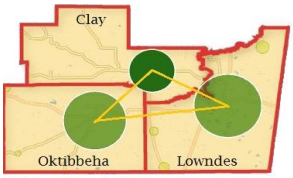
East Mississippi Community College
Golden Triangle Modern Manufacturing Project



Golden Triangle Modern Manufacturing

Detailed 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.

Related Deliverable – Detailed evaluation plan.

The following detailed evaluation plan was developed by the third party evaluator, the data provider – nSPARC, the program manager, and college staff. Recommendations by DOL were incorporated into the plan.

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Trade Adjustment Assistance Community College Career Training
Grant Program: Round 3

GOLDEN TRIANGLE MODERN MANUFACTURING PROJECT

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

DETAILED EVALUATION PLAN

II. Introduction

The Golden Triangle Modern Manufacturing Project is designed to transform East Mississippi Community College's Career and Technical Education programs to better meet market demands and provide new career pathways and employment opportunities to TAA eligible workers, Veterans, and other adults in the region. The goals of third-party evaluation are to determine if the project is implemented effectively, deploys strategies effectively to accomplish desired project outcomes, and results in positive impacts for participants.

The evaluation plan will consist of two parts: 1) a formative evaluation of project implementation; and 2) a quasi-experimental evaluation of project outcomes and impacts. The formative evaluation is to determine if the project is on target in deploying strategies to accomplish project outcomes. The process is designed to ensure the program is operating as intended and is on schedule to accomplish objectives. It will guide discussion about potential changes in the implementation process. The quasi-experimental evaluation will consist of both descriptive analyses and sets of multivariate regression models that examine differences between carefully designed comparison groups. Propensity Score Matching (PSM) techniques and Power Analysis will be used to design and size comparison groups. The evaluation plan will use a non-experimental research design that utilizes both descriptive analyses as well as sets of multivariate regression models that examine differences between carefully designed comparison groups.

The descriptive analyses, in particular, will provide an outcomes study for participants in the new non-credit customized training program, the new Manufacturing Discovery developmental program, and the new technician level credit programs for which comparison groups are not available. Multivariate regression models in conjunction with descriptive analyses will provide an impacts study for participants in the revised manufacturing Career and Technical

Education programs for which a comparison group has been selected. The impact analysis will consist of two parts. First, a descriptive analysis will be conducted to examine differences between the program participants and the comparison group on selected outcomes. This analysis will also include an examination of the outcomes of TAA-eligible grant participants as well as other subgroups. Assessment of data output during the course of the project will allow the third-party evaluator to provide input to project management on progress relative to project milestones and mid-course corrections.

Dr. Sandra H. Harpole, director of Mississippi State University's Center for Science, Mathematics, and Technology (CSMT), will serve as the third-party evaluator for the Golden Triangle Modern Manufacturing Project. Dr. Harpole, professor emerita of physics, retired as the university's associate vice president for research in 2009. Since that time she has been employed part-time as director of the CSMT and project director for three National Science Foundation (NSF) projects. Her services will be contracted through her company SHH Consulting LLC.

Detailed research questions will inform project performance, the outcomes study, and the impacts study. Research questions will include those required by the SGA plus 15 others, including questions about capacity. Twenty research questions will guide and ensure rigorous evaluation analysis of the outcomes/impact analysis. Data on participants will be collected by the college and uploaded to the National Strategic Planning & Analysis Research Center (nSPARC) at Mississippi State University. nSPARC collects and tracks student data for all Mississippi's community colleges and has access to the Mississippi Department of Employment Security Unemployment Insurance administrative database which provides employment and wage information for each participant. nSPARC will provide the third party evaluator with outcomes

analyses, multivariate regression model analyses, and participant performance data needed for her evaluations.

The third-party evaluator will prepare a summative evaluation for all parties during the third quarter of 2017 and will submit a final report to the U.S. Department of Labor prior to September 30, 2017. She will no later than 18 months into the project, perform an evaluation of the program design and project outcomes to date and submit a report to submit to the U.S. Department of Labor Grant Officer. She will provide EMCC and the Modern Manufacturing Sector Advisory Council interim reports quarterly and a comprehensive report annually summarizing the progress to date with suggestions for mid-course corrections.

III. Interventions

The interventions proposed will close gaps identified by employers and workforce partners to enable East Mississippi Community College to better serve TAA-eligible and other adults seeking education or career training (the target population) and the manufacturing firms in the region (the target industries). These interventions were derived from the evidence-based design used by 2012 TAACCCT grantee St. Louis Community College for its Missouri Manufacturing Workforce Innovations Network project. Four evidence-based strategies comprised the St. Louis Community College project and are replicated as the strategies for this project: 1) Build programs that meet industry needs; 2) Enhance career pathway options for learners and workers; 3) Accelerate and improve certification and attainment ; and 4) Strengthen online and technology-enabled learning. A key facet of this approach is the use of the National Association of Manufacturers (NAM) endorsed Skills Certification System. Fifteen actions will accomplish these strategies. They follow the St. Louis model with some adaptations to meet gaps

identified by manufacturers and workforce partners in the Golden Triangle Region. Each of the four strategy/actions combinations is an intervention.

INTERVENTION #1 – Strategy 1: Build programs that meet industry needs. Actions: 1) Replace the manufacturing CTE Advisory Committees with one Modern Manufacturing Sector Advisory Council (MMSAC) to enhance partnerships with employers and the public workforce system, to guide strategy implementation and review, and to review programs, data, credentials, and research, and make recommendations for program improvement. 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. 3) Develop a new 15-semester hour Manufacturing Discovery 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). 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. 5) Market the value of certifications to employers and the general public.

This intervention adds capacity in the form of instructors, equipment, recruitment marketing, and articulation for new programs and, through the new sector advisory council, it adds the capacity to respond more quickly to changing industry demand. All components of this intervention will be evaluated.

The changes this intervention should effect for the target population are: 1) clear pathways and programs through which more students and/or graduates are better prepared for

work and find higher-wages jobs with benefits; and 2) two years after completing training, participants will feel their future jobs, employment, or career prospects are better because of their experiences with sector training programs (Reference List 2). Changes this intervention should effect for the target industries are: 1) NCRC, NAM-endorsed, and industry-recognized credentials; and 2) program completers with the skills industry needs.

INTERVENTION #2 – Strategy 2: Enhance career pathway options for learners and workers. Actions: 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. 2) Develop new articulation agreements for CTE programs with other community colleges and universities. 3) Develop opportunities for work-based learning and paid internships.

This intervention adds the capacity to deliver credentials and credential-related instruction within existing programs. It also adds pathways for higher education access and work-based learning and paid internships. All components of this intervention will be evaluated.

The changes this intervention should effect for the target population are: 1) clear pathways and programs through which more students and/or graduates are better prepared for work and find higher-wages jobs with benefits; 2) two years after completing training, participants will feel their future jobs, employment, or career prospects are better because of their experiences with sector training programs; 3) improved outcomes; and 4) credentials of value in the labor market.

INTERVENTION #3 – Strategy 3: Accelerate and improve certification and attainment. Actions: 1) Contextualize all manufacturing CTE programs by training instructors to integrate

blueprint reading, measurement, safety, and lean manufacturing training from the non-credit Modern Manufacturing Skills Certificate Program into their programs. 2) Base CTE program admission on achievement of a Silver Level CRC credential (based on ACT's CRC WorkKeys assessment). 3) Develop standard practices to award credit for prior learning and/or non-credit training for the new technician education programs. 4) Add a navigator to provide intrusive student services to include tutorial supports, retention counseling, and LMI based career choices.

This intervention adds instructional capacity and pathways to further education through awarding credit through PLA. It also adds navigator capacity to provide counseling and support for participants. All components of this intervention will be evaluated.

The changes this intervention should effect for the target population are: 1) clear pathways and programs through which more students and/or graduates are better prepared for work and find higher-wages jobs with benefits; 2) two years after completing training, participants will feel their future jobs, employment, or career prospects are better because of their experiences with sector training programs; 3) improved student success; 4) higher graduation rates, better persistence, and lower time to degree for PLA students; and 5) improved student outcomes.

INTERVENTION #4 – Strategy 4: Strengthen online and technology-enabled learning. Actions: 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. 2) Develop hybrid online versions of sections within the new technician education courses. 3) Expand usage of self-paced, open source, online academic instruction/ remediation resources.

This intervention adds instructional capacity, online course-offerings, and access to open

source, online academic resources. All components of this intervention will be evaluated.

The change this intervention should cause for the target population is moderately better student outcomes.

IV. Implementation Analysis Design

To analyze the steps taken by the institution to create and run the training programs of the project, the third-party evaluator will:

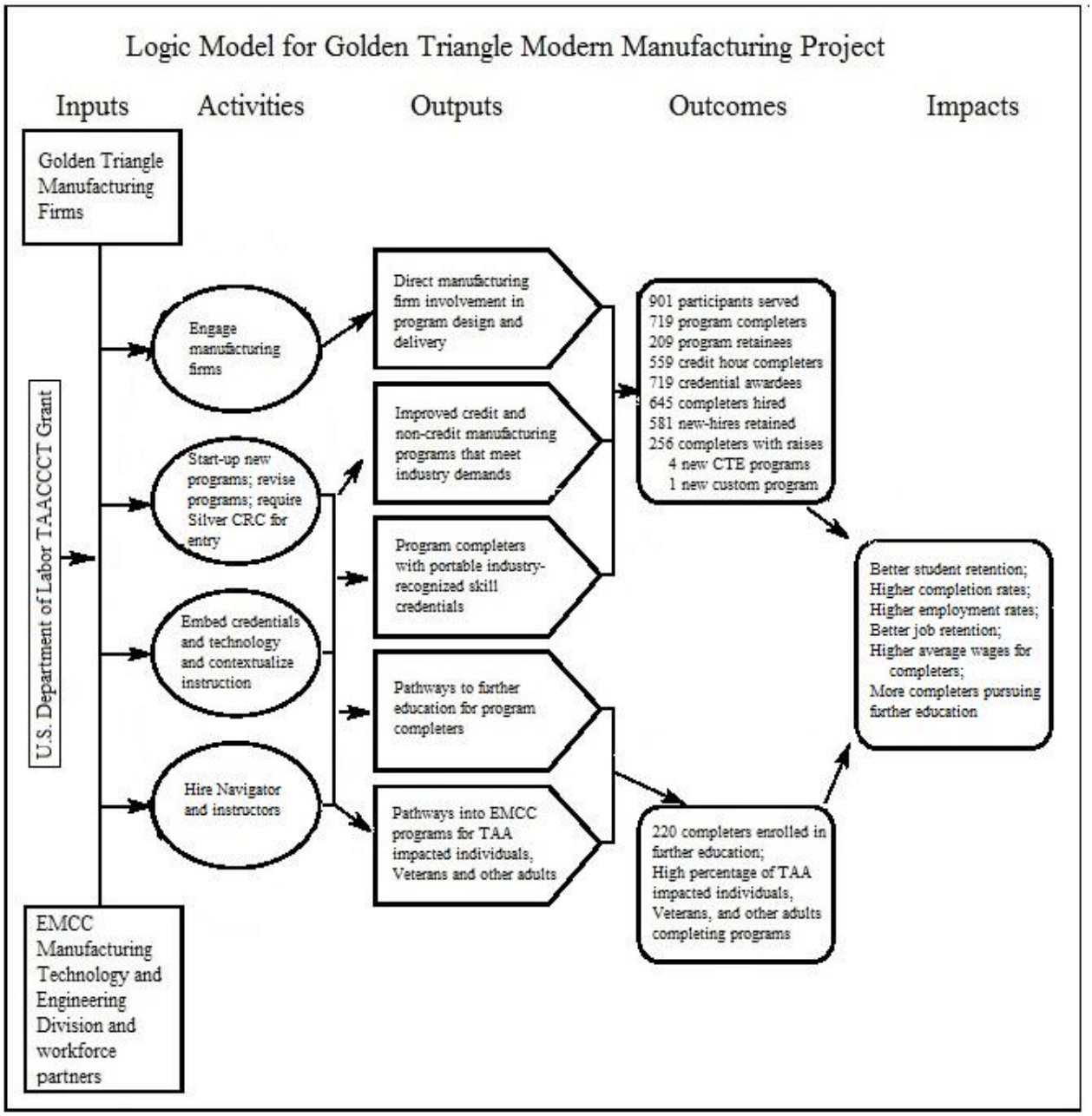
- Conduct structured interviews with industry representatives (including the Modern Manufacturing Sector Advisory Council) students, faculty, and project management;
- Make site visits to selected classes and industry sites; and
- Review quarterly reports and other documents provided by project management.

To assess the operational strengths and weaknesses of the project after implementation, the third-party evaluator will:

- Review the number and timeliness of statement of work tasks accomplished;
- Review the external reviews and timeliness of deliverables;
- Review the number of statement of work modifications;
- Review feedback from the FPO and the DOL national office;
- Conduct interviews with members of the MMSAC, project staff, program instructors, institutional management, and the FPO.

To suggest how implementation might be strengthened within appropriate timing so as not to interfere with the impact/outcomes analysis, the third-party evaluator will provide EMCC and the Modern Manufacturing Sector Advisory Council interim reports quarterly and a comprehensive report annually summarizing the progress to date with suggestions for mid-course corrections.

To lay the foundation for the implementation analysis, the theory of change was articulated in the logic model (see below). Essentially, the Golden Triangle Modern Manufacturing Project hypothesizes that if TAA eligible workers, Veterans, and other adults are provided opportunities to master skills required by local manufacturing employers, they will increase their employability.



Also, by providing opportunities for students to receive credit for non-credit training and prior learning experience plus articulation agreements providing completers better access to universities, participants will increase their participation in further education.

IV.A. Implementation Analysis Research Questions

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.

IV.B. Implementation Analysis Data Strategies

Data sources the third party evaluator will utilize to address the research questions include:

- Structured interviews based on the research questions with industry representatives and workforce system partners (including the Modern Manufacturing Sector Advisory Council), students (including TAA eligible workers and Veterans), faculty, project management, faculty from articulated institutions, and others as applicable.
- Participant performance data collected, aggregated, and analyzed by EMCC and Mississippi State University's n-SPARC, including program retention, completion, employment, and wage data.
- Quarterly reports filed by EMCC.
- Baseline capacity data prepared by project management to include existing 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.

The third party evaluator will manage and analyze the data collected through structured interviews. Project management will provide quarterly report information for analysis. Participant performance data will be collected and provided to the third party evaluator for analysis as follows: EMCC will enter student data into its Datatel system to track students in Career and Technical Education programs. EMCC will enter student data into a customized database to track students in non-credit customized training programs and to track credentials

and other data points that do not the Datatel system. EMCC will upload data from these systems to nSPARC. nSPARC, under contract with the State Workforce Investment Board through the Mississippi Department of Employment Security, collects and tracks student data for all Mississippi's community colleges and has access to the Mississippi Department of Employment Security Unemployment Insurance administrative database which provides employment and wage information for each participant. nSPARC will provide the third party evaluator with analysis and participant performance data needed for her evaluations. nSPARC will provide special reports as needed upon request. Data will also be kept by the project Navigator in a secured location that will contain file notes and certifications by participant.

V. Outcomes/Impact Analysis Design

The plan for rigorously evaluating the participant outcomes and impacts will rely upon a non-experimental research design that utilizes both descriptive analyses as well as sets of multivariate regression models that examine differences between carefully designed comparison groups. The quasi-experimental outcomes/impact evaluation, to be conducted during the last year of the grant, will consist of both descriptive analyses and sets of multivariate regression models that examine differences between carefully designed comparison groups. Propensity Score Matching (PSM) techniques and Power Analysis will be used to design and size comparison groups.

The outcomes analysis will consist of an examination of the performance of grant participants on selected outcomes, including the nine required SGA outcomes. The outcomes analysis will include descriptive analyses to examine outcomes for participants in the new technician programs, the new Manufacturing Discovery developmental program, and the new non-credit customized training programs for which there are no comparison groups.

The impact analysis, focusing on participants in the improved manufacturing education programs for which a comparison group can be selected, will consist of two parts. First, a descriptive analysis will be conducted to examine differences between the program participants and the comparison group on selected outcomes. This analysis will also include 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 will be 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.

V.A. Outcomes/Impact Analysis Research Questions

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 credentials?
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)?
12. What were the program completion rates for both cohorts (overall, by program, and by subgroup)?
13. What was the employment rate for completers both cohorts (overall, by program, and by subgroup)?
14. What were the job retention rates for both cohorts (overall, by program, and by subgroup)?
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 for both cohorts (overall, by program, and by subgroup)?
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?

V.B. Outcomes Analysis

Outcomes to be analyzed, including the nine outcomes required in the SGA, and related measures are shown in Table 1 below.

Table 1: Measures for Outcomes Analysis

Outcome	Measurement
Number of individuals that entered the target programs	Cumulative number of individuals over the course of the grant
Number of total participants completing a grant-funded program of study	Number and percentage of unique participants earned a degree or certificate of completion
Total number of participants not completing but retained in their program of study	Number and percentage of unique participants not completing a grant-funded program of study but remaining enrolled
Total number of participants completing credit hours	Number and percentage of participants enrolled and completing any number of credit hours
Total number of participants earning credentials	Number and percentage of participants completing degrees or certificates in grant-funded programs of study
Total number of participants that enroll in further education	Number and percentage of participants that complete a grant-funded program of study and enter another program of study
Total number of participants employed after completing a program of study	Number and percentage of non-incumbent worker participants that completed a grant-funded program of study and entered employment one quarter after program exit
Total number of participants retaining employment after completing a program of study	Of the total number of non-incumbent worker participants that completed a grant-funded program of study and entered employment one quarter after program exit, the number and percentage retaining employment in the second and third quarters after program exit
Total number of those participants employed at enrollment that received a wage increase post enrollment	For incumbent workers retaining employment, the number and percentage earning an increase in wages
Earnings change for incumbent workers	The average change in earnings for incumbent workers enrolling and completing grant-funded programs of study
New programs developed	Number of new programs developed
Student retention	Number and percentage of participants who persist from first semester to second semester and from third semester to fourth semester
Average wages	The average wage for all program completers one year after program completion
Work-based learning and paid internships participation	Number and percentage of participants who participate in work-based learning or paid internships while enrolled
Participants earning PLA	The number and ratio of students receiving PLA credits

The hypotheses for how the interventions will affect these outcomes are: 1) the interventions will improve student retention rates, program completion rates, employment rates, job retention rates, average wage rates, and participation rates in further education; and 2) the interventions will improve the rate of students receiving credit for non-credit training or PLA. Outcome measures, including the nine required by the SGA, will be measured using the data output from nSPARC on a quarterly and annual basis plus information provided by EMCC. The outcomes and impacts requiring comparison between cohorts and subgroups, e.g. TAA eligible participants, Veterans, and demographic subgroups, will be measured using the data output and analysis from nSPARC on an annual basis.

The nine outcomes required by the SGA will be used by the third party evaluator to assess progress in grant fulfillment quarterly and annually.

The third party evaluator will provide an impacts study for participants in the revised manufacturing Career and Technical Education programs for which a comparison group has been selected. The evaluator will provide an outcomes study for participants in the new non-credit customized training program and the new technician level credit programs for which comparison groups are not available.

V.D. Non-Experimental Design (if selected method for impact analysis)

A quasi-experimental research design is 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 will be indentified to comprise the historical comparison group. The grant participant comparison cohort will be comprised of students enrolling as first-time students at EMCC in comparable programs improved through grant initiatives.

A power analysis will be used to determine the minimum sample size of the treatment group for the test. The power will be set at 0.8 with and the significance level (α) at 0.01.

The total participant group is projected to include 901 unique individuals who will enroll and participate in grant-funded programs of study during this period. Of these approximately 434 will participate in new, customized, non-credit training programs to be developed and 210 will participate in new Career and Technical Education technician programs to be developed. There are no comparison groups available for selection for these participants. A total of 256 unique individuals are projected to participate in revised Career and Technical Education manufacturing programs. A comparison group for these participants can and will be selected for the impacts study.

The participant comparison group and the historical comparison group will be specified so that causal inferences can be drawn on the impact of grant activities on participant outcomes. The participant group for this evaluation will be drawn from all students who enroll in revised grant-funded manufacturing programs from AY 2013 through AY 2016. The comparison group will be identified from an historical cohort of students enrolled at EMCC from AY 2009 through AY 2012. To ensure comparability of outcomes, the historical comparison group will be comprised of first-time students at EMCC in comparable programs to the grant initiatives. The historical programs comparable to the grant-funded programs of study include the following: (1) automotive technology, (2) automation and control technology, (3) drafting and design technology, (4) electronics technology, (5) electrical technology, and (6) welding technology.

This group was selected because it is the most recent cohort participating in the existing set of programs to be improved that does not overlap with the grant-funded programs. Entry into both cohorts was and is by self-selection of the students. The only criterion for entry was and is to meet entry-level academic requirements. The entry-level requirement for the participant cohort is changing. A Silver or better CRC will now be required.

To generate a robust sample size, a multi-year pooled cohort design consisting of students enrolling in the above programs will be utilized. Students enrolling in comparable programs in AY 2009 through AY 2012 will be included in the comparison group to ensure that enrollment precedes grant-funded activities beginning in 2013. To ensure fidelity of implementation, any comparison group member subsequently enrolling in a grant-funded program of study will be excluded from the comparison cohort. Cohort sizes project to be similar. A preliminary analysis shows over 250 students enrolled in these programs between AY 2009 and AY 2012. Approximately 256 students are projected to enroll in comparable programs between AY 2013 and AY 2016.

Not using a randomly-assigned control group introduces "individual differences" which compromise the ability to infer with confidence that observed differences in outcomes between the treatment and comparison groups are indeed attributable to the Golden Triangle Modern Manufacturing Project. An attempt will be made to control for these individual differences by using a statistical technique called *Propensity Score Matching* (PSM).

PSM attempts to reduce the bias in observed covariates between treatment and comparison groups. Basically, there are five steps in PSM: (1) create a propensity score by running logistic regression model; (2) balance propensity scores across treatment and comparison groups; (3) balance the observed covariates across treatment and comparison groups

within strata of the propensity score; (4) employ nearest neighbor matching or kernel weighting strategies to further balance the covariates across treatment and comparison groups; (5) evaluate and ensure the balance of covariates across treatment and comparison groups in the matched or weighted sample. The resulting matched or weighted sample is used for further analyses. Observed covariates taken into account with PSM could include a variety of demographic and economic characteristics (e.g., age, ethnicity, gender, race, education level, military background, work history, previous earnings).

PSM is helpful to find matches across treatment and comparison groups so that observed confounders can be equally distributed between two groups. This, in turn, is useful to improve the accuracy of project evaluation. However, PSM cannot account for unobserved confounding variables.

V.E. Outcomes/Impact Data Collection and Analysis

Rigorously evaluating participant outcomes requires the collection, compilation, and lining up of unit-record data from several databases, including individual-level community college, university, and employment/earnings records. To this end, Mississippi has a well-established and robust statewide integrated longitudinal education and workforce data system. This system, known as Mississippi LifeTracks, is managed by the National Strategic Planning & Analysis Research Center (nSPARC) at Mississippi State University (www.lifetracks.ms.gov).[1] All Mississippi community colleges contribute unit-record data to this system. The system also includes individual-level administrative records that date as far back as 2005 from all education (PK-20) and workforce agencies in the state. The U.S. Department of Education has deemed

[1] Mississippi LifeTracks has a very well-defined procedure to de-identify unit record data to protect and maintain confidentiality. A randomized 10-digit ID is created for each unit record, and all PII is removed once the ID has been generated. Data is linked across databases using the 10-digit ID.

Mississippi's system as one of the best and most unique in the country, and it is heavily utilized by all community colleges in the state to evaluate program effectiveness.

Additional data from Mississippi Lifetracks will be used to measure labor market and education outcomes of program participants. Participant employment and earnings outcomes will be gauged using data from the Mississippi Department of Employment Security's Unemployment Insurance administrative database. Participant enrollment in further education will be determined from unit record data from Mississippi Institutions of Higher Learning (IHL) and the community college system. Finally, to gauge economic background of participants, participation in the TANF and SNAP programs will be identified using data from the Mississippi Department of Human Services.

The data will allow for the measurement of the following education and training outcomes of program participants and comparison group members: (1) retention in and completion of a grant-funded program of study, and (2) additional education programs taken at community colleges or the university system. In addition, the following labor market outcomes will be measured: (1) entered employment in the next quarter after program completion; (2) retained employment in the second and third quarters after completion (employment occurred in the first quarter); (3) average earnings after completion for those employed, and (4) change in earnings comparing pre-program and post-program wages for incumbent workers.

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.

A set of logistic regression models will be 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 is 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 will be 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 is the annualized earnings for the i^{th} individual. X_i is the vector of explanatory variables. ε_i is the random error term. β_0 is the intercept, and it represents the average earning when $X_i = 0$. β is a vector of regression parameters that account for the differential impact of factors on earnings.

Table 3: Variable Description

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

VI. Limitations

The non-experimental design for this evaluation analysis has been specified to minimize threats to internal validity. However, one limitation is that the participants are not randomly assigned to the treatment and comparison group. This is a limitation that we have to consider in our analysis when we look for factors that might influence outcomes and to be careful in making general inferences about cause/effect relationships. Another limitation is that our analysis might have low external validity. Because the goals and objectives of the grant activities are focused specifically on manufacturing-oriented programs at EMCC that align education with labor market opportunities in the tri-county Golden Triangle Region, it is 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 is available in the literature for similar programs in different labor market contexts.

VII. Reports

The third-party evaluator during the fourth year of the project will meet periodically with college and project leadership to provide suggestions for final adjustments and sustainability. She will prepare a summative evaluation for all parties during the third quarter of 2017 and will submit a final report to the U.S. Department of Labor prior to September 30, 2017. The third-party evaluator will no later than 18 months into the project, perform an evaluation of the program design and project outcomes to date and submit a report to submit to the U.S. Department of Labor Grant Officer. She will provide EMCC and the Modern Manufacturing Sector Advisory Council interim reports quarterly and a comprehensive report annually summarizing the progress to date with suggestions for mid-course corrections. She will use the

NSF recommended The User Friendly Handbook for Project Evaluation as a guide for report structure and content (Reference List 14).

VIII. Reference List

1) Maguire, S., Freely, J., Clymer, C., Conway, M., and Schwartz, D. (2010). Tuning in to Local Labor Markets: Findings from the Sectoral Employment Impact Study. (Private/Public Ventures. Strong Evidence contending that 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) Zandniapour, L. and Conway, M. (2002). Gaining Ground: The Labor Market Progress of Sectoral Employment Development Programs. The Aspen Institute. (Moderate evidence based on the Sectoral Employment Development Learning Project longitudinal survey of participants of industry-based workforce development programs about two years after completing training that a significant majority of participants felt their future jobs, employment, or career prospects were better because of their experiences with sector training programs.)

3) Rouse, R. and Miller, L. (2011). Creating Value from HR: The New Credentialed Manufacturing Workforce. Apollo Research Institute. (Preliminary evidence that NCRC and NAM-endorsed credentials provide value to the industry. Research found that firms observed value to recruiting costs, training investment, retention, advancement, and engagement and input; they reported less value to relocation costs and safety. Firms consistently agreed the NAM-endorsed manufacturing Skills Certification System would benefit the manufacturing industry as a whole; however, to be most beneficial, changes must be made within organizations, the industry, and the educational system. Conclusions: A catch -22 situation

exists; the manufacturing industry has not universally adopted the skills certification system, and educational institutions are offering limited certification classes, often at inconvenient times. An identified next step is that NAM should consider creating and implementing a communication plan to better educate manufacturing organizations on the NAM-endorsed manufacturing Skills Certification System.)

4) Lamos, E., Simon, M., Waits, M.J., Fulton, B., and Bird, J. (2010). A Sharper Focus on Technical Workers: How to Educate and Train for the Global Economy. NGA Center for Best Practices. (Preliminary evidence from a study of AMTEC provides an overview of Automotive Manufacturing Technical Education Collaborative (AMTEC) that illustrates the importance of developing real world curricula with industry to ensure students have the skills industry needs.)

5) Jenkins, D. (2011). Redesigning Community Colleges for Completion: Lessons from Research on High Performance Organizations. Community College Research Center. (Preliminary evidence from Jenkins' overview of research related to organizational redesign. He applies this work to community colleges to identify avenues to improve administrative structures to support student success. Jenkins postures that there are eight practices that affect performance of organizational goals: leadership, focus on the customer, functional alignment, process improvement, use of measurement, external linkages, employee involvement, and professional development. When applied to community colleges, these principles could improve student outcomes.)

6) Baider, A., Choitz, V., Duke-Benfield, A.E., Foster, M., Harris, L., Lower-Basch, E., Ridley, N., and Strawn, J. (2010). Funding Career Pathways and Career Pathway Bridges: A Federal Policy Toolkit for States. Center for Law and Social Policy (CLASP). (Moderate evidence

supporting work with industry to sequence education and training leading to credentials of value in the labor market; secure internships, clinical sites and jobs to underscore relevance of skills.)

7) Perrin, D. (2011). Facilitating Student Learning Through Contextualization. Community College Research Center. (Moderate evidence from a review of several studies that indicate that contextualization is a promising opportunity to accelerate the progress of academically underprepared students. Even more practitioners indicate that they have seen positive results and studies suggest it is a viable avenue for improving student success, including some adults.)

8) Houghton, T. and Proscio, T. (2011). Hard Work on Soft Skills. Public/Private Ventures. (Preliminary evidence finds that students who only develop hard skills may be as hard to employ as those who learn no skills at all. The research also found that support services and soft skills complement each other. The programs reviewed used simulations of the workplace to teach and practice soft and technical (or hard) skills in business settings.)

9) Brigham, C. and Klein-Collins, R. (2010). Availability, Use and Value of Prior Learning Assessment within Community Colleges. CAEL. (Preliminary evidence that students with Prior Learning Assessment (PLA) credit had higher graduation rates, better persistence, and lower time to degree, compared to students without PLA credit.)

10) Karp, M. (2011). Toward a New Understanding of Non-Academic Student Support: Four Mechanisms Encouraging Positive Student Outcomes in the Community College. Community College Research Center. (Review of preliminary research studies generally supports the notion that non-academic support can improve student outcomes. The specific service or program by which a support is delivered is less important than the processes that encourage

positive outcomes. The four mechanisms that appear to encourage student success are: creating social relationships; clarifying aspirations and enhancing commitment developing college know-how; and making college life feasible.)

11) Means, B., Toyama, Y., Murphy, R., Bakia, M., and Jones, K. (2010). Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies. U.S. Department of Education. (Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies: Strong evidence from a U.S. Department of Education meta-study that instruction combining online and face-to-face elements had a larger advantage relative to purely face-to-face instruction than did purely online instruction. However, students in online conditions performed modestly better, on average, than those learning the same material through traditional face-to-face instruction. Study focuses only on web-based delivery and does not include video and audio-based telecourses or stand-alone, computer-based instruction.)

12) Neuhauser, C. (2002). Learning Style and Effectiveness of Online and Face-to-Face Instruction. American Journal of Distance Education, Volume 16, Issue 2, pp. 99 – 113. (Moderate Evidence contending that 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.)

13) Jaggars, S. (2011). Online Learning: Does It Help Low-Income and Underprepared Students? Community College Research Center. (Review of moderate to strong research findings from 34 papers (some including multiple studies, resulting in a total of 36 studies) reaching different conclusions about online learning. One randomized and three controlled studies showed no difference between online and face-to-face completion rates. Six of the

controlled studies that showed higher withdrawal rates for online courses dealt with community college students. Various studies found that online coursework as typically implemented may hinder progression for low-income and underprepared students. A recent meta-analysis of the most high-quality studies (U.S. Department of Education, 2009) suggestion that online learning results in similar or better outcomes than does face-to-face learning.)

14) Frechtling, J. (2010) The 2010 User-Friendly Handbook for Project Evaluation.