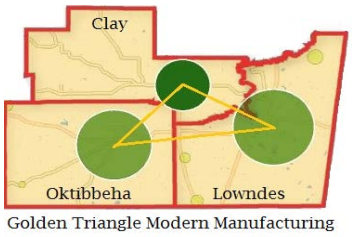
Final Evaluation
Golden Triangle Modern Manufacturing Project



Trade Adjustment Assistance Community College Career Training

Grant Program: Round 3

Grant No. TC-25149-13-60-A-28

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By

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Executive Summary

TAACCCT Program Description and Activities

East Mississippi Community College (EMCC), through the Golden Triangle Modern Manufacturing Project, sought to improve and better articulate career pathways into high skill, high wage modern manufacturing jobs for TAA eligible workers, Veterans, and other adults. After consulting with industry to determine employer demand for skilled training in targeted industries and occupations, identifying gaps in existing education and career training programs, and reviewing other programs, EMMC selected the 2012 Missouri Manufacturing Workforce Innovation Networks TAACCCT project as its model. That project's strategies relied heavily on the National Association of Manufacturers (NAM) endorsed credentials and were leveraged by EMMC.

The evidence-based interventions replicated from the Missouri Manufacturing Workforce Innovation programs resulted in the following research-based strategies implemented by EMCC: 1) Build Programs that Meet Industry Needs, 2) Enhance Career Pathways Options for Learners and Workers, 3) Accelerate and Improve Certification and Employment Attainment, and 4) Strengthen Online and Technology-Enabled Learning. Each strategy had associated activities with accompanying tasks and milestones

Evaluation Design

The purpose of formative evaluation of the Golden Triangle Modern Manufacturing Project, a Trade Adjustment Assistance Community College Career Training Grant (TAACCCT), was to determine if the project was on target in deploying strategies to accomplish project outcomes. The process was designed to ensure the program operated as intended and on schedule to accomplish project objectives. It guided discussion about potential changes in the implementation process. Summative evaluation focused on evaluating participant outcomes and impact.

Detailed research questions informed project performance, the outcomes study, and the impacts study. Questions included those required by the SGA and questions about capacity. There were 19 implementation questions and 20 outcomes questions. The logic model with inputs from Golden Triangle manufacturing firms and EMCC, through four activities, five outputs, and targeted outcomes predicted impacts of better student retention, higher completion rates, higher employment rates, better job retention, higher average wages for completers, and more completers pursuing further education. Data sources included structured interviews, participant performance data, and baseline data.

A descriptive analysis was conducted to examine actual outcomes and the nine required SGA outcomes. To draw causal inferences of the impact of grant activities on participant outcomes for which comparison groups were available, sets of multivariate regression models were estimated to examine differences between program participants and the comparison group outcomes when controlling for demographic, economic, and programmatic characteristics. Propensity score matching was used to bring balance between the groups on which the analysis was performed.

Implementation Findings

The formative evaluation found East Mississippi Community College's Golden Triangle Modern Manufacturing Project to be a well-managed, high performing project with significant accomplishments. The capacity of EMCC increased significantly in a number of areas. Three full-time instructors and several part-time instructors were hired for customized training and Manufacturing Discovery. Instructional delivery has been enhanced through professional development and industry input. New training equipment was purchased for use in credit program training as well as customized industry training. NAM-endorsed, nationally recognized credentials have been embedded in new and existing programs. Online and technology-enabled learning has been strengthened and self-paced online academic remediation expanded. Articulation among all 15 community colleges was approved, and an articulation agreement with Mississippi University for Women was developed. Two navigators, key to the success of the program, were hired.

To create and run an effective training program, EMMC modernized the college's manufacturing related Career and Technical Education (CTE) programs by merging them into a sector-based Modern Manufacturing Technology and Engineering Division along with the college's credential-based, technology-enabled, short-term training programs; latticing and stacking industry-recognized credentials into six CTE programs; increasing instructors' abilities to use advanced technology and contextualization; and requiring a Silver level CRC credential for program admission. Three credential-based, craft-level technician programs demanded by industry were added as well a new 15-semester hour CTE developmental program. Revised and new programs were meeting the demands of industry as well as the needs of the target population; feedback from industry was positive; 92%, of students surveyed two years after complaint said their experiences made them more marketable and skills obtained allowed them to successfully obtain employment.

Area modern manufacturers and workforce partners were instrumental in program design. Important partners included industry, the Mississippi Community College Board, and the Mississippi Partnership. Feedback from industry resulted in EMCC revamping the machining program and the hiring of more qualified instructors.

The Golden Triangle Modern Manufacturing Project was implemented with fidelity to the original design. The program operated as intended and on schedule to accomplish the objectives. Four strategies were employed to improve and better articulate career pathways into high skill, high wage modern manufacturing jobs for TAA eligible workers, Veterans, and other adults. Each strategy had a series of action items. Deliverables were accomplished within the time frame of the grant.

The program was successful because of strong program management, both administratively and financially, internally and programmatically. Fifteen actions with 115 tasks related to the strategies were completed. The program manager conducted weekly meetings with the management team to review tasks and assign responsibilities. The external evaluator attended a significant number of these meetings. Navigators provided exemplary services that aided recruitment, retention, and success rates and were a key strength of the program and a critical component in the management of the program.

Significant, positive unintended consequences resulted from the project, including: 1) the Community College Board has begun to build exit credentials into CTE programs statewide; 2) the Mississippi Development Authority adopted the pre-hire section of the customized training programs as a best practice for new manufacturers recruited to the state; and 3) the navigator

model resulted into a college-wide career navigation initiative funded by the Bill and Melinda Gates Foundation.

Participant Impacts & Outcomes

Evaluation results found that EMCC overachieved in six of the nine outcome measures stipulated in the SGA: 1) The 2,087 unique participants served was more than double the 901 target; 2) a total of 1,572 participants completed a grant-funded program of study compared to the 719 target; 3) the 178 students retained at the grant end date fell 15% below the 209 target; 4) the 709 students completing credit hours exceeded the 559 by 27%; 5) the 1,645 students earing degrees/certificates was more than double the 719 target; 6) the 356 students enrolled in further education after the program of study compared with the 220 target; 7) the 764 non-incumbent workers who obtained employment was 18% higher than the 645 target; 8) the 487 retained in employment so far falls short of the 581 target but final data is not available; and 9) the 167 incumbent workers who received a wage increase fell short of the 256 target. However, of the 2,087 participants, only 349 were incumbent workers; 48% had wage increases.

Of the 2,087 participants, 1,349 were non-credit participants and 738 were credit participants. Of the 1,572 completers, 1,069 received non-credit certificates and 503 received credit certificates or degrees. Of the 503 credit completers, 102 received 15-hour developmental program certificates, 229 received 30-hour vocational certificates, 30 received 45-hour technical certificates, and 160 received two-year degrees.

Of the 503 participants who received credit certificates or degrees, 422 or 84% obtained employment. Of the 1,069 participants who received non-credit certificates, 342 or 32% obtained employment.

Of the 2,087 participants, 10 were TAA eligible and 41 were eligible Veterans. Of the 10 TAA eligible participants, four received their Associates of Applied Science degree and four will receive their on-year vocational certificate in May 2018. The remaining TAA eligible participants left school after the first semester to return to work to provide for their families. Of the 41 eligible Veterans, two completed the 15-hour certificate program, 14 received their one-year Vocational certificate, one received his 45-your technical certificated, 11 earned two-year Associates of Applied Science degree while three completed the non-credit customized advanced skills training.

The summative evaluation found significant participant outcomes and positive impacts. Comparison of propensity score matching adjusted results for credit students in selected programs to similar historic cohorts found the following: 1) Program completers on average are earning 30% higher average wages than the comparison group, $34,863 compared to $26,892; 2) Program retention improved from 49% to 75%; 3) Completion rates improved from 43% to 80%; 4) Employment rates for non-incumbent workers improved from 58% to 83%; 5) Further education rates improved from 54% to 72%.

All six logic model targeted impacts were achieved. Logistic regression analysis, while controlling for individual characteristics, found large, statistically significant impacts of participation in program retention and program completion. Participants received credentials at a higher rate than the matched comparison group and were also retained in a grant-funded program of study during the grant period.

The impact analysis did not find a statistically significant impact on employment, although participants had a much higher employment rate than comparison group members: 87% of the participant group vs. 47% of the comparison group was employed during the first quarter after program exit. Despite the lack of overall impact on employment, exploratory

analysis indicates that participants in automotive and welding had a higher employment rate than comparison group students in these program areas.

Finally, the evaluation did not find a substantively meaningful difference in the earnings increase rate between participants and comparison group members. Exploratory analysis suggests that both participants and comparison group members received earnings increases.

The non-experimental design for this evaluation analysis was specified to minimize threats to internal validity. However, one limitation was that the participants were not randomly assigned to the treatment and comparison group. This limitation had to be considered in our analysis when we looked for factors that might influence outcomes and to be careful in making general inferences about cause/effect relationships. Another limitation was that our analysis might have low external validity. Because the goals and objectives of the grant activities were focused specifically on manufacturing-oriented programs at EMCC that align education with labor market opportunities in the tri-county Golden Triangle Region, it was more challenging to control for threats to external validity which might have an impact on the generalizability of the results.

Conclusions

There are several key components that increase the likelihood of successful implementation. It is essential to have a strong management team, with identified tasks, and regular communication and to obtain total buy-in from college administration. Developing detailed task reports with target dates, and weekly meetings with key personnel as well as involvement of the external evaluator will enhance on-target completion of strategies. Navigators are critical to a successful program.

A challenge was getting agreement from the state oversight board for program enhancements. Another challenge was identifying matching cohorts on which comparison may be conducted.

The combination of interventions and implementation actions showed positive outcomes and impacts for the project. Future workforce and education research should investigate specific factors that contribute to the success of the program. Future research should also control for limitations cited in this report: 1) a quasi-experimental design; 2) external factors influencing outcomes; and 3) local market conditions' effect on external validity.

Project Description and Activities

The Golden Triangle region of Mississippi, consisting of Clay, Lowndes, and Oktibbeha counties, suffered a series of plant closures and economic downturn and was classified by the Economic Development Administration as distressed counties. As a result, the region had an abundance of trade impacted, unemployed, and unskilled workers. The Golden Triangle Modern Manufacturing Project sought to improve and better articulate career pathways into high skill, high wage modern manufacturing jobs for TAA eligible workers, Veterans, and other adults.

East Mississippi Community College (EMCC) consulted industry to determine employer demand for skilled training in targeted industries and occupations. After identifying gaps in existing education and career training programs and reviewing other programs, EMMC determined the 2012 Missouri Manufacturing Workforce Innovation Networks provided the most appropriate model. That project's strategies relied heavily on the National Association of Manufacturers (NAM) and were leveraged by EMCC to accomplish the following: 1) completely modernize the college's manufacturing related Career and Technical Education (CTE) division by merging it into a sector-based Modern Manufacturing Technology and Engineering Division with the college's credential-based, technology-enabled, short-term training programs; latticing and stacking industry-recognized credentials (AWS, NCCER, NIMS, Siemens) into six CTE programs; uplifting CTE instructors' abilities to use advanced technology and contextualize soft skills and manufacturing concepts into their teaching; and requiring all students to achieve a Silver CRC credential; 2) adding three credential-based, craft-level technician programs demanded by industry – electro-mechanical, Mechatronics, and welder/fabricator technicians; 3) creating a new 15 semester hour CTE developmental program, 4) expanding EMCC's Clay County Campus to meet surging industry demands; and 5) fully engaging modern manufacturers and workforce partners in program design, labor market forecasting, and work-based learning through a new sector-based oversight and advisory council.

The interventions replicated from the Missouri Manufacturing Workforce Innovation programs resulted in the following strategies to be implemented by EMCC:

Strategy 1: Build Programs that Meet Industry Needs

Strategy 2: Enhance Career Pathways Options for Learners and Workers

Strategy 3: Accelerate and Improve Certification and Employment Attainment

Strategy 4: Strengthen Online and Technology-Enabled Learning

Each strategy had associated activities with accompanying tasks and milestones. (Appendix C).

Evaluation Design

The purpose of formative evaluation of the Golden Triangle Modern Manufacturing Project, a Trade Adjustment Assistance Community College Career Training Grant (TAACCCT), was to determine if the project was on target in deploying strategies to accomplish project outcomes. The process was designed to ensure the program operated as intended and on schedule to accomplish project objectives. It guided discussion about potential changes in the implementation process. Summative evaluation focused on evaluating participant outcomes and impact.

Project Evaluation Questions

Questions utilized in evaluating the project included the following:

- Is the project on target in accomplishing the goals of the project?
- Were strategies implemented as planned?
- Are there obstacles that have arisen during the deployment of strategies?
- Are the expected outcomes being produced?
- Are there unintended consequences?

Steps taken by the institution to create and run the training programs of the project were analyzed, and an assessment of the operational strengths and weaknesses of the project after implementation were conducted. To assess the effectiveness of implementation strategies and timeliness of meeting targeted tasks, the following sources were utilized:

- Structured interviews with students, faculty, and project management;
- Site visits to selected classes and industry sites;
- Quarterly reports and other documents provided by project management;
- Number and timeliness of statement of work tasks accomplished;
- External reviews and timeliness of deliverables;
- Statement of work modifications;
- Feedback from the FPO and the DOL national office;
- Interviews with members of the MMSAC, project staff, program instructors, institutional management, and the FPO.

Implementation Questions

The following implementation research questions were utilized to assess the overall effectiveness of the project:

1. How was the particular curriculum selected, used, and/or created?
2. How were programs and program designs improved or expanded using grant funds? What delivery methods were offered? What was the program administrative structure? What support services and other services were offered?
3. Was an in-depth assessment of participants' abilities, skills, and interests conducted to select participants into the grant program? What assessment tools and processes were used? Who conducted the assessment? How were the assessment results used? Were the assessment results useful in determining the appropriate program and course sequence for participants? Was career guidance provided, and if so, through what methods?
4. What contributions did each of the partners (employers, workforce system, other training providers and educators, philanthropic organizations, and others as applicable) make in terms of: 1) program design, 2) curriculum development, 3) recruitment, 4) training, 5) placement, 6) program management, 7) leveraging of resources, and 8) commitment to program sustainability? What factors contributed to partners' involvement or lack of involvement in the program? Which contributions from partners were most critical to the success of the grant program? Which contributions from partners had less of an impact?
5. What is the effectiveness of the Modern Manufacturing Sector Advisory Council? Of the new Modern Manufacturing Technology and Engineering Division?
6. Are the revised and new programs meeting the demands of industry? Are students exiting

programs with the skills industry needs?
7. Is LMI data informing students and the college as intended?
8. Is the new Manufacturing Discovery program providing a good pathway to further education?
9. Do industries value the credentials provided by the revised and new programs?
10. Are recruitment materials working?
11. Is the Navigator providing services that aid recruitment, retention, and success rates?
12. Are the revised and new programs, PLA, and articulation actions meeting the needs of TAA eligible workers, Veterans, and other adults?
13. Are technology and online systems being ably used to enhance instruction and student outcomes?
14. Are program completers earning higher average wages?
15. Do industry-recognized credentials provide students with more employment opportunities?
16. Do the revised and new programs enhance students' educational experiences resulting in them being more marketable?
17. Two years after completing training, do participants will feel their future jobs, employment, or career prospects are better because of their experiences with sector training programs?
18. Are career and further education pathways enhanced for students?
19. What institutional capacity was added? Include instructors, equipment, credentials, online and technology-enabled systems, open-source/online academic resources, articulation agreements, recruiting tools, counseling and support systems, labor management information processes, and business engagement activities.

Outcome/Impact Analysis Design

The impact analysis will consist of two parts. First, a descriptive analysis will be conducted to examine differences in outcomes between the program participants and the comparison group on the nine required SGA outcomes. This analysis will also include an examination of the performance of TAA- eligible grant participants, and an examination of outcomes across other subgroups including gender, race, and program of study. Second, to draw causal inferences of the impact of grant activities on participant outcomes, sets of multivariate regression models will be estimated to examine differences between program participants and the comparison group outcomes when controlling for other individual demographic, economic, and programmatic characteristics. Differences observed between the grant participant group and comparison cohort will also be examined in relation to the second set of control groups specified above.

A set of logistic regression models were estimated to determine differences in the likelihood of (1) program retention; (2) completion of programs of study, (3) enrollment in further education, (4) employment, (5) job retention, and (6) average wages between the program and control groups while controlling for other factors (e.g., individual demographics, veteran status, degree path, prior employment status, etc.). Logistic regression was used for this analysis because the dependent variable is binary (e.g. 1=employed, 0=unemployed).

The general logistic regression model can be described as:

$$log\frac{P(y_i = 1|X_i)}{1 - P(y_i = 1|X_i)} = \beta_0 + \beta X_i.$$

In the model, the binary response variable y_i indicates whether i^{th} individual is employed one quarter after closure (with 1=employed and 0=otherwise). X_i is the vector of explanatory variables. β_0 is the intercept parameter, and β is a vector of regression coefficients explaining the change in the log odds of the outcome ($y_i = 1$) for each unit change in the explanatory variable. In other words, the exponential function of β is the odds ratio associated with one-unit increase in the explanatory variable.

A set of ordinary least square regression (OLS) models was estimated to determine (1) the earnings after graduation and (2) change in earnings before and after training. OLS regression is used for this analysis because the dependent variables are continuous. The general model can be described as:

$$y_i = \beta_0 + \beta X_i + \varepsilon_i.$$

In this model, y_i was the annualized earnings for the i^{th} individual. X_i was the vector of explanatory variables. ε_i was the random error term. β_0 is the intercept, and it represented the average earning when $X_i = 0$. β was a vector of regression parameters that accounted for the differential impact of factors on earnings.

Variable	**Description**
Outcome Variables	
Program Completion	1=complete program, 0=otherwise
Additional Education	1=Enroll in additional postsecondary education after completing program, 0=otherwise
Employment	1=Employment within 1 quarter of exit from program, 0=otherwise
Employment Retention	1=Employed after 3 quarters of exit from program, 0=otherwise
Earnings	Annualized earnings after program completion
Earnings Change	Change in earnings before and after program participation
Test Variable	
Program Participation	1=participate in Golden Triangle Modern Manufacturing Project, 0=otherwise
Control Variables	
Individual Demographics	
Gender	1=male, 0=female
Age	Continuous Variable
Race	Dummy Variables: 1=white, 0=otherwise 1=black, 0=otherwise 1=Hispanic, 0=otherwise
Veteran Status	1=Veteran, 0=otherwise
Degree Path	Dummy Variables: 1=automotive technician, 0=otherwise 1=drafting and design, 0=otherwise 1=electro-mechanical technician, 0=otherwise

	1=welding/fabricator technician, 0=otherwise
Credential Attainment	
Career Readiness Credential	1=Attained CRC, 0=otherwise
Program Participation	
SNAP	1=received SNAP benefits, 0=otherwise
TANF	1=received TANF benefits, 0=otherwise
TAA-Eligible	1=TAA eligible/trade affected, 0=otherwise

Limitations

The non-experimental design for this evaluation analysis was specified to minimize threats to internal validity. However, one limitation was that the participants are not randomly assigned to the treatment and comparison group. This limitation had to be considered in our analysis when we looked for factors that might influence outcomes and to be careful in making general inferences about cause/effect relationships. Another limitation was that our analysis might have low external validity. Because the goals and objectives of the grant activities were focused specifically on manufacturing-oriented programs at EMCC that align education with labor market opportunities in the tri-county Golden Triangle Region, it was more challenging to control for threats to external validity which might have an impact on the generalizability of the results. We will attempt to overcome this limitation by examining our results in relation to what was available in the literature for similar programs in different labor market contexts.

The plan for rigorously evaluating the participant outcomes and impacts relied upon a non-experimental research design that utilized both descriptive analyses as well as sets of multivariate regression models that examined differences between carefully designed comparison groups. The outcomes analysis consisted of an examination of the performance of grant participants on selected outcomes, including the nine required SGA outcomes. The outcomes analysis included descriptive analyses to examine outcomes for participants in the new technician programs and the new non-credit customized training programs for which there were no comparison groups. The impact analysis, focusing on participants in the improved manufacturing education programs for which a comparison group can be selected, consisted of two parts. First, a descriptive analysis was conducted to examine differences between the program participants and the comparison group on selected outcomes. This analysis also included an examination of the outcomes of TAA-eligible grant participants as well as other subgroups. Second, in order to draw causal inferences of the impact of grant activities on participant outcomes, sets of multivariate regression models were estimated to examine differences between outcomes for program participants and a carefully selected comparison group when controlling for other individual demographic, economic, and programmatic characteristics. Propensity score matching was used to bring balance between groups on which the analysis was performed.

A non-experimental research design was the most appropriate strategy for comparing cohort outcomes and impacts as the grant activities focus primarily on improving outcomes for all students that enroll in manufacturing Career and Technical Education programs at East Mississippi Community College (EMCC). Therefore, implementing an experimental design to randomly assign students to a treatment and comparison group is not a viable approach. For this evaluation, an historical cohort of students enrolled in manufacturing Career and Technical Education programs at EMCC was identified to comprise the historical comparison group. The grant participant comparison cohort was comprised of students enrolling as first-time students at

EMCC in comparable programs improved through grant initiatives. This design will included an examination of the outcomes of a second set of two control groups as a comparison to more fully control for threats to internal validity. The magnitude of the difference in outcomes was compared to determine if differences observed between the grant participant group and comparison cohort were due to other extraneous factors related to the periods of observation. In doing so, a pre-test, post-test control group design was set up with all of the analytical benefits of an experimental design that utilized true randomization. The goal was to improve the robustness and power of the analysis, controlling for factors that might influence the outcomes of our participant group.

Propensity score matching was used to bring balance between the groups on which the analysis is to be performed. Since the control group and the treatment group are not randomly assigned, there are covariates that exist between the groups. Due to these existing covariates, there could be bias in the analysis of outcomes. Propensity score matching was used to reduce the bias in observed covariates between the treatment and comparison groups.

Implementation of propensity score matching involves using logistic regression to get the propensity score. The independent variables that were taken into consideration were race, gender, age, pell eligible and veteran status. Using the 2:1 matching ratio, students in the comparison group and treatment group are paired (one observation from treatment group is matched to two observations in the comparison group using the nearest neighbor method. Literature suggests the maximum allowable absolute difference should be set as 0.2 of the standard deviation of the logit of the propensity score. Using this parameter, the maximum allowable absolute difference is equal to 0.1390. This resulted in 373 students in the comparison group matched with 548 students in the control group.

Outcomes/Impact Analysis Research Questions:

The outcomes were analyzed in two ways: a survey of the target audience and a comparison for those programs for which cohorts can be compared. Questions 1-10 compared the results to the goals, while questions 11-20 compared cohorts.

1. How many unique participants did the grant serve?
2. How many participants completed a grant funded program of study?
3. How many participants did not complete but were retained in their program of study or another TAACCCT grant-funded program of study?
4. How many participants completed credit hours?
5. How many participants earned credit hours?
6. How many participants enrolled in further education?
7. How many non-incumbent completers were employed in the first quarter after program completion?
8. How many non-incumbent completers employed in the first quarter after program completion were retained in employment two and three quarters later?
9. How many participants employed at enrollment received wage increases post-enrollment?
10. How many new programs were created?
11. What was the student retention rate after the first semester for both cohorts (overall, by program, and by subgroup, e.g. TAA-eligible participants)? After the third semester?
12. What was the program completion rate after the first year for both cohorts (overall, by

program, and by subgroup)? After the second year?
13. What was the employment rate for completers after the first year for both cohorts (overall, by program, and by subgroup)? After the second year?
14. What were the job retention rates one year after employment for both cohorts (overall, by program, and by subgroup)? Two years after?
15. What were the average wages at the time of enrollment and one quarter after program completion for both cohorts (overall, by program, and by subgroup)?
16. What were the average wages one year after completion for both cohorts (overall, by program, and by subgroup)?
17. What was the rate of participation in further education after the first year for both cohorts (overall, by program, and by subgroup)? After the second year?
18. What were the completion rates for students who participated in work-based learning or paid internships and for those who did not participate for both cohorts (overall, by program, and by subgroup)?
19. What were the wages one year after completion for participants in work-based learning or paid internships for both cohorts (overall, by program, and by subgroup)?
20. What was the rate of students receiving credit for non-credit training or PLA for both cohorts?

Logistic Regression Model Differences to be Determined:

1. Program retention
2. Completion of programs of study
3. Enrollment in further education
4. Employment
5. Job retention
6. Average wages between the program and control groups while controlling for other factors (e.g., individual demographics, veteran status, degree path, prior employment status, etc.)

Findings

Intervention Findings:

EMCC's TAACCCT project proposed four interventions: 1) Build Programs that Meet Industry Needs, 2) Enhance Career Pathway Options for Learners and Workers, 3) Accelerate and Improve Certification and Employment Attainment, and 4) Strengthen Online and Technology-Enabled Learning.

The evidence used to justify these interventions cited the following findings for interventions #1 through #3: 1) strong industry participation results in clear pathways and programs through which more students and/or graduates are better prepared for work and find higher-wage jobs with benefits; 2) a significant majority of participants felt their future jobs, employment, or career prospects were better because of their experiences with sector training programs; 3) NAM-endorsed Skills Certification System has yielded promising results. Findings for intervention #4 were: 1) students in online conditions performed modestly better, on average, than those learning the same material through traditional face-to-face instruction; and 2) well-

structured online courses taught by instructors who are adept at online formats are as effective as face-to-face instruction in terms of student test scores, assignment quality, participation, grades, and perception of course effectiveness.

As shown in the table below, the average wages earned by participant completers in the current cohort were approximately 36% higher than those in the historical cohort overall. All individual programs showed an increase in wages earned except Electronics which was a program closed during the grant period with strong industry input. Each grant program participant has the opportunity to earn NAM-endorsed credentials (AWS, ASE, and NCCER) than the historical cohort participants as all of these credentials were not offered previously.

Did our results show more students better prepared for work and did they find higher-wage jobs with benefits?		Historical Cohort 10/01/2009 - 9/30/2012		Current Cohort 10/01/2013 - 09/30/2016	
		Average Wage Before Enrollment	Average Wage After Completion	Average Wage Before Enrollment	Average Wage After Completion
Overall		$13,468	$23,335	$16,259	$31,880
CIP	Name				
150303	Electronics	$16,119	$36,069	$16,220	$27,990
150613	Automation & Control	$17,590	$20,846	$17,853	$33,603
151301	Drafting & Design	$14,019	$21,024	$15,748	$30,891
460302	Electrical	$15,072	$27,056	$17,766	$39,847
470604	Automotive	$10,218	$13,947	$14,295	$27,238
480508	Welding	$8,073	$21,052	$15,672	$31,709

- **Did our results show a significant majority of participants felt their future jobs, employment, or career prospects were better because of their experiences with sector training programs?**
  Two years after completing training, we conducted telephone surveys of 395 credit program completers to get their impression of their career prospects and experiences in EMCC's Manufacturing Technology and Engineering Division programs. The vast majority, 368 of 395 or 95% of those surveyed positively expressed that their experiences have made them more marketable and the skills obtained during their training has allowed them to successfully obtain employment. Here is a sample answers received from students:

  My employment and/or career prospects are better because of my experiences in EMCC's Manufacturing Technology and Engineering Division programs:
  Yes, I was able to find a job within three weeks of graduation working with a local company in my degree field of Automation and Control. So many of my friends have been to college but do not work in their field of study. I am very fortunate to have had the training, assistance from the navigators to stay in school, critique my resume, have a mock interview and individualized assistance to better prepare me for my interview process.

  From a participant in the non-credit advanced skills training program:

Even though I did not receive a job offer after my first two interviews, I believe the training I received was beneficial and well worth the time. Learning how to properly construct a resume and learn how to prepare for an interview gave me the much needed confidence I lacked. I now know I am marketable and the right job and better life for my family is on the horizon.

My program prepared me to work in industry? *Yes, I knew I wanted to be a welder since high school and graduating from EMCC's welding program allowed me the opportunity to fulfill this dream. After I finished school, I got a job working on the pipeline in part due to the credentials I earned while at EMCC. Passing my first weld test on a job site was a satisfying experience for this twenty-year old county boy*.

My program prepared me for other educational opportunities? *Yes, after completing the Electrical Technology program, I was offered a part-time position at the local steel company so I could further my education at Mississippi State University. My goal is to be an engineer and with the constant encouragement and guidance of the navigators, I was able to take additional academic classes needed to transfer into the Industrial Technology program. Once I have completed my bachelor's degree, I am to be hired full-time as an engineer at my current company.*

- **Did our results show promising results from using NAM-endorsed credentials?**
  Yes; in combination, the Career Readiness Certificate (CRC) and NAM-endorsed credentials are recognized and accepted by several local industries in our area. While most business and industry have been slow to desire all the credentials offered, the local automotive industry appreciates the quality of students who complete our program because of the nine ASE certifications student can achieve prior to graduating and these signify to an employer that the student is proficient in the automotive repair and service industry. Yokohama Tire Manufacturing Mississippi, PACCAR Engine Company, Flexsteel, Weavex and Weyerhaeuser give preference to all employees who earn a silver level Career Readiness Certificate and complete the regionally recognized Manufacturing Skills Basic course. These companies value these credentials and have had great success in hiring qualified employees that fit into the company culture.

- **Did our results show students in online conditions performed better than those learning the same material face-to-face?**
  CareerReady 101, the comprehensive program with an integrated approach to exploring careers and their skill requirements, as well as building workplace and life skills was used throughout the grant period for all participates to prepare for the WorkKeys assessment in order to obtain the Career Readiness Certificate (CRC). Our Manufacturing Discovery students used CareerReady 101 extensively for its powerful way to offer remediation assistance and career success. The included Soft Skills Curriculum went a step further in addressing life and employability skills such as establishing career goals, learning financial awareness, knowing how to search for jobs, exploring interest inventories, searching job profiles and creating a resume. One of the greatest benefits of the online delivery of CareerReady 101 was it allowed the MTE Navigators to track each student's progress and completion of their assigned modules. There was no comparable material taught face-to-face

to allow for an assessment of student performance in online conditions compared to face-to-face instruction.

- **Did our results show courses taught by instructors online were as effective as face-to-face instruction in terms of student test scores, assignment quality, participation, grades and perception of effectiveness?**
  The goal of using more online hybrid instruction in credit classes was not achieved. Five hybrid courses were developed; however, instructors preferred face-to-face classroom interaction with students and were reluctant to adopt implementation. Technology used along with classroom instruction included CareerReady 101, Amatrol and Canvas, the open-source LMS of East Mississippi Community College.

Project Evaluation Findings:

- **Was the project on target in accomplishing the goals of the project**?
  As evidenced by documents and data reviewed and interviews conducted, the project accomplished the goals of this project on target.

- **Were strategies implemented as planned**?
  Strategies were implemented as planned, and all actions completed. Tasks/milestones were largely on target (Appendix D).
  - Strategy 1: Build programs that meet industry needs.
    Programs were been developed in response to industry needs.
    - New 30-hour certificate and 60-hour certificate/AAS degree programs tied to NAM- endorsed certificates for electro-mechanical craft technicians, Mechatronics technicians, and welder/fabricator technicians were implemented.
    - Instructors were trained, and professional development opportunities made available.
    - A new 15-semester hour CTE program tied to NAM-endorsed certificates was developed to provide concurrent basic skills education and Modern Manufacturing Basic Skills training.
    - Equipment was been purchased and installed.
    - Customized training occurred for Yokohama to include incumbent supervisory and technician personnel and non-incumbent technicians.
  - Strategy 2: Enhance career pathways options for learners and workers.
    Steps were put in place to enhance career pathway options for learners and workers.
    - The CTE and non-credit manufacturing programs were merged into one sector focused Modern Manufacturing Technology and Engineering (MMTE) administrative division.
    - Existing CTE programs were upgraded and credentials embedded into programs.
    - Steps were taken to establish articulation agreements.
    - Opportunities for work-based and paid internships are being developed, and students are being placed with local industries.
  - Strategy 3: Accelerate and improve certification and employment attainment.

        - All nine manufacturing CTE programs integrated blueprint reading, measurement, safety and lean manufacturing training from the non-credit Modern Manufacturing Skills Certificate Program into their programs resulting in contexualization.
        - Professional development has been offered through Friday sessions and a summer academy.
        - CTE program admission is based on a Silver Level CRC credential, raising standards for admission.
        - A second navigator was hired. The role of the navigator has been to provide intrusive student services to include tutorial supports, retention counseling, and LMI-based career choices.
    - Strategy 4: Strengthen online and technology-enable learning
        - Professional development was provided to enable instructors to utilize new and existing advance online and technology-enabled systems.

- **Are there obstacles that have arisen during the deployment of strategies**?
  The Mississippi Community College Board (MCCB) would not approve the mechatronics program as a stand-alone program. The Board required the program to be an add-on to the electromechanical program. Therefore, participants could not enter mechatronics without completing the two-year electromechanical program. This delayed the start of mechatronics. The Board also restrained implementation of credential-based exit assessment because of a requirement that all colleges have to adopt the same process.

- **Are the expected outcomes being produced**?
    - The unique number of participants served/enrolled was greater than the targeted number. With a target of 901, 2087 participants have been served.
    - The number who has completed a grant-funded program of study is above the targeted number with an actual number of 1572 compared to a target of 719.
    - The total number of students completing credit hours is higher the target. Seven hundred nine students have completed credit hours. The target was 559.
    - The total number of earned degrees/certificates is 1645, more than double the target of 719.
    - The total number enrolled in further education after program of study exceeded the target - 356 compared to a target of 220.
    - The total number employed after program of study of completion also exceeded the targeted number- 764 compared to a target of 645.

  Outcomes that did not exceed the target were as follows:
    - The total number retained in their program of study or other grant-funded program is slightly lower than the targeted number - 178 to the target of 209.
    - The total number retained in employment after program of study falls less than one hundred below the target – 487 as compared to the target to 581 (data is incomplete due to lagging UI data).
    - Only 167 of those employed at enrollment received a wage increase post-enrollment as compared to the target of 256 (data is incomplete due to lagging UI data).

- **Are there unintended consequences?**
  The success of the grant program has had a number of impacts both on EMCC and statewide as well as on industry.
  1. It was expected that with increased standards for admittance there would be a drop in enrollment. Instead there was an increase in enrollment. This continues to be true. Enrollment prior to increased standards was 145. At the end of grant period the enrollment was 738 credit students. The success of the program has put pressure on both facilities and personnel.
  2. The State of Mississippi has begun to build exit credentials into programs statewide.
  3. Welding programs statewide are being updated to match EMCC's program.
  4. Mississippi Development Authority (MDA) adopted Yokohama's pre-hire program for new modern manufacturers coming to Mississippi.
  5. EMCC has received a Gates grant to expand the Navigator program college-wide.
  6. Feedback from industry resulted in EMCC revamping the machining program and the hiring of more qualified instructors.
  7. PACCAR has implemented a "Grow Your Own Program" for incumbent workers modeled after Yokohama's Customized Training.
  8. The EMCC grant served as the model for East Central Community College's TAACCCT 4 grant.
  9. EMCC is building a $50 million Communiversity. The nearly 140,000-square-foot facility would accommodate EMCC Manufacturing Technology & Engineering Division credit and non-credit courses related to training workers for careers in advanced manufacturing. It is intended to enhance a growing manufacturing sector in East Mississippi by supporting workforce development for industries like Yokohama Tire, PACCAR, and Airbus Helicopter that already call the Golden Triangle home while also serving to lure more jobs to the region. The facility will expand EMMC workforce training capabilities to offer state and national credentials in important manufacturing and engineering sectors, including electromechanical, mechatronics, automation and controls, and precision machining technologies. The facility will also host dual enrollment programs for high school students interested in transitioning directly into the workforce or pursuing applied technology degrees at universities.

Structured interviews with students, faculty, and project management:

Student Interviews:

The third party evaluator interviewed nine students, four of whom were first year students, four were second year, and one was in a special group. There were eight males and one female. Six students were white and three were black. They represented programs of study in electromechanical, welding and fabrication, automation controls, electronics technology, and automotive. The student in automotive was in a program customized for Golden Triangle Mill (GTM) Service. He was a graduate of electronics with an AAS degree. He was a full-time employee of GTM with all of his schooling being paid for by the company. A summary of student responses is given below.

What is your background?

Backgrounds included four students with military backgrounds, and a two-year academic student.

Why did you choose the program?

- Reputation of the program and/or instructors
- Hands-on experience
- Low cost tuition
- Best welding program
- Industry experience of instructors
- Programs are used by industry to train their workers
- Good paying jobs upon graduation

What credentials are you receiving and of what value are they to you?

Students had a better sense of the credentials they are receiving than they did during year one. The instructors are emphasizing the importance of credentials and the benefits students will receive from having nationally recognized credentials.

How have your instructors embedded credentials in your course of study?

Instructors are making students aware of the credentials they are receiving and their importance. Students feel instructors are very aware of the needs of industry and are making coursework hands-on, relevant and industry-centered. Some programs are displaying posters showing credentials and their importance.

What is difference between the first year of study and the second?

The second year provides more in-depth, hands-on experience, building on what is learned in the first year.

Would you be interested in an internship?

Internships are important and provide hands-on experience in the field. They are needed for second year students but there may need to be a closer look at how they are scheduled in the framework of classes.

What are your plans for the future?

Futures plans ranged from going to work immediately upon completion of program to further study. Some of the students were working part-time and planned to continue with companies who employed them. Some students planned to pursue further education in underwater welding or welding engineering with the ultimate goal of working in the oil fields.

Student Telephone Survey Results**:**

A telephone survey was conducted of 395 credit program completers two years after completing training. The purpose of the survey was to get their impression of career prospects and their experience in EMCC's Manufacturing and Technology and Engineering Division programs. The vast majority, 368 of 395 or 93%, expressed that their experiences have made them more marketable, and that the skills obtained during training has allowed them to successfully obtain employment. Below are some of the students' responses:

- Are your employment and/or career prospects better because of your experiences in EMCC's Manufacturing Technology and Engineering Division Programs?
  Yes, I was able to find a job within three weeks of graduation working with a local company in my degree field of Automation and Control. So many of my friends have been to college but do not work in their field of study. I am very fortunate to have had the training, assistance from the navigators to stay in school, critique my resume, have a mock interview and individualized assistance to better prepare me for my interview process.

  From a participant in the non-credit advanced skills training program: *Even though I did not receive a job offer after my first two interviews, I believe the training I received was beneficial and well worth the time. Learning how to properly construct a resume and learn how to prepare for an interview gave me the much-needed confidence I lacked. I now know I am marketable and the right job and better life for my family is on the horizon.*

- Did your program prepare you to work in industry?
  Yes. I knew I wanted to be a welder since high school and graduating from EMCC's welding program allowed me the opportunity to fulfill this dream. After I finished school I got a job working on the pipeline in part due to the credentials I earned while at EMCC. Passing my first weld test on a job site was a satisfying experience for this twenty-year old county boy.

- Did your program prepare you for other educational opportunities?
  Yes. After completing the Electrical Technology program, I was offered a part-time position at the local steel company so I could further my education at Mississippi State University. My goal is to be an engineer and with the constant encouragement and guidance of the navigators, I was able to take additional academic classes need to transfer into the Industrial Technology program. Once I have completed my bachelor's degree, I am to be hired full-time as an engineer at my current company.

Faculty Interviews:

Five faculty members were interviewed. They represented welding, automotive technology, mechatronics, and electromechanical. Questions centered around their background and philosophy of educating/ preparing their students, the merger of the college's manufacturing related Career and Technical Education and Engineering Division with the college's credential-based, technology-enabled short-term training programs, and challenges/suggestions for improvement. All five of the instructors have industry experience, a quality recognized and valued as positive by their students. They stressed the need to stay updated in their field to better meet the needs of both their students and the industries that will employ them.

The merger of programs has been positive. The programs are more seamless and recognize what industry needs and wants. Seventy-five percent of each program is a curriculum

with 25% at the discretion of the instructor. The instructors felt they have more freedom to respond to industry needs; they are empowered to respond quickly, reducing their response time. They felt that merger of programs has provided them with the opportunity to work more closely together, allowing them to integrate programs, share and pool resources, and share ideas. One example of an integrated program is one developed between drafting and welding involving design and then fabrication. Students have the opportunity to work together to build a product from a design.

One of the Electro-Mechanical instructors spoke to the impact of higher entrance requirement. He said the electromechanical students have higher grades, more motivation and want to know how the material relates to the real world.

Internships are a positive in some areas. However, a problem is that students are lost to employment between first and second years. In at least one case the opportunity to work and continue their education was not offered as promised. In automotive, nearly 100% of the students participated. This was a large number to manage. Another issue was the pay schedule with the institution. Students were paid once a month causing an issue with students who needed funds for gas, food, etc. They suggested that the pay schedule be changed and that background checks could be completed ahead of time. These are institutional issues that will require systemic change.

The instructors feel that students must maintain certain academic standards to be allowed to work. There must be some agreement in place with industry that will require students to complete a program of study rather than dropping out to work. A challenge in developing internships in welding is that industry needs full-time welders and is not as open to welding internships.

The mind-set these outstanding instructors promoted is that they must strive to get better. In the words of one instructor, “Programs are like a business. They are either growing or dying. Our goal is for our students to be better than their instructors.”

The instructors recognize the importance of credentials for their students. They are credentialed and are promoting credentialing for their students with new posters promoting credentials. All welding students are members of the American Welding Society. All four welding instructors are Certified Welding Educators, two are Certified Welding Inspectors, and one is a Certified Associate Welding Inspector. The automotive instructor has all automotive certificates.

All NCCER credentials are registered with the National Center for Construction and Educational Research. NCCER is a national registry where any employer can verify credentials of a prospective employee.

The instructors all praised the Navigators and their commitment to students. They felt the best part of the program was hiring Navigators, and that they were a key to the success of the program.

The interest and concern of instructors for their students were evident in student interviews. A new instructor stated that one of the positive things about EMCC is the passion of the instructors and that they are all about students.

<u>Meetings with Management Team</u>:

The evaluator met with the management team a number of times during the year. During the meetings, progress of the project was discussed in terms of implementation, data collection, outcomes and challenges. A chart with tasks and dates completed was provided to the evaluator.

The team was extremely competent and dedicated to the success of the project and was substantially on target to complete tasks by the targeted date. Data were provided in a timely manner and in the form required for analysis.

Site Visits

The evaluator visited both classes and industry sites. Industries included Steel Dynamics, PACCCAR and Yokohama. She observed production and noted skills required by employers.

Quarterly reports and other documents provided by project management:

Quarterly reports were reviewed, and it was determined the project was on target with implementation of strategies.

Number and timeliness of statement of work tasks accomplished:

Four strategies were employed to improve and better articulate career pathways into high skill, high wage modern manufacturing jobs for TAA eligible workers, Veterans, and other adults. Each strategy had a series of action items. All strategy actions were completed. A chart outlining each task and a target completion date was provided (See Appendix C) and reviewed.

External reviews and timeliness of deliverables:

Deliverables 1-4, 6-18, 20-23 and 25 were completed. Deliverable 5 was completed with the submission of the final report. Deliverable 24 was folded into deliverable 25. (See Appendix D).

Statement of work modifications:

Statements of work modifications have been reviewed. All modifications have been approved.

Feedback from the FPO and the DOL national office:

The evaluator met with Ms. Connie Taylor, Program Officer, during her visit to EMMC during the week of August 17, 2015 and attended her exit interview with EMCC on August 21, 2015. The feedback she provided was totally positive and included comments on design and setup of project, relationship with employers, grant management and procurement, and delivery of services. She stated that EMCC is a change agent for the community and a model that can be replicated.

Interviews with members of the MMSAC, project staff, program instructors, institutional management, and the FPO:

The evaluator met with all members of this group except the MMSAC. The plan for utilizing the MMSAC was changed to one-on-one meetings rather than quarterly meetings of the entire group.

Implementation Findings:

1. **How was the particular curriculum selected, used, and/or created?**
   To determine the type of curricula and methods to be used, administration and faculty visited Amatrol, Central Piedmont Community College, OC Tech Community College,

Robeson Community College, Wayne Community College, Nash Community College, and Guilford Community College and conferred with industry partners. New courses were created and submitted to the Mississippi Community College Board. Industry experts were used to validate the curricula. Curricula were developed for five new programs. Information about each is provided below.

a. Manufacturing Discovery: This developmental program was designed with industry input to help under-prepared students succeed in enhanced Career and Technical Education programs in the college's Manufacturing Technology and Engineering Division (MTED). Through the TAACCCT EMCC committed to increase entry requirements and upgrade course content to better meet employer demands. The new 15 semester hour Manufacturing Discovery programs provides industry recognized certifications, basic skills education, and an introduction to modern manufacturing. The embedded Modern Manufacturing - Basic skills training program (which includes OSHA-10 hours and CPR credentials) provides a regionally recognized industry credential that will help participants qualify for employment whether they complete an MTED program or not. The one semester program includes individualized, self-paced remediation utilizing technology-based Career Ready 101 with intensive Navigator support along with traditional instruction. Upon completion of the Manufacturing Discovery program students receive CPR and OSHA 10-hours credentials, a silver level or higher Career Readiness Certificate, and the Manufacturing Skills – Basic certificate.

b. Welding and Manufacturing Technician: This program resulted from industry demand for more highly skilled welders to include pipefitting skills. Through this grant, the division was able to hire a highly qualified pipefitting instructor, a former employee of the MMSAC committee member Babcock and Wilcox. Higher level academics and the Manufacturing Skills – Basic program (which includes OSHA-10 hours and CPR credentials) were embedded in the program along with NAM-endorsed credentials – NCCER Welding Level I and II, American Welding Society SENSE Level I and II, and NCCER Pipefitting Level I. As a result of this program, the state re-designed its Welding Technology program to include many of the credentials in EMCC's program. Employers have expressed great support for the new and re-designed programs. The curriculum calls for contextualized instructions as follows: Instructors contextualize safety in WLT classes by relating OSHA safety to the welding workplace. They contextualize measurement by relating pressure/vacuum measurement, electrical measurement, alignment measurement and part measurement to the welding workplace. They contextualize print reading by relating part tolerances, pressure/vacuum tolerances, electrical measurement tolerances, alignment tolerances and use of prints for troubleshooting to the welding workplace. They contextualize lean concepts by relating organization, maintaining of tools, maintaining work place and maintaining materials/supplies/waste products to the welding workplace.

c. Electro-Mechanical Technician: The program was created with input from MMSAC partners. There has been a growing demand for maintenance personnel that are able

to troubleshoot and repair all aspects of facilities and equipment, from electrical to mechanical. Some companies refer to these employees as Craft Technicians while other use the term Maintenance Multi-craft. To ensure that the program would suit all stakeholders' needs the decision was made to name the new program Electro-Mechanical technician. This advanced CTE program combines many high-skilled topics into one comprehensive program. Because of the advanced level of training, the division decided on minimum entry requirements of a silver level CRC and ACT score of 21. The Mississippi Community College Board required that the program be offered as an option to the college's Industrial Maintenance AAS program. Consequently, the electromechanical program was transformed along with the Industrial Maintenance program as a result of a state-wide curriculum revisions. MMSAC members, specifically Yokohama Tire Manufacturing Mississippi and PACCAR Engine Company, were excited about the first class electromechanical which graduated Spring 2016. Many of the current students have already been placed in paid internships with Yokohama. Higher level academics and Manufacturing Skills – Basic (which includes OSHA-10 hours and CPR credentials) were embedded in the program along with NAM-endorsed credentials – NCCER Electrical and Instrumentation Levels I, II and III, and NCCER Mechanical Level III. The curriculum calls for contextualized instruction as follows: Instructors contextualize safety in ELM classes by relating OSHA safety to the maintenance technician workplace. They contextualize measurement by relating National Electric Code installation measurements, electrical measurement, and part placement measurements to the maintenance technician workplace. They contextualize print reading by relating part placement, structure tolerances, electrical measurement tolerances, and use of prints for troubleshooting and installing the maintenance technician systems. They contextualize lean concepts by relating organization, maintaining of tools, maintaining work place and maintaining materials/supplies/waste products to the maintenance workplace.

d. Mechatronics Technician: Mechatronics combines robotics and troubleshooting techniques. After industry feedback on the curriculum design, the Mississippi Community College Board declined to approve a 90-hour AAS degree. The pushback resulted in compromise, a 30-hour Advanced Technical certificate on top of an Electro-Mechanical Technician AAS degree. The first graduating class of students will be fall of 2017. In addition to the credentials embedded in the Electro-Mechanical Technician program, students completing the program receive a FANUC Certified Education Robot Training credential. The curriculum provides for contextualized instruction as follows: Instructors contextualize safety by relating OSHA safety to automated equipment. They contextualize measurement by relating length, volume, flow, temperature, speed, pressure and electrical measurements used in automated industrial environments. They contextualize print reading by relating electrical schematics, fluid power schematics, part/power flow diagrams and ladder logic programming used in automated industrial environments. They contextualize lean concepts by relating organization, maintaining of tools, maintaining work place, maintaining materials/supplies/waste products, and refining programs to improve reduce Takt time, the maximum time required to produce a product to customer's

demand, to the automated industrial workplace.

e. Customized Training: The customized training program developed for Yokohama Tire Manufacturing Mississippi (YTTM) was designed to meet the manufacturer's needs. It includes five customized training pathways:
   i. Incumbent Management and Staff Training Plan
   ii. Incumbent Technician Training Plan
   iii. Non-Incumbent Technician Training Plan
   iv. Incumbent Production Worker Training Plan
   v. Non-Incumbent Yokohama Production Worker Training Plan

   All candidates interested in working at YTMM must complete the non-incumbent technician training prior to applying with the company. This includes obtaining a silver level or higher Career Readiness Certificate and completing the Manufacturing Skills Basic course. The incumbent workers training pathways are customized to fit individual employee needs as prescribed by Yokohama management.

2. How programs and program designs were improved or expanded using grant funds? What delivery methods were offered? What was the program administrative structure? What support services and other services were offered?

Six programs were improved and expanded using grant funds; one program was suspended. Changes, along with the administrative structure and support services offered for each program, are described below.

Entry requirements in all the programs were increased to require a silver level or higher CRC.

MTED Navigators provide support for all students. The Navigators assess each potential student using the Workkeys and Accuplacer assessments. Students that do not make the cut score for their CTE program of choice are enrolled in the Manufacturing Discovery program. During the semester, student progress was closely monitored by the Navigators. Ongoing counseling is also provided. Navigators also help students obtain work-based learning experience and find employment upon completion.

All MTED instructors participated in professional development to learn how to add contextualized training to their programs and better utilize technology.

The administrative structure governing these programs was changed as part of the grant. New programs and all manufacturing non-credit programs were placed in a new Manufacturing Technology and Engineering Division under the direction of a vice president. A Modern Manufacturing Sector Advisory Council was created to provide industry input and oversight into manufacturing training programs.

The following programs were impacted:

a. Automation and Control Technology: This program was modularized to include a one-year certificate in addition to the two-year AAS degree. To embed industry-recognized credentials, the Manufacturing Skills Basic program (which includes

OSHA-10 hours and CPR credentials) was added to the curriculum as a required first year course and the Fanuc Robotics credential was embedded in many courses. The program now uses the technology that accompanies the Fanuc robot in addition to Canvas, Amatrol and Allen Bradley PLC software, making the program more relevant for today's industry. Instructors also contextualized safety in ATT classes by relating OSHA safety to the automotive workplace. They contextualized measurement by relating installation measurements, electrical measurement, and part placement measurements to the Automation and Control workplace. They contextualized print reading by relating part placement, structure tolerances, electrical measurement tolerances, and use of prints for troubleshooting and installing the Automation and Control systems. They contextualized lean concepts by relating organization, maintaining of tools, maintaining work place and maintaining materials/supplies/waste products to the Automation and Control workplace. Using the 5S lean process, the instructor sorted through obsolete equipment and removed outdated technology.

b. Automotive Technology: This program was improved by making the NAM-endorsed Automotive Service Excellence (ASE) Certification as its required exit assessment in place of the MS-CPAS2 exam. Due to credit hour limitations imposed by the Mississippi Community College Board, the Manufacturing Skills – Basic class could not be required, but it was added to the curriculum as a suggested elective. The program used automotive specific technology purchased through A-Tech to enhance students' learning and support skills taught in the lab and classroom. The instructors implemented 5S and other Lean and Safety concepts into their labs. They contextualized measurement by relating pressure/vacuum measurement, electrical measurement, alignment measurement and part measurement to the automotive workplace. They contextualized print reading by relating part tolerances, pressure/vacuum tolerances, electrical measurement tolerances, alignment tolerances and use of prints for troubleshooting to the automotive workplace. They contextualized lean concepts by relating organization, maintaining of tools, maintaining work place and maintaining materials/supplies/waste products to the automotive workplace

c. Drafting and Design Technology: Prior to fall 2013, the Drafting and Design Technology program was well-established program as one of the oldest at East Mississippi Community College. After the merger of non-credit and credit training into one Manufacturing Technology and Engineering Division, changes were implemented to support greater use of technology throughout the program. New surveying equipment was purchased with external funding and Immerse 2 Learn, a CNC simulation software, was purchased and used in several advanced courses. Autodesk Certified User Certification was embedded as an industry-recognized credential. Instructors contextualized safety in DDT classes by relating OSHA safety to the drafting workplace. They contextualized measurement by relating pressure/vacuum measurement, electrical measurement, alignment measurement and part measurement to the drafting workplace. They contextualized print reading by relating part tolerances, pressure/vacuum tolerances, electrical measurement

tolerances, alignment tolerances and use of prints for troubleshooting to the drafting workplace. They contextualized lean concepts by relating organization, maintaining of tools, maintaining work place and maintaining materials/supplies/waste products to the drafting workplace.

d. Electrical Technology: Prior to fall 2013, the Electrical Technology program was a well-established program with a one-year residential electricity program and two-year commercial electricity program. After the merger of non-credit and credit training into one Manufacturing Technology and Engineering Division, changes were implemented to support greater focus on commercial electricity throughout the program. A new commercial wiring lab was built with external funding to allow students more hands-on training. New industrial boxes were also purchased and built to offer students real-world simulation. The Manufacturing Skills Basic program (which includes OSHA-10 hours and CPR credentials) was added to the curriculum as a required first year course. NAM-endorsed NCCER Electrical Levels 1 and 2 were embedded in the program and became the approved exit assessments. Instructors contextualized safety in ELT classes by relating OSHA safety to the electrical workplace. They contextualized measurement by relating National Electric Code installation measurements, electrical measurement, and part placement measurements to the electrical workplace. They contextualized print reading by relating part placement, structure tolerances, electrical measurement tolerances, and use of prints for troubleshooting and installing the electrical systems. They contextualized lean concepts by relating organization, maintaining of tools, maintaining work place and maintaining materials/supplies/waste products to the electrical workplace

e. Electronics Technology: Prior to fall 2013, the Electronics Technology program had experienced few innovations since its inception in the late 80s. The program struggled to provide graduates qualified for jobs offered by the area's modern manufacturers. After the merger of non-credit and credit training into one Manufacturing Technology and Engineering Division, changes were implemented based on industry input. As a result in 2015, entry into the Electronics Program was suspended. Students interested in related careers are now encouraged to enroll in the Automation and Control program.

f. Welding Technology: Prior to fall 2013, the Welding Technology program was a well-established program as one of the only two-year AAS degree programs in Mississippi. After the merger of non-credit and credit training into one Manufacturing Technology and Engineering Division, changes were implemented to support greater focus on advanced skills such as pipefitting. A pipefitting lab was built with external funding to allow students more hands-on training. A new CNC plasma cutter was purchased for use by students. The Manufacturing Skills Basic program (which includes OSHA-10 hours and CPR credentials) was added to the curriculum as a required first year course. NAM-endorsed NCCER Core and Welding Levels 1 and 2, NCCER Pipefitting Levels 1 and 2, and AWS SENSE Levels 1 and 2 were embedded in the curriculum. Instructors contextualized safety in WLT classes by relating OSHA safety to the welding workplace. They contextualized

measurement by relating pressure/vacuum measurement, electrical measurement, alignment measurement and part measurement to the welding workplace. They contextualized print reading by relating part tolerances, pressure/vacuum tolerances, electrical measurement tolerances, alignment tolerances and use of prints for troubleshooting to the welding workplace. They contextualized lean concepts by relating organization, maintaining of tools, maintaining work place and maintaining materials/supplies/waste products to the welding workplace.

g. Machining Technology: Prior to fall 2013, the Precision Machining Technology program was struggling to enroll quality students and produce quality graduates. The program was one of the major driving forces behind the merger of CTE and Workforce programs. After the merger of non-credit and credit training into one Manufacturing Technology and Engineering Division, changes were implemented to support greater focus on building a reputable machining program. The instructor was sent to multiple professional development opportunities to sharpen his CNC skills. New equipment was purchased and obsolete items removed. Using grant funds, the Immerse 2 Learn software was purchased so that students could have additional resources to master CNC skills. NAM-endorsed NIMS certifications have been embedded in the program: NIMS bench work and drill press credential; NIMS mill and lathe between centers credential; NIMS layout credential; NIMS chucking credential; NIMS surface grinder credential; NIMS CNC lathe and CNC mill credential. Instructors contextualized safety in MST classes by relating OSHA safety to the machining workplace. They contextualized measurement in MST classes by relating pressure/vacuum measurement, electrical measurement, alignment measurement and part measurement to the machining workplace. They contextualized print reading in MST classes by relating part tolerances, pressure/vacuum tolerances, electrical measurement tolerances, alignment tolerances and use of prints for troubleshooting to the machining workplace. They contextualized lean concepts in MST classes by relating organization, maintaining of tools, maintaining work place and maintaining materials/supplies/waste products to the machining workplace. Enrollment for fall 2015 was suspended in order to upgrade the program from two (2) one-year vocational certificates to a two-year associate of applied science degree. EMCC received approval to offer a two-year associate of applied science degree in Precision Machining Technology in Fall 2016.

3. **Was an in-depth assessment of participants' abilities, skills, and interests conducted to select participants into the grant program? What assessment tools and processes were used? Who conducted the assessment? How were the assessment results used? Were the assessment results useful in determining the appropriate program and course sequence for participants? Was career guidance provided, and if so, through what methods?**

East Mississippi Community College did not use a special assessment process to select students for the grant program. The Manufacturing Technology and Engineering Division established an assessment process to be used in all its programs, even those not part of the grant. Every student is required to achieve a Silver Level or higher score on the Workkeys Career Readiness Assessment. They must also achieve a required level on the

ACT assessment or, if they have not taken the ACT, the Accuplacer exam. In addition to these assessments, the Automotive Technology program requires its applicants to pass a Bennett Mechanical Aptitude Test with 55% or better success prior to enrollment. CareerReady 101 is used as an online guide to preparing for the Workkeys Career Readiness Assessment. Each of these assessments is conducted by MTED Navigators or other MTED staff. If students are unsuccessful in obtaining the required scores for their desired program, they may enter the Manufacturing Discovery developmental program. For these students, an individual pathway is developed that allows them to earn college credit while participating in remediation exercises that will assist in meeting program entry. Each program of study in the Manufacturing Technology and Engineering Division has a defined course sequence allowing students to earn credentials and degrees in pathways of 30 hour or 60 hour depending on their personal career goals.

MTED Navigators use career interest surveys to determine students' interest prior to enrollment into a program. Tours are conducted by Navigators to parents and students who are interested in viewing the labs and speaking with instructors. One-on-one advising sessions with students both prior to and after assessments allow the Navigators to help students select programs that best fit their readiness and career goals. Career guidance for each program offered in the division is provided by the MTED Navigators using Labor Market Information

4. **What contributions did each of the partners (employers, workforce system, other training providers and educators, philanthropic organizations, and others as applicable) make in terms of: 1) program design, 2) curriculum development, 3) recruitment, 4) training, 5) placement, 6) program management, 7) leveraging of resources, and 8) commitment to program sustainability? What factors contributed to partners' involvement or lack of involvement in the program? Which contributions from partners were most critical to the success of the grant program? Which contributions from partners had less of an impact?**
    a. Yokohama
        i. YTMM was very instrumental in program design. The company guided MTED administration to make decisions on program additions and closures.
        ii. The company participated in curriculum development and suggested equipment to be used and classes to include in the technician program curricula.
        iii. The company requires the Manufacturing Skills Basic course as part of the hiring process. This requirement has generated new students for the division seeking employment with YTMM. The internship program has also generated interest in the Electro-Mechanical related programs. An internship through the college is the only possibility of a maintenance career with the company without many years of relevant experience.
        iv. The customized training pathway developed for YTMM has been used and has proven successful in identifying successful employees.
        v. YTMM has hired more of our credit students than any other company. The company also fully relies on EMCC's non-credit training for production level employees.

vi. The company meets regularly with MTED administration to provide continual input on students, instructors and programs.
vii. The company has donated $250,000 to be used for scholarships, summer camps, renovation and instructors.
viii. YTMM has supported their goal of program sustainability not only through the endowment mentioned above but also by continuing EMCC's paid internship program. The company now pays students, using criteria established by the division, to intern with the Maintenance department.

b. PACCAR
   i. The company has been very instrumental in program design of Electro-mechanical related programs and the machining program. The company guided MTED administration to make decisions on program additions and closures.
   ii. PACCAR has participated in state-wide curriculum revisions and has given insight into what information is needed for today's modern manufacturing careers.
   iii. The company relies on EMCC for new hires. All jobs posted within the Columbus plant give preference to those that have taken the Manufacturing Skills Basic course.
   iv. PACCAR has developed customized training pathways for both machining and craft technicians. The training proven successful in identifying successful employees.
   v. PACCAR does not currently allow interns but does rely on EMCC training for new hires and other incumbent workers. The company gives preference to graduates of the Manufacturing Skills Basic course.
   vi. The company has donated many pieces of equipment that are currently being used in our machining lab, automotive/diesel lab and truck driving program. PACCAR has been a huge supporter of training through donations of equipment and supplies.
   vii. PACCAR has committed to help MTED sustain programs and improve. PACCAR staff has served on hiring committees for new machining instructors and have allowed EMCC staff to train at their facilities on PACCAR equipment.

c. Welding partners (Ellis Steel, Babcock and Wilcox, Monroe Tufline, Thompson Welding)

   The companies have been instrumental in the design of Welding programs. The companies guided MTED administration to make decisions on program additions and internships. Monroe Tufline employed interns from the program. Unfortunately, Babcock and Wilcox closed the West Point facility during the grant period. The company qualified for TAA benefits, and dislocated workers are returning the school to upgrade skills.

d. Mississippi Partnership Workforce Investment Board

   The Mississippi Partnership has helped influence the success of the grant through the Make It in America grant. This grant allowed MTED Navigators to offer paid internship opportunities to students in grant programs, many of the

internships leading to full-time employment for those students. The Mississippi Partnership has committed to assist EMCC in sustaining the internship program through other funding sources.

e. Mississippi Department of Employment Security
   i. MDES has assisted the MTED in program recruitment and job placement. MDES offers referrals to college programs based on customer's career goals.
   ii. MDES assists TAA recipients in returning to EMCC for training and works very closely with the MTED Navigators to ensure a seamless transition into college.

f. Toyota Manufacturing Mississippi
   i. The company supported the project through a grant that offered scholarships to students interested in a career in modern manufacturing.
   ii. The grant also allowed MTED to purchase equipment and supplies needed to upgrade instructional training items.

g. Appalachian Regional Commission

   ARC has been very generous and supportive of the college's efforts in merging the MTED. Through two separate grants ARC has allowed EMCC to upgrade training equipment and technology infrastructure to make way for greater use of technology and customized online training.

h. AT&T

   The MTED was the recipient of a min-grant from AT&T to purchase modern manufacturing equipment to be used with the Electro-Mechanical training programs as well and the customized YTMM training.

5. What is the effectiveness of the Modern Manufacturing Sector Advisory Council? Of the new Modern Manufacturing Technology and Engineering Division?

a. MMSAC: MTED leadership has met one-on-one with industry partners through the grant to seek input of curriculum and to update on the progress made during the grant period instead of monthly meetings due to scheduling conflicts by industry leaders and EMCC. Instead, major input has come from MMSAC members on new and existing programs, the suspension of the Electronics program, the design of the Manufacturing Technology and Engineering Division, and the creation of the new technician and Manufacturing Discovery programs.

b. MTED: During the grant period the MTED has been successful in embedding credentials into all programs; contextualizing instruction in all programs; embedding Manufacturing Skills Basic in all programs except Drafting and Design and Automotive where state limited credit hours only allowed the class to be a suggested elective; requiring higher entry standards into all programs; increasing use of technology; providing consistent professional development; and hiring Navigators that provide students intrusive support services. Recruitment efforts by the navigators increased program enrollment for the division.

6. **Are the revised and new programs meeting the demands of industry? Are students exiting programs with the skills industry needs?**
   Input from industry shows that the programs are meeting their needs. Year three data show that 83.38% of students obtained employment upon program completion. This number increased from 40% of students employed at the end of year two and 25% in year one. The paid internship program has proved very beneficial for both industry and students. In the internship process students are recommended by instructors and are interview by industry. Of the 120 total interns, 96 were enrolled in a grant funded program. Of the grant funded participants, 50 were offered full-time positions. With 1,349 participants enrolled in the non-credit advanced skills training program, it is evident the needs of area businesses and industries are being met.

7. **Is LMI data informing students and the college as intended?**
   LMI is being used to provide counseling to students on available and future employment opportunities and to ensure programs are on target to provide a workforce to local industry.

   This labor market information has been used in marketing materials to advise students on programs providing training for high demand and high paying industries. LMI information has been provided to all students. Navigators serve as the primary provider of current labor market information to both credit and non-credit participants as part of their coaching duties. This labor market information has also been shared with the local WIN Job Centers, the Mississippi Partnership, and college recruiters, counselors and administrators.

8. **Is the new Manufacturing Discovery program providing a good pathway to further education?**
   The program offers a good pathway into a certificate or degree program for those who are successful. The Manufacturing Discovery program aims at increasing basic skills for those who lack the required assessment score while also providing courses required for most of the MTED programs. A total of 177 participants have been offered this pathway over five semesters. During the four completed semesters to date, 115 students were enrolled with 57.63% completing with the necessary CRC and ACT scores to enroll in other MTED programs. Of the 102 students that completed the program, 41 enrolled in CTE programs, 32 of which completed, while 18 found jobs. Preliminary data shows that students that complete and enroll in a CTE program succeed at the same rate as those entering the CTE program directly (41%). While completion rates do not reflect the outcomes that the program hoped to achieve, the Manufacturing Discovery program is still a necessary part of the Manufacturing Technology and Engineering Division. The program serves as an exit point for students choosing to leave college and enter the workforce. The program also allows the division to maintain higher entry requirements for CTE programs to deliver high quality graduates to industry. The program has made a positive difference within the college and will be sustained after the Golden Triangle Modern Manufacturing Project grant ends. While non-completers of the Manufacturing Discovery program seem to obtain employment, only 1% stated they are employed in the manufacturing industry.

9. **Do industries value the credentials provided by the revised and new programs?**
   Industries value the skills validated by credentials but not so much the credentials themselves. The one common credential valued by local industry is the Manufacturing Skills Basic credential. The MMSAC recognizes this as a regional credential with some industries requiring or giving preference to applicants that have passed the course. Manufacturers worked with EMCC for several years to design stacked and latticed credentials for the non-credit Manufacturing Basic Skills training program (stacked CRC Silver Level credentials and regional Manufacturing Skills Basic Certificate latticed with the OSHA 10-hour safety certificate and a CPR certification). EMCC continues active engagement of these employers in identify and implement industry-recognized credentials. NAM endorsed credentials such as NCCER and AWS have been added at industry request to Electrical, Welding and Electro-Mechanical programs. The NIMS credentials have been implemented throughout the Machining program. Other credentials that are being included in programs include ASE (Automotive), (FANUC robotics (Automation and Control and Mechatronics) and Autodesk Certified User Certification (Drafting and Design).

10. **Are recruitment materials working?**
    The recruiting materials, in combination with navigation, have been effective, evident by the increase in student enrollment of the division. As an example the new Electro-Mechanical program was filled to capacity for its first semester.
    a. Brochures: Over 2,000 brochures have been submitted since the beginning of the grant period.
    b. Advertising: Three separate advertising campaigns have been completed, two television and one radio. A billboard campaign was conducted in the area surround EMCC – Golden Triangle.

11. **Is the Navigator providing services that aid recruitment, retention, and success rates?**
    The Manufacturing Technology and Engineering Division's Navigator has been one of the most positive outcome of the grant. The Navigator identifies barriers students face during the registration process and helps eliminate as many as possible while providing academic counseling and career coaching, monitoring the academic progress of each student, and maintaining files and records on each student to chart their progress. The Navigator is responsible for recruiting, retention and promoting graduation. Efforts have paid off tremendously as the division experienced enrollment, retention and graduation increases each semester.

    Before the creation of the MTED, the career technical programs had enrollment of 211 first semester students in fall 2009. Of these entering students, 173 were retained into the second semester (8%). This number dropped off sharply however for students returning to the second year of school with only 37.91% returning for the sophomore year. The Navigator's role includes advising on the benefits of an AAS degree. During the first year of the project 130 students were enrolled in MTED program. Ninety-nine percent of these MTED students were retained into the second semester and 89.23% returned for the

sophomore year of training. Grant participants have completed programs of study at a 82% completion rate overall during the grant period compared to just 50% during the three years prior to the grant.

The Navigator provides and arranges additional tutoring as needed including open source courseware. One specific success story is a Drafting and Design student with diagnosed learning disabilities. The student is a first generation college student. The Navigator walked the student through the registration process, including setting up proper accommodations with the Dean of Students. The Navigator also toured the student around campus and made sure he knew where his classes were prior to the first day of school. The Navigator continued to visit with the student and regularly checked his progress with both the student and his instructors. The student succeeded beyond expectations because of the extra services and compassion shown by the Navigator and received his AAS degree in spring 2016 and was gainfully employed by one of our local industries.

The Navigator role has proven to be a vital part of the grant. As the number of grant participants grew, so did the need for an additional Navigator. In year two of the grant, a second Navigator was hired. With the addition of a second navigator, every Manufacturing Technology and Engineering student, with special emphasis on the Manufacturing Discovery student, was assisted, encouraged, counseled, and guided weekly. The Navigators have provided excellent service to both new and existing students. The Navigators have learned the registration and financial aid program and can expertly guide students through the sometimes difficult process. The Navigators also assist instructors in submitting and distributing national credentials.

12. Are the revised and new programs, PLA, and articulation actions meeting the needs of TAA eligible workers, Veterans, and other adults?

a. New programs:
   i. TAA Eligible Workers – there are two TAA Eligible workers enrolled in the non-credit pre-hire customized Yokohama training program beginning in Fall 2016.
   ii. Veterans - Three Veterans have enrolled in one of our three new programs and two have graduated with the remaining one to graduate in December 2016. The success rate shows these are conducive to learning styles used in military training facilities.
   iii. Other adults - The new programs have met needs of other adult workers. 14 non-traditional aged students enrolled in the Electro-Mechanical program which offers fast-paced hands-on learning.

b. Revised programs:
   i. TAA Eligible Workers - all programs qualify for TAA funds and the TAA Coordinator at MDES is aware of program offerings. Ten TAA Eligible Workers have enrolled in MTED revised programs to date. Of these 10 participants, four completed their program of study and are currently working in

their field. Two participants left school to return to work while the remaining four are enrolled are still enrolled in their program of study.

ii. Veterans – A total of 41 veterans have participated in CTE programs. These programs are conducive to hands-on learning styles accustomed to military training. Of the total participants, 31 have completed their program of study and have entered the workforce. The remaining 10 veterans are enrolled in further education.

iii. Other Adults- The new programs have met needs of other adult workers. Many non-traditional age students have enrolled into the revised programs to gain necessary technical experience that will prepare them to re-enter the workforce. Some have certain careers in mind such as Yokohama while others are working towards their dreams of owning their own auto body shops.

c. PLA:
   i. TAA Eligible Workers - PLA policies are in place for TAA Eligible Workers and four have utilized the process.
   ii. Veterans - Two Veterans have taken advantage of PLAs to complete required program coursework.
   iii. Other Adults – Forty-eight PLAs have been administered and have helped other adults with prior experience in their field to bypass unnecessary coursework.

d. Articulation:
   i. Community Colleges: Articulation agreements are in place to meet the needs of TAA, Veterans or other adults wishing to transfer credits to or from EMCC to other community colleges. EMCC has experienced several students transferring into the college, specifically 7 into the Welding program. EMCC is one of only 7 colleges in the state that offer the AAS in Welding. Other students that have transferred from other community colleges include 6 into Electrical, 4 into Drafting and Design and 3 into Automotive.
   ii. Mississippi University for Women: An articulation agreement is in place with the Business Technology Division to meet the needs of TAA, Veterans or other adults wishing to transfer credits from EMCC to MUW. To date, no students have taken advantage of the articulation with MUW. MTED will continue to promote the articulation by posting flyers in the office and advising sessions.

13. Are technology and online systems being ably used to enhance instruction and student outcomes?

a. Instructors are using technology to provide additional instruction to students, resulting in more successful outcomes. Amatrol, an online product, is a key component of the technician programs. Most other programs in the division use Amatrol to provide supplemental instruction and online practice at no cost to the student. Amatrol based online instruction was utilized for post-hire customized training in the following manufacturing technician pathways:
   i. Electrical Systems I
   ii. Industrial Electric Wiring
   iii. Electric Motors

iv. Motor Controls
v. Electrical Drives
vi. PLC AB SLC 500
vii. PLC AB Control Logix
viii. Mechanical Systems
ix. Mechanical Fabrication
x. Mechanical Drives
xi. Pneumatics
xii. Hydraulics

b. Instructors also use program specific technology such as the A-Tech training software in Automotive, Motoman Robotic Arm in Automation and Control and Welding, Computer Aided Design software in Drafting and Design and Computer Numerical Control equipment in Machining. The technology has given instructors additional tools to reinforce instruction and allow students to glimpse into the world of advanced manufacturing.

c. For basic skills assistance, Career Ready 101 is a key teaching tool available through the Manufacturing Technology and Engineering Division Navigators. This self-paced thorough guide has proven successful in aiding those students who require remediation in math or reading to improve their skills along with comprehension to obtain the required Career Readiness Certificate.

d. Each instructor uses Canvas as an online platform to post assignments, tests and additional resources. Through Canvas, five hybrid courses have been developed for the technician programs which will alleviate students' time in the classroom. Using the hybrid classes, students can view videoed lectures and work on assignments allowing on-campus class time to be dedicated to lab work. The five hybrid courses developed were:
   i. IMM-1113 Industrial Maintenance Core and Safety
   ii. IMM-2433 Electronic Motion Control
   iii. INT-1214 Fluid Power
   iv. WLT-1177 Intro to Welding and Safety
   v. IMM-2513 Programmable Logic Controllers Multi-Platform

e. The FANUC Certified Education Robot Training (CERT) has been identified as the technical exit assessment for the Mechatronics Technician program (pending state community college board approval). FANUC CERT trains the student in integration of robotic automation through design and manufacturing concepts. The students will use project-based activities to program and operate the robotic arm. Since 1982, FANUC Robotics America Corporation has been designing, engineering, and manufacturing innovative robots and robotic solutions for companies all over the world.

f. Immerse2Learn, a comprehensive online learning solution that integrates training assessment and certification, has been added to our Drafting and Design program as

well as our newly approved Precision Machining two-year program to enhance the curricula.

14. Are program completers earning higher average wages?

Program completers are earning substantially higher average wages. Recent data shows the Historical cohort group (pre-grant: 2009 – 2012) earned wage increases that varied by craft specialties. Salaries ranged from a low of $19,665 to a high of $32,662, resulting in a mean wage of $26,892 one year after program completion. Salary increases ranged from 3.4% to 56.7% over starting pay scales.

Starting wages of the current cohort group (grant: 2013 – 2016) were higher in most craft specialties. Salaries ranged from a low of $24,228 to a high of $43,114, resulting in a mean wage of $34,863 one year after program completion. The salary increases were substantially higher in all programs except Electronics which was closed during the grant period and ranged from 60.4% to 158% over the starting pay scales.

What were the average wages one year after completion for both cohorts (overall, by program, and by sub-group)?		Historical Cohort 10/01/2009 - 9/30/2012	Current Cohort 10/01/2013 - 09/30/2016
		Mean Wage	Mean Wage
Overall		$26,892	$34,863
CIP	Name		
150303	Electronics	$39,449	$30,440
150613	Automation & Control	$32,662	$39,627
151301	Drafting & Design	$27,791	$31,286
460302	Electrical	$27,963	$44,184
470604	Automotive	$19,665	$29,248
480508	Welding	$22,074	$33,895

15. Do industry-recognized credentials provide students with more employment opportunities?

Yokohama Tire Manufacturing Mississippi requires all employees to earn a silver level Career Readiness Certificate and complete the regionally recognized Manufacturing Skills Basic course. YTMM has completed Phase I with the hiring of 500 is employees. The company values these credentials and has had great success in hiring qualified employees that fit into the company culture. The local automotive industry appreciates the quality of students who complete our program because of the ASE certifications offered as exit assessment to graduate. There are nine certifications that a student can achieve prior to graduating and these signify to an employer that the student is proficient in the automotive repair and service industry.

16. Do the revised and new programs enhance students' educational experiences resulting in them being more marketable?

Three hundred ninety-five students were surveyed about their educational experiences and attitudes toward their program. A vast majority, 368 of 395, or 93% of those surveyed expressed that their experiences have made them more marketable. Survey questions were as followed:

- Did revised program of study help better your education experience by making you more marketable?
- Do you feel you were well trained to get a job?
- Did the certifications and credentials earned increase your marketability during your job search?

Do the revised and new programs enhance students' educational experiences resulting in them being more marketable?			
		YES	NO
Overall		368	27
CIP	Name		
150303	Electronics	18	0
150613	Automation & Control	26	0
151301	Drafting & Design	23	0
460302	Electrical	79	0
470604	Automotive	62	0
480508	Welding	84	0
	Manufacturing Discovery	66	27
150499	Electro-Mechanical	10	0

17. Two years after completing training, do participants will feel their future jobs, employment, or career prospects are better because of their experiences with sector training programs?

Three hundred ninety-five students, 225 credit and 170 non-credit, were surveyed about their career prospects two years after completing the training program. The majority, 322 of 395 or 82%, of those surveyed expressed that their experiences have made them more marketable, and the skills obtained during their training program have allowed them to successfully obtain employment.

Do participants feel their future jobs, employment, or career prospects are better because of their experiences with sector training programs?			
		YES	NO
Overall		322	73
CIP	Name		
150303	Electronics	8	0
150613	Automation & Control	26	0
151301	Drafting & Design	23	0
460302	Electrical	33	0
470604	Automotive	27	0
480508	Welding	38	0
	Manufacturing Discovery	58	2
150499	Electro-Mechanical	0	0
	Customized non-credit advanced skills training	109	61

18. Are career and further education pathways enhanced for students?

Career options are being enhanced for students with the inclusion of stackable credentials. Most of the MTED programs have a one year and a two year exit point. Drafting and Design and Electro-Mechanical offer a two year associates of applied

science only while Mechatronics is a one year advanced certificate for those who previously complete Electro-Mechanical.

a. The Manufacturing Discovery pathway was created for those who did not meet a specific program's entry requirements. This one semester contains 15 credit hours of coursework which includes Manufacturing Skills Basic, NCCER Core and academics. If a student chooses, they can exist after successfully completing this one semester. The recognized industry credentials they will receive are:

i. Manufacturing Skills Basic certification
ii. Career Readiness Certificate
iii. NCCER Core credential
iv. OSHA 10-hour
v. CPR/AED certification

b. Articulation agreements have been developed to further enhance the educational pathways for CTE students to four-year universities.

19. What institutional capacity was added? Include instructors, equipment, credentials, online and technology-enabled systems, open-source/online academic resources, articulation agreements, recruiting tools, counseling and support systems, labor management information processes, and business engagement activities.

a. Instructors: Through this project, 3 full-time instructors were hired (Welder-Fabricator Technician, Electro-Mechanical, and Mechatronics). Part-time instructors were hired to instruct customized training and Manufacturing Discovery. Instructional delivery of both the newly created programs and the existing CTE programs has been enhanced through professional development opportunities and input from industry.
b. Equipment: A total of $265,963 of the $270,000 budget was expended for training equipment. Equipment is being used in Electro-Mechanical training as well as the customized training for Yokohama Tire Manufacturing Mississippi.
c. Credentials: Manufacturing Skills Basic has been embedded into all programs with the exception of Drafting and Design Technology and Automotive Technology. Both of these programs offer Manufacturing Skills Basic as a technical elective. The Manufacturing Skills Basic course leads to a regionally recognized credential and embeds CPR and OSHA-10 hour certificates. All new and existing programs, with the exception of Drafting and Design Technology, have embedded NAM-endorsed, nationally recognized credentials. These credentials are listed in the answers to Questions #1 and #2.
d. Technology: Online and technology-enable learning has been strengthened in each grant-funded program. Professional development sessions and summer boot camps were focused on training instructors to fully utilize new and existing advanced online and technology-enable systems. Career 101 is used extensively in the Manufacturing Discovery program. *Immerse 2 Learn* technology has been incorporated into the Machining and Drafting and Design Technology programs. All programs utilize Amatrol eLearning to provide an advanced manufacturing knowledge base and online interactive simulation.

e. Another way that the project has increased the use of technology is through the five Hybrid courses developed within the new technician programs.
f. Open Source: EMCC has expanded self-paced online academic remediation resources by combining a list of online programs that can be used with each program. The online resources were developed to be incorporated in all existing CTE programs but were grossly underutilized throughout the grant period. Open source materials were included in the five hybrid courses developed.
g. Articulation Agreements: Developed to strengthen workers' and students' ability to seamlessly build their careers as lifetime learners.
    i. Community Colleges: The Mississippi Community College Board has approved articulation among all the 15 state community colleges to transfer CTE credits for not only the existing CTE programs but also the newly developed technician programs.
    ii. Mississippi University for Women: EMCC has developed an articulation agreement with Mississippi University for Women's Business Technology program for its existing CTE and technician programs. Up to 60 hours of credit will be accepted from EMCC.
h. Brochures and advertising: A marketing campaign was established for the division. Brochures, flyers, radio spots, internet impressions and television commercials were developed and utilized.
i. Navigators: two Navigators were hired during the grant period. These Navigators are responsible for a wide range of duties most importantly to provide intrusive student services to include tutorial supports, retention counseling, and LMI based career choices.
j. LMI: Updated LMI data was collected and used in marketing materials as well as Navigator advising sessions. This collection of LMI data revealed manufacturing to be one of the highest paid and fastest growing markets in the Golden Triangle.
k. MMSAC: Initially developed to replace manufacturing CTE Advisory Committees with one Modern Manufacturing Sector Advisory Council (MMSAC) to enhance partnerships with employers and the public workforce system, guide strategy implementation and review, and to review programs, data, credentials, and research, and make recommendations for program improvement. Although CTE Advisory Committees were not replaced the MMSAC was an invaluable part of the project providing guidance of curriculum development and program improvements.
l. Work-based Learning capacity was enhanced through Make It in America Grant. This grant provided 120 internship opportunities to Manufacturing Technology and Engineering Division credit students. Of these 120 interns, 57 were retained in employment while seven will complete their internships by December 2016. Additionally, students who participated in work based learning opportunities were allowed to earn college credit while they worked.
m. EMCC hosts an annual job fair for the residents of North Mississippi each April as a concentrated effort to showcase the business and industry partners of the Golden Triangle area. This time allows students as well as the general public to speak with hiring managers to obtain information on job availability. There have been several individuals who have received an invitation to interview along with job offers due to participation in the job fair.

n. The West Point campus of EMCC has developed into the primary training facility for our customized non-credit advanced skills training. Yokohama Tire Manufacturing Mississippi uses this campus exclusively after renovations to two classrooms and computer lab.
o. Instructors in the Manufacturing Technology and Engineering Division have each been certified to teach more credentials in their programs. With the addition of three full-time instructors and continuous professional development, the number of industry recognized credentials offered to students has increased over the grant period.
p. EMCC became a WIN one-stop center in 2016 to provide convenient and easy access to services in areas such as employment, education, training, human services and economic development.

Participant Impacts and Outcomes

Outcomes/Impact Results

Results for outcome/impact questions numbers 1-9 are shown in the chart below:

		Actual Outcomes	***Performance Targets***
1	Total unique participants served	2,087	901
2	Total number of participants who have completed a TAACCCT-funded program	1,572	719
3	Total number of participants still retained in their program of study or another TAACCCT-funded program	178	209
4	Total number of participants completing credit hours	709	559
5	Total number of participants earning credentials	1,645	719
6	Total number of participants enrolled in further education after grant-funded program of study completion	356	220
7	Total number of participants employed after grant-funded program of study completion	764	645
8	Total number of participants retained in employment after program of study completion	487	581
9	Number of participants employed at enrollment who received a wage increase post-enrollment	167	256

East Mississippi Community College overachieved in six of the nine outcome measures stipulated in the TAACCCT grant. Participants, completers and the number earning credentials were more than double the targets. The number enrolled in further education was 62% higher. The number of participants retained in employment may still be higher than projected because the numbers lag behind the end of the grant period. The number still retained in their program of study was 15% below target, and the number of incumbent workers receiving wages was 35% below the target. However, of the 2,087 participants, only 349 were incumbent workers; 48% had wage increases.

Of the 2,087 participants, 1,349 were non-credit participants and 738 credit participants. Of the 1,572 completers, 1,069 received non-credit certificates and 503 received credit

certificates or degrees. Of the 503 credit completers, 102 received 15-hour developmental program certificates, 229 received 30-hour vocational certificates, 30 received 45-hour technical certificates, and 160 received two-year degrees. Completers are reported on the first certificate earned. Five participants earned two Associates of Applied Science degrees in two different programs. Thirty-six participants who received 30-hour certificates went on to received their two-year degree while 12 were retained and still pursuing two-year degrees. Thirty-two of the participants who received 15-hour certificates completed higher level certification.

Of the 503 participants who received credit certificates or degrees, 422 or 84% obtained employment. Of the 1,069 participants who received non-credit certificates, 342 or 32% obtained employment.

Of the 2,087 participants, 10 were TAA eligible and 41 were eligible Veterans. Of the 10 TAA eligible participants, four received their Associates of Applied Science degree and four will receive their on-year vocational certificate in May 2018. The remaining TAA eligible participants left school after the first semester to return to work to provide for their families. Of the 41 eligible Veterans, two completed the 15-hour certificate program, 14 received their one-year Vocational certificate, one received his 45-your technical certificated, 11 earned two-year Associates of Applied Science degree while three completed the non-credit customized advanced skills training.

Question #10: How many new programs were created?
Five (5) new programs were created and started: Manufacturing Discovery, Welding and Fabrication Technician, Electro-Mechanical, Mechatronics and customized non-credit advanced skills training.

For outcomes/impact analysis questions 11-20, propensity score matching was utilized to generate comparison groups.

Propensity Score Matching

In order to examine the impact of participation in stacked and latticed pathways, the evaluation team conducted propensity score matching (PSM) to generate a comparison group that is similar to the treatment group along a set of background characteristics that could affect the likelihood of receiving treatment. Rosenbaum & Rubin (1983) introduced the propensity score approach to matching and described it as "the conditional probability of assignment to a particular treatment given a vector of observed covariates." In other words, the propensity score reflects the probability of receiving treatment based on a set of background characteristics. PSM is an increasingly common and popular approach for accounting for factors that may influence the receipt of treatment, and thus confound analysis of impact. By generating a comparison group that resembles the treatment group on all variables thought to affect likelihood of receiving treatment, researchers can infer that the subsequent observed impact is the result of the treatment, and not the result of different characteristics in these two groups.

While randomized control trials generate treatment and comparison groups that are expected to differ only in their treatment condition, observational studies face the issue of selection bias, in which receipt of treatment may be the result of meaningful differences between the treatment and comparison groups. In observational studies, the treatment is not randomly assigned and, thus, "baseline characteristics of treated subjects often differ systematically from those of untreated subjects." (Rubin 2001). Balancing on propensity scores is one way to

account for differences between treated and untreated cases. PSM uses a set of variables that may influence the receipt of treatment to create propensity scores, or scores that reflect the probability of receiving treatment, for both the treated and untreated cases. The subjects are then matched on their propensity scores, and untreated cases with propensity scores similar to those in the treatment group form the matched comparison group.

This approach controls for potential confounds in treatment receipt. After statistical balance has been achieved along the predictor variables (variables that could influence receipt of treatment), outcomes for the matched treatment and control group should not differ systematically in the absence of treatment. The evaluation team conducted separate PSM analyses for each outcome, and for each PSM model, balanced on characteristics that could be related to participation in the grant program.

The PSM approach to generating a matched comparison group enabled the evaluation to meet standards of rigor for non-experimental research studies as defined by the Clearinghouse for Labor Evaluation and Research (CLEAR) and the Institute of Education Sciences What Works Clearinghouse (WWC). PSM is a quasi-experimental design methodology that can achieve a moderate rating from CLEAR as well as meet WWC standards with reservations.

The treatment and matched comparison groups were balanced on all predictor variables used in the PSM model for the educational outcomes; however, a small number of PSM predictor variables were not perfectly balanced for the employment and earnings outcomes. In these instances, post- estimation regression analyses were conducted to account for the imbalance on these variables, and the results reported in the tables reflect the post-estimation analysis results. Consequently, all four outcomes meet CLEAR standards for regression studies using matching techniques.

For each outcome, impact is measured by estimating the average treatment effect on the treated (ATT), which is the average difference in the outcome between the treated and matched comparison groups. As Zeidenberg, Cho, and Jenkins (2010) explained, "The ATT is the average effect of the treatment on the sort of person who participates in the program." In other words, the ATT is the difference in outcome between two groups that have similar probabilities of receiving the treatment (based on the set of covariates used to generate the propensity score).

The evaluation team used the teffects psmatch program in Stata to conduct PSM and estimate the ATT. Teffects psmatch is a relatively new program that was designed to address a significant limitation of the previous – and widely used – propensity score matching program, psmatch2. Stata's previous PSM program (psmatch2) did not account for the fact that propensity scores are estimated when producing standard errors.

Therefore, users of psmatch2 needed to bootstrap the standard errors, a process that has recently been demonstrated, in general, as not appropriate for matching estimators. Teffect psmatch accounts for the fact that propensity scores are estimated rather than known when calculating standard errors, and thus produces a more precisely estimated ATT.

Covariates Used for PSM

PSM analyses were conducted separately for each outcome, given the unique subgroups for the two labor market outcomes (employment rate is examined for non-incumbent workers; earnings increase rate is examined for incumbent workers) and the different set of PSM predictor variables for those unique subgroups. For each outcome, the overall analytic sample for the PSM consists of treatment and comparison pool students who were enrolled in a manufacturing program at some point during the grant period. Therefore, the matched comparison group is

drawn from an overall comparison pool of students in the same occupational area (manufacturing) as the treatment students.

The covariates used in the PSM models consist of demographic and background variables that could influence the likelihood of receiving treatment, after restricting the sample to treatment and comparison pool students in manufacturing programs.

Propensity Score Matching Results

Propensity score matching (PSM) was used to identify a group of 180 comparisons who were similar to the participant group in the following characteristics: age; gender (male and female); minority status (Caucasian, non-Caucasian, and more than two races); incumbent worker status (employed and unemployed); enrollment status (part-time vs. full-time); educational attainment (GED, high school diploma, and some college); and program type (certificate, diploma, and degree).

After the matching process was complete, balance diagnostics were conducted to check the quality of the matches. It was expected that the selected comparison group would be similar to the participating group on all covariates being used for the PSM process (Rubin, 2001). As shown below, an examination of the distribution of propensity scores was first conducted to assess common support via a graphic diagnostic; then, three numerical balance measures were used to check covariate balances at the student level (Rubin, 2001):

- The ratio of the variances of the propensity scores in the two groups must be close to 1.0. Rubin (2001) suggests that the variance ratios should be between 0.5 and 2.0.
- The difference in the means of the propensity scores in the two groups being compared must be small. Rubin (2001) suggests that the standardized differences of means should be less than 0.25.
- For the percent of balance improvement, the larger the percent, the better the PSM results.

A visual examination suggests that the selected comparisons and participants have similar distributions of propensity scores across all three matching groups. As shown, the ratio of the variances of the propensity scores equals 1.14, which is within the range suggested by Rubin (2001). The analyses of standard mean differences suggest that the matching procedures have significantly minimized the group mean differences between the participant and comparison groups. Most importantly, after the PSM process, all covariates had a standardized mean difference smaller than 0.25, as suggested by Rubin (2001). The percent of balance improvement ranged from 70% to 100%, with few exceptions. Taken together, these diagnostic criteria suggest that the participants and selected comparisons were similar by key demographic characteristics.

Demographic Characteristics by Group before Propensity Score Matching

Variables	***Participants (N = 422)***		***Comparisons (N = 612)***	
	n	***%***	***n***	***%***
Gender				
Male	401	95	566	92.5
Female	21	5	45	7.4

Race/Ethnicity				
Caucasian	285	67.5	322	52.6
African American	136	32.2	272	44.4
Hispanic/Latino	1	0.2	5	0.8
Asian	0	0	2	0.3
Not Reported	0	0	11	1.8
Program Type				
Veterans	31	7.4	33	5.4
Pell Grant Eligible	258	61.1	463	75.7
Age				
Age Mean *(SD)*	24.81		24.69	

Demographic Characteristics by Group after Propensity Score Matching

Variables	***Participants (N = 373)***		***Comparisons (N = 548)***	
	n	***%***	***n***	***%***
Gender				
Male	352	94.6	503	91.8
Female	21	5.4	45	8.2
Race/Ethnicity				
Caucasian	255	68.4	290	52.9
African American	117	31.4	240	43.9
Hispanic/Latino	1	0.2	5	0.9
Asian	0	0	2	0.3
Not Reported	0	0	11	2.0
Program Type				
Veterans	27	7.2	33	6.0
Pell Grant Eligible	229	61.4	463	84.5
Age				
Age Mean *(SD)*	24.70		24.60	

Jitter plots of the distribution of propensity scores by matching groups.

Balance Diagnosis Before and After the PSM Process

Variables	Participants		Comparison				Balance Diagnosis			
			Before		After		Variance Ratio	Standard Mean Differences		% Balance Improvement
	M	*SD*	*M*	*SD*	*M*	*SD*		Before	After	
Propensity Score	0.43	0.16	0.17	0.18	0.40	0.14	1.32	0.26	0.03	87.05
Age	21.54	4.84	21.95	4.68	21.56	4.90		-0.41	-0.03	93.22
Gender	0.94	0.23	0.95	0.21	0.94	0.23		-0.01	0.00	100.00
Minority Status	1.12	0.43	1.67	0.51	1.12	0.43		-0.56	0.00	100.00
Employment Status	0.71	0.45	0.64	0.48	0.69	0.46		0.07	0.02	70.05
Enrolment Status	1.80	0.41	1.79	0.40	1.82	0.38		0.00	-0.03	-1572.16
Educational Attainment	2.23	0.55	2.23	0.60	2.07	0.40		0.00	0.16	-14521.13
Program Type	2.30	0.67	2.32	0.49	2.33	0.54		-0.01	-0.02	-38.76

Question #11: What was the student retention rate after the first semester for both cohorts (overall, by program, and by subgroup - e.g. TAA-eligible)?

		Historical Cohort 10/01/2009 - 9/30/2012	Current Cohort 10/01/2013 - 09/30/2016
		48.69%	**74.88%**
CIP	Name		
150303	Electronics	53.85%	58.82%
150613	Automation & Control	68.00%	79.49%
151301	Drafting & Design	46.84%	83.87%
460302	Electrical	46.34%	70.00%
470604	Automotive	62.20%	82.76%
480508	Welding	37.69%	72.88%
PELL		49.68%	76.31%
TAA		71.43%	60.00%
VETERAN		60.61%	100.00%

Question #12: What were the program completion rates for both cohorts (overall, by program, and by sub-group)?

		Historical Cohort 10/01/2009 - 9/30/2012	Current Cohort 10/01/2013 - 09/30/2016
		50.02%	**82.24%**
CIP	Name		
150303	Electronics	35.22%	94.12%
150613	Automation & Control	88.88%	87.18%
151301	Drafting & Design	39.50%	70.97%
460302	Electrical	31.30%	68.46%
470604	Automotive	35.00%	89.66%
480508	Welding	70.22%	83.05%
PELL		42.76%	74.30%
TAA		100.00%	60.00%
VETERAN		100.00%	50.00%

Question #13: What was the employment rate for completers for both cohorts (overall, by program, and by sub-group)?			
Note: This includes both Incumbent and non-incumbent workers		Historical Cohort 10/01/2009 - 9/30/2012	Current Cohort 10/01/2013 - 09/30/2016
		57.64%	**83.38%**
CIP	Name		
150303	Electronics	52.38%	68.75%
150613	Automation & Control	85.71%	88.24%
151301	Drafting & Design	57.14%	81.82%
460302	Electrical	57.41%	79.78%
470604	Automotive	63.16%	87.18%
480508	Welding	52.70%	84.69%
PELL		53.10%	80.69%
TAA		80.00%	83.33%
VETERAN		45.45%	88.46%

Question #14: What were the job retention rates for completers for both cohorts (overall, by program, and by sub-group)?			
If student is employed and has a wage greater than $0 in the second and third quarter after completion, they are considered retained.		Historical Cohort 10/01/2009 - 9/30/2012	Current Cohort 10/01/2013 - 09/30/2016
		82.91%	**94.63%**
CIP	Name		
150303	Electronics	81.82%	77.78%
150613	Automation & Control	91.67%	87.50%
151301	Drafting & Design	83.33%	91.67%
460302	Electrical	87.10%	96.55%
470604	Automotive	75.00%	95.00%
480508	Welding	79.49%	97.47%
PELL		80.52%	93.44%
TAA		100.00%	100.00%
VETERAN		80.00%	80.00%

Question #15: What were the average wages at the time of enrollment and one quarter after program completion for both cohorts (overall, by program, and by sub-group)?

		Historical Cohort 10/01/2009 - 9/30/2012		Current Cohort 10/01/2013 - 09/30/2016	
		Average Wage Before Enrollment	Average Wage After Completion	Average Wage Before Enrollment	Average Wage After Completion
		$13,468	$23,335	$16,259	$31,880
CIP	Name				
150303	Electronics	$16,119	$36,069	$16,220	$27,990
150613	Automation & Control	$17,590	$20,846	$17,853	$33,603
151301	Drafting & Design	$14,019	$21,024	$15,748	$30,891
460302	Electrical	$15,072	$27,056	$17,766	$39,847
470604	Automotive	$10,218	$13,947	$14,295	$27,238
480508	Welding	$8,073	$21,052	$15,672	$31,709
PELL		$12,498	$21,819	$16809	$27,085
TAA		$26,010	$35,840	$27,840	$37,336
VETERAN		$15,042	$22,575	$17,812	$28,116

Question #16: What were the average wages one year after completion for both cohorts (overall, by program, and by sub-group)?

		Historical Cohort 10/01/2009 - 9/30/2012	Current Cohort 10/01/2013 - 09/30/2016
		Mean Wage	Mean Wage
		$26,892	$34,863
CIP	Name		
150303	Electronics	$39,449	$30,440
150613	Automation & Control	$32,662	$39,627
151301	Drafting & Design	$27,791	$31,286
460302	Electrical	$27,963	$44,184
470604	Automotive	$19,665	$29,248
480508	Welding	$22,074	$33,895
PELL		$27,017	$29,616
TAA		$51,070	$56,670
VETERAN		$20,042	$30,975

Question #17: What was the rate of participation in further education in both cohorts (overall, by program, and by sub-group)?

		Historical Cohort 10/01/2009 - 9/30/2012	Current Cohort 10/01/2013 - 09/30/2016
		53.76%	**71.51%**
CIP	Name		
150303	Electronics	74.19%	75.00%
150613	Automation & Control	50.00%	52.94%
151301	Drafting & Design	90.63%	54.55%
460302	Electrical	65.67%	68.54%
470604	Automotive	42.86%	43.59%
480508	Welding	29.35%	56.12%
PELL		44.44%	60.10%
TAA		0.00%	0.00%
VETERAN		28.57%	69.49%

Question #18: What were the completion rates for students who participated in work-based learning or paid internships and for those who did not participate for both cohorts (overall, by program, and by sub-group)?

		Historical Cohort 10/01/2009 - 9/30/2012		Current Cohort 10/01/2013 - 09/30/2016	
		Completion Rate WBL	Completion Rate Non-WBL	Completion Rate WBL	Completion Rate Non-WBL
		57.45%	42.30%	86.18%	61.89%
CIP	Name				
150303	Electronics	54.55%	31.25%	66.67%	81.82%
150613	Automation & Control	75.00%	41.90%	90.00%	66.67%
151301	Drafting & Design	66.67%	35.53%	87.78%	29.63%
460302	Electrical	41.67%	58.33%	83.87%	68.13%
470604	Automotive	62.50%	27.27%	88.52%	48.43%
480508	Welding	69.46%	30.54%	87.34%	75.00%
PELL		62.50%	40.05%	87.42%	54.43%
TAA		100.00%	66.67%	100.00%	42.86%
VETERAN		0.00%	48.39%	100.00%	54.55%

Question #19: What were the average wages one year after completion for both cohorts (overall, by program, and by sub-group)?

		Historical Cohort 10/01/2009 - 9/30/2012	Current Cohort 10/01/2013 - 09/30/2016
		Mean Wage	Mean Wage
		$35,389	$40,936
CIP	Name		
150303	Electronics	$39,074	$32,947
150613	Automation & Control	$49,147	$48,371
151301	Drafting & Design	$28,442	$33,844
460302	Electrical	$35,186	$55,568
470604	Automotive	$23,379	$32,445
480508	Welding	$30,006	$39,786
PELL		$37,424	$38,917
TAA		$53,291	$57,633
VETERAN		$0	$44,228

Question #20: What was the rate of students receiving credit for non-credit training or PLA for both cohorts?

		Historical Cohort 10/01/2009 - 9/30/2012	Current Cohort 10/01/2013 - 09/30/2016
		0.00%	**12.79% (54 total)**
CIP	Name		
150303	Electronics	0.00%	11.76% (2)
150613	Automation & Control	0.00%	10.26% (4)
151301	Drafting & Design	0.00%	0.65% (2)
460302	Electrical	0.00%	17.69% (23)
470604	Automotive	0.00%	0.57% (5)
480508	Welding	0.00%	18.64% (18)
PELL		0.00%	12.30%
TAA		0.00%	0.00%
VETERAN		0.00%	14.81%

Logistic Regression Model Differences Determined:
All six logic model targeted impacts were achieved. The six key outcomes of the impact study were:

1. Program retention
2. Completion of programs of study
3. Enrollment in further education
4. Employment
5. Job retention
6. Average wages between program and control group

Impact Analysis Results

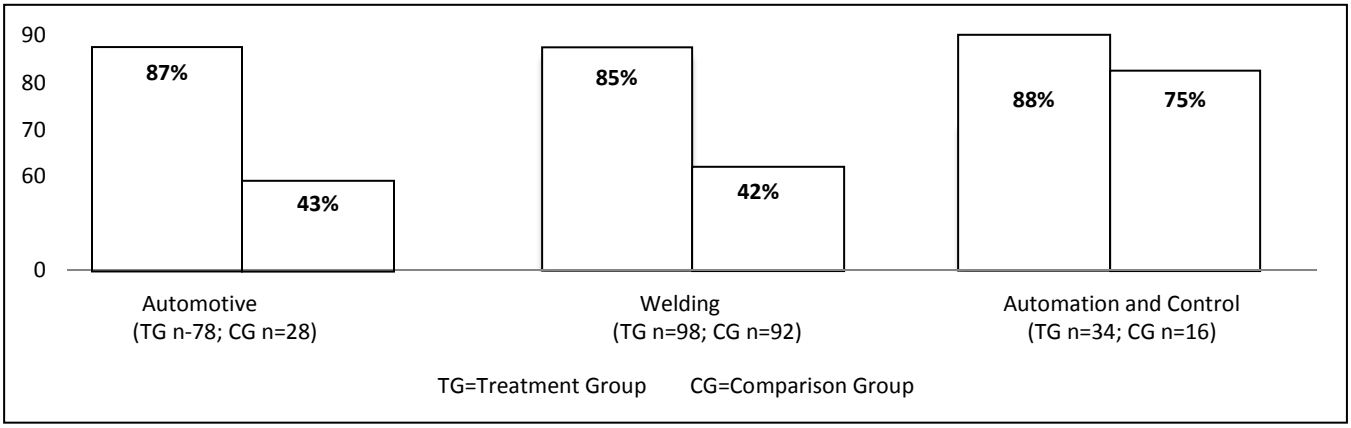
	Treatment Group	Comparison Group	ATT	P-value
Retention Rate	85%	54%	31%	.000
Completion Rate	90%	46%	51%	.000
Rate of further education in non-TAACCCT funded program of study	57%	53%	4%	.080
Employment Rate	86%	47%	38%	.071
Job Retention	70%	34%	36%	0.76
Average Wages	21%	19.66%	1.34	.000

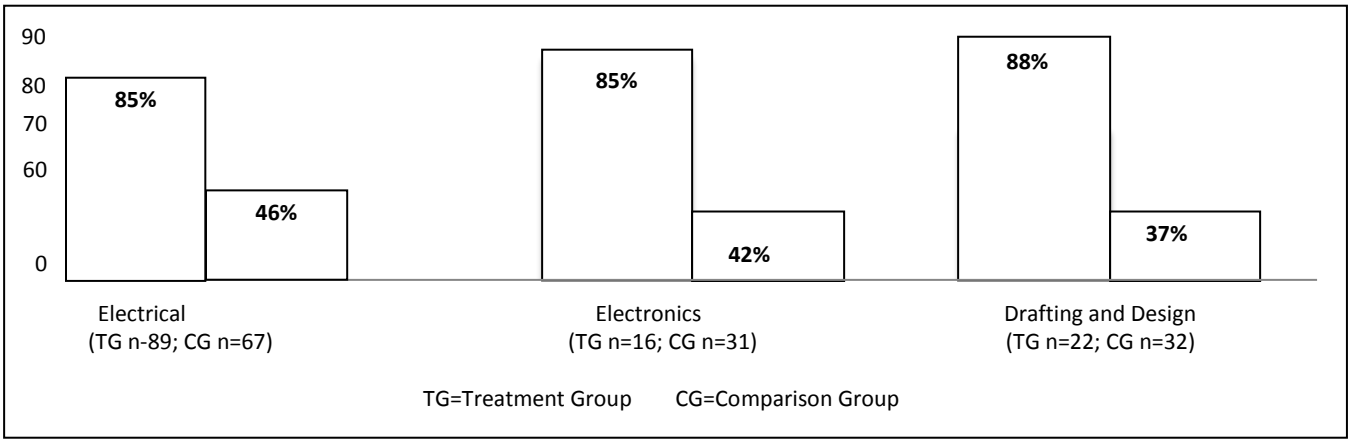
The impact analysis results indicate that participants in stacked pathway programs earned more credentials during the grant period and that more participants were retained in their program of study than students in a matched comparison group. These findings are statistically significant, because the p-value is less than .05:

- Participants were retained, on average, 6% times more than the matched comparison group; and
- 90% of participants earned credentials, while only 46% of the matched comparison group earned a credential.

By comparison, the analysis was inconclusive on employment and employment retention. Although the treatment group had a higher employment rate in the first quarter after exiting the program than the matched comparison group, these differences are not statistically significant, because the p-value is greater than .05. As the table shows, 86% of participants are employed one quarter after exit, compared with only 47% of the comparison group members. This difference in employment is not statistically significant (p-value is greater than .05), thus the results of the impact of employment are inconclusive. Despite the lack of overall impact on employment, exploratory analysis indicates participants in automotive and welding had a higher employment rate than comparison group students in these program areas.

Employment Rates by Treatment Group and Program Area





There is no meaningful difference in the employment retention rate between the treatment and comparison groups as the p-value is greater than .05 as well. However, the analysis of the impact on employment retention shows 70% of participants were retained in employment two quarters after exit compared to only 34% of the comparison group members.

Retained Employment by Program

CIP	Program Name	Comparison Group		Treatment Group	
150303	Electronics	3/11	27.22%	3/11	27.22%
150613	Automation & Control	4/12	33.33%	14/30	46.67%
151301	Drafting & Design	2/12	16.67%	9/18	50.00%
460302	Electrical	11/31	35.48%	58/71	81.70%
470604	Automotive	2/12	16.67%	47/68	69.12%
480508	Welding	18/39	46.15%	67/83	80.72%

The impact analysis results shows there is no meaningful difference in the earnings increase rate between participants and comparison group members: 21% of participants and 19.66% of the matched comparison group receive an earnings increase at some point after program entry.

Average Wage Change by Program

CIP	Program Name	Comparison Group		Treatment Group	
150303	Electronics	2/11	18.18%	2/11	18.18%
150613	Automation & Control	2/12	16.67%	4/30	13.33%
151301	Drafting & Design	2/12	8.33%	3/18	16.67%
460302	Electrical	8/31	25.81%	21/71	29.58%
470604	Automotive	2/12	16.67%	12/68	17.65%
480508	Welding	7/39	18.00%	17/83	20.48%

Conclusions

This evaluation found East Mississippi Community College's Golden Triangle Modern Manufacturing Project to be a well-managed, high performing project. The evaluation validated the outcomes and impacts predicted in the project's logic model. The combination of interventions and implementation actions resulted in strong outcomes and several significant impacts.

The impact study identified three key findings:

1. The number of TAACCCT 3 grant funded manufacturing program completers was almost double the number of completers in these same programs in the comparison group (90% vs. 46%).
2. Although participants in grant-funded manufacturing programs had higher employment rates after program exit, this finding was not statistically significant. However, exploratory analysis indicates that participants in Automotive and Welding programs have significantly higher employment rates than comparison group members in the same programs.
3. Stacked and latticed pathway participants and matched comparison group members had similar earnings increase rates.

Actual outcomes exceeded the target for six of the nine outcomes as shown in the chart below:

Outcome Measures	**Target**	**Actual**
1. Total Unique Participants Served	901	2,087
2. Total Number of Participants Completing a TAACCCT-Funded Program of Study	719	1,572
3. Total Number of Participants Still Retained in Their Program of Study or Other TAACCCT-Funded Program	209	178
4. Total Number of Participants Completing Credit Hours	559	709
5. Total Number of Participants Earning Credentials	719	1,645
6. Total Number of Participants Enrolled in Further Education	220	356
7. Total Number of Participants Employed After TAACCCT-funded Program of Study Completion	645	764
8. Total Number of Participants Retained in Employment After Program of Study Completion	581	487
9. Total Number of Those Participants Employed at Enrollment Who Received a Wage Increase Post-Enrollment	256	167

All six targeted logic model impacts, better student retention, higher completion rates, higher employment rates, better job retention, higher average wages for completers, and more completers pursuing further education, were achieved as shown in the chart below:

Outcome	Treatment Group	Comparison Group	ATT	P-value
Retention Rate	85%	54%	31%	.000
Completion Rate	90%	46%	51%	.000
Rate of further education in non-TAACCCT funded program of study	57%	53%	4%	.080
Employment Rate	86%	47%	38%	.071
Job Retention	70%	34%	36%	.076
Average Wages	21%	19.66%	1.34	.000

Other significant results include the following:

- Increased admission standards were implemented and credentials required.
- Wages increased for all by one category of existing programs.
- There is enhanced instruction and an increase in the number of credentials.
- Significant industry input had a positive impact on the project.
- A diesel program was begun in fall 2016 as a result of interaction with industry.

This evaluation cannot determine the impact of any one intervention or implementation action. Future workforce and education research should investigate specific factors that contributed to the success of the program. Future research should also control for limitations cited in this report: 1) a quasi-experimental design; 2) external factors influencing outcomes; 3) local market conditions' effect on external validity.

There were several key components that impacted successful implementation: 1) a strong management team, with identified tasks, and regular communication; 2) total buy-in from college administration; 3) detailed task reports with target dates; 3) weekly meetings with key personnel as well as involvement of the external evaluator; 4) navigators provided both exemplary services and were a critical component in the management of the program.

The significant, positive unintended consequences resulting from the project provide anecdotal evidence of its impact: 1) the state Community College Board has begun to build exit credentials into CTE programs statewide; 2) the Mississippi Development Authority adopted the pre-hire section of the customized training programs as a best practice for new manufacturers recruited to the state; and 3) the navigator model resulted into a college-wide career navigation initiative funded by the Bill and Melinda Gates Foundation.

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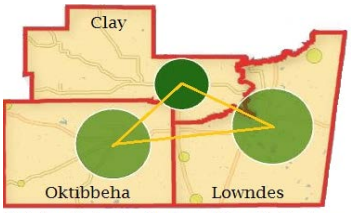
Appendix A

East Mississippi Community College
Golden Triangle Modern Manufacturing Project



Golden Triangle Modern Manufacturing

Outcomes Table

	Target	Actual
Unique Participants Served/Enrollees	**901**	**2087**
Total Number Who Have Completed a Grant-Funded Program of Study	**719**	**1572**
Total Number of Incumbent Workers Who Have Completed a Grant-Funded Program of Study	**N/A**	**114**
Total Number Still Retained in their Program of Study or Other Grant-Funded Program	**209**	**178**
Total Number Retained in Other Education Program	**N/A**	**50**
Total Number of Credit Hours Completed	**N/A**	**20344**
Total Number of Students Completing Credit Hours	**559**	**709**
Total Number of Earned Degrees/Certificates	**719**	**1645**
Total Number of Students Earning Certificates (less than one year)	**N/A**	**149**

Total Number of Students Earning Certificates (more than one year)	**N/A**	**40**
Total Number of Students Earning Degrees	**N/A**	**196**
Total Number Enrolled in Further Education After Program of Study	**220**	**356**
Total Number Employed After Program of Study Completion	**645**	**764**
Total Number Retained in Employment After Program of Study	**581**	**487**
Total Number of Those Employed at Enrollment Who Received a Wage Increase Post-Enrollment	**256**	**167**

Demographics

Males	1608
Females	479
Hispanic / Latino	6
American Indian / Alaskan Native	1
Asian	6
Black / African American	1031
Hawaiian Native / Pacific Islander	0 (none self-reported)
White	1038
More than one race	5
Full-Time Students	738
Part-Time Students	1349
Incumbent Workers	349
Veterans (eligible)	41
Age Mean	30
Disability	0 (none self-reported)
Pell Grant Eligible	550
TAA	14
Other	

Appendix B

Definitions

Unique Participants Served/Enrollees –Individuals who entered any of the grant-funded programs offered to date (including certificate or degree programs or other training activities). Participants should only be included once, even if they enroll in multiple programs. Note: Grant years began 10/1 and run through 9/30 for the years 2013 through 2016. Participants include both credit and non-credit students.

Participants Who Have Completed a Grant-Funded Program of Study – Unique participants (B.1) who completed any grant-funded program to date. Completion is defined as having earned all of the credit hours (formal award units) needed for the award of a degree or certificate in that program of study. Participants should only be included once, even if they complete multiple programs. Note: Credit completers and YTMM completers.

Incumbent Workers Who Have Completed a Grant-Funded Program of Study – Participants employed at enrollment who complete any grant-funded program to date. Completion is defined as having earned all of the credit hours (formal award units) needed for the award of a degree or certificate in that program of study. Participants should only be included once, even if they complete multiple programs. Note: YTMM incumbent workers are only those employed with YTMM on a full-time basis.

Participants Still Retained in Their Program of Study or Other Grant-Funded Program(s) – Unique participants enrolled who have not completed their programs who were still enrolled either in their original program of study or a different grant-funded program of study at the end of the reporting year.

Participants Retained in Other Education Program(s) – Unique participants enrolled who dropped out of a grant-funded program of study, but have enrolled in another education program not funded by the grant. Note: Completers or returning students are not counted.

Credit Hours Completed – Credit hours to date that have been completed by participants in grant-funded certificate and degree programs. Note: Aggregate number of credit hours.

Students Completing Credit Hours – Students who have enrolled that have completed any number of credit hours to date. Note: Number of students that have finished any number of credit hours.

Earned Degrees/Certificates – Degrees or certificates earned to date by participants for grant-funded programs, including multiple certificates and degrees earned by the same participant. Note: Degrees (30, 45 or 60 credit hours) and non-credit certificates (aggregate).

Students Earning Certificates (less than one year) – Students who earned certificates designed to be completed in one year or less, counted only once in this field, even if multiple certificates were earned by that student. Note: 30 hour and YTMM customized.

Students Earning Certificates (more than one year) – Students who earned certificates designed to be completed in more than one year, counted only once in this field, even if multiple certificates were earned by a student. Note: 45 hour

Students Earning Degrees – Students who earned degrees, counted only once in this field, even if multiple degrees were earned by that student. Note: 60 hour

Participants Enrolled in Further Education After Program of Study Completion – Participants who completed at least one grant-funded program to date and entered another program of study (grant-funded or not). Note: Completers that enrolled in another program (30 hour to 60 hour or Drafting to Welding).

Participants Employed After Program of Study Completion – Participants who were not incumbent workers, completed at least one grant-funded program, and entered unsubsidized employment in the first quarter after the quarter in which the student exits the college. 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.

Participants Retained in Employment After Program of Study Completion – Participants employed in the first quarter after the quarter in which the student exits the college, who were 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.

Participants Employed at Enrollment Who Received a Wage Increase Post-Enrollment – Incumbent workers (those employed at enrollment) who enter a grant-funded program and received an increase in their wages at any time after becoming enrolled.

Demographic Information:

Male – New participants who self-identify their gender as male.

Female – New participants who self-identify their gender as female.

Hispanic/Latino – New participants who 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.

American Indian or Alaskan Native – 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 – 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 – 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 - 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 - 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 - New participants who self-identify more than one of the racial categories outlined above.

Full-time Status - New participants who are enrolled in college courses on a full-time basis. Full-time basis is defined as enrollment into 12 or more credit hours in the Fall or Spring semester and 6 or more credit hours in the Summer.

Part-time Status - New participants who are enrolled in college courses on a part-time basis. Part-time basis is defined as enrollment into less than 12 credit hours in the Fall or Spring semester and less than 6 credit hours in the Summer.

Incumbent Workers - New participants who are already employed at the time of enrollment.

Eligible Veterans - New participants who meet one of the following conditions as a veteran:
1. Is a person who served at least one day in the active military, naval, or air service, and who was discharged or released therefrom under conditions other than dishonorable, as specified in 38 U.S.C. 101(2).
2. Is a person who is (a) the spouse of any person who died of a service-connected disability, (b) the spouse of any member of the Armed Forces serving on active duty who at the time of application for assistance under this part, is listed, pursuant to 38 U.S.C 101 and the regulations issued thereunder, by the Secretary concerned, in one or more of the following categories and has been so listed for more than 90 days: (i) missing in action; (ii) captured in the line of duty by a hostile force; or (iii) forcibly detained or interned in the line of duty by a foreign government or power; or (c) the spouse of any person who has a total disability, permanent in nature resulting from a service-connected disability or the spouse of a veteran who died while a disability so evaluated was in existence.

Participant Age (Mean) - Mean age in years of the new participants. Mean age is defined as the sum of the ages of all of new participants/enrollees divided by the number of new

participants/enrollees.

Persons with a Disability – New participants, where known, or who self-identify that they have 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.)

Pell-Grant Eligible – Participants who are eligible to receive federal Pell Grant assistance.

TAA Eligible – Participants who are eligible to receive Trade Adjustment Assistance (TAA) benefits.

Basic Skills Deficiency - Not academically prepared to succeed in college-level courses towards a degree or certificate.

Appendix C

Activity/Task/Milestone/Event	Strategy/Action	Start Date	Target End Date	Status at Quarter End	Actual End Date
-Hire Project Manager	Strategy 1: Build programs that meet industry needs. Action 1.1 Replace manufacturing CTE Advisory Committees with one Modern Manufacturing Sector Advisory Council (MMSAC) to enhance partnerships with employers and the public workforce system, guide strategy implementation and review, and to review programs, data, credentials, and research, and make recommendations for program improvement. Action completed 9-21-17	10/1/13	12/15/13	Completed	11/04/2013
-Recruit MMSAC members		10/1/13	12/31/13	Completed	01/13/2014
-Hire Evaluator and Data Subcontractor		10/1/13	2/03/14	Completed	08/04/2014
-Develop LMI review plan		10/1/13	3/31/14	Completed	03/19/2014
-Visit and assess St. Louis CC sector committee(s)		10/1/13	5/31/14	Completed EMCC made numerous attempts to contact St. Louis CC without success. This milestone will not be accomplished.	03/30/2015
-Establish MMSAC procedures, duties, strategic plan		10/1/13	6/30/14	Completed	06/15/2015
-Hold quarterly MMSAC meetings		10/1/13	9/30/14	Completed An initial meeting was held 3-27-14. Additional meetings have been held by D. Shaunak.	09/30/2014
-Review data and update MMSAC strategic plan		10/1/14	3/31/15	Completed	06/15/2015
-Evaluate MMSAC annually		10/1/14	5/31/15	Completed	06/30/2015
-Continue quarterly MMSAC meetings		10/1/14	9/30/15	Completed	09/30/2015
-Review data and update MMSAC strategic plan		10/1/15	3/31/16	Completed	03/28/2016
-Evaluate MMSAC annually		10/1/15	5/31/16	Completed	03/28/2016
-Continue quarterly MMSAC meetings		10/1/15	9/30/16	Completed	12/07/2016
- DOL reporting		10/1/13	9/30/17	Completed – except close-out	09/21/2017
- Data collection and evaluation		10/1/13	9/30/17	Completed – except close-out	09/21/2017
-Hire full-time Electro-Mechanical CTE technician instructor	Strategy 1: Build programs that meet industry needs. Action 1.2 Develop new 30-hour certificate and 60-hour certificate/AAS degree programs tied to NAM-endorsed certificates for electro-mechanical craft technicians, Mechatronics	10/1/13	1/6/14	Completed	01/01/2014
-Hire full-time Mechatronics CTE technician instructor		10/1/13	1/6/14	Completed	01/01/2014
-Hire full-time Welding/Fabricator technician instructor		10/1/13	3/31/14	Completed	06/01/2014
-Program Authorization by MCCB/EMCC Board		10/1/13	3/31/14	Completed MCCB approved welding/ fabricator program on 9/10/2014. MCCB approved Electro-Mechanical Technician Career Certificate, Technical Certificate, and Associate of	11/21/2014

	technicians, and welder/fabricator technicians. Action completed 12-1-16			Applied Science and Mechatronics Technician Advanced Certificate on 11/21/2014.	
-Train instructors and develop courses and credentials		10/1/13	4/1/14	Completed	04/28/2016
-Begin enrolling students		10/1/13	5/31/14	Completed Welding enrollment began January 7, 2015. Electro-mechanical began April 7, 2015. Mechatronics enrollment began 12/1/16	12/01/2016
-Instructors complete preliminary program curricula		10/1/13	7/31/14	Completed	03/31/2015
-Professional development visits to Fox Valley Technical College, Ivy Tech Community College and Amatrol, Inc.		10/1/13	7/31/14	Completed Visits made to Amatrol, Central Piedmont CC, OC Tech CC, Robeson CC, and Wayne CC in North Carolina and Nash CC and Guilford Tech CC.	07/31/2014
-Develop exit assessments with MMSAC input		10/1/13	8/1/14	Completed Welding approved by MCCB. Electro-Mechanical assessment approved by MCCB. Mechatronics exit assessment developed and pending MCCB approval.	04/28/2016
-Start technician programs		10/1/13	8/31/14	Welding started 1/7/2015; Electro-Mechanical started 8/17/2015; Mechatronics classes started 1/10/2017.	01/10/2017
-Credential instructors for AWS, NCCER, NIMS		10/1/13	9/30/14	Completed	11/21/2014
-Mechatronics instructor certification		10/1/13	12/31/14	Completed Part 1 and Part 2 Fanuc Robotics Certification.	07/01/2016
-Conduct first year program evaluation with MMSAC input		10/1/14	5/1/15	Completed Welding evaluation only since other programs delayed.	06/30/2015
-Instructors improve program curricula		10/1/14	7/31/15	Completed	07/31/2015
-Conduct second year program evaluation		10/1/15	5/1/16	Completed	03/28/2016
-Instructors finalize program curricula		10/1/15	7/31/16	Completed	08/31/2016

-Hire program instructors	Strategy 1: Build programs that meet industry needs. Action 1.3 Develop a new 15 semester hour CTE program tied to NAM-endorsed certificates that provides concurrent basic skills education and Modern Manufacturing Basic Skills training (including soft skills) to accelerate entry into high demand career pathways for individuals who score low on the CRC, especially those with high school degrees (not eligible for Adult Ed programs). Action completed 12-8-16	10/1/13	1/6/14	Completed	09/02/2014
-Complete Manufacturing Discovery program design		10/1/13	3/15/14	Completed	06/04/2014
-Obtain board approval		10/1/13	4/30/14	Completed Approved by EMCC Board 6/2/2014. MCCB has determined EMCC may operate this program without its approval on 9/10/2014. EMCC began offering courses to students August 18, 2014.	09/10/2014
-Begin enrolling students		10/1/13	4/30/14	Completed	07/07/2014
-Start classes		10/1/13	6/1/14	Completed	08/18/2014
-Conduct first semester evaluation		10/1/13	9/30/14	Completed Program was delayed awaiting state board action. Started in Fall 2014 instead of summer.	12/16/2014
-Conduct classes		10/1/13	9/30/14	Completed	08/18/2014
-Conduct second semester evaluation		10/1/13	12/31/14	Completed	06/09/2015
-Instructor improves program curriculum		10/1/14	7/31/15	Completed	07/31/2015
-Conduct classes		10/1/14	9/30/15	Completed	09/30/2015
-Instructor finalizes program curriculum		10/1/14	7/31/16	Completed	05/26/2016
-Conduct classes		10/1/15	9/30/16	Completed	12/08/2016
-Hire Coordinator, data clerk, and part- time trainers	Strategy 1: Build programs that meet industry needs. Action 1.4 Add capacity at the Golden Triangle campuses in Clay and Lowndes Counties to provide credential-based, non-credit customized training and credit training, and demonstrate non-credit to credit articulation based on those credentials. Action completed 12/30/2016	10/1/13	1/6/14	Completed Coordinator hired 11/4/14; Data clerk hired 1/1/14; Part-time trainers hired Jan. 1/6/15	01/06/2015
-Submit equipment list to Grant Officer for approval		10/1/13	2/28/14	Completed	02/12/2014
-Begin training/certifying instructors		10/1/13	3/1/14	Completed	01/06/2015
-Grant Officer approval of equipment bid packages		10/1/13	4/30/14	Completed	02/21/2014
-Advertise bid packages		10/1/13	5/31/14	Completed	03/21/2014
-EMCC Board authorizes equipment purchase		10/1/13	6/30/14	Completed	05/05/2014
-Final program officer approval of equipment bid packages		10/1/13	6/30/14	NA	
-Identify start-up skills training and credentials required by Yokohama		10/1/13	6/30/14	Completed - Customized training started in January 2014 for incumbent supervisory and technician personnel; on July 1, 2014 for non-incumbent technicians.	07/01/2014

				Production employee training began January12, 2015.	
-Order, install, equipment		10/1/13	7/31/14	Completed	08/21/2014
-Finalize start-up customized training plan		10/1/13	7/31/14	Completed	09/02/2014
-Begin customized training		10/1/13	8/1/14	Completed	01/06/2014
-Seek approval for pilot non-credit to credit articulation		10/1/13	3/15/15	Completed First leg of best practice competency crosswalk between non-credit and credit programs completed June 30, 2015.	03/03/2015
-Update customized training plan		10/1/13	9/30/15	Completed	06/09/2015
-Continued customized training		10/1/14	9/30/15	Completed	09/30/2015
-Evaluate customized training program		10/1/14	10/31/15	Completed	12/17/2015
-Update customized training plan		10/1/15	9/30/16	Completed	03/10/2016
-Continue customized training		10/1/15	9/30/16	Completed	12/30/2016
- Develop student recruitment marketing brochures that value certifications and a distribution plan	Strategy 1: Build programs that meet industry needs. Action 1.5 Market the value of certifications to employers and the general public. Action completed 11-30-16	10/1/13	1/31/14	Completed	03/31/2014
- Develop student recruitment TV, radio, and newspaper advertising materials that value certifications and a distribution plan		10/1/13	1/31/14	Completed First radio spot completed and aired in August 2014; Billboard went up in September 2014. TV spots started on November 8, 2014.	11/08/2014
-Distribute brochures		10/1/13	9/30/14	Completed	10/31/2014
-Advertise on radio, newspapers and TV		10/1/13	9/30/14	Completed Radio started in August 2014. Billboard ad ran September thru December 2014. TV ads ran in November and December 2014	11/01/2014
-Presentations to public forums		10/1/13	9/30/14	Completed Tracking system started	10/01/2014
-Repeat distribution, advertising, and presentations		10/1/14	9/30/15	Completed	09/30/2015
-Repeat distribution, advertising, and presentations		10/1/15	9/30/16	Completed	11/30/2016
-EMCC Board authorize merger into MMTE division	Strategy 2: Enhance career pathway options for learners and workers. Action 2.1	10/1/13	11/30/13	Completed	10/07/2013
-Develop plan to embed credentials in nine CTE programs		10/1/13	1/31/14	Completed	01/31/2014
-Begin every Friday professional development for faculty		10/1/13	4/1/14	Completed	03/21/2014
-Certify MMTE CTE faculty for NCCER Credentialing		10/1/13	4/1/14	Completed	01/18/2014

-One week summer academy for MMTE CTE instructors	Merge CTE and non-credit manufacturing programs into one sector-focused Modern Manufacturing Technology and Engineering (MMTE) administrative division, guided by the new Modern Manufacturing Sector Advisory Council, to facilitate a stackable credential career pathway model; embed NAM and local industry endorsed credentials into all programs. Action completed 12-09-16	10/1/13	7/31/14	Completed	05/23/2014
-Begin using credential-based assessments		10/1/13	8/1/14	Completed	04/01/2014
-Conduct review of revised CTE programs		10/1/13	8/31/14	Completed	08/29/2014
-EMCC Board approve credential-based exit assessments		10/1/13	5/31/15	MCCB approval received May 21, 2015, for Electrical and Welding programs; Automotive approved July 21, 2015; MCCB will only consider other programs as they roll program re-writes in coming months.	
-Continue Friday and summer professional development		10/1/14	9/30/15	Completed	09/25/2015
-Final review of CTE revised programs		10/1/14	5/31/16	Completed	05/26/2016
-Continue Friday professional development		10/1/15	9/30/16	Completed	12/09/2016
-Continuous outreach to other TAACCCT colleges to establish articulation agreements beginning	Strategy 2: Enhance career pathway options for leaerns and workers. Action 2.2 Develop new articulation agreements for CTE programs with other community colleges and universities. Action completed 5/31/16	10/1/13	3/1/14	Completed Reached out to TAACCCT colleges: Mira Costa, Bossier City, St. Louis, and Virginia Western	03/31/2014
-Attend AACC annual conference to reach out to other colleges July 2015		10/1/14	7/31/15	Cancelled	
-Develop Mechatronics articulation agreement with MSU's Industrial Technology program		10/1/14	6/30/16	Cancelled	
-Develop new technician CTE program articulation with MUW's		10/1/14	7/31/16	Completed	02/10/2016
-Attend the AACC conference to reach other colleges		10/1/15	7/31/16	Cancelled	
-Develop Mechatronics 2+2 degree program with Mississippi State University		10/1/15	9/30/16	Cancelled	
-Establish work-based learning/paid internships plan with MMSAC	Strategy 2: Enhance career pathway options for leaerns and workers. Action 2.3 Develop opportunities for work-based learning and paid internships. Action completed 9/12/16	10/1/13	3/31/14	Completed	05/13/2014
-Identify industries interested in work-based learning and paid internships		10/1/13	2/28/14	Completed	03/31/2014
-Place students		10/1/13	9/30/14	Completed -42 placed in Year 1	09/02/2014

-Place students with input from MMSAC		10/1/14	9/30/16	Completed - 96 placed in Year 2 -139 placed in Year 3	09/12/2016
-Develop plan to contextualize MMTE CTE programs	Strategy 3: Accelerate and improve certification and employment attainment. Action 3.1 Contextualize all nine manufacturing CTE programs by training instructors (using expert instructors) to integrate blueprint reading, measurement, safety, and lean manufacturing training from the non-credit Modern Manufacturing Skills Certificate Program into their programs. Action completed 12-09/16	10/1/13	1/31/14	Completed	03/20/2014
-Use expert instructor for summer academy, Action 2.1		10/1/13	6/30/14	Completed	05/20/2014
-Begin Friday professional development, see Action 2.1		10/1/13	9/30/14	Completed	03/21/2014
-Conduct review of revised CTE programs		10/1/14	5/31/15	Completed	06/15/2015
-Continue Friday and summer professional development		10/1/14	9/30/15	Completed	09/25/2015
-Final review of contextualized programs		10/1/15	9/30/16	Completed	05/26/2016
-Continue Friday professional development		10/1/15	9/30/16	Completed	12/09/2016
-Board of Trustees approval of change	Strategy 3: Accelerate and improve certification and employment attainment. Action 3.2 Base CTE program admission on achievement of a Silver Level CRC credential (based on ACT's CRC WorkKeys assessment). Action completed 5-31-16	10/1/13	2/3/14	Completed	03/03/2014
-Publish changes in catalog		10/1/13	2/28/14	Completed	09/16/2014
-Implement change		10/1/13	8/1/14	Completed	03/21/2014
-Annual review		10/1/14	9/30/16	Completed 2015 Annual review completed December 17, 2015 2016 Annual review completed May 31, 2016	05/31/2016
-Develop assessments for new technical PLAs	Strategy 3: Accelerate and improve certification and employment attainment. Action 3.3 Develop standard practices to award credit for prior learning and/or non-credit training for the new	10/1/13	6/30/15	Completed	6/30/2015
-Award PLA credit		10/1/13	9/30/16	Completed	11/05/2015

	technician education programs. Action completed 9/13/16				
-EMCC Board of Trustees approve positions	Strategy 3: Accelerate and improve certification and employment attainment. Action 3.4 Add a navigator to provide intrusive student services to include tutorial supports, retention counseling, and LMI based career choices. Action completed 12/16/16	10/1/13	11/15/13	Completed	10/07/2013
-Hire navigator		10/1/13	1/15/14	Completed	01/01/2014
-Complete navigator orientation and training		10/1/13	2/28/14	Completed	01/06/2014
-Begin recruiting, coaching, and serving as liaison with student services and financial aid by		10/1/13	2/28/14	Completed	01/06/2014
-Perform navigator duties		10/1/14	9/30/15	Completed	09/30/2015
-Perform navigator duties		10/1/15	9/30/16	Completed	12/16/2016
-Grant Officer approval of bid package for online CNC simulation software	Strategy 4: Strengthen online and technology-enabled learning. Action 4.1 Enhance modern manufacturing CTE instruction by providing special professional development workshops to instructors to fully utilize new and existing advanced online and technology-enabled systems. Action completed 12-09-16	10/1/13	11/30/13	Approval not needed	NA
-Develop plan to train instructors on use of new and existing advanced online and technology-enabled systems		10/1/13	1/31/14	Completed	03/20/2014
-Advertise bid package		10/1/13	3/31/14	Completed	03/20/2014
-One week summer academy, see Action 2.1		10/1/13	4/1/14	Completed	05/23/2014
-EMCC Board authorize purchase		10/1/13	5/31/14	Completed	06/02/2014
-Final program officer approval of bid package		10/1/13	6/30/14	Approval not needed	NA
-Order, install, software		10/1/13	7/31/14	Completed	09/04/2014
-Begin Friday professional development, see Action 2.1		10/1/13	7/31/14	Completed	03/21/2014
-Continue professional development and program review as in Actions 2.1 and 3.1		10/1/14	9/30/16	Completed First annual review completed 8/29/2014; second annual review completed 7/31/2015; final annual review completed 5/26/16	12/09/2016
-Pay stipends for creation of 5 hybrid online versions of sections within the new technician education courses	Strategy 4: Strengthen online and technology-enabled learning. Action 4.2 Develop hybrid online versions of sections within	10/1/14	9/30/15	Cancelled	

- Pay stipends for creation of 5 hybrid online versions of sections within the new technician education courses	the new technician education courses. Action completed 6-28-16	10/1/15	9/30/16	Completed College covered instructor costs to develop hybrid sections	06/28/2016
-Identify open source, online academic instruction/ remediation resource	Strategy 4: Strengthen online and technology-enabled learning. Action 4.3 Expand usage of self-paced, open source, online academic instruction/ remediation resources. Action completed 12-9-16	10/1/13	3/31/14	Completed	03/07/2014
-Link to MMTE CTE programs		10/1/13	6/30/14	Completed	06/05/2014
-Train navigators and instructors to use resources		10/1/13	7/31/14	Completed	05/23/2014
-Begin using resources		10/1/13	8/31/14	Completed	08/18/2014
-Evaluate program impact		10/1/14	6/30/15	Completed	06/25/2015
-Sustain program		10/1/14	9/30/16	Completed	12/09/2016

#	**Appendix D** Deliverables	Strategy/Action	Target End Date	Status at Quarter End	Actual End Date
1	Project evaluation plan	Strategy 1: Build programs that meet industry needs. Action 1.1 Replace manufacturing CTE Advisory Committees with one Modern Manufacturing Sector Advisory Council (MMSAC) to enhance partnerships with employers and the public workforce system, guide strategy implementation and review, and to review programs, data, credentials, and research, and make recommendations for program improvement.	2/28/14	Complete Submitted to SkillCommons	06/25/15
2	Modern Manufacturing Sector Advisory Committee (MMSAC) Procedures		4/30/15	Complete Submitted to DOL Revision submitted to SkillCommons	09/12/14 06/25/15
3	MMSAC Strategic Plan		5/31/15	Complete Submitted to SkillCommons	06/25/15
4	Labor Market Information (LMI) Plan		5/31/15	Complete Submitted to DOL Submitted to SkillCommons	 09/12/14 01/07/15
5	Final Project Evaluation Report		9/30/17	Completed Submitted to DOL	 09/21/2017
6	Electro-mechanical technician curriculum	Strategy 1: Build programs that meet industry needs. Action 1.2 Develop new 30-hour certificate and 60-hour certificate/AAS degree programs tied to NAM-endorsed certificates for electro-mechanical craft technicians, Mechatronics technicians, and welder/fabricator technicians.	9/30/16	Completed Submitted to SkillCommons	06/27/16
7	Mechatronics technician curriculum		9/30/16	Completed Submitted to SkillCommons	08/31/16
8	Welding/Fabricator technician curriculum		9/30/16	Completed Submitted to SkillCommons	06/27/16
9	Manufacturing Discovery developmental program curriculum	Strategy 1: Build programs that meet industry needs. Action 1.3 Develop a new 15 semester hour CTE program tied to NAM-endorsed certificates that provides concurrent basic skills education and Modern Manufacturing Basic Skills training (including soft skills) to accelerate entry into high demand career pathways for individuals who score low on the CRC, especially those with high school degrees (not eligible for Adult Ed programs).	9/30/16	Completed Submitted to SkillCommons	06/28/16
10	Start-up Customized Training Program for Yokohama	Strategy 1: Build programs that meet industry needs. Action 1.4 Add capacity at the Golden Triangle campuses in Clay and Lowndes Counties to provide credential-based, non-credit customized training and credit training, and demonstrate non-credit	7/31/14	Complete Submitted to DOL Submitted to SkillCommons	 09/12/14 06/15/15
11	Non-credit to credit credential based articulation program		3/15/15	Complete Submitted to SkillCommons	11/20/15

12	Updated Customized Training Program for Yokohama	to credit articulation based on those credentials.	9/30/15	Complete Submitted to SkillCommons	08/26/15
13	Updated Customized Training Program for Yokohama		9/30/16	Complete Submitted to SkillCommons	03/24/16
14	Student Recruitment Marketing Brochures that value certifications	Strategy 1: Build programs that meet industry needs. Action 1.5 Market the value of certifications to employers and the general public.	3/31/14	Complete Submitted to DOL Submitted to SkillCommons	 09/12/14 06/15/15
15	Student Recruitment TV, Radio, and Newspaper advertising materials		3/31/14	Complete Submitted to SkillCommons	03/16/15
16	Revised curricula for CTE programs – Automotive Technology, Electrical Technology, Electronics, Automation and Control, Welding, Drafting and Design	Strategy 2: Enhance career pathway options for learners and workers. Action 2.1 Merge CTE and non-credit manufacturing programs into one sector-focused Modern Manufacturing Technology and Engineering (MMTE) administrative division, guided by the new Modern Manufacturing Sector Advisory Council, to facilitate a stackable credential career pathway model; embed NAM and local industry endorsed credentials into all programs.	6/30/16	Complete Submitted to SkillCommons	06/14/16
17	Articulation agreements with other community colleges	Strategy 2: Enhance career pathway options for leaerns and workers. Action 2.2 Develop new articulation agreements for CTE programs with other community colleges and universities.	9/30/15	Complete Submitted to SkillCommons	11/20/15
18	Articulation agreement with MSU's Industrial Technology Program		9/30/16	Complete Submitted articulation agreement with MUW to Skill Commons	03/05/16
19	2+2 Mechatronics program curricula		9/30/16	Cancelled	
20	OJT and Work-based learning plan	Strategy 2: Enhance career pathway options for learners and workers. Action 2.3 Develop opportunities for work-based learning and paid internships.	9/30/14	Complete Submitted to DOL 12/18/14 but rejected and told to submit to SkillCommons. Submitted to SkillCommons	01/07/15
21	Revised curricula for CTE programs (combined with Action 2.1)	Strategy 3: Accelerate and improve certification and employment attainment. Action 3.1 Contextualize all nine manufacturing CTE programs by training instructors (using expert instructors) to integrate blueprint reading, measurement, safety, and lean manufacturing training from the non-credit Modern Manufacturing Skills Certificate Program into their programs.	6/30/16	Complete Submitted to SkillCommons	06/14/16
22	PLA Standard Practices	Strategy 3: Accelerate and improve certification and employment attainment. Action 3.3 Develop standard practices to award credit for prior learning and/or non-credit training for the new technician education programs.	9/30/15	Complete Submitted to SkillCommons	11/20/15

23	Revised curricula for CTE programs (combined with Actions 2.1 and 3.1)	Strategy 4: Strengthen online and technology-enabled learning. Action 4.1 Enhance modern manufacturing CTE instruction by providing special professional development workshops to instructors to fully utilize new and existing advanced online and technology-enabled systems.	6/30/16	Complete Submitted to SkillCommons	06/14/16
24	Five hybrid online versions of sections within the new technician education courses	Strategy 4: Strengthen online and technology-enabled learning. Action 4.2 Develop hybrid online versions of sections within the new technician education courses.	12/15/15	Cancelled	
25	Five hybrid online versions of sections within the new technician education courses		12/15/16	Complete Submitted to SkillsCommons	07/22/16
26	List of open source, online academic instruction/ remediation resources	Strategy 4: Strengthen online and technology-enabled learning. Action 4.3 Expand usage of self-paced, open source, online academic instruction/ remediation resources.	8/1/14	Complete Submitted to DOL Submitted to SkillCommons Revision submitted to SkillCommons	 09/12/14 06/16/15 06/29/15