Program Evaluation and Educational Research Group

M-PATH: Advanced Manufacturing
A Final Evaluation Report

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VALENCIA COLLEGE

TAACCCT
TRADE ADJUSTMENT ASSISTANCE COMMUNITY COLLEGE AND CAREER TRAINING GRANT PROGRAM

TABLE OF CONTENTS

Acknowledgements ii
List of Tables v
List of Figures v
Introduction 1
Background 1
TAACCCT Program Overview 1
M-PATH Advanced Manufacturing "The Project" Overview—Description of the Intervention 2
Evaluation Design 4
Project Implementation Analysis 4
Outcome Evaluation 5
Study Comparing Outcomes of Participants and Nonparticipants 6
Implementation Study Findings 10
Grant Start-up 10
Strategy One: Expand Education and Training Offerings in Advanced Manufacturing 11
Strategy Two: Create a New Joint Career Pathway Model 14
Strategy Three: Create Infrastructure to Better Serve Veterans and Women Leading into Advanced Manufacturing Through Partnerships 17
Strategy Four: Increase Capacity to Serve Individuals with Advanced Technology Labs and Software 20
Strategy Five: Evaluation and Reporting 21
Outcome and Impact Study Findings 23
Performance in Meeting Aggregate Projections 23
Counts for Common Outcome Measures (Years 1–4) 23
Participant Counts by Demographic (Years 1-3) 24
Employment (Years 1–4) 25
Comparing Outcomes of Participants and Nonparticipants 25
Study Conclusions 27
Study Limitations 27
Student Perspectives 28
Results from End of Course Surveys and Focus Groups 28
Instructor Perspectives 31
Results from Interviews 31
Employment Results Scorecard 33

Contributions by Industry Partners 33
Lessons Learned from Program Implementation 34
Plans for What will be Sustained 35
Study Limitations and Directions for Future Research 36
References 37
APPENDIX A. M-PATH Career Pathway Model 39
APPENDIX B. M-PATH Work Plan 41
APPENDIX C. M-PATH Logic Model 44
APPENDIX D. Implementation Evaluation Framework 47
APPENDIX E. Data Dictionary 51
APPENDIX F. M-PATH Organization Chart 56

LIST OF TABLES

Table 1. *Variables Available for Analysis* 7

Table 2. *Group Differences on Covariates before and after Matching* 9

Table 3. *Cumulative Participant Outcomes for All Grant Participants: Projected Versus Actual by Year (Years 1–4)* .23

Table 4. *Cumulative Participant Summary Information for All Grant Participants (Years 1–3)*..... 24

Table 5. *Employment Outcomes for All Grant Participants by Program (Years 1–4)*..... 25

Table 6. *Group Differences on Outcomes for the Matched Sample*..... 26

Table 7. *Participant Level of Agreement on Program/Course Exit Surveys: Average Scores from Likert-style Effectiveness Ratings* 29

LIST OF FIGURES

Figure 1. Implementation and Process Evaluation Key Questions 4

Figure 2. General Procedure for Matching Treatment and Comparison Students..... 8

Figure 3. Five Strategy Areas for M-PATH Activities..... 10

Figure 4. Activities for Expanding Education and Training Offerings in Advanced Manufacturing 12

Figure 5. Activities for Creating a Joint Career Pathway Model 14

Figure 6. Activities for Creating an Infrastructure to Better Serve Veterans and Women Leading into Advanced Manufacturing 18

Figure 7. WIB Areas of Support for Participant Recruitment, Assessment, and Job Placement 19

Figure 8. Activities for Creating an Infrastructure to Better Serve Veterans and Women Leading into Advanced Manufacturing 20

Figure 9. Activities for Creating a Joint Career Pathway Model 21

Figure 10. Participants' Perspectives: Describing the M-PATH Experience 30

INTRODUCTION

This evaluation report provides details and insights on the efforts and progress made by *M-PATH: Advanced Manufacturing*, a Department of Labor (DOL) Trade Adjustment Assistance Community College and Career Training (TAACCCT) program funded project. It presents findings on key outcomes and accomplishments at the end of the four-year Round 4 project, which ends September 2018. During this period, PEER performed a series of site visits; conducted interviews and surveys with key stakeholders; reviewed project related reports, deliverables, and other agreed-upon evidence; and attended regular meetings and events.

The report begins with a brief description of the project and a summary of the proposed activities. It then moves to a discussion of implementation efforts relative to its adoption, highlighting findings from PEER's evaluation. Next, it presents a quantitative analysis of short-term participant outcomes (education and employment), and results from a comparative impact study (Clark, Swan, & Hahs-Vaughn, 2018). All of this considers what the project has achieved in terms of the grant's Statement of Work. Finally, the last section provides a summary of what the M-PATH staff considered as lessons learned, promising practices, and innovative strategies.

Overall findings for process and implementation evaluation have shown that almost all of the planned activities started on time and momentum was gained for meeting all of the major requirements outlined in the grant's Statement of Work. Results for the interim outcome evaluation indicate that M-PATH has met five of the nine projected outcomes. This includes 353 total number served, 326 program of study completers, 801 certificates earned, 226 graduates employed, and 224 retained in employment. A total of 14 programs were developed, which included 10 of the 12 programs that were originally planned, and another four that were approved based on local industry needs.

BACKGROUND

TAACCCT Program Overview

On March 30, 2010, President Barack Obama signed the Health Care and Education Reconciliation Act, which appropriated a major investment of $2 billion over four years to fund the U.S. Department of Labor's Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant program. The Department of Labor is implementing the TAACCCT program in partnership with the Department of Education. The TAACCCT Round 4 Solicitation for Grant Applications (SGA/DFA PY-13-10) (United States Department of Labor, Employment and Training Administration, 2014) awarded 71 grants totaling $451 million. Efforts include three overarching goals:

- Increase attainment of degrees, certifications, certificates, and other industry-recognized credentials that match the skills needed by employers to better prepare workers under the Trade Adjustment Assistance (TAA) for Workers Program ("TAA-eligible workers") of Chapter 2 of Title II of the Trade Act of 1974, 19 U.S.C. 2271-2323, and other adults for high wage, high-skill employment or re-employment in growth industry sectors.
- Introduce or replicate innovative and effective methods for designing and delivering instruction that address specific industry needs and lead to improved learning, completion, and other outcomes for TAA-eligible workers and other adults.
- Demonstrate improved employment outcomes.

Every U.S. state has received funding from TAACCCT, through 256 grants totaling $1.9 billion. The last of these four rounds of grants, which end in September 2018, are happening in 60% of the nation's publically funded community colleges (TAACCCT, 2017). Efforts have aimed at institution building, rather than at tuition assistance, and have built industry-aligned programs in manufacturing, healthcare, information technology, energy, transportation, and other industries. Through TAACCCT, community colleges have developed or redesigned nearly 2,600 programs of study.

M-PATH Advanced Manufacturing "The Project" Overview—Description of the Intervention

According to the Florida Department of Economic Opportunity, in March 2014, the manufacturing sector had 329,300 jobs in Florida (4.3 percent of total employment). In September 2014, DOL awarded a $2,499,902 award under Round 4 of the TAACCCT grants program, to a Single Institution Applicant, Valencia College in Orlando, Florida to fund a four-year project titled *M-PATH: Advanced Manufacturing* (M-PATH or "the project") to build college capacity to provide specialized advanced manufacturing training. The official start date was October 1, 2014. Areas served by the grant include Florida's Orange and Osceola Counties. Orange County is in the top seven Florida counties with the highest number of manufacturing jobs, accounting for 58.7% of Florida manufacturing jobs. The sector is the third highest paying of all industries in the state ($53,284 average annual wages in 2012).

There were three overarching goals of M-PATH that are very similar to those of the TAACCCT program:

- Increase attainment of certifications, certificates, and other industry-recognized credentials to better prepare TAA-eligible workers and other adults for high-wage, high-skill employment or re-employment in growth industry sectors.
- Introduce innovative and effective methods for curriculum development and delivery that address specific industry needs and lead to improved learning outcomes and retention rates for TAA-eligible workers and other adults.
- Demonstrate for TAA-eligible workers improved employment outcomes as a result of the funded program.

The College collaborated with regional manufacturers, CareerSource Central Florida (CSCF), national, state, and regional industry associations, and philanthropic organizations to develop new and improved innovative educational pathways designed to serve the needs of the regional advanced manufacturing sector. Working alongside related for-credit programs, M-PATH created a joint career pathway model by coupling new continuing education certification training programs with college credit programs in Advanced Manufacturing. This is displayed in Appendix A. M-PATH has targeted displaced TAA-eligible individuals, incumbent workers, veterans, women, unemployed, and dislocated workers and provides them with training through a career pathway model designed for individuals to gain access to high quality short-term training to earn nationally recognized credentials and hands-on experience required in the manufacturing environment.

The main objective of the grant was to prepare these individuals by offering 12 programs. In the SOW, this included the 10 industry-recognized certifications (2 new), and two manufacturing specializations. By the end of Y4, 14 programs have been developed or enhanced and offered, including the 10 industry certifications listed in the SOW and four others, that were approved including Welding II, Manufacturing Skills Standards Council – Certified Logistics Associates, Transportation Logistics Specialist, and Warehouse Packaging Specialist. In the original grant document, Valencia College had been pursuing articulations into two degree programs that were not accomplished including Drafting and Design Technology and Electronics Engineering Technology. This decision was based on need. For after several program completion cycles, new evidence indicated that students were more likely to be promoted to lead or supervisor than to pursue a path towards a more technical field like engineering. In working with their Title Five program, program leaders were able to create accelerated pathways for students to earn an A.S. degree in Supervision and Management in Industry. This will also help students who come to Valencia College programs with

some college credits and earn certifications to obtain a degree faster. Currently students from Valencia's Advanced Manufacturing Program will receive college credits for the following programs:

- Electronic Board Assembly (EBA) – Accelerated (210 hours) – 6 credits
- Electronic Board Assembly (EBA) –(410 hours) – 11 credits
- Mechatronics (600 hours) – 16 credits
- Computer Numerical Control program (460 hours) – 12 credits
- Welding I & II program – (1050 hours) - 24 credits

Other M-PATH programs within the Valencia College's Advanced Manufacturing Training Center are still being reviewed for credits towards this AS degree. Also, this degreed program seemed to be a better fit within their industry and marketplace.

Serious applicants first entered an Advanced Manufacturing Specialist Certificate (AMSC) introductory non-credit course, developed through M-PATH, which gave some background about the field of advanced manufacturing and covered the various specializations and certifications available, as well as the different careers. It also focused on building basic academic and workplace skills such as critical thinking, following instructions, and dependability. Upon completion, AMSC students were better prepared to determine which career path is right for them within the manufacturing field. After successful completion of the AMSC, these individuals were all eligible to become M-PATH participants by enrolling in one of the programs developed by the grant.

Another component of the grant was to create 10 flexible lab environments to prepare individuals for industry certifications in manufacturing. New lab environments included instruction, simulations, and hands-on learning for required industry certifications. Valencia broke ground at a new Advanced Manufacturing Training Center in Kissimmee, which opened in January 2015. This facility continues to be developed, and includes training areas for Mechatronics, Manufacturing Skills Standards council (MSSC) Certified Production Technician, MSSC Certified Logistics Certification, Assembly, Welding, and Quality, among others.

In addition to the labs and coursework, M-PATH provided wrap-around services to help prepare these workers, including personalized student support services, career guidance, receiving credit for prior learning, non-traditional recruitment, and academic tutoring. M-PATH programs also provided personalized support services through educational advising, partnerships with CareerSource Central Florida, local manufacturing partners, community–based organization, and others. Details about the stacked programs and credentials are included in this report. You can also visit Valencia's Advanced Manufacturing Website (https://manufacturing.valenciacollege.edu/).

An abstract and executive summary, along with the technical proposal and other information about the project and other TAACCCT awards, are located at the U.S. Department of Labor's Grant Application and Award Database website (http://www.dol.gov/dol/grants/). Appendix B provides a table summarizing the project's work plan, detailing M-PATH activities and deliverables.

EVALUATION DESIGN

Evaluation components focused on program implementation/process (formative), outcomes, and impacts (summative). The next two sections provide an overview of PEER's evaluation questions, data sources, and methods of analysis. Appendix C contains a simple logic model identifying key program components and desired outcomes. The evaluation followed guidelines established by the Joint Committee Standards (Yarbrough, Shulha, Hopson, & Caruthers, 2011) and the American Evaluation Association Guiding Principles (www.eval.org).

PROJECT IMPLEMENTATION ANALYSIS

To help improve the usability of the findings and build capacity to improve outcomes for those involved, PEER performed implementation analysis and process-oriented evaluation throughout the project to support the project team in learning to inform action that went beyond forming short-term solutions. Findings were used to (a) accurately document and analyze, from a third-party perspective, the steps involved in developing and operating the program, and (b) drive improvement. There were three main evaluation questions for program implementation analysis (Figure 2).

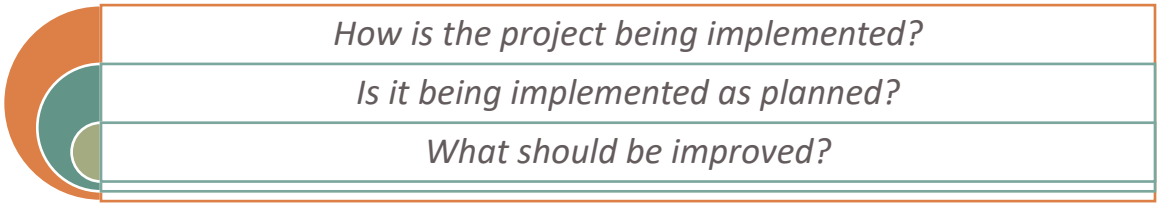

Figure 1. Implementation and Process Evaluation Key Questions

The implementation evaluation included multiple forms of data collection. To help assure a shared understanding of what is being accomplished, the evaluator provided an updated template to the grantee twice a year, mapping progress on activities, outputs/outcomes, and deliverables outlined in the project's work plan, what had been evidenced to the evaluator so far, along with any remaining questions. The evaluator also attended meetings as appropriate with project director, participants, program staff, work groups, Institutional Research (IR), CareerSource of Central Florida, DOL, etc. visiting the Advanced Manufacturing Training Center several times each year. The focus of these visits was providing technical assistance for data collection procedures, data storage at the student level, assuring understanding of required evidence to maintain, and reviewing timeline for reporting. Another focus was on keeping communication lines open and positive, and data collection (interviews, field notes, meetings with faculty and staff, visiting the new labs, and observations).

Other data collected came from a review of program records collected by the project team, for example, meeting minutes; articulation agreements and MOU; outreach and marketing plans; and participant demographics, attendance records, skill acquisition, and program status information. PEER also coordinated with the project team to conduct course instructor interviews, end-of-course surveys, program exit surveys, classroom discussions, as well as a focus group with a sample of students for each of the programs being offered in the early stages. This helped to identify and understand the operational strengths and weaknesses of the project that need to be addressed after

implementation. It also helped broaden understanding about student attitudes and motivations from an array of opinions, ideas, and perspectives on important topics.

The evaluator worked with the project director to document the contributions signature partners and employers were making in terms of: (a) program design, (b) curriculum development, (c) recruitment, (d) training, (e) placement, (f) program management, (g) leveraging of resources, and (h) the college's commitment to sustainability of the new programs. M-PATH leaders have held regular meetings with local manufacturing industry representatives and subject-matter experts to assure win-win programs were being developed and improved. These interactions also helped broaden understanding of the factors affecting how much and how the partners became involved with M-PATH, the contributions they made, the perceived worth of those contributions, and more. A table mapping program elements to the full set of evaluation questions, data sources and methods is provided in Appendix D.

To address the evaluation questions, descriptive statistics were used to identity data patterns, explore relationships, and organize data for presentation purposes. Correlation analysis from mining available data will be used to examine the relationship of program operational characteristics with program outcomes. Other data, from more qualitative sources—e.g. open-ended responses for assessing the effectiveness of the services using surveys, or guided interviews and focus groups—was analyzed via content analysis with narrative descriptions and member checks. Responses to open-ended questions were analyzed using coding to identify major themes (Corbin & Strauss, 2015) by two different analysts independently. Initial disagreements were discussed to reach a consensus (Morse, Barrett, Mayan, Olson, & Spiers, 2002). Quantitative analysis for process evaluation included a review of the recruitment and selection process about mid-way through the program, using program documents and the student level database to analyze and verify counts being used for the project's annual performance reporting. The evaluator also conducted an audit of the project's Participant Level Database, against a sample of other records kept, at multiple points to help assure that data were accurate. Appendix E contains the data dictionary used for the participant level database, listing the variables, along with definitions, values (codes), instructions, and acceptable forms of documentation.

Outcome Evaluation

Evaluation of outcomes and outputs determined the extent to which M-PATH was on track each year for accomplishing the nine TAACCCT common outcomes measures listed below. A USDOL/ETA issued handbook (OMB Control Number 1205-0489) defines each of these measures and their components. This, along with Annual Progress Report (APR) and Quarterly Narrative Progress Report (QNPR) Forms and Instructions are available with other resources on the TAACCCT Learning Network website (https://taaccct.workforcegps.org).

1. Total unique participants served with demographics;
2. Total number of participants who have completed a TAACCCT-funded program;
3. Total number of participants still retained in their program of study or another TAACCCT-funded program;
4. Total number of participants completing credit hours;
5. Total number of participants earning credentials;
6. Total number of participants enrolled in further education after grant-funded program of study completion;
7. Total number of participants employed after grant-funded program of study completion;
8. Total number of participants retained in employment after program of study completion; and
9. Total number of those participants employed at enrollment (for purposes of this reporting, "incumbent workers") who receive a wage increase post enrollment.

Participant characteristics described include basic demographics, school enrollment and worker status, veteran status, whether an individual has a disability, and Trade Adjustment Assistance (TAA) eligibility.

To determine how well the project was on track with meeting the grant's annual projections for the nine outcomes, the grantee used the participant-level database, mentioned in the previous section, to track students' progress, and captured all data elements necessary to report on demographic and outcome data. M-PATH (like all other TAACCCT grantees) provided counts for these outcomes, along with other information to the DOL/Employment and Training Administration (DOL/ETA) in annual reports on grant project progress from each available reporting year (October 1 through September 30), using the APR Form in order to comply with the reporting and record keeping requirements of the grant.

Participant background and demographic information was collected by project staff, using an intake form and available college records at the start of each Cohort. This information was provided to M-PATH's CareerSource Central Florida representative, who was paid by the grant, to enroll participants in the Employ Florida Marketplace (EFM), and then document employment information. This included whether students were employed at enrollment, their quarterly wage rate at enrollment until six months post enrollment, and their employer's name.

CareerSource Central Florida is part of CareerSource Florida, a statewide workforce policy and investment board. M-PATH's CareerSource representative has an office onsite, at the Advanced Manufacturing Center, making it easy for them to interact with project participants and staff.

Study Comparing Outcomes of Participants and Nonparticipants

Clark, Swan, & Hahs-Vaughn (2018) conducted an impact study that relied on a comparison of the outcomes of students who were involved versus others who were not. The study was guided by both (a) recognizing the actors that the evaluators believed would influence what could be accomplished with the grant; and (b) a thorough understanding of the different activities that individuals from both groups engage in. While randomized designs are typically a preferred method for assessing treatment outcomes, it was not feasible to randomly assign and retain students to XCEL-IT's educational programs. Therefore, we selected a quasi-experiment with a cohort-control group design with statistical adjustments.

Student-level data for this came from programs identified at the College. For the purposes of this report, students enrolled in the TAACCCT programs comprised the 'treatment cohort' and enrolled in at least one course in the targeted programs in courses during Year 2 (Summer 2015–Summer 2016). To facilitate the measurement of treatment impact (i.e., newly developed course), each college selected what they determined as the best-matched program(s) comparative cohort, which included Advanced Electronics Technician, Basic Electronics Technician, Drafting-AutoCAD, Rapid Prototyping Technician, and Robotics & Mechatronics Technician. The comparison students must have either enrolled or formerly enrolled in a similar program of study (or combined program of study) as those in the treatment cohort, but were not enrolled in a version of the program that had been funded in any way with other grant funds. All educational outcome data and student background/demographics were collected from the students' institutional records. To examine the performance outcomes of the training programs, the College linked the data from educational records to the unemployment (UI) wage records provided by the workforce investment board or workforce partner (WIB), and removed the identifiers before providing them to PEER. Demographic and education data were obtained from student records and wage and employment data were provided by Career Source Central Florida. Data for the variables in Table 1 were provided for both treatment and comparison students.

Table 1. *Variables Available for Analysis*

Variable	Values or Value Format
Gender	Male, Female, blank/no self-disclosure
Hispanic	Yes, No
Race	White, Black/African American, Hawaiian Native or Pacific Islander, Asian, American Indian or Alaskan Native, More than One Race, Blank/no self-disclosure
Eligible veteran status	Yes, eligible Veteran; Yes, other eligible person; No (see reporting guidelines for more details about this)
Disability status	Yes, No
Program of study (at enrollment)	
Still enrolled in other education programs[1]	Yes, No
Date of student's first enrollment in targeted program of study	MM/DD/YYYY
Date student completed targeted program of study (if applicable)	MM/DD/YYYY
Incumbent worker status[2]	Yes, No
Year/Quarter wage records checked for incumbent worker status	Quarter/Year
Entered employment (within six months after program completion)[1, 3]	Yes, No
Year/quarter wage records checked for employment status for post-certificate workers	MM/DD/YYYY
Retained in employment for six months or more [1,3,4]	Yes, No, N/A
Year/Quarter wage records checked for employment status for post-certificate workers[5]	Quarter/Year (for two quarters)
Wage increase for worker post enrollment[6]	Yes, No, N/A
Year/Quarter wage records checked for wage increase	Quarter/Year

Notes. [1]This was only answered if the student completed the targeted program of study.
[2]This was measured when the student first enrolled in the targeted program.
[3]This was only answered if the student was not an incumbent worker.
[4]This was only answered if the student had entered employment work after completing the targeted program and had been retained in employment in both the second and third quarters afterward.
[5]This was collected 3 and 6 months after verifying employment.
[6]Wage increases can occur any time after enrollment for any reason, however, only the first wage increase for incumbent workers can count. This was computed for incumbent workers as well as non-incumbents who entered employment using UI wage records.

Data Analytic Methods

Treatment effects were measured using a posttest only, quasi-experimental design, in which the treatment and comparison cohorts were balanced by propensity score matching after the intervention period, but prior to computing comparative differences. Propensity score matching is a common statistical adjustment procedure by which participants in non-randomized treatment groups are matched on an aggregate of several variables that, which relate to the outcome variables and the selection mechanism, to reduce selection bias (Bai, 2011; Caliendo & Kopeinig, 2008). Theoretical and empirical evidence indicates that propensity score matching can substantially reduce or eliminate bias between treatment and control groups caused by unequal distributions of observed characteristics between the two groups (Pearl, 2009; Rosenbaum & Rubin 1983). While the ability to reduce bias using propensity score methods (PSM) varies depending on the adjustment method, common support between the groups before matching, and specific outcomes; propensity scores can reduce as much as 95% of selection bias in quasi-experiments (Austin, 2011; Bai, 2015; Shadish, Clark & Steiner, 2008). Although there are several commonly used adjustment methods, propensity score matching often reduces more bias than other methods (Austin & Mamdani, 2006; Kurth et al., 2006). The propensity scores themselves are estimated as the predicted probability

that participants will be in a treatment condition based on several observed covariates (Rosenbaum & Rubin, 1983). If all relevant covariates are included in the propensity score model, the treatment effects from the evaluation will also be unbiased. For this evaluation, the covariates in the propensity score model included: gender, race (i.e., Asian, Black, White), Hispanic, veteran, disabled, and incumbent. Figure 3 provides the general procedure used to match treatment and comparison students.

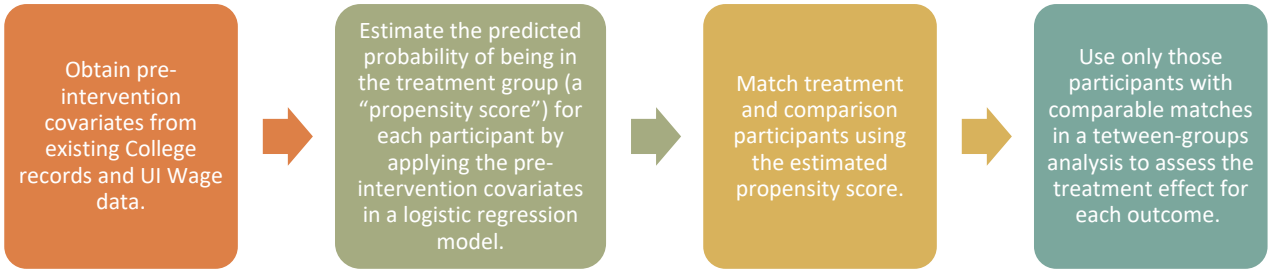

Figure 2. General Procedure for Matching Treatment and Comparison Students

The likelihood of finding comparable matches for the treatment group increases under the following conditions: (a) when there are samples of students with similar demographic characteristics; (b) when we draw comparison participants from a large pool of potential participants; and (c) when we utilize available covariates to model the propensity scores (Dehejia & Wahba, 2002; Rosenbaum & Rubin, 1985). In order to reduce the most bias while retaining the most participants, ratio matching with a caliper was employed. Ratio matching permits each treatment case to be matched with more than one comparison case (or vice versa), which allows a larger sample size and greater statistical power. In this evaluation, we used 1 to 2 matching so that each treatment case could be matched with as many as two comparison cases. Caliper matching helped to control the quality of the matches by limiting the distance of the propensity scores between the matched pairs. In this evaluation, the maximum difference of the propensity score on the matches (i.e., the caliper) could be no larger than .25 times the pooled standard deviation (SD) of the propensity scores. Previous studies have found that approximately 99% of the bias can be reduced by using a caliper width of .2SD of the propensity score, and at least 93% of the bias can be reduced with a caliper width of .4SD (Austin, 2010; Cochran & Rubin, 1973). Therefore, a caliper of .25SD should reduce at least 95% of the bias in the observed, pre-existing variables.

To determine the extent to which the propensity score matching was effective in reducing selection bias, we examined how well the propensity scores balanced the individual covariates after the matching procedure. Rubin's (2001) criteria were used to assess propensity score balance. Individual covariates were assessed for balance using standardized mean differences (d; Rosenbaum and Rubin, 1985), and graphs were used to visually inspect balance. It is assumed that the covariates included in the model will be sufficiently balanced (i.e., $d < .10$) after matching on propensity scores. To estimate the effect of group membership (i.e., intervention and comparison) on the outcomes, logistic regression was applied after matching.

Missing Data

Of the original sample (N = 602), three cases were dropped due to missing data on more than one variable. In order to estimate the propensity scores, missing data for gender was imputed for four cases, and missing data for Hispanic and veteran were imputed for two cases each. Data were imputed using a single regression approach in SPSS v. 23, in which the available covariates were used to predict the missing values (Allison, 2011). For covariates with more than 10% missing data (e.g., race, incumbent), missing data were coded as the reference group (i.e., '0').

Propensity Score Matching

Logistic regression was used to estimate the predicted probability of assignment to the M-PATH or comparison group. Matching on the propensity scores was conducted in SPSS with the R plug-in and PS Matching dialog (Thoemmes, 2012). The students were matched 1:2 (one treatment case to as many as two control cases) without replacement using nearest neighbor matching within a caliper of .25SD. Of the 181 remaining students in the M-PATH group, 147 (81%) were matched to one or two students in the comparison group (n = 244).

Overall balance, as measured by relative multivariate imbalance, improved after matching (.475 before as compared to .276 after). Means and percentages of bias were compared before and after matching. Absolute standardized mean differences close to zero are preferable, as that indicates small differences between the M-PATH and comparison students. All covariates and two-way interactions of covariates had absolute standardized mean differences below .25, suggesting relatively good balance in the model. Based on Rubin's (2001) criteria, treated and comparison propensity score mean differences were well within one-half standard deviation (.06), the ratio of the variances of the group propensity scores (1.11) and the ratios of the residual error variances of propensity scores regressed on covariates were near one. Plots, including jitter plots, histograms of standardized differences, and dot plots of standardized differences, all suggested that balance was achieved. Matching on the propensity score resulted in a matched sample for which all of the baseline covariates and interaction terms are very similar between students who participated in the M-PATH programs and students who participated in comparison programs. After matching, only those participants with comparable matches (i.e., the matched sample) were used to assess the treatment effect on each outcome.

Matched Sample

Table 2 shows the percent of students in each condition who reported the characteristics we used to match the treatment and comparison groups. Although the characteristics in the full, unmatched sample differed on several characteristics (e.g., percent of Black and White students, eligible veterans, incumbent and non-incumbent workers); there are fewer differences in the characteristics of the two groups after matching. Although matching increased the difference among the percent of females in each group, matching reduced the differences for most characteristics. In general, the matched sample was predominantly male (79%), White (58%), non-Hispanic (67%), not disabled (97%), and not veterans (89%).

Table 2. *Group Differences on Covariates before and after Matching*

	Full Sample		Matched Sample	
	Treatment *n* = 181	Comparison *n* = 418	Treatment *n* = 147	Comparison *n* = 244
Female	20%	18%	24%	19%
Asian	3%	5%	3%	3%
Black	26%	14%	26%	23%
White	60%	49%	57%	59%
Hispanic	37%	33%	34%	33%
Eligible Veteran	19%	9%	12%	12%
Disabled	7%	3%	4%	3%
Incumbent Worker	41%	66%	51%	59%
Non-Incumbent	54%	20%	44%	32%

IMPLEMENTATION STUDY FINDINGS

The M-PATH technical proposal provided a comprehensive list of all activities, along with the "deliverables" (including outputs, products, or other evidence) that would result from each. The evaluator worked with the project director to refine and make them more measurable for the purpose of evaluation.

Implementation study findings provide comparisons of performance to targets for the proposed activities. In addition to activities specific to grant startup, there were 13 other activities designed to develop and implement the model training programs at the College. These fall into five key strategy areas listed in Figure 4.

Figure 3. Five Strategy Areas for M-PATH Activities

This section provides brief descriptions of the activities with intended outcomes, how they were accomplished and to which degree, with particular focus on how the College designed and delivered manufacturing career pathways to connect students to job opportunities in Florida. It includes an overview of the pathways offered and strategies that supported pathway delivery, support services, and deliverables, and a few lessons learned. Finally, this report shares information about how the project has leveraged grant funds to improve capacity and supported innovation to build the skills and employment of those served.

GRANT START-UP

The project plan identified several milestone activities for the startup phase (Y1Q1-Y1Q2): established a project Advisory Committee, established taskforces, hired project staff, ordered equipment, procured vendors, and secured subcontract agreements with CareerSource Central Florida and the third party evaluator. These activities all occurred, with some completed later than planned.

Establishing an Advisory Committee

An Advanced Manufacturing Technology Advisory Council (AMAC) was established prior to the grant with the purpose of developing a sustainable business/education model for Central Florida. The project director assisted in

coordinating and led AMAC and served as its liaison. Other advisory groups, such as an Executive Board and a Managerial Advisory Board, also provided M-PATH guidance.

Hiring or Contracting Project Staff

The project operated with 18 full time staff, with very little turnover and plenty of evidence to support that a strong cohesiveness existed between the project team and the parent organization. The project took off quickly with plenty of support. Most positions were filled in the first six months of the grant and the lab manager was hired last, in Y2Q1. See Appendix F for the organization chart.

During Y2Q1, one of the faculty members resigned and the College took the opportunity to restructure the position to Assistant Director of Curriculum and Instruction. The restructure of the position will allow for a stronger, more relevant curriculum, provide additional support to the instructional team, and open new partnerships with industry providers. Former Veteran's Recruiter, Mike Kepner, later fulfilled this position during Y3Q4.

M-PATH Kickoff Meeting

Project leaders held a kickoff meeting in the sixth week of the project. All applicable college staff (facilities, curriculum, grant resource office, and administration) attended with external partners (workforce, community, and manufacturers) and the third-party evaluator.

Equipment Orders Completed

Planning began right away with the College's facility staff on details for purchasing manufacturing equipment and to secure a site for the manufacturing lab and classroom facility.

All grant supported equipment was ordered to correspond with the opening of the new facility and was installed, functional and in use by Y2Q3. Other equipment funds came through donations from industry partners, including Lockheed Martin, Lincoln Electric®, and an academic software grant from Siemens (Traynor, 2016). Valencia College had also invested, and continues to invest, in needed equipment for the program's sustainability, growth and industry training demands.

Establishing Taskforces

In the first few months of the grant, there were four steering committees (Outreach, Marketing, Curriculum and Facilities) created to assist and advise the grant team.

Other Start-up Deliverables

Four other M-PATH start-up deliverables were accomplished, with three evidenced later than planned.

- Subcontract with CareerSource of Central Florida (Y1Q4)
- External evaluator contract (Y1Q3)
- Outreach and marketing plan (Y2Q3)
- Vendors procured (Y1Q1)

STRATEGY ONE: EXPAND EDUCATION AND TRAINING OFFERINGS IN ADVANCED MANUFACTURING

Prior to the grant, a gap analysis by the AMAC, led by Valencia's Continuing Education (CE) Division and the College Credit Associate Degree programs, indicated significant gaps in existing education and career training programs and

Valencia Colleges' ability to implement TAACCCT core elements. The group, which included active employer membership, identified that

- the grantee's CE Division was the only public college within the workforce region offering advanced manufacturing short-term training courses preparing individuals for certification,
- there were limited entry-level education and training options for individuals interested in the advanced manufacturing career field, and
- there were limited options in the public education offering for incumbent workers to receive training leading to degrees in advanced manufacturing.

Strategy One identified three M-PATH activities for filling the gap (see Figure 5). All focused on expanding education and training offerings in advanced manufacturing to include latticed and stacked credentials leading to industry certifications and college credits.

Figure 4. Activities for Expanding Education and Training Offerings in Advanced Manufacturing

Activity 1.1: AMSC Entry Course Developed and Piloted

Projected Start and End Dates: Y1Q1–Y2Q2 **Status:** Completed Y2Q2

Intended Outcome: According to the work plan, there would be an Advanced Manufacturing Specialist Certificate of completion offered through Continuing Education (ED), designed to incorporate competencies identified by the Manufacturing Institute and Valencia College's New Student Experience Outcomes.

The College met targets for designing the Advanced Manufacturing Specialist Certificate (AMSC) with industry input and offering it tailored for M-PATH pathway options. PEER completed a review of evidence provided for consultation with subject matter experts (SME), the schedule, and enrollment records.

Initial planning for the AMSC started in the first few months of the grant. Competency driven curriculum with hands-on experience/labs that offers a skills certificate at completion attesting to the knowledge attained was developed by the end of Y1.

Developers ran a successful pilot in Y2Q1 and made some improvements before starting a second cohort in the 4-day course in Y2Q2. The second cohort enrolled a total of 56 students and all students completed the AMSC. AMSC continued to be successful in leading completers into becoming participants in the new M-PATH pathway options (TAACCCT participants).

Activity 1.2: Continuing Education Programs Developed

Projected Start and End Dates: Y1Q1–Y2Q2 **Status:** Completed Y2Q2

Intended Outcome: Continuing Education (CE) programs would be developed that would operate alongside related A.S. credit certificate/degree. These industry certification training programs and hands-on experience/labs would be developed and offered to TAA eligible and others beginning in Year 2 (Y2).

M-PATH's manufacturing programs were developed and are kept current in collaboration with the local manufacturing community using internationally and nationally recognized certification programs, to help students excel in the workplace. Curriculum development for the different CE programs and certifications began early in Y1, when CE and project staff worked with industry partner SME on outlining further hands-on training. One example evidenced for this was how they worked with their industry partner, Lockheed Martin, to refine and add specific competencies for the new Assembly program. This work went well beyond the expected level and now provides a J-Standard soldering certification option, which is Lockheed Martin's highest standard.

Project staff also worked with equipment vendors to understand the training materials that came with purchased equipment and how to adapt those resources to enhance classroom experiences.

Up to 200 students each year can attend training at Valencia College's new 17,000 square-foot Advanced Manufacturing Training Center, located on Shady Lane in Kissimmee, Florida. More information about M-PATH's CE programs, as well as a video and news articles documenting the February 2, 2016 opening of the new center is available at the Valencia College Advanced Manufacturing website (https://manufacturing.valenciacollege.edu/). The center received a lot of attention for how community and industry can collaborate to educate and train students for high-skill, high-wage employment through intensive short-term hands-on training. U.S. Education Secretary, Betsy Devos, toured the center in March 2017, before attending roundtable discussions hosted by the College, including one with M-PATH graduates.

Welding I and Welding II were implemented and additional hands-on training competencies were incorporated into CNC Machining, Quality Inspection, and Electronic Board Assembly. The Mechatronics program curriculum was enhanced and gave participants the opportunity to earn national credentials from NIMS, MSSC, and PMMI. Additionally, new CNC curriculum was initiated and allowed for NIMS and existing IHK certifications. The incumbent working training curriculum was designed to offer participants certificates in Lean Manufacturing and Six Sigma.

In January 2018, the College launched two new programs—Transportation Logistics Specialist and Warehouse Packaging Specialist. Through these programs, the students will learn inventory controls, tracking and receiving orders and shipments, and operating equipment such as fork lifts and pallet jacks. These students will also work with complex computer systems to track cargo and shipment data. Both programs will allow students the opportunity to earn industry recognized credentials in Basic Forklift and Pallet Jack Operations, CLA and CLT certifications, and the OSHA 10 credential. The Transportation Logistics Specialist program was launched at the Valencia Poinciana Campus and may lead students to a Logistics Specialist/Team Leader position and Transportation Specialist career. At the end of the quarter, a total of eight students successfully graduated with interviews scheduled for employment. The Warehouse Packaging Specialist program may lead to a Packaging Line Operator and Transportation Specialist career.

The College's short term, accelerated skills training programs in Advanced Manufacturing continue to be in high demand in the Central Florida area. The College also remains active in attending Manufacturing Association of Central Florida (MACF) board meetings, and participating in facility tours such as with DusoBox and Lake Mary High School.

Activity 1.3: College Credit Programs Developed

Projected Start and End Dates: Y1Q1–Y2Q2 **Status:** **ON TRACK FOR COMPLETION POST AWARD**

Intended Outcome: Two new A.S. college credit degree specializations would be developed, providing pathways for students receiving industry certifications, including Drafting and Design Technology – Rapid Prototyping Technical Certificate leading to a new Specialization in Digital Manufacturing (up to 9 articulated college credits); and Electronics Engineering Technology – Basic Electronics Technician leading to a new Manufacturing Specialization (up to 14 articulated credits).

M-PATH linked continuing education (CE) programs, college credit courses, and programs to support attainment of credentials and degrees, using credentialed instructors teaching CE programs, joint curriculum development, shared resources, and creation of transferable articulation options for students. This inner-agency model provided a way for students who enter into the labs to transition into college credit programs through industry certification and partnered teaching. However the College has had a late start on this.

To facilitate interconnected credentialing opportunities for program participants, College program and M-PATH team leaders worked since the start of the project to create pathways enabling and awarding credit toward an A.S. degree. The College's CPT, CNC, Electronic Board Assembly (EBA), Mechatronics, and Welding I and II programs have been developed into a pathway to the A.S degree in Supervision and Management for Industry.

Strategy Two: Create a New Joint Career Pathway Model

The second strategy of M-PATH created a joint career pathway model linking CE programs with certification, lab skills training, and college credit courses to support attainment of credentials and degrees. Figure 6 depicts the two main activities for this. Another important milestone for this was hiring a career coach.

Figure 5. Activities for Creating a Joint Career Pathway Model

The following sections document progress towards creating the new model, which includes short descriptions for the 14 industry-driven manufacturing programs accomplished. Of the 12 listed in the M-PATH SOW 10 were accomplished, 2 were not; and 10 were developed (new) and 2 were enhanced with grant funds. The extra 4 accomplished were not listed in the original SOW.

Activity 2.1: Develop Career Pathways between Continuing Education and Credit Programs

Projected Start and End Dates: Y1Q1–Y3Q4 **Status:** Completed Y3Q4

Intended Outcome: M-PATH would create a comprehensive career pathway model linking CE programs with certification/lab skills training and college credit courses to support attainment of credentials and degrees. These would address employment needs in IT.

Focused curriculum meetings began early in Y1, between Continuing Education (CE), the Dean of Engineering, and faculty, to plan and accomplish pathways linking the new M-PATH industry certifications to an A.S. degree. The work resulted in the alignment of learning objectives and certifications with assessments, lab and classroom experiences, and other content. Each of the new industry-driven programs accomplished are described further below. Five of the new CE technical programs listed enabled an award of 6–24 credits toward the Supervision and Management for Industry A.S. degree. These include Certified Production Technician (CPT) and Computer Numerical Control (CNC) Production Specialist, both enhanced by M-PATH; and others that are new, including Welding I & II, Electronic Board Assembly (EBA) Operator, Transportation Logistics Specialist, and Warehouse Packaging Specialist. The new training facility, where these are housed, includes learning labs for training in Mechatronics, MSSC Certified Production Technician, MSSC Certified Logistics Certification, Assembly, Welding, Quality and Inspection, among others.

Graduates from these programs have gotten jobs at Lockheed Martin, Custom Metal Designs, Qorvo (formally TriQuint), Mitsubishi Hitachi Power Systems, and with many other Central Florida employers.

Industry Certification Training Programs and Hands-on Experience/Labs Offered through Continuing Education

Computer Numerical Control (CNC) Production Specialist – 12 credits – *ENHANCED*

CNC students are introduced to the basics of machining and CNC coding, and have an opportunity to earn an international IHK Certification (Germany), CNC Production Specialist (Valencia), and both National Institute of Metalworking Skills Certifications (NIMS). The four new NIMS certifications were added (not listed in SOW). This change was driven by Disney and other local partners due to the demand for more in-depth skill sets needed in their workforce. The 460-hour CNC course includes over 200 hours of relevant hands-on experience.

Electronic Board Assembly (EBA) Operator –6 or 11 credits – *NEW*

EBA focuses on learning key skills needed within the manufacturing sector, including Safety and Quality Control. According to a recent articulation agreement between Valencia College and Valencia College AMC, EBA students may also receive 6 credits for the 210-hour accelerated version of the course or 11 credits for the 410-hour course upon completion and submission of current and valid certifications.

The Accelerated EBA 8-week class, where participants obtain over 80-hours of hands-on experience, was created due to Lockheed Martin's input and demand for workers on short notice. If they complete a 410-hour, larger version of EBA, and submit a current and valid copy of earned certificates, students have the opportunity to earn both J-STD-001 (Soldered Electric and Electronic Assemblies) and IPC/WHMA-A-620 (Cable and Wire Harness Assemblies) national certifications. The backbone of this program now delivers students focused on soldering and populating circuit boards at a Level III standard. This highest level of training and the outcome is production in a *no-fault* environment. Assembly training also includes cable wire harnessing, and practical experience with precision measurement tool handling and quality inspection.

Manufacturing Skill Standards Council Certification – Certified Production Technician (MSSC-CPT) *– ENHANCED*

The purpose of MSSC-CPT is to recognize, through certification, individuals who demonstrate mastery of core competencies of manufacturing production at the front-line. It began as a standalone course, but was later expanded greatly due to input from Lockheed Martin so students could gain needed skills. Since this industry partner had a focus on electronic board assembly, the result is that students can now earn the CPT at the beginning of the Electronic Board Assembly (EBA) course (see above). Completers are now eligible to take four individual certificate modules and earn CPT certification (Safety, Quality Practices and Measurement, Manufacturing Processes and Production, and Maintenance Awareness).

Manufacturing Skill Standards Council Certification – Certified Logistics Certification (MSSC-CLT and MSSC-CLA) *– NEW (2)*

This national certification recognizes those who demonstrate mastery of the core competencies of material handling. Upon successful completion of the certification assessments, participants receive the Certified Logistics Technician (CLT) and/or the Certified Logistics Associate (CLA) certifications from the Manufacturing Skills Standards Council (MSSC). M-PATH committed to the CLT, but added the CLA as a prerequisite to the CLT after the award (not listed in the SOW). For more information about MSSC certifications, and the CLT Key Activities which are the basis for MSSC national standards, visit the organization's website (http://www.msscusa.org/).

Mechatronics (600 hours) *–16 credits – NEW*

Mechatronics is an entry-level program that can lead individuals to a career as an Industrial Maintenance Technician. This program initially just offered a Packaging Machinery Manufacturers Institute (PMMI) certification, but now delivers four PMMI certifications. Through the curriculum development and working through partners, Frito Lay and Invacare, and FDA approved medical device manufacturer, the College was driven to add another nine NIMS certifications and incorporated the MSSC Certified Logistic Associate (CLA) and Certified Logistic Technician (CLT) certifications. This broadens the scope of industries students can earn jobs in, doing things like logistics, as well as, packing, maintenance and repair.

Welding I & II – 24 credits – NEW (2)

M-PATH was committed to Welding I and added Welding II as an additional program (not in the original SOW) based on industry needing more training for welders. Welding II focused on advanced welding techniques and concepts, which allows students to obtain two additional credentials. Each course is 525 hours, and both consist of 20% Classroom, and 80% demonstration and hands-on training. Completers are eligible to test for the American Welding Society (AWS) Standards of the flux-cored arc welding (FCAW) and gas tungsten arc welding (GTAW) credentials. Most students completing Welding I are ready to advance to Welding II and the first graduating cohort earned an average of six AWS certifications.

Transportation Logistics Specialist – NEW

Transportation Logistics Specialist can lead individuals to career opportunities in logistics and supply automation career clusters such as Logistics Specialist Team Leader and Transportation Specialist. Students will learn about Safety, Supply Chain Lifecycle and Facilities, Quality Control, Warehouse Operations, and earn industry recognized credentials in Basic Forklift and Pallet Jack Operations. They will also earn CLA and CLT certifications as well as the OSHA 10 credential. Students enrolled in this program will receive a minimum of 240 hours in various settings (e.g. classroom, labs, facility visits) and participate in engaging, hands-on, project-based learning activities.

Warehouse Packaging Specialist – NEW

Warehouse Packaging Specialist is an entry-level program with a commitment of at least 144 hours that can lead students to careers in logistics and supply automation career clusters with an emphasis on Safety, Supply Chain, and Material Handling Equipment. Careers that they can pursue are Packaging Line Operator and Warehouse Worker. Warehouse Packaging Specialists oversee the packaging of supplies and goods and facilitate the process from doing final inspections to labeling boxes with names of contents and destinations. Upon graduating from the program, students will earn industry recognized credentials in Basic Forklift and Pallet Jack Operations as well as CLA and CLT certifications and the OSHA 10 credential.

Quality Improvement – Targeting Incumbent Workers– NEW (3)

Quality & Inspection Specialist (CQIA Certification)

Certified quality improvement associate (CQIA) certification is a 200-hour course, which includes 80 hours of hands-on experience. The American Society for Quality (ASQ) CQIA certification is nationally recognized. This incumbent worker training program is offered on an as needed type basis. Students are exposed to the basic concepts of Six Sigma and Lean Manufacturing, and taught the use of multiple tools for measuring quality tolerances.

CQIA completers bring quality and efficiencies skills to the workplace therefore creating an immediate return on investment for the employer. Another added benefit includes consultation services, which can be provided by the College's highly trained Master Black Belt trainer.

Activity 2.2: Develop Articulation Agreements

Projected Start and End Dates: Y1Q1–Y3Q4 **Status:** Completed Y3Q4

Intended Outcome: CE programs would lead toward associate degree program articulation.

In an effort to provide career ladder opportunities for students in career and technical programs, an articulation agreement made it possible for completers of some M-PATH CE technical programs to receive 6- to 24-semester hours of college credit at no cost, other than an application for admission fee, toward the Supervision and Management for Industry A.S. degree. This included the CPT for 9 college credits, CNC for 12 college credits, Welding I & II for 24 college credits, Mechatronics for 16 college credits, and EBA for 6 or 11 college credits. The Supervision and Management program also had articulation agreements with Orange County Public Schools, Technical Colleges, TECO of Osceola, Lynx (tri-county transit), and Orlando Utilities Commission.

Strategy Three: Create Infrastructure to Better Serve Veterans and Women Leading into Advanced Manufacturing Through Partnerships

There were three important activities evaluated for creating an infrastructure to better serve veterans and women leading into Advanced Manufacturing through partnerships. See Figure 7.

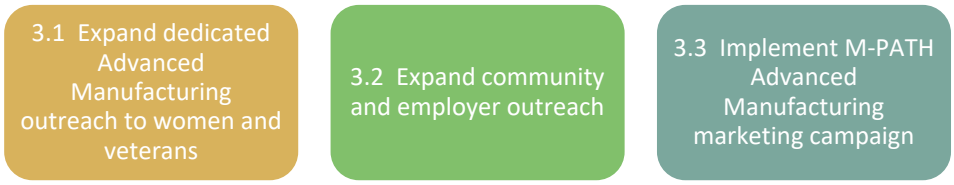

Figure 6. Activities for Creating an Infrastructure to Better Serve Veterans and Women Leading into Advanced Manufacturing

Intended Outcomes: According to the SOW, M-PATH would develop and implement a marketing campaign to target outreach to veterans through connections with local veteran organizations so members can understand the opportunities available in Advanced Manufacturing. Other important milestones identified include hiring a Veterans Coordinator to serve veterans' transition and hiring a recruiter to implement a recruiting plan, which includes holding meetings with local community groups and employers to recruit targeted populations, and other means.

The grant deliverable specified for Strategy Three, for targeted populations being enrolled and employed and/or retained in M-PATH programs, was met. M-PATH programs are active and enrolling students. At the end of Y4Q3, the College had enrolled a total of 353 students and 90% have already graduated. As of the end Y4Q3, 216 (84%) of the graduates who are seeking employment have been hired by 103 different employers, including Lockheed Martin, Custom Metal Designs, Tri-tech Technologies, The Bluffs Tool Machine, Teledyne Marine, Osceola Welding, Unlimited Welding, Northrop Grumman Electronic Systems, Mitsubishi Hitachi Power Systems, US Navy, Wheeled Coach, and others. There have also been students placed in a workplace internship experience, whenever that is feasible.

Activity 3.1: Expand Dedicated Advanced Manufacturing Outreach to Women and Veterans

Projected Start and End Dates: Y1Q3–Y3Q4 **Status:** Completed Y3Q4

The activity for completing a marketing plan and hiring a full-time recruiter to implement a marketing and recruiting plan was finished within the specified timeframe. There was also a full-time Veterans Coordinator hired in Y2Q2 to expand these efforts.

Project leaders started holding collaborative team meetings in Y1 for developing recruitment plans and marketing materials to target women and veterans. This included establishing contacts with the VA and working on improving pathways for engaging veterans in the M-PATH model. The evaluator evidenced a large number of activities and methods to fulfill the promise to expand outreach to women and veterans and other targeted groups. Examples of this included attending/holding events, posters, newspaper articles, news stories, media blasts, attractive flyers, program websites, word-of-mouth, and efforts through a WIB (see below). The College's veteran recruiter produced a Veterans Newsletter that was comprised of important information with brief historical facts and local veteran events in the Central Florida area. In March 2018, the College celebrated women in manufacturing by highlighting five of its students. Overall, these efforts were successful in bringing in 353 unique participants by the end of Y4Q3, with 10% women and 10% veterans.

Workforce Investment Board (WIB) Areas of Support

Project staff maintained a strong partnership for M-PATH with the regional Workforce Investment Board (WIB), CareerSource Central Florida. A WIB staff member and other staff were on site, dedicated to providing the grant with assistance coordinating efforts for participant recruitment, assessment, and job placement. More specifically, the agency has been committed to M-PATH mainly through the four areas of ongoing support, shown in Figure 8.

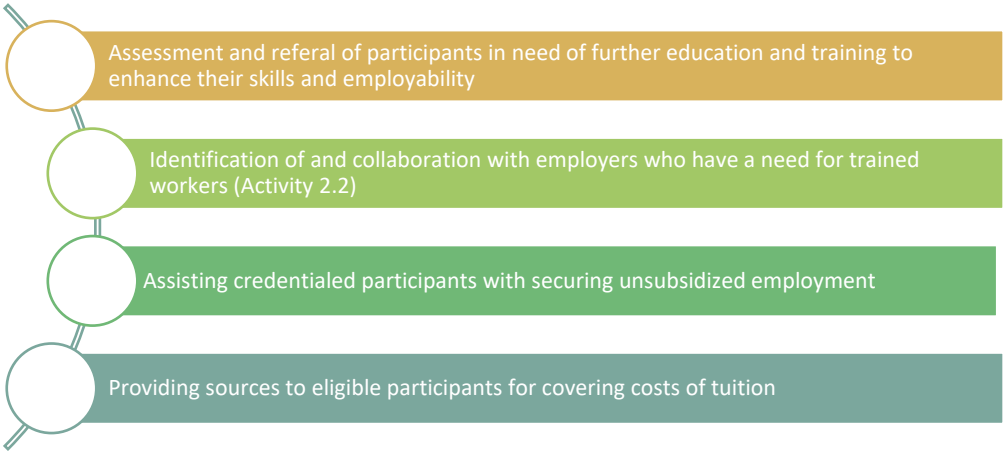

Figure 7. WIB Areas of Support for Participant Recruitment, Assessment, and Job Placement

The CareerSource Central Florida (CSCF) connection helped to provide recruits with full access to their programs and was a vital element for determining eligibility through the AMSC core. The WIB representative regularly tracked M-PATH participants through their existing statewide database tracking system and provided outreach and connection to veterans.

ACTIVITY 3.2: EXPAND COMMUNITY AND EMPLOYER OUTREACH

Projected Start and End Dates: Y1Q3–Y3Q4 **Status:** Completed Y3Q4

Intended Outcomes: The project would expand community and employer outreach by holding meetings with community groups and employers to recruit the targeted populations.

The M-PATH team has built an extensive community outreach network with employers, faith-based partners, and community based partners. For example, the project has built on relationships with the Central Florida Disability Chamber of Commerce (Veterans), Goodwill Industries of Central Florida, Central Care Missions, City of Life Church, Heart of Florida United Way of Central Florida, and the Society of Women Engineers. There has also been many meetings and other types of involvement for outreach documented with local employers, including Finfrock, LIFT Orlando, Lockheed Martin, Lincoln Electric®, Walt Disney World®, Frito Lay®, NASA, and others. The team also made training presentations with their local WIB to groups of displaced workers.

The team attended a tour MACF event at the Northrup Grumman Plant and discussed possible internship opportunities with NASA for CNC. The College's Veteran's Recruiter attended an Orange County Mayor Veterans Advisory Council and met with the Coalition for the Homeless director to discuss available veteran programs.

The College and the Advanced Manufacturing Training Center (AMTC) partnered with Lincoln Electric to host the Lincoln Electric and Torchmate CNC Plasma a 2-day cutting class. This covered the basics of the Torchmate CAD/CAM drawing software and the VMD cutting software. Students had the opportunity to design and cut their own projects. The College saw interest in this event and hopes to provide similar opportunities in the future.

The AMTC also hosted the charter presentation for the newly rebuilt American Welding Society Section 510. This group will now serve the Central Florida area and provide the welding community with an organization designed to bring welders, educators, and like partners. It will also provide students with additional opportunities to further their welding careers.

Activity 3.3: Implement a Marketing Campaign

Projected Start and End Dates: Y1Q3–Y3Q4 **Status:** Completed Y3Q4

Intended Outcome: Implement the M-PATH Advanced Manufacturing marketing plan.

A marketing committee was formed which outlined creative concepts for the M-PATH programs and had copy decks for the marketing program completed and approved within the first few months of the grant. Some of the main components of the marketing campaign include an attractive website (https://manufacturing.valenciacollege.edu/) for the Advanced Manufacturing Training Center and its programs, technical flyers and cart cards for each program, and colorful posters and brochures for students and for community partners. The College also invested in billboard, news releases, and newspaper advertising as well. Some others, among the many notable efforts, include (a) a series of Home Owners Association ads for a local neighborhood, covering 8,700 homes which exposed these individuals to the Advanced Manufacturing Program and Valencia's West Campus; (b) a Manufacturing Day for the Osceola School District Career & Technical Education high school students; and (c) a manufacturing camp for other local high schools.

Strategy Four: Increase Capacity to Serve Individuals with Advanced Technology Labs and Software

M-PATH has provided resources to help build the infrastructure needed to offer high quality simulation learning experiences in Advanced Manufacturing. The proposed solution for this was to increase infrastructure by securing space and purchasing dedicated equipment and lab software selected in consultation with industry and education. There were two M-PATH activities (Figure 9) successfully implemented to reach these goals, which are detailed below.

Figure 8. Activities for Creating an Infrastructure to Better Serve Veterans and Women Leading into Advanced Manufacturing

Activities 4.1 & 4.2: Provide Lab Space for Delivery of M-PATH Curriculum and Purchase Equipment and Software

Projected Start and End Dates: Y1Q1–Y2Q3 **Status:** Completed Y2Q2

Intended Outcome: Increase infrastructure for learning labs through securing space and purchasing equipment and software needed for instruction, simulations, and hands-on leaning required for successful skills training needed for employment.

The grant deliverables specified for Activity 4.1 included (a) finalizing a lab-facility lease design and agreement, and (b) setting up lab equipment and software for instructional delivery, for the targeted populations being enrolled and employed and/or retained in M-PATH programs. These were both met.

Planning began right away with the College's facility staff on details for purchasing manufacturing equipment and to secure a site for the manufacturing lab and classroom facility. Using money from M-PATH and another DOL grant, the College was able to renovate, equip, and run Valencia College's new 17,000 square-foot Advanced Manufacturing Training Center, located in Osceola County, on Shady Lane in Kissimmee, Florida. Equipment costs were also leveraged with donations from several industry partners, including Lockheed Martin, Lincoln Electric®, and an academic software grant from Siemens (Traynor, 2016). During Y2Q4, lab space was increased and redesigned to handle EBA and Mechatronics programs. The College continues to invest in needed equipment for the manufacturing program's sustainability and industry demand. To see latest news and updates about the center and programs visit, the Valencia College Advanced Manufacturing website (https://manufacturing.valenciacollege.edu).

Strategy Five: Evaluation and Reporting

Figure 10 depicts the three activities for evaluation and reporting.

Figure 9. Activities for Creating a Joint Career Pathway Model

Activity 5.1: Third Party Evaluation

Projected Start and End Dates: Y1Q1–Y4Q4 **Status:** Completed Y2Q4

Intended Outcomes: (a) Evaluation plan executed as planned and on time, and (b) Data provided to evaluator in a timely manner.

The third party evaluator worked closely and held regular meetings with the project director, grant staff, and CareerSource representatives.

All of the Deliverables outlined the SOW, were evidenced by PEER according to the timelines reported. The project director and his assistant went to great effort to provide a large number of files and other evidence requested by the evaluator for meeting the many intended outcomes and deliverables planned.

Activity 5.2: Steering Committees

Projected Start and End Dates: Y1Q1–Y4Q4 **Status:** Ongoing

Intended Outcome: Steering Committee meetings held monthly.

Four work teams (Outreach, Marketing, Curriculum and Facilities) were established at the start of the grant, to assist and advise the grant team. The M-PATH team also had input from a separate Executive and Managerial Advising Council. The College continues to meet with strategic key partners to focus on developing and improving the competencies for training and enhance successful job placement for graduates.

Activity 5.3: Employ Florida Marketplace Tracking

Projected Start and End Dates: Y1Q1–Y4Q4 **Status:** Ongoing

Intended Outcome: Data collection through the Employ Florida Marketplace is used to securely track participant outcome measures and baseline numbers for evaluation of and reporting on performance.

This intended outcome was accomplished. Florida WIB's are housed under CareerSource Florida, a statewide workforce policy and investment board. Historically, not all member colleges had used the WIB to channel adult students. The most successful, have one-stop centers located directly on college campus, which are convenient for attracting those who might not otherwise consider college programs. To learn more about CareerSource Florida and its local workforce development teams, visit the CareerSource Florida website (http://careersourceflorida.com).

The Advanced Manufacturing Center has a CareerSource representative onsite to help enroll participants in the Employ Florida Marketplace (EFM), which is an online resource for job listings, education and training opportunities, and various career building assistance. The CareerSource representative also helps students with getting tuition assistance.

M-PATH participants using the EFM have had varying degrees of success with finding employment. According to the project director, having direct contact with manufacturing partners has proven even more successful.

OUTCOME AND IMPACT STUDY FINDINGS

This chapter presents findings for how well the project is on track for meeting aggregate projections (common measures) for all participants in all programs at the end of Y4Q3.

PERFORMANCE IN MEETING AGGREGATE PROJECTIONS

Did M-PATH meet aggregate projections (common measures) for participants in all programs?

Counts for Common Outcome Measures (Years 1–4)

Prior to the start of the grant, the College came up with participant outcome projections (targets) for each of the TAACCCT Common Measures for each program year. These are listed in Table 3, however, the Common Measures highlighted in grey, were not committed to by M-PATH. At the time of this study, three months before the end of the four-year project, counts reveal that M-PATH has met five of the nine projected outcomes (in green). This includes 353 total number served, 326 graduated, 801 certificates earned, 226 graduates employed, and 224 retained in employment.

Table 3. *Cumulative Participant Outcomes for All Grant Participants: Projected Versus Actual by Year (Years 1–4)*

Outcome Measures	Year 1		Year 2		Year 3		Year 4		Total	
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual
1. Total Unique Participants Served	0	0	175	117	175	123	0	113	350	353
2. Total # Who Have Completed a Grant-Funded Program of Study (POS)	0	0	114	98	114	121	0	107	228	326
2a. Total # of grant-funded POS Completers Who are Incumbent Workers		0		28		30		NA		NA
3. Total # Still Retained in POS or other grant-funded programs	0	0	35	32	35	37	0	0	70	69
4. Total # Retained in Other Education Program(s)		0		5		5		0		0
5. Total # of Credit Hours Completed		0		0		0		0		0
5a. Total Number of Students Completing Credit Hours	0	0	15	0	15	0	0	0	30	0
6. Total # of Earned Degrees/Certificates	0	0	120	150	120	359	0	292	240	801
6a. Total # of Students Earning Certs—Less Than One Year	0	0	0	84	0	97	0	NA	0	NA

Outcome Measures	Year 1		Year 2		Year 3		Year 4		Total	
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual
6b. Total # of Students Earning Certs--More than One Year	0	0	0	0	0	0	0	0	0	0
6c. Total # of Students Earning Degrees	0	0	0	0	0	0	0	0	0	0
7. Total # Pursuing Further Education after POS Completion	0	0	20	1	20	5	0	0	40	6
8. Total # Employed After POS Completion	0	0	46	39	80	88	57	99	183	226
9. Total # Retained in Employment after POS Completion	0	0	40	37	70	88	50	99	160	224
10. Total # of Those Employed at Enrollment Who Received a Wage Increase Post-Enrollment	0	0	10	3	10	5	5	0	25	8

Notes. Not all outcome measures had targets set for goals.
Rows highlighted in grey were not committed to by M-PATH.
For Outcome 9, incumbents were not counted.
For the last column, Years 1-4 Actual, 'green' highlights outcome projections *met* or *exceeded* and 'red' highlights those *not met* for what Common Measure targets M-PATH committed to.
NA is not available at the time of this report.

Participant Counts by Demographic (Years 1-3)

Through the end of Y3 (October 2016 through September 2017), there were 240 unique participants enrolled in M-PATH programs. This is 110 fewer students than the 350 that were originally planned for this timeframe. Table 4 provides cumulative numbers by demographic.

Table 4. *Cumulative Participant Summary Information for All Grant Participants (Years 1–3)*

Demographic Information		Year 1	Year 2	Year 3	Totals	Percent
Gender	Male	0	90	107	197	82.1%
	Female	0	27	16	43	17.9%
	Totals	**0**	**117**	**123**	**240**	100.0%
Race	Hispanic/Latino	0	41	43	84	35.0%
	American Indian or Alaskan Native	0	1	2	3	1.3%
	Asian	0	3	5	8	3.3%
	Black or African American	0	38	25	63	26.3%
	Native Hawaiian or Other Pacific Islander	0	0	1	1	0.4%
	White	0	33	47	80	33.3%
	More Than One Race	0	1	0	1	0.4%
	Totals	**0**	**117**	**123**	**240**	100.0%
Degree	Full-Time Status	0	1	0	1	0.4%
	Part-Time Status	0	2	0	2	0.8%
	Totals	**0**	**3**	**0**	**3**	1.3%
TAA Eligible Individuals	Number of participants	0	4	0	4	1.7%
	Number who enrolled who obtained credentials, certificates, or degrees	0	4	0	4	1.7%
	Number who enrolled who did not obtained credentials, certificates, or degrees	0	0	0	0	0.0%

Other	Incumbent Workers	0	28	30	58	22.9%
	Eligible Veterans	0	25	13	38	28.8%
	Participant Age (Mean)[b]	NA	38	34		
	Persons with a Disability	0	12	6	18	7.5%
	Pell-Grant Eligible	0	0	0	0	0.0%
	TAA Eligible	0	4	0	4	1.7%

Notes. N = 240 unique participants served by the end of Y3 of the 4-yr grant.
Year 4 numbers were not available at the time of this report.

Employment (Years 1–4)

Through the end of Y4, 226 out of 341 (85%) graduates were employed. M-PATH was able to document that a majority of those not employed, were either still in school or not seeking employment. See Table 5, which breaks down these employment rates by program of study.

Table 5. *Employment Outcomes for All Grant Participants by Program (Years 1–4)*

Program	Graduates	Number Employed	In school, closed for medical reasons or not seeking employment	Seeking employment, who are employed
Computer Numerical Control (CNC)	57	49	7	98%
Manufacturing Skill Standards Council Certification – Certified Production Technician (MSSC-CPT)	14	10	4	100%
Quality & Inspection Specialist (CQIA Certification)	27	24	3	100%
Electronic Board Assembly (EBA) Operator	104	82	4	81%
Welding Technology Leve1s 1 & 2	85	40	40	92%
Mechatronics	38	20	7	74%
Transportation & Warehouse	16	1	0	6%
Total All Programs	334	216	65	84%

Comparing Outcomes of Participants and Nonparticipants

How do participants compare to control groups for post intervention outcomes?

Table 6 shows the frequencies and percent of students who completed their programs, were enrolled in other educational programs, entered employment, were retained by their employers, and received a wage increase. Chi square tests of association were computed to determine whether there were statistically significant differences in these five outcomes depending on the type of program of study (M-PATH or comparison program).

Table 6. *Group Differences on Outcomes for the Matched Sample*

	Treatment *n* = 147			Comparison *n* = 244		
	Yes	No	N/A	Yes	No	N/A
Completed program	147 (100%)	0 (0%)	0	15 (6%)	229 (94%)	0
Still Enrolled in Education (for Completers)	11 (8%)	136 (92%)	0	12 (80%)	3 (20%)	229
Entered Employment (for Non-Incumbents who Completed Programs)	45 (70%)	19 (30%)	83	0 (0%)	5 (100%)	239
Retained in Employment (for Non-Incumbents who Completed Programs and Entered Employment)	31 (86%)	5 (14%)	111	0	0	244
Wage Increase (for Incumbent Workers and Non-Incumbents who Entered Employment)	65 (86%)	11 (14%)	105	115 (80%)	29 (20%)	100

Notes. N/A indicates that participants did not meet the inclusion criteria for this outcome (e.g., did not complete the program or were not incumbent workers). These values are not included in reported percentages.

Completed Program

Students in the M-PATH programs were significantly more likely to complete the program as students in the comparison programs ($\chi^2(1) = 332.985$, $p < .001$). The odds ratio[1] ($OR = 4368$) suggests that students in M-PATH programs are more than 4,000 times more likely to complete the program as compared to students in other programs.

Still Enrolled in Education (For Completers)

Students who completed an M-PATH program were significantly less likely to be retained in another certificate program than students who had completed other technical programs ($\chi^2(1) = 58.757$, $p < .001$[2]). The odds ratio ($OR = 0.02$) suggests that students who completed other programs are nearly fifty times as likely to remain in additional certificate programs even after obtaining their certificate than students in an M-PATH program.

Entered Employment (For Non-Incumbents who Completed Programs)

Non-incumbent students who completed an M-PATH program were significantly more likely to enter employment compared to students in the comparison programs ($\chi^2(1) = 10.107$, $p = .004$[2]). The odds ratio[1] ($OR = 25.67$) suggests that non-incumbent students who completed an M-PATH program are nearly twenty-six times as likely to enter employment after obtaining their certificate than students in other programs.

[1] To adjust for the absence of participants in one of the cells, .5 was added to the frequency of each cell when computing the odds ratio so that it could be estimated.
[2] This is the *p* from Fisher's exact test, since at least one cell had an expected $n < 5$.

Retained in Employment (For Non-Incumbents who Completed Programs and Entered Employment)

Group comparisons could not be made since no one in the comparison group entered employment after completing their program. Of the 36 non-incumbent students who completed an M-PATH program and entered employment, 31 (86%) were retained in employment.

Wage Increase (For Incumbent Workers and Non-Incumbents who Entered Employment)

Non-incumbent M-PATH students who entered employment and M-PATH incumbents were statistically similar to students in comparison programs in terms of their likelihood of receiving a wage increase ($\chi^2(1) = 1.071$, $p = .301$). However, the odds ratio (*OR* = 1.490) suggests that the odds of M-PATH incumbent and non-incumbents who entered employment are 50% more likely to receive a wage increase as compared to students from other programs.

Study Conclusions

When compared to students in other technical programs at the College, students in the M-PATH programs were more likely to complete their program and enter employment and less likely to continue enrollment in other educational programs. In fact, all of the student who enrolled in M-PATH programs between October 2015 and August 2017 earned their certificates. Of these students, nearly three-quarters of them were able to obtain a new position within a year of completing their program. While we cannot be sure why M-PATH graduates were less likely to continue in other educational programs, a plausible explanation is that they need employment to earn a living wage and start a career before thinking about pursuing additional education. Given the number of M-PATH students who were able to obtain employment, remain employed, and receive wage increases; they may have believed that the M-PATH certificate was all the education they needed to meet their professional goals.

Study Limitations

First, it should be noted that approximately 40% of the students in the M-PATH program began their programs before those in the comparison group, which may account for why so many more people in the M-PATH programs completed their programs. However, even among the students who started their programs between July 2016 and June 2017, versus starting between August 2016 and June 2017, those in the M-PATH programs were significantly more likely to complete their programs, $\chi^2(1) = 139.403$, $n = 147$, $p < .001$. Unfortunately, because only 6% ($n = 15$) of the students in the comparison program completed their programs, it is difficult to make strong conclusions about the value of these programs (i.e., the programs in which comparison students were enrolled). Although none of those in the comparison groups who completed the other technical programs were hired within a year after completing their programs, one-third of them ($n = 5$) were already employed. Likewise, the small number of students in the comparison group who completed other programs prevented us from making any conclusions about their likelihood for being retained in newly obtained jobs.

A second concern is the amount of missing data. While the College was able to provide complete data for the educational covariates and outcomes, 7% ($n = 29$) of the students were missing data about their employment status prior to enrolling in a program (i.e., incumbent worker). Among those who completed a program, 11% (n = 9) were missing data about whether they had obtained new positions; 12% ($n = 5$) were missing data about whether they had been retained in those positions; and 10% ($n = 10$) were missing data about whether they had obtained a wage increase. While these percentages may seem small, given the already small sample of students who had completed

comparison programs, these missing data made it difficult to estimate treatment effects for some outcomes. Missing data also reduces our ability to confidently claim that these results can be generalized to all students in M-PATH programs or other technical programs at the College.

A third concern is that many of the analytic comparisons had few or no students with certain classifications, which may affect the accuracy and generalizability of the outcome analyses. For example, because all of the students in the M-PATH programs completed their programs, the likelihood of completing programs could not be estimated without statistical adjustments (i.e., adding .5 to each category). Even with this adjustment, it is unlikely that all the students who enroll in M-PATH programs in the future will complete them; therefore, the odds ratio found in this study may be inflated. This was also a problem when estimating the effect for those who obtained employment after completing their certificates. No one in the comparison group found a new job; therefore, the effect estimation from this sample may not be generalizable to all graduates.

Finally, propensity scores were used to balance the M-PATH and comparison groups on characteristics that may influence the program effects. The expectation is that if we account for all characteristics that influence students' choice of programs, the program effects will be accurate. However, this assumes that we have included all relevant covariates in the propensity score model, which is unlikely. Although the propensity scores balanced the two groups on the observed covariates (i.e., gender, race, ethnicity, veteran, disabled, and incumbent); we do not know if the groups are similar with respect to unobserved covariates (i.e., those that we did not have). Since we were restricted to variables provided by the institution, we only accounted for demographic characteristics. It is very likely that there are other characteristics of the students that influenced them to choose an M-PATH program rather than another program at the College. These differences may also contribute to the strong effects we see in the outcomes for the M-PATH programs.

Student Perspectives

Results from End of Course Surveys and Focus Groups

Respondents independently rated their satisfaction for some elements of each course that they took, anonymously, using an end of course survey administered after every course by the College. A representative sample analysis of the results across all M-PATH programs revealed the following.

- All (100%) agreed (either strongly agreed or agreed) that participating in the program helped them acquire skills needed to get a high wage.
- A large majority (90%) agreed that they were satisfied with the services that they have received, and that the program met their expectations.
- Almost all (97%) agreed that course objectives were clearly stated in the course material or by the instructor.
- All (100%) believed they would be able to use the information and/or skills learned.
- All (100%) would recommend the experience to others.

Table 7. *Participant Level of Agreement on Program/Course Exit Surveys: Average Scores from Likert-style Effectiveness Ratings*

Please rank the following categories with 5 being the highest score and 1 being the lowest	CNC N = 9	EBA N = 5	Mechatronics N = 6	Welding I N = 6	Welding II N = 6
Level of satisfaction in meeting stated objectives	*M* = 4.6	*M* = 5.0	*M* = 3.3	*M* = 5.0	*M* = 5.0
Handouts and materials were useful and well organized	*M* = 4.7	*M* = 5.0	*M* = 4.2	*M* = 4.7	*M* = 4.8
Training Facility	*M* = 4.1	*M* = 5.0	*M* = 4.5	*M* = 4.8	*M* = 4.8
Convenience	*M* = 4.1	*M* = 5.0	*M* = 5.0	*M* = 4.3	*M* = 5.0

Note. N = 32 (100%). Based on Likert-type responses (agreement scale 1-5 with 5 being highest level of agreement).

About Their Instructors

Participants perceived the instructors are supportive and caring, highly knowledgeable, and available for extra help if needed. Many cited interpersonal qualities of the instructors as a key part of their program satisfaction.

- "Great instructors provided classroom instruction and supervised machining, milling, and lathe parts."
- "S/He actually gives us the trust and I think that means a lot to a lot of the students like *Oh yah just do it*. *Don't worry about it*. *Don't be afraid and just go into it*. I think that made a difference in a lot of us because I mean you see that big machine and it's kind of like you just push a button and all of a sudden it starts moving and you run and you get scared for what it can do."
- "[Instructor] was very thorough and made sure everyone understood each piece of material before moving on."
- "If you have any problem you know I mean he's here most Fridays too you know so like if you want to come in on Friday and get some extra help."
- "The experiences being shared from the instructors were very valuable and very complimentary to our learning experience."
- "The instructors are nothing but amazing, knowledgeable individuals keen to their craft. I wouldn't have accomplished and improved the way I did if it wasn't for [my instructor] or obtained the certificates I set my sights on."
- "[Instructor] tells stories of past experiences and gets to give us one-on-one instruction."
- "[Instructor] was a phenomenal instructor. I learned a lot from my instructors."

What They Liked About a Course

- "Skills and knowledge are reinforced daily."
- "Classes are small and we are able to have more one-on-one time with instructor."
- "Instructor knowledge and help."
- "The skill set learned will help me get a good job to support my family."
- "I loved the environment I was in. I learned a lot that I will remember for a long time."
- "I liked the hands on approach and the instructors are very engaging. I also like the career opportunities."
- "The hands on portions were the most valuable because it provided us the necessary tools for job interviews."
- "I love the opportunity and help finding employment."
- "This course is ideal for my career and accomplishment."

Learning Gains

Several provided details about the relevance and importance for the knowledge and skills they were gaining. Especially for those who had no previous experience in the field.

- "Coming from someone whose never been involved with machining I think I've come a long way."
- "When I started…I sort of had a moment of panic where I was like I am never going to understand…but now I can look at it and recognize what does what and loading things into the machines and doing everything else is kind of just second nature now so it's nice."

Students agreed that the program provided an adequate amount of classroom and hands-on training.

- "We've been given books on all the stuff as well as the hands-on and it seems to relay back and forth between the two really well."
- "Of course some of us in the classroom prefer to be on the machines more time than programming because they think that will help but I mean everybody has a different opinion I guess about it. I think it's been equal for me. It's been a really good experience on both ends—in the classroom and on the machines."

Job Preparation

They believed M-PATH was preparing them to handle a variety of real-world challenges.

- "It gives you opportunity to see where they're going to be—because you're going to a shop [where] they have different machines and different ways of doing things." Another described how valuable the experience proved to be later when he came across it on a real job: "
- "They have a welding simulator that is phenomenal and how that really helped me. I had a job come up for welding some stainless steel and that is kind-of tricky. I had never done that before so I was allowed to use the simulator to set up what would be a machine, actually run the welds so I could hear, get the tactile feeling for what should be happening with angles and things of that for vertical, and then that weekend I went out and did a perfect job for the customer. It was a very enlightening experience for me to be able to see that the simulators actually help that much."

Impact of the Program

Students were asked to reflect on the impact M-PATH has had on them thus far. Focus questions included: (a) Where they would be if they had not participated in M-PATH; (b) One word to describe the M-PATH experience; and (c) Any additional comments regarding the program.

Where They Would be without M-PATH.

Most indicated that they would be working in a previous job field, but lacking satisfaction or opportunity. One stated, "I'd be working a dead end job," while another commented, "If I was to go back to work it'd be something I didn't want to do and just probably do that for the rest of my life. Now I have a choice." Several also mentioned that they might have entered a traditional educational pathway that would have required taking on debt. "I'd have massive debt from being at another college with a four-year degree course." Still others said they would be "unemployed for sure" or even "homeless probably."

Describing the M-PATH Experience.

Figure 11 displays results summarizing how participants described M-PATH giving greater prominence to what appeared more frequently from the analysis.

Figure 10. Participants' Perspectives: Describing the M-PATH Experience

Would they Recommend M-PATH to Others

All (100%) focus group participants agreed, that they would recommend M-PATH to others.

General Comments

- "I just want to say like I believe this is a great opportunity and people like me coming here don't know what we're doing and when I found this I think I found my way to a career and success."
- "Just to continue this because it's an excellent opportunity for a lot of people that really need it."
- "Skills and knowledge are reinforced daily."
- "Best decision I've ever made… for my future and my family's as well."
- "Overall, it has been an awesome experience. In just a few weeks we have learned so much, and I feel prepared to go out and be successful in the field."
- "I like that I am more marketable."
- "Accepting the GI Bill would assist veterans in paying for the training."

Instructor Perspectives

Results from Interviews

Results from the more recent of two sets of interviews conducted with M-PATH instructors are summarized below.

Most Enjoyable Aspect of Teaching

Instructor perspectives about what aspect of teaching M-PATH course(s) they liked the most fell within two main themes: *Impacting Students' Lives and Careers* and *Sharing their Expertise*.

Impacting Students' Lives and Careers.

- "But it's very fulfilling for me to see them reach these successful waypoints as we can call them. Upon graduation, the families are just glowing with the success that they have achieved at that point. It's just a springboard is what we're creating for them."
- "Being able to take somebody and teach them my craft and help them out so they can make their lives better, and show them something that I'm interested in and seeing the fact that . . . they have an interest in it, and it's pretty neat."
- "Well, what I enjoy the most is being able to teach students that have no prior knowledge to the electronics industries and have them pick it up and run with it . . . learn it and then actually have the hands-on for it. And then watch them get a job in the industry."
- "Honestly, the students. Being able to change somebody's life. Some of the students that come in here, their future doesn't look that bright and then all of a sudden they come back, like a year later, even just a couple of months later, and they're supporting themselves."

Sharing their Expertise with Others.

- "The thing that I enjoyed most was sharing my knowledge that I have learned through 30 years of experience in the field of machining, to get it out to students who can start their career."
- "The best part of teaching the M-PATH is that my experience in manufacturing, all those years of getting up early and actually making a product, and just being a part of something, a group of people who are working towards the same goal. And then not knowing that someday you're just going to teach others how to get into a career in manufacturing for me is the most fun."

Student Preparedness

Instructors shared whether they perceived students were ready for M-PATH coursework upon entry into the program. Most brought up that students were coming with varied levels of preparedness. For example, language barriers interfered with some students' ability to succeed and some students struggle because they lack some mathematical skills.

- "Well, we have various levels of students. Some know a little bit more math, some know a little bit less. So, I always adjust to be able to get anyone that might be at, let's say a very basic level, and bring them up."
- "I think all the classes have been going very well and our job placement rate kind of speaks to that."
- "Well, every group of students is different.
- "Yeah, I think they are for the most part. Everybody has ups and downs. Sometimes we have a little bit of issues with some of the students, but not much."
- "So I mean, there's a language barrier at times, it can be kind of tough to try to get people to understand why things are the way they are because they don't understand the nomenclature, they don't understand the written directions, what have you."
- "Some of them are experienced, and they know machining before they did part some of it. But some of them are starting out knowing nothing, but they catch on very quickly, but sometimes you have one or two drops out because the math and the trigonometry and there are a lot of numbers you have to be crunching it and stuff."

Course Materials

Instructors provided feedback about the teaching materials/books used in their courses. Overall, they believed the curriculum was at least adequate. They also brought up some issues and suggestions.

- "So I do research and we have, we probably have about 60 something books, in labs, especially mechatronics because we have so many different areas. In addition to those, have research and we gained and acquire books that are used today in the industry."
- "We have another software called Immerse2Learn, and that is a very good software and also we use software from NIMS, National Institute of Metalworking Skills. So we have very good software and the books that we have from NIMS and from Immerse2Learn is really good."
- "We <could use additional training materials>. We did not have enough textbooks. I had to give out my instructor books so that we could fulfill the class."
- "The materials that we're using are not the best resources that we have, but we make them work. . . . But we've talked with our staff and we've talked with our people that we work with and the problem is that it's really too expensive, the curriculum that we want."

Interest in Teaching the Course Again

They all indicated that they would be willing to teach the course again. One stated, "Oh, yes. Yes, yes. I tell my director every time I see him how much I love what I'm teaching and I said, 'You might find somebody better at it, but you won't find somebody who loves it as much as I do, and I can promise you that'."

General Comments and Recommendations

- "It's just a really great program and I'm really happy and excited to be a part of it. I really enjoy working here and working through the program with all the leadership, and mentorship, and the administration that I have worked with here, they're really supportive so that kind of means a lot."
- "I just feel like we're getting better and better at developing this Advanced Manufacturing Training Center with every class that we teach."
- "Make this course a little bit longer because there are so many things that need to be learned in 16 weeks.
- "If we could have more insight as to what the plans are ahead of time . . . . If we were able to have a little bit more vision, I think, into these plans and ideas that might prove fruitful for all ends."

Employment Results Scorecard

The College was involved with another TAACCCT program in Florida, prior to M-PATH, which provided effort toward the development of Florida College Graduates Succeed. This online business intelligence tool was designed to deliver an expanded single-state Employment Results Scorecard built from the experience gained through the development of the Florida College System's (FCS) Smart-College-Choices web portal.

The new scorecard tool was designed for Florida College System (FCS) administrators and others to access employment and earnings information on FCS college graduates. Viewing data at the state, college, award, and program level provides users the ability to access this information in a variety of ways to assist data-informed decision-making. Administrators can use it to align institutional outcomes to the workforce needs of the state of Florida, and advise students about the success of college programs.

The new scorecard tool has recently been launched for use by all through the Florida Department of Education's PK-20 Education Information Portal (FCS Portal) website (https://edstats.fldoe.org/) under the Florida College System tab. Links on the site allow users to search in different ways. Selections fall under three main categories:

- Graduation Rates
- Continuing Education/Employment (Employment and Continuing Education, Continuous Employment at Same Employer, Continuous Employment)
- Earnings (Full-Time Employment Earnings, Full-Time Employment Earnings Gain)

Data sources for this tool include the Florida Education and Training Placement Information Program (FETPIP), which provides follow-up statistics on students, and the Bureau of PK-20 Education Reporting and Accessibility (PERA).

Contributions by Industry Partners

What contributions did M-PATH partners make?

Industry Partner Contributions

QNPR Templates and feedback from the project director, detailed the many contributions that manufacturing industry partners made. PEER helped track how each partner was involved and summarized this by types of involvement. Over the four years of the grant, involvement from a total of 25 companies has been documented, including Lockheed Martin, Lincoln Electric®, Walt Disney World®, Frito Lay®, and NASA. Of the 25 companies, (8%) were actively involved in program design and 68% assisted in curriculum development. One company was involved in recruitment to the M-PATH program, while 40% assisted in placing students, and 32% in training students. Twenty-four percent of the companies contributed to leveraging resources through either donations of needed buildings and/or equipment such as a CMM machine and welding machine or donations of employees' time (e.g., to serve as instructors and subject matter experts). At the time of this report, 32% of the involved companies have made some form of commitment towards program sustainability.

Lessons Learned from Program Implementation

Learning Approach

In serving unemployed and underemployed students, program leaders have realized traditional instructional methods do not meet the needs of these diverse students. Instructional teams have designed content that contains intensive hands on application of the skills taught. Instructors deliver a short module of content follow by immediate application of the skills taught. This immediate relevance approach has really helped Valencia College help its students be prepared to pass industry recognized certifications and be successful on the job.

Placement Assistance

Since one the goals of TAACCCT is placing students in employment, project staff worked to establish effective placement strategies. As described in the following section, the College made strong ties with local employers, which definitely helped. The project also had a CareerSource [the local WIB] representative on site, to assist M-PATH students with finding employment.

Meaningful Relationships with Employers

A major design principle for all of the accelerated skills training programs was to partner with key employers in the initial design of the program. This approach involves

- learning about their workers' skills gaps,
- working with them on what is taught,
- realizing realistic job expectations,
- understanding what industry certifications are best for positions, and
- knowing what behaviors are needed.

An Assistant Director of Curriculum has been in charge of facilitating employer involvement and developing new programs. Employers are invited into the program on the first day of the program to help expose students to the workforce opportunities that are available. Employers are also invited back near the end of the program to participate in mock interviews, actual interviews, and to attend graduation. Regular meetings with employers are also scheduled to make sure what they are teaching is what is needed in industry. A sample outcome from this was finding that the development of a shorter, more concentrated course in Electronic Board Assembly was needed to help Lockheed Martin quickly fill their vacant positions for Electronic Board Assemblers. This new course also allowed students to earn their MSSC and IPC certifications and gain employment quicker, helping Valencia meet their certification and employment deliverables. By practicing this approach for more collaborative partnerships with employers, job placement results are higher than average and it has opened up opportunities for employers to participate with the Valencia College Foundation.

Embedding Soft and Life Skills (Holistic Human Being)

Employers are as hungry for technically competent employees as they are for good human beings. Woven into programs are a variety of soft and life skills that help the student be successful in their work lives. Topics like financial literacy, job search, interview skills, resume writing, and communication are just a few of the required program skills. Depending on the length of the program, instructors are able to select other soft and life skill modules for

their students. As additional support, the instructors run their programs like the job site by monitoring start and end times, managing interpersonal interactions, and providing consistent coaching on classroom performance. Program leaders believe this approach helps the student be prepared for the world of work.

Scheduling Programs at More Convenient Times

The College learned that scheduling the courses Monday through Thursday between 7:30am-2:30pm gave students more time during the afternoon to study or hold a part-time job. The change in schedule also provided instructors with more time to collaborate with each other on teaching and various learning methods.

Plans for What will be Sustained

What valued components of M-PATH can be sustained?

Valencia College leaders will continue to strive for the sustainability and expansion of its M-PATH programs across various campuses. Valued components, which are typical of many TACCCTT programs, are listed below.

- Maintenance of purchased equipment
- Marketing of certificates as a pathway to employment
- Articulation of non-credit career training courses to credit-bearing college courses
- Employer partnerships and engagement
- Outreach for programs of study
- Placement assistance onsite
- Taskforces
- Veteran outreach
- Proactive advising methods
- Advisory committees
- Positions created by the grant (instructors or other program staff)
- Facility
- Tracking completers (more job focused programs)

During April 2018, College officials joined with elected representatives from Osceola County as well as other community leaders to unveil plans for two new buildings on the College's Kissimmee campus. These new facilities will enable the College to expand further and offer more career training and workforce-oriented degree programs in Osceola County. One of the buildings will be used to house Valencia's Mechatronics program, which is currently housed at the main Advanced Manufacturing Training Center in Kissimmee.

STUDY LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

The findings give rise to some study limitations and directions for future research. With respect to the evaluation, the main limitation was that the available data could not account for many of the factors that might be driving student outcomes. Other lessons about data availability included that Annual Performance Report (APR) counts relied on self-report, when other more reliable methods were not obtainable.

Impact study employment data were all collected the same way, relying solely on UI wage records provided by the local WIB. Still there were cases where wage data and incumbent worker status was not available. Another limitation, for the impact study is that it was not possible to use random assignment in this context. However, we choose the best comparable groups that were similar enough to M-PATH to provide a likely estimate of causal impact of interventions. Still even with randomization, we could not have groups that were equivalent at baseline. There are simply too many confounding variables that cannot be controlled or accounted for. There were other issues regarding comparisons, which created some difficulties in computing matched sample.

Finally, a longer evaluation period would help to determine whether M-PATH approaches support job success and careers advancement, and longer-term educational outcomes.

For direction for future research, there is good news. Success of these programs and others in the Florida College System, using outcomes for completion and placement, will be tracked continuously using the Florida Employment Scorecard. Resulting data will be useful for future studies comparing outcomes across programs and across colleges, etc. Since implementation is so recent, additional research would reveal details about its effectiveness. Plans for continuing this work include, submitting a journal article, and presenting at professional meetings.

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APPENDIX A. M-PATH Career Pathway Model

Figure 1: Valencia College M-PATH: Professional Academic Training and Technical Certification & Higher Education Success (8-3-2018)

JOINT CAREER PATHWAY MODEL COUPLING CONTINUING EDUCATION PROGRAMS WITH COLLEGE CREDIT PROGRAMS: SHARED LABS AND CLASSROOMS, CURRICULUM DEVELOPMENT, ADVANCED ONLINE SIMULATION RESOURCES, LEADING TO TRANSFERABILITY AND ARTICULATION, STACKED AND LATTICED CREDENTIALS, INTERNSHIPS, APPRENTICESHIPS

TAA eligible, Unemployed, Underemployed, Incumbent Workers, Veterans, Women Serve 350 participants

Recruited from CareerSource CF, Industry Partners, Veterans' and Community Based Organizations

Ready to Work Assessment

Advanced Manufacturing Specialist Certificate (AMSC) of Completion

Offered through Continuing Education, the AMSC course will be designed to incorporate competencies identified by the Manufacturing Institute, and Valencia College's New Student Experience Outcomes.

Industry Certification Training Programs and Hands-on Experience/Labs Offered through Continuing Education

- Computer Numerical Control (CNC)(IHK) **COMPLETE - Added 4 NIMS certs**
- Manufacturing Skill Standards Council - Certified Production Technician (MSSC-CPT) **COMPLETE**
- Manufacturing Skill Standards Council- Certified Logistics Technician **COMPLETE - Added CLA Certification**
- Assembly - **changed to Electronic Board Assembly Added 2 *IPC certs COMPLETE**
- Mechatronics (4 *PMMI Certifications) **COMPLETE - Added 9 *NIMS certs**
- Welding Technology (AWS Certification) **COMPLETE - Added Welding Level II program (2 *AWS Certifications)**

Quality Improvement -Target: Incumbent Workers

- Quality & Inspection Specialist (CQIA Certification) **COMPLETE**
- Six Sigma Green Belt Certification - CSSGB **COMPLETE**
- Six Sigma Black Belt Certification - CSSBB **COMPLETE**
- Six Sigma Yellow Belt Certification - CSSGB **COMPLETE**
- Lean Manufacturing Certification - Bronze, Silver, **COMPLETE**

Jointly Developed

Associate in Science College Degree Program with new Articulations

Supervision & Management for Industry

Short-Term Technical Certificates leading into A.S. Degree Specializations

NEW: Manufacturing Specializations

- **Electronic Board Assembly (accelerated) - 6 credits**
- **Electronic Board Assembly – 11 credits**
- **Computer Numerical Control Technician program - 12 credits**
- **Welding program - 24 credits**
- **Mechatronics – 16 credits**

Stacked Credentials

Wrap-around services including personalized student support services and career guidance; credit for prior learning with special emphasis for veterans); non- traditional recruitment (women); academic tutoring

Leading to Industry-Recognized Certifications, Job Entry, Job Advancement

*IPC: International Printed Circuits
*NIMS: National Institute of Metal Working Skills, Inc.
*PMMI: Package Manufacturing and Merchandising Institute
*AWS: American Welding Society
*Blue Indicates "New" Certifications

APPENDIX B. M-PATH WORK PLAN

M-PATH Work Plan Summary

Activity	Implementer(s)	Timeline	Deliverables
Part 1: Start Up			
Grant Start Up	▪ M-PATH Project Director ▪ Leadership Team ▪ Legal Department ▪ Resource Development and Grants Accounting Departments	Start Date: 10/1/2014 End Date: 3/31/15 Milestones: First and Second Quarter: Advisory Committee, Taskforces established; kick-off meeting, project staff hired or contracted, equipment orders completed, vendors procured, CSCF subcontract agreement reviewed and authorized	Fully executed sub-contract agreements with CSCF; fully executed vendor contract with external evaluator, equipment purchased; Advisory Committee scope of work identified, roles and responsibilities clarified, timeline developed and key milestones set. Outreach and marketing plan complete with templates complete.
Strategy 1: Expand education and training offerings in Advanced Manufacturing.			
1.1 AMSC entry course developed and piloted. 1.2 Continuing Education Programs developed 1.3 College Credit programs developed.	▪ Project Director ▪ Subject Matter Experts ▪ Faculty ▪ CE Director ▪ CC Deans ▪ AVP Career & Workforce Education	Start Date: 10/1/2014 End Date: 03/31/16 Milestones: Year 1: Second Quarter AMSC course developed. Third and Fourth Quarter: Programs developed. College credit courses developed Year 2: (Within first quarter) Programs developed College credit courses developed Year 2 and 3: Programs offered	Curriculum developed Credit Faculty hired Schedule of programs Programs offered Within 18 months, program curriculum delivered offered to TAA eligible and others.
Strategy 2: Create a new joint career pathway model through partnership between CE and credit courses and programs.			
2.1 Develop career pathways between CE and credit programs 2.2. Develop articulation agreements	▪ Project Director ▪ Department and Campus Dean Faculty ▪ CE Director ▪ AVP ▪ Career and Workforce Education ▪ AVP Articulation	Start Date: 10/1/2014 End Date: 09/30/2017 Milestones: Career Pathway developed with clear alignment; joint faculty curriculum alignment; Articulation agreements	Curricula mapping outlines on file; articulation agreements on file; development meeting minutes and approvals on file Deliverable within first 18 months of grant period.

Activity	Implementer(s)	Timeline	Deliverables
Strategy 3: Create infrastructure to better serve veterans and women leading into Advanced Manufacturing.			
3.1 Expand dedicated Advanced Manufacturing outreach to women and veterans 3.2 Expand community and employer outreach 3.3 Implement M-PATH Advanced Manufacturing marketing campaign	▪ Project Director ▪ Department and Campus Dean ▪ CE Director ▪ AVP ▪ Academic Affairs ▪ AVP Marketing and Strategic Communications ▪ Employers ▪ Veteran's Coordinator ▪ Recruiter ▪ CSCF Career Coach	Start Date: 04/01/2015 End Date: 09/30/2017 Milestones: Recruitment strategic plan developed, Meetings held with community groups and employers to recruit targeted populations. Marketing plan implemented.	Targeted populations enrolled and employed and/or retained in the program.
Strategy 4: Increase capacity to serve individuals with advanced technology labs and software.			
4.1 Provide lab space for delivery of M-PATH curriculum. 4.2 Purchase equipment and software.	▪ Project Director ▪ Department and Campus Dean ▪ CE Director ▪ AVP Facilities ▪ Instructional Support Sr.	Start Date: 10/1/2014 End Date: 04/30/2016 Milestones: Leasehold and lease contract executed; equipment and software purchased and installed; supplies purchased. Faculty training	Lab facility lease design and agreement finalized. Lab equipment and software set up for instructional delivery Instructional Support Sr. hired. Delivery of courses within first 18 months of grant period.
Strategy 5: Evaluation and Reporting			
5.1 Third-Party Evaluation 5.2 Steering Committees 5.3 Employ Florida Marketplace Tracking (EFM)	▪ Project Director ▪ Steering Committee ▪ Leadership Team ▪ CSCF ▪ VC Institutional Research ▪ Central Florida CC ▪ TAACCCT Round 3 awardee	Start Date: 10/1/2014 End Date: 09/30/2018 Milestones: Evaluation plan executed as planned and on time; Data provided to evaluator in timely manner. Steering Committee meetings held monthly.	Quarterly and Year-End Two Formative and 1 Summative Evaluation Reports Tracking; focus groups, studies, Committee meeting minutes on file. Evaluation activities

APPENDIX C. M-PATH Logic Model

M-PATH Logic Model

Inputs Who is invested?	Strategies Specific Activities/Services	Outputs Measure of Strategy Implementation	Short-Term Outcomes Learning	Medium-Term Outcomes Action	Impact Conditions
▪ Project Staff ▪ College instructors, advanced manufacturing program staff, and administrators ▪ Regional manufacturers ▪ CareerSource Central Florida (CSCF) ▪ National, state, and regional industry associations ▪ Philanthropic associations ▪ TAACCCT funding ▪ Leveraged resources ▪ Internal and third party evaluation	▪ Develop non-credit competency-based certificate beginning with bridge course Advanced Manufacturing Specialist Certificate (AMSC) ▪ Develop ten M-PATH labs to prepare students for industry certifications in manufacturing ▪ Develop articulated career pathways and opportunities to transition into existing Valencia College A.S. degrees ▪ Provide participants with educational advising ▪ Develop partnerships with industry ▪ Develop partnership with CareerSource Central Florida ▪ Develop partnerships with community and philanthropic organizations	▪ Description, development timeline and enrollment numbers for AMSC ▪ M-PATH labs established ▪ Students gaining target industry certifications ▪ Pass rate on certifications attempted ▪ Demographics of participants enrolled ▪ Relevant industry positions where participants are placed ▪ Manufacturer partnerships ▪ Affiliates - Advanced manufacturing industry associations (national, state and regional) ▪ Specialized equipment obtained for labs ▪ Articulated A.S. pathways created and student enrollment ▪ Community organizations and philanthropic organizations/individual donors engaged ▪ Enhanced relationship with local WIB	▪ Paths to relevant Valencia College A.S. degrees are codified and publicized ▪ Links with industry and community organizations are defined and strengthened ▪ Participants demonstrate success in AMSC and in the labs ▪ Participants and Valencia faculty/staff value M-PATH course and lab experiences ▪ Participants perceive that they have increased skills in advanced manufacturing ▪ Participants develop interest and confidence in the area of advanced manufacturing	▪ Participants earn intended industry certifications ▪ Participants are employed in-field and plan to continue in those roles ▪ Some participants enroll in Valencia A.S. degree programs ▪ Greater labor pool for employers in advanced manufacturing as requested by area CEOs ▪ Local reduction in unemployment/under-employment among TAA-eligible populations. ▪ Models for competency-based rather than traditional-schedule adult education are piloted and refined	▪ Maintain or increase in the number of individuals in TAACCCT sponsored programs ▪ Developed programs continue to provide needed skills locally ▪ Participants remain employed after 12 months ▪ Participants increase average earnings ▪ Area industry CEOs and other leaders report continued improvement in quality and retention of available advanced manufacturing employees ▪ Maintain or increase the number of certifications granted ▪ Viable models for competency-based advanced manufacturing training for adults are created and widely disseminated

APPENDIX D. Implementation Evaluation Framework

Program Implementation Evaluation Framework

Program Element	Evaluation Questions	Data Collection Methods	Data Sources
Expansion of educational and training programs and career pathways in Advanced Manufacturing	▪ What was the M-PATH administrative structure? ▪ To what extent, and how, is progress being made towards accomplishing intended outcomes? ▪ How is curriculum being used selected, used, or created? How are content and delivery systems vetted and how well does that process work? Is M-PATH responsive to industry needs? ▪ What are the grant-funded programs of study? What delivery methods are being offered? How are program/program designs improved or expanded using grant funds? ▪ What support or other services are being offered?	▪ Document review ▪ Interviews ▪ On-site observations ▪ Site visits ▪ Signature partner interviews	▪ Grant applications ▪ Planning documents ▪ Meeting minutes (WIB, advisory board, partners) ▪ Detailed timeline for the project ▪ Planned descriptions of events ▪ Project staff ▪ Curriculum developers, instructors ▪ Program of study implementation data ▪ Subject matter expert reviews
Enrollment in the Advanced Manufacturing Career Pathway	▪ How are participants recruited? To what extent is M-PATH reaching non-traditional student populations? ▪ Are in-depth assessment of participant abilities, skills, and interests conducted during recruitment? Who conducts this assessment, and are they adequately prepared? Is that data used to determine placement and course sequence? Can that process be improved? Is it useful? ▪ Is career guidance being provided? If so, through what methods? ▪ Did M-PATH expand Veteran services to create a seamless transition for prior experience? If so through what methods?	▪ Individual and group interviews ▪ Ratings scales and questionnaires ▪ Document review ▪ Site visits ▪ Program data extraction	▪ Project director ▪ Project staff ▪ Instructors and other providers ▪ Student-level database
Participant Assessment	▪ Who are the participants? What are their demographics and characteristics? ▪ What are the rates of those who decline participation? ▪ How many and who exit from the program and why? ▪ What impact is the project having on participants' abilities, skills, interests, and confidence related to M-PATH objectives? ▪ To what extent are they using what they have learned? ▪ Are the services flexible and participant driven? ▪ Is the project providing high quality experiences? How satisfied are the participants with the services they receive? Are classes well attended?	▪ Individual and group interviews ▪ Follow-up interviews ▪ Ratings scales and questionnaires ▪ Program data extraction ▪ Sign in Sheets ▪ Site visits	▪ Project staff ▪ Students ▪ Instructors and other providers ▪ Program of study deans/directors ▪ Students ▪ Student-level database (e.g. demographic, coursework, and credentialing) ▪ Attendance records

Program Element	Evaluation Questions	Data Collection Methods	Data Sources
Partner Contributions	▪ What is the fidelity of implementation for services for each of the partners and other key stakeholders? ▪ What do they each contribute in terms of (a) program design, (b) curriculum development, (c) recruitment, (d) training, (e) placement, ▪ (f) program management, (g) leveraging resources, and (h) commitment to program sustainability? ▪ What factors contributed to partners' involvement or lack of involvement in the program? What obstacles to successful implementation are being reported? ▪ Which contributions were most critical to the success of the grant program? Which contributions from partners had less of an impact?	▪ Document review ▪ Guided interviews Ongoing structured conversations ▪ Roundtable discussions ▪ Case studies	▪ Project staff ▪ Project partners Employers/signature partners, WIB leaders ▪ Project documentation and reports ▪ Meeting minutes (WIB, advisory board, partners) ▪ MOU agreements ▪ Collaborative initiatives

Program Element	Evaluation Questions	Data Collection Methods	Data Sources
	▪ What do they each contribute in terms of (a) program design, (b) curriculum development, (c) recruitment, (d) training, (e) placement, (f) program management, (g) leveraging resources, and (h) commitment to program sustainability? ▪ What factors contributed to partners' involvement or lack of involvement in the program? What obstacles to successful implementation are reported? ▪ Which contributions were most critical to the success of the grant program? Which contributions from partners had less of an impact?	▪ Ongoing structured conversations ▪ Roundtable discussions ▪ Case studies	▪ Employers/signature partners, WIB leaders ▪ Project documentation and reports ▪ Meeting minutes (WIB, advisory board, partners) ▪ MOU agreements ▪ Collaborative initiatives

APPENDIX E. Data Dictionary

Student-level Database Elements

Variable	Need	Valid Values	Definitions/Instructions	Data Source (DOL acceptable forms of documentation)
Student ID	Valencia College			
Participant ID	In order of enrollment	Start with Y1.1…Y3.xx	In order of enrollment	
Name (keep identifiers separate and locked)	Element 1	F, M, Last (Textbox or auto pop)	Active in "program" (industry-recognized degree or cert);	College registration records; keep paper file with application or other info indicating participants enrolled
Application Date		MM/DD/YYYY	When student completes application	
Enrollment	Element 13 & APR B1	MM/DD/YYYY	Data started (only if completed AMSC intro course)	
Date of Birth	Element 2; APR C6 for Participant Age will report Mean	MM/DD/YYY	At time of enrollment	College registration records
Gender	Element 3; APR C	1 = Male 2 = Female Blank = no self-disclosure	Report either No Disclosure for self-identify their gender as male vs female	College registration records
Hispanic/Latino	Element 5; APR C.2a	1 =Yes 2 = No Blank = no self-disclosure	Whether participants self-identify their ethnicity as Hispanic/Latino. The term Hispanic/Latino includes persons of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture in origin, regardless of race.	College registration records
Race	Element 4; APR C.2	1 = American Indian or Alaskan Native; 2 = Asian; 3 = Black or African American; 4 = Hawaiian Native or Pacific Islander; 5 = White; *6 = More Than One Race; Blank= no self-disclosure	See end of table for more detail for Race. Also, not that more than one race is coded WHEN they self-identify to more than one of the racial categories outlined in categories C.2b-F of handbook	College registration records
Disability	Element 9; APR C7	1 =Yes 2 = No Blank = no self-disclosure		College registration records
Eligible Veteran Status	Element 8; and APR C 5	1 = Yes, <= 180 days 2 = Yes, Eligible Veteran 3 = Yes, Other Eligible Person 4 = No	See end of table for guidance re definitions for Eligible Veteran Status	
Have they registered in EFM?		1 = Yes 2 = No	ADD HOW TO FOLLOW UP	
Other Demographic Measure (TBD)	Element 12; APR 10	1 =Yes 2 = No Blank = no self-disclosure	Optional - Determined by grantee (optional). Leave blank if the participant does not wish to disclose or if no additional demographic measures are collected. This field allows grantees to enter and report on additional characteristics as needed or desired. For grantees focusing on Priority 1, information on the number of participants identified with a basic skills deficiency should be included. Basic skills deficiency is defined as not academically prepared to succeed in college-level courses towards a degree or certificate.	
School Status	Element 6 and APR C.3a and C.3b	1 = Full time 2 = Part time Blank = Other	Full time, Part time, or Blank (other)	College registration records

Variable	Need	Valid Values	Definitions/Instructions	Data Source (DOL acceptable forms of documentation)
Highest Level of Education (earned) at entry		0 = Nursery school to 8th 1 = Some high school, no diploma 2 = High School/GED 3 = Some college credit, no degree 4 =Trade/tech/vocational training 5 = Associate degree 6 = Bachelor-s degree 7 = Master's degree 8 = Advanced graduate work or doctoral degree		
Pell-grant Eligible	Element 10; APR C8	1 = Yes 2 = No Blank = no self-disclosure or not pursuing financial aid	Enter Yes or No based on eligibility to receive federal Pell Grant a	College financial aid records
Eligibility for Financial Aid (Y/N)		1 = Yes 2 = No Blank = no self-disclosure or not pursuing financial aid	Enter Yes or No based on other field for eligibility to receive federal Pell Grant assistance.	College financial aid records
Employment at Start				
Incumbent Worker Status	Element 7; APR C4	1 = Yes 2 = No Blank = no self-disclosure	Was student employed at the time of enrollment? (this will eventually be confirmed with UI wage data)	Evidence is pay stub or employer verification, or self-attestation of employment
Job Title				Application
Current Employer				Application
Hire Date				Application
Hours Per Week				Application
Hourly Rate				Application
TAA Eligible	Element 11; APR C9	1 = Yes 2 = No	Eligible to receive Trade Adjustment Assistance (TAA) benefits.	TAA Certification Documentation, such as determination of individual eligibility, letter from State TAA office confirming individual eligibility, or documentation of training plan approval (will differ by state)
Enter the following just once for annual report or *update annually)				
Completion date of AMSC	Element 14; APR B2	MM/DD/YYYY	Record date individual enrolled (only if complete MPATH orientation); Used to determine year for Element 1; Each counted once for B.1	MPATH orientation records
TACT (approved) Program of Study			List up to 4 in order of entry.	College registration records
Date of Program Completion	Element 14; APR B2	MM/DD/YYYY	Record date individual completed one of the 12 grant-funded programs. For Outcome B.2. Date recorded once, even if they complete multiple programs.	College registration records
*Still Retained in their Program of Study or Other in Grant-Funded Program at End of Reporting Year (UPDATE ANNUALLY)	Element 15; APR B3	1 =Yes 2 = No Blank = if has completed MPATH program	May change over time. Record Yes or No if individual is still enrolled in the original or a new grant-funded program. Leave blank if the individual has completed a grant-funded program. An individual's status in this field may change over time if he or she completes a program. Once a grant-funded program is completed, an individual should not be counted in this field. (Note: A participant counted in B.2 should not be counted again in B.3).	College registration records

Variable	Need	Valid Values	Definitions/Instructions	Data Source (DOL acceptable forms of documentation)
Continued Enrollment in Other Education Program(s)	Element 16; APR B7	1 =Yes 2 = No Blank = student completed an MPATH program	Record Yes or No if the individual is still enrolled in other (non-grant-funded) education programs and dropped from a MPATH program. Leave blank if the individual has completed a grant-funded program. If a grant-funded program is completed, an individual should not be counted in this field. (Note: A participant counted in B.2 should not be counted again in B.3).	
Enrolled in Further Education after Program of Study Completion Another Education Program	Element 22; APR Outcome B4	1 =Yes 2 = No Blank = not eligible to be counted in this field	Enter Yes if student completed at least one grant-funded program (B.2), and if entered another program of study (grant-funded or not) to date. If a grant-funded program is not completed, an individual should not be counted in this field.	Banner, Clearinghouse Tracker
Credit Hours Earned	Element 17; APR B.5a	Whole Number	Reported by Project Year. Includes total # of credit hours to date that have been completed by participants in grant-funded certificate and degree programs. This number should be reported in aggregate across all enrollees, even if the participant is no longer enrolled in the grant-funded program of study or did not complete the program.	
# of Earned Degrees/Certificates	Element 18; APR Outcome B.6. *Total Number of Earned Degrees/Certificates*	Whole Number (max 3 digits)	Record the number of degrees/certificates earned to date. May report more than one if appropriate for TACT participants in TACT programs.	
Earned one or more TACT Certificate in less than 1 Year (6a)	Element 19; APR Outcome B.6.a. *Total Number of Students Earning Certificates (less than one year)*	1 =Yes 2 = No	Enter Yes for students who earned a certificate designed to be completed in one year or less. A student can be counted only once in this field, even if multiple certificates were earned by that student.	
Earned TACT Certificate in More than 1 Year (6b)	Element 20; APR Outcome B.6.b. *Total Number of Students Earning Certificates (more than one year)*	1 =Yes 2 = No	Enter Yes for students who earned certificates designed to be completed in more than one year. A student can be counted only once in this field, even if multiple certificates were earned by that student.	
Earned Degree	Element 21; APR B.6.c	1 =Yes 2 = No	Enter the Yes for students who earned degrees. A student can be counted only once in this field, even if multiple degrees were earned by that student.	
Pursuing Further Education AFTER Program of Study Completion	Element 22; APR B.7.	1 = Yes 2 = No 3 = Still enrolled	If student completes at least one grant-funded program (B.2), enter Yes for individuals to date who entered another program of study (grant-funded or not).	College registration records
Date of Placement into Employment	Element 23	MM/DD/YYYY Blank = not eligible to be counted or did not enter employment.	Record the date the individual was placed into employment. Leave blank if the individual did not complete a grant-funded program or did not enter employment.	
Entered Employment after Program of Study Completion	Element 24; APR B.8	1 = Yes 2 = No Blank = not eligible to be counted in this field	For participants who were NOT incumbent workers and who completed at least one grant-funded program (B.2), enter Yes if they enter unsubsidized employment in the first quarter after the quarter in which the student exits the college (see Element 14 date to determine). Exit is defined as being no longer enrolled at the college in any program of study and can include formal withdrawal, expulsion, graduation, and other reasons. (Note: A participant counted in B.8 may be counted again in B.9). If a grant-funded program is not completed, an individual should not be counted in this field.	▪ State MIS/UI Records ▪ If these are not available, the following are examples of acceptable documents: – Pay stubs; or – Employer verification *For self-employment, self-attestation is acceptable.

Variable	Need	Valid Values	Definitions/Instructions	Data Source (DOL acceptable forms of documentation)
Retained in Employment after Program of Study Completion	Element 25; APR B.9	1 = Yes 2 = No Blank = not eligible to be counted in this field	Enter Yes for participants who were employed in the first quarter after the quarter in which the student exits the college (B.8), FOLLOW UP TO SEE HOW FROM THIS YOU CAN REPORT those employed in the second and third quarters after exit. Exit is defined as being no longer enrolled at the college in any program of study and can include formal withdrawal, expulsion, graduation, and other reasons. Leave blank if the individual has not entered employment.	▪ State MIS/UI Records ▪ If these are not available, the following are examples of acceptable documents: – Pay stubs; or – Employer verification *For self-employment, self-attestation is acceptable.
Wage Increase for Incumbent Workers	Element 26; APR B.10	1 = Yes 2 = No Blank = not eligible to be counted in this field	Record Yes or No if the individual was an incumbent worker at enrollment and received a wage increase at any time after becoming enrolled. If an individual is not an incumbent worker upon enrollment, he or she should not be counted in this field.	
PROGRAM (above is for student-level)—use this if needed for program level reporting				
Employment Retention rate for this Program	APR Outcome B.17	Percentage	Percentage is defined as the number of students from the program that retained employment during the second and third quarters after the quarter of program completion (B.15) divided by the number of students that entered employment in the first quarter after the quarter of program completion (B.12 and B.13).	No verification needed. Auto-calculated by reporting system.
Average Program Graduate 6-Month Earnings (gross)	APR Outcome B.16 *Employment Retention Rate for this Program*	Average Gross Earnings	Record only for participants from this program who are employed in their first, second, and third quarters after program of study completion (B.15), enter the average gross earnings from the second and third quarters after program completion.	▪ State MIS/UI Records ▪ If these are not available, the following are examples of acceptable documents: – Pay stubs; or – Employer verification *For self-employment, self-attestation is acceptable.

Notes. Some data elements defined by DOL see Individual-level Participant Data Collection document; APR measures for Outcomes and Participant Summary Information from QNPR/APR Reporting Handbook. Upon implementation of AS program, find out again if they were Pell Grant or Financial Aid eligible.

RACE (notice doesn't include ethnicity for Hispanic):

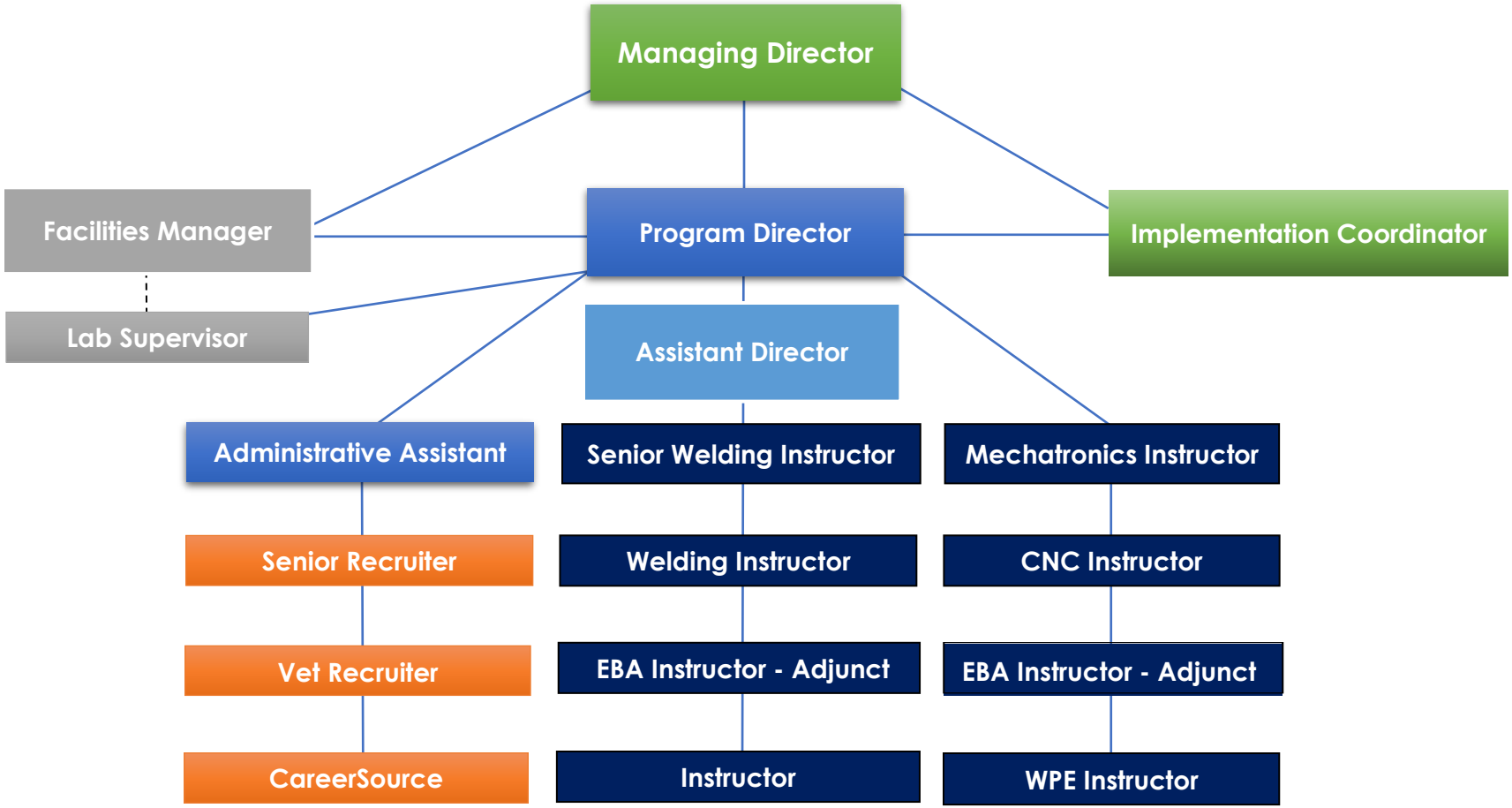
- American Indian or Alaskan Native – Enter the total number of new participants who self-identify their race as American Indian or Alaskan Native. The racial category American Indian or Alaska Native includes persons having origins in any of the original peoples of North America and South America (including Central America), and who maintains cultural identification through tribal affiliation or community recognition.
- Asian – Enter the total number of new participants who self-identify their race as Asian. The racial category Asian includes persons having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian Subcontinent (e.g., Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka, and Sikkim). This area includes, for example, Cambodia, China, Japan, Korea, Malaysia, the Philippine Islands, Thailand, and Vietnam.
- Black or African American – Enter the total number of new participants who self-identify their race as Black or African American. The racial category Black or African American includes persons having origins in any of the black racial groups of Africa.
- Native Hawaiian or Other Pacific Islander - Enter the total number of new participants who self-identify their race as Native Hawaiian or Other Pacific Islander. The racial category Hawaiian Native or Other Pacific Islander includes persons having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
- White - Enter the total number of new participants who self-identify their race as White. The racial category White includes persons having origins in any of the original peoples of Europe, the Middle East, or North Africa.
- More Than One Race - Enter the total number of new participants who self-identify more than one of the racial categories outlined in *those* above.

PERSONS WITH DISABILITY STATUS: Y N or Blank – No self-disclosure. Select yes if the individual indicates that he/she has any "disability," as defined in Section 3(2)(a) of the Americans with Disabilities Act of 1990 (42 U.S.C. 12102). Under that definition, a "disability" is a physical or mental impairment that substantially limits one or more of the person's major life activities. (For definitions and examples of "physical or mental impairment" and "major life activities," see paragraphs (1) and (2) of the definition of the term "disability" in 29 CFR 37.4, the definition section of the WIA non-discrimination regulations.)Select no if the individual indicates that he/she does not have a disability that meets the definition. Leave blank if the individual does not wish to self-identify.

APPENDIX F. M-PATH Organization Chart

VALENCIA COLLEGE

Advanced Manufacturing Training Center



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