



**Florida TRADE Consortium**

**EVALUATION FINAL REPORT**

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**For Grant Period Ended September 30, 2016**

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## **I. Executive Summary**

The Florida TRADE (Transforming Resources for Accelerated Degrees and Employment) Consortium was largely successful in accomplishing its mission and strategies to enhance the manufacturing workforce to meet the needs of industry, individuals, and the community at large.

The data indicate The TRADE program had a positive effect in generally giving an advantage to starters and completers of the program of study. Outcomes for non-starters, non-completers are not favorable. Several outcome targets were exceeded during the course of the TRADE program.

Although not formally sustained, a lingering effect of the Consortium's influence exists in the network of communication and collaboration that was fostered, especially between the colleges, the regional and state-wide manufacturers associations, and CareerSource Florida and the regional CareerSource offices who were directly involved in this project. Tremendous synergy was uncovered and harnessed to impact the manufacturing community and community at large in a positive way.

Networking and best practice sharing immensely benefited program managers in their efforts to reach manufacturers and deliver targeted curriculum to prospective and incumbent manufacturing employees. Colleges could take advantage of curriculum development and modification efforts in all parts of the Consortium. Training delivery resources and expertise also were shared.

The lack of a formal plan to sustain critical elements and functions of the TRADE program is a distinct disadvantage to the manufacturing education ecosystem in Florida.

Some target outcomes were not achieved, especially the targets for numbers of program completers placed, and the numbers of individuals earning at least one industry-recognized credential.

In data collection, entry, and retrieval, from the EFM database, a number of difficulties were encountered:

- Access to reported data was not granted for the entire consortium until very late in the grant period (i.e. August 2016).

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- Consortium College members did not collect and enter participant data in a consistent way. Data are available for 11 of the 12 Consortium colleges. There are some gaps even in what was entered.
- In many individual cases, incumbent workers did not provide social security numbers or permission to allow their registration into the EFM. Therefore, employment data for many incumbent workers are not available.
- Many Colleges did not collect and retain data for individuals who did not enroll in the program of study. As a result, there are comparison data only from a few colleges.
- Quarterly wage data for each individual varies widely in some cases for unknown reasons.
- Some Colleges did not distinguish between completers and non-completers among all those individuals who started the program of study.

## **II. Introduction to the Evaluation Plan**

### **1. The Strategic Foundation**

- a. Establishing the Strategic Foundation of the Florida TRADE Consortium was critical in creating the basis for monitoring effectiveness of the organization and program. A task accomplished early in the life of the TRADE program was the development of the Organizational Profile which defines the strategic challenges faced and the key internal and external environmental influences on operations of TRADE. A key strategic challenge never fully identified and addressed was the challenge of sustainability. That is, sustainability of the mission to be carried on following the expiration of the TRADE program, not sustainability of the organization itself. The profile is included as Appendix A and had been modified as conditions changed or were viewed from a different perspective. The completed profile describes the internal working environment and external influences. It defines the external environment in terms of partners, customers, and stakeholders, as well as the relationships with them. In the Profile document are described organizational strategic challenges and advantages, and key success factors. In a phrase, the Organizational Profile discussed what elements and factors were important to the TRADE Consortium. The initial Organizational Profile was developed with input and participation from stakeholders and the TRADE team. As developed, the Profile was shared and made accessible to partners and stakeholders.
  
- b. The Strategic Foundation of the Florida TRADE Consortium is found in its Mission and Strategies established.
  - i. Mission: To develop and deliver accelerated technical training programs that upon completion will allow participants to:
    - Upgrade current skills and knowledge.
    - Learn new skills.
    - Gain industry-recognized technical certifications.
    - Earn academic credits toward college degrees.
    - Procure employment.

Measures of effectiveness and impact as a result of the TRADE program revolve around the mission and the key bullet points highlighted.

ii. TRADE leadership and staff developed Organizational Strategies to accomplish the Mission by:

- Aligning partner colleges' resources to offer wide access to training.
- Providing short-term certification training that results in stackable or latticed industry-specific credentials that articulate to state-wide Associate of Science (A.S.). Degree programs.
- Partnering with the Manufacturing Association of Florida Center for Advanced Manufacturing Excellence to provide internship opportunities and enhanced networking directly aligned with manufacturers.
- Sharing existing targeted curricula which will be deployed in a non-traditional academic environment.
- Listening and responding to the needs of business, industry, and local manufacturing associations by developing innovative curriculum that blends and infuses Problem solving and critical thinking skills; Analytical Skills; Computer Skills; and Transferable Skills.

The Florida TRADE program was largely successful because these strategies had been outlined, were deployed to staff and stakeholders, and implemented.

## **2. Plan Overview**

- a. Effectiveness of any organization is dependent on whether activities bring significant impact to customers and stakeholders. In other words, measures of activities alone are low level indicators of organizational effectiveness and not sufficient to measure overall performance from the customer and stakeholder perspective. Higher levels of effectiveness are required. There must be positive impact. Activities must provide added value in the eyes of customers and stakeholders.
- b. Evaluation of this project was focused on a two-pronged approach, evaluating Participant Outcomes and Impact, i.e. value, and Program Implementation, i.e. the capability of the program to accomplish its mission and strategies, and achieve goals to bring value to

customers and stakeholders.

- i. Participant Outcome and Impact Evaluation are comprised of the analysis of participant-related employment (wage) data following program intervention and activities. Specific focus is on whether the intervention had wage and employment impact on program completers as compared to non-completers. Program activity data were also collected and reported in summary.
- ii. Program Implementation Evaluation is an analysis of the operational strengths and weaknesses of the program and interventions. It provides a measure of the capability of the TRADE organization to accomplish its mission; to identify system and processes that need to be in place to be successful. Suggestions for improvement, and recommendations, based on the Program Implementation Evaluations, were made to the leadership and operational staff of the TRADE Consortium of colleges.

### **3. Implementing the Evaluation**

- a. Evaluation of Participant Outcomes and Impact
  - i. The methodology used to evaluate outcomes and impact essentially follow the comparison cohort approach since participants were not randomly selected for inclusion in the training programs implemented. Only one variable was considered: whether an individual started and completed the program intervention. The comparison groups are those individuals who were served but did not apply, applied but did not enter, or those who entered but did not complete the program of study.
  - ii. Additional outcome measures were collected and reported quarterly during the grant period. These measures include:
    - 1) Total unique participants served;
    - 2) Total number of participants completing a TAACCCT-funded program of study;
    - 3) Total number of participants still retained in their program of study or other TAACCCT-funded program;
    - 4) Total number of participants completing credit hours;
    - 5) Total number of participants earning credentials;

- 6) Total number of participants enrolled in further education after TAACCCT-funded program of study completion;
- 7) Total number of participants placed after TAACCCT-funded program of study completion;
- 8) Total number of participants retained in employment after program of study completion;
- 9) Total number of participants employed at enrollment who received a wage increase post-enrollment.

b. Evaluation of Program Implementation

- i. The approach to evaluating Program Implementation was intended to assess the capability of the TRADE organization to accomplish its mission effectively and efficiently, and to establish systems which integrate with current college systems to sustain the beneficial effects of the TRADE Consortium. The evaluation considered specific activities of the of the program relating to advanced manufacturing career pathway training, improving technological education and training program curricula, building collaborations within industry and with other educational and training institutions, outreach to fully implement and deploy educational and training products and materials, and professional development as appropriate.



### III. Evaluation of Participant Outcomes and Impact

#### a. Outreach and Programs Offered

- i. The Florida TRADE college partners developed and delivered a number of programs across the Consortium intended primarily to prepare unemployed workers, veterans, and students for employment in a manufacturing career. To this end, the Consortium interviewed and collected input and feedback from industry in each of the 12 local regional areas served by the partner colleges. Figure 1 identifies the 12 TRADE Consortium colleges and the regions/counties where they are engaged.

**Figure 1. Consortium Partner Colleges and Counties of Coverage**

College	Counties	College	Counties
Broward College (BC)	Broward	Daytona State College (DSC)	Volusia
Florida State College at Jacksonville College (FSCJ)	Duval, St Johns	Gulf Coast State College (GCSC)	Bay
Hillsborough Community College (HCC)	Hillsborough	Indian River State College (IRSC)	Indian River, Okeechobee, Martin, St Lucie
Palm Beach State College (PBSC)	Palm Beach	Pasco-Hernando State College (PHSC)	Pasco, Hernando
Polk State College (PSC)	Polk	St. Petersburg College (SPC) – <b>Lead College</b>	Pinellas
Tallahassee Community College (TCC)	Leon, Gadsden, Wakulla	Valencia College (VC)	Orange, Osceola

Partner colleges were expected to engage, solicit, and collect information from industry in each respective region about the needs of manufacturers. At inception of the Consortium, delivery of training was intended to include a standard approach and standard offerings throughout the state, although the offerings would be mixed and matched to each specific individual participant need. Essentially a standard program for any participant was to begin, in most cases, with the Manufacturing Skills Standard Council’s Certified Production Technician (MSSC-CPT) credential, then integrate a wider range of standard offerings to comprise any unique individual’s program of study. Standardized development plans and tools

would be used for planning and documenting individual programs of study.

Outreach with industry was manifested in many different ways throughout the Consortium partner colleges. Primarily and initially, each College was mandated to establish working partnerships with their local Regional Manufacturers Association and the regional CareerSource/workforce development board offices, At the Consortium-level too, partnerships were established with the Manufacturers Association of Florida Center for Advanced Manufacturing Excellence (MAF CAME) and with CareerSource Florida. Most of these relationships were contractual, customized in each region, although not all were effective working relationships, despite the contracts in place.

While the relationships at the Consortium-level were strong, at the local level they ranged from very strong and collaborative to nearly non-existent. For example, Hillsborough Community College (HCC) had no contractual relationship with the local CareerSource office. Consequently, it was difficult if not impossible to adequately enter HCC individual data. In the end, no useful data for HCC participants was retrieved from the Employ Florida Marketplace (EFM) database.

Other outreach channels for gaining commitment and involvement from customers and stakeholders were developed and customized locally by each of the colleges. For instance, a very successful approach, called the Manufacturing Café, was developed and used well in the Pasco-Hernando State College region. In conjunction with the Upper Tampa Bay Manufacturers Association, the college established regular meetings with manufacturers, usually over breakfast, to discuss current TRADE training offerings and to seek input for additional industry needs. As the TRADE program progressed, the college program managers came to recognize need for more specific offerings to match diversity in the needs of industry across the state. Although there was and is general similarity in what Florida manufacturers need, the college program managers understood there were underlying regional specific requirements to be satisfied. As a result, varied training offerings were modified and developed and made available for delivery.

The Manufacturing Skills Standards Council's Certified Production Technician (MSSC-CPT) training is a good example of a fundamental course that has broad application across the industry. It was an offering in most of the colleges. In addition to an in-person format, it was offered as a distance learning course. Colleges shared delivery and offered a unified approach to students in widely dispersed regions of the State. Several colleges, as facilitated through the inter-college network developed by the TRADE Consortium, specifically Gulf Coast State College, Polk State College and Broward College, participated in this form of delivery for MSSC-CPT.

Additionally, the Consortium had intended to develop and disseminate a self-study, online course with the MSSC-CPT curriculum. However, the beneficial effects of that initiative did not have any appreciable positive impact due to development delays which lasted into the final year of the grant.

Figure 2, below, identifies the programs developed and delivered by Florida TRADE colleges, during the course of the grant period. As each region's manufacturers needs were apparently different, not all colleges offered all programs.

**Figure 2. TAACCCT Funded Programs Developed and Delivered by Florida TRADE**

Program	Description-Preparing students for...	Program	Description-Preparing students for...
Manufacturing Foundations	Work as a Certified Production Technician (MSSC-CPT)	Mechatronics-Electronics	Work directly on the mechanical and electronic devices used in advanced manufacturing including photovoltaics, surface mounts, electrical technology, and electro-mechanical maintenance
Machining-CNC	Work in shops using computerized-numerically-controlled (CNC) machining	Reliability Maintenance	Work in the specialized area of maintaining and troubleshooting automated systems
Drafting-Design	Work in industrial design using sophisticated 2D and 3D Computer-Aided-Design (CAD) systems	Instrumentation-Controls	Work in production automation, including operation programming of measurement instruments and logic controllers
Welding	Work in various welding arts in support of industrial production systems and maintenance	Robotics	Work in a shop using FANUC Industrial Robots
Quality	Professional Development in quality practices emphasizing the principles of Six Sigma and/or Lean in the manufacturing sector	Manufacturing-Professional	Work as a Certified Manufacturing Technician (SMA-CMfgT)
Safety	Professional Development in job safety in support of Industrial Risk Management programs	Special	Work in programs developed in conjunction with local manufacturers to focus on specific skills and qualifications related to advances in technology or new equipment

b. Data Collection Obstacles

- i. As the primary measure of impact, data were collected to determine whether the program had an effect on placement and employability of individuals completing their program of study. To determine this effect and its extent, data were sought from the state-wide Employ Florida Marketplace (EFM) database. Access to the EFM is controlled by the CareerSource Florida network.

A number of significant obstacles were encountered. It took many months at the start of the grant program to enable access by many of the colleges for entry of participant data. In some areas, the regional CareerSource offices permitted college personal access to enter data directly, in others they did not. In some colleges, no data were initially entered into EFM. Access to the data was hampered again by rules limiting access and release of the data to the colleges. Additionally, discontinuity in the TRADE data analyst position further impeded and delayed a coordinated effort to access EFM data.

To compound this, even data that had been entered was incomplete. TRADE intake data from individuals did not always include social security information, which is critical for entry into and retrieval from EFM. There was pushback in many parts of the Consortium for the need to collect social security numbers from program applicants and participants. This was especially true for incumbent workers, on whom, some colleges focused intensely on recruiting, particularly early in the life of the TRADE Consortium. Dependence on incumbent workers was primarily driven by two factors. First, the college already had channels established for recruiting incumbent workers for other non-TRADE related training. Second, funding for training tuition was more easily attainable for incumbent workers through employer-company accessibility to workforce development grants. These popular and familiar grants were not available to the unemployed.

Still another hindrance was that data for non-completers were not systematically collected and entered. Non-completers were defined, first, as individuals served but who did not apply for the program. Data for these individuals were not typically entered into the EFM database. In most, if not all these cases, social security numbers were not solicited and collected. Another group of individuals falling into the non-completer category were those who applied for the program but were not enrolled. Data from these individuals was not systematically entered in EFM. A third group considered non-completers were those who were enrolled but did not complete their program of study.

Finally, Consortium-wide data retrieval from the EFM database did not occur until very late in the life of the TRADE Consortium; in August 2016, about a month before grant end. Much of the success in gaining access to usable data from EFM is attributable to the persistence and diligence of the TRADE data analyst. By this time, many of the individuals involved at the colleges, particularly the program managers, had already departed and separated from involvement with TRADE. Consequently, many of the holes in the data, as described in the previous paragraphs, remained unfilled.

### c. Program Data

#### i. Outcome Measures

The following outcome measures were tracked “manually”, collected, and reported quarterly during the grant period. Collection was accomplished by direct reporting from the Consortium college program managers.

As described by the data in Figure 3, targets set were exceeded in four of nine measures, including:

- Total Unique Participants Served: goal exceeded by 61%
- Total Number of Participants Completing a TAACCCT-Funded Program of Study: goal exceeded by 23%
- Total Number of Participants Completing Credit Hours: goal exceed by 8%
- Total Number of Participants Enrolled in Further Education after TAACCCT-funded Program of Study Completion: goal exceed by two percent

Of particular note, two of the other measures indicating that levels fell short of the target include:

- Total Number of Participants Earning Credentials (at least 1); goal missed by 13%
- Total Number of Participants Placed After TAACCCT-funded Program of Study Completion: goal missed by 25%

The number of participants placed after completion of their program of study, could very well have been negatively impacted by the fact that large numbers of people

starting their programs were already employed. As seen in Figure 4, Column C, more than half, and as many as three quarters, of the starters were already employed at the start of their programs in 10 colleges. Only at Daytona State College were fewer than half employed.

**Figure 3. Outcome Measures Targets and Levels Attained**

<b>Outcome Measure</b>	<b>Target</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>
Total Unique Participants Served	2638	328	2025	3674	4253
Total Number of Participants Completing a TAACCCT-Funded Program of Study	2016	44	1003	2019	2495
Total Number of Participants Still Retained in Their Program of Study or Other TAACCCT-Funded Program	574	208	554	476	N/A
Total Number of Participants Completing Credit Hours	717	22	384	703	773
Total Number of Participants Earning Credentials (at least 1)	2652	36	901	1807	2304
Total Number of Participants Enrolled in Further Education after TAACCCT-funded Program of Study Completion	721	32	305	N/A	735
Total Number of Participants Placed After TAACCCT-funded Program of Study Completion	1297	9	248	661	977
Total Number of Participants Retained in Employment Six Months After Program of Study Completion	1216	0	97	326	452
Total Number of Participants Employed at Enrollment Who Received a Wage Increase Post-Enrollment	553	0	23	76	84

ii. Impact Measures

Data in the following discussion were entered and retrieved from the CareerSource Florida Employ Florida Marketplace (EFM) database.

Figure 4 shows, for 11 of 12 Colleges in the Consortium, data describing the

percentage of program participants who had wages (i.e. were employed) during the quarter in which they started the program. As noted earlier, no data were entered or retrieved relating to Hillsborough Community College starters, and are therefore not represented. Each of the leftmost columns indicate the month in which each quarter ended. The data in these columns indicate the percentage of starters, starting in that quarter, who had payroll wages reported to the EFM database. For instance, in the column labeled quarter ending June 2013, 45% of the program starters at Daytona State College (DSC) were receiving wages and assumed to be employed as they started their TRADE programs of study.

The rightmost three columns of Figure 4, labeled Column A, Column B, and Column C, indicate the total unique individuals reported starting the program, Column A, and the total individuals and percentage of that group with wages at their start quarter, Columns B and C, respectively.

The overall weighted mean of employment at the start of individual programs of study is 61.7%. This is weighted by the proportion of starters at each school to the total. The standard deviation is 9.2%.



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Figure 4 Percentage of Starters with Payroll Wages Reported in the Quarter Started

College	Month in Which the Quarter End														Column A Total Unique People Starting the Program	Column B Total People w/Wages at Start	Column C % of People Employed at Start
	Dec-2012	Mar-2013	Jun-2013	Sep-2013	Dec-2013	Mar-2014	Jun-2014	Sep-2014	Dec-2014	Mar-2015	Jun-2015	Sep-2015	Dec-2015	Mar-2016			
BC				64%	59%	73%	62%	71%	56%	75%	77%	65%	63%	71%	322	217	67.4%
DSC			45%	47%		33%		55%		14%	0%	55%	80%	45%	97	45	46.4%
FSCJ		50%	50%	56%	28%	44%	63%	78%		40%	79%	57%			392	204	52.0%
GCSC	17%			64%	67%	78%	89%	77%	85%	68%	75%	52%	64%		288	204	70.8%
IRSC			31%	45%	74%	75%	40%	65%	50%	70%	57%	63%	50%	74%	255	155	60.8%
PBSC		100%	100%	100%	80%	50%	97%				61%	56%	74%	90%	200	150	75.0%
PHSC				44%	50%	71%	43%	33%	80%	53%	70%	38%	57%	48%	261	139	53.3%
PSC				88%	34%	77%	71%	79%	81%	57%	77%				427	314	73.5%
SPC				42%	100%	43%	47%	25%	73%	71%	78%	82%	60%	29%	153	89	58.2%
TCC		22%	47%	78%	74%	77%	53%	63%	29%	59%	50%	76%	85%	74%	395	248	62.8%
VC				40%	63%	0%	29%	43%	45%	56%	69%	48%			152	80	52.6%
<b>Key to College Abbreviations</b>														<b>Overall</b>	<b>2942</b>	<b>1845</b>	<b>61.7%</b>
BC = Broward College			IRSC = Indian River State College												<b>Weighted Mean</b>  <b>9.2%</b>  <b>Standard Deviation</b>		
DSC = Daytona State College			PBSC = Palm Beach State College			SPC = St Petersburg College											
FSCJ = Florida State College at Jacksonville			PHSC = Pasco-Hernando State College			TCC = Tallahassee Community College											
GCSC = Gulf Coast State College			PSC = Polk State College			VC = Valencia College											

In Figure 5, data from Column C of Figure 4, the total employed at the start of their programs is compared to the data showing percentages of starters who were employed through the end of the TRADE grant, Figure 5, Column E. The difference, enumerated in Column F, indicates the change in total employment from each individual start to the effective program end in March 2016, for the starters at each of the 11 Colleges with data reported. The data show favorable increases in employed percentage at every College except Gulf Coast State College. Increases range from 3.0% to 21.7%, with an overall increase of 9.3% based on the difference of the weighted means.

Figure 5. Change in Total employment of Individuals starting the Grant Program

College	Column A Total Started	Column B Total w/Payroll at Start	Column C Percent Employed at start	Column D Total w/Payroll at End	Column E Percent employed at end	Column F Percentage Increase or (Decrease)
BC	322	217	67.4%	240	74.5%	7.1%
DSC	97	45	46.4%	57	58.8%	12.4%
FSCJ	392	204	52.0%	246	62.8%	10.7%
GCSC	288	204	70.8%	200	69.4%	(1.4%)
IRSC	255	155	60.8%	193	75.7%	14.9%

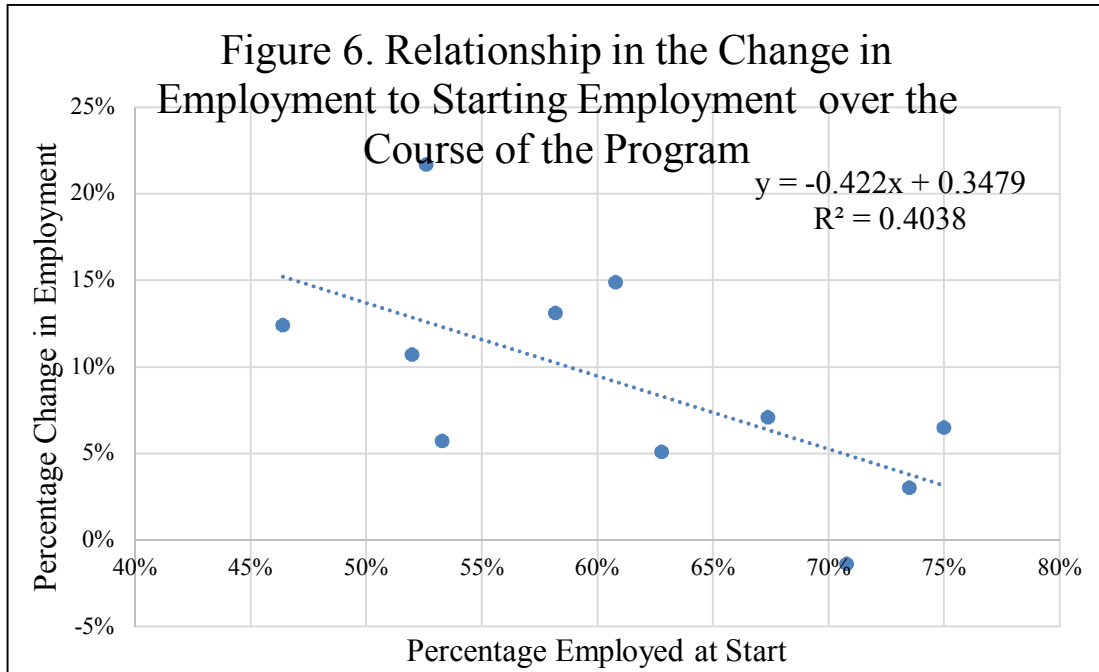
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<b>PBSC</b>	<b>200</b>	<b>150</b>	<b>75.0%</b>	<b>163</b>	<b>81.5%</b>	<b>6.5%</b>
<b>PHSC</b>	<b>261</b>	<b>139</b>	<b>53.3%</b>	<b>154</b>	<b>59.0%</b>	<b>5.7%</b>
<b>PSC</b>	<b>427</b>	<b>314</b>	<b>73.5%</b>	<b>327</b>	<b>76.6%</b>	<b>3.0%</b>
<b>SPC</b>	<b>153</b>	<b>89</b>	<b>58.2%</b>	<b>109</b>	<b>71.2%</b>	<b>13.1%</b>
<b>TCC</b>	<b>395</b>	<b>248</b>	<b>62.8%</b>	<b>268</b>	<b>67.8%</b>	<b>5.1%</b>
<b>VC</b>	<b>152</b>	<b>80</b>	<b>52.6%</b>	<b>113</b>	<b>74.3%</b>	<b>21.7%</b>
<b>Overall</b>	<b>2,942</b>	<b>1,845</b>	<b>61.7%</b>	<b>2,070</b>	<b>71.0%</b>	<b>9.3%</b>
			<b>Weighted Mean</b>		<b>Weighted Mean</b>	
			<b>Standard Deviation</b>		<b>Standard Deviation</b>	<b>Standard Deviation</b>
			<b>9.2%</b>		<b>7.1%</b>	<b>6.1%</b>

Key to College Abbreviations

BC = Broward College	PHSC = Pasco-Hernando State College
DSC = Daytona State College	PSC = Polk State College
FSCJ = Florida State College at Jacksonville	SPC = St Petersburg College
GCSC = Gulf Coast State College	TCC = Tallahassee Community College
IRSC = Indian River State College	VC = Valencia College
PBSC = Palm Beach State College	

A number of factors might impact the degree of increase in employment by the end of the program. For instance, if the number of incumbent workers enrolled at start the program is high, it can be expected that overall growth in employment percentage will be lower. Note in Figure 5, Column C, Polk State College (PSC) results show 73.5% employment at the start of the individual programs. PSC vigorously promoted its program in the manufacturing community and attracted many incumbent workers. The increase in the PSC employment percentage at the end of the program was only 3.0%, smaller than the overall TRADE difference of 9.3%. The trendline, in Figure 6, representing the regression of data in Columns C and F in Figure 5, indicates this inverse relationship between the start percentage of employed and the growth of employment through the program, with an admittedly low coefficient of determination ( $R^2$  value).



By comparison, as in Figure 7, it appears non-starter, non-completers were not as positively impacted by employment as were program starters. Only three of the Consortium member colleges, Florida State College at Jacksonville (FSCJ), Pasco-Hernando State College (PHSC), and St Petersburg College (SPC), recorded non-starter data. The data in Figure 7 indicate, for each of the three colleges reported, that starters received wages in more quarters after their program start than did non-starters throughout the duration of the TRADE program. The percentage of quarters with wages for each FSCJ, PHSC, and SPC starters is 59.5%, 59.1%, and 68.8%, respectively. On the other hand, percentage of quarters with wages for non-starters at the same colleges, respectively, is 43.9%, 54.6%, and 50.2%.

**Figure 7. Comparison: Total Quarters with Wages; Starters and Non-Starters**

College	Total Starters	Total Quarters with Wages for Starters	Total Possible Quarters for Starters	Percentage of Quarters with Wages for Starters	Total Non-Starters, Non-Completers	Total Quarters with Wages for Non-Starters, Non-Completers	Total Possible Quarters for Non-Starters, Non-Completers	Percentage of Quarters with Wages for Non-Starters, Non-Completers
FSCJ	392	1861	3162	59.5%	7	43	98	43.9%
PHSC	262	807	1351	59.1%	58	443	812	54.6%
SPC	153	622	904	68.8%	278	1954	3892	50.2%

For additional comparison, see Figure 8. This table indicates still further that the effects of the TRADE program are positive on starters in the program. Overall, more starters experienced wage growth than did those non-completers who did not enter the program. As indicated by the figure, 57.4% of the starters, overall, experienced wage increases, comparing favorably to non-starters, at 55.5% overall, reported by three partner colleges. However, when looking at these data in more detail by college, it is of interest that for the three colleges reporting non-starter wage data, each shows a higher percentage of non-starters with wage growth, than starters. The reason for this is unknown. In all instances, the data in Figure 8 do not take into consideration the dollar amount of wage increases reported.

**Figure 8. Wage Growth from Individual Start to End of Program; Comparison Starters to Non-Starters, Non-Completers**

College	Column A Total Starters	Column B Number of Starters with Wage Increase reported	Column C Percentage of Starters with Wage Increase	Comparisons, Non-Completers		
				Column D Total Non-Starters, Non-Completers	Column E Number of Non-Starters, Non-Completers with Wage Increase Reported	Column F Percentage of Non-Starters, Non-Completers with Wage Increase
BC	301	176	58.5%			
DSC	86	47	54.7%			
FSCJ	392	218	55.6%	7	4	57.1%
GCSC	288	139	48.3%			
IRSC	219	138	63.0%			
PBSC	203	114	56.2%			
PHSC	199	95	47.7%	57	30	52.6%
PSC	427	273	63.9%			
SPC	146	78	53.4%	278	154	55.4%
TCC	363	185	51.0%			
VC	152	109	71.7%			
<b>Overall</b>	<b>2573</b>	<b>1458</b>	<b>57.4%</b>	<b>342</b>	<b>188</b>	<b>55.0%</b>

## IV. Evaluation of Program Implementation

### a. Overview

- i. The approach used to evaluate the Florida TRADE Program Implementation considered the specific activities of the program relating to advanced manufacturing career pathway training, improving technological education and training program curricula, building collaborations within industry, with economic and workforce development organizations, and with other educational and training institutions, outreach to fully implement and deploy educational and training products and materials, and professional development as appropriate.

The approach for evaluating this organizational aspect of Consortium performance is based on assessment using the Baldrige Education Criteria for Performance Excellence or, interchangeably, the Florida Sterling Criteria for Performance Excellence. The Baldrige/Sterling model has been selected as the tool for this aspect of the evaluation because it is industry-recognized for managing and leading high performing organizations. When established as the Malcolm Baldrige National Quality Improvement Act of 1987, the goal of the model was to enhance the competitiveness of U.S. businesses. Its scope has since been expanded to health care, education, nonprofit, and government organizations. More than 160 organizations of all types and sizes have won either the Sterling or the Baldrige awards over the years, and about 20 of those are educational organizations. The model works. Winning organizations are shown to be higher performing than their overall industry counterparts. For instance,

- Baldrige education organizations effectively improve reading and mathematics proficiency and graduation rates.
- Baldrige Award winners create more jobs.
- Baldrige hospitals save more lives and are stronger financially.
- Baldrige small businesses demonstrate increasing sales, profits, and market share.
- Baldrige manufacturers' revenues improved 48% annually, on average.

The Baldrige/Sterling Criteria are an interrelated set of management best practice requirements aimed at increasing customer and stakeholder value, engaging the workforce (including the volunteer workforce) in driving organizational effectiveness, and creating higher and more effective organizational performance. The Criteria provide a framework for enhancing productivity, cost effectiveness, and continuous improvement, and improving bottom line effectiveness by helping the project focus on data and information that drive positive results. The Baldrige-style model provides an assessment tool for understanding organizational strengths and opportunities for improvement in the organizational leadership and management systems. In context of evaluation of the Florida TRADE Consortium, it assessed the capability of the program to achieve its goals and accomplish its mission.

The Baldrige/Sterling model is depicted in Figure 9 below.

**FIGURE 9 - BALDRIGE/STERLING CRITERIA FOR PERFORMANCE EXCELLENCE  
FRAMEWORK  
A SYSTEMS PERSPECTIVE**



The **Organizational Profile** (top of figure) sets the context for the way organizations operate. The environment, key working relationships, and strategic situation—including competitive environment, strategic challenges and advantages, and performance improvement system—serve as an overarching guide for the organizational performance management system.

**Performance System** - The performance system consists of the six categories in the center of the figure that define the processes and the results achieved.

The **leadership** triad (Leadership, Strategy, and Customers) emphasizes the importance of a leadership focus on strategy and customers.

The **results** triad (Workforce, Operations, and Results) includes the workforce-focused processes, key operational processes, and the performance results they yield. All actions lead to Results: a composite of product and process; customer-focused; workforce-focused; leadership and governance; and financial and market results.

The center horizontal arrow shows the critical linkage between Leadership and Results and the importance of feedback in an effective performance management system.

The **System Foundation** (Measurement, Analysis, and Knowledge Management) is critical to the effective management and to a fact-based, knowledge-driven, agile system for improving performance and competitiveness.

Reference for the above: "*2015-16 Sterling Management System Resource Guide*," Section III page 17.

## **b. Evaluation Methodology**

- i. The evaluation included two scheduled assessments of the Florida TRADE Consortium completed in March 2014 and May 2015. Both assessments, reports attached as Appendices B and C, respectively, used a collaborative process that was

accomplished by a team of three very experienced Baldrige/Sterling Master Examiners, i.e. Philip Centonze, Barbara Barnhouse, and David Klater. The process consisted of a review of Florida TRADE documents and materials that were provided either on line or in person along with site visits conducted at each of the 12 Florida TRADE Consortium member colleges. Interviews were conducted with Dr. Gary Graham – Executive Director, and with each of the twelve program managers. The assessment evaluated the program's overall approaches to leadership, management, and business systems and practices, based on the Baldrige/Sterling Criteria.

The focus of the evaluation was to identify program strengths, opportunities for improvement, and recommendations to ensure the Consortium satisfies its partners and stakeholders as to the program's performance and success. Evaluation results were intended to assure stakeholders the program was operating in manner that consistent with industry-recognized best business management practices and instill confidence in stakeholders in the capability of the program organization to achieve its performance goals. This evaluation methodology provided information for making program improvements to better align resources and activities in achieving program and TAACCCT grant goals.

The assessment was rooted in the establishment of a foundation of the Consortium organization and culture of the program in which the direction for success is set. A best practice among high performing organizations is the establishment and deployment to all stakeholders, of a clear organizational purpose and function. The assessment evaluated the extent to which organizational vision, mission, and values were established and communicated to all partners and stakeholders in a clear and concise way. When appropriately communicated, these foundational elements help stakeholders understand where the organization is headed and what must be accomplished to be successful. Understanding by stakeholders was helpful in aligning decisions and resources at all points in the Consortium organization.

An implicit element of the Program Implementation Evaluation was the development of an Organizational Profile (Appendix A) early in TRADE implementation, prior to the evaluations. The Organizational Profile defined the



internal working environment and the external environment in terms of students, partners, customers, and stakeholders, as well as the relationships with them. In the profile document are described organizational strategic challenges and advantages, and key factors to success. The profile was accessible for sharing with industry partners, to be used as an instrument to earn stakeholder confidence, identify gaps in key information, and focus on performance requirements and results.

Figure 10 demonstrates some of the project issues addressed by the evaluation team.

<b>Figure 10. – Project Issues and Criteria Categories</b>	
<b>Project Issues</b>	<b>Criteria Category Assessment</b>
How is the particular curriculum selected, used, or created?	Categories 2, 3, and 6
How are programs and program design improved or expanded using grant funds?	Categories 4 and 6
What delivery methods are offered?	Categories 3 and 6
What is the program administrative structure?	Categories 1 and 5
What support services and other services are offered?	Categories 3 and 6
Does the grantee conduct an in-depth assessment of participants' abilities, skills and interests to select participants for the program?	Categories 2 and 6
What assessment tools and process are used?	Category 6
How is the assessment results used?	Categories 2 and 4
Are the assessment results useful in determining the appropriate program and course sequence for participants?	Categories 3, 4, and 6
Is career guidance provided and if so, through what methods?	Categories 3 and 6
What contributions does each partner make in terms of: <ul style="list-style-type: none"> <li>• Program design</li> <li>• Curriculum development</li> <li>• Recruitment</li> <li>• Training</li> <li>• Placement</li> <li>• Program management</li> <li>• Leveraging resources</li> <li>• Commitment to program sustainability</li> </ul>	Categories 1, 2, 5, and 6
What factors contribute to partners' involvement or lack of involvement?	Categories 1 and 5
Which contributions from partners are most critical to the success of the grant program?	Categories 2, 4, and 6
Which contributions from partners have less of an impact?	Categories 2, 4, and 6
Key: Category 1: Leadership Category 2: Strategy Category 3: Customers Category 4: Measurement, Analysis, and Knowledge Management Category 5: Workforce Category 6: Operations	

## b. Summarized Findings

- i. The following recommendations were made as a result of the first assessment completed in March 2014:
  - Improve collaboration and sharing processes and systems for best practice documentation and sharing between Consortium members
  - Develop a set of balanced performance measures for the Consortium that include measures of program and process efficiency and effectiveness
  - Develop systematic Consortium-level action plans and use continuous improvement tools to ensure that Consortium goals are met and/or exceeded
  - Document Consortium key processes and programs to ensure ease of sustainability and sharing between members

As a result of the 2014 assessment, action plans were developed and implemented, resulting in improvements to the deployment of Florida TRADE throughout the state. These improvements are reflected in the findings of the 2015 assessment. Following is a summary of the **key strength themes** from the 2015 assessment.

The Florida TRADE Consortium has:

- Established a web of **collaboration and coordination** of resources across the state with a focus on building workforce pipeline skills to meet industry needs. The Consortium has become the linchpin for collaborative efforts among colleges (including some not formally incorporated in the Consortium), state and regional manufacturers associations, CareerSource boards, and others in discovering and meeting the needs of students and manufacturers.
- Further developed and expanded **an infrastructure and a strong communications network** among the twelve member colleges and manufacturing community resulting in routine sharing of best practices, online tools, and programs, and the creation of strong personal relationships that are likely to be sustained long-term. These include a statewide Steering Committee with five sub-committees (Curriculum, Evaluation, Technology, Workforce,

Outreach), and a regional committee structure tied to each of the 12 member state colleges.

- Created a **customer-focused environment** through the identification and segmentation of the key customer groups and the expectations and requirements for services and programs for each group at both the state and regional level. Many outreach activities have taken place to build and retain strong partnerships with manufacturers, potential students, and CareerSource boards across the state. Listening to the voice of the customer and customer relationship building includes:
  - Work with specific manufacturers to gain commitment to establish internships and provide programs that meet their specific requirements
  - Work with veteran groups, CareerSource boards, and public high schools and trade schools to find and attract capable students
  - Creation and distribution of marketing brochures, websites, and program materials
  - Making presentations to numerous organizations such as Economic Development Councils, Chambers of Commerce, School Boards, and student groups
  - Use of Social Media (Facebook, Twitter)
  - One-on-one meetings with various customers leading to better segmentation and understanding of the needs of students and manufacturers
  - Customized student needs (Skills, interviewing, mentoring, resume writing)

Figure 11 shows the key customer groups and the overall requirements for each.

<b>Figure 11. – Key Customer Groups</b>	
<b>Key Customer Groups</b>	<b>Key Expectations/Requirements for products, services, programs, and/or operations</b>
Florida Manufacturers/ Employers	Accelerated training programs that provide program completers with the skills necessary to be hired into entry level positions in manufacturing and that allow incumbent workers to upgrade current skills and learn new skills.
Students/Program Participants (Displaced workers, unemployed workers, veterans)	Accelerated training programs that lead to internship positions and job opportunities in manufacturing and provide a pathway for earning college credits and degrees.
Students/Program Participants (Incumbent workers)	Training programs that provide new skills, upgrade current skills, and may lead to higher pay or promotional opportunities.

### c. Operational Effectiveness

- i. While outcome measures define the overall success of a program, operational effectiveness is key to achieve the required outcome and is demonstrated throughout the life of a program through multiple cycles of evaluation and improvement utilizing industry accepted analysis methods and tools.
- The **Florida TRADE Grant Handbook**, developed in 2012 and revised in 2014, served as a very complete tool for the management of all key grant functions including budget and fiscal management, administrative responsibilities, legal compliance, reporting requirements, incident reporting, available resources, the program's mission, vision and values, along with a detailed description of key processes. The Grant Handbook served as a critical resource for day to day program management and for sustaining the programs key function for the future.
- Florida TRADE used multiple tools designed to manage and improve operational processes throughout the program with many documented in the Grant Handbook including:
  - Process Flow Charts (Figure 12)
  - Cooperative State Research, Education, and Extension Service (CSREES) Logic Model
  - Supplier, Input, Process, Output, Customer tool (SIPOC) (Figure 13)
  - Individual Development Plan Pathway Flow Charts (Program Overview, CNC, MSSC-CPT)
  - Roles and Responsibilities by process step and each stakeholder with best practice recommendations
  - Action Plans
  - PDCA – (Plan-Do-Check-Act)
- Florida TRADE implemented improvements to three key processes by using a Plan-Do-Check-Act improvement process. The improved processes were Parent Outreach, Placement, and Instructor recruitment. Action plans were developed at the Consortium-level to implement these improvements. This resulted in improvements in student recruitment and placement, and in more effective instructor recruiting.

- Due to low student success rates in passing the MSSC CPT Certification testing, several of the colleges made improvements to this training. Improvements made included additional classroom hours, additional hands-on experience, using employees from manufacturers as instructors, and adding OSHA 10 or OSHA 30 training to the MSSC CPT program. Indian River State College's Fast Track training program was a good example of implementation of these improvements. This resulted in better success rates for students in achieving these certifications.
- Florida TRADE, with key stakeholders from Colleges, Workforce Development Boards, and Manufacturers, identified eight key processes that were critical to the success of Florida TRADE activities in the areas of Outreach/Recruitment, Enrollment/Application and Placement. These processes were captured as high-level flow charts during a November 2012 Collaborative Engagement. They were then refined at the May 2014 Building Strong Partnerships workshop. A fourth area was also added at the May 2014 workshop to address Advisory Councils. To maximize the usefulness of these efforts this document was further developed to add more detail regarding related roles and responsibilities and document the best practice recommendations.

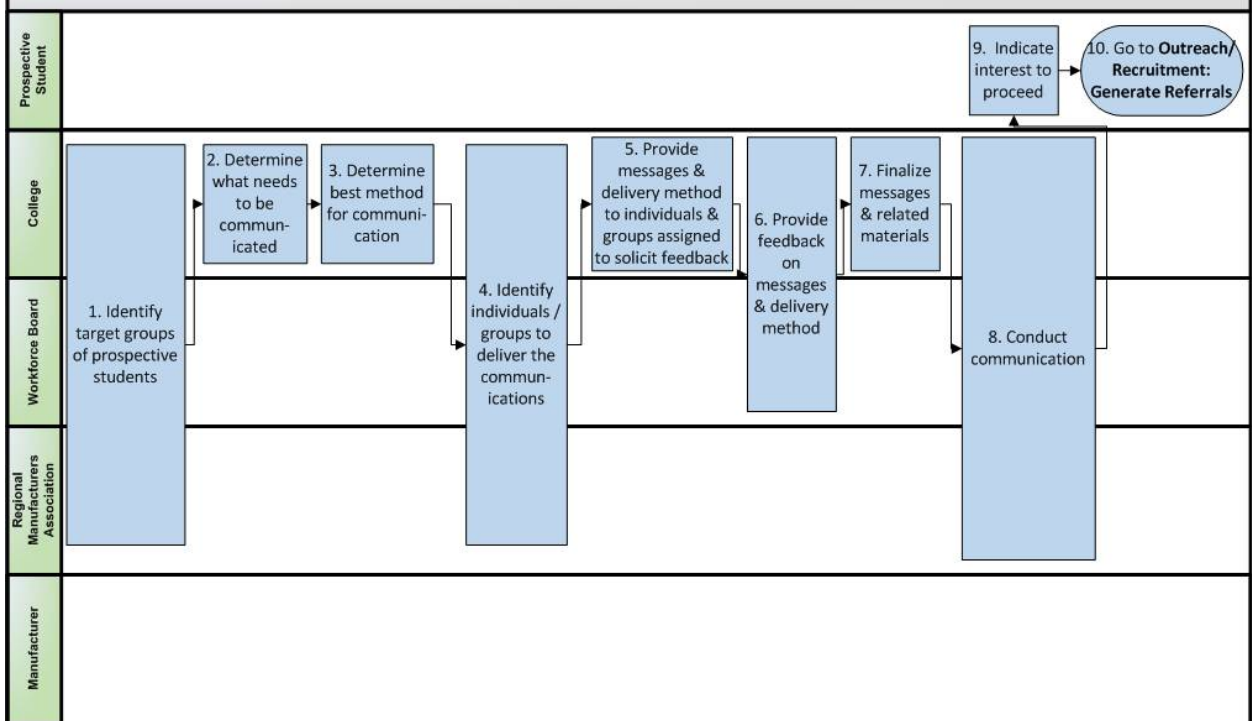
The four key processes are:

1. Outreach/Recruitment (Includes three sub-processes)
2. Enrollment/Application (Includes two sub-processes)
3. Placement (Includes three sub-processes)
4. Advisory Councils (Includes two sub-processes)

As an example, the map for process 1.1 is provided in Figure 12 below:

**Figure 12. – Process Map #1.1 – Conduct Prospective Student Outreach and Recruitment**

**1.0 Outreach/Recruitment – 1.1 Create Awareness with Prospective Students** *(Awareness Outlets/Partners – Communication Center)*





Florida TRADE developed its program to include pathways and credentials designed to meet the needs of the manufacturing community as depicted in the SIPOC depicted in Figure 13.

<b>Figure 13.: Florida TRADE SIPOC Diagram - June 2014</b>					
<b>Suppliers</b>	<b>Input</b>	<b>Process</b>	<b>Output</b>	<b>Customer</b>	<b>Requirement</b>
<b>SPC &amp; Partner Colleges</b>	-Facilities; - Training Equip; -Offices; - Office Equipment; - Classrooms; -IT Support; - Budget Support; - Admin support	<b>-Outreach to Manufacturers</b>  <b>-Identification of manufacturer needs and program development</b>	<b>Skilled Workers</b>	<b>Manufacturers</b>	Employees and Interns with the right hard & soft skills, when needed
<b>Manufacturers</b>	-Expertise (Curriculum Review, Advisory Councils, Direction) -Job and Intern Opportunities -Speakers -Incumbent Workers		<b>-Outreach to potential students</b>	<b>Jobs</b>	<b>Unemployed Workers</b>
<b>Vendors -SRI -MTI - CareerSource -POS-IMPACT -MAF/RMAs</b>	-Technology & Expertise -Expertise & Consulting -Potential Students -Expertise & Evaluation -Expertise & Outreach	<b>-Recruitment, assessment, and enrollment of students</b>	<b>Upgraded skills</b>	<b>Incumbent Workers</b>	Training which provides opportunity for raises & promotions; and allows mobility
<b>DOL</b>	Funding Direction	<b>-Delivery of program training</b>	<b>Jobs with a future</b>	<b>High School and College Students</b>	Career opportunities
<b>Subject Matter Experts</b>	-Program Development -Expertise -Instructors	<b>-Job and internship placement</b>	<b>Jobs with a future</b>	<b>Veterans</b>	Jobs matching previous military experience
<b>State of Florida</b>	-Assessments				

The Consortium delivered the following:

- Manufacturing Skills Standards Council Certified Production Technician (MSSC CPT)
- Certified Machinists through the National Institute of Metalworking Skills (NIMS)
- Certified Welders through the American Welding Society (AWS)
- Certified Quality Technicians & Inspectors, including Six Sigma Certifications through the ASQ (formerly the American Society for Quality)
- Certification of Safety & Health through the Occupational Safety & Health Administration (OSHA)
- Certification– Mechatronics through the Packaging Machinery Manufacturing Institute (PMMI)

## V. Evaluation Conclusions

### a. From Evaluation of Participant Outcomes and Impact

- i. The Florida TRADE program was successful in accomplishing its mission and implementing its strategies, despite a few areas of continued opportunity for improvement worthy of note.
- ii. Mission and Elements accomplishment: *To develop and deliver accelerated technical training programs that upon completion will allow participants to:*
  - *Upgrade current skills and knowledge and Learn new skills.* The TRADE Consortium offered a wide range of programs and successfully delivered them to train prepare individuals for work in a variety of manufacturing positions with skills desired by industry employers. While over 4,000 individuals were served by TRADE, nearly 2,500 completed a TAACCCT-funded program of study. This number surpassed the target.
  - *Gain industry-recognized technical certifications.* Over 2,300 individuals earned at least one industry-recognized and portable credential. While this number was short of the target, many of these individuals went on to earn a second or third credential.
  - *Earn academic credits toward college degrees.* 773 individuals completed credit hours in the TRADE program, and 735 enrolled in further education following the TAACCCT-funded program of study. Both these exceeded the targets.
  - *Procure employment.* 977 individuals were placed with manufacturer employers. While this number fell short of the target, the collaboration and communication in the network of colleges, manufacturer associations, and CareerSource partners demonstrated a willingness and ability for varied elements in the manufacturing talent development ecosystem to align for the benefit of industry and the community at large. Without the presence of the TRADE program focus, some aspects of this collaborative network will most

likely remain but perhaps not to the same intensity as when the TRADE Consortium was at the center.

- The data extracted from the EFM database indicate the TRADE Consortium was effective in giving an advantage to TRADE program participants/completers in the marketplace for employment. The data show increased likelihood that a program starter would be employed by the end of the TRADE program and would be more likely than a non-starter to earn wages in any quarter during the TRADE program.

ii. Organizational Strategies to accomplish the Mission by:

- ***Aligning partner colleges' resources to offer wide access to training and Sharing existing targeted curricula which will be deployed in a non-traditional academic environment.*** Networking and facilitation of communications within the network of Consortium colleges was a boon to the successful operations of the TRADE program. In interviews with program managers, evaluators continuously heard praises about the network and best practice sharing opportunities. Program managers were pleased to have the opportunity for and took advantage of resource sharing, whether instructors or curriculum or piggy-backing in distance learning offerings at other colleges in the network.
- ***Providing short-term certification training that results in stackable or latticed industry-specific credentials that articulate to state-wide Associate of Science (A.S.). Degree programs.*** Over 2300 individuals earned at least one industry-recognized credential. Many of those, including the MSSC CPT credential and others, are foundational elements of the National Association of Manufacturers-endorsed industry credential fitting in to a system of stackable credentials. In Florida, the MSSC CPT is a core component of the Engineering Technology two-year A.S. degree program. Individuals earning the certification are eligible to reduce the 60-hour degree program to 45 hours.
- ***Partnering with the Manufacturing Association of Florida Center for Advanced Manufacturing Excellence to provide internship opportunities and enhanced networking directly aligned with manufacturers and***

*Listening and responding to the needs of business, industry, and local manufacturing associations by developing innovative curriculum that blends and infuses Problem solving and critical thinking skills; Analytical Skills; Computer Skills; and Transferable Skills.* Colleges in the Consortium network were involved at differing degrees with the regional manufacturer associations (RMAs) to provide a two-way conduit of information, networking, and feedback between the colleges and the industry. Through the Manufacturers Association of Florida Center (MAF CAME) the RMAs solicited and collected opportunities from their respective regional manufacturers, opportunities to promote to prospective employees and interns participating in a TRADE program of study. Input from the manufacturers, funneled through this network to the local college was integrated into curriculum improvement and development efforts to better meet the manufacturer needs for skilled employees.

**b. From Evaluation of Program Implementation**

- i. Both program implementation evaluations provided Florida TRADE with detailed reports noting the strengths and also opportunities for improvement or challenges going forward. Action Plans were developed with strategies, objectives, goals, drivers, due dates, and status. While many of the opportunities were applicable to the program, there are several outstanding opportunities the evaluation team felt may be used as lessons learned and can be addressed in future projects.
  - Sustainability of critical TRADE functions was an open question at program end. In a discussion of sustainability of a typical organization the dialog is about how the organization will sustain itself and its success into the future. “Sustainability” takes on a slightly different meaning when referring to a finite-life, grant-funded project, like Florida TRADE. A number of successful outcomes as identified in this report, are the result of the initial funding and focus facilitated by the TAACCCT grant-funded TRADE Consortium. The level of collaboration and cooperation achieved generally within the network of Consortium colleges, with CareerSource and Regional Manufacturer

Association partners, as an example, was tremendously beneficial. The state-wide efforts of other organizations in the manufacturing training and education ecosystem were enhanced by the focus and resources TRADE brought to bear. Cooperation and alignment of statewide resources was evident in instances such as statewide career fairs, sharing of distance learning resources, and others. While it is desirable to perpetuate or sustain a successful organization, TRADE and its beneficial effects, in this instance, it is not always possible to amass the funding sources necessary to support the entity as a whole. Therefore, with these circumstances, it becomes important to identify key elements and functions of the mission and find ways for those elements to be sustained independent of the originating agency. As has been observed in other similar situations, functions were spun off to partner organizations resource-capable of assimilating the spun-off function/activity into the partner's mission. That did not happen. TRADE effort could have been directed to find an independent home for each essential TRADE function.

- The Florida TRADE colleges had built a strong network of relationships and best practice sharing resulting in the availability of better programs and courseware for students and manufacturers. However, these relationships and sharing were weakened as Florida TRADE ended. Without a plan to ensure the long-term **sustainability** of the functions processes, programs, and relationships funded by the TAACCCT grant and developed by this Consortium, the following losses will most likely occur:

- Weakening or loss of relationships and networking between industry, colleges, and CareerSource workforce development boards
  - Loss of relevance of program completion, therefore completers may have less value to employers (skills, knowledge, behaviors, job placement opportunities)
  - Loss of staff or instructor capability and capacity
  - Weakening of a unified statewide strategy to build a flow of qualified workers into manufacturing positions
  - Weakening of pathways between manufacturing focused certificate programs and degree programs
  - Loss of the Florida TRADE brand name and recognition
  - Loss of ownership of Florida TRADE documents for retention, updating, and sharing
  - Loss of sustained functions and associated processes
- The Consortium had not fully developed and implemented a set of balanced performance measures depicting the **efficiency and effectiveness** of the program. For example, some of the colleges had lengthened the amount of classroom hours required for MSSC CPT certification programs to increase the percentage of students able to pass the required testing. However, for example, measures were not in place to determine the optimum classroom time for each of the various modules to enable a high passing rate while keeping the cost of delivering this class as low as possible. Additionally, there were no measures showing the satisfaction of the manufacturing community with students who had completed the various Florida TRADE programs. Without a balanced set key performance measures, it may be difficult to validate or confirm the Florida TRADE vision of attaining status as a national role model.
  - Neither the Consortium nor the individual colleges systematically considered **cost effectiveness and efficiency** in the delivery of curriculum. For example, several of the colleges had offered to share their classes with the other colleges; however, many had not taken advantage of that opportunity. Additionally, at times training was delivered to very small cohorts of only a few students when

there may have been opportunities to combine these into larger more cost-effective groups. As a result, opportunities to reduce the cost per student certification were not fully addressed. This may make it more difficult to continue Florida TRADE programs if they are ultimately being delivered by the college corporate training departments that cannot operate without profitable programs.



# Appendices