9/30/2016

Third Party Evaluation of MoManufacturingWINs: Implementation, Outcomes, and Impact

Missouri Manufacturing Workforce Innovation Networks:
Grant Number TC-23785-12-60-A-29
St. Louis Community College

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This workforce solution was funded by a grant awarded by the U.S. Department of Labor's Employment and Training Administration. The solution was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership.

ACKNOWLEDGEMENTS

The authors express gratitude to all campus grant leads, faculty and staff, and related grant partners for sharing their time, experiences, and lessons learned throughout the grant. We thank Denise Coyne for her keen attention to detail and invaluable expertise in community college data. We appreciate the effort of Deborah Goodall for leading the review of curriculum and adding her insight to this final report. We express our gratitude to Catherine Kirby for sharing insights from her research on scaling innovation relative to the national project on Transformative Change Initiative (TCI) of which Missouri is a part. In addition, we wish to thank the leadership and staff of both St. Louis Community College and the Missouri Community College Association for their coordination, project management, and guidance. Finally, we thank Linda Iliff for assisting us with the creation of this final report.

EXECUTIVE SUMMARY

This report presents an evaluation of Missouri's Manufacturing Workforce Innovation Networks: MoManufacturingWINs (commonly referred to as MMW) grant as part of the Round 2 Trade Adjustment Assistance Community College and Career Training (TAACCCT) program administered by the U.S. Department of Labor (DOL). This is the culminating report on grant implementation, performance outcomes, and impact. Evaluation progress reports completed during the grant and the curriculum review report are attached.

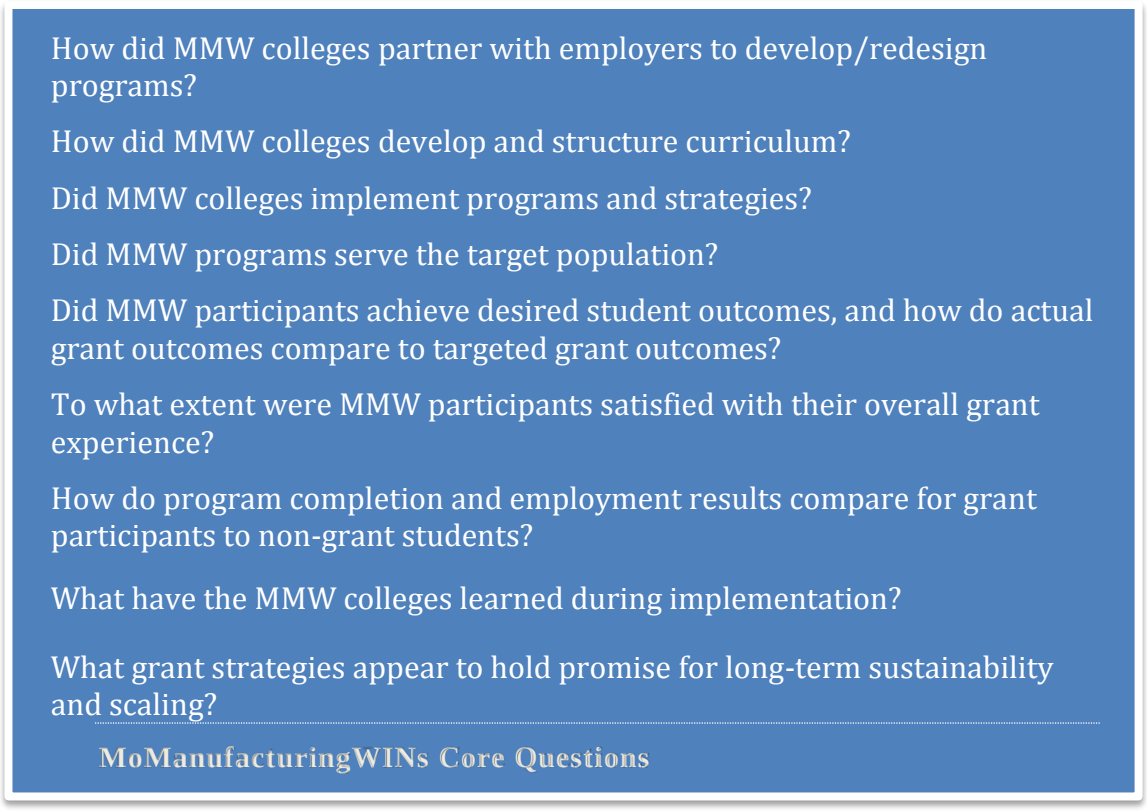
In 2012, Missouri received a $14.9 million Round Two TAACCCT grant to meet the State's growing demand for manufacturing related workers. Eight Missouri community colleges and the State's technical college came together under the Missouri Community College Association (MCCA) leadership to form the MMW consortium. Missouri community colleges operate as a decentralized system, thus MCCA was asked to lead and administer the MMW grant.

The MMW consortium colleges recognized the imperative to improve their instructional programs and support services to better meet the needs of adult learners and other grant target populations, including TAA-eligible and Veteran students. To serve and impact these populations, the colleges needed to engage employers to help design new or enhance existing programs of study based upon industry-recognized, stackable credentials to align with existing or emerging manufacturing competencies and career steps. The colleges also understood the need to develop programs of study which could be completed in a condensed/accelerated manner and ultimately lead to employment in the manufacturing sector.

To support the proposed theory of change, colleges employed a stackable certificate model connecting program awards to appropriate industry certifications and providing a map for completion based on "Manufacturing Career Pathways". This model allowed for multiple entrance and exit points to give students options for training in short increments. To further support this model, colleges developed a learning framework offering students basic academic skills through contextualized courses as well as intrusive support services to help students prepare for and persevere to completion and employment.

This report provides both implementation and grant performance outcome evaluation, and it examines the impact of grant programs and strategies with regard to program completion and employment upon program completion. A multi-dimensional evaluation process was employed to meet Department of Labor evaluation requirements and provide the consortium and its member colleges with data and analysis related to the following key questions outlined below and referenced throughout this report.

MoManufacturingWINs Core Questions



These research questions guided all project data gathering and the following mixed methods were employed to support the MMW outcome and impact evaluation:

- Unit-record participant and outcome (academic and employment data) files were collected for each grant participant, and data were recorded, tracked, and shared with the evaluation team and grant partners on a term-to-term and DOL-quarterly basis. Employment and wage data were acquired through a partnership with Missouri Division of Workforce Development (DWD), also on a DOL-quarterly basis. Where gaps in employment data occurred, colleges conducted employment follow-up data collection activities to determine students' employment status. Verification of employment was gained by college personnel using DOL-approved (WIA/WIOA) methods, including employee pay-stubs and letters from employers.
- Review of member colleges' quarterly reports was performed by the evaluation team. Since the lead researchers collected data for quarterly reporting, they were able to mine these data for key qualitative and quantitative data associated with grant compliance, grant progress, and lessons learned about implementation. In addition, the lead researchers designed and implemented additional quarterly reporting customized to each college's work plan, analyzed these results for trends across the consortium, and shared same with MMW leadership and MMW college leads.
- Anonymous student follow-up surveys were employed to acquire data related to student satisfaction with grant programs and support strategies employed in the MMW grant, as well

as gauge the extent to which the grant helped students acquire and develop soft-skills essential to the workplace.

- External subject matter experts gathered qualitative data for the DOL-mandated curriculum review on program implementation and quality.
- The evaluation team employed a Quasi-Experimental Non-Equivalent Control Group[1] design to evaluate grant outcomes/impact. The evaluation team partnered with the consortium to acquire, unit-record participant and outcome data for all grant participants and worked with member colleges to create a unit-record data set for a non-grant control group cohort of students. A three-year tracking period for both the grant and the non-grant groups was used to record academic and employment outcomes. The evaluation team employed logistic regression to compare dichotomous outcome variables (e.g., program completion, and employment) between students in the non-grant control group and the grant treatment group. By ensuring that students in both the control and treatment cohorts were new to college and enrolled in similar, manufacturing-related credit programs, we were able to remove potential bias associated with previous college enrollment. Age, gender, academic preparedness at entry (participant was college ready or participant required remediation in either English, reading, or mathematics) and employment status at initial enrollment were used as control variables and participation in the grant was employed as the treatment variable.

The evaluation team visited all MMW colleges to interview students, faculty, college staff and administration, and external partners. Interview results were cross-referenced with the colleges' QNPR reports, programmatic documents, implementation tools customized to the MMW Work Plan, student-level data from the colleges' student information systems, and surveys to ensure both validity and reliability of results.

The implementation evaluation draws on Weiss'[2] concept of process evaluation and Chen's [3] work on theory-driven evaluation to understand what is happening inside the program. By partnering with the consortium to employ two linked evaluation efforts---implementation and outcomes/impact, the consortium and its colleges are in a better position to document what was delivered and achieved with grant funds and to evaluate and learn more about the impact of such actions on student outcomes.

Although the evaluation team, member colleges, and consortium leadership took great care to ensure the validity and reliability of all data, the following list of possible limitations associated with these data should be considered when interpreting evaluation outcome and impact results.

- Participant enrollment and tracking to record DOL required metrics and grant performance outcomes challenged the colleges' existing data collection system/processes. To address

[1] Stanley, J. & Campbell, D. (1966). *Experimental and Quasi-Experimental Designs for Research*. Chicago, IL. Rand McNally Co.
[2] Weiss, C. H., (1998). *Evaluation: Methods for studying programs and policies*. Upper Saddle River, NJ: Prentice Hall.
[3] Chen, H. (2004). The roots of theory-driven evaluation: Current views and origins. In M. Alkin (Ed.), *Evaluation roots: Tracing theorists' views and influences* (pp. 132-152). Thousand Oaks, CA: Sage

such challenges, adaptations to existing information systems were required and secondary data reporting systems were developed. During such processes, student data may have been subjected to clerical/data entry and computing/coding errors.

- Employment and wage data collected by matching valid Social Security Number (SSN) with state UI employment records often lag behind actual employment and wages by 6-9 months. Although student follow-up surveys and employment verification were used to supplement official UI employment and wage data, these data were also at times incomplete.
- Student and employer satisfaction data collected through follow-up surveys may be subject to "positive-response bias", as students and employers with positive impressions are often more likely to respond to such surveys and/or respondents may not provide honest responses to survey questions.
- Self-assessments of grant progress, and innovation scaling and sustainability were completed by those working directly with the grant. Given the extensive commitment of such staff to grant success, such respondents may have an inflated view of grant progress, scaling and sustainability.

To help minimize and address possible data limitations, the evaluation team and consortium leadership/staff employed the following strategies.

- All student input and outcome data were reviewed at the end of each academic term by college staff and the evaluation team to check for accuracy.
- Consortium leadership/staff issued quarterly pathway-to-performance results on enrollment, completion, and financial data and asked colleges to review and confirm data for accuracy.
- The consortium secured an evaluation team knowledgeable about the types of data stored in each of the partner college data systems and any data limitations. The evaluation team and the consortium leadership/staff partnered to help ensure that the process of data integration proceeded in a consistent and reliable manner.
- MMW built on expertise from TAACCCT Round 1 and made use of the existing data structures.
- All data sources were examined with the grantee and evaluation team data analysis/interpretation was shared with the consortium leadership/staff and colleges on a quarterly basis.
- The self-assessment tool used was completed by the college grant teams three times throughout the course of the grant. The tool followed the MMW work plan from the statement of work, and with regard to planning, pre-planning and implementation stages was cross-referenced with QNPRs. In assessing the more complex values of sustaining and scaling, the tool was cross-referenced with individual grant team leadership at each college.

In addition, the evaluation team recognized the complex nature of the grant innovations and worked with the consortium to implement a Developmental Evaluation[4] model to support

[4] Patton, M. Q. (2011). *Developmental Evaluation: Applying complexity concepts to enhance innovation and use*. New York, NY: Guilford Press.

innovation by using data to improve grant performance and decision-making while meeting DOL requirements. To help the consortium and its member colleges use evaluation data for continuous improvement, the evaluation team provided two interim evaluation reports at key grant intervals, July 2013 and August 2014. These reports can be found in Appendices III-IV. In addition to these formal reports, the evaluation team provided quarterly project updates, including analysis associated with key grant targets related to enrollment, program completion, and completer employment.

Due to DOL's expectation to build capacity while implementing the grant requirements, campus grant leadership had to design the innovation, change college processes and cultures to implement innovations, manage the grant within stated DOL compliance requirements, and achieve and track the results—all within three years. Although laudable, DOL's challenge to build capacity did not always align with DOL's required reporting metrics and therefore may have been an unrealistic expectation for a three-year period.

The following represent key data results related to this evaluation.

- Enrollment of 4,547 surpassed grant target by 37%.
- Grant Program of Study (POS) completers (3,295) surpassed the grant target by 86%. The Program of Study completion rate of 72% surpassed the grant target program completion rate of 53%.
- Grant Program of Study completers employed at program completion (3,033) surpassed the grant target of program completers employed by 111%. The employment rate for grant POS completers of 92% surpassed the grant target employment rate of 81%.
- Colleges used employer input and engagement to create and/or redesign 44 programs built upon industry-requested stackable credentials.
- Colleges provided college access to unemployed and academically low-skilled adults and other key target groups.
    - Average age of participants was 35
    - 2% were TAA eligible
    - 12% were Veterans
    - 86% were either unemployed or under-employed at program start-up
    - 78% were academically low-skilled at program start-up
    - 54% were enrolling in college for the first-time
- Throughout the grant, colleges partnered with local Career Centers to recruit students. Fourteen percent of the participants (659) were referred to a campus by a Career Center.
- The credit hour-completed-to-attempted ratio for the credit programs was 92%, while the credit hour-completed-to-attempted ratio for non-credit programs was 70%.
- A total of 3,295 participants completed at least one program of study generating a program completion rate of 72%. Counting all program awards and stackable credentials, this group of completers received 8,873 industry-requested awards/credentials.

- Colleges awarded 4,599 awards/certifications recognized by the following professional societies: Manufacturing Skills Standards Council; Society of Manufacturing Engineers; American Welding Society; and National Institute for Metalworking Skills.
- Ninety-two percent of the program completers secured employment upon program completion with an annual average wage of $56,000.
- Eighty-six percent of the program completers who started as unemployed secured employment upon program completion with an annual average wage of $43,000.
- Grant participants expressed a high degree of satisfaction with program offerings and college support services. In addition, participants reported grant programs/services helped to improve their abilities and self-efficacy with regard to essential workplace skills.
- Through the development and implementation of short-term, career programs, MMW grant participants were more likely than non-grant students to complete a program award.

Data presented in this report point to the success of MMW grant participants and reveal that grant participants completed programs and secured employment at higher rates than students in more traditional, non-grant programs. Although such results are encouraging, it is important for the consortium to focus on lessons learned during the grant. These lessons include the following: the importance of connecting classroom faculty, advisors, and instructional support staff; accelerated programs and curriculum often require increased instructional support for students; advising and career coaching is a continuous process that covers the entire student experience from recruitment to program completion and onto employment; programs connected to career pathways and built upon industry-recognized credentials are valued by students and employers; accelerated and contextualized approaches to developmental education provide meaningful alternatives to more traditional, term-based developmental education models; and community and employer partnerships must be continuously cultivated in order to produce intended results.

Individual campus culture/climate certainly impacted the extent to which MMW innovations and experimentation were supported. For those campuses who embraced the experimental nature of MMW, the grant has laid a solid foundation for further development, scaling and sustainability of efforts associated with the following areas:

Development and redesign of programs using career pathways

Redesign of developmental education

Adoption of intrusive student and instructional support strategies

Expanded use of employer partnerships and engagement to support program creation and continuous improvement

Greater use of alternative instructional formats using non-term based and accelerated models, stackable credentials, and credit for prior learning.

MoManufacturingWINs continued the state's experience in working together as a consortium and, by the end of the grant, the colleges found that the consortium framework worked for them. Colleges consistently reported to the TPE the benefits of working and learning together as they implemented grant programs and strategies. College faculty and staff found the connections made to be useful in carrying out consortium-specific work and also expanding such efforts to other non-grant areas. One long-time college leader stated that the MoWINs consortia fundamentally changed the way the colleges think about how to approach new initiatives. Prior to Missouri's TAACCCT grants, such cooperation and sharing among the colleges was not as prevalent.

The Missouri Community College Association's new Executive Director recognizes this increased level of statewide cooperation and sees it as an opportunity for transformative change in how the State's community colleges respond to student, community and employers' needs. To further support and sustain such transformative change, MCCA has incorporated the lessons learned from its Round 1 and Round 2 TAACCCT grant into its current strategic planning process.

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PREFACE

The MoManufacturingWINs (MMW) Round 2 TAACCCT grant built upon successful innovations from Missouri's Round 1 TAACCCT grant, MoHealthWINs. MoManufacturingWINs provided the partner colleges the opportunity to expand and further develop a number of innovative instructional and student support strategies. Such strategies were designed to meet the needs of adults seeking to acquire industry recognized program awards and credentials and gain employment in the manufacturing industry. Many of the strategies were transformative and challenged existing organizational culture and long-standing processes/practices.

Despite such challenges, the colleges pushed forward and developed and/or redesigned more than 40 instructional programs connected to the following manufacturing career pathways: Industrial Maintenance; Machining; Logistics and Transportation; Production; and Welding. Colleges also developed and expanded innovative approaches to providing intensive student support. From the onset, MMW Grant Management and the Evaluation Team recognized the complexity of the MMW effort and stressed the value of documenting and analyzing implementation, lessons learned, and outcomes.

This report provides detailed and extensive data associated with the DOL required metrics, including a comparison of MMW outcomes to performance targets (see Figure 8 on page 39) established in the MMW statement of work (SOW). In addition, this report goes beyond DOL required reporting and examines MMW outcomes for a number of participant sub-groups (see pages 44-48). Taking this analysis one step further the report uses logistics regression analysis to explore MMW impact on program completion and employment (see pages 52-57).

Although, the MMW grant is ending on September 30, 2016 the impact of lessons learned continues. We believe Missouri's community colleges have a vision for change that extends beyond the grant. As the colleges move forward, they may wish to heed T.S. Eliot who cautions in *The Dry Salvages* (1941), "one should take care to not simply have the experience, but miss the meaning". As colleges work to develop promising practices and strategies and to build upon the foundation created by the MMW grant, we invite you explore the Executive Summary as well as the detailed data analysis provided throughout the report. Thank you for allowing us to be a part of your transformative journey.

INTRODUCTION

The Trade Adjustment Assistance Community College and Career Training (TAACCCT) program was launched in 2011 by the United States Department of Labor (USDOL), in partnership with the United States Department of Education. As stated in the Round One Solicitation for Grant Applications (SGA), a primary goal of the program is to "increase attainment of degrees, certificates, and other industry-recognized credentials and better prepare the targeted population, and other beneficiaries, for high-wage, high-skill employment" (p. 5, USDOL SGA). Since issuing this SGA, USDOL has awarded an unprecedented level of funding for a single federal program to community and technical colleges throughout the country. Through nearly $2 billion, TAACCCT has sought to raise the skill level and employability of America's citizens who have been adversely affected by the nation's Great Recession.

One year after receiving the Round One TAACCCT award for the MoHealthWINs Consortium, Missouri received a $14.9 million Round Two TAACCCT grant to meet the State's growing demand for manufacturing-related workers. Named MoManufacturingWINs (MMW), this consortium grant provided the opportunity to build upon lessons learned from the Round One MoHealthWINs award and further develop living-wage programs of study in critical industry sectors and improve the capacity of community colleges to deliver up-to-date instructional and student support strategies.

MoManufacturingWINs Colleges

- East Central College (ECC)
- Metropolitan Community College (MCC)
- Mineral Area College (MAC)
- North Central Missouri College (NCMC)
- Ozarks Technical Community College (OTC)
- St. Charles Community College (SCC)
- St. Louis Community College (STLCC)
- State Fair Community College (SFCC)
- State Technical College of Missouri (STCM)

Missouri community colleges operate as a decentralized system, and thus it was an individual-by-individual decision about whether to be part of the MMW Consortium. Ultimately, eight community colleges and the state's one technical college participated in the grant. The colleges included in MMW are listed to the right. Similar to Round One TAACCCT, the Missouri Community College Association (MCCA) administered and lead the MMW Consortium. With the addition of Round 2, MCCA brought on a deputy director to assist the executive director who had managed Round 1. Together these two individuals would oversee both of Missouri's TAACCCT grants.

According to the MCCA Bylaws, MCCA is "an individual and institutional membership organization, which serves the educational needs of the citizens of the state of Missouri by offering educational leadership through the state's community colleges. MCCA offers services to the state, to its member institutions, and to its individual members in educating the public about community college education, offering professional development, gathering and reporting information pertinent to community colleges, and shaping higher education policy in the state" (MCCA, 2009, p. 2). More detail on MCCA is available on its website at: mccatoday.org.

Upon receipt of the MMW funding in October 2012, Missouri was still recovering from the Great Recession of 2008. The statewide unemployment rate for October 2012 was 6.9%, and further analysis of this unemployment rate revealed a relationship between educational attainment and unemployment. (For national statistics on the relationship between employment and education level, see Carnevale, Jayasundera, Gulish, 2016[5].) For adults with less than a high school credential, the unemployment rate was 16.0%. For adults with a high school diploma, the rate was slightly better at 9.0%. As educational attainment continued to increase, unemployment continued to decrease. The unemployment rate for adults with some college, including an associate's degree, was 7.2%, while the rate for adults with at least a bachelor's degree dropped to 3.1%[6]. These statistics point to the difficult economic situation facing unemployed and/or academically low-skilled adults in 2012 when the MMW consortium formed.

[5] Carnevale, A. P., Jayasundera, T., Gulish, A. (2016). America's divided recovery: College haves and have nots. Washington D.C.: Center on Education and the Workforce, Georgetown University
[6] U.S. Census, American Fact Finder Missouri.

EVALUATION DESIGN, METHODS, & ANALYSIS

Through a variety of analytical methods, including the use of a comparison cohort design to compare the outcomes of MMW participants with the outcomes of similar non-grant students, this report describes how the MMW grant impacted the students and therefore the colleges and the State. Attention is given to required DOL metrics associated with the Annual Performance Report (APR), as well as the DOL-required metrics outlined in the MMW statement of work (SOW). In addition, the evaluation design went beyond DOL reporting and compliance metrics and stressed the importance of using results to identify and support lessons learned that may be meaningful for the purposes of capacity building and scaling innovation and change.

A comprehensive evaluation design was used to address the challenges that were predicted and which actually occurred. To accommodate the challenges associated with this complexity, a team of internal researchers aligned with the external evaluator. State leaders took this approach as they anticipated that DOL performance reporting plus required impact evaluation would challenge the Missouri colleges' research capacity. Consequently, the Consortium leadership decided to embed Cosgrove & Associates (C&A), an evaluation consulting firm located in St. Louis, Missouri, into the MMW Consortium grant as internal researchers. This firm, referred to as "lead researchers" throughout this report, took responsibility for designing and implementing the impact data collection and for gathering data required to support DOL performance reporting.

The lead researchers were also responsible for managing the DOL-required third party evaluation (TPE) process, which was performed by Bragg & Associates, Inc. (B&A) following selection of this firm through a competitive bidding process. Working together throughout the grant, the lead researchers and B&A, henceforth referred to as the "evaluation team", conducted and analyzed the performance and outcomes data. In addition, the evaluation team provided guidance to the MMW Executive Advisory Committee, grant management and oversight staff, and MMW Colleges on utilizing data for continuous process improvement.

Through routine reporting to grant leadership and the MMW colleges, the evaluation team used qualitative and quantitative data gathered throughout the grant to assist a wide range of stakeholders for the grant, including faculty and academic and student services administrators; grant leaders and their administrative teams; workforce and employer partners; and others to use data to improve the implementation of grant-funded innovations. Though the MMW is not entirely consistent with a developmental evaluation design, due to the emphasis of DOL on performance reporting and summative evaluation, some aspects of the MMW evaluation design did include implementation evaluation of a formative nature, which has strong parallels to developmental evaluation (Patton, 2010).

Mixed Methods

The DOL TAACCCT grants called for rigorous evaluation along with extensive data collection and reporting for grant compliance, performance reporting, and accountability. To ensure that data could be used for all these purposes, we used mixed methods to collect qualitative and quantitative data to complement and inform the phenomenon being investigated (Greene, 2008)[7], in this case TAACCCT-funded programs of study and strategies.

MoManufacturingWINs undertook a complex endeavor in a dynamic, and evolving context, therefore calling for a multi-faceted data collection approach. The nine Missouri colleges were attempting to work together as a consortium while also independently to develop and launch new programs of study, to modify existing programs of study, and to create and implement innovative strategies as well as sustain successful innovations from their Round One TAACCCT grant. Therefore, the data gathered from colleges had to be sufficiently robust to stand on its own, but also consistent enough to be combined with other colleges' data to create a meaningful overall picture of the phenomenon. The following mixed methods were employed to support the MMW outcome and impact evaluation:

- Unit-record participant and outcome (academic and employment data) files were collected from each college for each grant participant. These quantitative data were recorded, tracked, and shared with the evaluation team and grant partners on a term-to-term and DOL-quarterly basis. Employment and wage data were acquired through a partnership with Missouri Division of Workforce Development (DWD) also on a DOL-quarterly basis. Where gaps in employment data occurred, colleges conducted employment follow-up data collection activities to determine student employment status. Verification of employment was gained by college personnel using DOL-approved (WIA/WIOA) methods, including employee pay-stubs and letters from employers.
- Review of member colleges' quarterly reports was performed by the evaluation team, drawing on data gathered by the lead researchers for the purposes of the quarterly narrative performance report (QNPR). The lead researchers were able to mine QNPR data for key qualitative and quantitative data associated with grant compliance, grant progress, and lessons learned about implementation and improvements. In addition, the lead researchers designed and implemented additional quarterly reporting customized to each college's work plan. This customized reporting process enabled the colleges to report on grant implementation over time and identify additional progress measures reflecting their plans.
- Anonymous student follow-up surveys were employed by the lead researchers to acquire data on student satisfaction with the grant-funded programs and support strategies in which they were potentially participating. These survey data were also used to gauge the extent to which the grant helped students acquire and develop key workplace skills.
- External subject matter experts (SMEs) gathered qualitative data for the DOL-mandated curriculum review on program implementation and quality. Findings and recommendations from the curriculum review report were examined relative to the TPE implementation evaluation, providing a means of triangulating results on program of study implementation.

[7] Greene, J. C. (2008). *Mixed methods in social inquiry*. Hoboken, NJ: Wiley and Sons.

In addition, the curriculum review results were disseminated to the colleges to encourage the sustainability and improvement of new and improved curriculum funded by the grant.

- A non-equivalent control group, quasi-experimental design was employed to compare outcomes for a first-time-to-college grant student cohort (2013 to 2016) with outcomes for a retrospective non-grant student sample that enrolled in MMW member colleges for the first time in fall 2011 (tracking period of 2011 to 2014). Unit-record data were collected for students from each member college to build the retrospective comparison sample of non-grant students. Students in the non-grant sample were first-time to college and enrolled in programs similar to MMW programs. Outcome variables for the comparison study included program completion and employment upon program completion.
- Early in the grant, the academic skill level of entering students was identified as a key background variable by MMW member colleges. To standardize this variable across the nine different colleges, the evaluation team created a dichotomous variable to record the entering academic skill level of grant- and non-grant students. Using each college's placement tests and cut-off levels, students who were assessed as less than college-ready in English, reading, or mathematics were defined as academically low-skilled for purposes of analyzing outcomes for this grant.

Working together, the MMW Consortium and the evaluation team adopted the following research questions specified by the DOL, plus additional questions of interest that emerged as important to the MMW member colleges:

How did MMW colleges partner with employers to develop/redesign programs?

How did MMW colleges develop and structure curriculum?

Did MMW colleges implement programs and strategies?

Did MMW programs serve the target population?

Did MMW participants achieve desired student outcomes, and how do actual grant outcomes compare to targeted grant outcomes?

To what extent were MMW participants satisfied with their overall grant experience?

How do program completion and employment results compare for grant participants to non-grant students?

What have the MMW colleges learned during implementation?

What grant strategies appear to hold promise for long-term sustainability and scaling?

Figure 1. MoManufacturingWINs Core Questions

In addition to the abovementioned methods, the evaluation team visited all MMW colleges to interview students, faculty, college staff and administration, and external partners about implementation progress. Interview results were cross-referenced with the colleges' QNPR reports and to other grant documents. Triangulating the performance and implementation data, improved the evaluation team's confidence about evidence to address the evaluation questions.

To aid the MMW Consortium in the use of evaluation data for continuous improvement, the evaluation team provided two interim evaluation reports at the following key grant intervals, July 2013 and August 2014. These reports can be found in Appendix III and IV. In addition to these formal reports, the evaluation team provided quarterly project updates, including analysis associated with key grant targets related to enrollment, program completion, and completer employment. The evaluation team submitted the required interim report to the DOL at about the mid-point in the 4-year grant cycle.

Limitations of Data

Although the evaluation team and the consortium leadership/staff took great care to ensure the validity and reliability of all data, including ongoing training for college grant team members on interpreting and recording data variables and attributes, the limitations listed below should be considered when interpreting the evaluation results.

- Participant enrollment and tracking to DOL-required metrics and grant performance outcomes challenged the colleges' existing data collection system/processes, as anticipated. To address such challenges, adaptations to existing information systems were required and secondary data reporting systems were developed and used. During such processes, it is possible that errors may have occurred in coding and entering student-level data.
- Employment and wage data collected using valid Social Security Number (SSN) matched with state unemployment insurance (UI) records often lagged behind actual employment and wages by 6-9 months. Although student follow-up surveys and employment verification were used to supplement official UI employment and wage data, these surveys had some missing data.
- Student and employer satisfaction data collected through follow-up surveys may be subject to "positive-response bias", as students and employers sense an expectation to respond positively to such surveys.
- Self-assessments of grant progress, including the scaling and sustainability of grant-funded programs and strategies, were completed by those working directly with the grant. Given the extensive commitment of such staff to grant success, such respondents may have an inflated view of grant progress, scaling and sustainability.

To reduce data limitations, the evaluation team, along with MMW Consortium leaders and staff, employed the following strategies.

- All student input and outcome data were reviewed at the end of each academic term by college staff and the evaluation team to check for accuracy.
- Consortium leaders and staff issued quarterly pathway-to-performance reports on enrollment, completion, and financial data and asked colleges to review and confirm data for accuracy.

- The Consortium secured lead researchers with insider knowledge of the types of data stored in each of the partner college data systems, including data limitations. To maintain this knowledge at a high level, the evaluation team and the consortium leaders and staff partnered to help ensure that the process of data integration would proceed in a consistent and reliable manner.
- MMW built on expertise from the Round One TAACCCT Consortium grant and made use of functional data systems for TAACCCT.
- A self-assessment tool that aligned with the MMW Work Plan was completed by each college grant team at three points during the grant. With regard to the more complex values of sustaining and scaling innovation, the tool was cross-referenced with grant team leadership at each college.

The MoManufacturingWINs Theory of Change

MoManufacturingWINs' theory of change, depicted graphically in Figure 2 below, captures how the Consortium colleges understood the essential steps in implementing the SOW. They believed it was imperative to improve their instructional programs and support services to better meet the needs of the target student populations, including Veterans, TAA eligible, unemployed/under-employed, and academically low-skilled adults. To serve and impact this population, the colleges first needed to engage employers to redesign and improve programs of study based upon industry-recognized, stackable credentials aligned with existing or emerging career-ladder stair-steps. The colleges also understood they needed to design new or enhance current programs of study that students could complete in a condensed/accelerated manner, including online learning whenever appropriate and possible, and ultimately leading to the intended program completion, credentials, and employment.

To support the proposed theory of change the colleges employed a stackable certificate and credential model that connects both non-credit and credit education/training components to appropriate industry certifications and provides a map for completion based on "Manufacturing Career Pathways." This model allowed for multiple entrance and exit points to give students options for training in short increments. To further support this instructional model, the colleges developed a learning framework that provides students with the basic academic skills they need to succeed through contextualized technical courses and intrusive student services to help students prepare for and persevere to completion and employment.

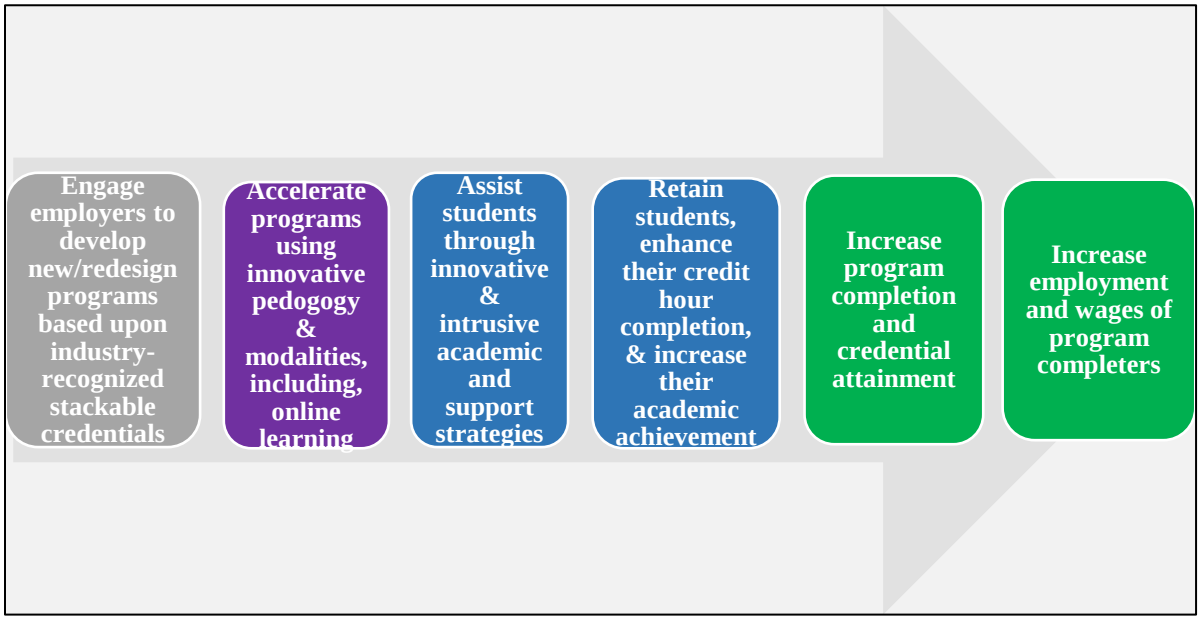


Figure 2. MoManufacturingWINs Theory of Change

The remaining sections of this report examine DOL-required metrics and additional evaluation data to determine the extent to which MMW colleges implemented this theory of change and whether or not it impacted students successfully. In addition, data associated with innovations that were thought to hold promise for implementation, scaling, and sustainability are discussed.

In soliciting grant applications, DOL acknowledged grantees would need to emphasize institutional capacity building to meet the program goals. DOL encouraged applicants to propose ways to "expand and improve their ability to deliver education and career training programs" urging them to incorporate evidence-based design, stacked and latticed credentials, online and technology-enabled learning, transferability and articulation, and strategic alignment (*U.S. Department of Labor, ETA Solicitation for Grant Applications, Round 2---SGA/DFA PY 11-08*).

Due to DOL's expectation to build capacity while implementing grant requirements, grant leaders at each college had to design the innovation, change college processes and cultures to implement innovations, manage the grant according to DOL-compliance requirements, and achieve and track results—all within three years. Although laudable, DOL's challenge to build capacity did not always align with DOL's required reporting metrics and the 3-year timeline, therefore seeming unrealistic to grantees at times. These conflicting pressures may have also limited the colleges' capacity to learn and transfer lessons learned from the grant to non-grant programs. While not intended, this inadvertent circumstance may have contributed to grant innovations being sheltered or isolated from the mainstream organization, thus diminishing potential for sustaining and scaling larger and longer-term change.

Implementation and Performance Outcome Evaluation

This section of the report presents and analyzes evaluation results related to the following key areas: partnership development and implementation; program and strategy implementation; participant performance outcomes; and the estimated impact of the grant on participant program completion and employment.

This section is organized around the evaluation questions specified by the DOL and other evaluation questions posed by the evaluation team to address areas of interest and concern for the MMW Consortium and its member colleges.

- How did MMW colleges partner with employers to develop/redesign programs?
- How did MMW colleges develop and structure curriculum?
- Did MMW colleges implement programs and strategies?
- Did MMW programs serve the target population?
- Did MMW participants achieve desired student outcomes, and how do actual grant outcomes compare to targeted grant outcomes?
- To what extent were MMW participants satisfied with their overall grant experience?
- How do program completion and employment results compare for grant participants to non-grant students?
- What have the MMW colleges learned during implementation?
- What grant strategies appear to hold promise for long-term sustainability and scaling?

Figure 1. MoManufacturingWINs Core Questions

Employer Partnerships in MoManufacturingWINs

This section of the evaluation report addresses the following core evaluation question: *How did MMW colleges partner with employers to develop, redesign, and implement programs of study?* The sub-evaluation questions addressed in this section of the report follow:

a. How did the MMW Consortium propose to enhance employer partnerships?

b. Who are the employer partners who were engaged in MMW?

c. What level of implementation did the colleges report for employer partnerships?

How did the MMW Consortium propose to enhance employer partnerships?

The grant proposal laid out a vision for employer partnerships that was to be developed through MMW, beginning with the following passage on page 2 of the TAACCCT proposal for MMW.

> Sector partnerships, led by employers in partnership with colleges and the public workforce system, incorporate the role of the advisory committees and expand that role to include providing current labor market information and industry trends, supporting curriculum design, identifying work-based learning opportunities and providing sample real-world projects to incorporate into instruction, increasing paid student internships, collaborating on training needs, and hiring completers (TAACCCT Proposal for MMW, page 2).

Partnerships were also mentioned with the Missouri Economic and Information Center (MERIC), the Missouri Department of Economic Development (DED), the Division of Workforce Development (DWD) and related local Workforce Investment Boards (WIBs), the United Auto Workers (UAW), and the University of Central Missouri (UCM). It is important to note that both local WIBs and the UAW worked to refer grant participants to the colleges and aid in grant participant recruitment. Fourteen percent of the total participants (659) were referred to a college from a local WIB, and 33% of the participants (1,497) were referred to a college from UAW. The consortium contracted with UCM to work with all consortium colleges to articulate their multiple new and existing manufacturing-related AAS degrees with its Bachelors of Technology. Please see Appendix I Curriculum Review for the new curriculum.

To more fully understand the scope of occupational clusters and programs of study related to partnerships, we share Table 1. This table shows that some programs were more extensively offered by some of the colleges, while other programs were only implemented at few colleges. As a result, the make-up of employer partners was bound to vary from college to college, not only due to differences in program offerings, but also by the geographic location of the colleges in rural, urban and suburban areas.

Table 1. *Target Occupational Clusters for Programs of Study by College*

Occupational Cluster	ECC	MAC	MCC	NCMC	OTC	SCC	SFCC	STCM	STLCC
Production		X	X	X	X	X	X		X
Industrial Maintenance	X	X	X	X			X		
Welding	X		X	X	X	X	X		
Machining	X		X				X	X	X
Transportation and Logistics		X	X						X

Source: MMW TAACCCT Proposal (2012, page 7)

An important focus of the MMW grant was to develop "regional manufacturing sector partnerships", which were described in the proposal as a "regional, employer-driven collaborative of industry, education and training, and other stakeholders focused on the workforce needs of a key industry in a regional labor market." The proposal further states "college program advisory committees will be expanded in both membership and role to provide current labor market information and industry trends; support curriculum design; identify work-based learning opportunities and provide sample real-world projects to incorporate into instruction; increase paid student internships; provide classroom speakers and plant tours; collaborate on training needs; participate in panel reviews/judging of student projects; hire completers; and provide feedback to college and workforce system partners on skill gaps and the success of training program completers." It was expected that these transformed advisory committees would engage [other] employers in designing and delivering postsecondary education in new ways (MMW TAACCCT proposal, page 10). See Table 2 below for specifics on how MMW colleges connected programs of study to industry clusters outlined in Table 1 above.

Who are the employer partners who were engaged in MMW?

As shown in Table 2 (pages 12-18), the nine MMW colleges partnered with over 200 employers. At the end of the grant the colleges were asked to evaluate the degree to which each partner met the college's expectation on a scale including "greatly exceeded our expectation", "exceeded our expectation", "about what we expected", "below our expectations", and "well below our expectations". The table also provides the programs of study with which each employer was engaged. For the most part, the employer relationships were what the colleges expected (169), ten of the employers greatly exceeded the college's expectations, 29 exceeded expectations, 12 were below expectations, and three were well below expectations. Although the majority of employers were involved with only one program of study, 57 employers were involved with more than one program. Welding programs had the highest number of employer partners (92), followed by CIMM (52), and CPT (29).

Table 2. *MoManufacturingWINs Employer Partners*

Employer Partner	Degree to which this partnership met the college's expectations	Programs of study with which each employer was involved
3M	Greatly Exceeded Our Expectations	Industrial Maintenance Technology (IMT)
ABB	Greatly Exceeded Our Expectations	Machine Tool, Intro Welding
Aerofil	Greatly Exceeded Our Expectations	Industrial Engineering Tech. (IET), Welding
Central States Industrial	Greatly Exceeded Our Expectations	Welding
Clemco Industries	Greatly Exceeded Our Expectations	Welding
Component Bar	Greatly Exceeded Our Expectations	Certified Production Tech. (CPT), American Welding Society (AWS) Welding Certification
Mondi	Greatly Exceeded Our Expectations	CPT, Certified Logistics Technician (CLT), Certified Manufacturing Technician (CMT), Pneumatics, Hydraulics
Multi-Craft Contractors, Inc.	Greatly Exceeded Our Expectations	Welder
Natoli Engineering	Greatly Exceeded Our Expectations	Machine Tool
U.S. Silica	Greatly Exceeded Our Expectations	IET, Precision Machining (PM)
Ace Manufacturing	Exceeded Our Expectations	IET, PM
American Air Filter	Exceeded Our Expectations	Machine Tool
American Iron	Exceeded Our Expectations	Machine Tool
Austin Machine	Exceeded Our Expectations	Machine Tool
Bass Pro Shops	Exceeded Our Expectations	IMT
CMC Letco Industries	Exceeded Our Expectations	Welding
Deutsche Precision/Hydromat	Exceeded Our Expectations	PMT, CPT, CLT
Donaldson Co., Inc.	Exceeded Our Expectations	Manufacturing Skills
Enduro Binders	Exceeded Our Expectations	IET, PM
Esselte	Exceeded Our Expectations	IET, PM
G.H. Tool & Mold	Exceeded Our Expectations	IET, PM
General Motors-Wentzville	Exceeded Our Expectations	CPT
Hellebusch Tool & Die	Exceeded Our Expectations	IET, PM
Homeyer Precision	Exceeded Our Expectations	IET, PM
Kraft Foods	Exceeded Our Expectations	IMT
Mississippi Lime	Exceeded Our Expectations	CPT, International Fluid Power Society (IFPS)
National Cart	Exceeded Our Expectations	AWS Welding Certification
Nike	Exceeded Our Expectations	Machine Tool
Parker Hannifin	Exceeded Our Expectations	IET, PM
Patterson Mold	Exceeded Our Expectations	Machine Tool
Piramal Glass	Exceeded Our Expectations	CPT/CLT/IFPS

Employer Partner	Degree to which this partnership met the college's expectations	Programs of study with which each employer was involved
Press Room Equipment Co.	Exceeded Our Expectations	MTT
Quest	Exceeded Our Expectations	Machine Tool
Rawlings Sporting Goods	Exceeded Our Expectations	CLT
Sonoco Plastics	Exceeded Our Expectations	Manufacturing Skills
Staples, Inc.	Exceeded Our Expectations	Warehousing & Logistics (WLA), Welding
The Gund Company	Exceeded Our Expectations	PMT
True Manufacturing	Exceeded Our Expectations	Machine Tool
Valent Aerostructures	Exceeded Our Expectations	IET, PM
Abel Machine, LLC	About What We Expected	CIMM
Accessible Technologies	About What We Expected	CIMM
All Purpose Construction	About What We Expected	WLA
Alphapointe	About What We Expected	WLA
Ambassador	About What We Expected	WLA
Arrow Material Handling Products	About What We Expected	CIMM/INTE/WLA
Aspen Products	About What We Expected	WLA
ATK (Alliant Tech Systems)	About What We Expected	CIMM/WELDING
ATK Small Caliber Systems	About What We Expected	CIMM, WLA, Welding, INTE
Baader Johnson	About What We Expected	CIMM, WLA, Welding, INTE
Baader Linco	About What We Expected	CIMM
Bennett Packaging, Lee's Summit	About What We Expected	WLA
Best Tech	About What We Expected	CIMM
Best Tool & Manufacturing	About What We Expected	CIMM
Black Jack Tire Supplies	About What We Expected	WLA
Boeing	About What We Expected	PMT and Machine Tool
Botkin Lumber	About What We Expected	CPT, CLT, CMT, Pneumatics, Hydraulics
Brogdon Machine, Blue Springs	About What We Expected	CIMM, WLA, Welding, INTE
Brown-Covey, Inc.	About What We Expected	CIMM
Brunson Instrument Co.	About What We Expected	CIMM
Burger & Brown Engineering	About What We Expected	CIMM
Capital Express	About What We Expected	WLA
Carboline	About What We Expected	CLT
Centralized Showing Services	About What We Expected	WLA
Centranz Inc.	About What We Expected	CIMM, WLA, Welding, INTE
Certain Teed Corporation	About What We Expected	WLA
Ceva Logistics	About What We Expected	WLA
Civacon	About What We Expected	CIMM
Clay & Bailey	About What We Expected	CIMM
CLR Logistics	About What We Expected	WLA
CNH Reman	About What We Expected	IMT
Component Bar	About What We Expected	Machine Tool

Employer Partner	Degree to which this partnership met the college's expectations	Programs of study with which each employer was involved
Comprehensive Logistics	About What We Expected	WLA
Computech Mfg. Co. Inc.	About What We Expected	CIMM
Continental Tool	About What We Expected	CIMM
Corbitt Manufacturing	About What We Expected	AWS Welding Certification
CoxHealth	About What We Expected	IMT
Creative Blow Mold Tooling	About What We Expected	CIMM
Custom Metalcraft	About What We Expected	Welding
Custom Mfg. & Polishing	About What We Expected	MTT
Custom Truck & Equipment	About What We Expected	WLA, INTE, Welding
CVS Pharmacy	About What We Expected	WLA
DioDes FabTech	About What We Expected	WLA
Dohman Life Sciences	About What We Expected	CLT
Dollins Tool, Inc.	About What We Expected	CIMM
Emerson	About What We Expected	Machine Tool
Executive Coach Builders	About What We Expected	IMT
Faurecia	About What We Expected	CPT
FE Moran	About What We Expected	INTE, Welding, WLA
FedEx Freight	About What We Expected	WLA
Fike Corporation	About What We Expected	CIMM
Flowers Bakery	About What We Expected	INTE/WLA
Ford Corporation	About What We Expected	Welding, WLA
FormPak	About What We Expected	CLT
GKN Aerospace	About What We Expected	CPT, CLT
Grainger	About What We Expected	WLA
Gray Manufacturing	About What We Expected	CIMM
Great Western Mfg.	About What We Expected	CIMM
Haldex	About What We Expected	CIMM
HallMark Underground Warehouse	About What We Expected	WLA
Harley Davidson	About What We Expected	WLA, INTE, Welding
Heartland Fabrication and Machine	About What We Expected	WELDING
Hogan Truck Leasing	About What We Expected	WLA
Home Depot	About What We Expected	WLA
HP Pelzer Automotive Systems	About What We Expected	WLA
Huhtamaki	About What We Expected	CIMM, WLA, Welding, INTE
Independence Missouri School District	About What We Expected	WLA
Industrial Spring Corp.	About What We Expected	CIMM, Welding
Industrial Steel Fabricators	About What We Expected	PMT
JE Dunn Construction	About What We Expected	WLA
Jet MidWest	About What We Expected	WLA
John Deere Reman	About What We Expected	IMT

Employer Partner	Degree to which this partnership met the college's expectations	Programs of study with which each employer was involved
Johnson Controls	About What We Expected	WLA
Josh Heinrich	About What We Expected	CIMM
Kansas City Missouri School District	About What We Expected	WLA and INTE
Kauffman Stadium	About What We Expected	WLA
KC Machine	About What We Expected	CIMM
Kocher+Beck	About What We Expected	CIMM
K-Ter Imagineering, Inc.	About What We Expected	CIMM
Lafayette Industries, Inc.	About What We Expected	CLT
Liberty Fruit Company	About What We Expected	WLA
Machine Labs	About What We Expected	CIMM
Martinrea	About What We Expected	WLA
May Technology & Manufacturing	About What We Expected	CIMM
Meadwestvaco-Calmar	About What We Expected	CIMM, WLA, Welding, INTE
Mercy	About What We Expected	IMT
Microtool, Inc.	About What We Expected	CIMM
Mid-America Fittings, Inc.	About What We Expected	CIMM
Milwaukee Tool	About What We Expected	WLA/INTE/WELDING
Modine Manufacturing	About What We Expected	Industrial Maintenance Skills, Manufacturing Skills
Murphys Logistics	About What We Expected	WLA
National Aluminum & Brass Foundry	About What We Expected	WLA
Nebraska Furniture	About What We Expected	WLA
O'Fallon Casting	About What We Expected	CPT
Overland Park Mazda	About What We Expected	WLA
Ozburn-Hersey Logistics	About What We Expected	WLA
Packaging Concepts	About What We Expected	CPT
PAS Technologies	About What We Expected	CIMM
Paul Mueller	About What We Expected	MTT
Paulo Manufacturing	About What We Expected	WLA
Peppers Pool & Spa	About What We Expected	WLA
PepsiCo.	About What We Expected	WLA
Permian Plastics	About What We Expected	CPT
Piston Automotive	About What We Expected	WLA
Porta King	About What We Expected	AWS Welding Certification
Pratt Industries	About What We Expected	WLA
Precision Prototyping	About What We Expected	PMT
Pride Manufacturing	About What We Expected	CIMM, WLA, Welding, INTE
Probitas Manufacturing Technologies	About What We Expected	CIMM
Pro-Con	About What We Expected	CIMM

Employer Partner	Degree to which this partnership met the college's expectations	Programs of study with which each employer was involved
Prologistics	About What We Expected	WLA
ProPack	About What We Expected	WLA
PSI Engineering & Consulting	About What We Expected	CIMM
Quest Specialty Products	About What We Expected	CPT
Quik Trip Distribution Center, Belton MO	About What We Expected	WLA
R&D/Leverage	About What We Expected	CIMM
R&L Carriers	About What We Expected	WLA
Reed Lumber Co	About What We Expected	CPT
Royal Machine	About What We Expected	CIMM
Schaefer Electric	About What We Expected	CPT, CMT
Seese Machine	About What We Expected	CIMM
Sega Engineering & Technical Services	About What We Expected	CIMM
Shick USA	About What We Expected	CIMM
Shure Manufacturing Corp.	About What We Expected	IET, PM
Siesco Valley Screw Products	About What We Expected	IET, PM
Silver Dollar City	About What We Expected	IMT
SOR, Inc.	About What We Expected	CIMM
Sporting KC	About What We Expected	WLA
Sprint Tech Warehouse	About What We Expected	WLA
SRC Electrical	About What We Expected	IMT
SRG Global	About What We Expected	IFPS
Sunnen Products Co.	About What We Expected	PMT
Superior Processes Solutions	About What We Expected	MTT
Sysco Kansas City, Inc.	About What We Expected	WLA, Welding
Tagg Logistics	About What We Expected	CLT
Tank Components Inc.	About What We Expected	Welder
TCI	About What We Expected	Welder
The Toolroom, Inc.	About What We Expected	IET, PM
Titanova Inc.	About What We Expected	PMT
Toys R Us	About What We Expected	WLA, Welding, INTE
Triumph Structures	About What We Expected	CIMM
True Manufacturing	About What We Expected	AWS Welding Certification
True Value Nuts & Bolts	About What We Expected	WLA, INTE, Welding
Ultrasource	About What We Expected	CIMM
United Health Insurance	About What We Expected	WLA
United Stationery	About What We Expected	WLA
Universal Galvanizing	About What We Expected	CPT
UPS	About What We Expected	WLA
USPS	About What We Expected	WLA

Employer Partner	Degree to which this partnership met the college's expectations	Programs of study with which each employer was involved
Van Am Tool & Engineering	About What We Expected	CIMM
Vanrob GM	About What We Expected	WLA
Vector Tool & Engineering	About What We Expected	CIMM
Vi-Jon	About What We Expected	CPT, CLT
Vince & Associates	About What We Expected	WLA
Vista Mfg. Company	About What We Expected	CIMM
Wainwright Industries	About What We Expected	CPT
Wainwright, a division of Modineer	About What We Expected	CPT
Waldo Thrift Store	About What We Expected	WLA
Walmart	About What We Expected	WLA
Washington Metal Fabricators	About What We Expected	IET, PM, Welding
WB Industries	About What We Expected	AWS Welding Certification
Wonder Bread	About What We Expected	WLA
Wunderlich	About What We Expected	CLT, CPT
XPO Logistics	About What We Expected	WLA
Yanfeng Automotive Interiors	About What We Expected	INTE, WLA, Welding
Yarbrough's Machine Company	About What We Expected	MTT
Zephyr Products	About What We Expected	CIMM
Ziglin Signs	About What We Expected	IET, PM
Zoltek	About What We Expected	CPT
Challenge Manufacturing	Below Our Expectations	WLA, INTE, Welding
CL Smith	Below Our Expectations	CLT
Havco Wood	Below Our Expectations	CPT, CLT, CMT, Pneumatics, Hydraulics
North Star Battery	Below Our Expectations	IMT
Paul Mueller	Below Our Expectations	IMT
Reckitt Benckiser	Below Our Expectations	IMT and CPT
Rubbermaid	Below Our Expectations	CPT, CLT, CMT, Pneumatics, Hydraulics
SRC	Below Our Expectations	MTT
TG USA	Below Our Expectations	CPT, CLT, CMT, Pneumatics, Hydraulics
U.S. Foods	Below Our Expectations	CLT
US TOOL	Below Our Expectations	NA
Versa Tech	Below Our Expectations	CPT, CLT, CMT, Pneumatics, Hydraulics
Alpla, Inc.	Well Below Our Expectations	CPT
Holcim Cement	Well Below Our Expectations	CPT, CLT, CMT, Pneumatics, Hydraulics
Montgomery Tool	Well Below Our Expectations	CPT
Bachman Machine Co	Not Reported	Not Reported
Duke Mfg.	Not Reported	Not Reported
Gardner Denver	Not Reported	Not Reported
Johnson Controls	Not Reported	Not Reported

Employer Partner	Degree to which this partnership met the college's expectations	Programs of study with which each employer was involved
Patriot Machine Co	Not Reported	Not Reported
ProEnergy	Not Reported	Not Reported
Schrieber Foods Inc.	Not Reported	Not Reported
Schwoeppi	Not Reported	Not Reported
Stahl Specialty	Not Reported	Not Reported
Strocco	Not Reported	Not Reported

The map of Missouri shown in Figure 3 reveals a concentration of employers in the Kansas City and St. Louis metropolitan areas with smaller numbers of employers located near the state's rural colleges. The high concentration near Metropolitan Community College in Kansas City is due to the college's Computer Integrated Machining & Manufacturing (CIMM) consortium.

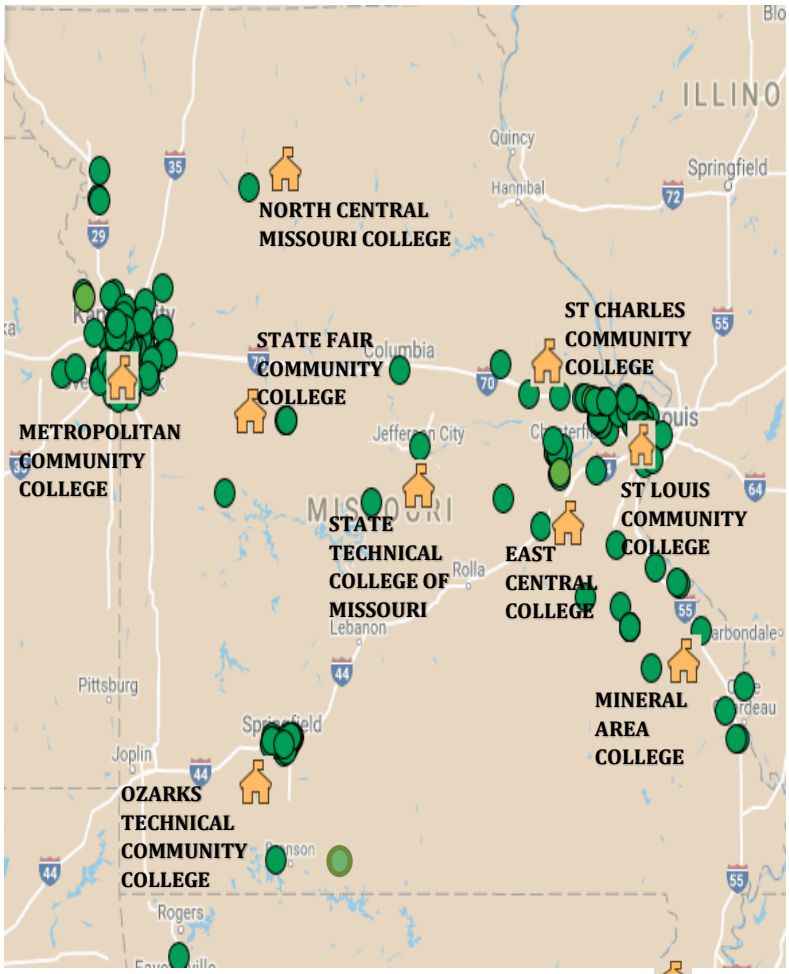


Figure 3: **Map of MoManufacturingWINs colleges and employer partners**

What types and to what extent did the colleges implement employer partnerships?

The MMW TAACCCT proposal (2012) identified a substantial list of strategic alignment activities for employer partners and expressed the desire for the colleges to engage employers in these ways. Figure 3 provides a list of the strategic alignment activities that were specified in the grant, and indicates the number of MMW colleges that reported they were engaged in these activities. These data were gathered by the TPE at the end of the third year of the grant, thus providing an indication of the status of implementation of the activities toward the end of the grant implementation period.

The findings show all but one of the activities was identified as having been implemented by the preponderance of the MMW colleges. The activity implemented only by a small number of colleges was work-based learning (WBL) and paid internships. The reasons for this exception are varied but have to do with the backgrounds and interests of the students, many of whom were already employed and unable to take advantage of WBL or paid internships, but also with the modest provision of such opportunities by employers. Employers must have a firm understanding of the value internships bring to their organizations. Although some colleges reported that employer partners did recognize such value, other employers had limited experience in the use of paid internships and were reluctant to take on the organizational responsibilities associated with internships. Program structure and length are also likely to have impacted the need for internships and work-based learning, as shorter programs do not allow enough time or opportunity for internships.

Figure 4 lists the various roles employers played in MMW and the number of colleges reporting employers having served in each role.

Figure 4. The Number of MoManufacturingWINs colleges (n=9) that Self-identify as Engaged in Employer Partnership Strategies

We used the employer engagement framework developed by Wilson (2015) to assess the employer engagement of the MMW colleges. Wilson suggests that employer engagement represents a ladder extending from minimal engagement to extensive engagement. The five levels of Wilson's framework are:

- **Advising** including advisory boards, employer consultation, and employer consultation to identify workforce needs
- **Capacity building** including strategies to increase responsiveness to employer needs as demonstrated through activities such as customized training
- **Co-designing** including designing new pathways and curriculum and employer partners providing adjunct faculty to teach
- **Convening** including recruiting and convening employers as on-going partners and colleges serving as the hub for workforce collaborations
- **Leading** including employers and colleges serving as full strategic partners resulting in partnerships that transform the local regional workforce.

Examples of the lowest level of engagement include employers "advising" on various aspects of education and training, which is indicative of the functions a typical college advisory committee carries out, to the most intensive level referred to as "leading" wherein employers partner with colleges to lead a sector strategy, including hosting summits and being the go-to resource for all aspects of education, training, and employment. This approach to employer partner engagement is very comprehensive and relatively rare at the present time in the United States. In many respects, it represents a much more European conception of education-employer engagement where the public and private sector are more interwoven and dependent on multiple levels.

Results of data gathered by the evaluation team using multiple methods (e.g., surveys, site visits, performance reporting) show the MMW colleges have made strides toward employer engagement at the first three levels of the Wilson scale: advising, capacity building and co-designing. There is also some evidence of initial stages of engagement at the convening and leading stages. This development suggests colleges are continuously improving their employer engagement efforts. It is important to note that MMW colleges employed lessons learned regarding employer engagement from previous efforts in their Round 1 TAACCCT grant. The statewide employer engagement task force consisting of Round 1 and Round 2 leadership provided an opportunity for colleges to engage in peer learning and to build a model for improving partnerships with employers (Cosgrove, 2015).[8]

However, the high-order levels of engagement related to Convening and Leading require prolonged and extensive engagement that must be continued and supported beyond the TAACCCT grant period. More time is needed to evaluate whether the employer partnerships begun through the Consortium will reach these higher levels of engagement.

[8] Cosgrove, J., Cosgrove, M., & Weathers, B. (2015, February). MoWINs Employer Engagement Task Force Report. Retrieved August 2016, from http://mccatoday.org/wp-content/uploads/2012/11/FINAL-Employer-Engagement-White-Paper-May-1-2015-added-disclaimer-cc-by.pdf

Table 3 below provides a summary of each college's employer engagement at the close of grant programmatic activity and includes selected activities, progress on internships and WBL, challenges, and self-assessments. The data show the range of experience across the Consortium and individual college responses to the context of their local area.

Table 3. *Summary of Employer Engagement by College*

College	Selected Employer Engagement Activities	Engagement with WBL and Internships	Challenges to Employer Engagement	Summary Self-Assessment (Quotes from MMW College leaders)
ECC	• Employer engagement goes beyond advisory committee • Engaged in developing "relevant curriculum"	No formal internships	• History of poor communications, misunderstandings with local employers	"MoMan gave ECC the platform to forge new relationships with employers and solicit their feedback - good and bad. As a result, the pool of employers that contact ECC directly when filling vacancies has increased exponentially."
MAC	• Quarterly advisory board meeting and SEMO Industry Consortium meeting • Variety of delivery modes • Delivery of some classes employer sites • Employers suggest curriculum change • Employers incentivize incumbent workers to participate in grant • Employers give notices of job openings • Employers host interns • Graduates hired	• Three students took advantage of optional internship • Employment upon graduation for several reduced the need for internship	• Unfamiliar with certifications and slow to promote to employee • Shift work impeded employee participation before college reformed delivery	"One way it moved the needle was by incumbent workers improving their skills through the certification programs which allowed them to move up the employment ladder and leave vacancies then to be filled by others. Ten of our unemployed completers found employment in the manufacturing sector."
MCC	• Communication and smoothing of relationships • Consultations with employers concerning job placements • Breakfast meetings • "Tailor-made training" • Graduates hired after graduation • Some students with credentials but issues with background checks	110 6-week CIMM internships; 104 offered jobs	• Challenges arranging company tours due to concern for student safety • Students/graduates unable to pass background checks • Students/graduates feel mislead or cheated of positions they feel qualified for	"We believe that our training helped move the needle based on the number of participants who found employment that was directly related to the training."

College	Selected Employer Engagement Activities	Engagement with WBL and Internships	Challenges to Employer Engagement	Summary Self-Assessment (Quotes from MMW College leaders)
NCMC	• At least one advisory meeting each semester, but many conversations and on-going interactions with employers • Smaller core of employers present at formal meetings • Most participants are incumbent workers – focus on upgrading training rather than new employees	Limited success developing internships; employers more interested in offering full-time jobs	• Placement and hiring are challenging • Students/graduates unable to pass background checks • Some graduates unwilling to relocate • Proximity to the college affects student/graduate engagement	"We are confident that our MMW programs contributed to the labor pool of qualified candidates in the area manufacturing sector. Industry had a continued hiring need throughout the duration of our programs and referrals from career centers noticeably decreased near the end of program instruction."
OTC	• Focus on recruiting graduates	Internships didn't fit with the curriculum	• Employers do not refer students to the college programs • Accelerated methods make it difficult for incumbent workers to participate • Some active partners do not hire graduates	"We do not see as many postings now as we did. Although statistics indicate that 81.9% of our completers are employed, and 90% of those were still retained 6 months later, I was expecting 'faster' placement. I had visions of folks being placed before they graduated and that rarely happened."
SCC	• All participants tested on NCRC+ using paper and pencil format • Employers value program – hiring graduates • Working with employers to "sell" the program • Continuing employer engagement after the grant • Large number of graduates employed; Grant staff meet with employers and help students fill job slots that arise	100s of work-based learning opportunities; majority completing the programs were hired	• Space (lab) issues – students wait listed	"For our region, MMW provided training needed by employers and gave confidence to graduates to be able to -- walk the walk -- of a manufacturing enterprise. It provided much needed skills to people who would not have understood manufacturing without the training MMW afforded the students."

College	Selected Employer Engagement Activities	Engagement with WBL and Internships	Challenges to Employer Engagement	Summary Self-Assessment (Quotes from MMW College leaders)
SFCC	• College lab tours • Meetings with employers: • Internships • Curriculum change • Focus on job openings and overall training • Employers hiring some graduates	• Internship opportunities • SFCC Learning Force encourages employers to share employment opportunities • SFCC Career Services supports internship and hiring placements	• Time to build partnerships	"MMW has helped fill vacancies in jobs by providing tuition assistance to students who otherwise would not have attended."
STLCC	• Hired Business Engagement Manager • Advisory committee meetings • Subject matter experts (SMEs) reviewed certifications and curriculum	No industry internships	• Time for industry outreach • Lack of familiarity with industry certifications	"What we did find is that most of the industry partners we met with had not heard of the MSSC certifications for Logistics and Production."
STCM	• Face-to-face meetings • Campus tours • Communications focused on graduate employment and sustainability of programs	No formal internships and work-based learning; some employers posted positions that students could ascertain.	Time to build partnerships	"Because participants were trained, hired, and the program aided quite a few employer partners we feel the needle was moved forward."

Source: TPE site visit notes, quarterly performance reports, TPE survey responses on implementation.

Consortium Implementation of Curriculum

This section of the report addresses the following question: *How did MMW colleges develop and structure curriculum?* Results pertaining to this question focus on grant-funded program of study (POS) implementation, drawing on survey and site visit notes from the TPE, as well as subject matter expert (SME) curriculum review. The curriculum review process was completed in August 2015 at the point of mature implementation of the grant (MMW Curriculum Review Report, 2015). Details of the methodology for the SME curriculum review are provided in the MMW Consortium's summary document (see Appendix I).

We begin by providing a summary table showing POS by college (see Table 4). In total, the MMW Consortium implemented 44 technical programs or courses, and three academic skills/career guidance "portal" programs were developed or enhanced with grant funds by the nine MMWs Consortium colleges.

Table 4 shows that there was a substantial amount of new curriculum developed under the MMW grant, but there was also a significant amount of enhanced curriculum as well. Approximately two-thirds of the programs of study and courses pertaining to these programs represented new curriculum, while the rest was enhanced. Program curriculum was developed or retrofitted to incorporate industry-recognized certifications to further validate, beyond the colleges' own certifications and degrees, the skills successful completers had mastered. Some of the curriculum was accelerated, although the importance of accelerated curriculum to the grant depended on the student populations that were being recruited. Whereas unemployed workers who had the time to enroll in college classes full-time could participate in accelerated (compressed) instruction, this format did not prove as relevant to incumbent workers who had limited blocks of time to participate in formal instruction.

Similarly, whereas most of the programs of study were offered for credit, some were not, and this was typically a decision based on the student population. In cases where the students were already employed and the decision to participate in training was largely tied to mastering skills for that employer, the college credit seemed to be less important. In other cases, colleges recognized that offering a non-credit program streamlined the program development and implementation process, as they could avoid typically lengthy internal credit-program curriculum approval processes.

While all TAACCCT funded programs were offered at no cost to the students (a decision the State made for both Rounds 1 and 2 of its TAACCCT Consortium grants), there are implications for curriculum offerings in the long run. Sustainability of programs of study may depend on future funding available from employers and students, and in the case of credit versus non-credit, the capacity to offer long-term programming may depend on estimating cost of attendance correctly. As such, the cost of attendance for the student may be reduced by administering future programs and courses through the colleges' customized training units rather than through college tuition.

Table 4. *MoManufacturingWINs Programs of Study Implemented by Consortium Colleges*

Program of Study	ECC	MAC	MCC	NCMC	OTC	SCC	SFCC	STCM	STLCC
Manufacturing Skill Standards Council Certified Production Technician (MSSC CPT)	New Credit NCRC MSSC CPT	New Credit MSSC CPT		New Credit MSSC CPT		New Non-credit MSSC CPT	New Credit MSSC CPT		New Non-credit MSSC CPT
Precision Machining (Technology)	Enhanced Credit NCRC NIMS 1 & 2								New Credit NIMS 1
Machine Tool								Enhanced Non-credit NCRC OSHA 10-hr NIMS 1	
Accelerated Machine Tool					Enhanced Credit NCRC+ CPR NIMS Level 1				
Machine Tool 1 & 2 (2 courses)							New Credit NIMS 1		
Computer Integrated Machining & Manufacturing (CIMM)			Enhanced Credit No certs						
Saw & Drill Press			New Non-credit NIMS 1						
Certified Manufacturing Technician		New Credit SME CMT Fanuc Robotics							
Basic Industrial Maintenance – ABB Robotics			New Non-credit NCRC OSHA 10-hr						
Industrial Maintenance (Total Production	New Credit			New Credit			Enhanced Credit		

Program of Study	ECC	MAC	MCC	NCMC	OTC	SCC	SFCC	STCM	STLCC
Maintenance, Skills Certificate)	NCRC MSSC CPT			NCRC OSHE 10-hr SMRP/ CMRT			SMRP/ CMRT		
Manufacturing Specialist (Accelerated Industrial Maintenance)					Enhanced Credit NCRC CPR MSSC CPT				
Pneumatics		New Credit IFPS							
Hydraulics		New Credit IFPS							
Welding, Basic Welding, Intro to Welding, Welding Skills, Welding Specialist, Welding Certificate			New Credit OSHA 10-hr	New Credit NCRC MSSC Safety OSHE 10-hr AWS	Enhanced Credit & Non-credit NCRC OSHA 10-hr AWS	New Non-credit NCRC AWS		New Non-credit NCRC+ Cert of Completion	New Non-credit AWS
Construction Welding			Enhanced Credit AWS						
MIG & MIG/TIG Welding	New Non-credit NCRC OSHA 10-hr		Enhanced Credit AWS						
Structural Welding							Enhanced Credit AWS		
Pipe Welding							New Credit None		
Warehousing and Logistics; Certified Logistics Technician; Logistics Associate & Technician		New Credit MSSC CLT OSHE 30-hr IC3	New Non-credit NCRC OSHA 10-hr						New Non-credit MSSC CLA CLT

Source: MMW SME Curriculum Review Report (2015)

Other curriculum developed through the grant included *Quality Systems Engineering* and *Inspection and Quality Control* at the University of Central Missouri (UCM), and these two offerings were developed and offered in the summer in 8-week online and hybrid formats. University of Central Missouri has proposed a degree in Technology Management 2+2. The *MMW SME Curriculum Review Report* indicates that the courses had some challenges with implementation because some of the skills could not be taught online, requiring students come to the UCM campus twice for face-to-face instruction. UCM also developed and transitioned other courses within its Technology transfer area, including a BS program that is offered entirely online, with a couple of hybrid courses.

In addition, three manufacturing portal programs were offered as part of the MMW Consortium grant. East Central College (ECC), St. Charles Community College (SCC), and St. Louis Community College (STLCC) offered these programs, with all three of these colleges extending the earlier work they created with the portal as part of the MoHealthWINs Consortium grant in Round One of TAACCCT. Details about these programs are provided in the MMW Subject Matter Expert Curriculum review, and briefly summarized below.

Table 5. *Portal Programs Offered through the MMW Consortium Grant*

College	Portal Program Description
ECC	This required, approximately 8-contact hour program is managed by the college's Division of Workforce Development to replace the 3-week credit Transitions program that ended in December 2014.
SCC	Required for entry into any MW technical programs, this 8 – 32-hour program of study is managed by the college's Workforce Development Division. It consists of five areas of focus: *Intro to Manufacturing/Welding*; *Basic Computer Skills*; *Simulated Work Environment*; *Job Search Skills* and *National Career Readiness Assessment.*
STLCC	This required 6-contact hour program of study is managed collaboratively by the college Student Services, Academic Services, and Continuing Education departments and its Workforce Solutions Group. Participants can earn their NCRC+ certificate and raise their computer literacy to the level required for entry-level employment in manufacturing through STLCC's Digital Literacy course.

Although partner colleges started with a small number of employers, they continuously engaged those initial employers and reached out to additional employers to increase impact within their community by ensuring employer needs were being addressed and by increasing hiring opportunities for program completers. Colleges often had to adjust and modify programs to meet the needs of entering students who were not academically prepared for complex advanced manufacturing programs but could benefit from shorter-term programs leading to employment. By juxtaposing students and employer needs and aligning such needs to appropriate program content and structure, colleges were better able to serve both students and employers.

Consortium Strategy Implementation

This section of the report addresses the following question: *Did MMW colleges implement programs and strategies in a timely manner?* The section presents results from the college summative assessment of implementation of strategies specified in the MMW grant and includes quantitative results from the internal research team's data gathered via participant unit records, interviews with college grant leads, and partner colleges' quarterly narrative reports. Although the MMW consortium implemented a wide ranging set of strategies, not every college implemented all such strategies. Moreover, as colleges moved from initial strategy implementation to mature implementation, the decision to explore further scaling of selected strategies tended to vary by college. Figure 5 reveals the number of colleges who implemented selected strategies AND saw the potential for further scaling of the designated strategies.

The MMW strategies presented in Figure 5 closely align with Missouri community colleges' vision to expand the use of a Career Pathway model for further enhancement of new and existing career and technical education programs. As Missouri and its community colleges continue the development of Career Pathways, the following strategies and related TPE observations seem especially relevant.

Credit for Prior Learning – A total of 304 MMW participants (7%) applied for and received credit hours using Missouri's Credit for Prior Learning (CPL) process. This process was initiated during Missouri's Round 1 TAACCCT grant and continued to evolve and develop during the MMW grant. Although less than 10 percent of the MMW participants received credit for prior learning, the use of CPL appears to be on the rise. Prior to the TAA Round 1 and Round 2 grants the systematic use of CPL across the State was negligible.

Colleges working on the expansion of CPL have noted the following challenges: internal barriers between credit programs and non-credit programs; short-term programs designed for specific industry clusters may not provide the opportunity for the inclusion of CPL; and efforts to expand CPL need to be more inclusive of existing program faculty. As noted in the mid-point evaluation progress report, colleges were aware of such challenges and worked to address them. To help in this effort, the Missouri Community College Association has worked to strengthen the connection between consortium grant staff and existing statewide committees related to academic and student affairs. Moreover, MCCA is continuing its efforts with the Council for Adult Experiential Learning (CAEL) to increase the standardization and expansion of CPL efforts across all campuses through Missouri's Round 4 TAACCCT grant.

Build Programs Based Upon Industry Recognized Credentials – Colleges reported the value of listening to employers and recognized that shorter-term stackable credentials matter. The MMW grant allowed colleges to experiment with the creation of such credentials and challenged the notion that a full degree or even a one-year certificate is needed to secure employment. Employers continually expressed the need for employees with industry-recognized skills who could read blueprints, understand basic machine-shop math/metrics, and have strong a foundation in and orientation to advanced manufacturing. The colleges responded to employer demands by producing 4,599 awards/certifications recognized by the following professional

societies: Manufacturing Skills Standards Council; Society of Manufacturing Engineers; American Welding Society; and National Institute for Metalworking Skills.

Colleges also found that it was not unusual for employers to be unaware of credentials, as such, the colleges found themselves in the position of educating both employers and students on credentials. One college even went as far as creating flyers to explain the value of the Certified Production Technician (CPT) credential to employers. Still other employers were more interested in one or a few of the skills of the credential and were willing to hire students before they had completed an entire program. Colleges needed to be flexible and adapt to the needs and demands of their various employers.

Program Acceleration and Use of Flexible Schedules and Curriculum Structures – Colleges reported that although program acceleration, non-term based schedules, and condensed curriculum structures benefit selected groups of students, such strategies should not be viewed as "silver bullets" to increase program completion and employment rates. Colleges recognized that a significant number of MMW participants were not prepared for the academic and life challenges related to accelerated instruction. This phenomenon was especially important when working with students who were in the high-need target group of academically under-prepared and unemployed at program entry. As colleges move to scale program acceleration and alternative instructional formats they now have a greater understanding of the importance of connecting academic, student, and life support services to a student's instructional experience.

Internships – A few MMW programs included internships with local employers, and 159 (4%) of MMW participants were involved in these internships. Program leadership, students, and employers reported satisfaction with grant internship programs. Such satisfaction seems linked to the following key factors: program leadership and employers worked together to develop the internship; employer and student expectations and benefits were outlined from the start and continually assessed; the internship was a meaningful component of the curriculum and related stackable credentials, and fit within the overall program structure.

Throughout the course of the grant, colleges expressed disappointment with their success in getting employers to agree to internships. The great exception was at MCC where interns in the CIMM program made up the bulk of the consortium's internships. At times the short nature of MMW programs precluded internships, in some cases employers were willing to hire the students without internships, but for the most part, internship development lagged behind the colleges' and students' expectations.

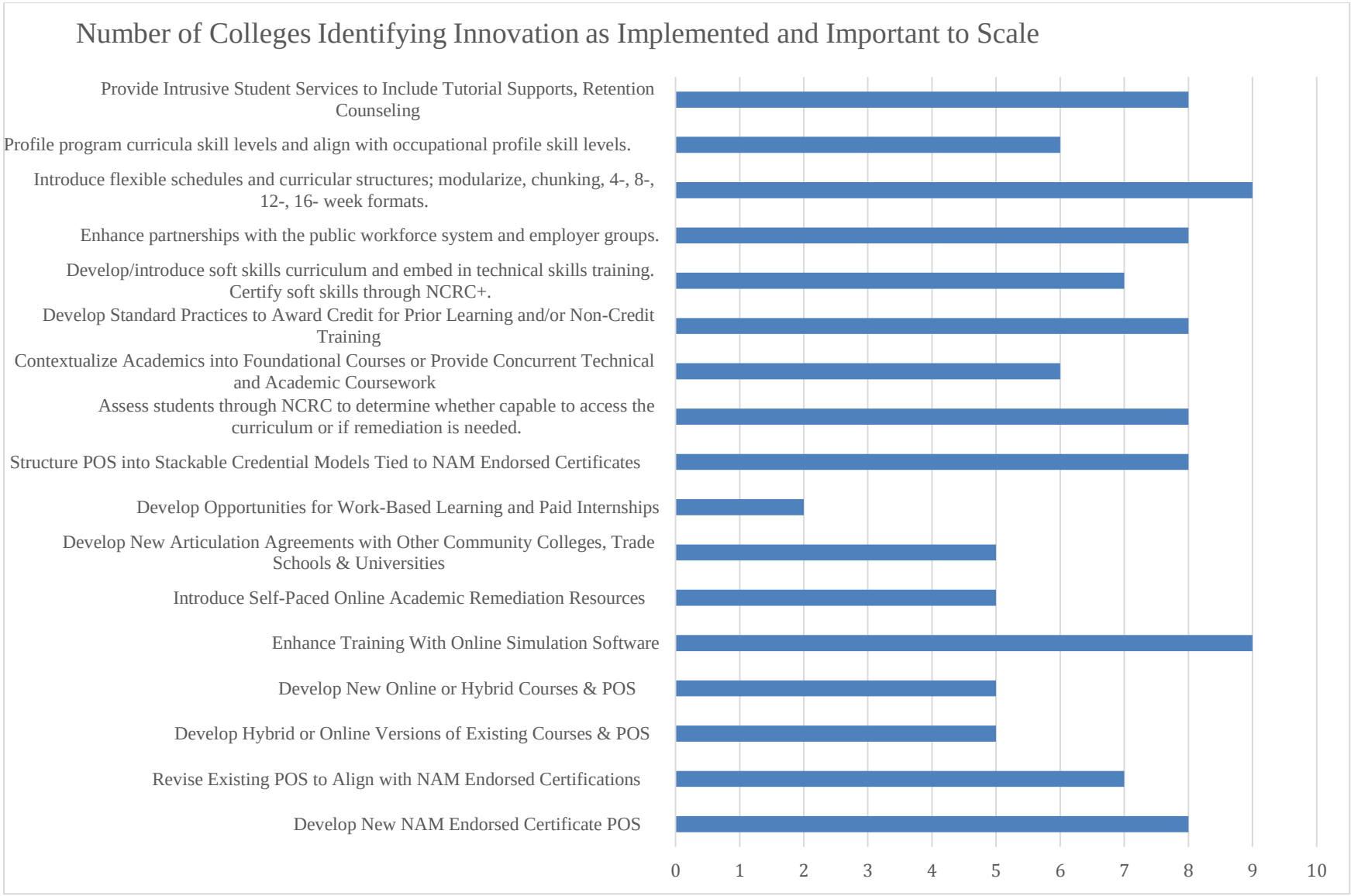


Figure 5: Strategies Identified as Implemented and Important to Scale by MoManufacturingWINs Colleges

Developmental or Remedial Education – Low academic skills were a barrier for many students trying to access manufacturing technology programs that require higher-order mathematic, reading, and English skills, and this was a consideration for the vast majority of grant participants. Seventy-eight percent of the MMW grant students (3,524) began with less than college-level skills in at least one academic area (mathematics, reading or English). Twenty-one percent (936) began with less than college-level skills in two academic areas, and 15% (639) started with less than college level skills in all three areas of mathematics, reading, and English. Depending on the program and the skills required to complete the program, colleges addressed these needs using a variety of methods. Five of the colleges employed self-paced remedial instruction to work with 307 students (9% of those with less than college-level entering skills) to address such developmental education needs.

Because of the short-term and often varying nature of the MMW programs of study, it is difficult to fully examine the impact of this self-paced remedial instruction on grant program completion. However, MMW participants who entered with less than college-level skills who participated in self-paced remedial instruction completed 85% of the instructional hours attempted. MMW participants who entered with less than college-level skills and did NOT participate in self-paced remedial instruction completed 78% of the instructional hours they attempted.

In addition to initial remedial instruction, colleges also recognized that students in accelerated programs often need instructional support throughout their program. To address this need colleges embedded tutors in the classroom, offered contextualized math, and utilized learning coaches. Across the Consortium, faculty noted students' weakness in basic mathematics and measuring skills and colleges modified programs to improve student achievement. Some colleges added classes to enhance these skills before lab sessions began. MCC added math basics and measurement to a Prep for Success course, brought technical faculty in to contextualize the content of academic assignments, and arranged group study sessions to provide help with textbook assignments and test preparation. Other colleges provided tutoring sessions and workshops including math remediation. North Central Missouri College formalized college success topics into a course by revamping an existing college course and will implement this as a required course in certain programs. Moreover, NCMC developed co-requisite developmental math courses. Ozarks Technical Community College established a minimum math level coupled with in-class tutors to assist with context. OTC found the in-class tutoring so successful that its Tutoring & Learning Center began to use the model in several classroom settings, and sustained it without grant funding. St. Louis Community College continued to tweak the Adult Learning Academy portion of their Manufacturing Portal to help students succeed in manufacturing programs.

Intrusive Student Support – All nine colleges continued to develop and expand intrusive student services aimed at helping participants complete programs of study and secure employment upon completion. Although 44% (2,003) of the MMW participants received individual intrusive student support from a dedicated advisor, almost all students were exposed to support services offered within their programs. Advisors served many functions such as: explaining career pathways and LMI data; helping student locate and secure non-academic support from social services agencies; connecting students to grant-funded and standard college

academic support; and assisting students in preparing resumes and organizing the job search. Such support services varied by college and although documentation related to such services was recorded in a student's case file, colleges did not systematically record the type and frequency of such services in the student's outcome tracking file.

Again due to the short-term and often varying nature of the MMW programs of study, it is difficult to fully examine the impact of any one innovation such as intrusive support on grant program completion. That said, MMW participants who received personal intrusive student support services completed 83% of the instructional hours attempted whereas participants who did not receive individual intrusive student support services completed 75% of their instructional hours attempted.

During the course of the grant, colleges experimented with the role of the intrusive support advisors. Colleges learned advisors could benefit students throughout their educational experience from recruitment to post-program completion. Thus the role of the intrusive support advisor evolved and came to encompass levels of expertise along the spectrum. Advisors became knowledgeable about recruitment, enrollment, academic support, locating support from social service agencies, finding internships, and securing employment.

As colleges increased intrusive student support services, they worked to break down pre-existing silos between traditional "instructional" and "student support" organizational components. At some colleges, the creation of inter-disciplinary teams that included faculty, instructional support staff, advisors, and career counselors helped enhance the support services provided to students. In addition, such teams enable students to receive support not only at the beginning of their educational experience, but throughout their program and onto employment.

Although all nine colleges employed intrusive student support strategies, several colleges noted that scaling such services beyond the grant was cost-prohibited. Despite such claims, other colleges, most notably State Fair Community College, have implemented new data collection and analysis strategies which reveal a positive return on investment related to an increase in student support services. These colleges have concluded that the additional cost related to increased support services is outweighed by the revenue generated through an increase in student retention and program/degree completion. For a more detailed discussion of scaling opportunity associated with intrusive advising see Kirby (2016)[9].

[9] Kirby, C. L. (2016). Expanding student support services. Champaign, IL: Office of Community College Research and Leadership, University of Illinois at Urbana-Champaign.

Populations Served by MoManufacturingWINs

This section of the report addresses the question: *Did MMW programs serve the target population?* Data presented in this section include participant enrollment by grant year; number of TAA-eligible participants; number of Veteran participants; the number of participants who were either unemployed or under-employed at initial grant enrollment; and the number of participants who lacked college-level academic skills at initial grant enrollment.

The MMW Consortium grant provided education and training programs to 4,547 unduplicated participants. The average age of MMW participants was 35. Figure 6 provides a breakdown of the total MMW enrollment (n=4,547) by grant year and shows the largest number of participants enrolled in year 3.

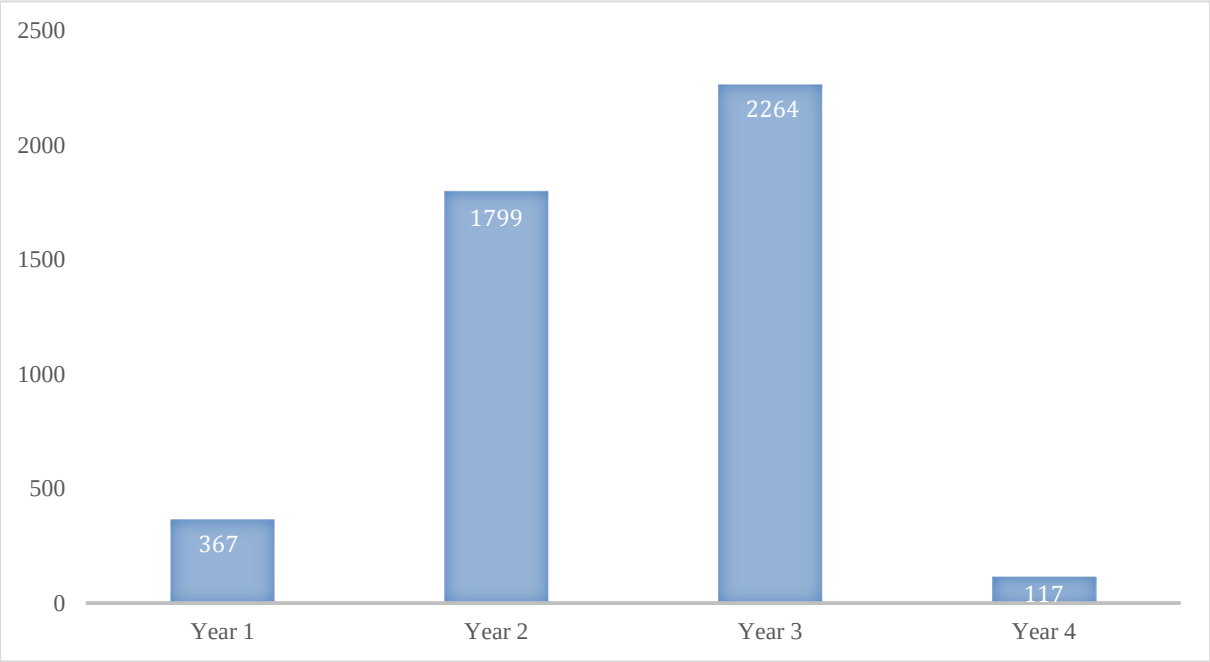


Figure 6: MoManufacturingWINs Annual Enrollment

Table 6 presents participant enrollment data for key populations outlined in the MMW statement of work.

Table 6. *Participant Total and Percentage by Sub-group*

Key Target Group	Participant Count	Percentage of Total Enrollment (n=4,547)
TAA eligible	92	2%
Veterans	566	12%
First-time enrolled in college	2,438	54%
Required remediation in math, reading or English upon initial program enrollment	3,521	77%
Not employed at initial program enrollment	1,606	35%
Under-employed at initial program enrollment	2,301	51%

Table 6 shows a sizeable number of targeted groups participated in the MMW Consortium grant. Whereas the number of TAA-eligible is small at just under 100 or less than 2%, the number of Veteran participants is 566 (representing 12%) of all grant participants. The remainder of the groups identified in Table 6 represents sub-groups mentioned in the MMW Consortium grant application. Over 50% of the MMW grant participants were identified as first-time enrolled in college; requiring remedial coursework in math, reading, or English; and under-employed at initial program enrollment. Over one-third of the grant participants were identified as not employed at initial program enrollment based on self-report and confirmed by state level employment records.

Education and Employment Outcomes

This section of the report addresses the following question: *Did MMW participants achieve desired student outcomes, and how do actual grant outcomes compare to targeted grant outcomes?* Results on education outcomes and employment outcomes are compared to the target outcomes presented in the original grant statement of work.

Of the total MMW participants (4,547), 72% (3,295) completed at least one grant-funded program of study. Of this total, some participants enrolled in and completed more than one program of study, resulting in the number of participants completing programs of study being larger than the simple number of participants. The number of completers by program award are presented below.

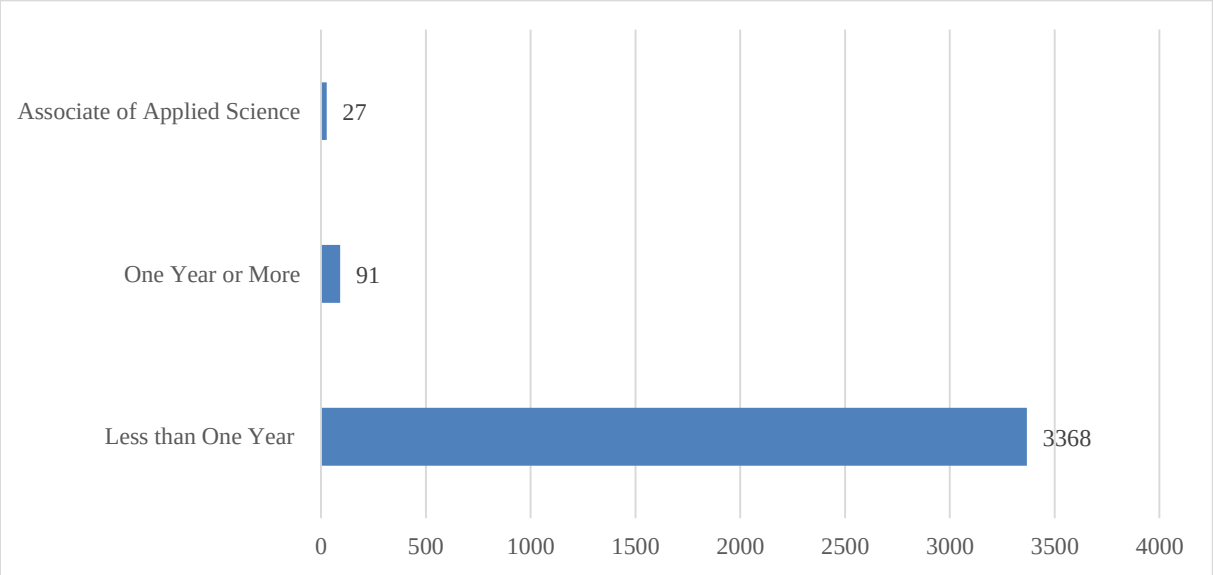


Figure 7. MoManufacturingWINs Completion by Program Award

Of the 4,547 unduplicated MMW participants, 93% (n=4,214) completed at least one industry-recognized, stackable credential, including the ACT National Career Readiness Certificate.

Counting all program awards and stackable credentials, 8,873 industry-recognized awards and credentials were awarded through the MMW Consortium grant. Included in this total are 4,599 awards/certifications recognized by the following professional societies: Manufacturing Skills Standards Council; Society of Manufacturing Engineers; American Welding Society; and National Institute for Metalworking Skills.

The MMW colleges enrolled participants in 44 different programs across the following manufacturing career pathways: Industrial Maintenance; Machining; Transportation and Logistics; Production; and Welding. Table 8 provides the full list of enrollment by program. For purposes of this analysis similar programs offered on more than one campus are grouped together, thus the list of programs in Table 7 is less than 44.

Table 7. *Duplicated Enrollment by Program of Study*

Program of Study	Count*
General Motors Portal	1,194
Manufacturing Tech Portal	872
Basic Welding	424
Machine Tool Technician	419
Faurecia Portal	346
Certified Production Tech	298
Warehousing & Logistics	292
TIG MIG Pipe Structural or Other Advanced Welding	289
Certified Logistics Tech	224
Precision Machining Tech	168
Computer Integrated Machine & Manufacturing	147
Industrial Maintenance	103
Total Productive Maintenance	81
Industrial Engineering Tech	78
NON-Credit Welding (all forms)	56
Industrial Maintenance ABB Robotics	44
Manufacturing Skills & CPT	33
Saw & Drill Press Operator	28
Industrial Hydraulic Mechanic	22
Certificated Manufacturing Tech	9
** Enrollment data are duplicate counts given that participants may have enrolled in more than one program.*	

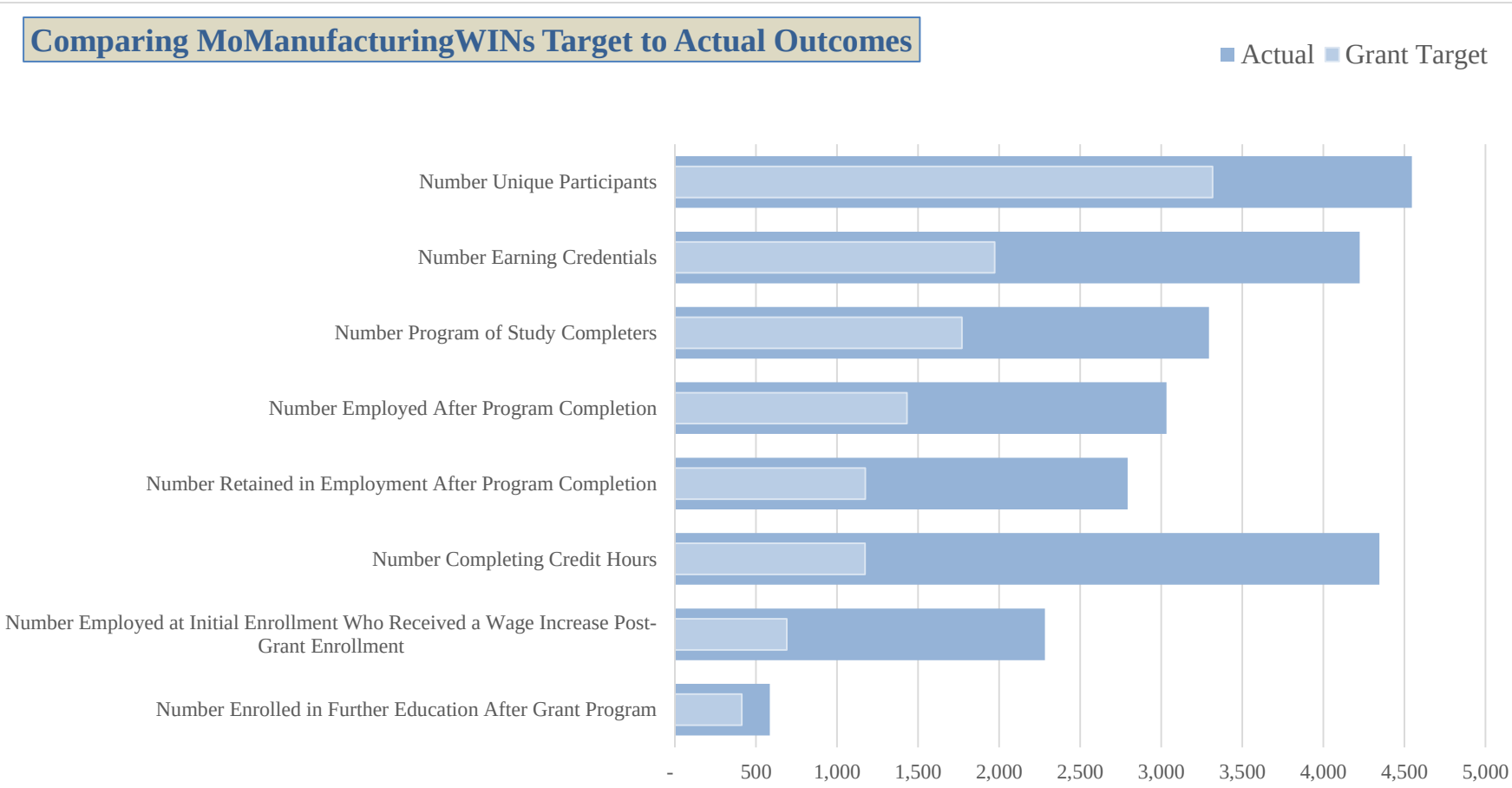
MMW participants enrolled in both credit and non-credit programs, and they completed both credit and non-credit instructional hours at a high rate. The credit-hour-completed-to-attempted ratio for the credit programs was 92% and the non-credit-hour-completed-to-attempted ratio was 70%.

According to Missouri employment and wage records, 92% percent of program completers (n=3,033) secured employment of some type during the grant and the average annual wage for the program completer group is $56,000, with a 6-month employment retention rate of more than 90%. The employment rate for program completers who began as unemployed is 86% (n=891) and the average annual wage for this group is $43,000, with a 6-month employment retention rate of more than 90%.

Comparison of Actual Grant Performance to Targets

The DOL required grantees to specify outcomes of the statement of work. To examine the extent to which the MMW consortium met these specified targets we compared the actual grant performance to the designated targets. This analysis is presented in Figure 8 (next page). The consortium actual grant performance surpassed all performance targets outlined in the original statement of work. Given DOL's commitment to improving program completion rates and employment rates the following data points are especially relevant.

- Enrollment of 4,547 surpassed grant target by 37%.
- Grant Program of Study (POS) completers (3,295) surpassed the grant target by 86%. The Program of Study completion rate of 72% surpassed the grant target program completion rate of 53%.
- Grant Program of Study completers employed at program completion (3,033) surpassed the grant target of program completers employed by 111%. The employment rate for grant POS completers of 92% surpassed the grant target employment rate of 81%.



	Number Enrolled in Further Education After Grant Program	Number Employed at Initial Enrollment Who Received a Wage Increase Post-Grant Enrollment	Number Completing Credit Hours	Number Retained in Employment After Program Completion	Number Employed After Program Completion	Number Program of Study Completers	Number Earning Credentials	Number Unique Participants
Actual	585	2,282	4,346	2,793	3,033	3,295	4,224	4,547
Grant Target	412	689	1,173	1,174	1,431	1,771	1,973	3,317

Figure 8: Comparisons of Performance to Targets from the MoManufacturingWINs Statement of Work

Analysis of Outcomes for Key Populations

The previous sections of this report provided results on the consortium's performance on a number of grant-related education and employment outcomes. This section of the evaluation report dives more deeply into the core evaluation question: *Did MMW participants achieve desired student outcomes, and how do actual grant outcomes compare to targeted grant outcomes?*

These results reveal that the MMW grant out-performed all of the performance targets articulated in the grant. The MMW colleges were encouraged to develop programs and strategies to meet both state and local needs, and this often required customizing programs for key populations. Because the MMW colleges offered a variety of programs and served diverse sub-groups of participants, it is worthwhile to look more deeply into the outcomes and examine them by college and by key population groups.

Program Completion and Employment by Partner College

With 3,295 program completers, MMW has a program completion rate of 72%. Looking at employment, 92% of the POS completers are employed as of June 2016. Table 8 presents enrollment, completion, and employment results for each MMW college, displaying a range of results by college on the selected outcomes measures. Many factors can contribute to this finding, including differences in programs of study funded by the grant, the instructional hours required for program completion, when the programs were funded during the duration of the grant, and other factors.

Table 8. *MoManufacturingWINs Enrollment, Completion, and Employment by College*

Performance Outcome	ECC	MCC	MAC	NCMC	OTC	SCC	SFCC	STLCC	STCM	TOTAL
Unduplicated Participants	276	666	141	94	162	1,965	280	585	378	4,547
Program Completers	136	514	44	46	138	1,862	181	256	118	3,295
Program Completion Rate	49%	77%	31%	49%	85%	95%	65%	44%	31%	72%
Completers Employed (includes all Completers)	91	422	40	43	123	1,794	173	236	111	3,033
Completer Employment Rate	67%	82%	91%	93%	89%	96%	96%	92%	94%	92%

Across the Consortium, completion rates varied from 31% at State Technical and Mineral Area colleges to 95% at St. Charles Community College. Ranging from 44% to 49%, East Central, North Central, and St. Louis colleges rates were in the mid-range for the Consortium. Metropolitan, Ozarks Technical, and State Fair colleges achieved completion rates of 77%, 85%, and 65% respectively.

Mineral Area College attributes its lower completion rate to their programs being more in-depth as they were for college credit and students were considered "program of study completers" only after obtaining their national certification. Other colleges in the consortium counted completers based on instructional completion. Although the completion rate was lower at this college, the completer employment rate was high at 91%.

State Technical College attributed its lower completion rate to students gaining employment prior to completing their program and, as with Mineral Area College, the completer employment rate at State Tech was high at 94%.

East Central College achieved an overall 49% completion rate with great variation among programs of study. The shorter programs saw higher completion with the welding program having the highest completion while the lowest completion rates were found for those students who came through the manufacturing portal and were first-time to college with significant academic and personal barriers.

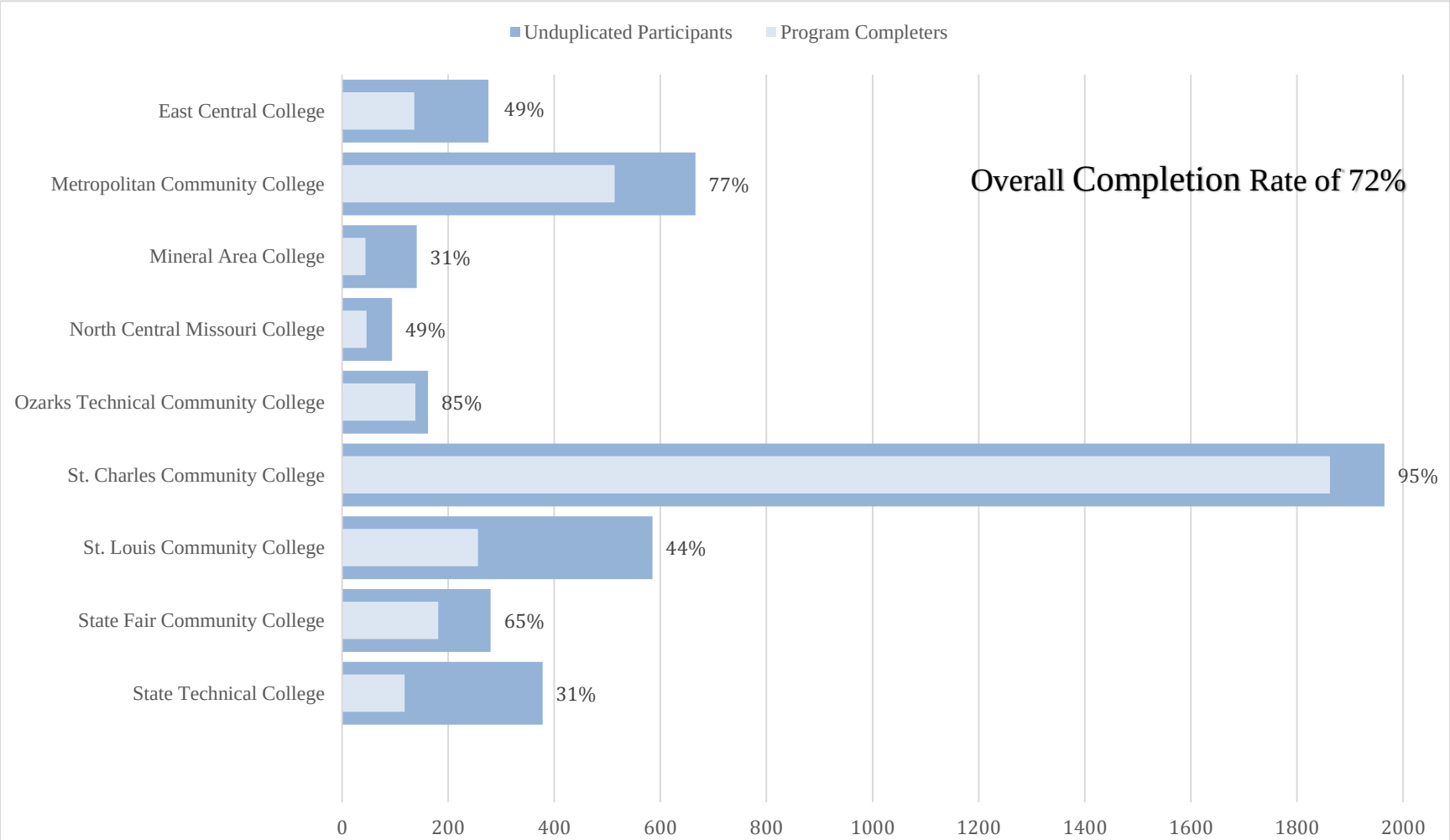
Approximately 40% of North Central Missouri College participants were incumbent workers and the goal for many of those was to gain specific skills rather than to complete a program. The completion rate for North Central's non-incumbents approached 80%.

Transportation was an issue for many of the MMW students both in urban and rural colleges. Metropolitan Community College found bus fare was a problem for some students even though the WIB stepped in to help with bus passes. On the rural campuses public transportation was not available and some employer partners stepped in and offered on-site classes for incumbent workers.

St. Charles Community College had the largest number of participants, completers, and employed completers as well as the highest completion and completer employment rate. This is due in part to the large number of students who participated in the GM Portal as this portal served as new employee training and orientation for the General Motors plant in the St. Charles Community College district.

Colleges found that completion was lower in self-paced programs where students could easily fall behind. Moreover, colleges also found attendance to be a challenge even within instructor-led programs as life got in the way for participants. Colleges across the Consortium attributed non-completion along the same reasoning described below:

Many of our participants were non-traditional students without basic computer skills, lacked college success skills, and brought chronic personal, legal, and other life issues with them. The personal, legal, and life issues were the main, core reasons for non-completers. Many simply could not manage or escape their non-academic and personal situations. For those who did, we felt the non-completers may not have known how to deal with success academically or perhaps had fears of what to do after the completed programs. Some solid students were progressing well but, for various reasons, didn't cross the finish line by not taking a final, quit attending classes, or some other excuse - something we called academic self-destruction. – MMW Campus Lead



		State Technical College	State Fair Community College	St. Louis Community College	St. Charles Community College	Ozarks Technical Community College	North Central Missouri College	Mineral Area College	Metropolitan Community College	East Central College
Unduplicated Participants		378	280	585	1965	162	94	141	666	276
Program Completers		118	181	256	1862	138	46	44	514	136

Figure 9. MoManufacturingWINs Enrollment, Completion, and Completion Rate by College

Participant Completion and Employment Status by Demographic Categories

Since a primary purpose of the MMW grant was to provide instructional programs and support services designed to boost program completion and employment attainment, we examined these outcomes. Of the total 4,547 MMW participants, 3,033 individuals completed a program and were employed at program completion, thus 67% of MMW participants achieved the dual outcome of Program Completer AND Employed.

Our analysis not only described the outcomes for the MMW participants in aggregate but it broke out results by the following demographic and pre-program characteristics: age, gender, ethnicity, college-readiness, and employment status upon program entry. We also examined employment at program completion by the same demographic and pre-program characteristics (see Tables 10-14 below).

Table 10. *MoManufacturingWINs Participant Completion and Employment by Gender*

Completion and Employment Status at Completion by GENDER									
GENDER	**Total**	**Non-Completer**		**Completer**		**Completer and Not Employed**		**Completer and Employed**	
Attribute	Count	Count	Percent	Count	Percent	Count	Percent*	Count	Percent*
Male	3663	1113	30.4%	2550	69.6%	226	8.9%	2324	91.1%
Female	884	139	15.7%	745	84.3%	36	4.8%	709	95.2%
Total	4547	1252	27.5%	3295	72.5%	262	8.0%	3033	92.0%

* Percent is of program completers.

Although far more males enrolled in MMW, program completion rates were high for both males and females (70%, n=2,550 and 84%, n=745 respectively). It is noteworthy that the program completion for females was higher. In addition, employment rates for both male and female program completers were high (91%, n=2,324 and 95%, n=709 respectively).

Table 11. *MoManufacturingWINs Participant Completion and Employment by Ethnicity*

Completion and Employment Status at Completion by ETHNICITY									
ETHNICITY	**Total**	**Non-Completer**		**Completer**		**Completer and Not Employed**		**Completer and Employed**	
Attribute	Count	Count	Percent	Count	Percent	Count	Percent*	Count	Percent*
Black, Non-Hispanic	1444	272	18.8%	1172	81.2%	74	6.3%	1098	93.7%
American Indian/ Alaskan Native	64	13	20.3%	51	79.7%	9	17.6%	42	82.4%
Asian/ Pacific	22	8	36.4%	14	63.6%	1	7.1%	13	92.9%
Hispanic	75	27	36.0%	48	64.0%	3	6.3%	45	93.8%
White, Non-Hispanic	2688	837	31.1%	1851	68.9%	162	8.8%	1689	91.2%
Other	90	17	18.9%	73	81.1%	5	6.8%	68	93.2%
Does Not Wish to Specify	164	78	47.0%	86	53.0%	8	9.3%	78	90.7%
Total	4547	1252	27.5%	3295	72.5%	262	8.0%	3033	92.0%

*Percent is of program completers.

Table 11 above shows MMW Black, Non-Hispanic participants were the most likely to complete their program (81%, n=1,172). MMW White, Non-Hispanic participants' completion rate of 68.9% (n=1,851) was less than the overall average for all MMW participants.

Across all ethnicities, little variation occurred in employment rates for program completers. The highest rate was for Hispanic at 93.8% (n=45) and the lowest for American Indians at 82.4% (n=42). The employment rates for completers who were Black, Non-Hispanic was similar to that of White, Non-Hispanic participants (94%, n=1,098 and 91% n=1,689 respectively).

Table 12. *MoManufacturingWINs Participant Completion and Employment by Age Group*

Completion and Employment Status at Completion by AGE CATEGORY									
AGE CATEGORY	**Total**	**Non-Completer**		**Completer**		**Completer and Not Employed**		**Completer and Employed**	
Attribute	Count	Count	Percent	Count	Percent	Count	Percent*	Count	Percent*
LT 21	431	181	42.0%	250	58.0%	28	11.2%	222	88.8%
21-25	776	256	33.0%	520	67.0%	49	9.4%	471	90.6%
26-30	763	202	26.5%	561	73.5%	41	7.3%	520	92.7%
31-35	567	145	25.6%	422	74.4%	27	6.4%	395	93.6%
36-40	472	120	25.4%	352	74.6%	30	8.5%	322	91.5%
41-50	895	194	21.7%	701	78.3%	36	5.1%	665	94.9%
51-60	564	128	22.7%	436	77.3%	42	9.6%	394	90.4%
GT 60	79	26	32.9%	53	67.1%	9	17.0%	44	83.0%
Total	4547	1252	27.5%	3295	72.5%	262	8.0%	3033	92.0%

*Percent is of program completers.

Table 12 above shows younger participants were the least likely to complete their MMW program of study. The program completion rate for the less than 21 age group was 58% (n=250) and the program completion rate for the 21-25 age group was 67% (n=520). Program completion rates for age categories 26-30, 31-35, 36-40, 41-50, and 51-60 all exceeded 70% with the highest completion rate for the 41-50 group at 78.3% (n=701).

Although program completion varies by age category, employment rates for program completers by age category all surpassed 85% with exception of the over 60 age group (employment rate for program completer = 83%). The age 41-50 group earned the highest employment rate for completers at 94.9% (n=665).

Table 13. *MoManufacturingWINs Participant Completion and Employment by Academic Skill Level at Initial Enrollment*

Completion and Employment Status at Completion by ACADEMIC SKILL LEVEL									
ACADEMIC SKILL LEVEL	**Total**	**Non-Completer**		**Completer**		**Completer and Not Employed**		**Completer and Employed**	
Attribute	Count	Count	Percent	Count	Percent	Count	Percent*	Count	Percent*
College Ready in All Areas	1022	337	33.0%	685	67.0%	71	10.4%	614	89.6%
Dev Ed in at Least One Area	3525	915	26.0%	2610	74.0%	191	7.3%	2419	92.7%
Total	4547	1252	27.5%	3295	72.5%	262	8.0%	3033	92.0%

*Percent is of the program completers.

Table 14 below depicts the completion and employment rates for MMW participants by academic skill levels and divides MMW participants into two categories: those who are college-ready in all areas and those who are in need of developmental education in at least one area of math, reading, or English. MMW participants who began as college ready in all academic areas were slightly less likely to complete their program (67%, n=685) than those MMW participants who started as non-college ready in at least one academic area (74%, n=2,610). This difference is likely related to program structure and content, as those who started as non-college ready were more likely to enroll in shorter, less complex, and less comprehensive programs of study.

Employment rates upon program completion were high for participants who began as college ready (90%, n=614), and participants who began as less than college ready in at least one academic area (93% n=2,419).

Table 14. *MoManufacturingWINs Participant Completion and Employment by Employment Status at Initial Enrollment*

Completion and Employment Status at Completion by EMPLOYMENT STATUS AT ENROLLMENT									
EMPLOYMENT STATUS	**Total**	**Non-Completer**		**Completer**		**Completer and Not Employed**		**Completer and Employed**	
Attribute	Count	Count	Percent	Count	Percent	Count	Percent*	Count	Percent*
Not Employed at Initial Enrollment	1726	691	40.0%	1035	60.0%	144	13.9%	891 Estimated annual income after program completion = $43,000	86.1%
Employed at Initial Enrollment	2821	561	19.9%	2260	80.1%	118	5.2%	2,142 Estimated annual income after program completion = $60,000	94.8%
Total	4547	1252	27.5%	3295	72.5%	262	8.0%	3033 Estimated annual income after program completion = $56,000	92.0%

*Percent is of the program completers.

Table 14 above shows the completion and employment status of MMW participants by employment status at enrollment. MMW participants who were employed at the start of a program were more likely to have completed their program, at 80% (n=2,260) versus 60% (n=1,035) for those unemployed at the start of their program.

Although slightly higher for those who started as incumbent workers, the employment rates for program completers who were incumbent workers (95% n=2,142) and program completers who were non-incumbent workers (86% n=891) both surpassed 85%. Estimated annual income for program completers who began as incumbent workers and were employed at program completion was $56,000. The estimated annual income for program completers who started as non-incumbent workers and were employed at program completion was $43,000. The current average annual income for Missouri manufacturing employees is estimated at $55,000.[10]

[10]Missouri Economic Indicator Brief: Manufacturing Industries. (2015, November). Retrieved August 2016, from https://www.missourieconomy.org/pdfs/2014_manufacturing_brief.pdf

Further Analysis for Academically Low-Skilled and Unemployed

Given the MMW goal of increasing access for unemployed and academically low-skilled populations, further analysis related to this key target group was conducted. Although Missouri's economic picture and related unemployment rate has improved since MMW began in 2012-2013[11], the current unemployment rate for those without a high school diploma and for those with only a high school diploma remains high (16% and 9% respectively, U.S. Census Bureau factfinder.census.gov).

At initial MMW program enrollment, 29% (n=1,321) of the MMW participants were academically low-skilled in at least one academic area (English, reading, or mathematics) and unemployed. Academic and employment outcomes for this target group are presented in Table 15 while Figure 10 below shows completion and employment rates and reveals that 29% (n=1,321) of participants were both academically low-skilled and unemployed at enrollment. Of those students, 59.9% (n=791) completed a program and 86% (n=683) of those completers gained employment.

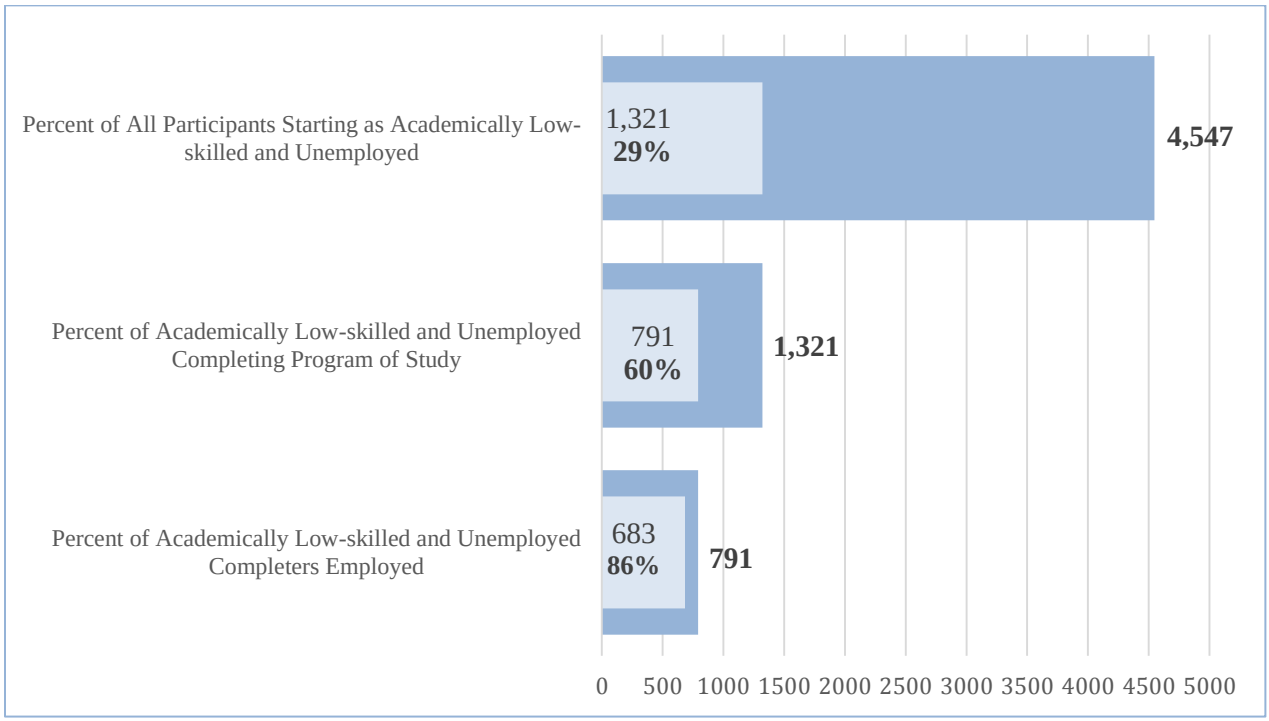


Figure 10. Completion and Employment Counts and Rates for Participants Starting as Academically Low-skilled and Unemployed

[11] Missouri unemployment rate in 2013 was 6.9% and June 2016 Missouri unemployment rate stands at 4.3% http://apps.labor.mo.gov/data/statArchives.asp

Turning to Table 15, we see that the average wage for those that began as academically low-skilled and unemployed was $41,000.00.

Table 15. *MoManufacturingWINs Academic & Employment Outcomes for Students Who Began as Academically Low-Skilled & Unemployed*

Academic and Employment Outcomes for Low-Skilled & Unemployed Students	
Number Participants who started as academically low-skilled and unemployed	1,321
Percentage of total participants	29%
Number Completing Program of Study	791
Program Completion Rate	60%
Instructional Hours completed	12,912
Ratio of instructional hours completed to instructional hours attempted	78%
Number program completers employed	683
Employment rate for program completers	86%
Average annual income for program completers employed	$41,000

PARTICIPANT SATISFACTION

This section of the evaluation report addresses the following evaluation question*: To what extent were MMW participants satisfied with their overall grant experience?*

MMW students were exposed to new and innovative instructional and student support strategies. In an effort to help gauge participant reaction and engagement associated with these strategies, the evaluation team designed an anonymous online follow-up survey (administered by colleges) to give MMW Program Completers an opportunity to indicate the extent to which they thought their MMW program experience had increased their skills and self-efficacy. The survey also assessed their overall satisfaction with their MMW program experience. Seventy-one percent (n=2,337) of MMW Program Completers responded to the survey. The full set of survey results are presented in Appendix II: MoManufacturingWINs Completer Survey Responses.

Major findings from the survey (see Table 16) reveal nearly 75% of the MMW program completer respondents reported their MMW program exceeded or greatly exceeded their expectations. Approximately 90% indicated they are confident their MMW program provided them with the skills and knowledge necessary to be successful in their chosen field.

Table 16 shows the majority of respondents also reported their MMW program provided significant help (quite a bit or very much) with developing their abilities and self-efficacy in regard to key workplace skills.

Table 16. *Summary of MoManufacturingWINs Program Completer Survey Responses (n=2,337)*

Survey Question	Responded Quite a Bit or Very Much
Acquire Information Related to Careers in Manufacturing Technologies	86%
Work effectively with others	85%
Think critically and analytically	82%
More Clearly Develop a Plan to Pursue Your Career Goals	79%
Ability to speak clearly and effectively	72%
Ability to write clearly and effectively	68%
Solve math/quantitative problems	62%
Use computing and information technology	58%

EVALUATION OF MoManufacturingWINs IMPACT ON PROGRAM COMPLETION AND RELATED EMPLOYMENT

This section of the evaluation report addresses the following evaluation question: *How do grant program completion and employment results compare to similar metrics for non-grant students?*

Up to this point we have presented an extensive set of outcomes for MMW participants, plus an in-depth analysis of differences in completion and employment rates for various MMW sub-groups. Such results are highlighted in Figure 11.

In this section we explore the extent to which the MMW grant impacted program completion and employment upon program completion. This impact evaluation is designed to help answer the question: how would program completion and employment outcomes look if students had not enrolled in a grant program?

A participant count of 4,547.

The participant profile demonstrates colleges served the low-skilled, unemployed/underemployed, adult target population including TAA eligible and Veteran participants.

A total program completion rate of 72% and an employment rate of 92% for program completers. Both rates surpassed the targeted rates outlined in the original statement of work. Program of study completers who are employed at program completion show an estimated annual income of $56,000.

A non-incumbent worker program completion rate of 60% and an employment rate of 86%. Non-incumbent workers who completed a program of study and secured employed show an estimated annual income of $43,000.

Figure 11: Selected MoManufacturingWINs Results

To assist in determining the extent to which MMW participants differed in terms of program completion AND employment at program completion from non-grant students, we built a Non-Grant Control Group. The Non-Grant Control Group consisted of 411, credit-seeking, first-time to college students who enrolled in a manufacturing-technology related program with a Missouri community college in the Fall 2011 academic term. We tracked academic and employment outcomes for this Non-Grant Control Group through June 2014.

We then combined this Non-Grant Control Group with 613 MMW credit-seeking students[12] (MMW Treatment Group) who were first time to college in the Fall 2013 academic term. We tracked academic and employment outcomes for the grant students through June, 2016. We then employed logistic regression analysis on the full data set of 1,024 records to examine the impact of MMW grant participation on program completion and employment.

Table 17. *Comparison Between the Non-Grant Control Group and the MoManufacturingWINs Treatment Group for Key Background Variables*

Background Variable	Non-Grant Control Group	MMW Treatment Group
Average Age	27	31
Percentage Female	10%	7%
Percentage Male	90%	93%
Percentage Incumbent Workers	18%	51%
Percentage Non-Incumbent Workers	82%	49%
Percentage Minority	19%	20%
Percentage White	81%	80%
Percentage with Dev Ed Need	71%	68%
Percentage College Ready All Areas	29%	32%

[12] Programs offered to the MMW Participants and Non-Grant Control Group differed regarding program mix, as the MMW participants had greater access to non-credit, short-term programs. To ensure appropriate comparability among the MMW Participants and the Non-Grant Control group, we restricted the regression analysis to students from both the MMW Participant group and the Non-Grant Control Group who were first time to college and enrolled in programs which led to a "credit" program award.

Impact: Logistic Regression Model 1:
MMW Grant & Non-Grant Student Program Completion

Model 1 examines Program Completion as the outcome variable and includes the following set of dichotomous control variables:

- Gender (0=Male and 1=Female)
- Age (actual age at program start-up)
- Race (0=Minority and 1=White)
- Dev Ed Need (0=College Ready All Areas and 1=Non College Ready in at least one academic area)
- Student employed at program start (0=Not Employed and 1=Employed)

The treatment variable in this analysis is MMW Participant or Not (0=Non-Grant student and 1=MMW Participant). Key results are associated with Regression Model 1 are presented below.

Table 18. *Regression Analysis Results for Variables Predicting Program Completion (n=1,024)*

Total Treatment & Control Group, Credit Programs Only	Model Chi-Square Goodness of Fit Coefficient & Sig. Level	Nagelkerke R-Squared
N = 1,024	**117.949, Sig. <.001**	**0.147**

Table 19. *Classification Table*

Observed			Predicted		
			Completer Code		Percentage Correct
			No	Yes	
Step 1	Completer Code	No	349	262	57.1
		Yes	107	306	74.1
	Overall Percentage				**64.0**

The cut value is .500

Table 20. *Variables in the Equation*

	B	S.E.	Wald	df	Sig.	Exp(*B*)
MMW Participant or Not	1.479	0.157	89.243	1	.000	4.40
Gender	-0.544	0.264	4.256	1	.039	0.581
Race	0.061	0.171	0.127	1	.722	1.063
Age	0.001	0.006	0.059	1	.808	1.001
Dev Ed Need	-0.113	0.146	0.598	1	.439	0.893
Employed at Program Start	-0.084	0.146	0.333	1	.564	0.919
Constant	-0.652	0.436	2.236	1	.135	0.521

The model's Goodness of Fit Chi-Square value of 117.949 (sig. <.001) reveals the model performs well as a set of variables and was statistically significant. The Nagelkerke R-Squared value of 0.147 reveals the model explains approximately 15% of the variance in the program completion outcome variable. The Classification Table 19 shows the model correctly classified 64% of the cases. A further review of the results indicates MMW Grant Participants were 4.40 times more likely to complete their program of study than Non-Grant students (Exp(*B*) = 4.40). Regardless of MMW grant participation, females were slightly more likely to complete their program.

Impact: Logistic Regression Model 2:
MMW Grant & Non-Grant Student Employment upon Program Completion

Certainly program completion is an important outcome, but MMW was also designed to increase the employability of its participants. Model 2 examines Employment upon Program Completion as the outcome variable for both the MMW Grant Participants and Non-Grant students and includes the following set of dichotomous control variables:

- Gender (0=Male and 1=Female)
- Age (actual age at program start-up)
- Race (0=Minority and 1=White)
- Dev Ed Need (0=College Ready All Areas and 1=Non College Ready in at least one academic area)
- Student employed at program start (0=Not Employed and 1=Employed)

The treatment variable in this analysis is MMW Participant or Not (0=Non-Grant student and 1=MMW Participant).

Again, it is important to note that programs offered to the MMW Participants and Non-Grant Control Group differed regarding program mix, as the MMW Participants had greater access to non-credit, short-term programs. To ensure appropriate comparability among the MMW Participants and the Non-Grant Control group, we restricted the regression analysis to students from both the MMW Participant group and the Non-Grant Control Group who were first time to college and enrolled in programs which led to a "credit" program award.

The following key results are associated with Regression Model 2

Table 21. *Regression Analysis Results for Variables Predicting Program Completion (n=1,024)*

Total Treatment & Control Group, Credit Programs Only	Model Chi-Square Goodness of Fit Coefficient & Sig. Level	Nagelkerke R-Squared
N = 1,024	**220.166, Sig. <.001**	**0.270**

Table 22. *Classification Table*

Observed			Predicted		
			Employed at Program Completion		Percentage Correct
			No	Yes	
Step 1	Employed at Program Completion	No	546	145	79.0
		Yes	182	151	45.3
	Overall Percentage				**68.1**

The cut value is .500

Table 23. *Variables in the Equation*

	B	S.E.	Wald	df	Sig.	Exp(*B*)
MMW Participant or Not	2.275	0.206	122.521	1	.000	9.728
Gender	-0.471	0.295	2.261	1	.110	0.624
Race	-0.024	0.186	0.017	1	.896	0.976
Age	0.005	0.007	0.501	1	.479	1.005
Dev Ed Need	-0.056	0.160	0.123	1	.726	0.945
Employed at Program Start	0.320	0.154	4.333	1	.037	1.377
Constant	-2.382	0.493	23.368	1	.000	0.920

The model's Goodness of Fit Chi-Square value of 220.149 (sig. <.001) reveals the model performs well as a set of variables and was statistically significant. The Nagelkerke R-Squared value of .270 indicates the model explains approximately 27% of the variance in the employed upon program completion outcome variable. The Classification Table 22 shows the model correctly classified 68% of the cases. A further review of the results indicates MMW Grant Participants were 9.7 times more likely to complete their program of study and be employed after program completion than Non-Grant students. Regardless of MMW grant participation, students who were employed when they started their program of study were more likely to be employed upon program completion than students who were unemployed when they started their program.

Regression models 1 and 2 suggest participation in the MMW grant had a positive impact on credit program completion and employment upon program completion for first-time to college students. A portion of this impact may be attributed to the accelerated and condensed time period of MMW programs compared to the traditional programs available to the Non-Grant Control students. It is important to keep in mind that changing program structures to include shorter-term, industry recognized credentials was a key ingredient in the grant's attempt to accelerate students through a program and into employment.

WHAT THE COLLEGES LEARNED

This section of the evaluation report addresses the following evaluation question: *What did the MMW colleges learn during the implementation process?*

The MMW grant provided its member colleges with the opportunity to develop, implement, and analyze a number of innovative and experimental instructional and student support strategies. As outlined in the previous sections, MMW colleges worked diligently to meet the grant's stated deliverables. Performance outcomes and related analysis reveal that such efforts positively impacted colleges, students, and employers. This section of the report takes us a bit deeper into these efforts and seeks to address the question---*"what did the colleges learn during the implementation of grant programs and strategies?"*

The Role of Faculty

Over the course of MoManufacturingWINs, colleges experimented with new roles for faculty aimed at increasing student success. Several colleges came to see the value of involving instructors in the intrusive student support process. Some colleges referred to the "team" of faculty and advisors that contributed to student success by engaging in activities such as regularly monitoring student progress and providing needed support; sending weekly email to students; continuously checking certification bodies for student resources; and leveraging industry experience and integrating it into program curriculum.

The Many Aspects of Advising, Coaching, and Student Support

Colleges continuously explored a wide variety of advising and coaching activities. During this exploration, they discovered that advising, career coaching, and student support are most useful when such services are applied continuously throughout a student's experience from recruitment to program completion and onto employment. The intrusive support services provided during MMW further confirmed the value and importance of a personal relationship between the student and the advisor/coach.

Colleges saw the value of explaining career pathway options, having students complete a career and education plan, and reviewing labor market information with students. Throughout these efforts colleges discovered that advisors had the most success when they were in frequent, regular communication with faculty, student success teams, social service agencies, and employers. Colleges saw that advisors and faculty working together could more quickly recognize and address the issues of struggling students.

Colleges learned that students often were more likely to share issues, problems, and struggles with their advisors than they were with their classroom faculty. Advisors soon learned the importance of campus resources as well as other social service agencies as referral sources for students with non-academic life challenges. Colleges also realized that advisors could help deliver the soft-skills and other employability skills needed by many students. Since advisors understood the importance of staying in contact with employers regarding job skills and opportunities, they were able to provide students with current information to aid in securing employment.

Although the colleges anticipated the need to provide student support services, the role of an advisor/career coach and the scope of services provided by such staff evolved and expanded during the course of the grant. At times it was difficult for a single individual to meet the demands associated with this expanded set of expectations/duties. Although such staff held varying job titles---advisors, career coaches, retention specialist, etc., they were called upon to be provide a wide variety of student support and administrative reporting tasks.

The Challenge of Recruitment

One lesson for the colleges involved the challenge of recruiting to manufacturing-related programs and the misconceptions of the public concerning manufacturing careers. When the volume of unemployed traffic at career centers diminished, several colleges focused on training incumbent workers while others recruited from high schools. Colleges learned that recruitment activities and materials needed to be tailored to the various populations and to stress the value and economic return on employment in the manufacturing sector. Colleges found the benefit of using labor market information and real time labor market summaries show current job demand provided by the MERIC.

The Need for Student Support in Accelerated Courses and Programs

Although students appreciated accelerated programs, colleges learned that student success in such programs depended on the complexity of the curriculum as well as the student's academic readiness and life situation. With regard to implementing accelerated or non-semester based programs, colleges found it imperative to coordinate with campus departments (Financial Aid, Registrar, Student Services). Colleges also recognized that accelerated programs create additional academic challenges for students. Moving through a challenging curriculum at a quick pace is not an easy task. The role of increased instructional support services to support an accelerated curriculum should not be understated.

The Value of Stackable Credentials

Employers' willingness to embrace industry credentials varied across the consortium. Colleges often reported employers were not always aware of the relationship between specific certifications and the skills achieved to acquire such certifications. At times colleges had to educate employers on the value of industry-recognized certifications. Colleges learned how to balance employers' need for employees with desired competencies with their unwillingness to specify credentials as a job requirement. In particular, several colleges found employers generally unaware of the Certified Production Technician certification although the employers said they needed employees with those skills.

The Importance of Preparing Students

Colleges recognized the academic, economic, social, and personal barriers of students from the target population often lead to attendance, commitment, and completion issues. Participants' struggles with time management, college-level coursework, and math drove the colleges to experiment with a variety of methods to address these issues. Such efforts included working with students in advance of entering the program to identify potential barriers to success and matching available resources to combat such barriers. For example, both urban and rural colleges learned that transportation can be an insurmountable hurdle for students. Colleges

addressed this issue with offsite classrooms, online/hybrid curriculum, and bus passes provided by social service partners,

Several colleges learned that dealing with success was an issue for some students who may not have known how to deal with success academically or perhaps had fears of what to do after completing programs. Some students were progressing well but, for various reasons, did not complete. As discussed above, advisors and coaches played key roles in working with students to address such issues throughout the student's entire educational experience.

Implementing Alternative Developmental Education Approach

Across the Consortium, colleges came to understand the importance of getting students ready for programs but approached this in varied ways. Examples included embedding CPT training in the manufacturing portal, workshops on college success and math, and establishing a minimum math level coupled with in-class tutors. One college learned having math tutors physically in the class room to assist with the context of the issue was so successful that their Tutoring & Learning Center is using it in several classroom settings sustained without grant funding. Another college addressed the need for program-ready students by adding math and measurement to a Prep for Success course with contextualized academic assignments.

Overall colleges learned how to assist students with academic struggles centered around low-level basic computer skills, poor college success skills, and lack of basic math proficiency. As a result of lessons learned through MoHealthWINs and MoManufacturingWINs, one college has formalized college success topics into a course by revamping an existing college course and will be implementing this as a required course in certain programs as well as developing and implementing co-requisite developmental math courses. Another college is seeking to expand its Adult Learning Academy concept in an effort to redesign its approach to developmental education.

Connecting Curriculum to Employers and Students

The colleges' experience with the online platform ToolingU varied with some colleges finding it unwieldy while others learned to adapt the platform to suit student needs. Across the Consortium, colleges learned the importance of students' digital literacy skills related to success. As a result, several colleges developed digital literacy assessments and courses. Colleges also learned that online, self-paced training requires study skills and discipline and thus offered additional support for students who were not prepared for the programs ranging from two-week foundational skills courses; workshop to tutor students on basic computer navigation, email accounts, learning management systems, and online course requirements. Colleges learned to improve graduates' employability with curriculum in resume writing, job-seeking, and interview skills delivered by faculty, advisors, and/or employers. Colleges also learned the value of open educational resources (OER) and used this resource when developing or enhancing curriculum.

Communication is Key to Building Partnerships

Employer Partners –

Colleges learned the importance of communicating with employers and experimented with ways to improve employer engagement in developing curriculum, connecting with students, and hiring completers. Several colleges learned new methods to leverage the work of employer consortia to strengthen programs. Colleges learned the value of employer contributions to curriculum development and discovered ways to improve employer participation. One college learned a new model for employer engagement from advisory committees seen as an avenue for employers to offer periodic feedback to employer partners helping design dynamic programs to meet immediate needs by maintaining a regional dialogue of critical, basic manufacturing technical skills. As discussed earlier in the Results section of this report, as a result of MMW efforts colleges are working to incorporate a richer understanding of college and employer engagement and are using this understanding to help develop new and enhance existing partnerships to coincide with Wilson's (2015) employer engagement framework.

Social Service Agency Partners

Colleges learned the value of social service agencies for recruiting and providing non-academic support for students. Throughout the course of the grant, colleges continued to seek out new social service agencies as MMW partners.

Workforce Partners

Over the course of MoManufacturingWINs, several colleges learned new ways of leveraging the services of their local Workforce Investment Boards, Career Centers, and Chambers of Commerce and came to understand the importance of the personal relationship between the college intrusive advisor/retention specialist and the career center to assure collaboration on projects going forward.

The majority of the colleges reported improvements in their WIB partnerships as the grant moved from initial to mature implementation. Just as with employer partners, on-going communication between a college and its local WIB, as well as one-on-one personal relationships were reported as critical to the development of a successful partnership. In addition, colleges also reported significant value in hiring staff with previous WIB experience to serve as student support staff and career coaches.

SUSTAINABILITY AND SCALING

This section of the evaluation report addresses the following evaluation question: *What grant programs and strategies appear to hold promise for long-term sustainability and scaling?*

Data presented in this report point to the successful and timely implementation of MMW grant programs and strategies. In addition, performance outcome data reveal participants completed programs and secured employment at higher rates than targeted grant outcomes. Furthermore, the impact analysis suggests that participants in accelerated grant programs were more likely to complete their program of study and secure employment than students in more traditional, non-grant programs.

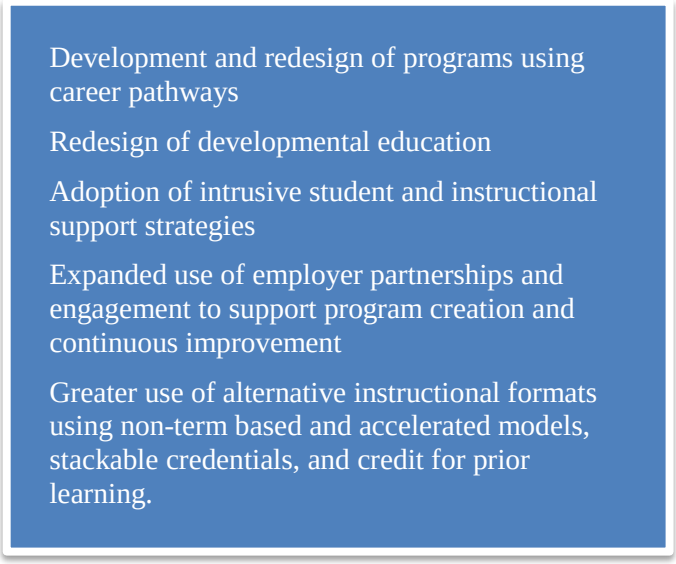


Figure 12: Scaling Exploration Areas

Although such results are encouraging, it is important for the consortium to focus on lessons learned during the grant and build upon the innovations and strategies used to achieve such results. Individual campus culture/climate certainly influenced the extent to which MMW innovations and experimentation were supported. For those campuses who embraced the experimental nature of MMW, the grant has laid a solid foundation for further development, scaling and sustainability of efforts associated with the areas outlined in Figure 12.

Round 1 of TAACCCT was the Missouri community colleges' first effort at working on large scale innovations via a consortium. MoManufacturingWINs continued the state's experience in working together as a consortium and, by the end of the grant, the colleges found that the consortium framework worked for them. Colleges consistently reported to the TPE the benefits of working and learning together as they implemented grant programs and strategies. College faculty and staff found the connections made to be useful in carrying out consortium-specific work and also expanding such efforts to other non-grant areas. One long-time college leader stated that the MoWINs consortia fundamentally changed the way the colleges think about how to approach new initiatives. Prior to Missouri's TAACCCT grants, such cooperation and sharing among the colleges was not as prevalent.

The Missouri Community College Association's new Executive Director recognizes this increased level of statewide cooperation and sees it as an opportunity for transformative change in how the State's community colleges respond to student, community and employers' needs. To

further support and sustain such transformative change, MCCA has incorporated the lessons learned from its Round 1 and Round 2 TAACCCT grant into its current strategic planning process.

CONCLUSION

The MMW consortium began with a bold vision to change how colleges respond to the education and training needs of Missouri's manufacturing industry. Consortium colleges first worked with employers to more clearly identify employers' needs and define specific, industry-recognized credentials to meet such needs. Colleges then developed new instructional programs and modified existing programs of study based upon stackable credentials aligned with industry-recognized credentials. To more fully support employer needs and increase access for adult learners, the colleges modularized and condensed program curriculum to allow students to complete their program of study and secure employment in an accelerated manner. To help students succeed in these accelerated programs, the colleges employed a wide range of innovative pedagogy and support strategies, including technology-enabled instruction, self-paced developmental and remedial assistance, and intrusive student advising and career coaching.

Data presented in this report point to the success of MMW grant participants and reveal that grant participants completed programs and secured employment at higher rates than students in more traditional, non-grant programs. Equally as important as these positive results, the colleges documented a number of key lessons throughout the grant. These lessons include the following: the importance of connecting classroom faculty, advisors, and instructional support staff; accelerated programs and curriculum often require increased instructional support for students; advising and career coaching is a continuous process that covers the entire student experience, from recruitment to program completion, and onto employment; programs connected to career pathways and built upon industry-recognized credentials are valued by students and employers; accelerated and contextualized approaches to developmental education provide meaningful alternatives to more traditional, term-based developmental education models; and community and employer partnerships must be continuously cultivated in order to produce intended results.

Using data and lessons learned, the colleges have laid a solid foundation for further development, scaling and sustainability of efforts associated with the areas shown in Figure 12 above. The Missouri Community College Association recognizes the opportunity for transformative change in these areas and is using its statewide strategic planning process to further explore innovations and continuous improvement strategies for each area.

Connecting MMW lessons learned and evaluation data to the MCCA strategic planning process is a significant step. However, as noted in the MMW mid-point evaluation progress report, colleges must continue to recognize that innovations and subsequent transformative change will require college leadership, faculty, and staff to modify existing processes and organizational culture to support such changes. We have observed some initial changes in organizational practices to enhance student advising, break down barriers between non-credit and credit instruction, expand credit for prior learning opportunities, and redesign developmental and remedial education. Time will tell how Missouri's community colleges meet these challenges.

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APPENDIX

Appendix I: MoManufacturingWINs Curriculum Review Final Report, September, 2015

MoManufacturingWINs Curriculum Review
Overview Report (Grant Number: TC-23785-12-60-A-29)

To meet compliance requirements established by the U.S. Department of Labor for recipients of Round 2 TAACCCT grant funding, the MoManufacturingWINs consortium conducted a curriculum review of 44 technical programs or courses and three academic skills/career guidance "portal" programs developed or enhanced with grant funds by the nine MoManufacturingWINs consortium colleges and the University of Central Missouri. The review process was introduced in October 2014 and completed in August 2015. This report provides **(1)** an overview of that process, **(2)** a summary of the parameters of the technical program reviews and general subject-matter expert findings in three key areas; **(3)** a listing of the 44 technical programs with selected programmatic highlights, innovations and/or challenges; and **(4)** a summary of the strengths and opportunities of the three "portal" programs.

1. Curriculum Review Process

Process Introduction and Orientation. The curriculum review process for Missouri's Round 2 MoManufacturingWINs programs mirrored the process established for the state's Round 1 MoHealthWINs grant. An advantage for this second review was the colleges' familiarity with the review requirement, both the process and rationale, the documents required and the inherent benefits of objective subject matter expert review.

In October 2014, the chief academic officers (CAOs) and grant leads received an outline of the review process, a timeline, a list of required reporting documents and drafts of sample templates (blank and completed) for their consideration and approval. The CAOs had the opportunity to review the plan and to discuss it prior to and then at their state meeting on November 6, 2014. They and the grant leads approved both the process and required documentation and no suggestions for edits were made. (See Exhibits 1 and 2.)

The first week in December, the grant leads received the approved list of programs and templates and were immediately able to start posting documents to the MoWINs Weebly website. In January and February, subject matter experts (SMEs) were identified to review the manufacturing/machining, welding, industrial/engineering technology and portal programs.

Subject Matter Experts. Fifteen SMEs participated in the curriculum review project. One reviewed the introductory "portal" programs. The remaining 14 were assigned to review specific technical programs at colleges other than their own. Of those, 10 are full-time or adjunct instructors at Missouri two-year public colleges. Three were recruited through TAACCCT Round 2 colleague colleges in Florida and a fourth from Wichita State University in Kansas. All were recommended by a representative from the participant colleges and have significant instructional experience in the same occupational field of the programs they were assigned to review. The rubric the subject matter experts used to review the technical programs and the questionnaire used to analyze the strengths, weaknesses, opportunities and threats of the three portal programs are attached. (See Exhibits 3 and 4.)

The review coordinator oriented the SMEs to the project through program-topic conference calls. The SMEs reviewed the goals of the MoManufacturingWINs grant and the intent of the review process. They studied the list of required documentation and related templates that would be used by the colleges to document their programs and the rubric the SMEs would use to evaluate them. The process of document submittal and review was discussed at length and they were encouraged in the orientation conversations and in subsequent email communications to contact college personnel directly if they had questions about the programs they were assigned to review. The SMEs were asked to not see the review as a "grading" of the programs, but instead as a look at their structure and curricular components, how both address the needs of adult learners, and an opportunity, when appropriate, to suggest how the programs could be improved.

Timeline. The college deadline for submission of review documents was March 31, 2015. The SMEs were instructed to submit their review rubrics by May 31. All but one college met the submission deadline. Despite the delay, all SME rubrics were received by June 11 and reviewed by the curriculum review coordinator by June 16.

2. Summary of Subject Matter Expert Findings/Technical Programs and Courses

The SMEs assigned to review technical programs were asked to assess program or course components according to standard principles of quality technical curricula: Is it clear, logical, and progressive? Are the curricula linked to current industry standards and practices? Is it innovative; i.e., does it address the challenges many adult students encounter in attempting to acquire skills and, hence, jobs in an accelerated timeframe?

The SME rubric sought to assess the programs on seven general components:

Program or Student Learning Outcomes and Industry Certifications: Is the program structure logical and effective; do the program outcomes align to industry standards; are they clearly stated, introduced and reinforced effectively; when appropriate and possible, are learning outcomes linked to one or more recognized industry certification; and are successful students able to earn certification/s upon program completion or are they prepared to do so following any requisite work experience?

Course Objectives: Are the program or course objectives appropriate, clearly stated and measurable and do they support one or more program or student learning outcome?

Module or Unit Objectives: Are module or unit objectives linked to course objectives; do they address one or more objective; are they clearly stated and measurable?

Instructional Materials and Lab Resources: Are program materials and resources appropriate to teach the course and module objectives; do they meet current industry practices and standards; do they provide options for multiple learning styles and do they demonstrate evidence of an effort to support adult learner success?

Learning Activities: Do they promote achievement of module/unit objectives; are they presented in a way that students understand their purpose and how the skills and or knowledge points being learned are linked to current industry practices and standards; do they demonstrate evidence of an effort to support adult learner success?

Assessment and Evaluation: Do they measure the learning objectives and link to industry standards, align with course activities and resources, and provide regular and timely feedback to students?

Innovative and Enhanced Strategies: Is there evidence of industry input in the program design; are there enhancements in any or all of the curricular components to support adult learners; and is there evidence of improved student success?

A compilation of the results of the 44 reviews is provided in Attachment A. Overall the reviews were positive, with programs receiving a preponderance of "very good" or "good" ratings on the rubric scale. Over 30 percent of the possible 1188 ratings were awarded an "exceptional" mark. These high ratings were primarily given to programs that had complete and detailed review documentation.

Only 23 "ineffective" ratings were given. Ten of the 44 programs received one or more of the "ineffective" ratings. Of these ratings, 16 were given to three Manufacturing Skill Standards Council Certified Production Technician (MSSC CPT) programs. The subject matter experts who reviewed these programs have significant national experience developing and evaluating them and their reviews were particularly rigorous. Most of the "ineffective" CPT ratings and the remaining seven for non-CPT programs focused on poorly written program or course outcomes, weak documentation of learning activities (particularly those that support adult learners), or failure to demonstrate effective student assessments or improper citing of instructional materials.

It should be noted again that 14 subject matter experts who reviewed the 44 technical programs all have significant instructional and industry experience in the technical program area they reviewed. (See Exhibit 5.) However, it is evident that some are more familiar with the key components of solid curricular structure and assessment and thus focused not only on the program content and competencies but also on how the programs were structured (prerequisites, course sequencing, how competencies were assessed and linkages between certificates and degrees).

Several common themes emerged in SME comments about **program structure**, a key concern being that prospective and current students be able to review course descriptions, syllabi and general program outcomes and understand the skills and knowledge they would gain. The reviewers also weighed in on course objectives and assessments. Examples of reviewer comments follow.

- The program structure is effective and provides a reasonably clear and logical path to degree completion. However, the catalog and syllabi do not list appropriate prerequisites for all the courses.
- While the overall course objective in the syllabus is clear, I suggest adding more detailed individual objectives or competencies so the students have an idea of primary skills and knowledge they should have if they successfully complete the course.
- Consider revising the stated module/unit objectives. Doing so may lend itself to developing more specific learning activities that align with the course objectives.
- The curriculum map is a good start to understanding what will be covered within the two weeks, 75-80 hours of learning. It appears that the class has several components: OSHA/Safety, Forklift, Warehouse Learning and Preparing for Success. The map and syllabi should all interrelate. It seems like the content was written independently of each other. A student should be able to review the curriculum map and syllabi and articulate the expectations of the class.
- The Machine Tool class syllabi need to be updated. Incorporate program and course outcomes, what is going to be assessed and which NIMS credential will be earned.

- Ideally outcomes could be reinforced and/or assessed multiple times to ensure student knowledge retention. Consider rewording outcomes, as this may lead to opportunities to reinforce and/or assess in another course. General Comment: Multiple reinforcement and/or assessment may not be possible given the time available for the course.
- The blending of concepts and competencies from eight different courses is a unique approach. This innovative integration strategy provides dynamic flexibility in introducing and reinforcing the objectives very efficiently. This curriculum is aligned, flexible and dynamic. It is linked to industry practices and certifications.

Several good suggestions were made about how to better engage **adult learners** and several best practices were noted:

- Students who have difficulty with computers and online learning will have difficulty in these courses. Consider adding active learning activities that require students to conduct hands-on exercises and/or work in groups or having guest speakers come in to the mandatory class hours to aid different learners
- Plant tours are a great tool to connect adult learners with information because they are seeing the process in action. Create activities that involve action or experiential learning -- learning by doing -- as this has been shown to be the most effective way to teach adult learners.
- The use of Moodle and the provision of credit for prior learning options are excellent resources for adult non-traditional learners. Both support self-discovery and motivate learning.
- Active learning is an excellent way to support adult learning. Also consider providing an introductory computer lesson to help those whose computer skills are an area of opportunity.
- This is a truly well rounded group of learning activities, with interactive labs, a tour, and a variety of presentation methods to introduce the students to the information.
- The addition of Blackboard Discussion Board assignments to the MSSC Certified Production Technician modules is a best practice. It adds a level of peer-to-peer interaction and support that is vital to many adult learners. Discussion boards help students learn by teaching each other and often bolster students' confidence in their learning ability.
- The integrated nature of this program allows the introduction or inclusion of competencies whenever they are appropriate for the students, rather than excluding the knowledge and concepts until a different course is being taught. This is also great for adult learners because it addresses individual experience and learning styles. The use of the *ToolingU* modules is very appropriate and supports formative assessment and feedback.
- The infusion of online and technology-enabled learning with hands-on is both challenging and appropriate for this type of endeavor. Employment of 8-week courses versus traditional 16-weeks is also challenging but very appropriate, if not imperative, to the acceleration desired. This program is meeting those challenges with innovation and commitment.

How the programs tie to **industry standards** was another primary review component. Again, the SMEs' suggestions and remarks are insightful:

- The two books by MSSC are likely to reflect industry practices and standards. However, they may not be current as they are nine years old. Also, OSHA standards (safety) are constantly evolving, but they keep their website up-to-date; consider calling students' attention to www.osha.gov for up-to-date safety information. Also continue to reach out to industry partners to ensure the materials reflect their current operating equipment and practices.

- Access manufacturing resources for suggestions on how industry partners train their current employees on these topics.
- Utilizing resources like OSHA, Tooling U, and Amatrol ensure that the course materials will meet/reflect current industry practices. Additionally, the examples of class exercises reflect the current industry practices in regards to soft skills; i.e., working in groups, researching ability, asking questions when needed, etc.
- The laboratory exercises are representative of industry practices. IFPS certification is widely respected in industry and is definitely a plus for the students entering this discipline.
- Consider additional innovative options for adult learning. Ideally, the *Preparing for Success* course would have a bit more interaction than the on-line portion. Maybe bring local HR professionals into the classroom for mock-interviews. Utilize OSHA best practices of teaching from on-line portals.
- Modules 1 through 5 do a good job of covering mainstream, introductory welding and cutting practices. However, I recommend that the program also introduce more welding positions other than 1F and 2F and welding on grove plates. Overall general industry requires entry-level welders to be able to weld, test, and pass out-of-position welds such as 3F, 4F and 3G, 4G respectively. Programmatic time constraints could make these suggestions prohibitive.

Among comments pertaining to **innovative strategies**, some SMEs commented that:

- The college clearly worked closely with industry partners to develop or enhance the program thus ensuring students who complete it are truly prepared for employment opportunities.
- Students need to be encouraged and/or required to use campus tutoring centers.
- More support should be provided to students attempting to master challenging technical concepts and skills.
- There is a weak or non-existent alignment between non-credit and credit offerings within the same program. The college needs to address this gap so there is a clear pathway or link between these offerings so students don't lose time pursuing credentials.
- Too many internet courses can overwhelm students who don't have a solid background in the field. The college should consider redesigning the program in a hybrid format to ensure students benefit from more varied teaching methodologies.

3. Technical Program Curriculum Review Synopsis

In order to better orient the SMEs to the programs and to give them essential context to assess program curriculum, the colleges were asked to submit a one- to two-page Introductory Overview with information on how the program was developed or enhanced and how it evolved over the course of the grant; what challenges the college encountered in this work; and the status of the program and what the plans were for it going forward. They were also asked to submit a Statement of Programmatic Innovation and/or Enhancement to provide, from their perspective, how the program met the key grant goals. These two documents paint a picture of nine community colleges doing what community colleges do best: Work with diverse industry partners to develop or tweak programs that, in a desirable but realistic timeframe, enable frequently underprepared or "rusty" students to gain sophisticated technical skills and notch up their academic and digital skills in order to get and/or keep a job with a promise of a viable career.

Industry Certifications. Of the 44 MoManufacturingWINs programs, 30 are new programs. Of those, 21 are credit. All but three of the new programs offer one or more industry certification. Fourteen existing

programs were enhanced with grant funds. Of those, only one did not tie its 10-week program to an industry certification but it is an introductory link or "stack" to courses with NIMS certification.

Introducing industry credentials posed a few challenges. In several instances the colleges had to introduce specific certifications to industry partners and at least one college had to go another step and convince its partners of their value. North Central Missouri College faced the issue of at least one company being hesitant to encourage incumbent workers to pursue program certifications (or hire workers with them) because they prepare workers for better job opportunities elsewhere. That employer, who continued to participate in the college's Advisory Committee, preferred to train his own workers specifically to the skills they required at his company. Another challenge associated with adopting certifications is when they are best -- or even can be --obtained. For example, at Metropolitan, several welding program industry partners advise students to wait to take AWS certification tests until they get a job or a job offer so they know which certifications the company prefers or requires. At Mineral Area, recruitment has been challenging because SME certifications require that a technician have both postsecondary and work experience to sit for the exam.

Modifications of program length, schedule, delivery methods and/or location. All of the new programs were developed with accelerated time-to-completion options through programmatic structure: shorter program or course length; linked certificates to stair-step to a degree; more intense, consecutive time on task in laboratories; creative course rotation schedules; and day/evening/weekend offerings. The enhanced programs, if they didn't already have them, were modified in the same ways. In addition, the colleges sought ways to facilitate program completion through hybrid or online delivery systems; offering their programs at multiple locations; promoting credit for prior learning; technology-enhanced curriculum or simulators; and strengthening industry partnerships and the role employers play in supporting bridged and future skill development.

Inevitable challenges arose. One noted by three colleges was finding ways to "properly balance the accelerated concept with insuring the curriculum is sufficiently covered." North Central faculty realized they would need to teach more efficiently, using simulations and online resources to save time. State Technical found a way around that issue when its industry partners stepped up and offered to "bridge" through on-the-job training what the new hires had learned in the college's accelerated program to what they needed to know at each individual company. St. Louis abandoned a hybrid approach in its three-week logistics program for a mandatory on-campus experience to ensure the students did, in fact, master the competencies. Another major challenge was finding sufficient qualified instructors to enable colleges to adopt non-traditional or flexible schedules which, though beneficial to working adults, spread instructional resources thin in the effort to cover both day, evening and weekend options.

The following chart captures programmatic detail gleaned from the documents the colleges submitted for the curriculum review process or from reports prepared by the subject matter experts.

Program	Program Detail/Highlights/Innovation/Challenges
MSSC Certification (and related) Programs	
East Central College: Certified Production Technician	**New program** **Credit with stand-alone NC option** **Industry certifications: NCRC, MSSC CPT** **Highlights/Innovation:** Originally designed as a stand-alone introduction to manufacturing; industry partners pushed it for incumbent workers; started with online Tooling U resource but reverted to a hybrid model per student reviews. Students who complete the certification through the non-credit option can earn credit for a required course in the manufacturing program.
Mineral Area College: Certified Production Technician	**New program** **Credit** **Industry certification: MSSC CPT** **Highlights/Innovation**: adult/incumbent worker friendly; online instructional resources; strong industry partnership. One of four program courses offered every eight weeks or students can complete all four in the 12-week format. The four new courses were aligned with existing courses; the latter being revised to incorporate specific certification competencies.
St. Louis Community College: Certified Production Technician	**New program** **Non-credit** **Industrial certification: MSSC CPT** **Highlights/Innovation**: Continuous improvement - determined that students could complete the four required courses in 8 instead of 16 weeks; found online Tooling U resource ineffective with introductory, TAACCCT-target students. Completion rates rose notably when college made attendance on campus mandatory instead of allowing student to opt for online, own-pace format.
North Central Missouri College: Manufacturing Skills Certificate	**New program** **Credit** **Industry certification: MSSC CPT** **Highlights/Innovation**: The notion of accelerated, one-semester certificates was new to NCMC prior to MoManufacturingWINs. In order to adapt, 8-week courses (with longer class periods) were developed so that students could better manage their course work and ultimately be successful. This certificate utilizes a combination of 8-week lecture/lab courses and 16-week hybrid courses.
State Fair Community College: Manufacturing Production Skills Certificate	**New program** **Credit** **Industry certification: MSSC CPT** **Highlights/Innovation**: Started as traditional classroom format but has migrated to a hybrid/online program.
St. Charles Community College: Certified Production Technician	**New program** **Non-Credit** **Industry Certification: MSSC CPT** **Highlights/Innovation**: Offered in traditional classroom format in multiple locations.

Program	Program Detail/Highlights/Innovation/Challenges
Metropolitan Community College: Warehousing/ Logistics	**New program** **Non-Credit** **Industry Certifications: NCRC, OSHA 10-hr** **Highlights/Innovation:** Focus on forklift training and refined academic/employability *Preparing for Success* supplemental support course, which was then incorporated into all of the other non-credit MoManufacturingWINs programs. Industry input caused college to drop CLA certification and to shorten the program from 4 weeks/4 hours a day to 2 weeks/8 hours a day.
Mineral Area College: Certified Logistics Technician	**New program** **Credit** **Industry Certifications: MSSC CLT, OSHA 30-hr, IC3** **Highlights/Innovation**: The design of rotating classes every 8 weeks allows incumbent workers the chance to improve their skills which provides opportunities for advancement with their companies. Several employers are providing financial incentives for employees who earn their CLT.
St. Louis Community College: Logistics Associate & Technician	**New program** **Non-Credit** **Industry Certifications: MSSC CLA, MSSC CLT** **Highlights/Innovation:** This 3-week program was originally designed in a hybrid format with students in class only two days a week to enable them to study as was convenient to their schedules. However, more student success/completion has resulted when the program's structure was converted to mandatory on-campus attendance four days a week.
Precision Machining	
East Central College: Precision Machining • AAS • CNC Certificate • Certificate of Specialization • Certificate of Achievement	**Enhanced programs** **Credit** **Industry Certifications: NCRC, NIMS Level 1 and 2** **Highlights/Innovation:** College was working on a restructure of its machining program to incorporate NIMS certifications and to stack certificates to degree when the grant was awarded so used funds for tuition and some equipment. Program has had terrific success and is the only one with growing enrollment at the college. Will be moving into a new lab space three times larger than its current location and college is investing heavily in new manual machines. Focusing more intently on what industry is doing; i.e., need for a solid CNC program but at the same time recognizing how critical manual skills are as well. Are now working on a hybrid model that will allow students to learn concepts online and then master skills in the lab twice a week. **Challenges:** Some industry partners were reluctant to embrace NIMS until they were fully oriented to it. Industry partners are sometimes slow in inspecting student parts for NIMS certification. Found Tooling U resource to not be fully aligned with NIMS and so abandoned it.

Program	Program Detail/Highlights/Innovation/Challenges
Ozarks Technical Community College: Accelerated Machine Tool Certificate	**Enhanced program** **Credit** **Industry certifications: NCRC+, CPR, NIMS Level 1** **Highlights/Innovation**: Local industry dismissive of MSSC credentials (with the exception of the safety course) so college abandoned initial plan to use MSSC and ultimately tailored the program to NIMS certification. Dramatically expanded lab time (11 a.m. – 5 p.m. 4 days a week) enables students to master machining skills typically acquired in a two-year program. **Challenges**: Finding fulltime instructor/s to cover this duration and recruiting working students who could participate. The format which is better for learning isn't feasible for most incumbent workers.
Metropolitan Community College: Computer-Integrated Machining and Manufacturing	**Enhanced program** **Credit** **Industry Certifications: None** **Highlights/Innovation:** Ten 40-hr weeks of classroom/lab instruction plus a six 32-hr weeks of internship. Creative industry consortium that directs curriculum AND commits to paid internships for successful students – which helps with recruitment. Modifications to program to give students who need it six extra weeks of instruction prior to seeking internship position.
Metropolitan Community College: Saw/Drill Press	**New program** **Non-Credit** **Industry Certifications: NIMS Level 1** *MCC respectfully would like to provide further clarity regarding NIMS certification in its non-credit saw and drill press program. While the SME report indicates the college issues this industry credential, in alignment with the curriculum, MCC does not award the NIMS Level 1 upon completion. MCC does award its own certification of completion for the program of study, and the curriculum has been validated to align with the industry competencies. **Highlights/Innovation:** A short-term, preliminary step to the 16-week CIMM program, this new course would allow students to see if they had enough aptitude and interest in machining to warrant entering the CIMM program while gaining the skill needed to hold a job in the saw room of a larger manufacturing machining company.
State Fair Community College: Machine Tool #1 Certificate	**New program** **Credit** **Industry Certifications: NIMS Level 1** **Highlights/Innovation**: Shorter-term program option (one semester vs. one- or two-year options); introduction of NIMS certification. The Machine Tool Program has experienced a major overhaul since the inception of the grant. It has doubled the number of classes offered, made numerous program changes and improvements targeted at increasing programmatic rigor, and purchased much needed equipment. Instructors spend a large part of their non-instructional time working with local industries to improve the program and track student worker progress. **Challenges:** Throughout this program overhaul there has been unexpected instructor strain due to the extra work and non-work hours required to create a better program and track the student placement and success.
State Fair Community College: Machine Tool #2 Certificate	**New program** **Credit** **Industry Certifications: NIMS Level 1** **Highlights/Innovation:** Next-step program for completers of Machine Tool #1

Program	Program Detail/Highlights/Innovation/Challenges
Mineral Area College: Certified Manufacturing Technician	**New program** **Credit** **Industry Certifications: SME Certified Manufacturing Technician, Fanuc Robotics** **Highlights/Innovation:** Developed to align with existing courses and resulted in enhancing some of them with SME-certification competencies. Strong blend of online, hybrid and traditional resources and program structure. **Challenges:** Program recruitment challenging because SME certification requires combination of postsecondary and work experience to sit for exam.
St. Louis Community College: Precision Machining Technology	**New program** **Credit** **Industry Certifications: NIMS Level 1** **Highlights/Innovation**: Driven by industry request, program focused on manual machining and CNC set up, not just CNC operation. Grant presented a great opportunity to strengthen college's machining focus within its Computer Integrated Manufacturing AAS program with a 17-credit PMT certificate of specialization – and the department's first experience with cohort-based education. Hits all facets of grant goals. Tightly stacked in other certificate and degree options.
State Technical College of Missouri: Machine Tool	**Enhanced program** **Non-Credit** **Industry Certifications: NCRC, OSHA 10-hr, NIMS Level 1** **Highlights/Innovation:** Use of Tooling U and Immersive Software.
Welding	
Metropolitan Community College: Construction Welding	**Enhanced program** **Credit** **Industry Certifications: AWS** *MCC respectfully would like to provide further clarity regarding AWS certifications. While the SME report indicates the college issues these industry credentials, in alignment with the curriculum, MCC does not award the AWS upon completion. As stated on page 7 of the report, our industry partners prefer that students wait to sit for these examinations. MCC does award its own certification of completion for the program of study, and the curriculum has been validated to align with the industry competencies. **Highlights/Innovation:** Lab expansion and improvements to include new fabrication competencies.
Metropolitan Community College: MIG Welding	**Enhanced program** **Credit** **Industry Certifications: AWS** *MCC respectfully would like to provide further clarity regarding AWS certifications. While the SME report indicates the college issues these industry credentials, in alignment with the curriculum, MCC does not award the AWS upon completion. As stated on page 7 of the report, our industry partners prefer that students wait to sit for these examinations. MCC does award its own certification of completion for the program of study, and the curriculum has been validated to align with the industry competencies. **Highlights/Innovation**: Lab expansion and improvements to include new fabrication competencies.

Program	Program Detail/Highlights/Innovation/Challenges
Metropolitan Community College: MIG/TIG Welding	**Enhanced program** **Credit** **Industry Certifications: AWS** *MCC respectfully would like to provide further clarity regarding AWS certifications. While the SME report indicates the college issues these industry credentials, in alignment with the curriculum, MCC does not award the AWS upon completion. As stated on page 7 of the report, our industry partners prefer that students wait to sit for these examinations. MCC does award its own certification of completion for the program of study, and the curriculum has been validated to align with the industry competencies. **Highlights/Innovation**: Lab expansion and improvements to include new fabrication competencies.
Metropolitan Community College: Basic Welding	**New program** **Non-Credit** **Industry Certifications: OSHA 10-hr** **Highlights/Innovation:** Accelerated program to prepare non-code welders for entry-level jobs. Preparing for Success course effective in simultaneously strengthening academic and employability skills.
St. Louis Community College: Welding	**New program** **Non-Credit** **Industry Certifications: AWS** **Highlights/Innovation:** Partnership program with Carpenters Joint Apprenticeship Program, a contracted venue because college did not have the welding lab facilities to house a short-term program.
East Central College: MIG Welding	**New Program** **Non-Credit** **Industry Certifications: NCRC, OSHA 10-hr** **Highlights/Innovation**: Offered at four locations. This course was designed from direct feedback provided by area manufacturers and is designed to be responsive to working individuals, with courses being offered in the evening and on Saturdays.
Ozarks Technical Community College: Welding Specialist (Non-Credit)	**Enhanced program** **Non-Credit** **Industry Certifications: NCRC, OSHA 10-hr, AWS** **Highlights/Innovation**: Designed specifically to build stainless steel welding skills in demand in the Springfield area. Intended to provide flexibility to both employed and unemployed workers but employed welders are already working overtime and at night. Employed workers prefer to earn credit. Use of welding simulator. **Challenges**: Welding labs full during the day. Course has yet to run but is ready to launch.
Ozarks Technical Community College: Weld Specialist (Credit)	**Enhanced program** **Credit** **Industry Certifications: NCRC, OSHA 10-hr, AWS** **Highlights/Innovation:** Dramatically expanding lab time (5 days a week/8 hours per day) that enables student to master welding skills in 20 weeks that are typically acquired in a two-year program. Tried welding simulator and Tooling U to enhance learning but students didn't like either one or the resources didn't work well in the welding lab setting. Continuing to look for ways to "flip" the instruction to allow even more lab time. **Challenges:** Math and computer skills and drug screening. Simulator did provide mechanism to objectively compare welding skills per student.

Program	Program Detail/Highlights/Innovation/Challenges
State Technical College of Missouri: Introduction to Welding	**New Program** **Non-Credit** **Industry Certifications:** NCRC+ and Certificate of Completion from STC **Highlights/Innovation:** Developed with significant industry input to expose students to four thermal cutting welding techniques in a shorter timeframe than current programs. Program is flexible, allowing open entry and exit based on participant need; Saturday mornings 8 to noon.
North Central Missouri College: Welding Skills	**New program** **Credit** **Industry Certifications: NCRC, MSSC Safety, OSHA 10-hr, AWS** **Highlights/Innovation:** Partnered with area career center to overcome challenges of finding AWS-certified instructor. Grant dollars were used to purchase new equipment to supplement that in place at the career center. The notion of accelerated, one-semester certificates was new to NCMC prior to MoManufacturingWINs. In order to adapt, 8 week courses (with longer class periods) were developed so that students could better manage their course work and ultimately be successful. **Challenges:** AWS certification - at least one employer hesitates hiring AWS credentialed applicants because they see their position(s) with the small, rural manufacturer as simply a stepping stone to gain work experience in order to land a better job.
St. Charles Community College: Welding Certificate	**New program** **Non-Credit** **Industry Certifications: NCRC, AWS** **Highlights/Innovation:** First welding program in college's 28-year history at three diverse locations. Have program under review with DHE to qualify for credit. Strong demand: waiting list of 40+ students.
State Fair Community College: Structural Welding	**Enhanced program** **Credit** **Industry Certifications: AWS** **Highlights/Innovation:** Accelerated the program from 16-week classes to 8-week classes with more intense lab time. Clear stackable program from Structural Welding, to Pipe Welding, to Professional Certificate and then AAS in Metals Technology-Welding Emphasis.
State Fair Community College: Pipe Welding	**New program** **Credit** **Industry Certifications: None** **Highlights/Innovation**: Part of clear stackable program starting with Structural Welding and linking to Professional Certificate and then AAS in Metals Technology-Welding Emphasis.
Industrial Maintenance	
East Central College: Industrial Maintenance • AAS • Certificate of Achievement • Certificate of Specialization	**New programs** **Credit** **Industry Certifications: NCRC, MSSC CPT** **Highlights/Innovation**: Clearly defined stacked program, starting with MSSC CPT and moving up through Certificate of Specialization and then Certificate of Achievement to AAS degree program. Use of Moodle as a technology-enhanced learning resource. Provides Credit for Prior Learning options.

Program	Program Detail/Highlights/Innovation/Challenges
Mineral Area College: Pneumatics	**New program** **Credit** **Industry Certification: IFPS** **Highlights/Innovation**: Developed to align with existing courses. Course revision and creation of a new one. Developed to address industry-council shared need for incumbent worker skill enhancement. 8-week rotation course schedule. A component of a clear, stackable pathway. Stackable into the college's AAS program. Online and technology enhanced; Tooling U and Amatrol Learning Packets. **Challenges**: Finding qualified instructors.
Mineral Area College: Hydraulics	**New program** **Credit** **Industry Certifications: IFPS** **Highlights/Innovation**: Developed to align with existing courses. Course revision and creation of a new one. Developed to address industry-council shared need for incumbent worker skill enhancement. 8-week rotation course schedule. A component of a clear, stackable pathway. Stackable into the college's AAS program. Online and technology enhanced; Tooling U and Amatrol Learning Packets. **Challenges:** Adjusting the hands-on portion to coincide with the donated components from industry for disassembly and reassembly to act as field, major, and minor repairing.
State Fair Community College: Industrial Maintenance: Total Productive Maintenance	**Enhanced program** **Credit** **Industry Certifications: SMRP/CMRT** **Highlights/Innovation**: Clear certificate component in 3-step stack to AAS degree. Instructional focus on interpreting not just duplicating applications. Accelerated 8-week schedule with day and evening starts that offers different paths to completion. Program schedule was expanded to accommodate part-time evening students and structured to allow students to enter into the TPM in *any* semester and complete the program in 6 semesters. Hybrid program with two online courses that lend themselves to successful learning and mastery of material in a non-hands on environment.
Metropolitan Community College: Basic Industrial Maintenance – ABB Robotics Emphasis	**New program** **Non-Credit** **Industry Certifications: NCRC, OSHA 10-hr** **Highlights/Innovation**: Short-term program developed to address immediate need by new industry partners. Not yet stackable but designed to be. The curriculum is aligned, linked and very relevant. *Preparing for Success* course to build academic and digital skills. **Challenges:** Staffing program with adjunct instructors and managing schedule accordingly. Preparing technicians adequately with limited class/lab time. Sufficient training equipment to support class enrollments.

Program	Program Detail/Highlights/Innovation/Challenges
North Central Missouri College: Industrial Maintenance Skills Certificate	**New program** **Credit** **Industry Certifications: NCRC, OSHA 10-hr, SMRP/CMRT** **Highlights/Innovation**: Just prior to the onset of the MoManufacturingWINs, NCMC was working with a local manufacturer to deliver a particular sequence of technical courses leading to a college certificate. The MoManufacturingWINs program allowed the college to formalize this customized program and effectively served as the catalyst to create the Industrial Technology academic department along with its associated degrees and certificate as a new career pathway. Combination of 8-week lecture/lab courses and 16-week hybrid courses. Given industry partner recognition of value of Manufacturing Skills Certificate and how it matches identified needs to skill-up incumbent workers, college's lead instructor adapted the courses and created an additional track to deliver them directly in manufacturing facilities. The addition of Blackboard Discussion Board assignments to the MSSC Certified Production Technician modules is a best practice. It adds a level of peer-to-peer interaction and support that is vital to many adult learners. Discussion boards help students learn by teaching each other and often bolster a student's confidence in their learning ability. **Challenges**: Faculty is still endeavoring to properly balance the accelerated concept with insuring the curriculum is sufficiently covered. Related to classroom instruction, faculty quickly learned that an adequate amount of hands-on training simulators is critical to managing the lengthened class periods. Ensuring students have adequate computer skills to successfully navigate online and simulator resources.
Ozarks Technical Community College: Manufacturing Specialist (Accelerated Industrial Maintenance)	**Enhanced program** **Credit** **Industry Certifications: NCRC, CPR, MSSC CPT** **Highlights/Innovation**: Integrated approach to curriculum topics to better prepare technicians who are today expected to have a broader and more integrated scope of technical and critical thinking skills. The use of *ToolingU* and *CPT* ensures both the quality and the alignment to industry needs. The elimination of required textbooks is quite a cost savings. This does not detract from the quality of the curriculum and actually helps the students focus on the content of the program. Integrated curriculum in an accelerated format – 17 weeks instead of 2 years. The blending of concepts and competencies from 8 different courses is a unique approach. Certificate program stacks into AAS in Industrial Maintenance which in turn stacks into AAS in Manufacturing. **Challenges:** Tough for incumbent workers to attend daytime classes even in an accelerated format. Incumbent workers benefited more quickly from integrated curriculum than did new students who needed more time to orient themselves/master skills because of their inexperience in a manufacturing setting. Finding instructors with the broad scope of skills – who themselves could address an integrated environment.
University of Central Missouri: **ENGT 4580** – *Quality Systems Engineering* and **ENGT 3530** *Inspection and Quality Control*	**New courses** **Credit** **Industry Certifications: None** **Highlights/Innovation**: Online and hybrid formats developed in 8-week formats to be offered during the summer but could easily be reformatted into 16-week courses. Department has proposed a degree name change to Technology Management 2+2. **Challenges:** Not all skills in ENGT 3530 can be taught online so course requires students to come to UCM campus twice during course. University has developed and transitioned other courses within its Technology transfer: Bachelor of Science program so it can offer that entire degree program online with a couple of hybrid courses. Other future plans include solutions to develop online 3530 labs.

4. Manufacturing Portal Programs

East Central, St. Charles and St. Louis used MoManufacturingWINs funds for portal programs to orient students to manufacturing careers in addition to college services supporting student success. Within the Portals, colleges also assessed program readiness and provided preliminary remediation, if needed, in basic mathematics, reading and digital literacy. All three colleges introduced similar programs as part of the Round 1 TAACCCT Round 1MoHealthWINs grant but modified them for Round 2. While the St. Louis and East Central Manufacturing Portals are abbreviated versions of their MoHealthWINs Adult Learning Academy and Transitions Program, respectively, St. Charles expanded its original "GED Hybrid" portal program to a more comprehensive orientation and preparation program for grant (and other) participants.

Due to the unique nature of each of the three programs and because they do not lend themselves to the same kind of curricular review as the technical programs, it was decided to approach their review differently. A questionnaire was developed to capture key information. This was reviewed by the subject matter expert – a former industry tool and die maker, community college precision machining instructor, manufacturing/machining program coordinator and division chair with significant experience developing orientation programs, career-planning and employability courses and recruitment initiatives. She reported her findings in a Strengths/Weaknesses/Opportunities/Threats (SWOT) analysis.

The chart below outlines the components of each portal program and the SME's analysis of each Portal.

East Central College Transition Gateway Program	
Overview	• This required, approximately 8-contact hour program is managed by the college's Division of Workforce Development. (The 3-week credit Transitions program was abandoned in December 2014.)
Access/Enrollment	• The program is an independent enrollment step into MoManufacturingWINs grant programs.
Orientation to Career/Industry	• Orientation to what employers are looking for in desirable/successful employees and to manufacturing careers. • The focus on self-management – the ability to be a proactive, intentional student.
Academic Skill Assessment and Development	• WorkKeys assessments in Applied Mathematics, Reading for Information and Locating Information
Outcomes	• Not addressed
Strengths – College Perspective	• The program's ability to, in a very short time, influence students to change their point of view, review skills necessary to produce quality work, reflect on the intentional use the 168 weekly hours of technical instruction the grant affords and set priorities to complete tasks, set goals and build healthy habits.

East Central College Transition Gateway Program	
Strengths – SME Reported *based on document review/staff interviews*	• The Transition Gateway program was designed to equip the student with the necessary study/foundational skills for success in the classroom and workplace. • The use of Work Keys assessments; Applied Mathematics, Locating Information and Reading for Information and ability to acquire a National Career Readiness Certificate. • Basic skills remediation focusing on basic computer skills, basic academic skills (reading, sentence skills, and mathematics), multiple facets of student, emotional, and career success. • Curriculum delivery in multiple formats (traditional, hybrid and accelerated). • Student support services at campus annex have proved to be beneficial to student success and retention. • Focus on retention through the identification of student barriers, remediation and the use of intrusive student support.
Weaknesses – College Reported	• The short timeframe to cover such a rich curriculum. • Lack of funding.
Weaknesses – SME Reported *based on document review/staff interviews*	• The lack of a sustainability plan for the Transition Gateway program. • The lack of a sustainability plan for grant-developed curriculum and services. • Lack of clear documentation of career ladder that shows entry and exits (see ecc_iet_credentials.pdf for an example). • The lack of documented curriculum.
Opportunities – College Reported	• The program offers students multiple opportunities to prepare to succeed in their coursework but the funding for it has declined.
Opportunities – SME Reported *based on document review/staff interviews*	• Curriculum development and enhancements that provide flexible and alternate delivery methods to encourage entry into technical programs. • Incorporate and document grant-developed curriculum, student services and best practices into existing programs and services. • Development of career ladder for manufacturing program.
Threats – College Reported	• The adoption of Meta-Major as the model for freshman studies has removed the option to use the Transition program as the method to introduce/reinforce student success, digital and academic skills and orientation to program and career options.
Threats – SME Reported *based on document review/staff interviews*	• Lack of sustainability plan for grant-developed curriculum, services and programs (Transition Gateway). • Student lack of awareness of programs and opportunities in technical careers.

St. Charles Community College Manufacturing Portal	
Overview	• Required for entry into any MoManufacturingWINs technical programs, this 8 – 32-hr program of study is managed by the college's workforce development division. • It consists of five areas of focus: *Intro to Manufacturing/Welding*; *Basic Computer Skills*; *Simulated Work Environment*; *Job Search Skills* and *National Career Readiness Assessment.*
Access/Enrollment	• Prospective students meet with SCC staff, complete eligibility forms, register in Mo.Jobs.gov and verify their enrollment in the portal program. • The program is accessed by all job seekers, incumbent workers and other grant-eligible participants. • The portal requirement does not hurt enrollment in the technical programs.

St. Charles Community College Manufacturing Portal	
Orientation to Career/Industry	• Resources used to orient prospective students to careers in manufacturing include lectures with PowerPoint slides, videos, handouts and work samples, information about industry assessments and certifications and online information resources and references. • Participants meet in groups and individually with college staff.
Academic Skill Assessment and Development	• Academic skills are assessed using WorkKeys National Career Readiness Certificate materials. • Instructors provide remedial resources through Career 101, other online skill building resources/references and/or individualized practice packets.
Outcomes	• Participation in the portal programs has increased student completion rates.
Strengths -College Perspective	• Students are introduced to and learn about the program model and become comfortable with the program and instructors before classes begin. • Students gain greater understanding about manufacturing and welding career path options which allows them to make more informed choices on whether to pursue these particular paths.
Strengths – SME Reported *based on document review/staff interviews*	• Students gain greater understanding about manufacturing and welding career path options which allows them to make more informed choices on whether to pursue these particular paths. • Students complete four Work Keys assessments (*Talents, Applied Mathematics, Locating Information* and *Reading for Information*) and the opportunity to earn a National Career Readiness Certificate. • Students gain basic skills in digital literacy and job search techniques and an orientation to manufacturing or welding careers through simulated work environment resources. • Students benefit from remediation to build their academic skills. • Program curriculum is delivered through multiple formats (face to face, blended and online). • Curriculum is tailored to the individual students' skills and needs and therefore the required hours of program participation varies. • Curriculum is easy to follow and disseminate. • Recruitment and marketing materials to explain the course and career opportunities in manufacturing and welding, (Career Pathways & Stackable Credentials Defined).
Weaknesses – College Reported	• Occasionally, students are frustrated by a delay between the portal program and the beginning of the technical programs. These delays are causes by a variety of issues, including number of enrollments and space/instructional resources. • Online testing service for NCRC creates roadblocks and issues for test takers. • The online WorkKeys *Locating Information* module is problematic, requiring test takers to scroll back and forth several times to complete each question.
Weaknesses – SME Reported *based on document review/staff interviews*	• Programmatic logistics are impacted by the management of low enrollment sections. • Challenges finding instructors to teach the curriculum.
Opportunities – College Reported	• Program is attractive to growing numbers of industry partners who are challenged by the academic, technical and employability skills sets of their entry-level workers. • Program could benefit the large population of un- and under-employed workers.
Opportunities – SME Reported *based on document review/staff interviews*	• Increase awareness about and participation in the portal program through additional industry partnerships. • Market the portal to high schools as a dual credit option to increase awareness of manufacturing and welding careers and promote enrollment in technical programs. • Reach out to industry partners for qualified instructors to teach the curriculum. • Develop a sustainability plan for grant-developed curriculum, services and programs.

St. Charles Community College Manufacturing Portal	
Threats – College Reported	• Funding to support program after grant ends. • Employer, job seeker and community partner awareness of the program. • Availability of space and instructional resources.
Threats – SME Reported *based on document review/staff interviews*	• Lack of funding and instructional resources to support the program. • Lack of awareness of program and opportunities in technical careers.

St. Louis Manufacturing Portal	
Overview	• This required six-contact hour program of study is managed collaboratively by the college Student Services, Academic Services and Continuing Education departments and its Workforce Solutions Group. • Participants can earn their NCRC+ certificate and raise their computer literacy to the level for entry-level employment in manufacturing through STLCC's Digital Literacy course.
Access/Enrollment	• Prospective students complete an online MoManufacturingWINs application and then contact the Continuing Education division and sign up for an Information Session. • Students attend an information session, take CR101 and schedule the WorkKeys NCRC+ and Digital Literacy assessments when they are ready. • The college felt required enrollment in the portal was negatively impacting program enrollment. To address that, Digital Literacy was imbedded into the MSSC CLT and CPT classes for those who hadn't completed it on their own time.
Orientation to Career/Industry	• Students participate in a presentation on manufacturing career pathways, which includes videos of "real jobs". • Students start in group orientation but then they with advisors one-on-one as needed.
Academic Skill Assessment and Development	• The COMPASS is used to assess academic skills. • CPT students are offered accelerated remedial assistance in math and literacy if they need it.
Outcomes	• College does not believe the portal program has increased completion or student success rates. • Students seem to believe that they should be able to choose a program and get right into it and not have to extend their unemployed status by taking tests prior to learning skills in classes. • The program is included in the Round 4 MoSTEMWINs grant.
Strengths – College Perspective	• Students participate in a presentation on manufacturing career pathways, which includes videos of "real jobs". • Students start in group orientation but then they meet with advisors one-on-one as needed.
Strengths – SME Reported *based on document review/staff interviews*	• The COMPASS is used to assess academic skills. • CPT students are offered accelerated remedial assistance in math and literacy if they need it.
Weaknesses – College Reported	• College does not believe the portal program has increased completion or student success rates. • Students seem to believe that they should be able to choose a program and get right into it and not have to extend their unemployed status by taking tests prior to learning skills in classes.

St. Louis Manufacturing Portal	
Weaknesses – SME Reported *based on document review/staff interviews*	• The lack of a sustainability plan for the portal program to support manufacturing programs. • No clear documentation of a career ladder that shows entry and exit points once the portal is completed.
Opportunities – College Reported	• Continuation in MoSTEMWINs
Opportunities – SME Reported *based on document review/staff interviews*	• Curriculum development and enhancements that provide flexible and alternate delivery methods to encourage entry into technical programs. • Incorporate and document grant developed curriculum, student services and best practices into existing programs and services. • Include the portal as part of the career ladder for STLCC manufacturing programs. • Use of MoHealthWINs and MoManufacturingWINs grant-developed contextualized curriculum in the Round 4 MoSTEMWINs portal.
Threats – College Reported	• None reported
Threats – SME Reported *based on document review/staff interviews*	• Sustainability plan for grant-developed curriculum, services and programs. • Self-paced remediation doesn't fit into the current Federal Financial Aid model. • Dilution or abandonment of program will weaken prospective student awareness of programs, opportunities in technical careers and the need for (and hence assessment of) foundational skills in digital literacy, math, reading and employability or soft skills.

Appendix I: Exhibit 1

MoManufacturingWINs Curriculum Review Timeline	
October 30	Project timeline, Subject Matter Expert (SME) nomination forms and draft review templates and rubric sent to MCCA MoManufacturingWINs Grant Team; to the Grant Leads at the nine participating two-year colleges and UCM; and to Dr. Paul Long, MCCA CAO Chair, for distribution to MoManufacturingWINs college CAOs prior to the MCCA Convention.
November 6	CAOs discuss review process and templates at MCCA convention meeting.
November 15	Suggestions for template or rubric revisions and/or edits due to Cosgrove & Associates.
December 1	Final templates and rubric distributed to MoManufacturingWINs Grant Leads.
January 5	MCCA Weebly site established for uploading of completed review documents.
February 20	All SME-College contracts signed and W-9s submitted.
February-March	SME orientation and training by webinar and personal phone call.
March 31	Deadline for college review documents to be uploaded to the MCCA Weebly site.
April 7	Review Coordinator approves uploaded documents and notifies appropriate SME that they are available for review.
May 31	SME review rubrics due to Review Coordinator.
June 8	Approved SME reviews forwarded to colleges.
June 15	Deadline for SME stipend payment.
September 30	Draft Curriculum Review report submitted by Review Coordinator.
January 20	Final Curriculum Review report submitted by Review Coordinator.

Appendix I: Exhibit 2

MoManufacturingWINs Curriculum Review Documentation

Please prepare the following documents for the Subject Matter Expert review of each of your MoManufacturingWINs programs:

1. **Key personnel information contact sheet**

   Grant Lead and Program Coordinator/s names, email addresses, work phone numbers.

2. **Introductory overview of program**

   To provide your SME with a preliminary orientation to your program, this one- or two-page overview should *briefly* describe:

   - the program (CIP code, credit/non-credit, number of credits or contact hours, certificate or degree, occupational family, industry certifications, delivery method/s),
   - how its development and/or enhancement evolved,
   - any challenges encountered in developing or launching it (change of focus resulting from post-award industry partner discussions, recruitment issues, changes in regional job market demand, difficulty finding qualified instructors, etc.),
   - information on current status of and plans for the program;
   - any other pertinent information that would help orient the SME to your program prior to document review.

3. **Curriculum Map**

   For multi-course programs, provide a crosswalk between program or student learning outcomes and courses indicating where outcomes are introduced, reinforced and mastered. For single-course programs, provide a crosswalk between course objectives and units. *See different templates and examples for a multi-course program and a single-course program.*

4. **Program Career Ladder or Stackable Credential Information**

   Descriptive or graphic depiction of how students in your program can move up a career ladder through the acquisition of skills and certifications. *See MCC Manufacturing Careers and Career Map examples*

5. **Syllabus**

   A syllabus (for each course in the program) that includes course objectives, prerequisites, course length (# of days or weeks) and delivery method/s.

6. **Overview Table of Objectives, Modules, Learning Activities, Assessments**

   Complete a table for *each course developed or enhanced with grant funds*, capturing in sufficient detail sample learning activities and assessments that best showcase your curriculum. See *template and example*.

7. **Statement of Programmatic Innovation and/or Enhancement**

   Provide a one- or two-page document describing specific examples of how the program incorporates one or more of the MoManufacturingWINs key strategies: **(a)** Build programs that meet industry needs; **(b)** Strengthen online and technology-enabled learning; **(c)** Enhance career pathway options for learners and workers; **(d)** Accelerate and improve certification and employment attainment. This document should include programmatic data or faculty observations how the infused innovations or enhancements impact student learning and success.

MoManufacturingWINs Curriculum Review Documentation
8. Instructional Materials List of all textbooks, manuals, websites, ancillary materials and major laboratory tools and equipment. *See template and example*.
9. Overview Table of Objectives, Modules, Learning Activities, Assessments Complete a table for *each course developed or enhanced with grant funds*, capturing in sufficient detail sample learning activities and assessments that best showcase your curriculum. See *template and example*.
10. Statement of Programmatic Innovation and/or Enhancement Provide a one- or two-page document describing specific examples of how the program incorporates one or more of the MoManufacturingWINs key strategies: **(a)** Build programs that meet industry needs; **(b)** Strengthen online and technology-enabled learning; **(c)** Enhance career pathway options for learners and workers; **(d)** Accelerate and improve certification and employment attainment. This document should include programmatic data or faculty observations how the infused innovations or enhancements impact student learning and success.

Appendix I: Exhibit 3

MoManufacturingWINs Curriculum Review Rubric
Fall 2014/Spring 2015

Program Reviewed:
College:
Reviewed by:
Date:

Review scale definitions:
Exceptional: Review component is a "best practice" and represents a model for replication.
Very good: Review component is complete and effective.
Good: Review component is adequate but presents opportunities for improvement.
Ineffective: Review component is weak and in need of significant improvement.
No or Insufficient Evidence: Review component was not covered or information provided in the documents was insufficient for assessment.

Curriculum Map, Career Ladder/Stackable Credential Documentation, Syllabi	Excellent	Very Good	Good	Ineffective	No/ Insufficient Evidence
1. Program CIP code/s appropriate to program title and outcomes.					
2. Effective program structure (prerequisites, course sequence, stackable credential-structure provide a clear, logical path to completion).					
3. Outcomes aligned to occupational focus (industry skills and standards) and prepare students for appropriate industry certification/s.					
4. Outcomes are clearly stated.					
5. Outcomes are introduced and reinforced effectively.					
6. Course objectives are clearly stated and measurable.					
7. In multi-course programs, course objectives support one or more program or student learning outcome. In single-course programs, modules support one or more course objective.					

Comments or recommendations specific to each section rated:
1.
2.
3.
4.
5.
6.
7.
General comments or recommendations:

MoManufacturingWINs Curriculum Review Rubric Fall 2014/Spring 2015					
Instructional Materials and Lab Resources	**Excellent**	**Very Good**	**Good**	**Ineffective**	**No/ Insufficient Evidence**
1. Support stated course or unit learning objectives.					
2. Meet/reflect current industry practices and standards.					
3. Provide options for multiple learning styles.					
4. Instructional materials are cited properly.					
5. There is evidence of materials and resources that support on-line or technology-enabled learning.					
Comments or recommendations specific to each section rated: 1. 2. 3. 4. 5. General comments or recommendations:					
Overview Table: Objectives, Modules/Units, Learning Activities and Assessments	**Excellent**	**Very Good**	**Good**	**Ineffective**	**No/ Insufficient Evidence**
1. Modules/units are linked to course objectives.					
2. Learning activities promote achievement of stated module/unit objectives.					
3. Learning activities provide opportunities for interaction and active learning.					
4. Learning activities provide options for multiple learning styles.					
5. Learning activities are linked to current industry practices, standards and certifications.					
6. Learning activities demonstrate evidence of innovation or enhancements to support adult learner success.					

MoManufacturingWINs Curriculum Review Rubric Fall 2014/Spring 2015					
7. Materials/resources (to include equipment, tools and software) are used in a way that students understand their purpose and use in industry settings.					
8. Assessments measure stated learning objectives and link to industry standards.					
9. Assessments align with course activities and instructional materials and resources.					
10. Assessments are sequenced throughout the instructional period to enable students to build on feedback.					
11. Assessments are varied and appropriate to content.					
12. Assessments provide opportunities for students to measure their own learning progress.					
Comments or recommendations specific to each section rated: 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. General comments or recommendations:					
Innovative or Enhanced Strategies	**Excellent**	**Very Good**	**Good**	**Ineffective**	**No/ Insufficient Evidence**
1. Evidence of industry input/standards in program design and curricular components.					
2. Evidence of program enhancements to support the adult learner.					

MoManufacturingWINs Curriculum Review Rubric Fall 2014/Spring 2015					
3. *If program has run long enough*, is there evidence that program design and curricular components and enhancements are resulting in good or improving completion rates?					
Comments or recommendations specific to each section rated: 1. 2. 3. General comments or recommendations:					

Exhibit 4

MoManufacturingWINs Portal Program Questionnaire
Overview 1. Briefly outline or describe the components of your portal program/s. 2. Is the portal part of the program of study or is it an independent enrollment step? 3. Which college department manages the portal; i.e., student services, academic services, workforce development, other? 4. How many contact hours do students invest in completing the portal requirements or options?
Access/Enrollment 1. Describe the enrollment steps required for entry into your MoManufacturingWINs program/s. 2. Who accesses the portal/s? 3. Do you lose potential students because of the portal step? 4. Is the portal required or optional for entry into the technical program/s? 5. Describe any additional information you feel is pertinent regarding access and enrollment.
Orientation to Career/Industry 1. What resources or methods are used to orient students to manufacturing careers? 2. Do students meet individually with an advisor or are there group orientation meetings? 3. Describe any additional information you feel is pertinent regarding orientation to the career and/or industry.
Academic Skill Assessment/Development 1. Are academic skills assessed? And if so, what resources or methods are used to do so? 2. How do you support students who don't meet minimum academic requirements for their program of interest? 3. Describe any additional information you feel is pertinent regarding academic skill assessment and/or development.
Outcomes 1. Has the portal improved/increased student success and completion? 2. What do students seem to like or dislike about the portal? 3. Are there plans to expand the portal model or continue it after MoManufacturingWINs grant funding ends? 4. Describe any additional information you feel is pertinent regarding program outcomes.
SWOT Analysis • What are the **strengths** of your portal program/s? • What are its **weaknesses**? • What are the **opportunities** for enhancement or growth? • What are the **threats** to its sustainability or efficacy?

Appendix I: Exhibit 5

Subject Matter Experts		
Name/Certifications	**Credentials**	**Programs Reviewed**
Marilyn Barger, MSSC CLA/CLT	Executive Director, Florida Advanced Technological Education Center of Excellence, Hillsborough Community College	NCMC, SFCC and SCC Certified Production Technician
James Bridwell, AWS	Instructor, Ozarks Technical College, Welding	MCC Welding
Kendall Davis, AWS	Program Coordinator, Metropolitan Community College-Business & Technology, Welding	ECC, OTC, STCM Welding
Curtis Elliott, NIMS	Coordinator/Instructor, East Central Community College, Precision Machining	MCC and SFCC Precision Machining
Sarah Galatioto, MSSC	Assistant Professor, Florida State College at Jacksonville, Manufacturing/Maintenance Technology	ECC, MAC and STLCC Certified Production Technician
Deepak Gupta, PhD	Director/Assoc. Professor, Wichita State University, Engineering Technology	UCM Engineering Technology courses
David Grady, NIMS	Program Coordinator, Metropolitan Community College-Business & Technology, Manufacturing	MAC, STCM and STLCC Precision Machining
Joanne Kazmierski, CTL, ASTL	CEO, Global Business Logistix; American Society of Transportation and Logistics (ASTL) Certification	MCC Logistics
Chris Muenks, NIMS	Dept. Chair/Instructor, State Technical College of Missouri, Machine Technology	ECC and OTC Precision Machining
Joseph Roche, ISA	Program Coordinator, Metropolitan Community College-Business & Technology, Industrial Technology	ECC Industrial Engineering
Thomas Schwartze, AWS	Co-Chair/Instructor, State Technical College of Missouri, Welding	NCMC, SCC, SFCC Welding
Robert Sherman, MSSC, SME, SMRP, IFPS	Instructor, Ozarks Technical College, Industrial Maintenance Technology	MAC and SFCC Industrial Maintenance
Steve Snodgrass, MSSC, SMRP	Program Coordinator, State Fair Community College, Industrial Technology	MCC, NCMC, OTC Industrial Maintenance
Penny Tepesch, NIMS	Division Chair (Retired), Metropolitan Community College-Business & Technology	ECC, SCC and STLCC Portals
Peter Warner, MSSC CLA/CLT	Performance Consultant, Metropolitan Community College-Institute for Workforce Innovation, Warehousing and Logistics	MAC and STLCC Logistics

Appendix II: MoManufacturingWINs Completer Survey Responses

Response Category	Not Applicable		Very Little		Some		Not Sure Yet		Quite a Bit		Very Much		Total	
Survey Question	#	%	#	%	#	%	#	%	#	%	#	%	#	%
How Much Did Your MMW Program Help You Acquire Information Related to Careers in Manufacturing Technologies?	15	0.64	46	1.97	84	3.59	193	8.26	671	28.71	1328	56.82	2337	100.00
How Much Did Your MMW Program Help You More Clearly Develop a Plan to Pursue Your Career Goals?	38	1.63	54	2.31	129	5.52	270	11.55	708	30.30	1138	48.69	2337	100.00
How Much Did Your MMW Program Help You Obtain a Job in a Manufacturing Related Field	66	2.82	65	2.78	71	3.04	387	16.56	566	24.22	1182	50.58	2337	100.00
How Much Did Your MMW Program Help You Speak Clearly & Effectively	36	1.54	209	8.94	240	10.27	170	7.27	785	33.59	897	38.38	2337	100.00
How Much Did Your MMW Program Help You Think Critically & Analytically	40	1.71	119	5.09	165	7.06	91	3.89	941	40.27	981	41.98	2337	100.00
How Much Did Your MMW Program Help You Write Clearly & Effectively	60	2.57	222	9.50	242	10.36	223	9.54	726	31.07	864	36.97	2337	100.00
How Much Did Your MMW Program Help You Analyze Math/Quantitative Problems	34	1.45	180	7.70	271	11.60	392	16.77	785	33.59	675	28.88	2337	100.00
How Much Did Your MMW Program Help You Use Computing & Information Technology	62	2.65	284	12.15	209	8.94	433	18.53	659	28.20	690	29.53	2337	100.00
How Much Did Your MMW Program Help You Learn to Work Effectively with Others	50	2.14	79	3.38	109	4.66	113	4.84	499	21.35	1487	63.63	2337	100.00

Appendix II: MoManufacturingWINs Completer Survey Responses Continued

Response Category	No Answer		Not Really, I Wish I Would Have Learned More		Not Quite Sure		Not Sure At This Point		Yes, Somewhat Confident		Yes, Very Confident		Total	
Survey Question	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Are you confident that you received the skills & knowledge necessary to be successful in your chosen field?	30	1.28	21	0.90	31	1.33	144	6.16	641	27.43	1470	62.90	2337	100

Response Category	No Answer		Much Less Than I Expected		Less Than I Expected		Matched My Expectations		Exceeded My Expectations		Greatly Exceeded My Expectations		Total	
Survey Question	#	%	#	%	#	%	#	%	#	%	#	%	#	%
To what extent did your MMW program meet your expectations?	13	0.56	15	0.64	51	2.18	535	22.89	928	39.71	795	34.02	2337	100

Appendix III: MMW Evaluation Progress Report #1, July 30, 2013

Introduction

MoManufacturingWINs (MoMan) is designed to connect TAA-eligible and dislocated, unemployed, underemployed and low-skilled adult populations to the growing number of high-skilled manufacturing jobs. The MoManufacturingWINs Consortium is establishing a set of training programs that, through multiple delivery formats and adult-friendly support systems, will accelerate training and provide stackable and portable credentials related to career pathways associated with the following high demand occupations: Production, Industrial Maintenance, Welding, Machining, and Transportation and Logistics. The MoManufacturingWINs grant is designed to meet the following key deliverables:

- Build Programs that Meet Industry Needs, Including Developing Career Pathways
- Strengthen Online and Technology-Enabled Learning
- Enhance Career Pathway Options for Adult Learners and Workers
- Accelerate and Improve Certification and Employment Attainment

To evaluate and support program development Cosgrove & Associates (C&A) is partnering with the MoManufacturingWINs Consortium to conduct a comprehensive, multi-dimensional approach to examine the following grant phases: process; implementation; progress and performance measures; and use of data continuous improvement. During the initial phases of this evaluation, Cosgrove & Associates worked with the Consortium to examine grant processes and program/strategy implementation. Particular attention was directed to review the extent to which Consortium processes were in place to launch programs of study, support participant enrollment, collect participant enrollment data, and expend grant funds to acquire faculty/staff and launch programs. This report summarizes key findings from this initial evaluation phase.

Process evaluation

Over the past six months, Cosgrove & Associates partnered with the MoMan Grant Team to conduct site visits with faculty and staff at each of the Consortium campuses. A five-point rubric (5= Excellent Progress to 1 = Poor Performance---See Appendix A of this report) was employed to evaluate each campus in the following domains: Design and Governance; Program Review; Program Staffing; Data Collection; and Local and Regional Collaboration. All campuses received overall scores in the 3 to 4 range (see below). It is noteworthy that three campuses actually started programs in the Spring 2013 term. As one might expect, those colleges that started programs tended to receive higher scores, including implementation scores of 5 for some areas.

- *Score 4 = Good Progress: COLLEGE IS MAKING SIGNFICANT PROGRESS AND SUCCESSFUL IMPLEMENTATION IS LIKELY FOR FALL 2013, BUT MORE WORK IS NEEDED TO ENSURE SUCCESSFUL IMPLEMENTATION FOR FALL 2013.*
- *Score 3 = Making Progress: COLLEGE IS MAKING SIGNFICANT PROGRESS AND SUCCESSFUL IMPLEMENTATION IS LIKELY FOR FALL 2013, BUT MORE WORK IS NEEDED TO ENSURE SUCCESSFUL IMPLEMENTATION FOR FALL 2013.*

Strengths and Concerns identified during the site visits are presented in Appendix B and C of this report.

It seems apparent that all campuses, as well as the Consortium Grant Team have benefited from their experience as Round 1 TAA recipients and are using lessons learned to ensure the appropriate

implementation of grant related processes. The Executive Director and the Deputy Project Manager have created a strong organizational structure for grant management and overall project communication.

In addition to the site visits, the Grant Team conducted two training sessions to support MoMan campuses. The following topics were addressed during such sessions: development of program structures, including stackable and latticed credentials; participant data collection processes; expenditure reporting; partnership development; employer engagement; and quarterly and annual reporting processes. As a follow-up to the staff development sessions, the following activities were completed to support data collection and evaluation processes.

- Reviewed DOL and Consortium reporting needs and research/evaluation questions
- Developed employment and wage data process
- Developed data sharing Memorandums of Understanding with all grant partners.
- Trained campus users in regard to DOL required data elements and student cohorts
- Developed statewide data system
- Piloted data collection process and tracking system
- Trained campus users on data system
- Implemented data collection process to support program start-up
- Procured Third Party Evaluator

Although MoMan has established a solid foundation to move forward, a key issue has yet to be resolved. During the original grant submission process, confusion developed regarding the number of participants projected to be served. This confusion resulted in a duplicate count of more than 800 participants. The Grant Team sought relief from US DOL in regard to this issue, but DOL indicated that the original participant count could not be reduced. The Consortium is currently working with all grant partners to develop a specific strategy to ensure that the additional 800 participants will be served and the final target number met.

Implementation evaluation

The MoMan Consortium has started four programs at three campuses. These programs are based upon employer input and strong employer partnerships are in place; including internship and learn and earn opportunties. As of the end of Quarter 3, Year 1, participant enrollment stands at 58. Nintey-five percent of the participants are male. Eighty-six percent are white and 14% are minority. Seventy-five percent were unemployed when they started their program and 97% reported being either unemployed or under-employed at the start of their program. Twenty-five percent are attending college for the first time, while 60% are low-skilled in at least one area (math, reading, or English). Three percent are TAA eligible. The average age is 32 and 40% are over the age of 35. Current progress measures for these participants are positive, with the credit hour completion to credit hour attempted ratio in excess of 90%. It is also expected that some of the current participants will likely complete their program of study by end of Quarter 4. Given, the strong employer engagement, employment rates for the first round of completers are expected to be high.

Looking forward to Fall, 2013, the remaining six campuses are all scheduled to start at least one program by the end of Year 1. As stated earlier, grant processes including participant data collection and grant expenditures reporting are in place to support program start-ups.

To further support program and strategy implementation, Cosgrove & Associates developed a Strategy Implementation Assessment Tool for each campus. This tool is designed to help colleges link specific strategies to programs and monitor strategy implmentation on a continuous basis. Furthermore, Cosgrove & Associates also developed a Sustainability Planning Assessment Survey for each campus. The survey is designed to collect data related to a campus' ability to implement and support organizational change. Baseline survey data are being collected, as colleges launch their first round of MoMan programs. Additional data will be collected at key grant intervals.

Action recommendations

This evaluation report reveals that the MoManufacturingWINs Consortium has established a strong foundation. Programs are serving key target populations and current employer/community partnerships are positive. To continue to build upon this strong foundation, the Consortium should address the following items.

- Each campus should conduct a campus-wide Faculty/Staff MoManWINs training sessions. Sessions should be designed to increase program awareness and share successful innovations currently being developed for MoManWINs.
- Initiate program start-ups across all campuses.
- When appropriate campuses should adhere to common Consortium-wide program structures.
- Examine potential barriers to enrollment and program retention.
- Each campus should complete the Strategy Implementation Assessment Tool and have full understanding of the relationship between grant strategies, programs, and projected outcomes.
- Each campus should complete the Sustainability Planning Assessment Survey and review data with program and college leadership.
- Initiate data collection related to completer and NON-returner follow-up. In addition, analyze such data for required reporting and continuous improvement processes.
- Develop Consortium-wide Comparison Cohort for required quasi-experimental evaluation design.
- Complete the Strategy Implementation Assessment Tool so as to clearly define the relationship between grant strategies and grant programs.
- Resolve Consortium issue associated with "duplicate counting" of participants and finalize plans to meet target participant number.

Appendix III-A Process and Implementation Assessment Scale

5 EXCELLENT PROGRESS: COLLEGE IS MAKING EXCELLENT PROGRESS AND SUCCESSFUL IMPLEMENTATION HAS ALREADY OCCURRED OR WILL CERTAINLY OCCUR NO LATER THAN FALL 2013.

4 GOOD PROGRESS: COLLEGE IS MAKING SIGNFICANT PROGRESS AND SUCCESSFUL IMPLEMENTATION IS LIKELY FOR FALL 2013, BUT MORE WORK IS NEEDED TO ENSURE SUCCESSFUL IMPLEMENTATION FOR FALL 2013.

3 MAKING PROGRESS: COLLEGE IS AWARE OF STEPS REQUIRED FOR SUCCESSFUL IMPLEMENTATION, AND HAS TAKEN SOME ACTION, BUT SIGNIFICANT WORK NEEDS TO BE COMPLETED TO ENSURE SUCCESSFUL IMPLEMENTATION FOR FALL 2013.

2 LACKING PROGRESS: COLLEGE IS AWARE OF STEPS REQUIRED FOR SUCCESSFUL IMPLEMENTATION, BUT CURRENTLY ACTION IS LACKING. IMMEDIATE ACTION NEEDS TO BE TAKEN IF SUCCESSFUL IMPLEMENTATION FOR FALL 2013 IS EXPECTED.

1 PERFORMANCE IS POOR: PROGRESS IS COMPLETELY LACKING. COLLEGE MUST TAKE IMMEDIATE ACTION TO INCREASE AWARENESS OF STEPS REQUIRED FOR SUCCESSFUL IMPLEMENTATION.

Appendix III-B Strengths Noted During Site Visits

STRENGTHS
An experienced data analyst and systems are in place to track enrollment and progress measures.
College created matrix of programs offered including required courses, companies that provide clinical, average salary, job outlook, certifications, and cost. This will be helpful to participants, recruiters, and grant team.
College documented internal procedures to implement accelerated programs and addressed course scheduling, enrollment, student accounts, admission and financial aid.
College has a history of grant management and oversight and is leveraging lessons learned from Round 1 grant.
College has a history of grant management and oversight and is leveraging lessons learned from serving as host institution for Round 1 grant.
College has created key connections between academic and student support services within each program.
College has designed curriculum and programs to accommodate eight week courses that can begin at semester or mid-semester.
College has plans to integrate student and instructional support services (i.e., career coaching, pathway navigation, tutoring, etc.) with program structure.
College hired additional Retentions Specialist for MMW with a different job description. The difference is this role will be working more closely with the college relations office at the BTC campus for a more concentrated recruitment effort. The position will have co-location at FEC.
College hired additional Retentions Specialist. The two specialists are splitting their time between the Rounds 1 and 2 thus leveraging lessons learned.
College increased employer engagement by having employers complete Work Keys occupational profiles.
College is addressing the Non-Credit to Credit bridge through Credit for Prior Learning, and innovative instructional designs
College is imbedding digital literacy into every program.
College is integrating hybrid course offerings throughout programs.
College is investigating best practice for administering WorkKeys testing (considering imbedding test into programs).
College is leveraging lessons learned from participating in the Missouri TAA Round 1 Consortium, MoHealthWINs, in terms of grant eligibility, documentation, recruitment, coordination with WIB and data collection.
College is promoting program across campus and satellite sites to faculty and staff.
College is pursuing articulation agreement with four-year institutions.
College plans to build on strong relationship/integration of service including recruitment, eligibility determination and information dissemination with Career Centers.
College plans to revise the Healthcare Portal for the manufacturing sector to offer services to MMW participants and to launch the portal in May 2012.
College plans to revise the Transitions program for the manufacturing sector and offer services to MMW participants.
College will use retention counseling/tutoring/supplemental instruction across all programs.
Employer engagement is a key component of program development, and College confidence in using industry partners to conduct training at industry sites is high.
Employer engagement is high, particularly in the Industrial Maintenance program where employers have agreed to paid internships.

STRENGTHS
Executive level engagement in grant priorities and strategies is strong.
Faculty has created matrix of certification programs, college credit, and applicable programs and developed a plan to offer 8 week blocks - running classes at all hours of the day.
Grant faculty and staff have been hired.
One program has begun. Programs are outlined and relevant stackable credentials are being identified and vetted with employer partners.
Programs are outlined and relevant stackable credentials are being identified and vetted with employer partners.

Appendix III-C Concerns Noted During Site Visits

Concerns Noted During Site Visits
College must add DOL disclaimer and NCRC+ to outreach materials.
College should add Retention Specialist position. Grant team is concern that one staff member will be responsible for program coordination and participant retention. The grant team urged College to hire an additional Retention Specialist to split time between Rounds 1 and 2.
College should amend MOU with WIB.
College should begin work on articulation of MMW programs to other grant-named, four-year partner institutions.
College should closely monitor the work load of Retention Specialist/Navigator positions. Although the College is wise to leverage Round 1 experiences by splitting the time of the Retention Specialist between Rounds 1 and 2, the College should monitor to ensure that the quality of the services offered to participants and completers is not diminished by increased workload.
College should create map of student intake and transfer from George to Advisor/Faculty.
College should outline staff development to ensure that new grant hires are quickly brought up to speed in regard to grant strategies and requirements.
College should develop UAW referral process.
College should expand Credit for Prior Learning in programs.
College should fill Retention Specialist position and begin training as soon as possible.
College should finalize its MMW abstract.
College should finalize negotiations on ToolingU contract.
College should finalize stackable credentials within each program of study and submit final program of student worksheets required for participant and outcome data collection. This step must be completed before programs begin.
College should gain WIA approval for programs as needed.
College should research (use MERIC) to determine if Machine tool technology is a need in Springfield, or more of a state-wide need.
Cost Worksheets need to be finalized for each program.
Cost Worksheets need to be finalized for each program. The current draft has a high participant cost.
DOL/DESE regulations regarding seat time vs. mastery of material. This concern is not specific to College but applies across the MMW Consortium.
Industry and Vocational Technical Center partnerships aimed at providing instructional sites, should be finalized as soon as possible. Although plans are being developed, lack of specific agreements could result in delayed program start-up.
Integrated curriculum makes it a challenge to find faculty. This concern is not specific to College but applies across the MMW Consortium.
Lab space is at capacity. College could revisit budget and consider building capacity.
Lack of financial support for supportive services from local Career Center. Although this is beyond control of the College, it has the potential to negatively impact participation.
Need to flowchart/map out case note systems.
Need to flowchart/map out case note systems. Currently they are using PeopleSoft and Numara to determine which system is better.
SCC is expanding its mission to better address the Career and Technical needs of its service area. Although this is a positive step in the College's development, it is being met with some organizational resistance. St. Charles

Concerns Noted During Site Visits
Community College was designed (and grew) primarily as a "traditional" two-year transfer oriented college. Movement to expand CTE offerings is a challenge to the organizational status quo. A College-wide staff development effort support CTE efforts and specific TAA efforts should be developed and implement during the 2014 academic year.
College should submit a signed MOU Data Sharing Addendum to Cosgrove & Associates.
The accelerated program design combined with State and Federal definitions of full-time vs. part-time instructors affects adjunct faculty's benefits. This concern is not specific to College but applies across the MMW Consortium.
The change in Executive level leadership has slowed College's progress in program design and implementation.
Tutoring plans are in place and tutors will be hired as needed. The College should closely monitor tutor staffing to ensure that existing staff are not overwhelmed and new tutors can be hired in a timely manner.

Appendix IV: MMW Interim Evaluation Report, August 30, 2014

Executive summary

MoManufacturingWINs (MMW) is designed to connect Veterans, TAA-eligible and dislocated, unemployed, underemployed and low-skilled adult populations to the growing number of high-skilled manufacturing jobs. The MoManufacturingWINs Consortium is establishing a set of training programs that, through multiple delivery formats and adult-friendly support systems, will accelerate training and provide stackable and portable credentials related to career pathways associated with the following high demand occupations: Production, Industrial Maintenance, Welding, Machining, and Transportation and Logistics. The MoManufacturingWINs grant is designed to meet the following key initiatives

1. Build Programs That Meet Industry Needs, Including Developing Career Pathways
2. Strengthen Online and Technology-Enabled Learning
3. Enhance Career Pathways Options for Learners and Workers
4. Accelerate and Improve Certification and Employment Attainment

To examine program and strategies development and implementation under TAACCCT Round 2, Cosgrove & Associates and Third Party Evaluator, Bragg & Associates, are conducting a comprehensive, multi-dimensional evaluation of the following grant phases: process; implementation; progress and performance measures; and use of data for continuous improvement. During phase 2 of this evaluation, Cosgrove & Associates and Bragg & Associates worked with the MoMAN Consortium to examine grant processes, program/strategy implementation, and progress related to key performance measures. The following summary results address key questions that the Consoritum leadership established to monitor progress toward implementation and participant outcome targets.

- Have colleges developed programs that are built upon industry-recognized stackable credentials?

Yes, all colleges are engaging with industry/employers to create and/or modify program structures that include industry-recognized stackable credentials leading to post-secondary certificates and degrees. TAACCCT grant funds are supporting the modification as well as the creation of brand new programs of study related to manufacturing. All of the grantees spoke of involving employers in programs of study that are built upon industry-recognized stackable credentials. It is noteworthy that some of the employers who are involved in the MoMAN grant are unfamiliar with industry-recognized credentials that pertain to the occupations in their companies, and MoMAN grant personnel are introducing and educating them on these credentials. MoMAN personnel work closely with employers to customize industry-recognized credentials so they have credibiility on the local level.

- Have colleges modified instructional formats to strengthen on-line/hybrid formats and contextualization of key skill/competencies?

Colleges (except for East Central) have developed new instructional formats which employ on-line/hybrid instruction and students have responded well to such formats. The extent to which contextualization of key skills/competencies has taken place is behind schedule due to confusion and/or disagreement related to the best strategies for contextualizing of the curriculum.

- Have colleges implemented programs of study and support strategies in a timely manner?

As of the end of the 2013-2014 all nine partner colleges have implemented all MoMAN programs of study and related instructional and student support strategies. Employer engagement and student

recruitment were mentioned as important strategies by many of the interviewees. In addition, the majority of respondents mentioned the career navigator/coach strategy and indicated the importance of this strategy extends to assisting to place program graduates in employment.

- Are colleges using appropriate data collection processes to record participant enrollment and track performance outcomes?

All partner colleges are collecting participant and outcome data at the unit-level and sharing such data with the grant leadership, and grant research and evaluation personnel. Data are collected and shared in a secure data ennvironment. In addition, statewide data sharing agreements and practices exists which allow the grant research and evaluation team to track employment and wage data at the unit record level. Respondents demonstrated knowledge of and support for the data collection processes. They commended the evaluators for making the evaluation process tranparent and smooth.

- Are colleges enrolling participants in accordance with expected implementation and pathways to performance targets.

Grant leadership monitors participant enrollment on a quarterly basis and has established college-level pathway to performance participant and completers targets. All partner colleges are enrolling participants in accordance with participant targets. The current participant total of 1,605 is nearly 50% of the final target.

Some interviewees indicated student recruitment was becoming more challenging as the economy recovered, including mentioning that vouchers are going unused. Besides difficulties recruiting dislocated workers, some interviewees mentioned challenges recruiting veterans. Numerous meetings had occurred with groups representing veterans but the programs had not been successful increasing veterans. Despite these struggles, all of the grantees expressed confidence that the overall consortium performance targets would be met.

- Are participants completing programs of study in accordance with expected implementation and pathways to performance targets?

Participants are progressing through stackable credentials (889 participants have completed at least one stackable credential) established within programs of study and completing programs of study in accordance with expected targets. Term to term retention of non-completers remains high (approximately 80%) and is higher than traditional program term to term retention. The current total of 590 completers is 26% of the final target.

- Are program completers securing employment?

The Consortium tracks both the overall employment rate for completers and the non-incumbent worker employment rate for completers. The current employment rate for all program completers (includes under-employed) is nearly 75 percent. The employment rate for non-incumbent workers is 42%; however, the majority of such completers have had less than one month to secure employment at the time of this report.

- Are colleges creating and managing participant case note files?

Yes, all nine partner colleges are creating and managing extensive participant case files. All colleges are leverging lessons learned from Missouri's Round 1 TAA grant to develop case files.

- Are colleges spending grant funds in accordance with the expected implementation timeframe?

Several colleges are behind in their spending patterns. Such delays are primarily the result of the lack of timely equipment purchases and difficulty in finding qualified instructors for key areas. The Consortium montiors expenditures on a monthly basis and quarterly reports are issued in accordance with the pathway to performance reports. Colleges who continue to lag in their spending patterns are at risks of being placed on non-performance status and having funds re-allocated to other partners.

- Are colleges developing meaningful partnerships with employers?

All partner colleges used and are using employer engagement to develop and modify curriculum, program structure, and program completer competencies. Several respondents mentioned a paradigm shift in engaging employers in ways that move beyond advisory committees under federal CTE Perkins legislation. For example, the lead college in the consortium is creating a new position that focuses on employer engagement, and this position is described as one that will create "continuous" rather than "episodic" relationships. Other colleges mentioned implementing systemic changes that would result in deeper and more sutained relationships with employers.

Thus far, employer engagement related to internships and learn and earn opportunities is lacking as only two colleges have reported their participants have acquired internships. Some college leaders mentioned the importance of internships and other forms of work-based learning, but said they had difficulty getting employers to implement them. The Consortium has established this as a target area for improvement. In addition, the Consortium has established a statewide Employer Engagement Taskforce to increase employer engagement related to the hiring of program completers.

- Are colleges developing meaningful partnerships with local WIBs?

All nine college partners continue to reach out to their local WIBs to create meaningful partnerships. Numerous colleges report positive college/WIB partnerships, while other colleges are struggling to overcome political issues and nunances which curtail partnership development. At this stage only 15 percent of the MoMAN participants have been referred to a college through a Career Center. In fact, due to changes in state rules, some colleges reported decreased referrals from Career Centers for MoMAN compared to efforts with the Round One MoHealthWINs grant, which has relied heavily on Career Center referrals.

Interim evaluation methods

During Year Two of the TAA grant, Cosgrove & Associates conducted site visits with faculty and staff at each of the Consortium campuses. A 5-point rubric (5= Excellent Progress to 1 = Poor Performance--- See Appendix A of this report) was employed to evaluate each campus in the following domains: Program Implementation, Participant Enrollment, Program Completion, Employer Engagement, WIB Engagement, Data Collection, and Overall Organization Support for Grant Innovations. In addition, Cosgrove and Associates asked colleges to identify best practices and key innovations. All campuses received overall scores in the 3 to 5 range. As one might expect, those colleges that had already implemented all their programs of study tended to receive higher scores, including implementation scores of 5 for some areas.

- *Score 5 = Excellent Progress: COLLEGE IS MAKING SIGNFICANT PROGRESS AND FULL IMPLEMENTATION HAS OCCURRED. COLLEGE PROCESSES SUPPORT GRANT INNOVATIONS AND SCALING OF SUCCESSFUL INNOVATIONS IS TAKING PLACE OR BEING DISCUSSED.*
- *Score 4 = Good Progress: COLLEGE IS MAKING SIGNFICANT PROGRESS AND SUCCESSFUL IMPLEMENTATION HAS OCCURRED OR IS SCHEDULED FOR FALL 2014.*
- *Score 3 = Making Progress: COLLEGE IS MAKING PROGRESS, BUT FULL IMPLEMENTATION HAS NOT YET OCCURRED. ALTHOUGH FULL IMPLEMENTATION IS SCHEDULED FOR FALL 2014, MORE WORK IS NEEDED TO MEET THE FALL 2014 IMPLEMENTATION DEADLINE.*

Strengths/Promising Practices and Areas of Concern identified during the site visits are presented in Appendix B and C of this report.

To further support program and strategy implementation, Cosgrove & Associates met with each college to review the college's compliance with their stated workplan. Data were collected through college self-reports, direct observation and campus interviews. This process when combined with the grant-required quarterly reporting process helps the colleges link specific strategies to programs of study and monitor strategy implmentation on a continuous basis.

In addition to the on-going evaluation work conducted by Cosgrove & Associates, Bragg & Associates conducted personal and phone interviews with the MMW Consortium leadership, and just prior to the submission of this Interim report, Bragg & Associates conducted telephone interviews with all nine MMW colleges to ascertain colleges' actions to remedy noted concerns. In addition, Bragg & Associates studied emerging documentation pertaining to the grant, including Consortium plans, scope of work, performance reports, and targeted outcomes; and the team reviewed previous evaluation reports prepared by Cosgrove & Associates and the Consortium leadership.

The following section presents the integration of evaluation findings from Cosgrove & Associates and Bragg & Associates.

Implementation and performance measure progress evaluation

Performance Measures. The MoMAN Consortium has implemented 17 new and/or programs (includes a number of versions of welding) across all nine partner colleges. At most colleges, these programs are based upon employer input and employer partnerships are in place. As of the end of Quarter 3, Year 2, participant enrollment stands at 1,605. Eighty-one percent of the participants are male. Sixty-one percent are white and 37% are minority (2% did not provide data). Thirty-eight percent were unemployed when they started their program, while an additional 36% reported being under-employed at the start of their program. Thirty-eight percent are attending college for the first time, and 82% are less than college-ready in at least one academica area (math, reading, or English). Three percent are TAA eligible and 14% are Veterans. The average age is 37 and 41% are over the age of 35.

Participant Results. Current progress measures for these participants are positive, with the credit hour completion to credit hour attempted ratio in excess of 80%. Of the 1,605 unique participants, 590 have completed a program of study, and 889 have completed at least one industry-recognized stackable credential. Seventy-three percent of the program completers are employed at the time they completed their program of study. It should be noted that this percentage includes both incumbent and non-incumbent workers. The current employment rate for program completers who were NOT employed when they started the program is 42%. Although this rate appears low, one must consider that a

significant number of program completers recently completed their program (June 2014) and the current employment follow-up data are as of July 31, 2014. Thus, many of the completers have not had sufficient time to secure employment.

Intrusive Student Supports. Colleges continue to provide significant intrusive support services related to retention, tutoring, academic and personal counseling, and career pathway development. Colleges are using lessons learned from the TAA Round One MoHealthWINs grant to support and further develop such services for MoMAN participants. In addition, some colleges are initiating campus-wide scaling efforts to provide intrusive support services to all career and technical education (CTE) students. Spill-over benefits are evident in intrusive student supports wherein career navigators associated with Round 1 MoHealthWINs are able to extend what they have learned about enhanced employment services to MoMAN students much earlier in the Round Two grant period.

Accelerated Developmental/Remedial Education. Colleges have recognized that a high percentage of the target population require accelerated developmental/remedial education to begin manufacturing technology programs. Again, colleges are benefiting from knowledge gained during Missouri's Round 1 TAA MoHealthWINs grant to further such efforts. Programs and instructional strategies related to Transition to College, Manufacturing Skills Enhancement, Manufacturing Portal and Adult Learning Academy, and Employer Workforce Preparedness Portals look to be especially promising in helping students acquire the academic skills required for student success.

Credit for Prior Learning. The MoMAN Consortium is also leverging lessons learned and new processes from Missouri's TAA Round 1 MoHealthWINs grant to support and encourage Credit for Prior Learning (CPL). Although all colleges have agreed to a new statewide policy to award CPL, only five percent (80 students) among the current MoMAN participants have been awarded CPL. The Consortium expects the number of students benefiting from CPL to increase as students progress through longer programs of study (One Year Certificate and Two Year AAS programs). However, obstacles are sometimes encountered at the individual department level where the awarding of credit is governed by faculty who may or may not support CPL. The MoMAN Consortium and its member colleges continue to work around obstacles using non-credit to credit bridge programs. The Consortium is targeting more students to benefit from CPL in the 2014-2015 academic year, and this grant strategy will be monitored closely during this time period.

WIB Partnerships. A number of colleges reported positive partnerships with their local WIBs, particularly when the college is a co-location site for WIB services, and several colleges reported improvements in college/WIB partnership. However, some partnerships appear to be based more on individual personalities and the dedicated efforts of key personnel than on systemic policies and structures. We believe that the colleges have made a good start, but there is a need to create better college/WIB partnerships based upon organizational relationships and structures throughout the State. To aid in this effort, the Consortium has noted a number of promising practices concerning college and WIB relationships/structures related to recruitment, staff co-location, and employment follow-up. Such practices are being shared with colleges who are experiencing difficulties in developing WIB partnerships.

Employer Engagement. Colleges have reported enhanced college/employer partnerships that are being used to increase employer engagement. Site visits and interviews with college faculty/staff provide evidence that employer engagement and feedback have been used to modify curriculum and program content/structure. Several colleges have developed specific programs and partnerships for large employers in their service area. It should be noted that employer engagement and specific college/employer programs have provided a significant boost to MMW participant enrollment.

Specifically, MMW participant enrollment grew from 58 in August 2013 to more than 1,600 in August, 2014.

Internships. Although the colleges are working with employers to provide internships, employers have been somewhat reluctant to offer internships outside of a number of key areas. The Consortium has initiated a statewide Employer Engagement Taskforce to develop additional internship opportunities for grant participants. The Consortium has designated an increase in internships as a target area for the 2014-2015 academic year, and the number of internships will be monitored closely by the third party evaluator during this time period.

Action recommendations

This evaluation report reveals that the MMW Consortium has made significant progress in Year 2. Programs are nearing full implementation and are serving key target populations. To continue to build upon its strong foundation, the Consortium should address the following items:

- Each campus should conduct campus-wide Faculty/Staff MMW training sessions designed to increase program awareness and share successful innovations associated with employer engagement, CPL, competency-based instructional formats, intrusive student support services, and modified developmental education formats.
- Finalize grant program and strategy implementation across all campuses.
- When appropriate, campuses should adhere to common Consortium-wide program structures.
- Examine potential barriers to enrollment and program retention.
- Continue to explore non-credit to credit bridge programs to provide a seamless transition for students wishing to move through industry-recognized stackable credentials.
- Build upon successful innovations associated with modified developmental education and examine scaling opportunities on statewide basis.
- Examine current organizational practices/processes that curtail grant innovations. Specific attention should be directed to helping colleges adapt/modify traditional term-based models to accept and accommodate off-schedule, non-term based instructional formats.
- Align grant participant and outcome data collection with standard college data collection efforts and student information systems.
- Initiate data collection related to completer and non-returner follow-up. In addition, analyze such data for required reporting and continuous improvement processes.
- Initiate MMW Curriculum Review process and engage both grant and non-grant faculty and staff in this process. Specific attention should be made to fully engage college Chief Academic Officers in the curriculum review process.
- More fully develop college/WIB partnerships with an eye toward creating specific organizational relationships between the college and its local WIB.
- Expand college/employer engagement to increase internship opportunities for MMW students and increasing employer hiring of MMW program completers.
- Review information collected through the Spring 2014 site visits, WorkPlan reviews and the Quarterly Reporting process so as to clearly define the relationship between grant strategies and grant programs.

Appendix IV-A Process and Implementation Assessment Scale

5	**EXCELLENT PROGRESS:** COLLEGE IS MAKING EXCELLENT PROGRESS AND FULL IMPLEMENTATION HAS OCCURRED. COLLEGE PROCESSES SUPPORT GRANT PROGRAMS & INNOVATONS AND SCALING OF SUCCESSFUL INNOVATIONS IS TAKING PLACE OR BEING PLANNED.
4	**GOOD PROGRESS:** COLLEGE IS MAKING SIGINFICANT PROGRESS AND SUCCESSFUL IMPLEMENTATION HAS OCCURRED OR IS SCHEDULED FOR FALL 2014.
3	**MAKING PROGRESS:** COLLEGE IS MAKING PROGRESS, BUT FULL IMPLEMENTATION HAS NOT YET OCCURRED. COLLEGE IS AWARE OF STEPS REQUIRED FOR SUCCESSFUL IMPLEMENTATION AND IS SCHEDULED FOR FALL 2014, BUT MORE WORK IS NEEDED TO MEET THE FALL 2014 IMPLEMENTATION DEADLINE.
2	**LACKING PROGRESS:** COLLEGE IS AWARE OF STEPS REQUIRED FOR SUCCESSFUL IMPLEMENTATION, BUT CURRENTLY ACTION IS LACKING. IMMEDIATE ACTION NEEDS TO BE TAKEN TO MORE FULLY SUPPORT GRANT PROGRAMS AND STRATEGIES.
1	**PERFORMANCE IS POOR:** PROGRESS IS COMPLETELY LACKING. COLLEGE MUST TAKE IMMEDIATE ACTION TO INCREASE AWARENESS OF STEPS REQUIRED TO IMPLEMENT AND SUPPORT GRANT PROGRAMS AND STRATEGIES.

Appendix IV-B Strengths/Promising Practices Noted During Site Visits

Strengths/Promising Practices Noted During Site Visits
Several colleges are exploring the scaling the MMW retention and student support services model across the campus.
The Grant is providing the opportunity for colleges to look at the non-credit to credit bundling of certifications.
The Grant has allowed colleges to develop new model for employer partnerships.
STLCC is working to scale successful developmental education innovations into all STEM programs.
Several colleges are working to build bridges from MMW non-credit programs to standard credit manufacturing technology programs
Colleges have successfully employed on-line/hybrid instructional formats and such formats are well received by students.
Integration of industry certifications has been very helpful in improving employer relationships. This Grant required the colleges to engage with employers as the certifications must be industry recognized.
Colleges are targeting key populations of chronically, un-employed, low-skilled students. Colleges have recognized the variety of difficulties in serving such groups and are using intrusive support services to support student economic, social and education needs.
Employer engagement is being used to bring employers to the campus for career fairs and mock interviews.
Colleges have modified existing credit program structures to allow for the inclusion of industry-recognized stackable credentials.
Colleges are working with faculty to integrate new instructional technologies into mainstream practices (i.e., Tooling U.).
A number of colleges have developed specific employer partnership to assist and support employers in the training of new employees.
One college is working with community groups to document the success of developmental education innovations and help the community understand the social and economic impact of such changes.
Program modularization and acceleration are being recognized by students and employers as positive strategies in meeting both student and employer needs.
One college successfully engaged employers by having them profile occupations.
Several colleges have used the state's Toolbox system and WIB partnership for recruitment.
Several colleges are attempting to connect grant to their existing processes and procedures.
Colleges are experimenting with new program structures to allow for Pell eligibility.
MMW has created new career and technical education opportunities which are based more on employer needs than existing college program and term structures.
MMW has allowed SCC to provide programs that employers have been requesting for the seven years that Employment Specialist has been working with area employers.
Hiring faculty with industry connections combined with an understanding of the grant goals allowed colleges to start MMW POS on time. Employers view faculty as colleagues rather than as academics.

Appendix IV-C Concerns Noted During Site Visits

Concerns Noted During Site Visits
Lack of spending at some colleges not consistent with grant and program implementation timeline
Difficult in securing faculty with required credentials to teach in selected programs. Problem seems especially acute in regard to AWS certified welding programs.
Some colleges seem to look at the grant in terms of what it is doing to the organization and not focusing on what the innovations mean to the students.
Student records are kept in the grant office until completion and not maintained in existing standard college data systems. There is a concern that students may not have an "official" record of completion/attendance once the grant is over.
Although Statewide procedures for Credit for Prior Learning have been developed, some colleges are reluctant to embrace the new processes and move away from their individual campus' existing processes.
Due to the complicated politics of college/WIB relationship, the college has turned over the placement of completers to the WIB. Rather than building partnerships this has the potential to create a divide. The college has secured a consultant to work on improving WIB relationship and streamlining it.
Aside from a few areas, employers seem reluctant to offer internships and "learn and earn" opportunities in a meaningful way.
In some areas the lack of systematic, organizational partnerships between colleges and local WIB has created organizational silos which negatively impact participant recruitment and successful job placement for program completers.
At some colleges there is a lack of faculty buy-in to innovations.
Confusion over contextualization vs. tutoring at several colleges.
Leadership regarding data collection and staff turnover have created data input and tracking concerns at some colleges.
Questions, internal political issues and lack of consistency related to awarding credit for prior learning exist at several colleges.

Appendix