Detailed Evaluation Plan for Ohio TechNet TAACCCT Grant

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II. Introduction

The Ohio Technical Skills Innovation Network (TechNet) consortium includes eleven colleges in Ohio that have joined forces to address workforce challenges in advanced manufacturing. The consortium is led by Lorain County Community College in Lorain, OH. The other consortium colleges are: Cincinnati State Technical and Community College, Columbus State Community College, Cuyahoga Community College, Eastern Gateway Community College, Lakeland Community College, Owens Community College, Rhodes State College, Sinclair Community College, Stark State College, and Zane State College.

The consortium has adopted three strategies:

1) Create mechanisms for statewide collaboration among consortium partners and economic and workforce development allies that help advance Ohio's innovation economy.

2) Transform instructional design and delivery systems for customization to student needs and rapid response to labor market demand.

3) Expand best practices that redesign student intake, placement, and success.

Programs and pathways are in the areas of Welding, CNC/Machining, Industrial Maintenance, Digital Fabrication/Industrial Automation; and Occupational Safety. In addition to programmatic enhancements and promotion of deeper collaboration among partners, a focus on veterans and entrepreneurship training is incorporated. Implementation and impact evaluation approaches are envisioned to assess the effectiveness of the TechNet consortium in achieving its goals.

III. Intervention

The consortium work plan is divided into three primary strategies:

Strategy 1: Create mechanisms for statewide collaboration among consortium partners and economic and workforce development allies that help advance Ohio's innovation economy

This strategy responds to a lack of alignment between the TechNet community colleges, public workforce and economic development, existing state initiatives and projects, and employers and industry partners. The strategy intends to improve collaboration among these entities. The theory is that enhanced collaboration will enable colleges to marshal resources to make programmatic improvements. Additionally, there is a theory that this consortium may be able to affect policy change in the state by speaking with a unified voice, although specific messages or agendas are not determined at this time. The strategy envisions establishing structures that bring together grant partners, leverage existing projects and initiatives in the state, and establishes processes for using this consortium as a platform for promoting policy and systems improvements statewide. Figure 1 depicts the logic model.

Strategy 2: Transform instructional design and delivery systems for customization to individual student needs and rapid response to labor market demand.

This strategy responds to a need to update, enhance, and scale programs that meet industry needs while concurrently providing accelerated, accredited skills training/education for transitioning adults. Enhancements include new or improved curricula, facilities, and equipment; new uses of technology and innovative instructional models, and upfront & continuing engagement with employers. A focus on veterans and entrepreneurs is incorporated in this strategy. The grant participant outcomes (DOL Outcomes 1 through 9) are driven by this strategy. The theory is that programmatic improvement will lead to improved participant connections to jobs and career advancement in manufacturing due to better alignment between instruction and skills demanded by

businesses as well as accelerated readiness for employment or paid work-based learning. Due to the fact that colleges exist in different contexts with varying needs and constraints, the proposal TechNet submitted to the Department of Labor is diffuse in describing this strategy. A variety of programmatic activities are described, but specific models are not prescribed to particular partners. Nor is it expected that partners will participate evenly in the list of activities. Thus, the evaluation approach will rely heavily on the implementation evaluation to capture and determine the specifics of on-the-ground implementation, so they can be attributed in the impact evaluation. Figure 2 depicts the logic model.

Strategy 3: Expand best practices that redesign student intake, success, and placement.

This strategy responds to a need to enhance practices that support student retention and completion in targeted programs. Key features include the incorporation of approaches for intrusive advising, intensive student support services, job readiness training, and the incorporation of prior learning credit. It also incorporates an approach for aligning and articulating non-credit credentials delivered by Ohio's non-credit Technical Center system – a separate and sometimes parallel adult vocational training system. The theory is that these activities will promote increases in student retention and completion in targeted programs, and job attainment. Similar to Strategy 2, the proposal that TechNet submitted to the Department of Labor is diffuse in describing this strategy. Strategy 1, which aims to add cohesion to the initiative, will interact with this strategy, as well as Strategy 2. And similarly, the evaluation approach will rely heavily on the implementation evaluation to capture and determine the specifics of on-the-ground implementation, so they can be attributed in the impact evaluation. These strategies are intended to positively impact student retention and completion rates. As such, outcomes related to these measures are incorporated into this strategy. Figure 3 depicts the logic model.

Figure 1: Strategy 1 Logic Model - Create mechanisms for statewide collaboration among consortium partners and economic and workforce development allies that help advance Ohio's innovation economy

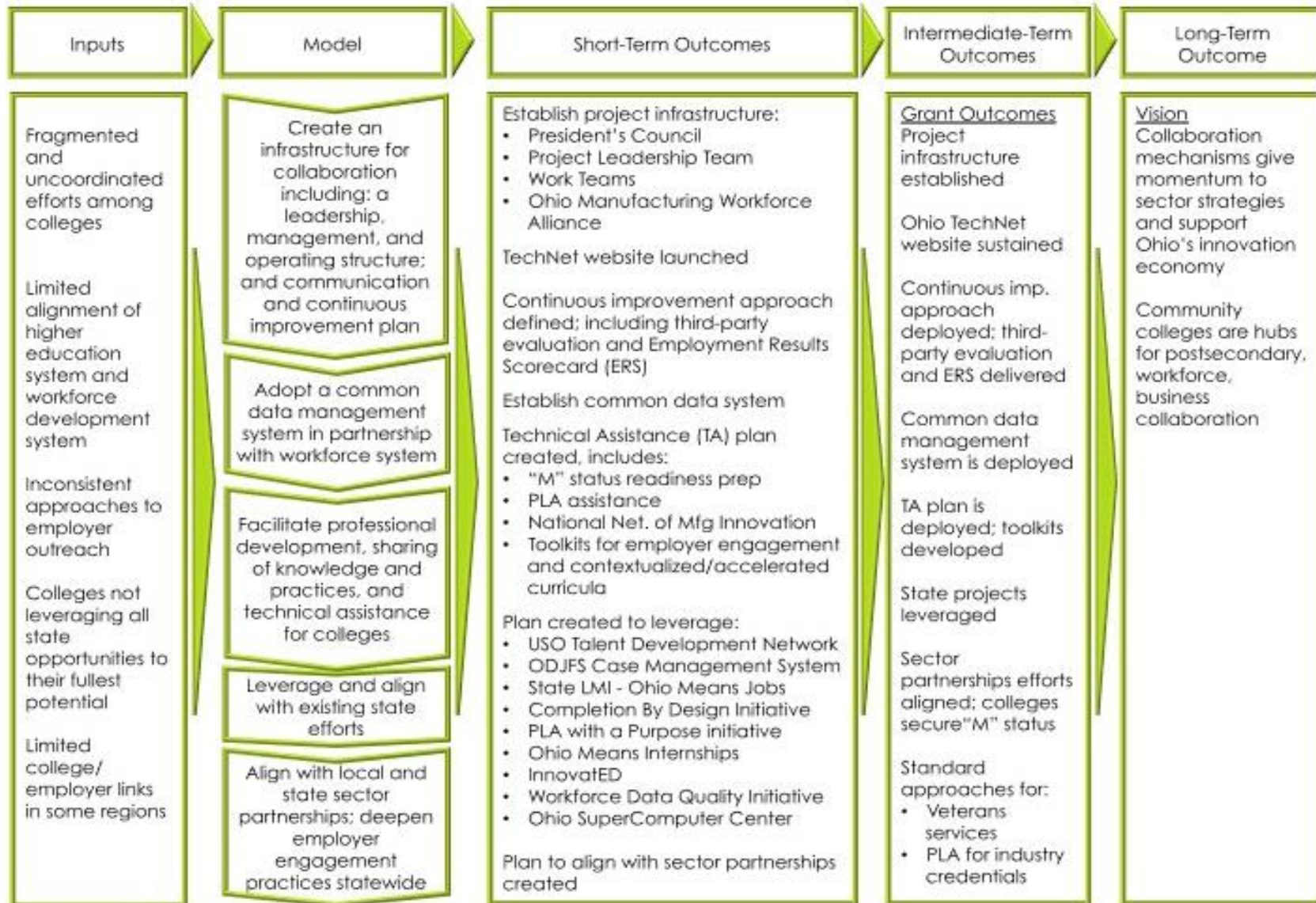| Inputs	Model	Short-Term Outcomes	Intermediate-Term Outcomes	Long-Term Outcome
Fragmented and uncoordinated efforts among colleges Limited alignment of higher education system and workforce development system Inconsistent approaches to employer outreach Colleges not leveraging all state opportunities to their fullest potential Limited college/ employer links in some regions	Create an infrastructure for collaboration including: a leadership, management, and operating structure; and communication and continuous improvement plan Adopt a common data management system in partnership with workforce system Facilitate professional development, sharing of knowledge and practices, and technical assistance for colleges Leverage and align with existing state efforts Align with local and state sector partnerships; deepen employer engagement practices statewide	Establish project infrastructure: • President's Council • Project Leadership Team • Work Teams • Ohio Manufacturing Workforce Alliance TechNet website launched Continuous improvement approach defined; including third-party evaluation and Employment Results Scorecard (ERS) Establish common data system Technical Assistance (TA) plan created, includes: • "M" status readiness prep • PLA assistance • National Net. of Mfg Innovation • Toolkits for employer engagement and contextualized/accelerated curricula Plan created to leverage: • USO Talent Development Network • ODJFS Case Management System • State LMI - Ohio Means Jobs • Completion By Design Initiative • PLA with a Purpose initiative • Ohio Means Internships • InnovatED • Workforce Data Quality Initiative • Ohio SuperComputer Center Plan to align with sector partnerships created	Grant Outcomes Project infrastructure established Ohio TechNet website sustained Continuous imp. approach deployed; third-party evaluation and ERS delivered Common data management system is deployed TA plan is deployed; toolkits developed State projects leveraged Sector partnerships efforts aligned; colleges secure "M" status Standard approaches for: • Veterans services • PLA for industry credentials	Vision Collaboration mechanisms give momentum to sector strategies and support Ohio's innovation economy Community colleges are hubs for postsecondary, workforce, business collaboration

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Figure 2: Strategy 2 Logic Model - Transform instructional design and delivery systems for customization to individual student needs and rapid response to labor market demand
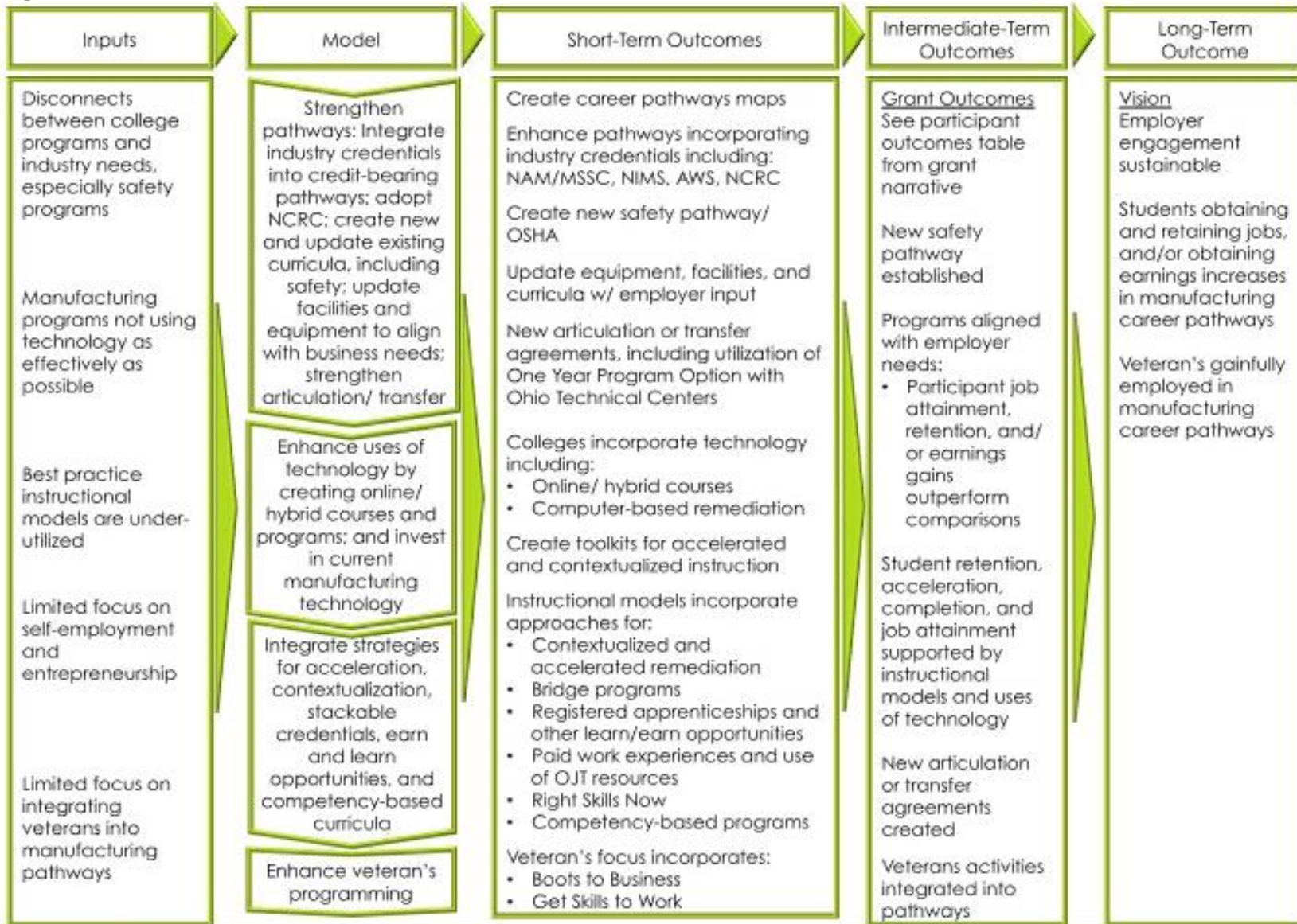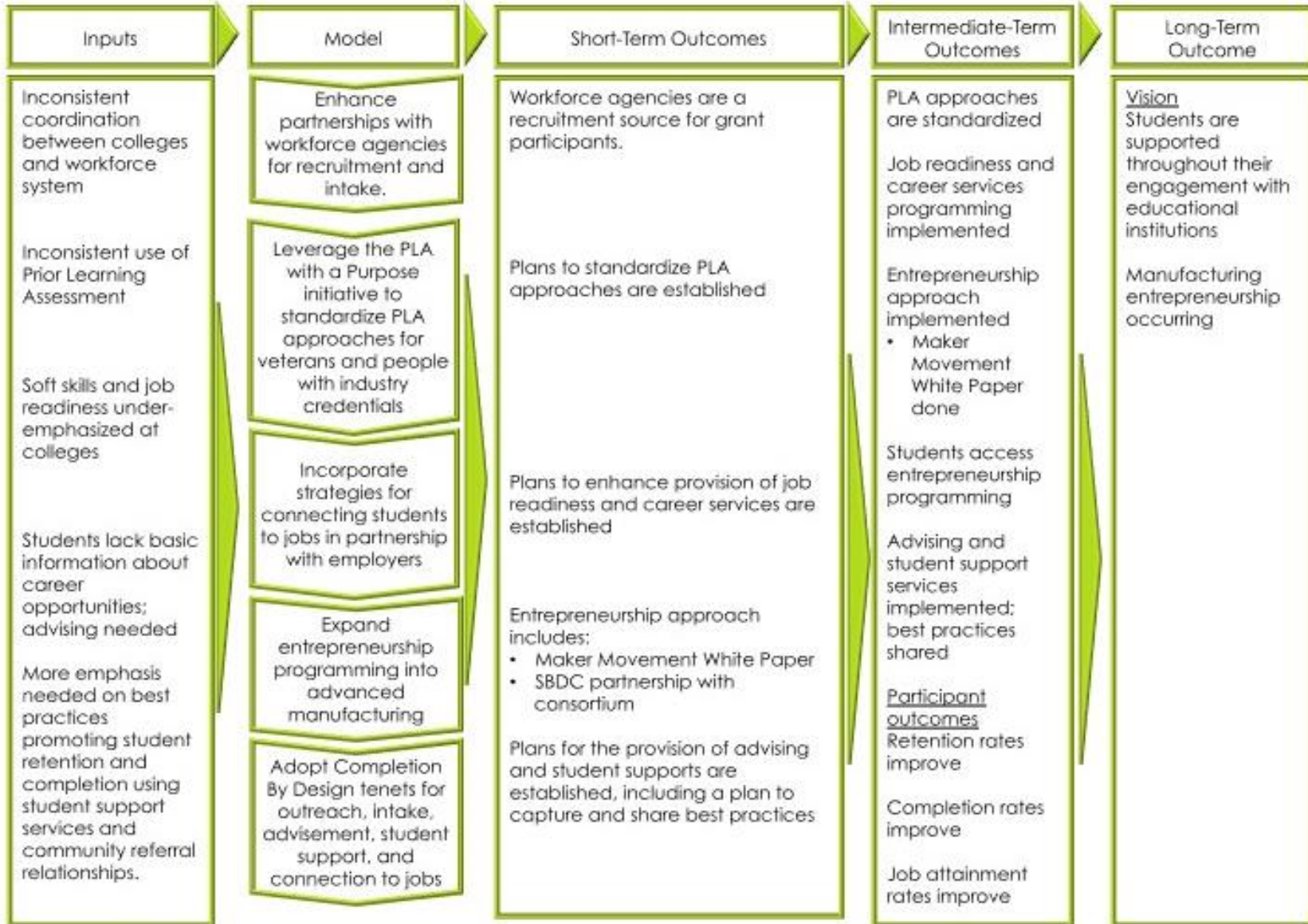
Inputs	Model	Short-Term Outcomes	Intermediate-Term Outcomes	Long-Term Outcome
Disconnects between college programs and industry needs, especially safety programs

Manufacturing programs not using technology as effectively as possible

Best practice instructional models are under-utilized

Limited focus on self-employment and entrepreneurship

Limited focus on integrating veterans into manufacturing pathways | Strengthen pathways: Integrate industry credentials into credit-bearing pathways; adopt NCRC; create new and update existing curricula, including safety; update facilities and equipment to align with business needs; strengthen articulation/ transfer

Enhance uses of technology by creating online/ hybrid courses and programs; and invest in current manufacturing technology

Integrate strategies for acceleration, contextualization, stackable credentials, earn and learn opportunities, and competency-based curricula

Enhance veteran's programming | Create career pathways maps

Enhance pathways incorporating industry credentials including: NAM/MSSC, NIMS, AWS, NCRC

Create new safety pathway/ OSHA

Update equipment, facilities, and curricula w/ employer input

New articulation or transfer agreements, including utilization of One Year Program Option with Ohio Technical Centers

Colleges incorporate technology including:
• Online/ hybrid courses
• Computer-based remediation

Create toolkits for accelerated and contextualized instruction

Instructional models incorporate approaches for:
• Contextualized and accelerated remediation
• Bridge programs
• Registered apprenticeships and other learn/earn opportunities
• Paid work experiences and use of OJT resources
• Right Skills Now
• Competency-based programs

Veteran's focus incorporates:
• Boots to Business
• Get Skills to Work | Grant Outcomes
See participant outcomes table from grant narrative

New safety pathway established

Programs aligned with employer needs:
• Participant job attainment, retention, and/ or earnings gains outperform comparisons

Student retention, acceleration, completion, and job attainment supported by instructional models and uses of technology

New articulation or transfer agreements created

Veterans activities integrated into pathways | Vision
Employer engagement sustainable

Students obtaining and retaining jobs, and/or obtaining earnings increases in manufacturing career pathways

Veteran's gainfully employed in manufacturing career pathways |

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Figure 3: Strategy 3 Logic Model - Expand best practices that redesign student intake, placement, and success.

Inputs	Model	Short-Term Outcomes	Intermediate-Term Outcomes	Long-Term Outcome
Inconsistent coordination between colleges and workforce system	Enhance partnerships with workforce agencies for recruitment and intake.	Workforce agencies are a recruitment source for grant participants.	PLA approaches are standardized Job readiness and career services programming implemented	Vision Students are supported throughout their engagement with educational institutions
Inconsistent use of Prior Learning Assessment	Leverage the PLA with a Purpose initiative to standardize PLA approaches for veterans and people with industry credentials	Plans to standardize PLA approaches are established	Entrepreneurship approach implemented • Maker Movement White Paper done	Manufacturing entrepreneurship occurring
Soft skills and job readiness under-emphasized at colleges			Students access entrepreneurship programming	
Students lack basic information about career opportunities; advising needed	Incorporate strategies for connecting students to jobs in partnership with employers	Plans to enhance provision of job readiness and career services are established	Advising and student support services implemented; best practices shared	
More emphasis needed on best practices promoting student retention and completion using student support services and community referral relationships.	Expand entrepreneurship programming into advanced manufacturing	Entrepreneurship approach includes: • Maker Movement White Paper • SBDC partnership with consortium	Participant outcomes Retention rates improve	
	Adopt Completion By Design tenets for outreach, intake, advisement, student support, and connection to jobs	Plans for the provision of advising and student supports are established, including a plan to capture and share best practices	Completion rates improve Job attainment rates improve	

Enrollment in targeted pathways will define grant participation. Enrollment is determined based on declaration of a targeted program of study or enrollment in a core course as defined by USDOL. Within the TechNet consortium, there are certificate and degree pathways in five key areas that will enroll 1,801 unique participants:

College	Welding	CNC/ Machining	Industrial Maintenance	Digital Fabrication/ Industrial Automation	Occupational Safety
Cincinnati State Technical and Community College	X				
Columbus State Community College	X	X	X		
Cuyahoga Community College	X				
Eastern Gateway Community College	X				
Lakeland Community College	X				
Lorain County Community College	X		X		X
Owens Community College	X			X	
Rhodes State College				X	
Sinclair Community College		X	X	X	
Stark State College	X	X			
Zane State College			X		

We engaged in the following evaluation design process in partnership with TechNet colleges:

Task	Description
Evaluators Procured	Mid-January 2015
Evaluation Orientation	Delivered an evaluation orientation to the consortium in March 2015;
Create Logic Model and Define Participants	Developed an initial version of the project's logic model; refinements and additional details may be incorporated in the future; a standard
Derive Evaluation Questions and Key Measures	Evaluation questions emerged from the logic model process; built around key outcomes and progress indicators.

Draft Evaluation Plan	• Methodological approaches, timelines and data collection strategies were selected, including comparison design • The data plan drafted and in the process of finalization based on available data sources. A few residual issues are being investigated regarding time lags, and formats; primary data collection plans are being finalized currently to augment administrative data. • Implementation evaluation plan are drafted including key topics for inquiry. Timing of inquiries is based on anticipated implementation progress.
Performance Management and Continuous Improvement Plan	• Performance management approaches are still being defined; key progress and performance indicators are part of the discussion • Employment Results Scorecard approach is being defined, planning is still ongoing.

IV. Implementation Analysis Design

The implementation evaluation has two goals: (1) to assess fidelity to the intent, and (2) to identify factors affecting outcomes. Addressing the first goal will involve investigating how colleges are implementing grant activities and the extent to which activities align with the logic models. Inquiries will capture each individual college's activities and assess their fit to the intent of the project. Colleges will be assessed using survey and interview techniques. Variations from the logic model are captured; reasons and rationales for variations are determined through structured inquiries.

The second goal of capturing factors that affect outcomes will be assessed through structured inquiries seeking to identify and capture enabling or hindering factors affecting participant and consortium-level outcomes. Interventions may not work exactly the same way as intended given contextual factors. To accommodate and explore the project's evolution, the structured inquiries will proceed in three stages of the grant's implementation: (1) planning stage, (2) early implementation, and (3) later stage implementation. Semi-annual feedback will be provided on findings from structured inquiries.

IV.A. Implementation Analysis Research Question

Broadly, the implementation evaluation will capture the following:

- What is being implemented, and how is it theorized to drive impacts?

- Has implementation occurred on time and as intended?

- Is there fidelity to the intent? When variation exists, is it effective and consistent with project outcomes?

Specific questions pertaining to each grant strategy are posed, as follows:

- Strategy 1:

  o How has the consortium accomplished its intended outcomes? What factors have enabled or hindered the consortium's ability to accomplish its outcomes?

  o What are the indicators that the TechNet consortium is operating effectively? What factors are relevant in the effective operations of the consortium?

  o How is the consortium able to leverage external resources and programs to promote its goals?

  o How is the consortium able to encourage adoption of best practices among its members to promote its goals?

  o Were colleges able to establish/ align with sector partnerships enabling employers to convey their workforce needs and colleges to implement programs to meet those needs?

  o What is the value added to colleges due to the activities of the consortium?

  o Is the consortium sustainable beyond the grant period? What factors affect this?

- Strategy 2:

  o Have colleges in the consortium accomplished the intended grant outcomes? What factors have enabled or hindered each college's ability to accomplish its outcomes?

- What factors enabled or hindered the following: participant job attainment, job retention, and earnings?

- Are there models or practices that have been effective in promoting successful participant outcomes?

- Have successful models or practices been replicated by TechNet colleges, partners, or other colleges in Ohio?

Questions posed in the original proposed evaluation plan will be incorporated:

- How curricula were selected, used, or created?

- How programs and program design were improved or expanded using grant funds? What delivery methods were offered? What was the program administrative structure?

- What contributions did each of the partners (employers, workforce system, other training providers and educators, philanthropic organizations, and others) make in terms of: 1) program design, 2) curriculum development, 3) recruitment, 4) training, 5) placement, 6) program management, 7) leveraging of resources, and 8) commitment to program sustainability. What factors contributed to partners' involvement or lack of involvement in the program? Which contributions from partners were most critical to the success of the grant program? Which contributions from partners had less of an impact?

- Strategy 3:

- Have colleges in the consortium accomplished the intended grant outcomes? What factors have enabled or hindered each college's ability to accomplish its outcomes?

- What factors enabled or hindered the following: student retention and completion in targeted programs?

- Are there models or practices that have been effective in promoting successful participant outcomes?

- Have successful models or practices been replicated by TechNet colleges, partners, or other entities such as workforce agencies or Technical Centers in Ohio?

Questions posed in the original proposed evaluation plan will be incorporated:

- What support services and other services were offered?

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

IV.B. Implementation Analysis Data Strategies

Implementation evaluation activities will involve local project staff and instructors, consortium leadership, students, and/or employers and may include: (1) document analysis, (2) interviews, (3) student focus groups, and (4) on-site visits. Assessment of progress measures or benchmarks required in the original grant proposal or established by TechNet leadership are embedded in the activities.

Interviews and/or site visits will be conducted once per academic term. The specific instruments and contents of inquiries will be determined as the evaluation develops. It is expected that inquiries will be thematically organized as follows during the sequence of terms in the project period of performance: (1) program planning and logistics, (2) management of the student pipeline recruitment and intake through enrollment, including approaches for remediation, (3) training and

uses of technology, (4) the connection to work, (5) partnership effectiveness and employer engagement, and (6) student support systems.

The data from the variety of qualitative activities will be combined using a process of transcription and coding. The qualitative and quantitative work will be carried out using an integrated design. While qualitative and quantitative activities in the initial time period of the evaluation will occur in parallel, evaluation factors and frameworks will be integrated in middle and later stages to provide more insightful understanding. The overarching question that ties together the qualitative evaluation to the quantitative is: How do factors uncovered in the qualitative evaluation affect participant outcomes?

To assess consortium, annual interviews will be conducted with leaders in each partner institution to assess the value added due to the consortium in terms of efficiency, professional learning, community, and collaboration. We will also examine the impact of the consortium in terms of sustainability, efficiency, and increase in collaborative projects.

V. Outcomes/Impact Analysis Design

The primary impact question posed in TechNet's original proposal to DOL is: "What is the impact of the TechNet project on participants and other adult learners, particularly with regard to completion and employment rates?" An assessment of the impacts of pathway design strategies on student enrollment, credit attainment, postsecondary retention, postsecondary completion, job attainment, job retention, and earnings will be included. However, given the constraint of variation among colleges in implementation of pathway designs, evaluating the impacts of individual elements on participant outcomes may need to be focused on specific programs or participants.

The impact evaluation will be conducted at the program level. A random-assignment research design is impractical for the proposed programs. TechNet comprises open-access community colleges with limited resources to serve students in targeted programs. Randomly

assigning those students to different systems of programs and services is resource-intensive and would jeopardize the successful implementation of the programs. Thus, a quasi-experimental approach is the most practical way to assess the impacts of the intervention.

As stated in TechNet's proposal to USDOL, the impact study will use a comparison group design comparing participants to nonparticipants. Participants (treatment group) will consist of Ohio TechNet students based on a definition derived from official program declaration or enrollment on a core course. Nonparticipants (comparison group) will be individuals enrolled in Ohio TechNet institutions but not defined as participants. The impact study will use a matched comparison group. Propensity scores will be used to select comparison groups of nonparticipants who are as similar as possible to the participants. The matching strategy is described in the following section.

The Ohio TechNet project is projected to enroll 1,801 students in these five occupational programs (as shown in Table 12 of the project narrative). These participants will be compared to students in comparison groups (nonparticipants) for each career pathway program. To assess labor market outcomes, the Consortium will partner with the Ohio Department of Job and Family Services (ODJFS) to obtain individual-level wage record data. Upon program entry, participants will be asked to sign a consent form that will allow Ohio TechNet to access project-related data.

V.A. Outcomes/Impact Analysis Research Questions

The outcomes/impact research questions incorporate the DOL reporting requirements for the annual performance report. For each question listed, we are comparing grant participants in the grant-affected programs of study to comparison group participants (for strategy for selecting comparison groups, see section V.D. below):

1.   How many unique participants/comparisons have been served?

2.   How many individuals have completed a grant/comparison program of study?

      a. Of those, how many are incumbent workers?

3. How many individuals are still retained in their program of study (or other grant-funded program)?

4. How many individuals are retained in other education programs?

5. How many credit hours have been completed?

      a. How many students have completed credit hours?

6. How many credentials have been earned by participants/ comparisons?

      a. How many students have earned certificates (<1 year)?

      b. How many students have earned certificates (>1 year)?

      c. How many students have earned degrees?

7. How many students are pursuing further education after program of study completion?

8. How many participants/comparisons are employed after program of study completion?

9. How many participants/ comparisons are retained in employment for three quarters after program of study completion?

10. What are the earnings of participants/ comparisons relative to before enrollment?

      a. How many of those employed at enrollment received a wage increase post-enrollment?

11. What is the time-to-completion of participants / comparisons?

The research questions drive the following analyses. For each research question, an outcome is defined that will be used to answer that question. The definitions given are from the point of view of the grant-affected programs (the "treatment group"). Corresponding definitions will be used for the comparison programs (the "comparison group") and are not repeated here for brevity. For the outcomes that correspond to one of the 9 DOL outcomes, that DOL outcome number is noted.

1. Participants = individuals who officially declare for a targeted program of study or enroll in a defined core course in a targeted program of study (DOL#1)

2. <u>Completion rate</u> = number of students who complete / participants (DOL#2)

    a. <u>Incumbent completion rate</u> = number of students who complete / participants (numerator and denominator restricted to incumbents)

3. <u>Retention rate</u> = number of students who are retained in their program of study (or other grant program) / (participants – completers) (DOL#3)

4. <u>Other retention rate</u> = number of students who are retained in another program of study (non-grant) / (participants – completers)

5. <u>Credit hour completion amount</u> = number of credit hours earned per student

    a. <u>Credit hour completion rate</u> = number of students who complete a credit hour / participants (DOL#4)

6. <u>Credential amount</u> = number of credentials earned per student

    a. <u>Short-term credential rate</u> = number of students who earn a credential (<1y) / participants

    b. <u>Long-term credential rate</u> = number of students who earn a credential (>1y) / participants

    c. <u>Degree rate</u> = number of students who earn a degree / participants (DOL#5 = 'a' or 'b' or 'c')

7. <u>Further education rate</u> = number of students entering further education program after completion / completers (DOL#6)

8. <u>Employment rate</u> = number of students employed / completers (numerator and denominator restricted to non-incumbents) (DOL#7)

9. <u>Retain employment rate</u> = number of students retained in employment for 2nd and 3rd quarters after completion / completers (numerator and denominator restricted to non-incumbents) (DOL#8)

10. <u>Earnings increase amount</u> = quarterly earnings increase for each quarter after program

    completion – average quarterly earnings in four quarters prior to program entry

    a. <u>Earnings increase rate</u> = number of students who received quarterly earnings increase

       after enrollment relative to the average of four quarters prior to program entry /

       participants (numerator and denominator restricted to incumbents) (DOL#9)

11. <u>Time-to-completion</u> = the time elapsed from enrollment until program completion

    The outcomes will be measured continuously as the data becomes available. For example,

for data coming from the institutions, data will be collected twice a year – once in the fall reflecting

the previous summer and spring terms and once in the spring reflecting the previous fall term.

    Analysis: For each outcome, the rate (or average) in the treatment group will be compared to

the rate (or average) in the control group (see V.E. below for more).

V.D. Non-Experimental Design

    Program outcomes will be calculated by comparing the differences on key measures between

participants and comparison groups. We choose to use propensity score matching rather than

including the control variables in a standard regression model. When using a traditional regression

model (OLS, logistic regression, or similar), we must assume that the relationships between the

response and the control variables are linear, and that all of the slopes are the same regardless of

treatment group. Creating a match group prior to measuring outcomes provides an alternative way

to estimate the average causal effect of TechNet without strong assumptions about how the

outcomes are related to the control variables.

    We will take the following steps in creating a match group: estimate the propensity score

using relevant variables that might predict TechNet participation, chose a matching algorithm, assess

the matching quality, and finally calculate treatment effects (Caliendo & Kopeinig, 2008).The first

step in creating a match group using propensity score matching is to build a model that predicts participation in TechNet, to create the propensity score. We will use a limited dependent variable model to predict participation using demographic variables and other available information that is related to TechNet participation. Traditional variables include individual characteristics such as gender, as well as education and economic background. The general theory behind the development of a matched group is to use as many variables as possible to capture as much of the variation between control and treatment groups. Therefore, as additional sources of data come available they will be used.

Before attempting to create a comparison group, we first determine whether the TechNet participants and the pool for comparisons have enough overlap, or in propensity score matching parlance, ensure a region of common support (Caliendo & Kopeinig, 2008). To compare match groups we will use a variety of matching methods, including nearest neighbor matching and Mahalanobis distance match. Results will be compared from several matching methods to ensure that we are minimizing the differences in the individual characteristics between the treatment and control groups for TechNet. The technical quality of the match will be determined by numerical or standard deviation differences in the averages and by visual inspection of the propensity scores of the match and TechNet groups.

After determining if the comparison and TechNet groups are appropriately similar using the propensity scores we conduct statistical procedures to calculate the differences between the two groups in the outcomes of interest as specified above. This is normally done as a way to measure the average treatment effect of the treated.

V.E. Outcomes/Impact Data Collection and Analysis

The majority of data will be captured through the Ohio Longitudinal Data Archive (OLDA). Managed by the Ohio State University's Center for Human Resource Research (CHRR) and the

Ohio Education Research Center (OERC), the OLDA provides centralized access to cross-matched, longitudinal state administrative data to support the education and workforce research priorities of the OERC and Ohio's public agencies (Attachment A). Notably, the OLDA holds Higher Education Information (HEI) records for all of the state colleges, as well as employment and job training records from ODJFS. These records can be used to measure term by term college enrollment and completion by college and program, as well as quarterly employment and earnings by employer (anonymous) and industry. Because the OLDA contains statewide records, data are available for both the treatment and comparison groups.

To accurately identify the treatment group and to capture all of the necessary program-level participant data, the consortium will leverage the existing ODJFS Workforce Case Management System.

To build program capacity and ensure continuous, data-driven monitoring, the project leadership, in collaboration with the third-party evaluator, will implement a common database and data management system to be used by all TechNet partners. The database will facilitate primary participant-level data collection. System features will include a standardized data collection and tracking mechanism and the assignment of unique identifiers to enable the data matches necessary for longitudinal tracking. The system will be web-based to facilitate integration of data collected from each college as well allow for reviews of project data.

To supplement data from existing sources, we will add primary data collection: First, we will administer a participant intake form, which will capture any key baseline data elements that are not found in a college's database. Second, we will conduct a post-completion survey to add depth and granularity to the employment data. A sample of subjects will be selected for the post-completion survey to keep costs down. Sampling will be stratified within program at each college to ensure coverage of each grant-affected program of study. The size of the sample will be constrained by the

survey budget, but will include a minimum of 10% of the participants in each program. The participant intake form is structured to capture additional contact information for participants to aid in follow-up. Specific data elements that are not expected to be available from other sources, but will be captured from the survey are: occupation of employment, full-time/part-time status, hourly wage, and presence of benefits. See Appendix B for a list of planned variables.

Only the final data analysis at the end of the study period will be used to draw conclusions about the impact of the grant activities. However, interim reports will have data components. First, the annual performance reports (APR) due each November require a roll-up of the number of individuals (and credit hours and credentials) who have achieved certain milestones and/or reached certain end-points of tracking. No statistical modeling or comparisons are planned for the APRs.

Second, an interim report is due to DOL approximately halfway through the grant period. For this report, descriptive statistics will be compiled. For each grant program and for each comparison program, each outcome will be summarized. Also, each demographic and other covariates of interest will be summarized. As with the APR, no statistical modeling or comparisons are planned for the interim report. The reason to avoid performing statistical procedures for the APR or interim report is because interim analyses would rob the study of statistical power to no benefit. The use of interim analyses is called for (e.g., in clinical trials) when there exists the possibility of stopping a study early due to clear advantage (or disadvantage) accruing to the treatment compared to the control. The cost of an interim analysis is a conservative adjustment to the criterion for declaring statistical significance (e.g., through alpha-spending). Since this study will continue to completion at the end of the study period regardless of the outcome of any interim analysis, it is not worth the statistical cost to perform one.

At the end of the grant period, data analysis will proceed on all data accumulated through the grant period. The outcomes (see V.B. above) will be analyzed as follows:

1) Outcome #1 counts the number of participants: The total number of participants served is a summary measure and will be reported for each grant program and contrasted with corresponding comparison programs. No statistical modeling or testing will be done.

2) Dichotomous outcomes (outcome #'s 2, 2a, 3, 4, 5a, 6a, 6b, 6c, 7, 8, 9, 10a): The raw rates of each outcome will be reported for each grant program and contrasted with the raw rate for the corresponding comparison programs. Example 1: number of grant program completers divided by number of grant program participants versus number of comparison program completers divided by number of comparison program participants. Example 2: Number of non-incumbent grant program completers who entered employment in the quarter after program exit divided by number of non-incumbent grant program completers versus number of non-incumbent comparison program completers who entered employment in the quarter after program exit divided by number of non-incumbent comparison program completers. Statistical models will be used to estimate the effects of grant program membership adjusting for baseline covariates.

3) Continuous outcomes (outcome #s 5, 6, 10, 11): The average outcome will be reported for each grant program and contrasted with the average for corresponding comparison programs, using statistical methods to estimate the effect of grant program membership, adjusting for baseline covariates.

4) Time-to-completion outcome (outcome #12): The median time-to-completion will be reported for each grant program and contrasted with the median time-to-completion for corresponding comparison programs. Program duration and proportions of programs completed will be taken into account. Statistical models will be used to estimate the effect of grant program membership, adjusting for baseline covariates. Given that median time varies by program length we will need to report median time to completion by type of program (e.g, degree seeking, certificate).

The important baseline covariates will include at a minimum: number of credits attained at time treatment (control) begins, employment at enrollment, and demographics: age, gender, and race. The minimum expected program size is approximately 50 individuals. Assuming a similar size comparison group would result in 100 units for analysis, which is sufficient to support a model with 6 variables (the 5 covariates listed plus treatment/control indicator variable). Since outcomes #8 and #9 are restricted to non-incumbent completers, the sample size would be smaller. It is not possible to know exactly how much smaller without knowing whether incumbent or non-incumbent workers will be more prevalently served (and at what rate they complete), but approximately half is plausible. This would reflect 50 total individuals, which is on the low side for a reasonably estimated model with 6 predictors. In this situation, less useful predictors can be left out of the model to ensure well estimated parameters. In contrast with the minimum program size, the majority of programs are expected to have more than double the minimum number of participants. Therefore, for the majority of programs, there is no expectation of difficulty with modeling.

To assess the robustness of results to modeling assumptions, various sensitivity analyses will be performed. Other demographic or other baseline covariates which are imbalanced between treatment and control groups will be entered into models to determine if any are strongly associated with the outcomes. Propensity scores will be investigated as a means for establishing between-group comparability. Propensity scores will be utilized as an analysis method, although it will not be clear until sensitivity analyses are performed that this method will improve model performance beyond simpler direct adjustments of baseline covariates.

VI. Limitations

Gaps in data including: intake form unavailable (especially comparison individuals), missing data elements from college database, etc.

Small sample sizes in a select few programs, especially when evaluating DOL outcomes 7

and 8 (restricting sample to non-incumbent completers).

Difficulty in identifying parallel comparison programs at colleges.
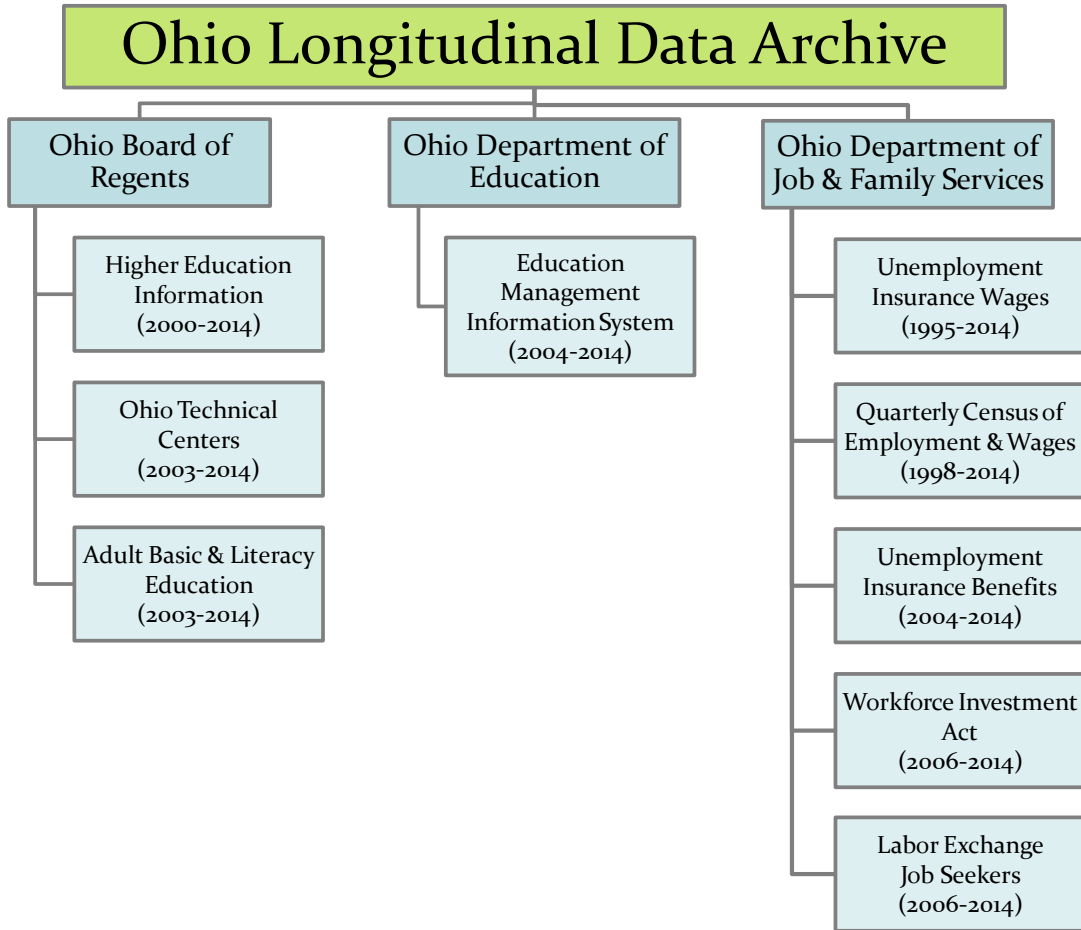
VII. Reports

We envision a timeline as described below. Key deliverables include mid-term and final evaluation

reports to USDOL and the lead college (Lorain County Community College).

Task	Date
Evaluation website launched	July 2015
Year 1 site visits, planning year inquiry	June – August 2015
Data plan finalized (follows site visits)	August 2015
Evaluation training #2, includes data plan training	August 2015
Data sharing agreements and IRB approvals done	August 31, 2015
First data collection based on available data (may be primarily comparison group data depending on Year 1 participant enrollments)	September 30, 2015
Year 1 APR prepared for LCCC	November 2015
Employment Results Scorecard and Continuous Improvement tool finalized	January 2016
Post-completion survey finalized and launched	March 2016
Monthly reports, QPR, and APR contributions	Monthly, two weeks prior to DOL schedule
Post-Completion Survey administered	Each semester
Employment Results Scorecard and Continuous Improvement tool	Completed annually along with APR
Site visits	All colleges annually, schedule TBD
Interim evaluation report	November 2016
Final evaluation report	September 2018

VIII. Reference List

Caliendo, M. and Kopeinig, S. (2008), SOME PRACTICAL GUIDANCE FOR THE
IMPLEMENTATION OF PROPENSITY SCORE MATCHING. Journal of Economic Surveys,
22: 31–72. doi:10.1111/j.1467-6419.2007.00527.x

Ohio Longitudinal Data Archive

Ohio Board of Regents

- Higher Education Information (2000-2014)
- Ohio Technical Centers (2003-2014)
- Adult Basic & Literacy Education (2003-2014)

Ohio Department of Education

- Education Management Information System (2004-2014)

Ohio Department of Job & Family Services

- Unemployment Insurance Wages (1995-2014)
- Quarterly Census of Employment & Wages (1998-2014)
- Unemployment Insurance Benefits (2004-2014)
- Workforce Investment Act (2006-2014)
- Labor Exchange Job Seekers (2006-2014)

Appendix B

Data Source	Variables	Data Elements
HEI[1]	Number of program participants	Program & course codes[2]
	Number of participants who complete	Degree/certificate level code
		Degree/certificate program code
	Number of participants retained in their program of study	Student enrollment program code
	Number of participants retained in another program of study	Student enrollment program code
	Number of credit hours earned	Award of academic credit (y/n) per course enrolled
		Number of credit hours per course enrolled
	Number of credentials earned per student	Degree/certificate level code
	Number of participants who earn a degree	Degree/certificate level code
	Number of participants entering further education program after completion	Student enrollment
	Time to completion	Student enrollment year/term
		Student enrollment program code per year/term
		Degree/certificate program code per year/term
	Treatment/comparison matching & other categorization data elements	Age
		Sex
		Race/ethnicity
		Year/term
		College (institution code and campus)
		Degree certification credit hours (number of credit hours to complete program)
		Student enrollment major field of study code (intended major CIP code)
UI Wages[3]	Number of participants employed	Employed (y/n) per fiscal quarter
	Number of participants retained in employment	Employed (y/n) per fiscal quarter
	Earnings increase amount	Earnings per fiscal quarter
	Employed in manufacturing	Employer code

[1] Pending Ohio Board of Regents data delivery timeline; direct transfer from colleges is an alternative
[2] Colleges need to provide the evaluation team with applicable grant program codes to extract from the HEI
[3] UI Wage records capture individuals employed in Ohio and excludes federal and self-employed workers

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	Treatment/comparison matching	Number of weeks worked
		Number of employers
Quarterly Census of Employment and Wages	Employed in manufacturing	Employer code
		Industry code (NAICS)
	Treatment/comparison matching	Number of employees
		Employer location
Intake Form	Number of grant-related activity participants	
	Incumbent/Non-incumbent worker	
	Veterans	
	Employment History	
Follow up surveys	Career advancement	Employment occupation
		Hourly wage
		Benefits/non-wage compensation
		Number of hours worked per week or part-time/full-time employment status
Case Management System	TAA participant	TAA participant (y/n)