application) characteristics of program participants at (see Chapter 4 for details). These analyses provided information on the demographic and socioeconomic characteristics, employment history, and baseline UI receipt of individuals. We also conducted descriptive analyses of the characteristics of the "served population" who were not enrolled in the AAMMP Up program but who took classes developed and/or supported with AAMMP Up grant funds.
- *Analysis of Outcomes:* We used PCC and PCOS data for descriptive analyses of labor market and educational outcomes of program participants (see Chapter 5). Specifically, we examined the likelihood of obtaining a certification/credential through the program (equivalent to program completion), number of certifications/credentials, likelihood of continued enrollment in education, likelihood of employment, and quarterly post-program earnings.

**Multiple Regression Analysis.** In addition to descriptive analyses, we estimated multiple regression models for each outcome of interest. The dependent variable in these models was the outcome of interest, and control variables included participant socioeconomic and demographic background characteristics and employment history. Depending on whether the outcome variable was binary or continuous, we estimated Probit or linear regression models. These models cannot be used to estimate program impacts; rather, they were used to examine how differences in outcomes are predicted by socioeconomic factors and labor market history, which are known to influence outcomes for training program participants.

## CHAPTER 3: IMPLEMENTATION STUDY

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### 3.1 Summary of Main Findings

Exhibit 3.1 provides a snapshot of the main findings in this chapter. The subsections that follow present these findings in more detail.

#### Exhibit 3.1: Summary of Main Findings

- **Grant Start-Up and Implementation.** In addition to expanding the capacity of PCC's training programs, the TAACCCT grant funding provided PCC with the opportunity to develop new curricula and redesign existing curricula to align with industry needs. The AAMMP Up program implemented/enhanced both academic services and non-academic support services to assist students in completing their programs of study.
- **Program Successes.** TAACCCT grant funding enabled the development of new relationships and the strengthening of existing ones with employers, workforce development, and other key partners. PCC's administrative structures and procedures enabled AAMMP Up to create new college programs and modify existing ones, and the AAMMP Up program had the flexibility to modify program components when changes in local economic conditions and labor demand became evident. Three AAMMP Up programs—Welding, Part 65, and Mechatronics—were institutionalized at the college, and NCCER (National Center for Construction Education and Research) certification added to the Welding program.
- **Program Challenges.** The collapse of the mining industry in the area necessitated elimination of the Mining part of the program. Implementation delays occurred due to staff turnover in the Program Manager position and at PCOS. Delays also occurred due to PCC being placed on notice by the Arizona Higher Learning Commission (HLC) over compliance matters.

### 3.2 Grant Start-Up and Implementation

PCC had been part of the Arizona Sun Corridor Get into Energy Consortium (ASC-GIEC), recipient of a Round 2 TAACCCT grant awarded in 2012 to train trade-impacted workers and other adults for high-skill, high-wage employment and advancement in the energy and mining industries. In September 2014, PCC received a Round 4 TAACCCT grant to develop a new, industry-requested, degree pathway in industrial technology, welding, and aviation, to be known as AAMMP Up. The AAMMP Up program was designed to help adult students quickly obtain industry-recognized credentials that demonstrated skills that are in high demand in local industry and that facilitated their obtaining/maintaining employment in these industries. The program was organized around the following three strategies:

- Strategy #1: Accelerate participant entry into high-demand careers
- Strategy #2: Align programs with employer needs for a trained workforce
- Strategy #3: Improve employment attainment

Taking this systemic approach, PCC proposed to create an industry-aligned degree pathway to high-skill, high-paying jobs by adding new courses and certification options to the college's existing programs in Welding, Aviation, Electrical and Instrumentation (E&I) Technology, Industrial Maintenance Mechanic, and Mechatronics. In addition to providing opportunities for a short-term route to employment, AAMMP Up programs would provide students with a path from entry-level training to an Associate of Applied Science (AAS) degree over two years. Plans included developing four short-term, stackable certificates in Welding, and a short-term Aviation Technology training program targeting active and newly discharged military with experience as aircraft mechanics who need licensure to work in a civilian job. AAMMP Up funds would also be used to purchase equipment for training students in the specific job skills needed by local employers. The different components of AAMMP Up were designed in collaboration with local industry to meet the workforce needs of local employers.

As a result of changes in the local labor market and industry needs, certain components of the plan were changed once the grant was under way. For example, because of a drop in copper prices and resulting job cutbacks in the region's copper mines, PCC decided in the fall of 2016 not to implement the planned Industrial Maintenance Mechanic certificate. Similarly, the proposed E&I degree was designed largely for employment with Tucson Electrical Power (TEP), which no longer has hiring needs in this area. As a result, AAMMP Up developed certificates in E&I instead of an AAS degree in E&I as initially planned.

AAMMP Up staff moved quickly to create stackable certificates within Welding to build momentum for the AAMMP Up program. Under AAMMP Up, the PCC Welding Department created four new stackable certificates: Shielded Metal Arc Welding (SMAW), Gas Metal Arc Welding/Flux Core Arc Welding (GMAW/FCAW), Gas Tungsten Arc Welding (GTAW), and Fabrication Welding. Students pursuing a certificate could take a basic welding and blueprint reading course and then add more advanced and specialized welding courses to earn additional certificates. The certificates are credit-bearing, and students can apply these credits toward an AAS degree. The Welding curriculum was aligned with the National Center for Construction Education and Research (NCCER), a standardized training and credentialing program for the industry, and the Welding faculty received training in NCCER.

Also implemented quickly was the Math Boot Camp, an accelerated refresher course for AAMMP Up participants that allowed them to refresh their math skills quickly without having to take the full-semester math class. This fast-track program was first offered to program participants in June–July 2015.

The E&I curriculum was developed in coordination with local industry and, as with Welding, in close alignment with NCCER. The E&I curriculum was sent to the college curriculum council for review and, following the council's approval, was converted into certificates.

The AAMMP Up grant also provided the resources and space for the college to create and refine a non-credit course to assist active and newly discharged military trained in aircraft mechanics in preparing for the Federal Aviation Administration (FAA) Part 65 Airframe and Power Plant (A&P)

test. Initially, AAMMP Up offered an online-only course that took nearly a semester to complete. Student feedback that the course was too long and that it needed to be more “hands on” led AAMMP Up staff and the aviation faculty to refine the curriculum, resulting in a shorter classroom course that had less dense reading material and provided more opportunities for hands-on practice. As currently structured, the Part 65 test preparation course is open to experienced mechanics with an approved FAA Form 8610-2, Airman Certificate, and/or Rating Application Form. The course, which takes four hours a day, four days a week for four weeks, prepares students for the oral and practical tests by providing a comprehensive review of the relevant technical subjects and a hands-on review of practical skills. Instructors also provide individual and group coaching.

Mechatronics—an advanced manufacturing approach that combines electronics, mechanical engineering, computer science, and robotics—was the last program to be developed for AAMMP Up. After more than a year of advisory meetings and work with local industry, the curriculum for a Level 1 certificate in Mechatronics was approved by the PCC curriculum council in the summer of 2017, and four Mechatronics classes were approved for piloting in the fall 2017 semester. Following the pilot, the college finalized the Level 2 certification for Mechatronics and held classes for the previous semester’s cohort in Spring 2018.

The AAMMP Up training programs also provided students with the opportunity to obtain various industry-recognized certifications—in particular, NC3 (National Coalition of Certification Centers) certification, which involves hands-on training on industry-approved equipment. The precision measurement instruments (PMI) credential was added under the NC3 program, which includes additional hours of study in the use of precision measurement instruments.

At the close of the AAMMP Up program in September 2018, PCC had institutionalized the Welding and Aviation programs and was supporting the Mechatronics faculty.

Findings related to implementation were as follows:

**AAMMP Up aligned its training programs to local labor market needs.** Operating in a local economy where manufacturing and aviation workers were in high demand, AAMMP Up designed programs to meet the workforce needs of local employers, who had expressed a critical need for workers with very specific technical skills and subject matter knowledge. Employers were involved in curriculum development, and AAMMP Up staff regularly engaged with advisory committee members and other employers about improving these programs. In response to employer—and participant—input, AAMMP Up staff modified their program curricula, and in some cases created new curricula to meet these needs. Establishing programs that resulted in certifications or licensure were especially important. For example, former military often have the appropriate skill set for Part 65 but lack the license for civilian work. Before AAMMP Up, PCC’s other aviation programs could not keep up with the demand for graduates with a Part 65 license.

**The AAMMP Up program provided funding to develop new curricula and redesign existing curricula to align with industry needs.** For example, under AAMMP Up, the Welding department

created four new stackable certificates. AAMMP Up also designed shorter-term credentials that required less time in the classroom and lab for students than existing one-year and two-year programs of study, so that students could attain skills and credentials along an occupational pathway more quickly.

**AAMMP Up grant funds were also used to expand the capacity of PCC’s training programs.** The AAMMP Up program supported capital improvements and new equipment purchases to expand the capacity of the training programs, such as the Amatrol training equipment for Mechatronics, as well as providing funding for faculty and new positions.

- Mentioned by multiple respondents in both site visits was the grant-funded outdoor awning in the welding lab, which increased usable space.
- The AAMMP Up program also provided the resources and space for the college to refine the Part 65 test preparation course.
- The AAMMP Up program also used grant funds to hire and train dedicated faculty, which was seen by both instructors and students as an effective—and much appreciated—service delivery strategy. To enhance this instructional approach, AAMMP Up grant funds were used to make significant investments in professional development and Train-the-Trainer sessions to ensure that all faculty were trained on the new equipment and in state of the art techniques. Several faculty emphasized the collaborative approach of AAMMP Up staff, noting that they included faculty in program decisions.
- AAMMP Up also funded the hiring of additional faculty so that more students could take courses each semester. Also, as more than one respondent noted, having more instructors and advisors involved in the program meant that faculty members now had time to “nurture” their relationships with employers and to provide extra help to students in their efforts to find employment.

**The AAMMP Up program implemented/enhanced *academic services* to assist students in enrolling and completing programs of study.** AAMMP Up provided academic support services through activities such as Math Boot Camp, which was designed to ensure that students had sufficient math competencies to understand and master the course content.

**The AAMMP Up program implemented/enhanced *non-academic support services* to assist students in enrolling and completing programs of study.** In addition to the supports offered all students through PCC’s advising and counseling services, AAMMP Up’s grant-funded staff provided students with help specific to the program, such as guiding them through the enrollment process and helping them secure funding for their training. Students were offered the opportunity to participate in mock interviews and resume writing workshops, and in job shadows and mentoring with local employers. Other non-academic support services focused on such things as career planning, job search, and networking for career achievement and advancement.

- In the first site visit, students and faculty praised AAMMP Up staff for helping students develop industry-specific “technical résumés,” a service they don’t receive from the



college's career services, as well as for setting up job shadows and mock interviews with actual employers.

- Some students in the Aviation focus group noted that AAMMP Up staff helped them get funding to pay the fees for the Part 65 tests, an expense on top of the fee for the test preparation course.
- AAMMP Up staff have followed up with graduates after they have been employed to get information on what it's like to work for a particular employer.

### **3.3 Program Successes and Challenges**

Program successes included the following:

**Since AAMMP Up began, faculty and staff have developed new relationships and strengthened existing ones with employers, workforce development professionals, and other key partners.**

- AAMMP Up staff work closely with PCOS workforce professionals, referring students/job seekers to each other's programs and collaborating to help students eligible for Workforce Innovation and Opportunity Act (WIOA) access funding to cover their tuition, fees, and other associated costs. For both organizations, this relationship helps facilitate recruitment and service delivery coordination for TAA-eligible individuals, veterans, and unemployed and underemployed adults. Faculty, staff, and students at PCC are all aware of the point of contact at PCOS, and several students in the focus groups held during both site visits reported that had received services at PCOS. The PCOS workforce specialist appreciated the relationship because it has given her WIOA clients a conduit for receiving services at the college.
- AAMMP Up engaged employers, often through advisory committees, to help develop curricula and establish credentials according to what they needed in a trained workforce. This expanded employer engagement included actions to incorporate industry skill standards and competencies into program curricula and to create more work-based learning experiences and employment opportunities for students participating in the AAMMP Up program.
- AAMMP Up has brought new employer partners to the table. AAMMP Up staff did not solely rely on pre-existing partnerships, developing new relationships through cold calls, attending outreach events, and staying in touch with employers who hire program graduates. As a result, the visibility and credibility of the program has increased among employers throughout the Tucson area. Especially in the Welding program, AAMMP Up staff have added additional capacity to communicate with employers about industry need and facilitate job placement for students. AAMMP Up staff and faculty are diligent about referring students who have the technical and soft skills needed to succeed at a job to employers.
- In addition to these partnerships, AAMMP Up, along with other PCC initiatives, has increased collaboration with high schools and veterans' programs.

**AAMMP Up had the flexibility to modify its program components when changes in local economic conditions and labor demand became evident.** Although the original components of AAMMP Up's programs were carefully designed to meet the workforce needs of local employers, some of those needs changed after the grant began. As noted, employers were involved in curriculum development and provided input regarding how to improve the grant programs. In response to both employer and participant input, AAMMP Up staff modified their program curricula, and in some cases created new curricula to meet these needs.

- When the price of copper began to decline, it led to job cutbacks in the area's copper mines. In response, AAMMP Up changed its approach and did not implement the industrial maintenance certificate or classes related to the planned Mining program. Similarly, the proposed Electrical and Instrumentation (E&I) degree was designed largely for employment with Tucson Electrical Power (TEP), which no longer has hiring needs in this area. As a result, AAMMP Up modified its plans to develop a mechatronics certificate program and a degree course sequence building on the E&I certificates.
- Staff have followed up with Aviation students a few months after they completed the Part 65 course to find out whether they passed their test(s) and learn about their perceptions of the course. This was particularly useful early in the grant, when staff learned through this process that students were unhappy with some aspects of the course design. The original structure of the Aviation program did not really meet the needs of people who had already gotten a lot of training in the military and who just needed some very specific knowledge and skills to get their certification. Initially, AAMMP Up offered an online-only long course that took nearly a semester to complete. AAMMP Up staff learned that students felt the course was too long and needed to be more "hands on." AAMMP Up staff shared the feedback with the Aviation faculty and they collaborated to refine the curriculum, which resulted in a shorter (5-week) classroom course that had less dense reading material and provided more opportunities for hands-on practice.
- Also, early in the grant, there was some resistance from employers to participate in internships or apprenticeships for the Welding students because of insurance concerns. AAMMP Up staff worked with welding employers to develop a job shadowing model to give students an experiential learning opportunity that did not have the same insurance requirements as the internships and apprenticeships that were originally planned.

**Three AAMMP Up programs have been institutionalized at the college.** The stackable Welding certificates and the Part 65 Aviation course are now established at PCC, as is the Mechatronics program created in the last months of the grant. PCC also added National Center for Construction Education and Research (NCCER) certification to the Welding program.

**PCC provided a structure and procedures that enabled AAMMP Up to create new college programs and modify existing ones.** Several respondents told us that effective grant implementation was also facilitated by the commitment of senior administrators at PCC. Making AAMMP Up an institutional priority will be critical to its sustainability.

However, multiple challenges arose, both within the AAMMP Up program and external to it, which in many cases led to lengthy implementation delays and relatively large changes to planned activities. It appears that, for the most part, staff were resilient and creative in addressing these challenges, and that, ultimately, the issues were resolved in a way that was consistent with the goals of the program and the expectations of both DOL and the program's participants. The major challenges we identified were as follows:

- In 2015, the Arizona Higher Learning Commission (HLC) placed the college on notice that it was at risk of being out of compliance with core accreditation criteria. This caused several implementation delays because of the need for new programs and degrees to be approved by the HLC at a time when few such approvals were being granted. Planned programs and activities were put on hold, requiring the program manager to make changes in the project timetable and scope that had to be negotiated with the DOL grant officer in addition to the HLC.
- At about the same time that the accreditation issues arose, the mining industry in the area, in the words of one respondent, "cratered," and it was necessary to eliminate the Mining part of the program. Staff were required to refocus the planned classes and certificates related to mining in another direction (and again, negotiate the change in scope with the DOL grant officer). The decision to add an advanced manufacturing program encountered very restrictive college policies regarding the establishment of a new program.
- Staff turnover in the Program Manager position presented a number of challenges for the program. When the first Program Manager left for another position in the college, AAMMP Up's Coordinator of Student Services took over the Program Manager position. This individual was very familiar with the program but not with its management and reporting responsibilities, and she reported to us that this put her on a difficult learning curve. This second Program Manager left the college in July 2017, and the position remained vacant until mid-October 2017. During that time, other college staff, including the first Program Manager, filled in as needed, but there was still some slowdown in activities related to provision of the last year of program services and institutionalization of AAMMP Up's classes and certificate programs.
- There was also turnover in staff at PCOS, which required AAMMP Up staff to spend time orienting new people to the program and developing rapport and referral processes. Fortunately, the workforce specialist who was contracted by AAMMP Up for the latter part of the grant period was a person who was very experienced with AAMMP Up and able to serve as a good partner to the grant.
- During the first site visit, staff reported that the college had encountered challenges enrolling students in the revised Part 65 course, despite the fact that many active military were interested in it. The first short course was delayed because it took a while to put together a large enough cohort of students to enroll, and the second short course was delayed a couple of months, partially because of low enrollment numbers.

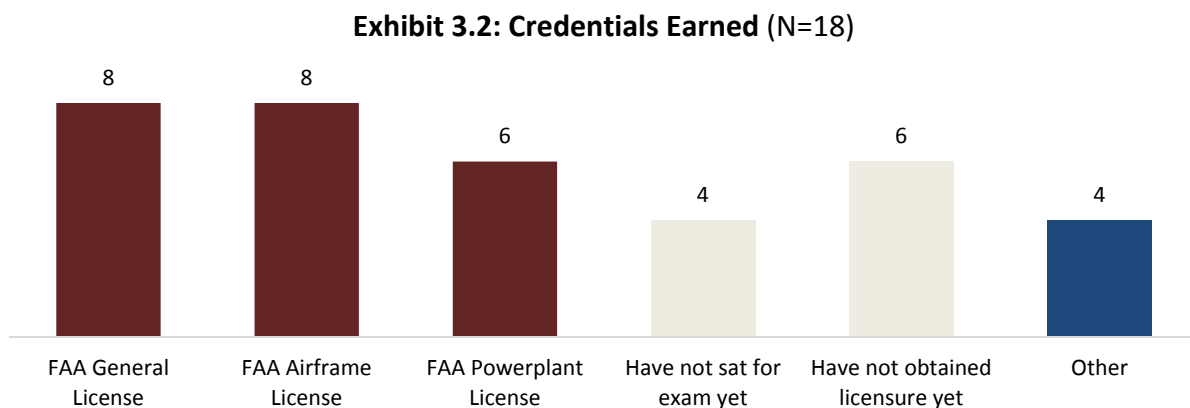
### 3.4 Survey Findings

#### 3.4.1 AAMMP Up Part 65 Participant Survey

Beginning in January 2017, the IMPAQ team surveyed AAMMP Up Part 65 participants following their completion of the course, to seek feedback from them regarding their experiences with the AAMMP Up program. Unfortunately, few program participants were reachable after completing the Part 65 course and only 24 participants responded to the survey.

Among the Part 65 survey respondents, 88 percent were employed, including in the active military, whereas 12 percent were unemployed and seeking full-time paid employment.

As illustrated in Exhibit 3.2, the majority of Part 65 respondents had earned their FAA General License and/or their FAA Airframe License at the time they completed the survey.

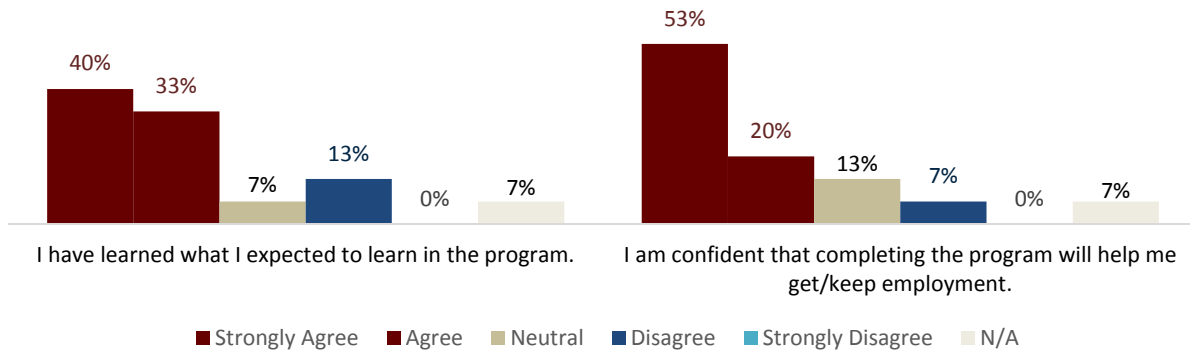


Twenty-six percent of respondents indicated that information provided by the college or the AAMMP Up program about the opportunity to attain industry-recognized credentials most influenced them to join the Part 65 program. Twenty-one percent were influenced by information and encouragement provided from employers.

Survey respondents found the hands-on application of test materials with civilian aircraft the most valuable part of the class, with 50 percent citing the hands-on training as the most helpful experience in preparing for employment in the aviation sector. Most respondents were hard pressed to find anything negative about the training, but a couple of participants felt that the training could have been longer. In addition, although most respondents were quite satisfied with the training, when asked what could be done to make the program more useful to future students, one participant suggested that the AC 43.13 training be included, as it was referenced often throughout the class.

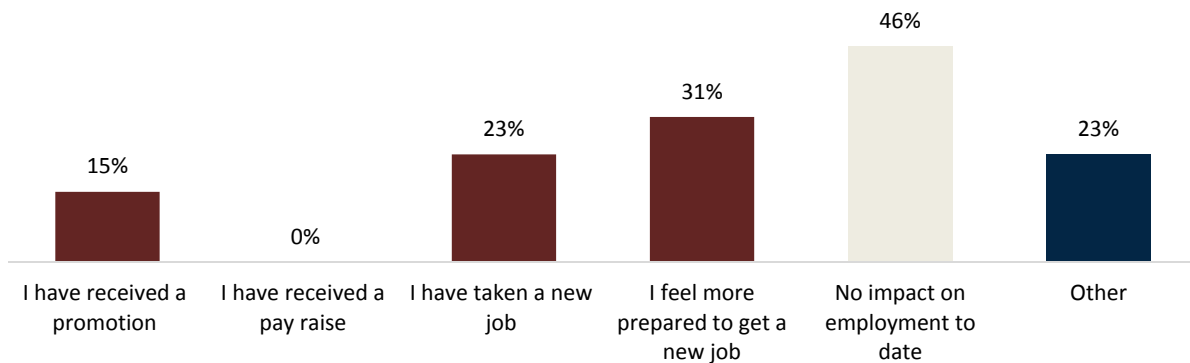
Seventy-three percent of Part 65 survey respondents indicated they learned what they expected to learn and were confident that completing the program would help them obtain/retain employment (Exhibit 3.3).

**Exhibit 3.3: Participant Expectations (N=15)**



And even though no respondents in the Part 65 program have yet received a pay raise as a result of the training, 15 percent have received a promotion. Forty-six percent of respondents indicated that the training has had no impact on their employment yet. Thirty-one percent of respondents felt more prepared to get a new job, and 23% have taken a new job as a result of the training (Exhibit 3.4).

**Exhibit 3.4: Results of Part 65 Training (N=13)**



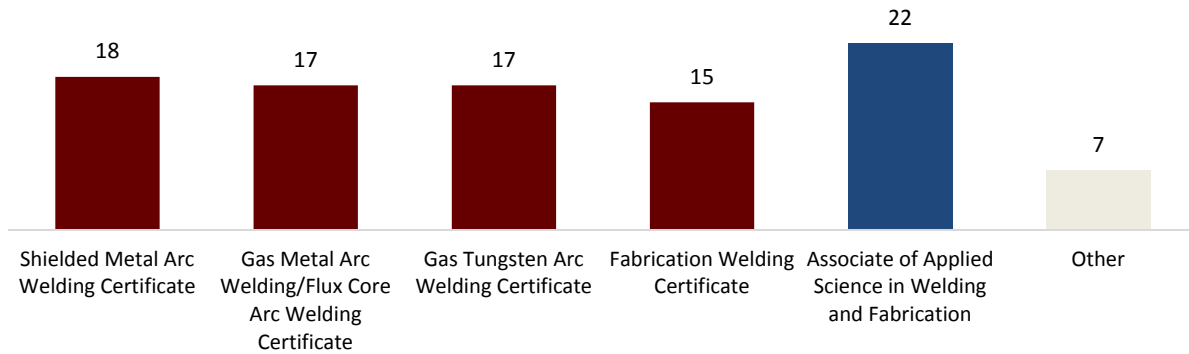
### 3.4.2 AAMMP Up Welding Participant Survey

Beginning in January 2017, the IMPAQ team surveyed AAMMP Up CAD/Welding participants following their completion of the course, to seek feedback from them regarding their experiences with the AAMMP Up program; as occurred with the survey of Part 65 participants, few completers were reachable, and only 35 participants responded to the survey.

Among the Welding survey respondents, 72 percent were employed, 20 percent were unemployed and seeking full- or part-time employment, and 7 percent were unemployed and not seeking paid employment. Of the respondents, 60 percent were currently working in the welding industry.

Seventy-one percent of respondents were pursuing an AAS degree in Welding and Fabrication, either alone or in combination with specialized welding certificates (Exhibit 3.5).

**Exhibit 3.5: Welding Credentials Pursued by Participants (N=31)**

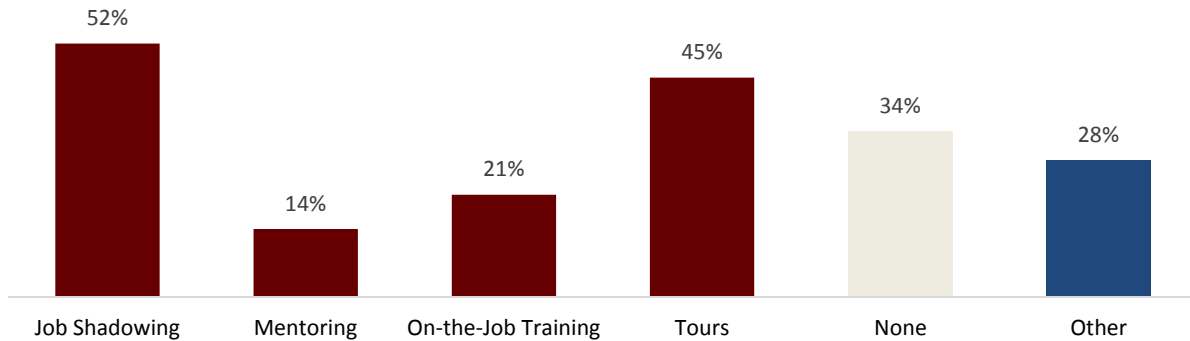


Approximately 60 percent of respondents indicated that information provided by the college or the AAMMP Up program about career opportunities in welding and the opportunity to attain industry-recognized credentials most influenced them to join the Welding program. Twenty-seven percent were influenced by information and encouragement provided from employers.

Fifty-eight percent of survey respondents cited the résumé assistance and mock interviews as the most helpful experiences in preparing for employment in the welding field. Other respondents found support by the AAMMP Up advisors and the opportunity to meet potential employers as most valuable. Several respondents also indicated that they would have appreciated more time devoted to job shadowing. Recommendations for how the Welding program could be made more useful for future students included “insuring students have basic skills in hand-held power tools,” and having more local industry officials talk to students about working standards.

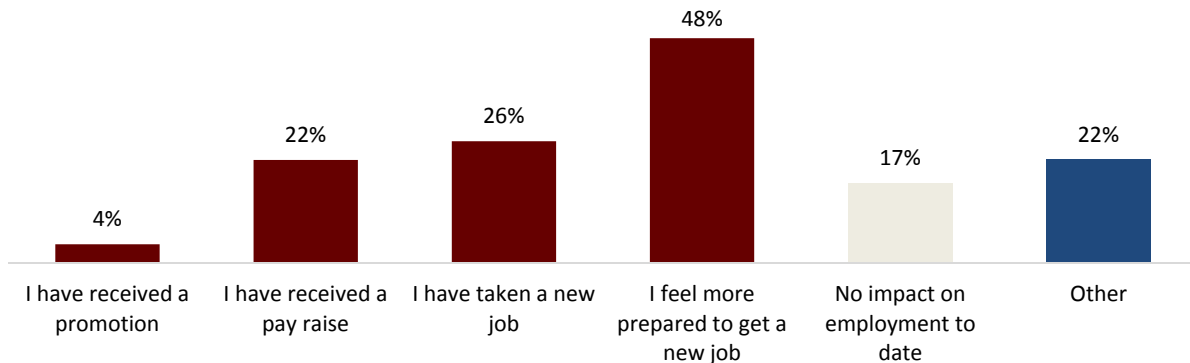
As shown in Exhibit 3.6, 52 percent of survey respondents participated in job shadowing as part of the Welding program, 45 percent took tours of employers, and 21 percent participated in on-the-job training. Fewer respondents (14 percent) engaged with mentoring. Thirty-four percent of respondents admitted to participating in none of the out-of-the classroom training opportunities presented by the AAMMP Up Welding program. Approximately 60 percent of respondents found the job shadowing and on-the-job training aspects of the class very or somewhat important.

**Exhibit 3.6: Out-of-Classroom Training Opportunities (N=29)**



As a result of earning an AAMMP Up certificate and/or AAS degree, 26 percent of welding survey respondents have taken a new job, 4 percent have received a promotion, and 22 percent have received a promotion. In addition, 48 percent of respondents feel more prepared to find a new job (Exhibit 3.7).

**Exhibit 3.7: Results of Welding Program Participation (N=23)**



### 3.5 Key Lessons Learned

Lessons learned included:

**Industry and local workforce partners should be involved early in the implementation process.**

For AAMMP Up, strong partnerships with industry and the workforce development system were critical to curriculum development, equipment procurement, and worker/student participation in classes and other training. Collaboration with industry partners allowed the AAMMP Up program to ensure that students learned to use the equipment and tools used by local employers. The strong partnerships that characterized the program facilitated not only successful program implementation and curriculum development but also effective grant management and collaboration. Active engagement with industry and workforce partners early in implementation helped AAMMP Up realize the full potential of the partnerships by promoting buy-in from all partners from the beginning and allowing for successful leveraging of new and existing

relationships with employers to develop industry-relevant programs. More than one partner expressed a desire to continue collaboration with PCC following the grant.

**Effective alignment of training programs to local labor market needs demands flexibility and nimbleness.** PCC's application to DOL for TAACCCT funding proposed detailed plans for establishing programs in mining/extraction, aviation, and manufacturing that responded to the high demand in the area for workers in those sectors and to local employers' expressed need for workers with very specific technical skills and subject matter knowledge. However, changes in the economy and labor market, particularly the sharp decline of the mining industry in the area, caused program staff to have to refocus the planned classes and certificates and restructure the overall AAMMP Up programs in major ways. The likelihood that such unanticipated situations will occur underscores the need for flexibility in program development and responsiveness to changing labor markets.

**It is important to plan for the sustainability not only of program components but also the necessary administrative and management structures that support program implementation and collaboration among partners.** Strong college organizational structures and procedures are crucial to effective grant management and to supporting collaboration across colleges and industry partners. Several respondents told us that effective grant implementation was greatly assisted by the commitment of senior administrators at PCC to the goals and objectives of AAMMP Up. Moreover, college grant managers and AAMMP Up program staff developed procedures (e.g., for documenting program activities and reporting) and operated within a structure that facilitated efforts to create new college programs and modify existing ones. Making AAMMP Up an institutional priority will be critical to its sustainability.

### **3.6 Conclusion**

DOL's TAACCCT grant program represented a major investment in bringing together the public workforce development system and the nation's community colleges to address the workforce needs of today's economy. In partnership with the U.S. Department of Education (ED), DOL provided community colleges around the country with funds to expand their education and career training programs and to improve their ability to train American workers with the skills demanded by the 21st century job market and connect them with businesses in need of such skilled workers. The AAMMP Up program, one such recipient of TAACCCT grant funding, helped strengthen programs aimed at workers eligible for training under the TAA as well as other adults seeking to obtain the skills—and, importantly, the credentials—needed for high-wage, high-skill employment. Using TAACCCT funds to identify local and regional business needs, create new partnerships or strengthen existing ones with employers and with labor and community-based organizations, and develop industry-aligned programs, through the AAMMP Up program, PCC made an important contribution to improved economic opportunity for workers and for meeting the workforce needs of employers in high-demand, high-growth industry sectors.



## CHAPTER 4: BASELINE CHARACTERISTICS

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The previous chapter introduced the reader to the details of the AAMMP Up program and its implementation. Against that backdrop, this chapter provides a detailed description of the demographic and socioeconomic characteristics of program participants. In addition, we describe the composition of a separate group of individuals who, although they did not enroll in the AAMMP Up program, comprise the “served” population who took classes developed and/or supported with TAACCCT grant funds.

The chapter proceeds as follows: Section 4.1 summarizes the main findings of the chapter. Section 4.2 describes the key characteristics of program participants, for each cohort. Section 4.3 compares the key characteristics of participants across the different programs. Section 4.4 presents a descriptive profile of individuals who did not enroll in AAMMP Up, but who were served by the grant-funded programs. Section 4.5 concludes the chapter.

### 4.1 Summary of Main Findings

Exhibit 4.1 provides a snapshot of the main findings in this chapter. The subsections that follow present these findings in more detail.

#### Exhibit 4.1: Summary of Main Findings

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- The AAMMP Up program enrolled 403 individuals over four years of operation.
- **Sociodemographic Characteristics at Baseline.** Individuals in the analytic sample tended to be male (91 percent), white (58 percent), and aged 25–44 years (54 percent). Most also had at least some college experience or an advanced associate degree (59 percent), and nearly all were English-speaking U.S. citizens. A sizable share of individuals reported having applied for financial aid (29 percent); this was most commonly reported among those enrolled in year 1 of the program (42 percent). Finally, a large share of students had already taken a course relevant to their program of study or had already earned a certification prior to enrolling in their program (64 percent).
- **Employment History.** The AAMMP Up program tended to attract individuals with employment experience (86 percent of the analytic sample reported ever being employed). Of these, the majority reported being currently employed (80 percent).
- **Comparison with General Population.** When compared with the general Arizona and U.S. populations, AAMMP Up was overrepresented by men aged 25–34 years, who are more educated, and are more likely to be veterans.
- **Comparison with Non-Program “Served” Students.** In addition to conferring direct benefits on program participants, the AAMMP Up program also enabled students not enrolled in AAMMP Up to take classes developed and/or supported with TAACCCT grant funds. The sociodemographic composition of the served population was largely similar to that of program participants.

## 4.2 Participant Demographic and Socioeconomic Profile, by Year

The evaluation is based on 403 individuals who were enrolled in the AAMMP Up program over four years of operation. The college met its target number of participants. The last participant was enrolled in January 2018 and participants continued to receive program services through May 2018.

Exhibit 4.2 on the following page provides a detailed summary of the sociodemographic characteristics of participants at baseline, in each year, and across the duration of the program.

- *Age and Gender.* The vast majority (91 percent) were male. More than half of participants across years (54 percent) were aged 25–44 years.
- *Race/Ethnicity.* 58 percent were white, and nearly a third were Hispanic (31 percent). The racial composition of the sample was largely similar across each of the annual cohorts.
- *Education.* A large proportion of the analytic sample (59 percent) had at least some college experience or an advanced associate degree, with similar proportions in each year.
- *Veteran Status.* 21 percent of participants overall were veterans.
- *Other Characteristics.* Nearly all participants were English-speaking U.S. citizens. A sizable share of individuals reported having applied for financial aid (29 percent); this was most commonly reported among those enrolled in year 1 of the program (42 percent). A large share of students (64 percent) had already taken a course relevant to their program of study or had already earned a certification prior to enrolling in their program.

Exhibit 4.3 on page 24 provides a detailed summary of participants' employment-related characteristics, again for each year and across all years. The AAMMP Up program tended to attract individuals with employment experience (86 percent of the analytic sample reported ever being employed). One reason for this was that several of the AAMMP Up programs were designed to provide specialized training for currently employed workers or, in the case of Part 65, to provide test preparation assistance to individuals employed as military aviation mechanics who lacked the licensure for future civilian employment. Of them, the majority reported being currently employed (80 percent) and earned average hourly wages of \$14.82. Average number of years of work experience was 4.38. A small proportion (3 percent) reported receiving UI benefits at baseline.

**Exhibit 4.2: Sociodemographic Characteristics of Participants, By Year**

<b>Characteristic</b>	<b>All Years</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>
<b>Male</b>	91% (367)	90% (88)	92% (130)	89% (139)	100% (10)
<b>Race/Ethnicity*</b>					
White	58% (231)	54% (53)	60% (83)	57% (86)	90% (1)
African American	3% (13)	4% (4)	4% (6)	1% (2)	10% (1)
Hispanic	31% (123)	32% (31)	29% (40)	35% (52)	0% (0)
Other Race	7% (29)	9% (9)	7% (10)	7% (10)	0% (0)
<b>Age Group</b>					
Under 18 Years	4% (18)	0% (0)	12% (17)	1% (1)	0% (0)
18–24 Years	37% (136)	39% (38)	30% (42)	35% (54)	20% (2)
25–34 Years	40% (147)	36% (35)	38% (53)	36% (56)	30% (3)
35–44 Years	14% (56)	13% (13)	14% (20)	12% (18)	50% (5)
45–54 Years	7% (31)	8% (8)	6% (9)	9% (14)	0% (0)
55–64 Years	2% (11)	2% (2)	0% (0)	6% (9)	0% (0)
65+ Years	1% (4)	1% (1)	0% (0)	2% (3)	0% (0)
<b>Education</b>					
No High School Diploma	6% (25)	2% (2)	14% (20)	3% (5)	0% (0)
High School Diploma	28% (112)	21% (20)	28% (39)	26% (41)	20% (2)
Some College or AA Degree	59% (240)	70% (68)	54% (76)	62% (96)	50% (5)
College Degree	7% (26)	7% (7)	4% (6)	8% (13)	30% (3)
<b>Military Status</b>					
Active Duty	11% (45)	0% (0)	12% (17)	14% (22)	60% (6)
Veteran	21% (86)	18% (17)	27% (38)	19% (29)	20% (2)
<b>Other Characteristics</b>					
U.S. Citizen	98% (398)	99% (96)	98% (139)	99% (153)	100% (10)
Limited English ability	6% (24)	7% (7)	9% (13)	2% (4)	0% (0)
Taken at least one relevant prior course or certification*	64% (258)	85% (82)	56% (79)	59% (92)	50% (5)
Applied for financial aid	29% (118)	42% (41)	23% (32)	28% (44)	10% (1)
<b>Total Participants</b>	<b>403</b>	<b>97</b>	<b>141</b>	<b>155</b>	<b>10</b>

Note: Data from PCC. Sample proportion is reported. The “Other Race” category includes individuals who are American Indian, Asian, and other/mixed races. The “College Degree” category includes individuals with a Bachelor’s degree or higher level of education. Included in this exhibit are participants with non-missing values of the relevant variables. Variable values of “n/a” are treated as “no.”

\* Data were missing for one or more participants.

**Exhibit 4.3: Employment-Related Characteristics of Participants, By Year**

<b>Characteristic</b>	<b>All Years</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>
<b>Ever Employed**</b>	<b>86% (347)</b>	<b>86% (84)</b>	<b>84% (113)</b>	<b>87% (135)</b>	<b>100% (10)</b>
Currently employed	80% (276)	73% (61)	88% (99)	79% (106)	100% (10)
Not currently employed, but were employed in the past	20% (71)	27% (23)	12% (14)	8% (29)	0% (0)
<b>Type of Current Employment*</b>					
Currently employed without past experience	31% (86)	26% (16)	26% (26)	39% (41)	30% (3)
Currently employed with past experience	69% (190)	74% (45)	74% (73)	61% (65)	70% (7)
<b>Average Years of Experience*</b>	4.38	3.42	6.07	3.51	4.10
<b>Average Current Hourly Wage*</b>	\$14.82	\$12.49	\$15.11	\$15.83	\$25.60
<b>Currently Claiming UI Benefits*</b>	14 (3%)	4 (4%)	5 (4%)	3 (2%)	2 (20%)
<b>Total Participants</b>	<b>403</b>	<b>97</b>	<b>141</b>	<b>155</b>	<b>10</b>

Note: Data from PCC. Sample proportion or mean is reported. Included in this exhibit are participants with non-missing values of the relevant variables. Variable values of “n/a” are treated as “no.”

\* Data were missing for one or more participants.

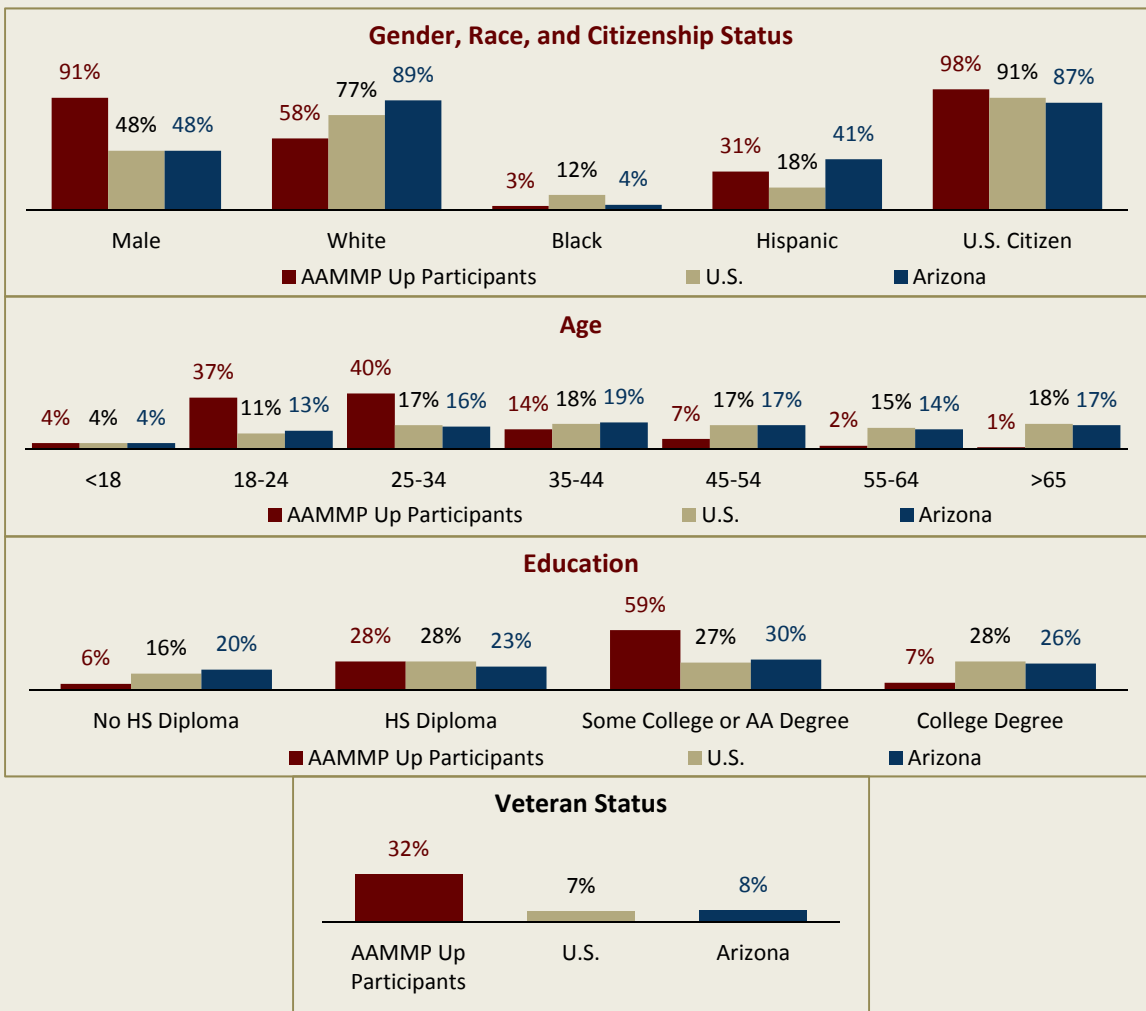
\*\* This includes participants currently employed at baseline, and those unemployed at baseline but who held a job in the past.

## How representative are AAMMP Up participants compared to the general U.S. population and Arizona?

AAMMP Up participant demographics were generally similar to the demographics of the general adult population in Arizona and in the United States, but several key differences are notable (Exhibit 4.4.):

- **Gender, Race/Ethnicity, and Citizenship Status:** AAMMP Up participants were more than twice as likely to be male. For race and ethnicity, although some differences exist between AAMMP Up participants and the general U.S. population, the program largely attracted individuals who were similar to the general Arizona population. Like the general populations, the vast majority of the AAMMP Up participants were U.S. citizens.
- **Age:** More than three-quarters of AAMMP Up participants were between the ages of 18 and 34, compared to only almost one third of the general U.S. and Arizona populations.
- **Education:** About twice as many AAMMP Up participants had some college experience or earned an advanced associate degree than the general U.S. and Arizona populations, but far fewer participants had a Bachelor’s or higher college degree.
- **Veteran Status:** Almost one-third of AAMMP Up participants were veterans, compared to less than 10 percent of the general U.S. and Arizona populations.

**Exhibit 4.4: Comparison of AAMMP Up Participants to General Population in the U.S. and Arizona**



Source: IPUMS-CPS, University of Minnesota, [www.ipums.org](http://www.ipums.org), March 2017 dataset.

### **4.3 Participant Demographic and Socioeconomic Profile, by Program Type**

Exhibit 4.5 on the following page provides a detailed summary of the sociodemographic and employment-related characteristics of participants at baseline, by program type. Because the vast majority of participants were male, the same pattern was seen by program as well. In terms of age, NC3, Mechatronics, and Welding tended to attract younger individuals (aged 18–24 years), whereas nearly half of all participants enrolled in the Part 65 program (49 percent) were aged 25–34 years. Those enrolled in Part 65 and the E&I programs were the most educated (with 78 percent and 74 percent, respectively, having at least some college experience), whereas individuals with only a high school diploma constituted the largest relative share of participants in the Mechatronics program (56 percent). Financial aid applications were most common among NC3 program participants, with 40 percent reported having applied for aid. As far as employment experience is concerned, each program type saw high rates ranging from 77 percent for NC3 to 100 percent for E&I. Part 65 participants had the maximum average experience of 6.93 years. However, baseline average wages earned by E&I participants was the highest, at \$36.50.

**Exhibit 4.5: Sociodemographic and Employment-Related Characteristics of Participants,  
By Program Type**

<b>Characteristic</b>	<b>NC3</b>	<b>Mechatronics</b>	<b>Welding</b>	<b>Part 65</b>	<b>E&amp;I</b>
<b>Sociodemographic Characteristics</b>					
<b>Male</b>	94% (91)	89% (8)	88% (174)	97% (88)	75% (6)
<b>Race/Ethnicity*</b>					
White	49% (47)	11% (1)	61% (120)	69% (62)	25% (1)
African American	1% (1)	11% (1)	2% (3)	10% (9)	0% (0)
Hispanic	46% (44)	78% (7)	30% (59)	11% (10)	75% (3)
Other race	4% (4)	0% (0)	8% (15)	10% (9)	0% (0)
<b>Age Group</b>					
Under 18 Years	18% (17)	0% (0)	1% (1)	0% (0)	0% (0)
18–24 Years	35% (34)	55% (5)	40% (80)	19% (17)	17% (1)
25–34 Years	30% (29)	22% (2)	34% (68)	49% (45)	17% (1)
35–44 Years	6% (6)	0% (0)	14% (28)	23% (21)	17% (1)
45–54 Years	7% (7)	11% (1)	7% (13)	7% (6)	50% (3)
55–64 Years	3% (3)	11% (1)	3% (5)	2% (2)	0% (0)
65+ Years	1% (1)	0% (0)	2% (3)	0% (0)	0% (0)
<b>Education</b>					
No High School Diploma	18% (17)	0% (0)	4% (7)	1% (1)	0% (0)
High School Diploma	18% (17)	56% (5)	31% (62)	20% (18)	13% (1)
Some College or AA Degree	63% (61)	22% (2)	58% (116)	78% (71)	74% (6)
College Degree	1% (2)	22% (2)	7% (13)	1% (1)	13% (1)
<b>Military Status</b>					
Active Duty	1% (1)	0% (0)	1% (1)	47% (43)	0% (0)
Veteran	10% (10)	0% (0)	17% (33)	44% (40)	38% (3)
<b>Other Characteristics</b>					
U.S. citizen	100% (97)	100% (9)	99% (197)	100% (91)	88% (7)
Limited English ability	6% (6)	0% (0)	6% (12)	13% (12)	75% (6)
Taken at least one relevant prior course	55% (53)	67% (6)	63% (125)	73% (66)	100% (8)
Applied for financial aid	40% (39)	22% (2)	37% (73)	7% (6)	0% (0)
<b>Employment-Related Characteristics</b>					
<b>Ever Employed**</b>	77% (75)	89% (8)	84% (166)	99% (90)	100% (8)
Currently Employed	63% (47)	88% (7)	79% (131)	93% (84)	88% (7)
Not Currently Employed, but was employed in the past	37% (28)	13% (1)	21% (35)	7% (6)	13% (1)
<b>Types of Current Employment</b>					
Currently employed without past experience	32% (15)	86% (6)	76% (100)	44% (37)	29% (2)
Currently employed with past experience	68% (32)	14% (1)	24% (31)	56% (47)	71% (5)
<b>Average Years of Experience*</b>	3.26	2.86	3.50	6.93	4.00
<b>Average Current Hourly Wage*</b>	\$11.50	\$14.58	\$12.81	\$24.48	\$36.50
<b>Currently Claiming UI Benefits*</b>	2% (2)	0% (0)	3% (6)	7% (6)	25% (2)
<b>Total Participants</b>	<b>97</b>	<b>9</b>	<b>198</b>	<b>91</b>	<b>8</b>

Note: Data from PCC. Sample proportion or mean is reported. The “Other Race” category includes individuals who are American Indian, Asian, and other/mixed races. The “College Degree” category includes individuals with a Bachelor’s degree or higher level of education. Included in this exhibit are participants with non-missing values of the relevant variables. Variable values of “n/a” are treated as “no.”

\* Data were missing for one or more participants.

\*\* This includes participants currently employed at baseline, and those unemployed at baseline but who held a job in the past.

#### **4.4 Demographic and Socioeconomic Profile of the Served Population**

In addition to conferring benefits on program participants, the AAMMP Up program also served students who took classes developed and/or supported with AAMMP Up grant funds from 2015 to 2017. Although these individuals were not enrolled in the AAMMP Up program, they were considered to be in the overall “served population” of the grant.

Exhibit 4.6 investigates characteristics of the served population. The data is shown by year, as well as across years. Proportions are also separately shown for any course versus the CAD/Welding course in particular. In total, 735 students who were not enrolled in AAMMP Up benefited otherwise from the grant funds. With the exception of educational attainment, the demographic makeup of individuals enrolled in any course was largely similar to those enrolled in CAD/Welding. In particular:

- *Gender.* The vast majority overall (92 percent) were male.
- *Age.* Nearly two-thirds (65 percent) were between the ages of 18 and 34 years.
- *Race/Ethnicity.* 56 percent were white, and a third were Hispanic.
- *Education.* More than half (54 percent) reported having earned a certificate. However, for CAD/Welding, individuals were more than twice as likely to have earned an AA degree compared to a certificate (76 percent versus 24 percent).
- *Citizenship and Veteran Status.* 15 percent overall were veterans, and the vast majority were U.S. citizens (94 percent).



**Exhibit 4.6: Characteristics of Served Population, By Year and Course**

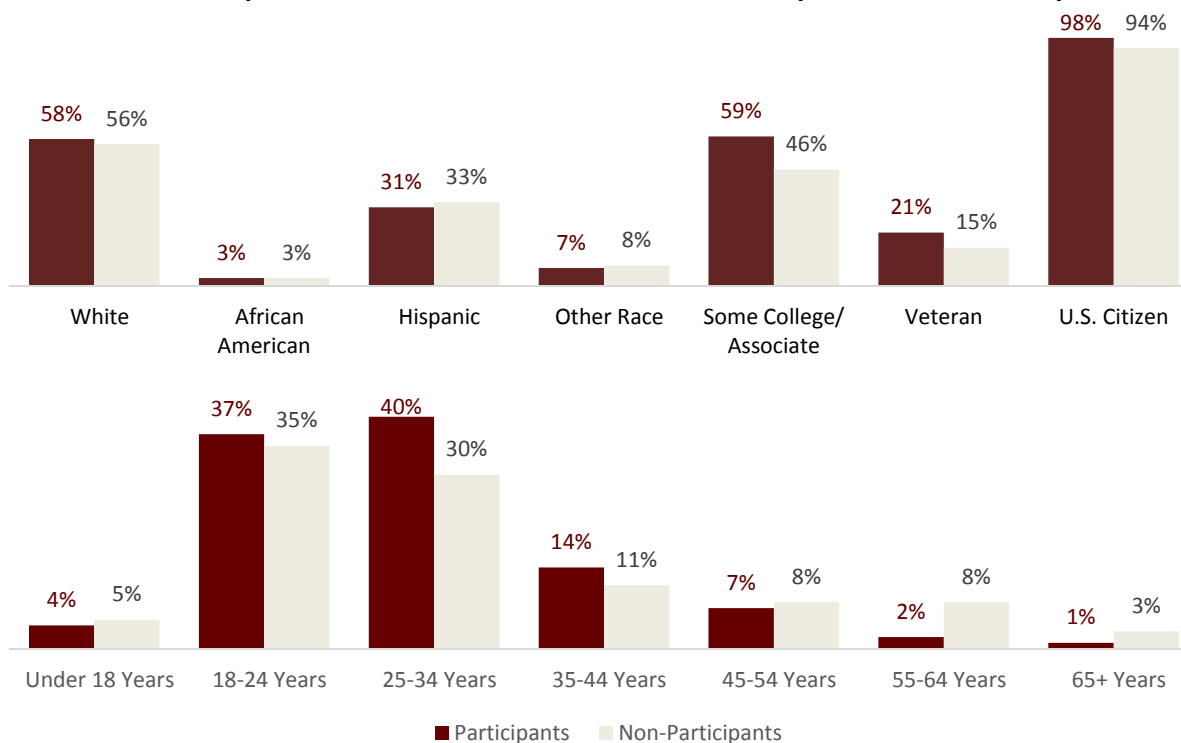
<b>Characteristics</b>	<b>All Years: Any Course</b>	<b>All Years: CAD/ Welding</b>	<b>2015 Any Course</b>	<b>2015 CAD/ Welding</b>	<b>2016 Any Course</b>	<b>2016 CAD/ Welding</b>	<b>2017 Any Course</b>	<b>2017 CAD/ Welding</b>
<b>Male</b>	92% (550)	100% (135)	91% (152)	100% (104)	94% (197)	100% (23)	91% (202)	100% (8)
<b>Race/Ethnicity*</b>								
White	56% (390)	62% (76)	57% (148)	64% (60)	56% (123)	57% (12)	56% (119)	57% (4)
African American	3% (19)	1% (1)	3% (7)	0% (0)	4% (9)	5% (1)	1% (3)	0% (0)
Hispanic	33% (228)	28% (34)	32% (82)	27% (25)	32% (70)	29% (6)	36% (76)	43% (3)
Other Race	8% (54)	9% (11)	8% (21)	10% (9)	9% (19)	10% (2)	7% (14)	0% (0)
<b>Age Group</b>								
Under 18 Years	5% (35)	1% (1)	0% (0)	0% (0)	7% (17)	0% (0)	8% (18)	13% (1)
18–24 Years	35% (257)	28% (38)	33% (89)	29% (30)	35% (82)	35% (8)	37% (86)	0% (0)
25–34 Years	30% (219)	39% (39)	33% (90)	32% (33)	31% (72)	22% (5)	25% (57)	15% (1)
35–44 Years	11% (82)	10% (13)	12% (32)	8% (8)	11% (25)	9% (2)	11% (25)	38% (3)
45–54 Years	8% (61)	12% (16)	10% (26)	11% (11)	9% (20)	13% (3)	6% (15)	25% (2)
55–64 Years	8% (59)	13% (18)	8% (23)	13% (14)	6% (14)	13% (3)	10% (22)	13% (1)
65+ Years	3% (22)	7% (10)	4% (11)	8% (8)	1% (3)	9% (2)	3% (8)	0% (0)
<b>Veteran</b>	15% (109)	13% (17)	11% (31)	13% (14)	21% (48)	9% (2)	13% (30)	13% (1)
<b>Highest Degree Attained</b>								
Associate	46% (102)	76% (19)	52% (65)	78% (18)	42% (22)	0% (0)	34% (15)	50% (1)
Certificate	54% (120)	24% (6)	48% (61)	22% (5)	58% (30)	0% (0)	66% (29)	50% (1)
<b>U.S. Citizen</b>	94% (692)	96% (129)	94% (254)	96% (100)	95% (221)	96% (22)	94% (217)	88% (7)
<b>Total Individuals</b>	<b>735</b>	<b>135</b>	<b>271</b>	<b>104</b>	<b>233</b>	<b>23</b>	<b>231</b>	<b>8</b>

Note: Data from PCC. Sample proportion is reported. Included in this exhibit are individuals with non-missing values of the relevant variables. Variable values of “n/a” are treated as “no.”

\* Data were missing for one or more individuals.

Exhibit 4.7 compares key characteristics between program participants and the served population. The two groups tracked closely in several characteristics, including race/ethnicity, and citizenship. AAMMP Up participants were more likely than non-participants to have some college or an associate degree, and to be veterans. In addition, there were more participants between the ages of 18 and 44 than non-participants, and fewer participants between 45 and 65+ years old.

**Exhibit 4.7: Comparison of Characteristics between Participant and Served Populations**



Note: Data from PCC. Sample proportion is reported. Included in this exhibit are individuals with non-missing values of the relevant variables. Variable values of “n/a” are treated as “no.”

## 4.5 Conclusion

This chapter provides a snapshot of the baseline characteristics of program participants. Participants in the AAMMP Up program tended to be male (91 percent), aged 25–44 years (54 percent) and white (58 percent). A large proportion had at least some college experience (59 percent), and nearly all were English-speaking U.S. citizens (98 percent). When compared with the general Arizona and U.S. populations, they were overrepresented by men aged 25–34 years, were more educated, and were more likely to be veterans. The AAMMP Up program tended to attract individuals with employment experience (86 percent), of whom the majority (80 percent) reported being currently employed. Correspondingly, only a small proportion (3 percent) reported receiving UI benefits at baseline.

The next chapter describes the educational and labor market outcomes of AAMMP Up participants.

## CHAPTER 5: PARTICIPANT OUTCOMES

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AAMMP Up's key goal was to help participants attain educational and labor market outcomes. This chapter describes the key outcomes of program participants, including their program completion rates, certifications earned, enrollment in further education, and employment and wages. We first present a simple descriptive analysis of the attainment rates of outcomes. We follow this with multiple regression analyses of outcomes. As described in Chapter 3, our Outcomes Assessment is based on participant-level data from PCC. In addition, we make use of DOL quarterly state UI wage data provided by PCOS.

The analyses presented in this chapter do not provide evidence on the effectiveness of the AAMMP Up program, but rather represent an assessment of the key determinants of outcomes during the study period. Although we determined that it was not feasible to establish a causal link between program participation and participant outcomes using experimental or quasi-experimental impact analysis methods,<sup>2</sup> the rigorous Outcomes Assessment provides valuable results for assessing the results of the AAMMP Up program, helping to understand factors that are associated with success in the program, and providing data useful for program improvement and development of effective workforce education and training strategies.

Section 5.1 describes the main outcomes analyzed in this chapter. Section 5.2 presents a summary of the main findings. Section 5.3 provides descriptive analyses of the rates of outcomes achievement. Section 5.4 presents the results of multiple regression analyses of outcomes. Section 5.5 concludes the chapter.

### 5.1 Description of Outcomes

The key outcomes considered in this chapter fall under three broad domains: program completion, educational outcomes, and labor market outcomes.

- **Program Completion:** This is equivalent to a participant having received at least one certificate or credential via the program.

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<sup>2</sup> In developing the evaluation design, we determined that an experimental design was not possible, due to a program structure that did not permit random assignment to treatment and control groups. Nor was a quasi-experimental study of the AAMMP Up program feasible for a number of reasons. In addition to sample sizes being insufficient to conduct a quasi-experimental analysis and detect statistically significant effects, a suitable comparison group was not available. Few programs are offered by PCC outside of AAMMP Up that provide similar training or attract a similar student population. Comparing or matching new AAMMP Up students to past students in PCC aviation, industrial mechanics, and other classes was not considered an effective strategy either, as AAMMP Up was designed to attract a different population from those of previous courses. Drawing comparison groups from neighboring colleges was also not feasible, as many AAMMP Up courses (such as those in diagnostics, industrial safety, and large electrical distribution systems) were unique to PCC, which made finding similar programs for comparison difficult. Few programs in industrial technology and aviation exist in the area, and several of the programs that are available, such as welding and mechatronics, are located at considerable distance from PCC's campuses. Furthermore, these programs not only cater to a different local labor market than the one PCC serves, but also attract a demographically different population than does PCC. Procuring data sharing agreements from other colleges was also considered to be a serious challenge.

- **Educational Outcomes**
  - Number of certificates/credentials obtained through the program
  - Continued enrollment in education
- **Labor Market Outcomes**
  - Employment obtained after program exit
  - Labor market earnings

## 5.2 Summary of Main Findings

Exhibit 5.1 provides a snapshot of the main findings in this chapter. The subsections that follow present these findings in more detail.

### Exhibit 5.1: Summary of Main Findings

- **Descriptive Analysis**
  - **52 percent (208)** completed their respective program type (or earned at least one credential).
  - **10 percent (41)** enrolled in further education.
  - **20 percent (56)** found employment after exiting PCC.
- **Multiple Regression Analysis**
  - **Female** students were more likely than males to complete the program, enroll in further education, and become employed. **Younger** students (under age 30) were also more likely to achieve these outcomes than their older counterparts.
  - **White** students were more likely to attain all but one outcome (number of certifications earned), than non-whites. Hispanic students were more likely than non-Hispanic students to enroll in further education and gain employment after exiting the PCC system.
  - **More-educated** students were more likely than their less-educated counterparts to complete their respective program type and earn more certificates and wages.
  - **NC3** participants saw much higher completion rates than any other program, but **Welding** students earned the most certifications, on average.

## 5.3 Descriptive Analysis of Participant Outcomes

In this section, we present descriptive analyses of participant outcomes.

### 5.3.1 Program Completion

The AAMMP Up program defines “completers” according to the program requirements for each program type (namely, Welding, Part 65, Mechatronics [MCT], NC3, and E&I). For example, in Welding, an individual is classified as a program completer after obtaining the first certificate.

For Part 65, individuals are considered as completers if they successfully pass the aviation exam. For NC3, an individual is counted as a completer after obtaining the NC3 certification. Specifically, we considered an individual as a program completer if he or she earned at least one credential or certificate through the program.

Of 403 program participants who were enrolled during the period of March 2015–January 2018, Exhibit 5.2 shows that a little over half (52 percent, or 208) were designated as completers of program requirements. However, a completer does not automatically exit the program. Completers exit the program only when they leave the institution that they are enrolled in. Therefore, of the 208 completers, as seen, 127, or 61 percent, have fully exited the program. Although the program saw high rates of completion of required services, 195 participants were designated as non-completers. When comparing rates of program completion across program types, it can be observed that the NC3 program had the highest completion rate, with all but three participants having completed the program. No participant in the Mechatronics program had yet been classified as a program completer at the time of the present analysis.

**Exhibit 5.2: Completion and Non-Completion Status of Program Participants, by Program Type**

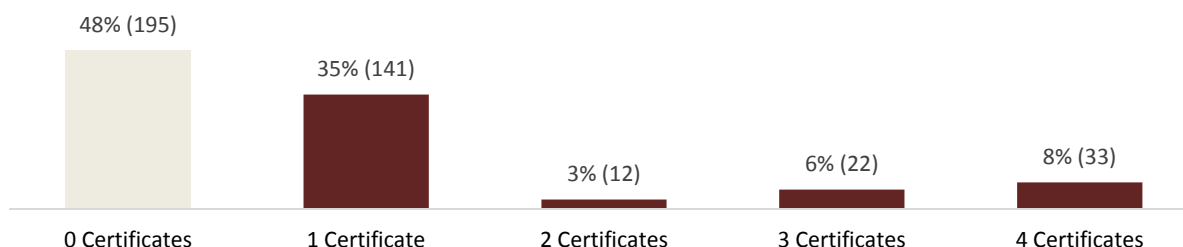
Completion Status	All Individuals	NC3	MCT	Welding	Part 65	E&I
Non-Completer	48% (195)	3% (3)	100% (9)	55% (109)	75% (68)	75% (6)
Completer	52% (208)	97% (94)	0% (0)	45% (89)	25% (23)	25% (2)
Still Enrolled in Institution	39% (81)	55% (52)	0% (0)	67% (60)	0% (0)	0% (0)
Fully Exited the Program	61% (127)	45% (42)	0% (0)	33% (29)	100% (23)	100% (2)
<b>Total Participants</b>	<b>403</b>	<b>97</b>	<b>9</b>	<b>198</b>	<b>91</b>	<b>8</b>

Note: Data from PCC. Sample proportion is reported.

### 5.3.2 Educational Outcomes

Exhibit 5.3 presents descriptive analyses of the educational outcomes of program participants. We considered two types of educational outcomes. First, we considered the number of certifications/credentials earned by program participants. As noted earlier, individuals who have earned at least one credential are considered to be program completers (52 percent). As shown in Exhibit 5.3, of the 208 completers, 35 percent (141) of participants earned only one certificate at some point while in the program, 3 percent (12) had two, and 14 percent (55) earned three or more.

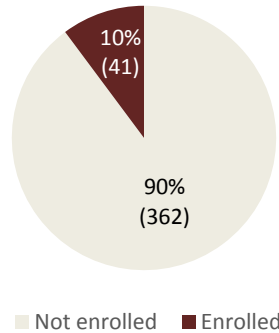
**Exhibit 5.3: Number of Certificates/Credentials Earned**



Note: Data from PCC. Sample proportion is reported.

The second educational outcome we considered was continued enrollment in education. For this, we combined continued enrollment in the AAMMP Up program, continued enrollment in other AAMMP Up grant-funded programs, and enrollment in further education, as all were considered relevant by program staff for measuring continued enrollment in education. As seen, 41 individuals (10 percent of total participants) availed themselves of further education (Exhibit 5.4).

**Exhibit 5.4: Ongoing Enrollment in Education**



### 5.3.3 Labor Market Outcomes

Exhibit 5.5 presents descriptive analyses of the rate of employment of program participants. Employment status was identified based on a combination of administrative UI data and PCC data, and is presented for participants who fully exited the program (that is, those who are no longer enrolled in their institution). Of 403 students, 286 exited the PCC system. Of these 286, 127 completed their program before exiting (see Exhibit 5.2).

We received UI data for completers of the program. Therefore, exiting individuals are considered to be employed if either they are present in the UI data or self-report being employed in the PCC data. Furthermore, exiters were flagged as employed through the program only if their employment date from UI records was at or after their date of program exit. Based on this definition, as seen in Exhibit 5.5, of the 286 exiters, at least 56 individuals (or 20 percent of participants)<sup>3</sup> reported having gained employment through the program.

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<sup>3</sup> It is important to keep in mind though that because employment status is based on self-reports for some individuals, this outcome is likely to be underestimated.

**Exhibit 5.5: Post-Program Employment Status**

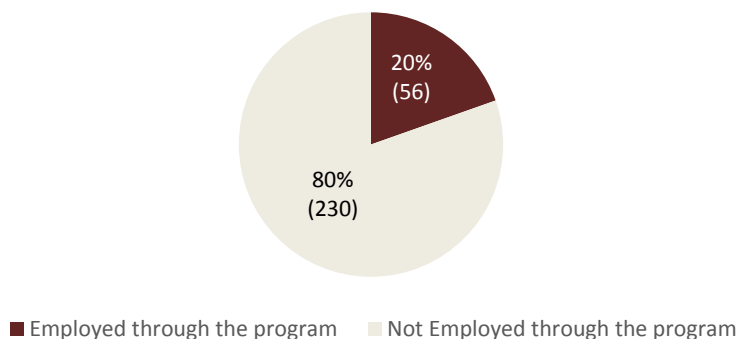


Exhibit 5.6 presents descriptive analyses of quarterly wages of program participants. Because wages were obtained from the UI data, this analysis is restricted to the employed individuals for whom we received UI records.<sup>4</sup> As shown in Exhibit 5.5, 56 exiters (20 percent) found employment after exiting. We have quarterly earnings data and employer information for 46 of these job finders.<sup>5</sup> As shown in Exhibit 5.6, average quarterly earnings were \$10,885. There was substantial variation in individuals’ earnings, which ranged from \$1,663 to \$36,969.

**Exhibit 5.6: Post-Exit Earnings by Program Participants**

Outcome	Number
<b>Average Quarterly Earnings</b>	<b>\$10,885</b>
Standard Deviation	\$5,770
Median	\$10,230
Minimum	\$1,663
Maximum	\$36,969
<b>Total Participants with Earnings Data</b>	<b>46</b>

Note: Data from UI records. This data is limited in that it doesn’t permit us to distinguish between participants employed for a full quarter from those employed for just part of the quarter.

## 5.4 Multiple Regression Analysis of Participant Outcomes

To further examine the extent to which there is an association between program outcomes and the demographic and socioeconomic characteristics of participants, we used regression models that, in their simplest form, can be expressed by the following equation:

$$Y = \alpha + \beta.X + \varepsilon$$

<sup>4</sup> We did not receive UI records for 10 of the 56 students who were flagged as employed in Exhibit 5.5.

<sup>5</sup> By performing a Google search on the employer name listed in the UI records, we were able to determine that at least 28 of these 46 job finders obtained employment in sectors or jobs that use the skills they learned in their program. For example, many welding students were able to find jobs with local manufacturers.

The dependent variable in this model ( $Y$ ) is the relevant outcome of interest. Control variables include (1)  $\alpha$ , an intercept, and (2)  $X$ , a vector that includes demographic and socioeconomic characteristics of individuals.<sup>6</sup> The term  $\varepsilon$  is a zero-mean random error term. The vector of parameters  $\beta$  captures the relationship between participant socioeconomic and demographic characteristics and the outcome of interest.

This model is estimated separately for each outcome of interest. For dichotomous variables (e.g., likelihood of program completion), we use a Probit model. For these models, we report coefficient estimates as average marginal effects, which measure the average percentage change in the probability of achieving the outcome when the explanatory variable moves from the “0” condition to the “1” condition. For the continuous outcomes (e.g., number of credentials/certifications), we use linear models with Ordinary Least Squares (OLS). Standard errors in all models are computed using the robust Huber/White sandwich estimator to account for potential heteroscedasticity.

Exhibit 5.7 presents the regression results from Probit or linear regression models for each of the outcomes described previously. Robust standard errors are noted in parentheses.<sup>7</sup> Probit models are estimated for the binary outcomes (likelihood of program completion, likelihood of enrollment in continued education, and likelihood of employment). Linear models are estimated for the continuous outcomes (number of certifications/credentials, and quarterly wages).

***Relationship with Gender and Age.*** As Exhibit 5.7 shows, being male is significantly associated with three of the five outcomes. Specifically, male participants were 12.3 percentage points, 9.7 percentage points, and 12.7 percentage points less likely to complete the program, enroll in further education, and become employed, respectively, than their female counterparts. Students under age 30 were more likely than their older counterparts to complete their program, by 11.9 percentage points. They were also 8.4 percentage points more likely to enroll in continued education and earn more certifications/credentials.

***Relationship with Race and Ethnicity.*** Being white was significantly positively associated with four of the five outcomes. White students were more likely to complete their program than non-white students, by 16.7 percentage points. They were also more likely to enroll in continued education and become employed (by 13.3 percentage points and 12.5 percentage points, respectively), and, on average, earn \$9,676 more quarterly earnings than non-whites. However, there were no statistically significant differences observed between white and non-white students in the number of certifications/credentials earned. Hispanic students were 13.2 percentage points more likely to enroll in continued education than non-Hispanic students and were 13.6 percentage points more likely to gain employment after exiting the PCC system.

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<sup>6</sup> This vector includes indicators for program, gender, race, ethnicity, age, pre-program educational achievement, pre-program employment experience, prior program-relevant experience, need for financial aid, English fluency, and veteran status.

<sup>7</sup> These standard errors are robust to the presence of heteroscedasticity.



***Relationship with Education, Prior Coursework, and Financial Aid.*** Educational achievement prior to entering one of these programs is predictive of success, as well. Having at least some college experience compared with a high school degree or below increases the likelihood of program completion by 10.7 percentage points and is associated with a greater number of credentials earned, on average. Also, more educated participants earn, on average, about \$3,869 more per quarter. Having taken a prior class in a program-relevant field, or already having a certification under one's belt, is quite effectual in terms of our outcomes of interest. This is associated with an increased likelihood of program completion by nearly 10 percentage points, enrolling in continued education by 8.3 percentage points, and conveys more certifications, on average. Surprisingly though, even though participants with relevant prior coursework were nearly 14 percentage points more likely to become employed, they earned lower quarterly earnings, on average, compared with their counterparts without any prior coursework. Applying for financial aid was associated with only one outcome; it increases the likelihood that a student enrolled in continued education by 6.7 percentage points.

***Relationship with English Speaking Ability, Veteran Status, and Employment.*** None of these characteristics were strong predictors of outcomes. English-speaking ability was associated significantly with only the employment status outcome, but the direction of association was surprising. Specifically, we found that those less fluent in English were 11.1 percentage points more likely to become employed. Being a veteran was also associated significantly only with employment gain, with veterans being 5.4 percentage points less likely to secure employment following program exit. Being ever employed was not at all a significant predictor of outcomes.

***Relationship with Program Type.*** NC3 participants saw much higher completion rates than those in any other program, with likelihood of completion being 63.1 percentage points higher than for Welding. Part 65 students, on the other hand, were 16.8 percentage points less likely to complete their program than Welding students. Note that Mechatronics does not yet have any completers, and the sample size of E&I students is too small to make any judgment on its completion rates. With regard to the number of credentials/certifications earned, Welding students earned more, on average, than those in any other program type.

### Exhibit 5.7: Regression Results

Characteristics	Program Completion	Enrollment in Continued Education	Number of Certificates/ Credentials Earned	Gained Employment	Quarterly Wages
Male (Base=Female)	<b>-0.123*</b> (0.070)	<b>-0.097**</b> (0.048)	-0.226 (0.237)	<b>-0.127*</b> (0.047)	3,315 (3,188)
White (Base =Non-White)	<b>0.167*</b> (0.088)	<b>0.133*</b> (0.070)	0.304 (0.223)	<b>0.125*</b> (0.071)	<b>9,676***</b> (3,171)
Hispanic (Base=Non-Hispanic)	0.093 (0.092)	<b>0.132*</b> (0.728)	0.069 (0.239)	<b>0.136*</b> (0.076)	<b>9,871***</b> (3,222)
Age Group 30-69 (Base=Age Group 18-29)	<b>-0.119***</b> (0.041)	<b>-0.081***</b> (0.032)	<b>-0.330***</b> (0.124)	-0.014 (0.035)	-1,858 (1,435)
Some College or Above (Base=High School Diploma or below)	<b>0.107**</b> (0.045)	-0.026 (0.032)	<b>0.286**</b> (0.136)	0.033 (0.037)	<b>3,869**</b> (1,598)
Prior Courses or Certifications (Base=None Prior)	<b>0.096**</b> (0.043)	<b>0.083**</b> (0.034)	<b>0.310**</b> (0.119)	<b>0.139***</b> (0.039)	<b>-4,889*</b> (2,483)
Applied for Financial Aid (Base=Did Not Apply)	0.046 (0.046)	<b>0.066**</b> (0.031)	0.190 (0.145)	-0.016 (0.034)	627 (1,354)
Limited English (Base=Not Limited English)	0.051 (0.087)	-0.049 (0.062)	0.007 (0.240)	<b>0.111**</b> (0.053)	243 (1,927)
Veteran (Base=Not a Veteran)	0.093 (0.052)	0.031 (0.038)	0.135 (0.144)	<b>-0.054**</b> (0.046)	568 (2,081)
Employed At/Before Program Start (Base=Not Employed Before)	0.047 (0.067)	0.056 (0.049)	-0.147 (0.202)	0.050 (0.057)	-11,970* (5,084)
NC3 Program (Base=Welding)	<b>0.631***</b> (0.059)	NA <sup>1</sup>	<b>-0.240**</b> (0.117)	-0.097 (0.047)	-336 2,589
Part 65 Program (Base=Welding)	<b>-0.168*</b> (0.052)	NA <sup>1</sup>	<b>-0.975***</b> (0.141)	NA <sup>1</sup>	NA <sup>2</sup>
E&I Program (Base=Welding)	0.071 (0.174)	NA <sup>1</sup>	<b>-0.668**</b> (0.311)	NA <sup>1</sup>	NA <sup>2</sup>
Mechatronics Program (Base=Welding)	NA <sup>2</sup>	NA <sup>1</sup>	<b>-1.002***</b> (0.179)	NA <sup>1</sup>	NA <sup>2</sup>
Intercept	NA <sup>1</sup>	NA <sup>1</sup>	<b>1.008***</b> (0.320)	NA <sup>1</sup>	11,483 (3,720)
Number of Observations	396	396	396	396	45
Chi-Squared/F-Statistic	123.86	27.18	13.42	26.90	5.02
P=Value	0.000	0.0024	0.000	0.0048	0.000

Coefficient estimates from Probit models are average marginal effects. Estimates for the wages outcome should be interpreted with caution, as the UI data is limited in that it doesn't permit us to distinguish between participants employed for a full quarter from those employed for just part of the quarter.

Robust standard errors in parentheses. Bold indicates statistically significant.

\* p<0.1, \*\* p<0.05, \*\*\* p<0.01

NA<sup>1</sup> Characteristic perfectly predicted failure and was dropped from the regression because of collinearity.  
NA<sup>2</sup> Characteristic had no observations in the subsample and was dropped from the regression.

## **5.5 Conclusion**

The Outcomes Assessment uses participant-level data collected by the AAMMP Up program to examine its outcomes. Our analyses of available participant data yield promising evidence about the efficacy of the program in providing training and other services to individuals and in helping them achieve their outcomes.

For example, of the pool of participants, more than half were determined to be successful completers (52 percent). Similarly, 10 percent of participants enrolled in some form of continued education. At least 56 students gained employment after exiting the Pima Community College system. Finally, regression analyses show that characteristics such as gender, age, race and ethnicity, prior college education, and prior courses or certifications in the respective program area appear to matter for outcomes.

As emphasized, findings from the Outcomes Assessment reported here cannot be interpreted as causal estimates of the impact of the AAMMP Up program; rather, they provide an assessment of the key factors associated with participant outcomes.

## APPENDICES

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- A. Site Visit Agendas**
- B. AAMMP Up Interview Protocols**
- C. Part 65 Participant Survey**
- D. CAD/Welding Participant Survey**

## APPENDIX A: SITE VISIT AGENDAS

### Site Visit to Arizona Aviation Mining and Manufacturing Program (AAMMP Up) Pima County Community College District AAMMP Up Grant

Site Visitors: Raquel Sanchez and Kelley Akiya, IMPAQ International  
October 19–20, 2016

#### Day 1, October 19, 2016

Time	Interview Respondent	Location	Topics (general)
8:30–10:30	Denise Kingman Program Manager Robin Larson Project Coordinator ----- PCOS rep will join at 9:30	Community Campus	Project status; current and planned activities; implementation challenges; relationships with business and industry and the roles they play in the grant; leveraging of resources; reporting; best practices; lessons learned so far
11:00–12 noon	Aviation Director, Faculty	Aviation Center	Responsibilities; understanding of role in the grant; perceptions of how program is going; perceptions of local business conditions, industry needs, changes in the economic environment, job opportunities for students, etc.
1:30–2:30	Ozlem Kacira	District Office 4905D East Broadway Room C-226	Methods for collecting information needed for reporting, student tracking, program decision-making
3:30–4:00 (before 4 PM class)	Aviation Students	Aviation Center	Experience with program; career goals; satisfaction with program  Observe class, note type of presentation, questions from students, interactions among students/teacher

#### Day 2, October 20, 2016

Time	Interview Respondent	Location	Topics (general)
11:00–12 noon	Welding Dept. Faculty Jon Mount/Ken Bice (30 minutes each)	Downtown Campus	Responsibilities; understanding of role in the grant; perceptions of how program is going; perceptions of local business conditions, industry needs, changes in the economic environment, job opportunities for students, etc.
12 noon–1:00	Welding Students	Downtown Campus	Experience with program; career goals; satisfaction with program
1:45–2:15 pm	Ian Roark VP of Workforce	Community Campus	Overview of grant program at the college

**Site Visit to Arizona Aviation Mining and Manufacturing Program (AAMMP Up)  
Pima County Community College District AAMMP Up Grant**

Site Visitors: Kay Magill, IMPAQ International

January 18–19, 2018

**Day 1, January 18, 2018**

<b>Expected length of time</b>	<b>Interview Respondent</b>	<b>Location</b>	<b>Topics (general)</b>
8:00–8:30 A261	Amanda Abens	Community Campus	Overview of grant program at the college
8:30–10:30 A248	Document Review	Community Campus	Program documentation and DOL reports
11:30–1:00 ST 215 (Lunch provided for participants)	Welding Students	Downtown Campus	Experience with program; career goals; degree/certificate goals; satisfaction with program
1:00–2:00 ST 215	Welding Jon Mount/Ken Bice (30 minutes each)	Downtown Campus	Role in the grant; successes and challenges in implementing classes/courses; perceptions of local industry needs; perception of alignment of program with student and industry needs; job opportunities for students; student outcomes (job, college, etc.)
3:00–4:00 (Mechatronics lab ST118) 1 hour	Mechatronics Charlie Perkins	Downtown Campus	Role in the grant; successes and challenges in implementing classes/courses; perceptions of local industry needs; perception of alignment of program with student and industry needs; job opportunities for students; student outcomes (job, college, etc.)

**Day 2, January 19, 2018**

<b>Expected length of time</b>	<b>Interview Respondent</b>	<b>Location</b>	<b>Topics (general)</b>
8:00–9:00 am D-114 (grants conference room)	Joe Erker	District Office	Data collection successes and challenges; methods used to collect information needed for reporting, student tracking, and program decision-making
9:00–10:00 D-114 (grants conference room)	Amanda Kaminski Laurie Wright	District Office	Role in the grant; monitoring/reporting issues; perceptions of program successes and challenges; evaluation support needed from IMPAQ
11:00–12:00 A248	PCOS: Dorothee Harmon	Community Campus	Relationship with PCC and with AAMMP Up program; perceptions of local business conditions and industry needs; perceptions of alignment of AAMMP Up with industry needs; student outcomes (job, college, etc.)
1:00–2:30 A248	Jessica Normoyle Kim Crantz	Community Campus	Project status; implementation successes and challenges; nature and extent of relationships with business and industry; assessment of alignment of AAMMP Up with industry needs; assessment of alignment of AAMMP Up with student needs; student outcomes (job, college, etc.); leveraging of resources; reporting; best practices; lessons learned; program sustainability; evaluation support needed from IMPAQ
3:00–4:30 Room 103	Aviation Program Charlie Cook Jason Bowersock	Aviation Center	Role in the grant; successes and challenges in implementing classes/courses; perception of alignment of program with student and industry needs; job opportunities for students; student outcomes (job, college, etc.)

Phone interviews:

Maxine Alvarez, PCOS

Greg Wilson, Academic Dean, PCC

Kevin B. Westfall, Business Development Engineer, CAID Industries

## APPENDIX B: AAMMP UP INTERVIEW PROTOCOLS

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### Instructions to Interviewers

The interview protocols are intended to serve as semi-structured guides for your conversations with key faculty, staff and partners. Do not read the questions or probes word for word. Instead, adapt the wording to match the phrasing used by the respondent. Take notes on key terms or phrases used by the respondents that may be helpful in coding the interview data. Ask for clarification and definitions as needed.

Familiarize yourself with the interview protocol in advance of your meeting. Skip questions that are not relevant given the current phase of implementation. Highlight the questions you will prioritize if the respondent's time is limited. Be respectful of the respondent's time and keep the interview to the agreed length of time. We can follow up by phone or email for more information as needed.

In addition:

- Take notes during the discussion. To ensure we accurately report what is discussed during the interview, we will record this session as well. No one except the research team will have access to this recording.
- As necessary, tailor all questions to fit the individual's relationship with AAMMP Up.
- Keep the discussion under forty-five minutes.



## Introductory Script for All Interviews

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*[Introduce yourselves.] Thank you for taking the time to speak with us. This conversation will allow us to get a better understanding of the AAMMP Up program.*

*Before we begin, we just want to remind you that:*

- *We want to focus the discussion on the AAMMP Up program and your perspective on the program.*
- *There are no right or wrong answers; we are interested your perspective and experiences.*
- *As an outside evaluator, we will ensure that the information shared through these interviews remains strictly confidential.*
- *Your comments will not be identified by name in any of our reports.*
- *[Name] will be taking notes during the discussion. To ensure we accurately report what is discussed during this interview, we would like to record this session as well. No one except the research team will have access to this recording.*
- *We will keep the discussion under forty-five minutes.*

*May we audio-record our conversation?*

*[Turn on the audio recorder if the respondent has agreed to be recorded.]*

## College Staff/Faculty Interview Protocol

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*This protocol contains all questions that may be asked of AAMMP Up program staff, faculty, and/or other college staff; the actual interviews will be customized according to role in the program, and not all questions listed here will be asked of everyone.*

### 1. BACKGROUND AND CONTEXT

- What is your specific role and responsibility as it relates to the AAMMP Up program?
  - Has it changed since the beginning of the grant? *(If yes, ask for examples)*
- What will your role be after the grant period ends?
  - How will your position be funded?

### 2. PROGRAM MANAGEMENT *(asked of program staff)*

- Is the program currently managed in a manner consistent with your understanding of the original program design? *(Probe for examples, challenges/successes, etc.)*
  - If changed, in your opinion, what are the most significant changes from the original program design?
- Please describe the current status of faculty/staffing positions. *(Probe for positions that need to be filled, individuals who have left, challenges/successes, etc.)*
  - What will the staffing look like after the grant ends?
  - How will those positions that continue beyond the grant be funded?
  - Which positions will be eliminated or changed significantly?
- What would you say have been the most significant strengths associated with program management?
  - What have been the most significant challenges?

### 3. OUTREACH

- Please update us on any outreach activities for the AAMMP Up program. *(Probe for examples, target populations, challenges/successes.)*
  - How has grant funding been used to support outreach and recruitment over the course of the grant? *(Probe about changes in emphasis/activities from Y1, Y2, Y3.)*
  - Has the population originally targeted by the grant changed? If so, why? *(Probe on TAA-eligible/dislocated workers)*
  - Have you done any outreach aimed at attracting more female applicants?

- Do you work with partners when conducting outreach? *(If yes, ask for examples)*
- What kind of outreach will continue after the grant has expired?
  - How will these activities be funded?
  - How will the amount of outreach change after the grant funding is gone?
- Looking back over the grant, are there any types of outreach that haven't been done that you think would have been beneficial?
- What would you say have been the most significant strengths of the program's marketing and recruitment approach? What have been the most significant challenges?

#### **4. PARTICIPANT ENROLLMENT AND RETENTION**

- Have there been any changes to the enrollment process since the last time we spoke? *(Probe for examples, challenges/successes, etc.)*
- What previous activities, if any can be counted for program credit? *(Probe for work, military, or life experiences)*
- Please describe the overall AAMMP Up program retention rate thus far. *(Probe for comparison to other programs, dropout rate, attempts to retain participants, etc.)*
- What would you say have been the most significant strengths of the program's enrollment and retention approach? What have been the most significant challenges?

#### **5. CURRICULUM**

- Please update us on any changes or developments in the AAMMP Up course curriculum. *(Probe for new courses, gap analysis etc.)*
- Please describe the technology-enabled learning available at your community college. *(Probe for virtual labs, e-text books, recorded lectures, self-paced training modules, etc.)*
  - Are students provided with opportunities to work with the kinds of equipment they'd use on the job?
- When does credentialing take place as students move through the programs? *(Probe for specific credentials and when they are offered/awarded.)*
- How does your college engage industry to ensure competencies and course curriculum remain current and relevant to the aviation, mining, and manufacturing career fields? *(Probe for examples, challenges/successes, etc.)*
  - How has the grant funding facilitated this kind of collaboration?
- How will you ensure that the curriculum remains relevant to industry needs after the grant has ended?
  - Are there any resources that will no longer be available after the grant ends?

- How will any continued collaboration with industry be funded?
- What would you say have been the most significant strengths of the program's curriculum? What have been the most significant challenges in terms of curriculum?

## 6. STUDENT SUPPORTS

- Please describe the current status of support services available to students through the AAMMP Up program, such as resume help, mock interviews, job shadowing or mentoring.
- [On second visit] Are there any support services available to students since our last visit? *(Probe for examples, context, sustainability)*
  - How have AAMMP Up students used the support services available to them through the AAMMP Up program? (Probe for examples, changes, challenges/successes, etc.)
  - What is the role of the program advisors? Do you expect changes?
  - What employers provide opportunities for job shadowing and mentoring?
  - What proportion of the AAMMP Up students participate in job shadowing and mentoring?
  - How do you track participation in job shadowing and mentoring?
  - How often does student participation in job shadowing and mentoring result in permanent employment?
- At this stage in the program, which student services appear to be most critical to the success of the participants?
  - How has the grant shaped the delivery of these services?
  - Do you know if there any student services or resources now available through AAMMP Up that will be available to students after the grant expires? Do you know how these might be funded?

## 7. PARTNERSHIPS

- Please update us on the AAMMP Up program's partnerships with the local workforce system. *(Probe for changing roles, increase/decrease in participation, successes/challenges, sustainability, etc.)*
  - How many students come to the program from the Pima County One-Stop (PCOS)?
  - How has PCOS specifically targeted TAA-eligible and dislocated workers?
  - How will this partnership be sustained beyond the life of the grant?
- Please update us on the AAMMP Up program's partnerships with local employers. *(Probe for changing roles, increase/decrease participation, success/challenges, sustainability, supply/demand of students, etc.)*

- What have been the greatest benefits to come out of the partnerships associated with the grant? What could be done to improve these partnerships?

## **8. PROGRAM OUTCOMES AND SUSTAINABILITY**

- What, if any, system-level changes or changes to service delivery have come out of this grant? *(Probe for examples of improvements, innovations, or utilization of new technology, learning assessments, program delivery.)*
- Are there any plans to continue collaborative activities after the grant has expired?
- Who from the campuses do you expect to be in regular contact with after the grant funded activities are over? *(Probe for new relationships that came about because of the grant that will be maintained.)*
- How will the work you are doing be sustained beyond the life of the grant? *(Probe for plans to transition duties to a staff position.)*

## **9. PROMISING PRACTICES AND LESSONS LEARNED** *(asked of program staff)*

- Describe any areas of the AAMMP Up programs that have been particularly successful.
- Describe any areas of the AAMMP Up programs that have been particularly challenging.
- Looking back over the life of the grant, what would you do differently?
- Looking back over the life of the grant, what would you do differently from the beginning?
- Is there anything else about your experience with the TAACCCT grant or the AAMMP Up program you would like us to document?

*Thank you for taking the time to speak with us. This discussion has been very informative and helpful. If you think of any additional information you would like for us to know, please feel free to contact me directly. [Give business card].*

## EMPLOYER PARTNER INTERVIEW PROTOCOL

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### 1. BACKGROUND AND CONTEXT

- What is your specific role and responsibility as it relates to the AAMMP Up program?
  - Has it changed since the beginning of the grant? *(If yes, ask for examples)*
- What will your role be with regard to AAMMP Up after the grant period ends?
  - How will your organization/company fund your participation in AAMMP Up-related activities/events?

### 2. CURRICULUM/PROGRAM DEVELOPMENT *(asked of advisory boards)*

- Do you feel that the AAMMP Up curriculum provides students with the skills needed to succeed in jobs with employers like you? Are there any gaps in the curriculum?
- How have you or your organization contributed to the AAMMP Up course curriculum development? *(Probe for program design input, suggesting new credentials, curriculum review, participation in course activities such as mock interviews, etc.)*
- How do you or your organization help ensure competencies and course curriculum remain current and relevant to the aviation, mining, and manufacturing career fields? *(Probe for examples, challenges/successes, etc.)*
  - How has grant funding facilitated this kind of college/employer/workforce collaboration?
- How will you help ensure that the curriculum remains relevant to industry needs after the grant has ended?
  - How will continued college/employer/workforce collaboration be funded?
- Please describe any technology or equipment your organization has donated to the program. *(Probe for capital equipment donations, financial donations for equipment or technology purchases, etc.)*
- Tell us about any work-based training opportunities offered by your organization.
  - Do any of these training opportunities pre-date the grant?
  - Have any of these training programs changed as a result of the grant? *(If yes, probe for examples.)*
- What would you say have been the most significant strengths of the program's curriculum? What have been the most significant challenges in terms of curriculum?

### 3. STUDENT EMPLOYMENT SERVICES *(such as job shadowing, mentoring)*

- What kind of AAMMP Up program-related job placement services/activities does your organization participate in? *(Probe for examples, changes, challenges/successes, etc.)*

- *Who is your main contact at the college about these kinds of activities?*
- *Do you work directly with the career coach or someone else at the college?*
- *How will these relationships change after the grant has expired?*
- At this stage in the program, which skills/credentials acquired in the AAMMP Up program appear to be most critical to the success of the participants?
- Do you feel that local employers will be able to provide enough jobs for AAMMP Up students once they graduate?

#### **4. PROGRAM OUTCOMES AND SUSTAINABILITY**

- What, if any, system-level changes at your organization have come out of your participation in the AAMMP Up program? *(Probe for examples of improvements, new hiring practices or HR timelines, learning assessments, training delivery.)*
- Are there any plans to continue AAMMP Up program activities after the grant has expired?
- How will the work your organization is doing with the college(s) be sustained beyond the life of the grant? *(Probe for plans to fund activities that were previously funded through the grant.)*

#### **5. PROMISING PRACTICES AND LESSONS LEARNED**

- Describe any areas of the AAMMP Up programs that have been particularly successful.
- Describe any areas of the AAMMP Up programs that have been particularly challenging.
- Is there anything else about your experience with the TAACCCT grant or the AAMMP Up program you would like us to document?

*Thank you for taking the time to speak with us. This discussion has been very informative and helpful. If you think of any additional information you would like for us to know, please feel free to contact me directly. [Give business card].*

## **WORKFORCE PARTNER INTERVIEW PROTOCOL PIMA COMMUNITY ONE-STOP (PCOS)**

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### **1. BACKGROUND AND CONTEXT**

- What is your specific role and responsibility as it relates to the AAMMP Up program?
  - Has it changed since the beginning of the grant? *(If yes, ask for examples)*
- How often are you in contact with staff from the AAMMP Up program? *(Probe for who they're in contact with, what they discuss)*

### **2. MARKETING AND RECRUITMENT**

- How do people who come through your organization generally find out about the AAMMP Up program?
- How does your organization participate in the outreach activities for the AAMMP Up program? *(Probe for examples, target populations, challenges/successes.)*
  - How is your participation in such activities funded?
  - Have you been involved in any outreach specifically aimed at attracting the following applicants:
    - Females?
    - TAA workers?
    - Military?
  - Has the population originally targeted by the grant changed? If so, why? *(Probe on TAA-eligible/dislocated workers)*
  - Will you continue participating in these activities once the grant ends? If so, in what capacity?
- What would you say have been the most significant strengths of the program's marketing and recruitment approach? What have been the most significant weaknesses?

### **3. STUDENT EMPLOYMENT SERVICES**

- What kind of AAMMP Up program related job placement services/activities does your organization participate in? *(Probe for examples, changes, challenges/successes, etc.)*
  - Who is your main contact at the college about these kinds of activities?
  - Do you work directly with the career coach or someone else at the college?



- How will your relationships with your contacts at the college change after the grant has expired?
- At this stage in the program, which skills/credentials acquired in the AAMMP Up program appear to be most critical to the success of the participants?
- Do you feel that local employers will be able to provide enough jobs for AAMMP Up students once they graduate?
- What would you say have been the most significant strengths of the program's student employment services? What have been the most significant challenges?

#### **4. PROGRAM OUTCOMES AND SUSTAINABILITY**

- How will the work your organization is doing with the college be sustained beyond the life of the grant? *(Probe for plans to fund activities that were previously funded through the grant.)*

#### **5. PROMISING PRACTICES AND LESSONS LEARNED**

- Describe any areas of the AAMMP Up programs that have been particularly successful.
- Describe any areas of the AAMMP Up programs that have been particularly challenging.
- Is there anything additional you feel the AAMMP Up program could have provided to help your organization better serve its customers?
- Is there anything else about your experience with the TAACCCT grant or the AAMMP Up program you would like us to document?

*Thank you for taking the time to speak with us. This discussion has been very informative and helpful. If you think of any additional information you would like for us to know, please feel free to contact me directly. [Give business card].*

## APPENDIX C: PART 65 PARTICIPANT SURVEY

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Introduction

**The Arizona Aviation Mining and Manufacturing (AAMMP Up) program at Pima County Community College is currently seeking feedback from students regarding their experiences with the AAMMP Up program. Because you are currently or were previously enrolled in the college's Part 65 program, which is affiliated with the AAMMP Up program, you have been selected to provide feedback about your experience in a brief survey. Your feedback will provide valuable information to help improve the program for you and for future students.**

**All of the information we collect through this survey is confidential. We will not share or use your name, email, or any other identifying information in reports or other materials related to this survey. We will not identify any survey respondents by name. Your responses will be pooled with responses from other program participants and reported as aggregate or grouped data only. There are no risks expected through, or associated with, responding to this survey. The information gathered through this survey will be used to improve the program for participants.**

**This online survey will take about 5-10 minutes to complete. Your participation in this survey is voluntary. If you decide to participate in the survey, you may withdraw at any time. If you decide not to respond to this survey, or if you withdraw from participating at any time, you will not be penalized.**

**If you have any questions about the research study or the AAMMP Up program, please contact Robin Larson at 520-206-3944, or RLarson6@pima.edu. This research has been reviewed according to Pima Community College's Institutional Review Board procedures for research involving human subjects. If you have any questions regarding your rights as a research subject, or if problems arise which you do not feel you can discuss with Robin Larson, please contact the Pima Community College Institutional Research, Planning & Effectiveness Office at 520-206-4934.**

\* 1. Would you like to participate in the survey?

Clicking yes below indicates that you have read the information on the previous page, voluntarily agree to participate, and are at least 18 years of age.

Yes

No

\* 2. Please enter your first name:

\* 3. Please enter your last name/initial

4. Which AAMMP Up program are you/were you pursuing? (Please check all that apply)

- Part 65 General
- Part 65 Airframe
- Part 65 Powerplant
- Other (please specify)

5. Which of the following credentials/licensures have you earned?

- FAA General License
- FAA Airframe License
- FAA Powerplant License
- Have not sat for exam yet
- Have not obtained licensure yet

Other (please specify)

6. Did any of the following influence your initial decision to enroll in the AAMMP Up/Part 65 program? (Check all that apply)

- Information provided by the college or the AAMMP Up program about career opportunities in aviation
- Information provided by the college or the AAMMP Up program about the opportunity to attain industry-recognized credentials
- Information provided by an employer about the opportunity to attain industry-recognized credentials
- Strong encouragement/requirement by an employer to enroll
- Nothing in particular influenced my initial decision
- Other (please specify)

7. Thinking about your time in the AAMMP Up Part 65 program, what would you say have been the most helpful experiences in preparing you for employment in the aviation sector?

8. Thinking about your time in the AAMMP Up Part 65 program, what would you say have been the least helpful experiences in preparing you for employment in the aviation sector?

9. What could the AAMMP Up Part 65 program do to make it more useful to future students?

10. While enrolled in the AAMMP Up Part 65 program, have you received career guidance from any of the following? (Check all that apply)

- Campus Student Services
- Instructors
- Current Employer
- AAMMP Up Program Advisor (Yvette Rodriguez)
- Industry Professionals
- Military
- None

11. Thinking of the career guidance you received, how important was it in helping you achieve your career goals, please rate the guidance you received on the following scale:

	Very important	Somewhat important	Not at all important	No Applicable
Campus Student Services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Current Employers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AAMMP Up Program Staff (e.g., Robin Larson)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Industry Professionals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Military	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



12. Thinking about your experience with coursework and training activities associated with the AAMMP Up Part 65 program, please rate your agreement with the following statements:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Not Applicable
I had the opportunity to work with the actual tools and apparatus found in local aviation facilities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Program requirements were/are clear and reasonable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have learned what I expected to learn in the program.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teaching is relevant to students with various levels of experience.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors provide high quality teaching.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The available equipment and facilities are sufficient and well maintained.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Classes are offered at a convenient time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have found the support services to be adequate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am confident that completing the program will help me get/keep employment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Which of the following best describes your current employment status?

- Employed (including active military)
- Unemployed, seeking full-time paid employment
- Unemployed, seeking part-time paid employment
- Unemployed, not seeking paid employment

14. What impact has your participation in the AAMMP Up Part 65 program had on your employment to date?  
(Check all that apply)

- I have received a promotion as a result of my training
- I have received a pay raise as a result of my training
- I have taken a new job as a result of my training
- I feel more prepared to get a new job as a result of my training
- No impact on employment to date.
- Other (please specify)

## APPENDIX D: CAD/WELDING PARTICIPANT SURVEY

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### Introduction

**The Arizona Aviation Mining and Manufacturing (AAMMP Up) program at Pima County Community College is currently seeking feedback from students regarding their experiences with the AAMMP Up program. Because you are currently or were previously enrolled in one of the degree or certificate programs affiliated with the AAMMP Up program, you have been selected to provide feedback about your experience in a brief survey. Your feedback will provide valuable information to help improve the program for you and for future students.**

**All of the information we collect through this survey is confidential. We will not share or use your name, email, or any other identifying information in reports or other materials related to this survey. We will not identify any survey respondents by name. Your responses will be pooled with responses from other program participants and reported as aggregate or grouped data only. There are no risks expected through, or associated with, responding to this survey. The information gathered through this survey will be used to improve the program for participants.**

**This online survey will take up to 10 minutes to complete. Your participation in this survey is voluntary. If you decide to participate in the survey, you may withdraw at any time. If you decide not to respond to this survey, or if you withdraw from participating at any time, you will not be penalized.**

**If you have any questions about the research study or the AAMMP Up program, please contact Robin Larson at 520-206-3944, or [RLarson6@pima.edu](mailto:RLarson6@pima.edu). This research has been reviewed according to Pima Community College's Institutional Review Board procedures for research involving human subjects. If you have any questions regarding your rights as a research subject, or if problems arise which you do not feel you can discuss with Robin Larson, please contact the Pima Community College Institutional Research, Planning & Effectiveness Office at 520-206-4934.**

\* 1. Would you like to participate in the survey?

Clicking yes below indicates that you have read the information on the previous page, voluntarily agree to participate, and are at least 18 years of age.

Yes

No

\* 2. Please enter your first name:

\* 3. Please enter your last name/initial:

4. Which of the following certificates or degrees are you/were you pursuing? (Please check all that apply)

- Shielded Metal Arc Welding (SMAW) Certificate
- Gas Metal Arc Welding/Flux Core Arc Welding (GMAW/FCAW) Certificate
- Gas Tungsten Arc Welding Certificate (GTAW) Certificate
- Fabrication Welding Certificate
- Associate of Applied Science (AAS) in Welding and Fabrication
- Other (please specify)

5. Did any of the following influence your initial decision to enroll in the AAMMP Up program? (Check all that apply)

- Information provided by the college or the AAMMP Up program about career opportunities in welding
- Information provided by the college or the AAMMP Up program about the opportunity to attain industry-recognized credentials or certificates of completion
- Information provided by an employer about the opportunity to attain industry-recognized credentials or certificates of completion
- Strong encouragement/requirement by an employer to enroll
- Nothing in particular influenced my initial decision
- Other (please specify)

6. Thinking about your time in the AAMMP Up program, what would you say have been the most helpful experiences in preparing you for employment in the welding industry?

7. Thinking about your time in the AAMMP Up program, what would you say have been the least helpful experiences in preparing you for employment in the welding industry?

8. What could the AAMMP Up program do to make it more useful to future students?

9. Have you participated in any of the following out-of-the-classroom training as part of the AAMMP Up program? (Check all that apply)

- Job Shadowing
- Mentoring
- On-the-Job Training
- Tours
- None
- Other (please specify)

10. Thinking of how important these training experiences are to developing the skills necessary for a career in welding; please rate each training experience on the following scale:

	Very important	Somewhat important	Not at all important	Not Applicable
Job shadowing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mentoring	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
On-the-job training	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tours	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



11. While enrolled in the AAMMP Up program, have you received career guidance from any of the following? (Check all that apply)

- Campus Student Services
- Instructors
- Current Employer
- AAMMP Up Program Adviser (Robin Larson)
- Industry Professionals
- None

12. Thinking of the career guidance you received, how important was it in helping you achieve your career goals, please rate the guidance you received on the following scale:

	Very important	Somewhat important	Not at all important	Not Applicable
Campus Student Services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Current Employers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AAMMP Up Program Adviser (Robin Larson)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Industry Professionals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Thinking of your experience with coursework and training activities associated with the AAMMP Up program, please rate your agreement with the following statements:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Not Applicable
I had the opportunity to work with the actual tools and apparatus found in local welding facilities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Certificate course requirements are/were clear and reasonable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have learned what I expected to learn in the program.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teaching is relevant to students with various levels of experience.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructors provide high quality teaching.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The available equipment and facilities are sufficient and well maintained.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Classes are offered at a convenient time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have found the support services (e.g., resume help, job shadows, mock interviews) to be adequate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am confident that completing the certificates or AAS degree will help me get/keep employment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. Which of the following best describes your current employment status?

- Employed**
- Unemployed, seeking full-time paid employment**
- Unemployed, seeking part-time paid employment**
- Unemployed, not seeking paid employment**

15. How many hours do you work in a typical week? If you work a non-standard schedule, please provide your hours in a one-week average.

16. What is your pay for this position? (Please enter an hourly wage or annual salary amount)

17. Is this an hourly wage or your annual salary amount?

- Hourly wage
- Annual salary amount
- Other (please specify)

18. Are you currently working in the welding industry

- Yes
- No

19. What is the 5-digit zip code of your current employer?

20. Were you employed at any point within the year prior to enrolling in the AAMMP Up program?

Yes

No

21. Was this job (the one before you enrolled in a welding certificate/AAS degree program) with your current employer?

- Yes
- No
- I am not currently employed

22. Was this job in the welding industry?

- Yes
- No

23. Was this position full-time or part-time?

- Full-time
- Part-time

24. What was your pay for this position? (Please enter an hourly wage or annual salary amount)

25. Was this an hourly wage or your annual salary amount?

- Hourly Wage
- Annual Salary Amount
- Other (please specify)

26. What impact has your participation in the AAMMP Up program had on your employment to date? (Check all that apply)

- I have received a promotion as a result of earning an AAMMP Up Certificate and/or AAS Degree
- I have received a pay raise as a result of earning an AAMMP Up Certificate and/or AAS Degree
- I have taken a new job as a result of earning an AAMMP Up Certificate and/or AAS Degree
- I feel more prepared to get a new job as a result of earning an AAMMP Up Certificate and/or AAS Degree
- No impact on employment to date.
- Other (please specify)