**Transforming Education for Advanced Manufacturing (TEAM)**
**Trade Adjustment Assistance Community College and Career Training Grant**
# *Revised* Evaluation Plan – December 15, 2015

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## II. Introduction

The goal of the evaluation of the South Dakota TEAM (Transforming Education for Advanced Manufacturing) program is to provide program leaders, partners, and funders with data-based observations for informing the implementation process and for making judgments about program effectiveness. The evaluation of this program is designed to reflect a formative assessment of the implementation of specific interventions and a summative assessment of the program's outcome measures.

The assessment of the program's implementation and outcome measures will be drawn from the following data sources: deliverables and other products produced by the program; notes and documents generated via program activities; interview, survey, and focus group data from program leaders, partners, participants, and employers, and participant record information provided by Lake Area Technical Institute's (LATI) Data Management System. The Data Management System collects data from *Jenzabar*, the student management system used at LATI. It includes demographic information including TAA eligibility as well as enrollment dates, credits and diplomas earned, employment status, and wage information.

Evaluation methodologies include: examination of the content and the alignment of the deliverables and other products with identified interventions; design, administration, compilation, and analysis of interview, survey, and focus group results for patterns and themes. A compilation and analysis of numbers of participants associated with the program outcome measures

will also be conducted. Periodic reports of the information produced by the evaluation will be provided to program leaders to support ongoing decision-making about the program's progress and effectiveness.

## III. Intervention

The Transforming Education for Advanced Manufacturing (TEAM) program will improve employment opportunities in the manufacturing industry for TAA-eligible workers and other low-skilled individuals living in remote, rural locations or communities in South Dakota, Minnesota, and North Dakota. The program will focus on helping to ensure that TAA-eligible workers, the unemployed and under-employed, veterans, recent high school graduates, and dislocated or incumbent workers have the tools needed to pursue an education and career in advanced manufacturing.

Regional leaders in Advanced Manufacturing serve on LATI's advisory committees and offer current knowledge of the industry which helps shape program content. Discussions among these advisory committees have identified the following areas of need to develop and expand regional capacity in manufacturing.

1. **Pipeline Development and Expansion**– update the image of manufacturing, employ innovative approaches to enable TAA-eligible and fully employed students the ability to simultaneously accomplish their education, market to a diverse population including first generation college students, Native American, Hispanic, women, and the under-employed.
2. **Enhance and Expand the Curriculum with Advanced Technology-Enabled Learning** – leverage Rounds 1, 2, and 3 existing OER resources and other grant deliverables, explore online tutoring and personalized educational

experiences, and take the lab to the student by offering off-campus lab sites through employer partners and community facilities.

3. **Accelerated Educational Model** – develop and employ methodologies to better assess occupational experiences and award credit for prior learning and competencies, develop lattice degrees and additional statewide and across-borders articulation agreements.
4. **Employer Relationships and Industry Engagement** – enhance and expand LATI robust industry relationships through the expansion of a business partner specialist position from Round 3 focused on increased job placement, summer internships, and cooperative agreements with industry.

The TEAM program will use a range of interventions to address these needs. Efforts will focus on marketing an improved image of manufacturing to the target population. TEAM leaders will also incorporate promising practices from previous TAACCCT grants such as the Student Success Toolkit developed in Round 1 and the Technical Education at a Distance (TED) Model developed in Round 2. To ensure effective methods for designing and delivering instruction, TEAM leaders are focused on competency-based education models which include performance based assessments and internship opportunities.

The goals, interventions, and deliverables for the project are listed below.

**Goal 1: Increase attainment of degrees, certifications, certificates, diplomas, and other industry-recognized credentials.**

**Intervention 1***:* Create a marketing campaign utilizing a variety of formats to address employer workforce needs along with enhancing the AM workforce image. **Deliverable 1:** Marketing Campaign Package – including brochures, pamphlets, videos, and social media designed to target grant participants.

**Intervention 2**: Hire Marketing Assistant to work with the AM Industry and assist with the identification of employers' needs, implementation of sector strategies and the determination of a critical, complex task. **Deliverable 2:** An industry-driven "Grown Your Own" business model. This model will support training and career placement, advocate for policies that facilitate increasing the number of Advanced Manufacturing workers, and coordinate and align innovative partnerships of businesses, technical institutes, universities, and communities. In addition, the "Grow Your Own" business model will include plans to upskill entry level employees, target potential grant participants with manufacturing camps and AM career fairs, and support the retention of TEAM grant participants.

**Intervention 3:** Hire Career Pathways Coordinator to accelerate the time to degree completion and employment through implementing the components of career pathways developed through the TAACCCT grant funded programs.

**Deliverable 3:** Career Pathways Model - This is a document showing how prior learning assessments (dual credits, tests, veterans, college credit) apply to earning certificates, diplomas, Associate and Bachelor degrees.

**Goal 2: Introduce or replicate innovative and effective methods for designing and delivering instruction.**

**Intervention 1:** Hire Continuous Improvement Coordinator to develop new strategies, or replicate or adapt existing evidence-based strategies and use data for continuous improvement of programs. **Deliverable 1:** Continuous Improvement Publication - this is a document based on LATI's Assurance Arguments and documentation sources for Higher Learning Commission accreditation process.

**Intervention 2:** Hire content experts to expand the use of virtualization and simulation in AM courses. **Deliverable 2:** Course Curriculum and Materials for Robotics/Electronics, Energy/Plant Operations, High Performance Engine Machining, Precision Machining, and Welding.

**Intervention 3:** Leverage Round 1 Student Success Toolkit and Round 2 Technical Education at a Distance (TED) Model to improve learning completion rates. **Deliverable 3:** Student Success Toolkit and TED Model. - These have been developed from previous TAACCCT grants in South Dakota. The TEAM program will expand and enhance them. For example, the Student Success Toolkit currently focuses on on-campus students and the TEAM program would expand it to support online students.

**Intervention 4:** Improve technology infrastructure support for educational programs provided by the grant.

**Goal 3: Demonstrate Improved Employment Outcomes**

**Intervention 1:** Complete and publish Employment Results Scorecard **Deliverable:** Employment Results Scorecard – This is a publication which includes annual graduation rates, employment rates, employment retention rates, average earnings, and transfer rates of students into four-year programs of study.

**Intervention 2:** Third Party Evaluation **Deliverable:** Third Party Evaluation Reports

## IV. Implementation Analysis Design

To facilitate the implementation analysis, evaluators will gather relevant data from the following three primary sources: 1) program leaders and partners, 2) program participants, and 3) program deliverables and other documentation. Based on examinations of program documentation and deliverables, evaluators will confirm the implementation of each of the interventions associated with the three program goals. Patterns and themes derived from interview and survey data will be examined to identify strengths, weaknesses, and overall fidelity to the program model. Evaluators will participate in quarterly meetings with the program's oversight committee and offer data-based observations, as appropriate, for the consideration of program leaders as they make decisions about the continuous improvement of the program.

The TEAM program's theory of change includes an emphasis on re-imaging Advanced Manufacturing occupations through marketing efforts in order to increase enrollment in AM programs. Through technology-enabled and competency-based learning, technical assistance from business and industry, and proven student support systems, non-traditional students will complete AM programs and secure improved employment status in a more expedient and streamlined manner. By "upskilling" workers' proficiency with the latest industrial equipment and technology, graduates will help South Dakota increase and strengthen its highly-skilled workforce. The logic model for the TEAM program is listed below and addresses the growing problem that South Dakota lacks workers for highly-skilled positions in the Advanced Manufacturing industry.

| **Inputs** | **Activities** | **Outputs** | **Short Term Outcomes** | **Inter-mediate Outcomes** | **Long Term Outcomes** |
|---|---|---|---|---|---|
| LATI Advanced Manufacturing Programs and Advisory Councils, Regional Manufacturers, TAACCCT Round 4 Funds, Industry-grade technologies and equipment. | Advanced Manufacturing Marketing Campaign, Additional Marketing Assistant, Career Pathways Coordinator, and Continuous Improvement Coordinator positions, expansion of virtualization and simulation components of AM courses, | Marketing Campaign Package, Grow Your Own Business Model, Career Pathways Model, Continuous Improvement Publication, Course Designs and Materials, Student Success Toolkit and TED Model, IT Servers and Storage, Employment Results | Increased enrollment in AM programs, innovative designs for delivering AM programs, increased institutional capacity at LATI. | Increased numbers of degrees, certificates, diplomas, and other credentials recognized by the Advanced Manufacturing industry.<br><br>Documented and replicable models of hybrid delivery of AM programs. | Increased numbers of employees working in Advanced Manufacturing industry with increased wages over previous employment. |

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| | expanded use of Student Success Toolkit and TED (Technical Education at a Distance) Model, improved technology infrastructure at LATI, publication of Employment Results Scorecard, Third Party Evaluation. | Scorecard, Third Party Evaluation Reports. | | | |

**IV.A. Implementation Analysis Research Questions**

The following four research questions, as required in the SGA, represent the core of the implementation analysis for the program.

1. How was the particular curriculum for the Advanced Manufacturing programs 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 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?

Evaluators will gather data to answer the following two additional research questions pertaining to the implementation of the program.

1. To what extent did each of the program's interventions produce the desired result?
2. In what ways did the implementation of the grant enhance institutional capacity?

**IV.B. Implementation Analysis Data Strategies**

Data to address the research questions will be collected through online surveys, onsite interviews, and focus groups with program leaders, partners, instructors, and students. Rubrics will be constructed and utilized to examine program deliverables and documentation. Coding and categorization techniques will be used to uncover salient themes in the data. Evaluators will provide data and feedback to program leaders on a quarterly basis for assessing progress and for considering potential adjustments to program activities.

The following matrix reflects the research questions identified for the implementation analysis, the data sources to be considered in answering the questions, and the process and timelines proposed for the data collection and analysis.

| Research Questions | Data Sources | Data Collection, Timelines, and Analysis |
|---|---|---|
| 1. How was the particular curriculum for the following programs selected, used, and/or created?<br>• Robotics/Electronic Systems Technology<br>• Precision Machining<br>• Welding<br>• Energy/Plant Operations<br>• High Performance Engine Machining | Program leaders, partners, and instructors, as appropriate<br><br>Advanced Manufacturing Course and Program Documentation | Key program leaders, partner representatives, and Advanced Manufacturing (AM) instructors will be interviewed or surveyed using an instrument with the specified research questions. This data collection will take place during January – March 2016 to identify baseline information about each of the five AM programs. In addition, program documentation, as appropriate, will be reviewed for relevant data. Interview/survey data as well as data from the documentation will be compiled. Observations including patterns and themes will be noted and reported to program leaders for their consideration about program adjustments. |
| 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? | Program leaders, partners, and instructors, as appropriate<br><br>Advanced Manufacturing Course and Program Documentation<br><br>Relevant Deliverables | Key program leaders, partner representatives, and selected instructors will be interviewed or surveyed using an instrument with the specified research questions. This data collection will take place during January – March 2016 to identify baseline information about each of the five AM programs and again in the Fall of 2016 and 2017 to document changes and progress. In addition, program documentation and deliverables, as appropriate, will be reviewed for relevant data. Interview/survey data as well as data from the documentation/deliverables will be compiled. Observations including patterns and themes will be noted and reported to program leaders for their consideration about program adjustments. |
| 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 used? Who conducted the assessment? How were the assessment results used? Were the assessment results useful in determining the appropriate program and course sequence | Program leaders, partners, and instructors, as appropriate<br><br>Advanced Manufacturing Program Documentation | Key program leaders, partner representatives, and selected instructors will be interviewed or surveyed using an instrument with the specified research questions. This data collection will take place during January – March 2016 to identify baseline information about each of the five AM programs and again in the Fall of 2016 and 2017 to document changes and progress. In addition, program documentation and deliverables, as appropriate, will be reviewed for relevant data. Interview/survey data as well |

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| for participants? Was career guidance provided, and if so, through what methods? | Relevant Deliverables | as data from the documentation/deliverables will be compiled. Observations including patterns and themes will be noted and reported to program leaders for their consideration about program adjustments. |
| 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? | Program leaders, partners, and instructors, as appropriate<br><br>Advanced Manufacturing Advisory Councils<br><br>Advanced Manufacturing Program Documentation<br><br>Relevant Deliverables | Key program leaders, partner representatives, selected instructors, and Advisory Council members will be interviewed or surveyed using an instrument with the specified research questions. This data collection will take place in the Spring of 2016 and 2017 to gather evidence about the contributions of various partners to each of the five AM programs. In addition, program documentation and related deliverables will be reviewed for relevant data. Interview/survey data as well as data from the documentation/deliverables will be compiled. Observations including patterns and themes will be noted and reported to program leaders for their consideration about program adjustments. |
| 5. To what extent did the following program interventions produce the desired result?<br>• Marketing Assistant and Campaign<br>• Grow Your Own Business Model<br>• Career Pathways Model<br>• Continuous Improvement Publication<br>• Virtualization/Simulation in AM coursework<br>• Improved Technology Infrastructure<br>• Round 1 Student Success Kit<br>• TED Model | Marketing Assistant<br><br>AM Advisory Councils<br><br>AM Students<br><br>Identified AM Content Experts<br><br>AM Program Instructors<br><br>Career Pathways Coordinator<br><br>Continuous Improvement Coordinator | Online surveys, interviews, and focus groups will be used to collect data during the spring of 2016 and 2017 about the impact of these interventions. Common messages and/or suggestions for improvement gleaned from the interviews will be communicated to the project leaders. Rubrics will be created to examine the related deliverables. |

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| 6. In what ways did the implementation of the grant enhance institutional capacity? | Program Leaders<br><br>Marketing Assistant<br><br>Continuous Improvement Coordinator<br><br>Career Pathways Coordinator<br><br>AM Program Instructors | Interviews will be conducted in the spring of 2016 and 2017 to assess growth in institutional capacity as determined by the following indicators:<br>• additional online programs<br>• permanent hires<br>• upgraded technology and equipment<br>• new partnerships with employers and other institutions<br>• expanded student services<br>• upgraded facilities |

## V. Outcomes/Impact Analysis Design

Accreditation standards for each the Advanced Manufacturing programs involved in the program require consistency and fidelity of curriculum, thereby preventing the use of a true experimental design. Given the small sample sizes in the Advanced Manufacturing programs and the remote, rural demographics, evaluators do not plan to use a quasi-experimental design involving comparison groups. Regional differences in the manufacturing industry within South Dakota, and the corresponding regional differences in curriculum, hinder efforts to establish valid comparison groups with the state's three other technical institutes. The TEAM program is well underway, currently operating in its fifteenth month, which also creates challenges in establishing comparable cohorts of students.

An outcomes-only analysis will be used to determine program effectiveness. Progress toward each targeted outcome measure will be documented and analyzed using descriptive statistics. Summative observations about the program will be documented and reported to program leaders and the funder, as appropriate. In addition, an analysis of Advanced Manufacturing program enrollment numbers, completer numbers, and time to completion will compare data from a historical cohort of students from the three years prior to the grant to data from the students enrolled during the three years of the grant period. Comparing these *aggregated* enrollment numbers, completion rates, and time to completion rates between the historical AM cohort and the current AM cohort will assist evaluators in benchmarking the effectiveness of the program.

## V.A. Outcomes/Impact Analysis Research Questions

The quantitative answers to the following three questions are of significant value to TEAM leaders and the funder for making informed judgments about the success of the program.

1) To what extent did each outcome measure reach its targeted goal?
2) How did the *aggregate* performance of the grant participants compare to previous AM students in terms of enrollment, program completion, and time-to-completion?
3) Which of the outcome measures displayed the most growth over the duration of the grant period? Which displayed the least growth?

## V.B Outcomes Analysis

Evaluators hypothesize that the program's interventions will collectively result in attaining the targeted goal for each outcome measure. Pre and post analysis of selected outcome measures will aid in determining varying levels of participant success. Wage data will be examined for post-program increases and for the level of increase. A Data Collection System which was created in the TAACCCT Round 1 grant effort will be used to track and report information on all outcome measures. The Data Management System collects student data from Jenzabar, the student management system used at LATI. The data which is collected includes demographic information including TAA eligibility, enrollment dates, credits and diplomas earned, employment status, and wage information. Employment and wage information is attained through an agreement with the South Dakota Department of Labor and Regulation.

Listed below is a section of the annual report submitted to DOL by the South Dakota TEAM program in November 2015. Each outcome measure for Year 1 is shown, along with the targeted goal for the entire project period. Evaluators will use this format to track progress on the outcome measures and offer observations about program success.

| Participant Outcomes | Year 1 Actual | Year 2 Actual | Year 3 Actual | Total Target |
|---|---|---|---|---|
| 1. Unique Participants Served/Enrollees | 291 | | | 508 |
| 2. Total Number of Participants Who Have Completed a Grant-Funded Programs of Study | 73 | | | 209 |
| 2a. Total Number of Grant-Funded Program of Study Completers Who Are Incumbent Workers | 26 | | | |
| 3. Total Number Still Retained in Their Programs of Study (or Other Grant-Funded Programs) | 191 | | | 487 |
| 4. Total Number Retained in Other Education Program(s) | 1 | | | |
| 5. Total Number of Credit Hours Completed (aggregate across all enrollees) | 4336 | | | |
| 5a. Total Number of Students Completing Credit Hours | 163 | | | 463 |
| 6. Total Number of Earned Credentials (aggregate across all enrollees) | 82 | | | 225 |
| 6a. Total Number of Students Earning Certificates - Less Than One Year (aggregate across all enrollees) | 41 | | | |
| 6b. Total Number of Students Earning Certificates - More Than One Year (aggregate across all enrollees) | 0 | | | |
| 6c. Total Number of Students Earning Degrees (aggregate across all enrollees) | 41 | | | |
| 7. Total Number Pursuing Further Education After Program of Study Completion | 26 | | | 55 |
| 8. Total Number Employed After Program of Study Completion | 7 | | | 71 |
| 9. Total Number Retained in Employment After Program of Study Completion | 0 | | | 48 |
| 10. Total Number of Those Employed at Enrollment Who Receive a Wage Increase Post-Enrollment | 36 | | | 265 |

## V.C. Experimental Design

Not applicable.

## V.D. Non-Experimental Design

Not applicable.

## V.E. Outcomes/Impact Data Collection and Analysis

The following matrix reflects the outcome measures specified for the outcomes analysis, the data sources to be examined, and the process and timelines proposed for data collection and analysis.

| Outcome Measures | Data Sources | Data Collection, Timelines, and Analysis |
|---|---|---|
| 1. **Total Unique Participants Served:** *Cumulative total number of individuals entering any of the grant-funded programs offered?* **Goal for Project Period:** 508<br>2. **Total Number of Participants Completing a TAACCCT-Funded Program of Study:** *Number of unique participants having earned all of the credit hours (formal award units) needed for the award of a degree or certificate in any grant-funded program.* **Goal for Project Period**: 209<br>3. **Total Number of Participants Still Retained in Their Program of** | Documents such as program registrations, student records during program participation, and program completion records will be reviewed.<br><br>Documents to collect the employment status of program completers will be developed, implemented, and reviewed.<br><br>Data Management System for tracking TAACCCT Grant Participants developed in Round 1. | Advanced Manufacturing program enrollment, completion, and time to completion information during the 2011-12, 2012-13, and 2013-14 school years will be collected as baseline information during January – March 2016. The same information will be compiled for each of the three school years of the grant period.<br><br>Evaluators will rely on the grant manager to supply pertinent data on each of the nine outcome measures. The grant manager will utilize the Data Management Systems for tracking TAACCCT Grant Participants to provide updated |

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| **Study or Other TAACCCT-Funded Program:** *Number of unique participants enrolled who did not complete and are still enrolled in a grant-funded program of study.*<br>**Goal for Project Period:** 487<br>4. **Total Number of Participants Completing Credit Hours:** *Total number of student enrolled that have completed any number of credit hours to date.*<br>**Goal for Project Period:** 463<br>5. **Total Number of Participants Earning Credentials:** *Total number of participants completing degrees and certificates in grant-funded programs of study.*<br>**Goal for Project Period:** 225<br>6. **Total Number of Participants Enrolled in Further Education After TAACCCT-Funded Program of Study Completion:** *Total number of students who complete a grant-funded program of study and enter another program of study.*<br>**Goal for Project Period***:* 55<br>7. **Total Number of Participants Employed After the TAACCCT-Funded Program of Student Completion:** *Total number of students (non-incumbered workers only) who completed a grant-funded program of study entering employment in the quarter after the quarter of program exit.*<br>**Goal for Project Period:** 71<br>8. **Total Number of Participants Retained in Employment After** | Student questionnaire about pre-program employment.<br><br>Wage information provided through an agreement with the South Dakota Department of Labor and Regulation (DLR). | information to the evaluators in the summers of 2016 and 17.<br><br>Evaluators will integrate the quantitative data about the nine outcome measures with the qualitative data derived from the implementation analysis to make observations about the overall effectiveness of the program. This summative analysis will take place in the Summer of 2018.<br><br>Pre and post program employment information will be analyzed in the Fall of 2017 and 2018 to determine the degree to which program interventions resulted in stable employment and wages commensurate with educational background. |

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| **Program of Study:** *Total number of students (non-incumbent workers only) who completed a grant-funded program of study and who entered employment in the quarter after the quarter of program exit who retain employment in the second and third quarters after program exit.*<br>**Goal for Project Period:** 48<br>*9.* **Total Number of Those Participants Employed at Enrollment Who Received A Wage Increase Post-Enrollment:** *Total number of students who are incumbent workers and who are enrolled in a grant-funded program of study who received an increase in wages after enrollment.*<br>**Goal for Project Period:** 265 | | |

## VI. Limitations

One challenge to the implementation analysis includes a delayed start to the evaluation activities as the program began more than a year ago. For example, evaluators will collect baseline information and data during January – March 2016 and will be asking interviewees to recall their perceptions of the program's beginning phase in the fall of 2014, which will be problematic for some. Another limitation is the six month processing time with the collection of wage data from the SD Department of Labor and Regulation.

## VII. Reports

Data will be provided to the grant manager on a periodic basis for use with the advisory committees for each of the programs involved in the program. Evaluators will participate in quarterly meetings with the program's oversight committee and offer data-based observations, as appropriate, for the consideration of program leaders. Annual reports will be submitted to the grant manager in September 2016 and September 2017. Evaluators will integrate the implementation analysis and the outcomes analysis to determine findings. This synthesis will then be used as a lens to examine the degree to which each of the three goals of the program was attained. Conclusions about the overall effectiveness of the grant program will be communicated in a final evaluation performance report to program leaders and the grant funder in September 2018.

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