

MIRACOSTA COLLEGE
TECHNICAL CAREER INSTITUTE
DOL-TAACCT ROUND 3

IMPLEMENTATION ANALYSIS



Technical Career Institute

MiraCosta Community College

Department of Labor TAACCCT Grantee

Implementation Analysis Evaluation Report

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EXECUTIVE SUMMARY

The Technical Career Institute (TCI) was created by MiraCosta College, Department of Community Services and Business Development, using TAACCCT Department of Labor grant funding. The goals of the program were: to expand its small but successful industry-recognized machinist certificate program, to create industry-needed electronics engineering and robotics/automation certificate programs, and to further increase worker earning potential by adding industry-responsive mini-manufacturing programs to increase incumbent worker skills.

TCI utilized a combination of several evidence-based programs to impact student success, including the components of Jobs for the Future's "Breaking Through" approach (Leibowitz, 2004):

- ***Accelerated Learning.*** "Short-term intensive learning programs enable adults to make rapid progress and complete programs more quickly," which "strengthens persistence by enabling students to see progress," and "meets the needs of working adults."
- ***Comprehensive Support Services.*** "Research suggests that career counseling, advising, academic and social supports, and case management improve the persistence and success of low-income, low-skilled adults in community colleges."
- ***Labor Market Payoffs.*** "Organized around strong partnerships with employers" and "driven by employer skill needs and local economic development priorities," programs "that link skills and credentials to specific economic outcomes are critical to the persistence and success of low-income working adults."
- ***Integration and Program Alignment.*** "To serve students with low basic or pre-college skills," programs need to be designed "in order to integrate adult education, workforce development, developmental education, and noncredit programs and create multiple paths leading into and through occupational and technical degree programs."

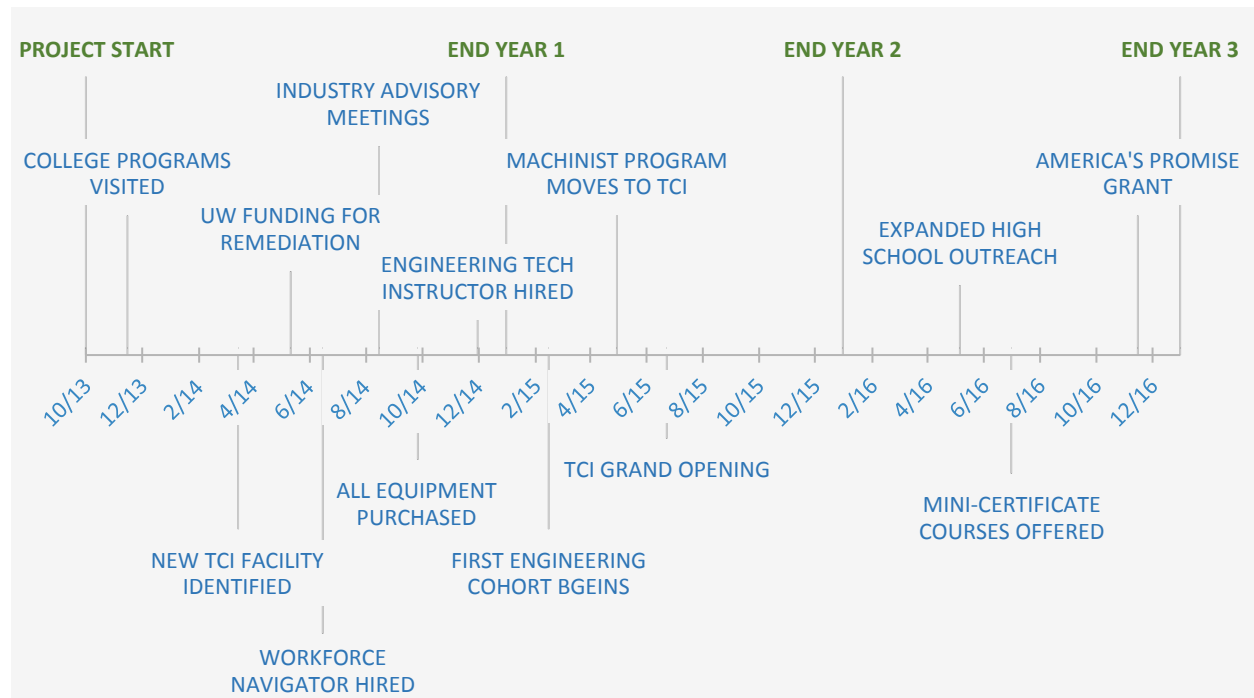
Accelerated learning, comprehensive support services, labor market payoffs, and integration and program alignment have been instrumental to the success of students at TCI, and this has helped fulfill industry need for skilled workers. Since TAACCCT funding was awarded

in 2013, TCI has launched two new or expanded certificate programs designed to address San Diego's need for highly skilled machining and engineering technicians. These are: 1) the expanded 14-week Machinist Technician program, which now includes optional NIMS certification; and 2) the 15-week Engineering Technician program. The number of incumbent programs has also been increased from a handful to over 20, and dozens of new mini-manufacturing programs have been added to serve incumbent workers in gaining and enhancing work skills. A California-approved Certified Apprenticeship program has been approved, and the addition of others is anticipated. Students have been able to navigate into and through these accelerated learning programs with the help of advisory, academic, and financial support services organized through efficient case management, and have emerged as strong and successful job candidates due to the integration and alignment of the programs with industry needs.

Implementation Analysis (IA) begun at Year 2 focused on the progress of implementation and systems change that occurred throughout the program. Student impact data was collected ongoing and shared with program staff. This data and mandated GPRA measures will be detailed in the final evaluation report, but preliminary analysis indicates that through increased industry connections and incorporation of industry feedback both certificate programs have experienced over a 90% hire rate by local employers within one month of program completion. Preliminary analysis of process data also indicates attrition is low, with around 90% of participants remaining in the program and a graduation rate of 98%. The total hire rate is 88%, with the remaining graduates continuing their education.

In terms of fidelity to the DOL-approved Statement of Work (SOW), all strategies have been implemented, all positions have been filled or refilled as needed, and almost all activities and deliverables are on time or complete. Due to capacity issues and lower than anticipated student numbers in the first year, a mid-year implementation plan was created and approved by DOL. The objectives were completed and the program is on track to meet financial and reporting requirements by the end of the fourth fiscal year. Figure 1 shows major program milestones through Year 3.

Figure 1. TCI Milestones



In just three years, TCI has evolved from a small program temporarily housed in a local community center to a large, dedicated facility that is recognized by industry partners for the quality of training provided. Such recognition of their success is expanding. This was exemplified when MCC received a 3-day accreditation visit from the Accrediting Commission for Community and Junior Colleges (ACCJC), Western Association of Schools and Colleges (WASC). The visiting team provided the college with six commendations, one of which was for the TCI and its innovative approach to career training.

In addition, MCC has applied for the recognition of TCI as a Center of Excellence. The Centers of Excellence designation is prestigious and will be instrumental in helping TCI and MCC apply for additional public and private funding to sustain and expand the program. Being designated as a Center of Excellence means that funders, industry and government partners, students, and community will recognize that TCI is a leader in, and a model for, the implementation of best practices in advanced manufacturing instruction.

INTRODUCTION AND BACKGROUND

The Technical Career Institute (TCI) was established using TAACCCT Department of Labor grant funding to expand MiraCosta College's successful, industry-recognized machinist certificate program, and to create electronics engineering and robotics/automation certificate programs to fulfill industry demand for workers in these areas. TCI students can earn a credential in 14 or 15 weeks that will help them find a job and move up the career ladder in their chosen field.

The goals of the program were to:

- 1) Increase attainment of certificates, degrees, and other relevant, industry-recognized credentials that match the skills needed by employers and better prepare TAA-eligible workers for high wage, high skill jobs;
- 2) Introduce innovative and effective methods for designing and delivering instruction; and
- 3) Demonstrate improved employment outcomes.

More ambitiously, the program aimed to not only train participants and demonstrate improved employment outcomes through innovative methods, but to also leverage MiraCosta's social capital, build a state-of-the-art technical training facility, and enact system change within a community college located in a large urban area. The program set out to accomplish these goals through the following strategies:

Strategy 1. Program start up.

- 1.a Build an infrastructure that supports strong industry connection and input from previous TAACCCT awardees.
- 1.b Develop and align curricula to industry needs, using evidence-based models and National Certification standards.
- 1.c Coordinate with TAA rep, Veterans rep, and local One Stops to collaborate on identifying potential students, assessment strategies, and service needs.
- 1.d Prepare an inviting state-of-the-art facility conducive to accelerated and blended learning, job readiness, and skills development.

Strategy 2. Deliver instruction.

- 2.a Student recruitment with planned assessment and remediation tools available.
- 2.b Coursework implementation utilizing "Breaking Through" approach through Accelerated Learning, Comprehensive Support Services, Labor Market Payoffs, and Aligning Programs for low-skilled adults.

Strategy 3. Articulation and stackable credentials.

- 3.a Create course certifications for developing competencies that are recognized by industry.
- 3.b Establish work experience, internship, and job placement services.
- 3.c Create educational and career pathways for TAA eligible workers, Veterans, and other adults.

Strategy 4. Evaluation.

- 4.a Course evaluation using data and industry input for continuous improvement.
- 4.b Project evaluation, including comparison cohort.

With the input of industry advisory committees, during 2013-14 (Y1) the program focused on: 1) the expansion of the existing machinist program, 2) exploring best practices for technical education at community colleges, 3) planning for startup of the Electronics Engineering Technician program, and 4) negotiating the move of the program to a new facility. Considerable effort was spent working with local civic official and leveraging several business collaboration initiative policies spearheaded by the college. A lease was brokered with the City of Carlsbad. Retrofitting the facility to meet technical education needs delayed the expansion of the program, but upon completion the facility was lauded as the state of the art technical education facility in the area. The facility itself has acted to enhance further recruitment. In Year 2 (2014-15) the new Technical Career Institute was opened with both certificate programs fully operational. Year 3 (2015-16) was devoted to calibrating the certificate programs based on feedback from students, instructors, employers and other industry partners, and also to developing other programs and pathways for incumbent workers to enhance skills needed by local industries.

The evaluation proposal included an Implementation Analysis (IA). This analysis focuses on program start-up and development, and has been informed by the program goals and strategies for assessing progress towards these goals and all other mandated outcomes.

The overarching goal of the IA is to produce a comprehensive picture of the development and roll-out of the program, while the underlying evaluation goal is to provide ongoing evaluative feedback that contributes to program improvement as the program continues to mature and develop (Maxwell, 2013). The evaluation utilizes a developmental evaluation framework to capture emergent change and system level impact within the community college setting and within broader community-wide systems that include local industry.

The evaluation plan had a soft delivery date of the IA in the second program year, but in order to gain a better picture of progress the report was finalized after the establishment of both certificate programs, the move to the new facility, and the completion of data entry into the program evaluation database in Year 3. Portions of the analysis have been shared with TCI administration and staff throughout the first three years to provide feedback to program administrators, staff, faculty, and stakeholders.

METHODOLOGY

The implementation analysis utilized several evaluation methodologies including observation of meetings and programs, focus groups, questionnaires, and key stakeholder interviews. The theory of change was that as a result of increased industry-driven program capacity as well as enhanced and shortened program/training time, there would be higher student retention rates, shortened training to job timeframes, and fulfillment of demonstrated industry need. See Appendix A. The goal of the analysis is to produce both quantitative and qualitative data that allows for drawing causal inferences regarding program effects in relation to this theory of change.

The inquiry framework for the program is Developmental Evaluation, which is designed to capture all emergent program components (Patton, 2011). This bottom-up method supports the theory of change of new and developing programs by tracking fidelity to allow the program to monitor adaptations and changes as they arise in response to data collected and lessons learned (Chen, 2009). Appendix B summarizes data sources and methods. The evaluation team conducted:

- Informal industry representative interviews
- Industry partner surveys
- Student focus groups
- Student interviews
- Student questionnaires
- Interviews with instructors of both programs
- Key staff interviews
- Document reviews (archives of program catalogues)

Several data points were added to evaluation rubrics and tools based upon industry feedback regarding hirability. Information gathered through these tools was shared through both a first-year Evidence Brief and in subsequent White Sheets containing summary data. The data was cumulative over the entire program operation. Summaries of this data from Year 1, 2, and 3 White Sheets are included as Appendices C, D, and E. Data was shared with the team and

instructors through periodic meetings, which occurred more frequently early in the program and less often as the program ramped up.

Implementation Analysis (IA) research questions incorporate an actual vs. ideal framework to provide an inquiry scaffold. The questions were developed with the hypothesis that the changes planned will result in a more relevant training program which will be responsive to employers needs and thus produce better prepared workers who are employable. This informed a self-reflective Implementation Analysis Rubric that key program staff completed at the end of Year 3 to validate their sense of program progress (Blase, 2013).

The evaluation used methodology and questions outlined in the evaluation plan. See Appendix B. Each of the questions was incorporated into three areas of inquiry, each of which guided the IA during Year 1, Year 2, and Year 3. In addition, the evaluator developed a pre-post student questionnaire based upon workforce readiness assessments and program satisfaction. Questions used were derived from standardized Career Training Instruments to track student's confidence and soft skill acquisition (O'Neil, 2014).

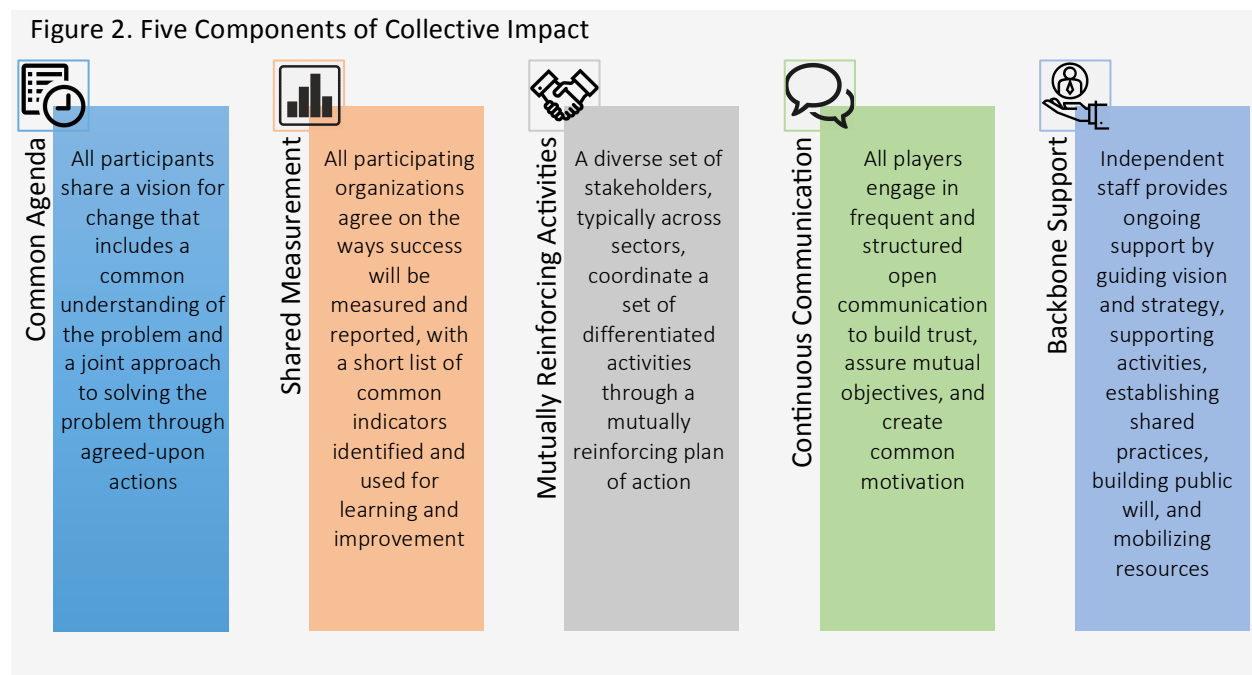
The creation of the TCI would not have been possible without systems change at MCC. The overriding questions pertinent to evaluating such change were:

- 1) What were the systems change impacts of programmatic efforts?
- 2) How did the program change how it situated itself in meeting the needs of industry and workers?
- 3) How did this program affect the ability of MCC to attract students, and engage business, civic, and industrial communities in an effort to enact and sustain overarching change?

The TCI program was very strategic in working with all the MCC departments from the very beginning of planning. The program solicited cooperation from the departments and promoted collaboration rather than competition. TCI also collaborated with industry partners and social services organizations to ensure that their needs and the needs of workers were being met. The evaluation has attended to these collaborative efforts to assess the impact and

sustainability of TCI and systemic changes within the program and its broader institutional contexts as it has been implemented.

Through feedback from staff and industry, and direct program observation, the questions regarding sustainability and systems change from the partner perspective were examined through the lens of Collective Impact (Kania, 2011). Collective Impact was an appropriate lens to collect measures from partners who are an essential component of the TAACCCT grant. The five components of Collective Impact are incorporated into the evaluation rubric and integrate mechanisms from the literature around analyzing collective impact (Preskill, 2014). See Figure 2.



Utilizing instruments created to measure Collective Impact, the evaluation team created a rubric to measure tracking with the essential components of collective impact. Measurement was conducted in Years 1,2, and 3. Additional measures of Systems Change were collected at the MCC Community College level, and at the local civic recognition and policy levels. Engagement with non-conventional partners was also noted as the program built capacity and enhanced its public presence. In addition, web analytics were considered, as well as measures of student discovery of the program. Details of these metrics are reported in relevant areas of the results section below.

RESULTS

The TCI has had substantial impact on both MCC and the local community, and has established significant partnerships within the education, industry, and non-profit sectors. TCI has leveraged these partnerships and also grant monies to develop a state of the art facility and courses that benefit MCC, local industry, and the community. Positive feedback has in turn allowed TCI to tap into economic and intellectual capital from industry partners and the community that did not previously exist.

Moreover, TCI successes have been used by MCC to promote a college bond measure that resulted in

TCI has created a culture change at both MCC and the North San Diego area. With the increase in the number of courses and programs offered at TCI, the value of accelerated work skills to our local industries has increased. Where there was general good will about the creation of TCI, there is now a much more profound appreciation for the types of programming offered at TCI. The affluent residents of Carlsbad, where TCI is located, and our own college faculty have begun to see the tremendous value in offering an alternative pathway for a significant number of local residents.

– MCC Director of Community Education & Workforce Development

approval of a \$455 million bond by local residents – the first time in more than 50 years that such a bond was passed. Business groups and the San Diego County Taxpayers Association were among those backing the proposal, which included construction of career training facilities for

MiraCosta College is a job generator that plays a major role in driving the coastal North County economy and provides skilled training in growing fields such as biotechnology, nursing, maritime technology and high-tech manufacturing. A recent report analyzing the economic impact of higher education systems found that MiraCosta College pumps \$338.4 million into San Diego County's Gross Regional Product annually – enough to support 5,041 jobs in its service area each year.

– OsideNews.com, 2016

science, nursing, health care, engineering, and skilled trades. The positive impact of TCI added credibility to MCC's case for the needed expansion of training facilities.

The success of TCI and its impact on MCC and the local community result from significant

progress in the implementation of all activities proposed to achieve its strategic objectives. Table 1 provides an at-a-glance assessment of program activity status at the close of Year 3.

TABLE 1. Status of Program Activities as of 9/30/2016

ACTIVITIES		STATUS	START / END DATE	DELIVERABLES
1. Program Start Up	1.a Build an infrastructure that supports strong industry connection and input from previous TAACCCT awardees	Complete	10/1/13 – 1/30/14	<ul style="list-style-type: none"> • Workforce Navigator & Lab Tech hired and trained ✓ • Operations and evaluation processes in place ✓ • Advisory Board in place ✓ • Facility in place ✓ • New registration/retention software ready to use ✓ • Best practices from TAACCCT awardees and DOL training inform program development ✓
	1.b Develop and align curricula to industry needs, using evidence-based models and National Certification standards	Complete	10/1/13 – 6/30/14	<ul style="list-style-type: none"> • Instructors hired for core courses ✓ • National certification obtained ✓ • Course content, software, assessments and materials in place ✓ • Remediation plan in place ✓ • Best practices from TAACCCT awardees inform program develop ✓ • Advisory board approves curricula ✓
	1.c Coordinate with TAA rep, Veterans rep, and local One Stops to collaborate on identifying potential students, assessment strategies, and service needs	Ongoing	1/1/14 – Ongoing	<ul style="list-style-type: none"> • All support agencies are ready to recruit and assist students ✓ • Student success and retention strategy is in place ✓
	1.d Prepare an inviting state-of-the-art facility conducive to accelerated and blended learning, job readiness, and skills development	Complete	10/1/13 – 6/30/15	<ul style="list-style-type: none"> • Establish classrooms ✓ • Additional machines installed to enhance / expand current course ✓ • Online programs obtained for use in blended learning model ✓

ACTIVITIES		STATUS	START / END DATE	DELIVERABLES
2. Deliver Instruction	2.a Student recruitment with planned assessment and remediation tools available	Ongoing	3/1/14 – Ongoing	<ul style="list-style-type: none"> Students enroll in the program ✓ Students have career pathway plans ✓ New software enrolls, tracks and retains students ✓
	2.b Coursework implementation utilizing "Breaking Through" approach through Accelerated Learning, Comprehensive Support Services, Labor Market Payoffs, and Aligning Programs for low-skilled adults	Ongoing	6/1/14 – Ongoing	<ul style="list-style-type: none"> Students enrolled ✓ Increase expansion modules for continuing education ✓ Emporium math and remediation support resources in place ✓ Students access funding for training and support services ✓ Successful retention strategies ✓
3. Articulation and Stackable Credentials	3.a Create course certifications for developing competencies that are recognized by industry	Ongoing	6/1/14 – Ongoing	<ul style="list-style-type: none"> ISA, ETA, & NIMS certification approved or in process ✓ Students obtain certifications ✓ TCl is approved "testing" site
	3.b Establish work experience, internship, and job placement services	Ongoing	9/1/14 – Ongoing	<ul style="list-style-type: none"> Students can earn college credit through work experience and internships Students placed in internships Job offers & placements for students ✓
	3.c Create educational and career pathways for TAA eligible workers, Veterans, and other adults	Complete	4/1/14 – 9/30/15	<ul style="list-style-type: none"> TAA students are provided educational plans, build on experience & best practices ✓ Student materials available to assist with educational options & career pathways ✓ More articulation agreements with local community and state colleges ✓
4. Evaluation	4.a Course evaluation using data and industry input for continuous improvement	Complete	10/1/13 – 9/30/17	<ul style="list-style-type: none"> Evaluation informed by student and industry input ✓ Course correction strategy in place ✓ Evaluation process guides course improvement ✓
	4.b Project evaluation, including comparison cohort	Ongoing	10/1/13 – 9/30/17	<ul style="list-style-type: none"> Ongoing industry input ✓ Quarterly data & evaluation report ✓ Sustainable program

Evidence substantiating progress on successful development and implementation of the program through the proposed activities is detailed by strategy below:

Strategy 1. Program Start Up.

1.a. Build an infrastructure that supports strong industry connections and input from previous TAACCCT awardees.

Building infrastructure entailed: 1) the establishment of roles, responsibilities, processes, and accountability, 2) research into similar programs, 3) work with the evaluator on reviewing and modifying the evaluation plan, 4) securing a facility, 5) procurement of software for student registration and tracking, 6) establishing an advisory board, and 7) hiring a workforce navigator and lab tech.

1) An Internal Steering Committee was established in Year 1 and had multiple meetings with MCC administration and various departments on campus to determine their involvement with TCI, funding, and allocation of resources. This committee has been instrumental in defining the roles and responsibilities of various stakeholders, and in developing processes to ensure the integration and accountability of TCI within MCC and the broader community.

2) The TCI team visited 13 colleges in eight states during Year 1 to see how they were implementing advanced manufacturing and mechatronics programs. The colleges, some of which were prior TAACCCT grantees, were generous in sharing best practices, which informed TCI program design and reduced the likelihood of “reinventing the wheel” during program development. Practices adapted from these programs include: industry involvement in developing curriculum and providing feedback, provision of job shadowing and internship opportunities, creating articulated, stackable, and latticed learning, credentials, and certificates, provision of coaching and peer support, and establishing connections with local workforce center partners. TCI has continued to meet with other TAACCCT grantees throughout the grant period, learning from practices they employ, in addition to applying learning from their own program evaluation to guide ongoing program development. The benefit of such ongoing outreach is exemplified in the evaluation of TCI's Engineering Technician (ET) curriculum by another TAACCCT awardee at the request of the ET instructor.

3) After the Grant Officer requested a revision to the Baseline Data Method proposed in the evaluation plan, several meetings were held with the evaluator to discuss this revision. A modified evaluation plan was submitted and approved at the beginning of Year 2.

4) During Year 1, MCC and TCI administrators worked closely with the City of Carlsbad in negotiating a 6-year lease of a 23,000 sq. ft. city-owned building at a significantly reduced fee. The city approved a Conditional Use Permit for the facility, and MCC's Governing Board approved the use of general funds for necessary building modifications as well as agreeing to pay the monthly rental fees.



5) Significant research and review informed the selection of the Orbund Educational Management System for combined student registration and tracking. TCI contracted with Orbund, worked closely with their staff on planning implementation, submitted data for integration, and participated in multiple trainings. However, major problems, challenges, and repeated delays led to cancellation of the contract. TCI decided to continue using Lumens for student registration and selected the Apricot Data Management System for gathering and reporting data. Staff were trained, and the system was implemented and rolled-out by the beginning of Year 2. Apricot has proven to be an invaluable tool for collecting and analyzing data pertaining not only to student performance and outcomes but also to industry partnerships.

6) An advisory board of industry partners was established in Year 1, and advisory meetings regarding the Machinist and ET programs have been held regularly over the first three years. These meetings provided valuable feedback as these programs have been developing. Additional advisories with high school counselors, veterans' organizations, and service agencies were also held, which have been useful in structuring pathways into and through the programs TCI offers.

7) Both the workforce navigator and lab tech were recruited, interviewed, and hired in Year 1. There was some turnover in the lab tech position in Years 2 and 3 due to technicians

being hired away by industry. In Year 3 the ET instructor took on volunteer interns from SDSU and UCSD to help with equipment maintenance and to assist students with their lab work. This leveraging of relationships with local institutions has added value to the program by bringing in knowledgeable engineering students as lab technicians, while also benefitting the student interns, who have expressed appreciation of the opportunity for hands-on experience that they do not necessarily have access to in their own institutions.

1.b. Develop and align curricula to industry needs, using evidence-based models and National Certification standards.

The process of curriculum development involved: 1) recruiting and hiring instructors, 2) research into similar programs, 3) beginning the certification process and aligning curricula with certification requirements, 4) the development of content and assessment materials, 5) establishing basic skills and remediation strategies, and 6) advisory board review of curricula.

1) Hiring of new instructors was delayed until the new facility was secured, but by the end of Year 1, job descriptions were created for an additional Machinist instructor and for the ET instructor, the positions were advertised, multiple candidates were interviewed, and the positions were filled. The ET instructor was replaced in Year 2, and an incumbent worker training instructor was hired. In Year 3, more incumbent instructors were hired to teach machining, soldering, electronics, electro-mechanics, SolidWorks, manufacturing fundamentals, and other higher-level courses.

The Machinist and ET instructors have proven themselves popular, effective, and successful at teaching the skills students need to succeed in these fields. In class observations conducted by the evaluator, the ET instructor effectively employed a range of pedagogical practices – from interactive logic quizzes to hands on engineering projects – that engaged students in the learning process, imparted necessary theoretical knowledge, evaluated student progress, and built confidence, camaraderie, and organizational skills.

2) The visits to other colleges with similar programs and ongoing outreach to other TAACCCT grantees, noted above as informing program development, were also informative in the development of curricula. Some of these programs shared with TCI curriculum that they had

found to be effective.

3) The certification process was delayed following a survey of local industries that found only 27% wanting employees to be certified. After further discussion with industry partners and other schools, implementation of NCRC and curricular alignment with certification standards began in Year 2. NCRC certification was added to both the Machinist and ET programs in Year 3, RF certification was added to the ET program, and work began on offering AWO certification for welding, IPC for soldering, and IUPC-A-610 for electronics assembly.

4) The development of the Machinist program curriculum was sensitive to alignment with NCRC and NIMS standards. The instructor also paid attention to the needs of students in alignment with emerging local manufacturing needs. Development of incumbent worker program curricula was also informed by relevant certification standards and the needs of local industry. Due to the absence of national creditable standards in curriculum for engineering technician certificates, the ET instructor relied on his extensive instructional background and industry experience. Key to success was the development of a curriculum that was responsive to input of industry partners and relevant to students' needs for hands-on learning. All program curricula has been developed through an ongoing, iterative process guided by reviews by academic and industry partners, regular meetings with instructors, observations of classroom dynamics, and student evaluations.

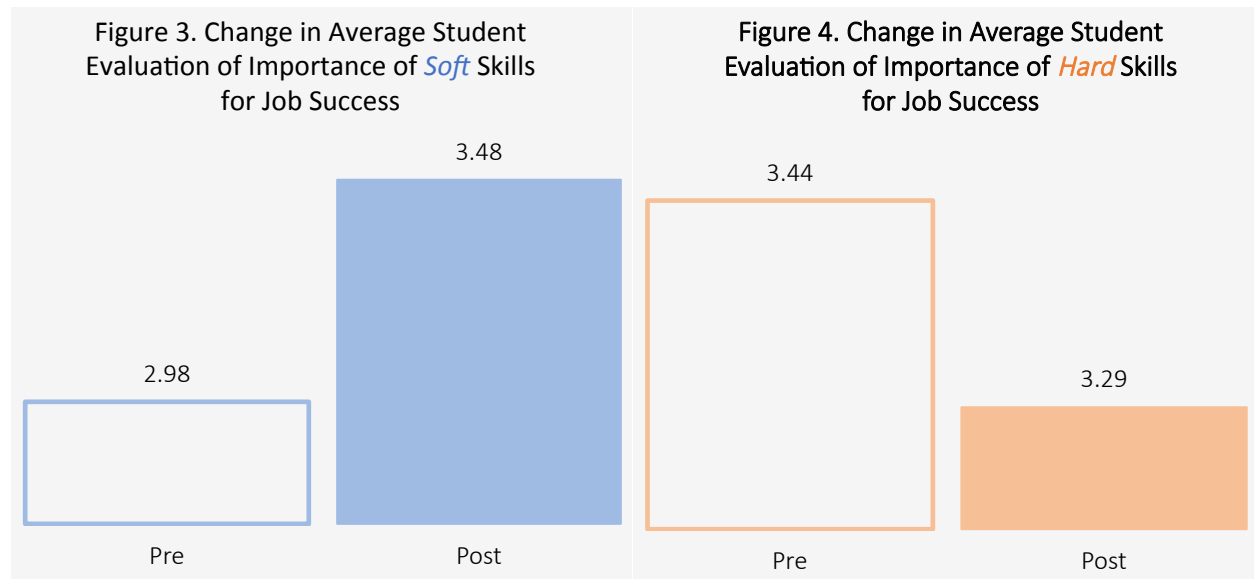
5) In Year 1, basic skills course work was designed to serve students in need of remediation. With a \$23,000 grant from the United Way, remedial math and reading comprehension courses were implemented. 3 out of 4 low-scoring program candidates completed the first run of this remediation program and were subsequently admitted into the Machinist program. In-class math tutoring was also offered. Funding allowed for the provision of these remediation efforts through Year 2.

6) Advisory board review of curricula began in Year 2, and has been supplemented with feedback gathered at meetings with employers, support services, and other

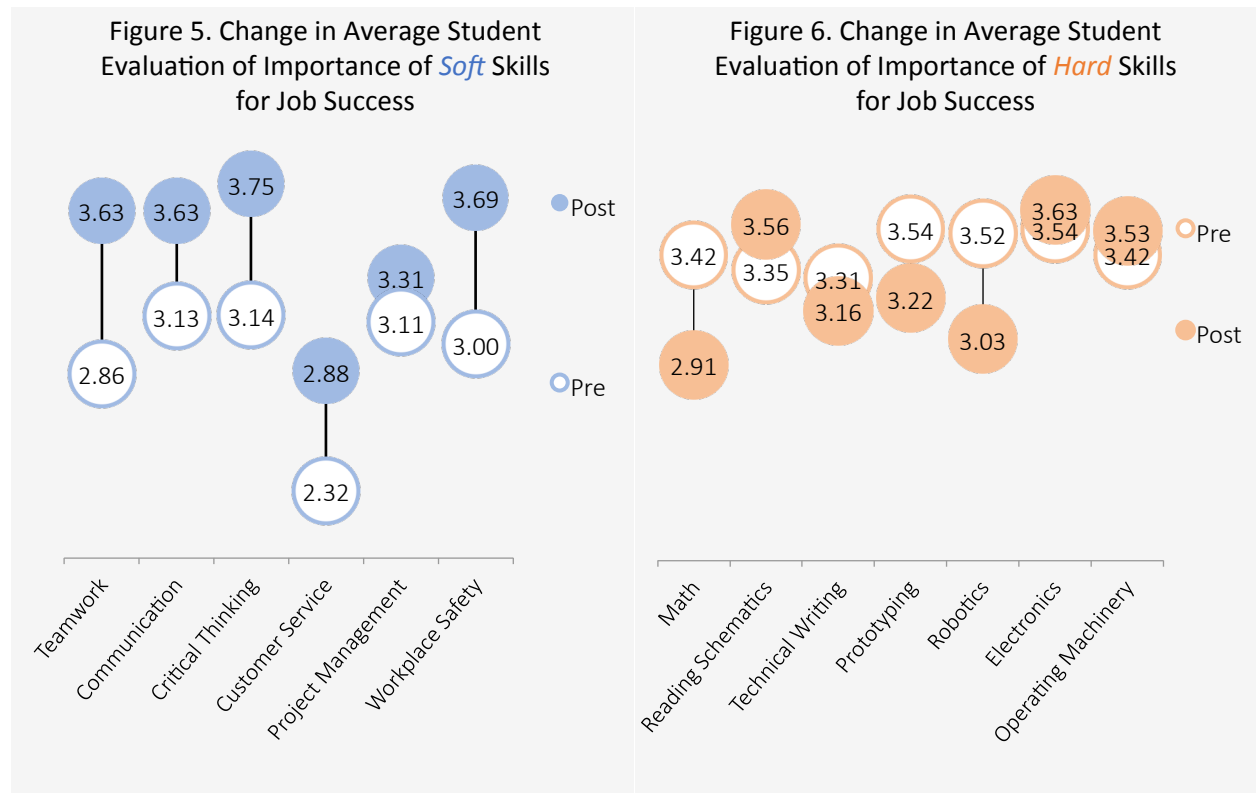
Keep the focus on business applications in order to keep the instruction narrow, and do not forget the soft skill sets such as collaboration and problem solving.

– Industry Partner at ET Advisory Board Meeting

industry partners, as well as at site visits and award ceremonies. This feedback has been **invaluable** in ongoing curriculum development. For example, input from the ET Advisory Board suggested the importance of helping students develop the soft skills necessary for business applications. This focus has been incorporated into the program by the ET instructor, and the change in student recognition of the value of soft skills relative to hard skills can be seen below.



Students were asked to evaluate the importance of 13 different skills for job success. Responses were weighted: Highly Important = 4, Very Important = 3, Important = 2, and Not Very Important = 1. Weighted responses were averaged across all cohorts. Figures 3 & 4 reveal a polarized shift in students' evaluation of skills, as they came to recognize the importance of 'soft' skills such as communication, critical thinking, teamwork, project management, workplace safety, and customer service in relation to 'hard' skills like math, reading schematics, technical writing, prototyping, operating machinery, electronics, and robotics. Figures 5 & 6 provide detailed results from the skill evaluation rubric.



Industry partnerships have also been leveraged in the development of new courses, as was the case with the collaboration with ViaSat in designing and implementing an Electronic Assembly program in Year 3, which is taught by two ViaSat supervisors.

1.c. Coordinate with TAA rep, Veterans rep, and local One Stops to collaborate on identifying potential students, assessment strategies, and service needs.

Coordination and collaboration was conducted through: 1) meetings with TAA representatives, veterans services organizations, and the WIA career center; and 2) meetings between program instructors, the workforce navigator, and the project coordinator.

1) Meetings with representatives from the TAA, veterans service organizations, and the career center began in Year 1. TCI has been proactive in meeting with the Workforce Investment Board and the local career center to gain assistance with industry studies, to discuss contracted training, and to solicit their service on a panel extending training

This program allows additional options for veterans who many times do not adapt well to a more traditional community college environment at a cost they can afford.
 – Veterans service agency representative

outreach to unemployed individuals. Meetings with veterans service organizations and local high schools have also been helpful in identifying potential students who could benefit from TCI programs.

2) Program instructors, the workforce navigator, and the project coordinator meet regularly to discuss program and curriculum development, assessment strategies, and how to work with local service organizations to best address their needs. These meetings have been critical to a responsive fine-tuning of the program as it has been developing.

1.d. Prepare an inviting state-of-the-art facility conducive to accelerated and blended learning, job readiness, and skills development.

Preparation of the TCI facility involved: 1) ordering classroom and core program supplies, machines, simulators, and computers, 2) setting up offices for staff and instructors, and 3) the installation of software.

1) TCI met with SMC, Labvolt, and Amatrol to discuss equipment, online content, and computer simulations at the beginning of Year 1. As the offerings of educational training vendors were found to be prohibitively expensive, it was decided to customize a learning system modeled on successful programs in Northern California and Iowa. Following extensive consultation with Festo, Fanuc, and HAAS, RFPs were issued, board approval was attained, and all major equipment purchases were made by the end of Year 2.

2) After securing a building for the new facility in Year 1, work began immediately on renovating it for the necessary classroom and office infrastructure. Engineers were contracted for architectural studies and planning, and a project manager was hired to handle the process of permitting and building modification, including work with associated contractors and internal constituents. At the beginning of Year 2, plans were submitted to the Division of State Architects and a timeline for modifications was established. Contractors and subcontractors were hired and worked nonstop, along with TCI and other MCC staff, who ensured proper installation of communication infrastructure in the facility and timely acquisition and set-up of all other necessary technologies, furnishings, and supplies. Move-in and classes began even as contractors and staff were putting on the finishing touches.

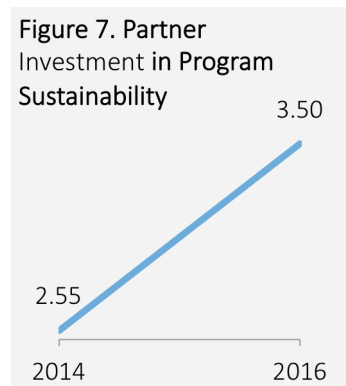
3) All necessary software was acquired and installed during Year 2.

Summary. All of the hard work of building infrastructure, developing curriculum, setting up the facility, and coordinating and collaborating with local industry and community organizations paid off in the successful start up of TCI. The cultivation of working partnerships has been crucial to this success. Input from workforce development agencies, veterans service organizations, and local employers has significantly shaped program and curriculum development around service and industry needs. Establishing lasting partnerships with employers in particular is a common challenge for workforce development programs (Spaulding, 2015); however, the program has demonstrated substantial success at this endeavor, with over 40 employers who have participated by offering tours of their facilities, contributing to graduations, offering job shadowing, being guest speakers, teaching classes, and donating tools, equipment, and supplies.

Grants and donations from partners have been leveraged to help equip the facility, develop programs, and attract and retain students. These include a \$131,000 grant from USC to develop and offer a low cost welding program, \$39,000 from the San Diego Women's Foundation for welding equipment, \$92,000 from Interfaith Services to assist young adults in completing certificate work skills programs offered at TCI, a \$15,000 grant from the HAAS Foundation for student scholarships, \$56,000 in scholarships from the Girard Foundation for students to attend TCI, and over \$160,000 worth of donated tools and metal from local industry. TCI has also been working with Able-Disabled to become a training partner for their apprenticeship grant.

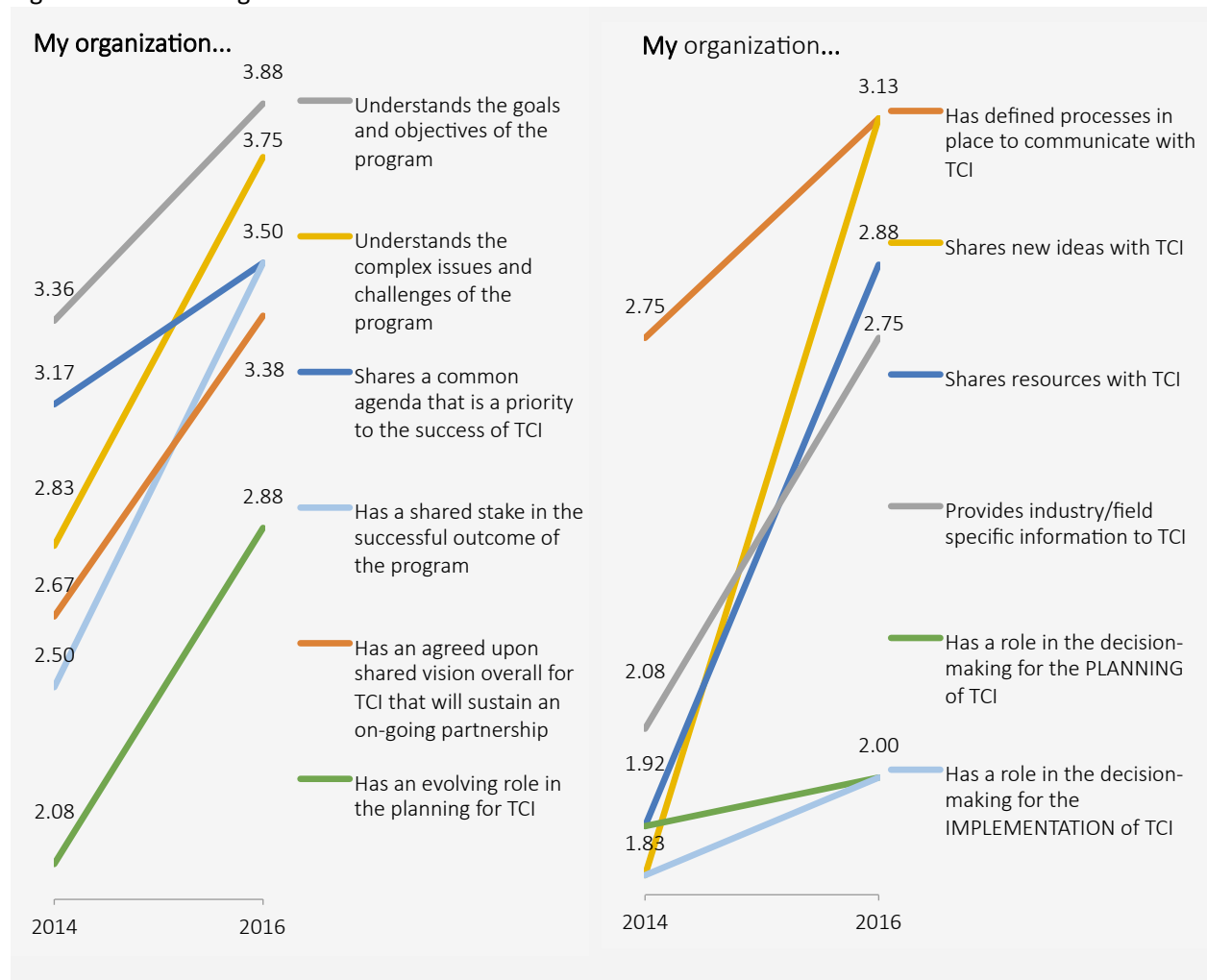
Over
\$500,000
 in Partner Contributions

These partnerships will continue to contribute to the ongoing sustainability of TCI. In an annual survey, partner organizations have been asked about their investment in program sustainability. Their responses were weighted as follows: 'Very much invested' = 4, 'Somewhat invested' = 3, 'Plan on investing more in the future' = 2, and 'Not invested at this time' = 1. As Figure 7 reveals, the average of weighted responses shows a significant



increase in partner investment in sustainability from Year 1 to Year 3. Partner organizations were also asked a number of more specific questions about the actual status of their alignment with and investment in TCI. Their responses were weighted as follows: 'It has been accomplished' = 4, 'In progress' = 3, 'On occasion' = 2, and 'Not at this time' = 1. The average weighted responses also reveal a significant increase in alignment and investment across all measures from Year 1 to Year 3. See Figure 8.

Figure 8. Partner Alignment with and Investment in TCI



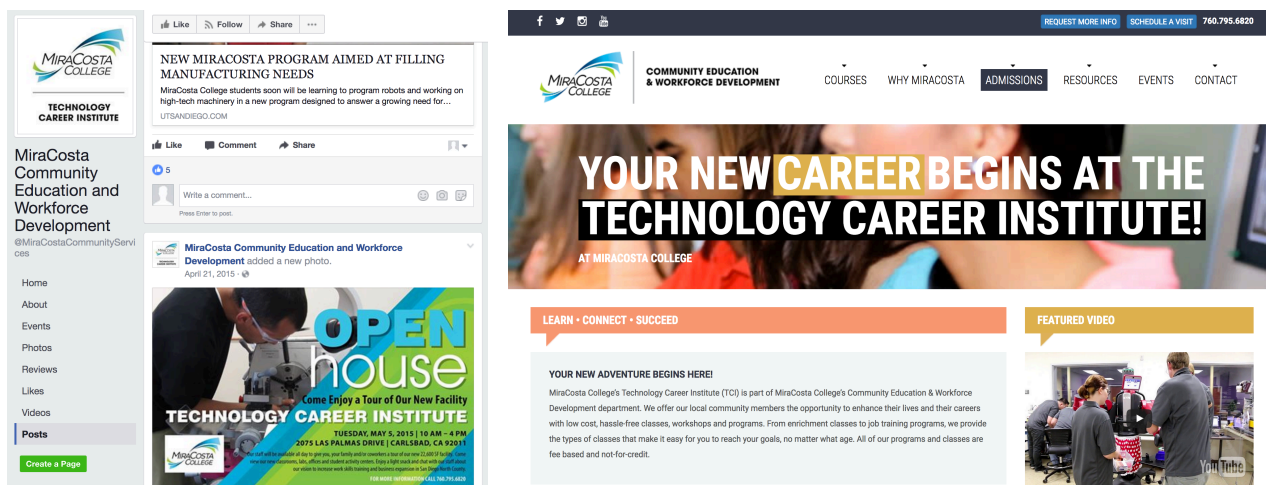
Strategy 2. Deliver Instruction.

2.a. Student recruitment with planned assessment and remediation tools available.

Student recruitment worked through: 1) advertising and marketing, 2) partnerships with TAA, the workforce center, and community and veterans organizations, 3) provision of career planning, 4) implementation of student tracking database, 5) establishing job shadowing opportunities, and 5) providing student orientation and assessment.

1) Advertising and marketing expanded significantly as the start-up efforts of Year 1 were coming to fruition in Year 2. TCI established a social media presence on Facebook through MCC's Community Services page (<https://www.facebook.com/MiraCostaCommunityServices/>), and with the help of the MCC webmaster and an outside web development company, created and launched their own website (<http://tci.miracosta.edu/>). See Figures 9 & 10.

Figures 9 & 10. TCI's Facebook and Website



With over 700 followers, the Facebook page facilitates direct communication with local community about class offerings, program progress, success stories, and information relevant to technical careers and workforce development. The website provides information about available courses and programs, and links for requesting more information and scheduling a visit. Working with professional workforce videographers, the dynamics and potentials of the new grant-funded programs and classes were captured and shared on Facebook, the TCI website, and YouTube (<https://www.youtube.com/watch?v=MSGF6TfsEyK>). See Figure 11.

Figure 11. TCI Program Video



The Open House and Grand Opening of the new TCI facility in Year 2 were tremendously successful outreach efforts, with more than 200 participants representing the local community and industry partners. TCI also held a “Manufacturing Day” event in the end of Year 2, which was open to the public and industry representatives and included a number of opportunities to participate in hands-on activities that demonstrated the extensive resources available at the newly opened facility. A second Open House was held during Year 3 to celebrate the first anniversary of the new facility, and weekly tours continue to be offered to encourage student enrollment.

In Year 3, TCI substantially increased outreach to local high schools. This included a breakfast meeting with 25 counselors from, which was followed by several additional breakfasts. This successful strategy to expand awareness of the program at the high school level and encourage enrollment in TCI programs will be continued. TCI has also given presentations at

schools and at college and career fairs. They have also worked with local high schools and Junior Achievement to offer tours of the facility; however, transportation cost is often prohibitive for the schools. To address this issue, TCI is working with the local Economic Development Council to find funding. Finally, TCI launched the first Youth Robotics BAXTER Competition in Year 3 as a way to both recruit high school students and showcase the TCI program in the community.

TCI was also able to significantly improve marketing materials in Year 3 with the help of a graphic designer. See Figures 12 & 13. These new materials address outreach to both students and industry partners, and will continue to do so through the planned creation of posters to help recruit high school students. Work with a marketing group has continued to expand TCI's social media presence; however, there is still need for a broader outreach effort, and TCI is proactively seeking funding to do so. This effort will likely include the purchase of traditional advertising.

Figures 12 & 13. Improved Marketing Materials



2) Partnerships with social service organizations were established beginning in Year 1. TAA representatives visited the campus prior to the opening of the new facility to meet the instructor and interview students in the machinist program, and formal and informal meetings were held with various veterans service providers, the local career center, and WIB. These meetings have continued through Years 2 and 3. Although TAA was initially unable to find

appropriate clients to send to TCI programs, in Year 3 a few TAA-funded applicants began pursuing training at TCI, and more are expected in the future. Other service organizations have also been helpful in improving outreach and recruitment. In Year 3, two part time WIB representatives joined TCI, and a grant partnership was established with Interfaith Services to increase student enrollments. The career center and WIB have assisted with industry studies and in extending training outreach to unemployed individuals. TCI also worked with the local CalJOBS site director in exploring the use of Workforce Innovation and Opportunity Act (WIOA) funding to cover student costs, but the stipulations were found to be too restrictive. TCI has also partnered with Able-Disabled to leverage their DOL grant in developing apprenticeships, an incentive that will help drive recruitment.

3) Career planning began with hiring and training the workforce navigator in Year 1. Through outreach and networking with local businesses, he has helped create recognition of TCI, kept abreast of industry needs, and established opportunities and pathways into industry for students. Along with the Program Coordinator, the navigator developed educational intake forms in Year 2 that help to determine career pathways of students prior to program entry. The

[The work force navigator] is great at helping us with career skills... resumes, interviews... it's a major benefit.
– TCI Student

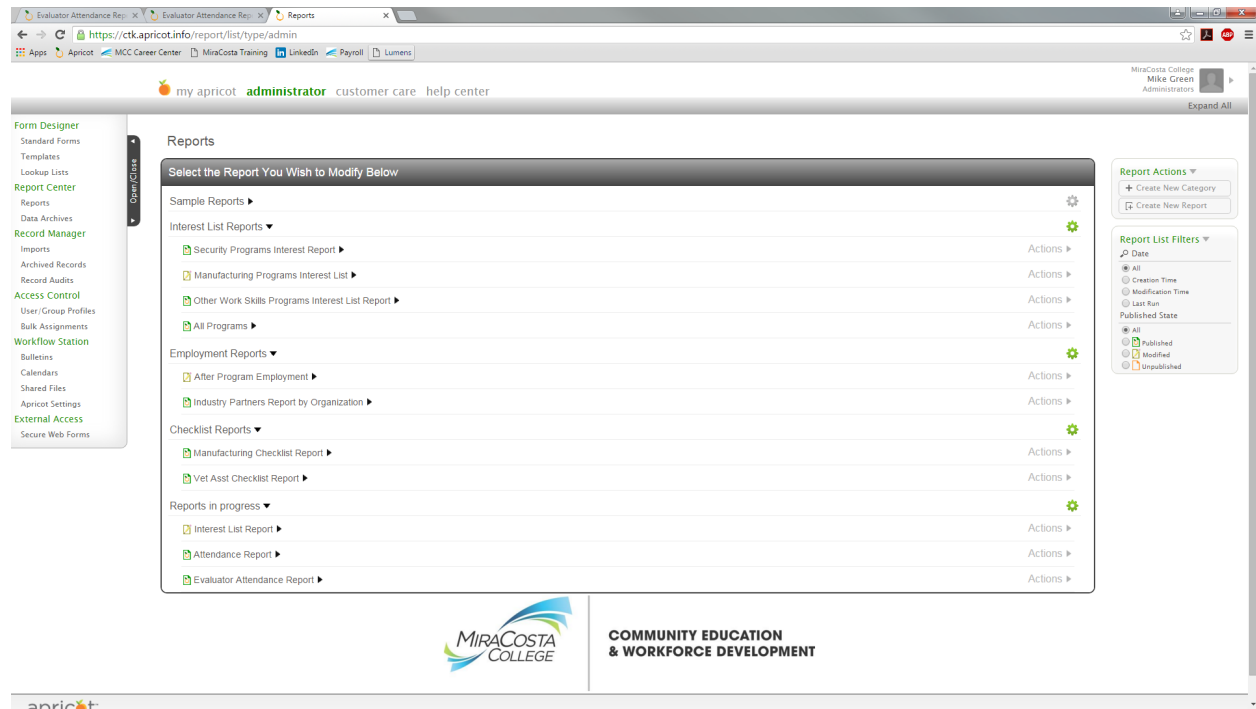
navigator continues to work closely with students before, during, and after their time at TCI to help ensure that their efforts lead to career or further educational opportunities.

Students thus receive customized support which is aligned with what employers have told TCI they need: leadership skills, work preparedness, interviewing skills, tutoring, skills navigation, financial aid, communication skills, and job placement. 96% of students in the Machinist program have met with the workforce navigator, and students have expressed particular appreciation of the one-on-one support in areas such as resume development and interviewing skills.

4) After significant problems and delays with implementing the Orbund Educational Management System, TCI switched to the Apricot Data Management System for student tracking. TCI staff were trained and began using Apricot at the beginning of Year 2, and all backlogged data was entered by the end of Year 3. Apricot manages all student data from first contact interest forms to post-program employment status; it is useful for generating progress

reports on individual students, and will also be useful for creating reports that reveal broader trends across cohorts. See Figure 14.

Figure 14. Apricot Reports



5) The workforce navigator has worked closely with local businesses to establish job-shadowing opportunities for students enrolled in TCI programs. HME, TE Connectivity, SMAC, and ViaSat provide job shadowing for the ET students. 94% of students in the Machinist program have taken part in job shadowing. These opportunities have helped students make industry connections and build confidence, and have led in some cases to employment upon program completion.

Job shadowing gave me a sense of what working in the industry is like, and I was like, I can do this!
– TCI Student

6) The TCI team has developed and delivered orientations for incoming program cohorts, and has implemented a process of student assessment that helps ensure students develop the basic skills necessary for program success. Students with low scores on initial assessments can be directed into remedial courses or offered tutoring, which has aided their successful completion of the program. Regular assessments

My students are testing out in industry at the same levels or higher than students taking a program for two years.
– TCI Instructor

during the program have helped instructors to focus on areas where students need more help, and final exams assure students and instructors of program effectiveness. WorkKeys assessments are also used to measure "real world" skills such as work discipline, teamwork, customer service, and managerial potential.

2.b. Coursework implementation utilizing "Breaking Through" approach through Accelerated Learning, Comprehensive Support Services, Labor Market Payoffs, and Aligning Programs for low-skilled adults.

Coursework was implemented by: 1) rolling out machinist, electro-mechanical, and robotics/automation core courses, 2) provision of remediation and tutoring, 3) ongoing course evaluation and improvement, 4) development and implementation of new modules, 5) implementation of student retention strategies, and 6) review of support services from TAA and One Stops.

1) Rollout of core coursework began in Year 1 with the development and delivery to the first cohort of the Machinist Program. The electro-mechanical and robotics/automation components of the Engineering Tech Program were implemented in Year 2. The accelerated learning that these programs offer has been reported by students in surveys, interviews, and focus groups conducted by the evaluator as a significant reason for enrollment and an important factor in student retention and success.

Running an accelerated program is a great way to go. It gets students very engaged at a high level. You can get through a lot of curriculum in less instructional hours than in a credit setting. It emphasizes skill sets and troubleshooting in the workplace.
– TCI Administrator

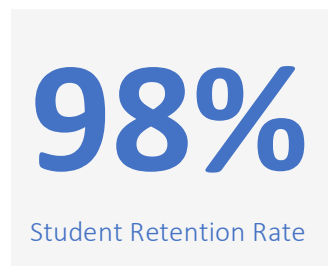
2) The provision of remediation and tutoring advanced significantly with the procurement of a grant from the United Way, allowing for the development and implementation of remedial math and reading programs. Sierra College provided a remedial shop math curriculum. A math tutor was hired to provide support for students in both the Machinist and Engineering Technician programs who do not test at the necessary baseline level. In Year 3, 24 students participated in remediation in order to enter the program, and 42 participated in a need-driven homework lab designed to assist students in developing basic skills. These forms of

support have not only helped students to succeed by increasing the effectiveness of core training, but have also helped to increase program enrollment.

3) From Year 1, course evaluation has been conducted through instructor assessment and the input of outside educators and industry professionals. Working with the evaluator, student questionnaires were developed and have been deployed pre- and post-program to assess student expectations and experience with course offerings. Additional curriculum has been purchased or developed as necessary in responses to these inputs. By Year 3, TCI has developed a consistent system of course correction that incorporates student evaluations mid- and post-course, instructor debriefings after each cohort, and ongoing classroom monitoring. This system has worked satisfactorily to revise and resolve program curricula.

4) By Year 3, TCI had added more than 20 courses for both the general public and incumbent workers. In addition, TCI created five mini-certificates, which when stacked can lead toward a more comprehensive certification. The mini-certificates are: SolidWorks, Electronic Assembly, CNC Programming, Precision Measuring & Blueprint reading, and Robotics. The addition of these mini-certificates allowed TCI to expand incumbent worker enrollment and offer additional national certifications.

5) Student retention strategies have focused on provision of support services. Remediation efforts have helped ensure the success of incoming students who score low on basic skills assessments, which has had a direct impact on attendance and punctuality. Engaging students in planning their career path with the workforce navigator has also helped retention, as have the provision of job shadowing and apprenticeship opportunities. These strategies have proven effective, with 98% of participants remaining in the program as of the end of Year 3.

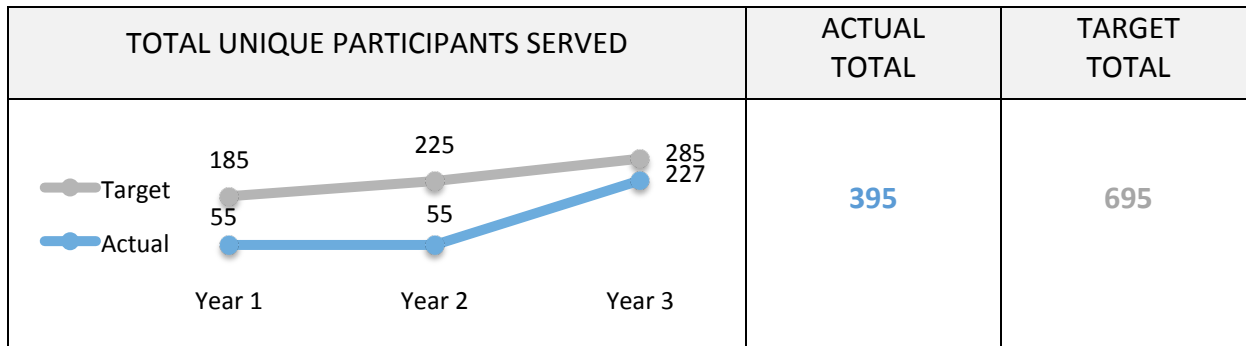


6) TAA and One Stop support services have been reviewed regularly, and continual efforts have been made to strengthen these connections.

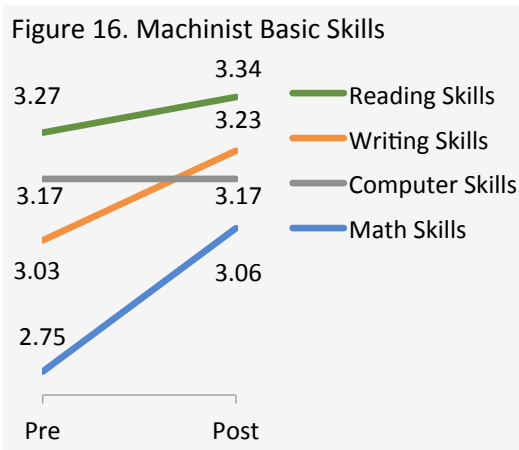
Summary. Although TCI has worked hard to expand recruitment through marketing efforts, partnerships with community organizations, and the provision of orientations, assessments,

career planning, and job shadowing opportunities, enrollments remain under target numbers even as they have increased substantially in Year 3. See Figure 15.

Figure 15. Participants Served



However, the implementation of coursework, including the provision of remediation, tutoring, evaluation, and support services, has been highly successful in retaining students and producing skilled workers needed by local industries. This can be seen in student assessments of basic skills, communication and teamwork, and workplace presence, which produced data reflecting changes in student self-confidence in skills necessary for success in the fields of work for which they are training. Machinist students were asked both pre- and post-program to rate their math, reading, writing, and computer skills. Their responses were weighted as follows: 'Great' = 4, 'Good' = 3, 'Okay' = 2, and 'Needs Improvement' = 1. Weighted responses were averaged, and as can be seen in Figure 16, there were significant increases in all but computer skills.



Both Machinist and ET students were asked both pre- and post-program to what extent they agreed with a number of statements about their communication, teamwork, and workplace presence. Their responses were weighted as follows: 'Agree' = 4, 'Somewhat Agree' = 3, 'Somewhat Disagree' = 2, and 'Disagree' = 1. Weighted responses were averaged, and changes can be seen in Figures 17-20.

Figure 17. Machinist Communication & Teamwork

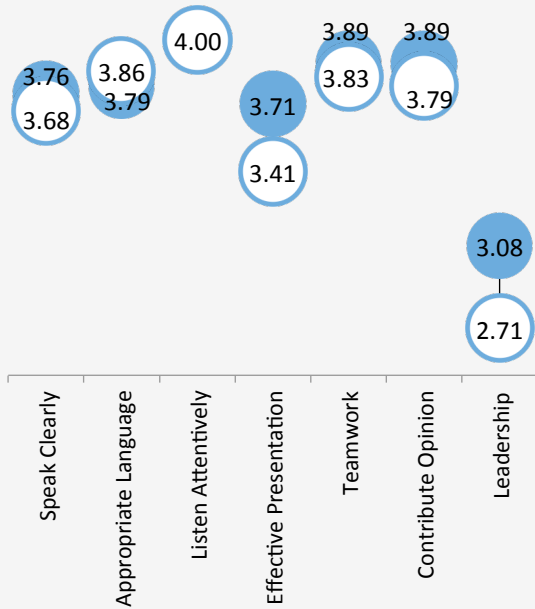


Figure 18. Machinist Workplace Presence

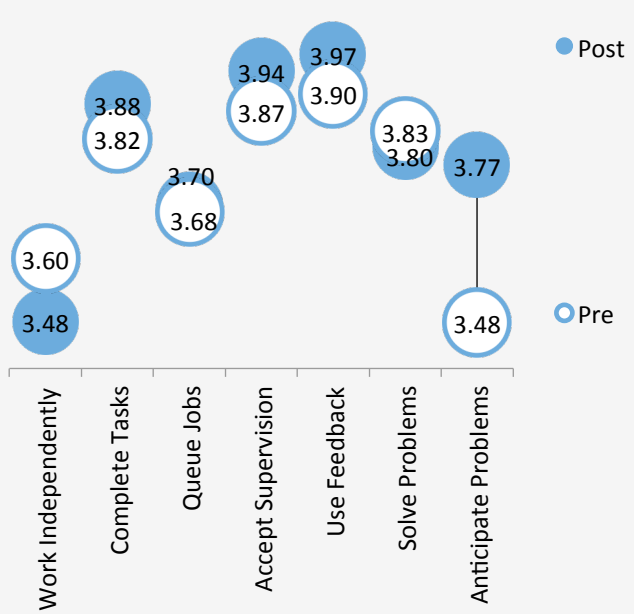


Figure 19. ET Communication & Teamwork

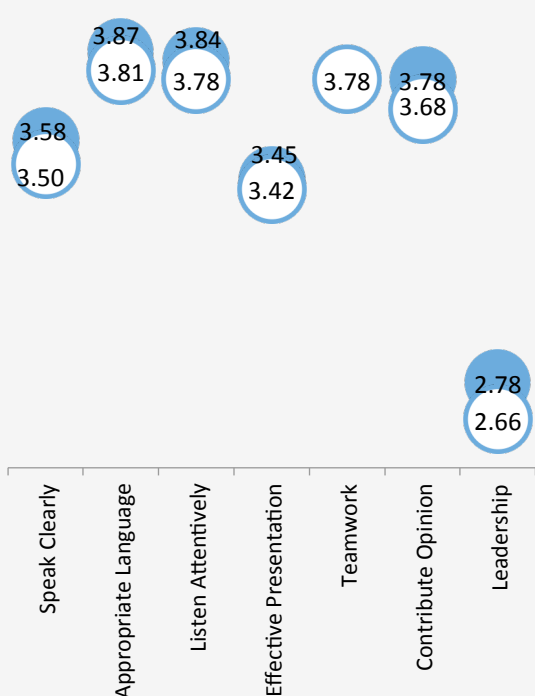
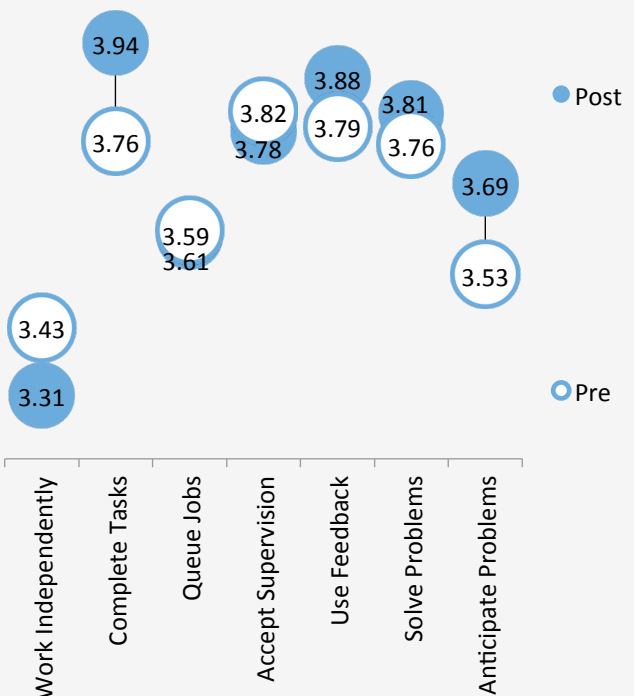


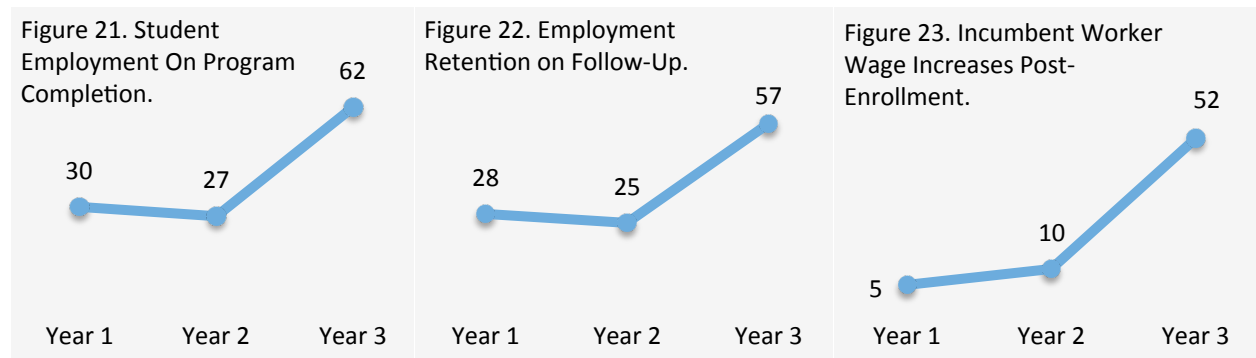
Figure 20. ET Workplace Presence



With few exceptions, significant increases are revealed across the data points of these rubrics. The most notable exception common to both Machinist and ET students is the decrease in their

perceived ability to work independently, which is likely due to an increase in their perception of the value of teamwork. See Figure 5, above, in context of students' increased valuing of soft skills such as teamwork and communication.

The successful implementation of curriculum is also evidenced in the hirability of TCI students and their retention as employees. Through Year 3, 119 students had been hired upon program completion, and 110 of these had been retained at follow-up. See Figures 21 & 22. Moreover, a significant number of incumbent employees who have received training at TCI have received a wage increase post-enrollment. See Figure 23. More annual outcome data can be found in Appendix F.



Strategy 3. Articulation and Stackable Credentials.

3.a. Create course certifications for developing competencies that are recognized by industry.

Course certification was approached through: 1) the NIMS certification process, and 2) assisting students with certification applications.

1) The process of obtaining program certifications was delayed until Year 2 upon finding that only 27% of local industry desired that employees be certified. Certification requirements were reviewed and discussed with institutions that use NIMS during Year 2, and the value of national certification was discussed with numerous schools and industry representatives. NCRC certification was added to both Machinist and ET programs at the beginning of Year 3, and RF certification was added to the ET program. AWO certification is now offered in welding, and IPC-

A-610 certification in electronics assembly. The Machinist instructor is now using NTMA online coursework to compliment classroom work, and is working on updating curriculum for NIMS approval.

2) The workforce navigator works closely with students to ensure the proper and timely submission of certification applications.

3.b. Establish work experience, internship, and job placement services.

Work experience and job placement services were established by: 1) identifying potential employers, 2) seeking employer feedback on student performance, 3) developing job pathways for students, and 4) providing job placement services.

1) San Diego has a wealth of growth industries in which program graduates can work, including aerospace, blue-tech, bio-medical, bio-tech, pharmaceutical, and food industries. Hunter Industries, Kyocera, BAE Systems, RJ Machine, Pyramid Precision, NuVasive, Achates Power, Johnson Matthey, Nordson Asymtec, Barrel Service, Fluid Components, Hydranautics, Means Engineering, Seabotix, Automation GT, HME, TE Connectivity, SMAC, ViaSat, Assure Controls, CEA Corp, Genetech, Peak Technical, K-Tech, NTMA, Southwest Greene, VIP, C&H Machine, and Beckhoff Automation have all been identified as potential employers for TCI students. Moreover, the credentials that students obtain are transferable throughout the United States, providing mobility for workers.

2) TCI has been seeking employer feedback from Year 1, when a meeting with 20 NTMA members to discuss the progress of Machinist graduates in their new work sites confirmed that the program was meeting the needs and expectations of local industry. Employers have continued to give positive feedback about the students they have hired out of TCI programs.

3) A key component of developing job pathways is ensuring that TCI programs meet WIA, GI Bill, and industry standards as appropriate, so that students can receive the assistance they need to progress in alignment with industry needs. The Machinist and ET programs are both approved by WIA and the GI Bill. TCI has also been working on getting FAFSA and Pell grant approval, although this is taking considerably more time than expected. They continue to pursue

other grant opportunities to help lower course costs for students. The Girard Foundation has offered to help us identify a bank to offer student loans for program attendees.

TCI has worked diligently to establish apprenticeship programs, and in Year 3 submitted an application and was approved for a Machine Operator I apprenticeship. The program is considered an apprenticeship by the State of California and a pre-apprenticeship by the DOL. TCI anticipates submitting additional applications for other apprenticeship program approval in Year 4. A partnership with Able-Disabled is being leveraged to use their DOL Apprenticeship grant to help support these efforts.

TCI is also working on establishing a local manufacturing community by hosting class reunions, which will not only support past students as they continue on their path in the workforce, but may also aid in recruitment as these students can serve as role models for new students considering enrollment. The reunions also provided a forum for gathering statistics and qualitative data to contribute to tracking of students who have completed TCI programs.

4) TCI has been successful in placing students through partnerships with such prominent local employers as Qualcomm, as well as many of those listed above. They have begun receiving

My undergraduate degree gave me an education, but TCI gave me a career.
– TCI Student

calls directly from employers with vacancies, and the number of calls has been increasing, to more than 20 calls in the last quarter of Year 3. Industry partners who required two years of experience for hiring new recruits are now accepting students directly from TCI without work

experience. 90% of program graduates are employed upon completion. As TCI continues to grow and offer more job shadowing opportunities and apprenticeship programs, they expect to expand placement relationships with employers. In addition to efforts to place program graduates directly with employers, TCI developed a Staffing Agency Job Fair in Year 3, with representatives from Colt, Aerotek, and Manpower attending. The Job Fair provided students additional interviewing experience as well as the opportunity to explore

other placement options. Students had often not considered staffing agencies and were focusing their efforts solely on industry employers. TCI intends to continue these Staffing Agency Job Fairs as a best practice.

90%
Employment
of Program Graduates

3.c. Create educational and career pathways for TAA eligible workers, Veterans, and other adults.

Career pathways were created through: 1) working with TAA and industry representatives to explore best practices, 2) designing student navigation materials, 3) meetings with San Diego Community College and Palomar College to develop articulation agreements, and meetings with Cal State San Marcos and San Diego State to increase articulation possibilities.

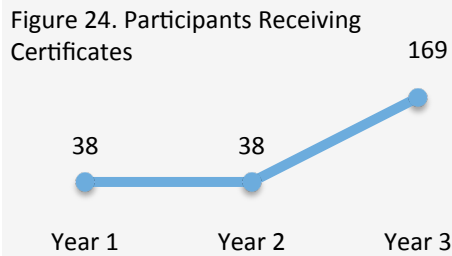
1) Industry partners provided feedback to the program recommending development of shorter certification courses that allow an individual to learn a specific topic in manufacturing. The subsequent creation of these courses for incumbent workers was also a response to the declining unemployment rate during the program period. By Year 3, TCI had added more than 20 courses and five mini-certificate programs, which when stacked can lead toward a more comprehensive certification. The addition of these mini-certificates has allowed TCI to offer additional pathways to national certifications.

2) Basic student navigation materials were created in Year 1, including an education and interest intake form that helps to determine career pathways of students prior to program entry. As of Year 3, TCI was researching best practices for student navigation and working with a graphic designer on new pathway documents to provide students more accessible and visually intuitive references for planning steps and charting progress.

3) TCI has met with local community colleges and state universities to explore articulation and transfer agreements that would allow students to earn college credits for work experience after completing TCI programs, to earn stackable credits in pursuit of advance standing, and to lattice their careers by earning professional development certifications. Although no such agreements have been established as of the end of Year 3, program and curriculum development has been shaped in alignment with the relevant programs at these colleges and universities in anticipation of articulation.

Summary. Credentialing and articulation with local industry, academic institutions, and service agencies has been one of the more challenging parts of the project. Some national certifications are now offered for program components where it is feasible and a necessary step along the

career pathway in that area, but the scope and intensity of the Machinist and ET programs does



not align well with the credentialing processes of such organizations as NIMS and SME. However, as these programs have become the Gold Standard for training in this region, and as local employers are hiring students without these certifications directly out of these

programs, it seems that existing program credentials and certificates may be enough. Figure 24 shows the total number of certificates attained by students in Years 1 through 3. And although articulation agreements with local colleges and universities have not yet been established, working with these institutions, local employers, and TAA and industry representatives has helped ensure that TCI programs and curriculum align with other potential educational pathways while also offering viable career pathways to an increasing number of students.

Strategy 4. Evaluation.

4.a. Course evaluation using data and industry input for continuous improvement.

Course evaluation has been conducted through: 1) student questionnaires to obtain feedback for course improvement, 2) meeting with instructors to assess course performance, 3) meeting with the evaluator to review findings, and 4) meeting with industry representatives to review student success.

1) The evaluator, grant coordinator, and workforce navigator worked together on designing surveys that are given to Machinist and ET students before and after the program to assess their expectations and experiences. Feedback has been overwhelmingly positive, while critically productive comments have informed curricular design moving forward. TCI also began implementing student questionnaires given mid-program to obtain feedback for course improvement in process. This helps the instructor know if they are covering each area adequately, and if they should work more on skills in areas where students are struggling.

2) TCI administrators meet with instructors regularly to assess course performance. The evaluator has also conducted multiple interviews with the instructors to solicit feedback on

program successes and shortcomings. This feedback loop has been particularly useful in the progressive development of coursework for both the Machinist and ET program. For example, both the Machinist and ET instructors identified the need to maximize student time in the shop or in the lab, where hands-on learning both solidifies classroom study and maintains student engagement, and they have been working to increase the percentage of program time spent in these spaces.

I knew right away I had to get them in the shop to keep them engaged.
– Machinist Instructor

3) The TCI team and the evaluator have met regularly to review findings, and the evaluator has provided updates through annual White Sheets (see Appendices C-E) and this Implementation Analysis / Interim Evaluation Report.

4) The workforce navigator has continued contact with employers to assess student performance. Overall, employees have been highly satisfied with the quality of workers who have been through TCI programs.

4.b. Project evaluation, including comparison cohort.

Project evaluation has been conducted through: 1) implementation of data tracking to generate reports, 2) meeting with the advisory board to review outcomes, 3) meeting with the evaluator to consult on findings, and 4) establishing and implementing program improvement based on findings.

1) All data necessary for program reporting has been collected by the workforce manager and entered into Apricot. The project manager, project coordinator, workforce manager, and the evaluator have all been able to use this data in generating reports that help track project development and fidelity to proposed objectives and outcomes.

2) The advisory board has reviewed outcome data as it has become available in Years 2 and 3, and will continue to do so.

3) The TCI team and the evaluator have met regularly to consult on findings, and the evaluator has provided updates through annual White Sheets (see Appendices C-E) and this Implementation Analysis / Interim Evaluation Report.

4) Project evaluation findings have informed program improvements in a number of ways detailed in this report. This includes not only the work of the evaluator, but of all TCI's partners in industry, academia, and social services who have provided feedback as the program has been developing, as well as the feedback of students, instructors, and staff.

Summary. Feedback from students, instructors, the evaluator, and industry partners has been instrumental in calibrating coursework and improving the programs that TCI offers. The final Evaluation Report, to be submitted at the end of Year 4, will provide an overall assessment of the impact of these efforts.

The final Evaluation Report will include an Impact Analysis. The evaluation plan determined that this analysis would employ a Non-Equivalent Comparison Group Design (NECGD) with repeated measures to provide quantitative evidence of the degree to which outcomes were met and of the overall program impact (Campbell, 1966). Numerous attempts were made to contact the TAACCCT grant coordinator to help gather comparison data from a local community college that offered a two-year Machinist Tech program. The program coordinator also contacted a TAACCCT program evaluator from a cohort two grant, who had contacted the Department of Labor, and explained that individual/disaggregated data could not be collected from individuals. TCI leadership and the evaluation team together decided that the collection of comparison group data was neither feasible nor would it support the evaluation proposed. Impact analysis will instead be based on the following data:

- ***Department of Labor Data.*** The evaluator contacted the Department of Labor office regarding the collection of required UI wage data for participants. We discovered that due to California privacy laws, individualized student data cannot be shared. Data can only be shared in the aggregate for user populations. The evaluator will capitalize on relationships with Department of Labor and Industrial Relations (DLIR) to access UI wage data for participants and the comparison groups. These include employment following program completion, employment retention, and wage increases for incumbent workers who enter the program. We are now strategizing how to incorporate this data into the impact analysis.

- ***TCI Data.*** All student outcome measures will be pulled from Apricot, the MCC student information system. This database was added in Year 2, as the originally planned database was determined not to be compliant with the needs of the program. The workforce navigator combined all data components from various Excel workbooks to create a central database within Apricot for all data requirements. All data was added to this database by Year 3.
- ***Independent Evaluation Data.*** The HCA evaluation team collected student pre-post test data with each of the cohorts, which reflects all program components including the roles of the workforce navigator and industry partners.

CONCLUSIONS

The MiraCosta College Community Services and Business Development division has successfully developed and implemented the Technical Career Institute. The findings of all available evidence are meeting, and in some cases exceeding, projections. Those that are not meeting projections are expected to meet projections during the upcoming year. Most importantly, students are gaining valuable credentials, jobs, and increased wages.

Despite these advances, the following recommendations, if applied, are likely to affect not only TAACCCT-funded grant outcomes, but also the long-term success of the program:

1. ***Continue outreach to high school programs throughout the service area to provide career awareness.*** TCI's experience has been that for the most part, older students who have previous job experience make the most successful students. However, with the current low rates of unemployment, the program should pivot to engage the emerging workforce of recent high school students. Also, it is recommended to target recent dropouts from MCC's credit program who did not complete their transfer program.
2. ***Continue to provide access to high quality student-level data for multiple stakeholders including program staff, administration, and third party evaluators.*** The database should have the capability of tracking students longitudinally rather than just at one-point in

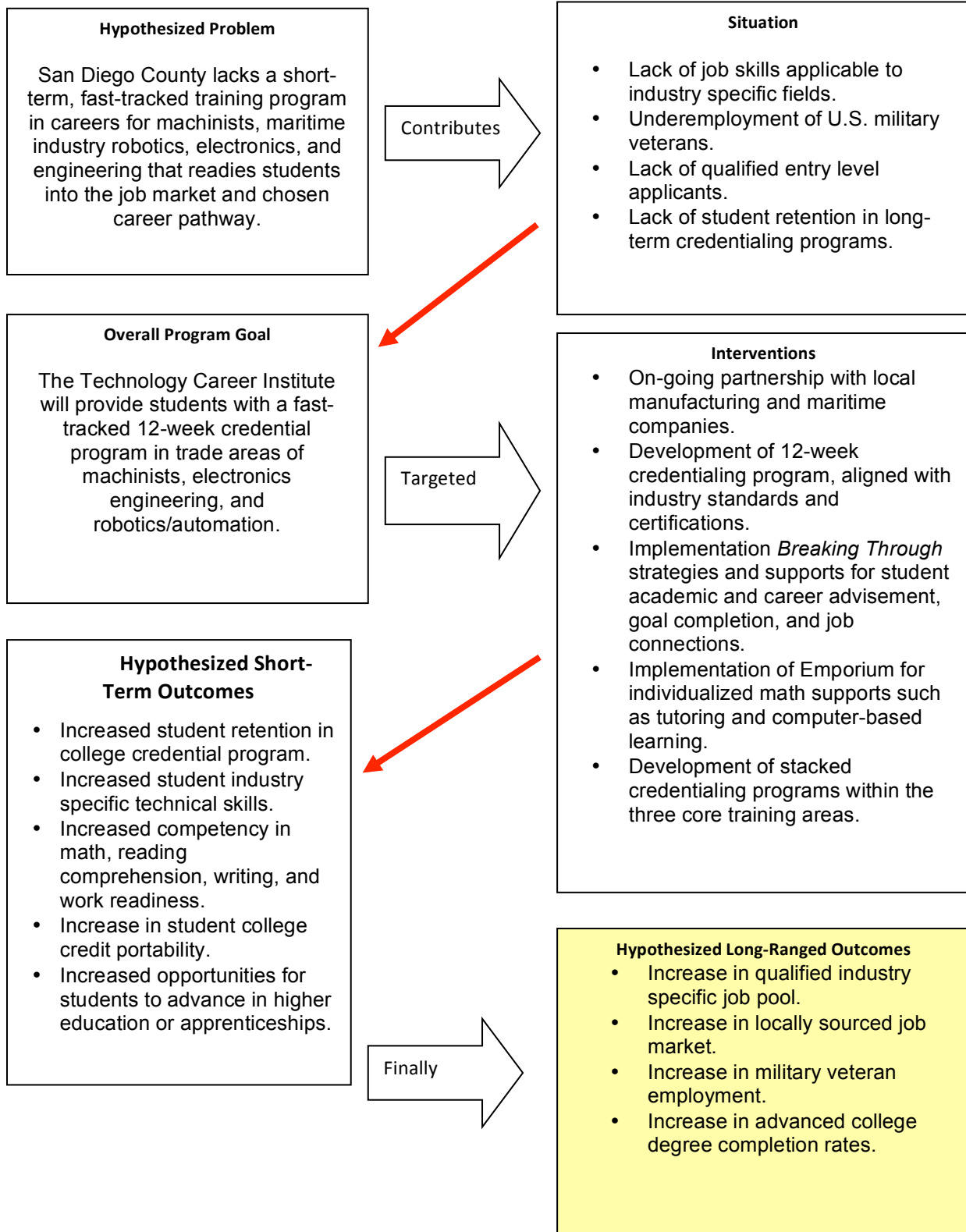
time. It should also be able to cluster students in cohorts and make comparisons to other cohorts, for the purposes of comparative analysis and data-based decision-making.

3. *Make better use of program-level data to make decisions.* A user-friendly database, replete with high quality participant-level data will allow program staff to use data to make informed decisions.
4. *Train staff in the effective use of the database and meet regularly with staff around data issues.* Unless staff understands the value of a program-specific database, which collects and tracks student services dosage data, it is not likely that such an effort will be adopted and maintained. Training should involve the use of data for both reporting and planning. Reports should be geared toward making the case for sustainability, and should inform strategic planning. Even in the case of strong evidence of program impact, defining what components to strategically maintain to insure the program's continued impact will be hampered by a lack of services data by student.
5. *Continue to work with the evaluation team to build in ongoing transparent evaluation measures.* Even with access to high quality participant level data, institutionalized data systems and evaluation practices should be put into place. Some practices can be built into the program to ensure periodic assessment of program efficiency, using qualitative and quantitative outcome measures to substantiate claims.

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APPENDIX A. LOGIC MODEL



APPENDIX B. EVALUATION PLAN

Evaluation Questions/ Components	Data Collection Components	Instrumentation	Methodology	Timeline	Data Use
<p>Program</p> <p>How was the original vision of TCI developed?</p> <p>How did the capacity of program change through the grant program?</p>	<p>Curriculum selection</p> <p>Recruitment</p> <p>Partnerships</p> <p>Latticed/ stacked coursework pathways.</p> <p>Increased student capacity/ learning opportunity.</p> <p>Track student capacity</p>	<p>Checklist and interview questions.</p> <p>Tracking planning meetings through targeted time studies (LM timeline).</p>	<p>Staff interviews</p> <p>Evaluation observed site visit</p> <p>Key stakeholder interview</p>	<p>Baseline and Annually</p>	<p>Internally for staff and reporting to DOL.</p>
<p>Student</p> <p>What are the characteristics of students?</p> <p>How did students' progress in program?</p> <p>What program components were useful?</p>	<p>Indicators of program self-selection and recruitment</p> <p>Direct service provision.</p>	<p>Participant Surveys</p> <p>Checklist of assessment tools/student support services (Orbund)</p>	<p>Tracking program dosage</p> <p>Analysis of student surveys</p> <p>Student interviews</p> <p>Focus groups</p>	<p>On-going beginning Year 1</p>	<p>Use of data in quarterly meetings and real time feedback of interviews in Year 1</p> <p>Evaluation Briefs and Annual White Sheets</p>

Evaluation Questions/ Components	Data Collection Components	Instrumentation	Methodology	Timeline	Data Use
<p>Partner/System</p> <p>To what extent did program partners add to program, development, recruitment, training, placement program management and program sustainability?</p>	<p>Organizational capacity for collaboration and sustainability</p> <p>Direct service provision and services tracked</p>	<p>Partner Surveys</p> <p>Stakeholder surveys</p> <p>Student tracking (case management database)</p>	<p>Online survey of partners.</p> <p>Meeting attendance and observation for key issues.</p> <p>Web analytics</p> <p>Collective Impact Rubric</p>	<p>Survey delivered annually.</p> <p>Meetings TBS</p>	<p>Feedback to staff</p> <p>Annual reports and quarterly reports as needed</p>

APPENDIX C. YEAR 1 EVALUATION SUMMARY

MiraCosta College TAACCCT Grant Y1 Evaluation Summary

October 2013 – October 2014

Goal: MiraCosta College will create a Technical Career Institute (TCI) that will expand their successful, industry-recognized Machinist certificate program, and create an Electronics Engineering and Robotics/Automation certificate programs in response to industry needs for skilled workers.

Year 1 Program Highlights

- MCC negotiates and acquires new facility in Carlsbad for the Technical Career Institute.
- Program implements pre-requisite Math and Reading Comprehension grant funded remediation in partnership with United Way.
- Program hires a Work Skills Navigator to assist students in job placement.

Student Profile

- 54 Enrollees Male, 1 Enrollee Female.
- 6 Enrollees were Veterans.
- 31 Mean age of Enrollees.
- 34% Latino, 3% Asian, 1% African American
- 38% White, 10% Mixed Race Enrollees, 14% Undeclared.

Student Results

- 55 Unique participants received services.
- 41 Enrollees completed a grant-funded program of study.
- 11 Enrollees were still completing program of study at time of reporting.
- 88% Enrollees self-reported employment after program completion at time of reporting.
- 11% Enrollees pursuing further education.
- 93% Enrollees retained in job at follow-up.
- 5 Enrollees who were employed received a raise upon program completion.
- 100% of program graduates maintained the 90% program attendance requirement.

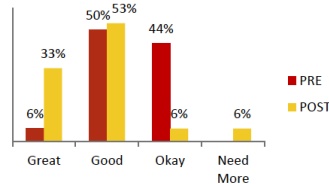
MCC Objective: Provide students with personal and job related support services

- 100% of students received services from the Work Skills Navigator.
- 53 Hours of one-on-one services were conducted by the Work Skills Navigator.
- 14 Hours of Job Skills training were conducted by the Work Skills Navigator.
- 11 Students participated in remediation to enter program and 9 participated in a need-driven Homework Lab.
- 100% of students participated in Job Shadowing.

MCC Objective: Increase student job related competencies upon program completion

- 85% reported high confidence to speak with potential employers.
- 72% reported high confidence to get a job in their desired profession.

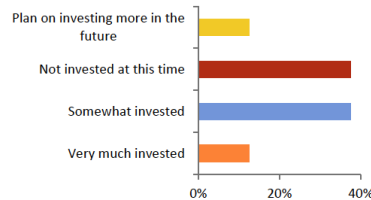
Figure 1. Self-Reported Improvements in Basic Computer Skills



MCC Objective: Increase High Value Industry Partnerships Industry Survey Results

- 40% Of survey respondents believe that student job retention is the best measure of program success.
- 50% of survey respondents share a common agenda that has as a priority the success of the TCI.

Figure 2: The Degree of Partner Investment in Sustainability (Baseline)



MiraCosta College TAACCCT Grant Y1 Evaluation Summary

October 2013 – October 2014



The following question responses are from multiple perspectives regarding program implementation in Year 1.

STUDENT Survey responses: What component of the Machinist program was most useful to you?

- ❖ Had zero knowledge of milling, turning, CNC and blueprints. Everything has improved including interviewing skills.
- ❖ I know my skills have improved because each project was harder and I improved with each one.
- ❖ I have improved my machining skills 100% since the start. Instructor answered all my questions and was quick to correct my mistakes. I feel confident in my machining abilities because of this program.
- ❖ I know about milling, drilling, and lathe working, so that I can get a job or work from home.
- ❖ I had very little shop experience and now I feel confident to jump on any machine and can understand it and run the machine safely.

MCC STAFF Interview responses: How did the capacity of the program change during Year 1?

- ❖ Running an accelerated program is a great way to go. It gets the students very engaged at a very high level. You can plow through an enormous amount of curriculum in less instructional hours than you would if you were running it in a typical credit setting. We wanted to emphasize developing skill sets and trouble shooting in the workplace
- ❖ By expanding the application process to be more of an intensive interview we were able to better recruit students who succeeded.
- ❖ Adding the Work Skills Navigator has increased my ability to focus on student learning and teaching. Many students have life problems which can take away my time and focus from quality instruction.

MCC STAFF Interview responses: To what extent did Industry Partners add to the program in Year 1?

- ❖ The job shadowing, contacting our partners in industry and asking them to donate their time to have our students come and shadow.
- ❖ MiraCosta College is leveraging the support of the business community. This is the only way to sustain the program.
- ❖ Expansion of our partnerships will increase the quality of our materials and tools we can use in the program. Partners are being more and more helpful as they see us graduate more qualified students. They call me asking when students will be graduating. They are also finding us new students.

Industry Partner Survey responses: Please share a highlight from Year 1.

- ❖ We have participated in the advisory task force committee, job shadowing program and have successfully hired two former students!
- ❖ The startup of the Incumbent Worker program.
- ❖ Our substantial donation and assisting MCC in the Landes facility design and layout.



APPENDIX D. YEAR 2 EVALUATION SUMMARY

MiraCosta College TAACCCT Grant Y2 Evaluation Summary

October 2014-September 2015

Goal: Mira Costa College (MCC) will create a Technical Career Institute that will expand and create industry-recognized Machinist and Engineering Technician Certificate programs and incumbent worker programs to respond to demand for a technically skilled workforce.

Year 2 Program Highlights

- MCC equips and opens Technical Career Institute (TCI). Over **250** Industry, Community, and City representatives attended grand opening.
- Program hires Engineering Technician (ET) Program Instructor and creates curriculum with Industry input.
- MCC initiates its first cohort of Engineering Technician students. Program length is 15 weeks full time for **600** hours total.
- Program moves Machinist Technician (MT) program to TCI and expands program length and curriculum to meet expanding industry needs for a total of **487** hours.
- MCC hosts first Machinist program student reunion.
- MCC creates Incumbent Worker programs and conducts outreach to Veteran Groups, High Schools and Industries.
- Staff successfully launched a new program-tracking database.

Machinist Tech Student Profile to Date

- 96** Enrollees Male, **2** Enrollees Female.
- 6** Enrollees were Veterans.
- 32** Mean age of Enrollees.
- 28%** Latino, **3%** Asian, **3%** Native Hawaiian or Pacific Islander, **1%** African American, **46%** White, **5%** Mixed Race Enrollees, **14%** Undeclared.

Engineering Tech Student Profile to Date

- 92%** Enrollees Male, **8%** Enrollees Female.
- 38%** Enrollees were Veterans.
- 78%** Enrollees in the 18-35 age category.
- 38%** Enrollees have English as a second language.
- 31%** Latino, **8%** Asian, **8%** African American, **53%** White.



Technical Career Institute Advisory Board Meeting

MCCTechnical Career Institute objective is to Provide students with personal and job related support services. All students meet a high standard of program attendance, receive services from a Work Force Navigator, participate in job shadowing and industry related field trips. To date:

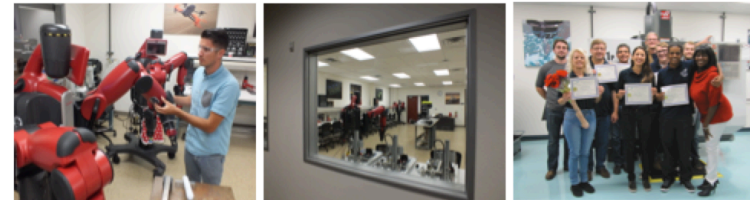
- 784 Hours** of one-on-one services were conducted by the Work Skills Navigator.
- 24** Students participated in remediation to enter program and **42** participated in a need-driven Homework Lab.

Student Results to Date

- 110** Unique participants received services (97 MT, 13 ET).
- 79** Enrollees completed a grant-funded program of study (74 MT, 5 ET).
- 72** Program graduates employed after program completion (68 MT, 4 ET).
- 71** Enrollees retained in job at follow-up (67 MT, 4 ET).
- 15** Enrollees who were employed received a raise upon program completion.

MiraCosta College TAACCCT Grant Y2 Evaluation Summary

October 2014-October 2015



The new Technical Career Institute

Left to right, Engineering Tech student programming Robot, Engineering Tech Lab and Machinist Tech TCI 2015 graduates.

Machinist Student Survey responses: As a result of graduating from this program how have you changed?

- ❖ Before entering the program I had almost no knowledge of what a machinist did. Upon completion I feel confident in my ability to gain employment in the machining field. A combination of classroom and hands on training helped achieve this transformation
- ❖ I improved because every project got harder and harder, which made me pick new things up and practice what I learned in the beginning.
- ❖ Yes, I have learned to apply what I have learned through actual hands on applications.
- ❖ Coming in I had an idea of what machining was, but now I understand and I am able to work with the machines

Engineering Tech Student Survey responses: Did this program meet your expectations?

- ❖ Yes. I expected it to provide me with a basic understanding of a wide variety of engineering topics, fields, tools, techniques, and experiences. It did just that.
- ❖ While I would have enjoyed a more thorough examination of some of the course materials, overall the course fulfilled my expectations in assisting me gain new work skills and find gainful employment.
- ❖ Yes, I came in knowing nothing about electronics. And now feel I can effectively troubleshoot, repair, and document issues within circuitry.
- ❖ The program was better than expected. The hands on experience really helped me understand the subject we were learning.
- ❖ To a certain degree. It was what it said it would be. I still want to pursue further education though.
- ❖ Yes. I like that the program has ties to industry and helps with job readiness/placement.

Industry Partner and Family Member Interview Responses: Please share a highlight of your experience.

- ❖ We have developed a partnership with the TCI programs that are groundbreaking. This partnership will allow us to replace our aging workforce, utilize local talent and provide specific industry needs to the ongoing curriculum for this fast changing technologically oriented field. -Local tech company representative
- ❖ This program allows additional options for veterans who many times do not adapt well to a more traditional community college environment at a cost they can afford. -Veteran service agency representative
- ❖ I am very impressed with the number of industries who are active in the curriculum and provide not only needed supplies but hands on experience. -Workforce Partnership member
- ❖ This program was a god send for us, this program was fast, my husband was immediately engaged in learning from day 1 and got a job right after he graduated! -Student spouse

APPENDIX E. YEAR 3 EVALUATION SUMMARY

MiraCosta College TAACCCT Grant Y3 Evaluation Summary

October 2015-September 2016

Technical Career Institute

MCC Technical Career Institute objective is to provide students with personal and job related support services. All students meet a high standard of program attendance, receive services from a Work Force Navigator and participate in job shadowing and industry related field trips.

Year 3 Program Highlights

20 new classes added by MCC and/or certificate programs in response to local industry.

In partnership with a local partner, we began a new Electronic Assembly Certificate.

25 High School Counselors held a breakfast meeting to inform them of our program.

Began a Machinist Operator 1 and CNC Operator Apprenticeship program approved by both the Federal and State Departments of Labor.

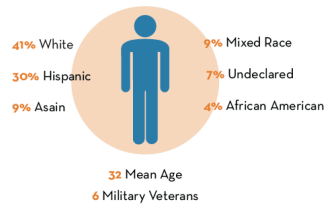
4,000 visits to tcmiracosta.edu during September 2016.

2 Alumni events conducted to facilitate networking with former students.

\$318,000 in additional funding were garnered to enhance TCI offerings and scholarships.

Certificate Program Student Profile

89% Male 11% Female



This is a total of all students in core program over three years.

Year 3 Cumulative Program Results

700 Hours of one-on-one services were conducted by the Work Skills Navigator.

26 Mini Manufacturing programs added

126 Enrollees completed a grant-funded program of study (102 MT, 24 ET).

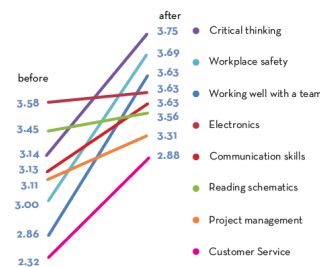
112 Program graduates employed after program completion (93 MT, 19 ET).

95 Enrollees retained in job at follow-up (76MT, 19 ET).

15 Enrollees who were employed received a raise upon program completion.

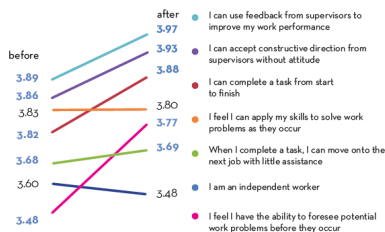
Importance of Skills for Job Success

Engineering Tech Students N=40



Importance of Skills for Job Success

Machinist Tech Students N=70



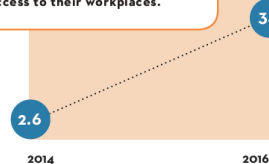
MiraCosta College TAACCCT Grant Y3 Evaluation Summary



Continued Partnership with Industry Increases Technical Career Institute Success



Industry Partners help to ensure the program's future by providing valued input, materials and access to their workplaces.



Mean scale scores in measure of partner commitment over time.

Machinist Tech Student Survey responses
Now that you have graduated can you comment on the course quality?

It was a great course, I learned a lot and the teacher was fantastic.

More on CNC/CAM/Operation/Setup

Great program. I just felt it would've been helpful for future math problems to have the tutor that was said was coming did. Other than that I was happy with the outcome.

I was very satisfied with the outcome.

The course was fantastic and fast paced as promised. The instructor was exceptional. I appreciate the connections the program has with industry. Everyone in the course was cooperative. Wish I would have had more math, and access to industry measuring tools.

Engineering Tech Student Survey responses
Did this program meet your expectations?

It exceeded my expectations related to job skills in communication, presentations, field technicians, BOM, cGMP, OSHA.

While I would have enjoyed a more thorough examination of some of the course materials, overall the course fulfilled my expectations and helped me to learn new work skills and find gainful employment.

Yes, the program had mechanics, electronics and software in it. The software could have been a little more in depth than what we had.

It provided me with a basic understanding of a wide variety of engineering topics and tools.

This course will give me an edge over other job seekers.

Program funded by the US Department of Labor TAACCCT grant.

APPENDIX F. ANNUAL OUTCOME DATA

#	Outcome Measure	Outcomes by Program: Year 1 to 3	Totals												
1	Total Unique Participants Served	<p> ● Machinist/Engineering ● Incumbent </p> <table border="1"> <tr><th>Year</th><th>Machinist/Engineering</th><th>Incumbent</th></tr> <tr><td>Year 1</td><td>55</td><td>8</td></tr> <tr><td>Year 2</td><td>55</td><td>11</td></tr> <tr><td>Year 3</td><td>227</td><td>97</td></tr> </table>	Year	Machinist/Engineering	Incumbent	Year 1	55	8	Year 2	55	11	Year 3	227	97	337 116
Year	Machinist/Engineering	Incumbent													
Year 1	55	8													
Year 2	55	11													
Year 3	227	97													
2	Total Number of Participants Completing a TAACCT-Funded Program of Study	<p> ● All Participants </p> <table border="1"> <tr><th>Year</th><th>All Participants</th></tr> <tr><td>Year 1</td><td>38</td></tr> <tr><td>Year 2</td><td>38</td></tr> <tr><td>Year 3</td><td>169</td></tr> </table>	Year	All Participants	Year 1	38	Year 2	38	Year 3	169	133				
Year	All Participants														
Year 1	38														
Year 2	38														
Year 3	169														
2a	Total Number of Grant-Funded Program of Study Completers Who Are Incumbent Workers	<p> ● All Participants </p> <table border="1"> <tr><th>Year</th><th>All Participants</th></tr> <tr><td>Year 1</td><td>8</td></tr> <tr><td>Year 2</td><td>11</td></tr> <tr><td>Year 3</td><td>97</td></tr> </table>	Year	All Participants	Year 1	8	Year 2	11	Year 3	97	116				
Year	All Participants														
Year 1	8														
Year 2	11														
Year 3	97														
3	Total Number of Participants Still Retained in Their Program of Study or other TAACCT-Funded Program	<p> ● All Participants </p> <table border="1"> <tr><th>Year</th><th>All Participants</th></tr> <tr><td>Year 1</td><td>11</td></tr> <tr><td>Year 2</td><td>15</td></tr> <tr><td>Year 3</td><td>64</td></tr> </table>	Year	All Participants	Year 1	11	Year 2	15	Year 3	64	90				
Year	All Participants														
Year 1	11														
Year 2	15														
Year 3	64														
4	Total Number Retained in Other Education Programs	<p> ● All Participants </p> <table border="1"> <tr><th>Year</th><th>All Participants</th></tr> <tr><td>Year 1</td><td>2</td></tr> <tr><td>Year 2</td><td>3</td></tr> <tr><td>Year 3</td><td>0</td></tr> </table>	Year	All Participants	Year 1	2	Year 2	3	Year 3	0	5				
Year	All Participants														
Year 1	2														
Year 2	3														
Year 3	0														
5	Total Number of Credit Hours Completed (aggregate across all enrollees)	TAACCT is a non-credit program	0												

#	Outcome Measure	Outcomes by Program: Year 1 to 3	Totals								
5a	Total Number of Participants Completing Credit Hours	TAACCCT is a non-credit program	0								
6	Total Number of Earned Credentials (aggregate across all enrollees)	<table border="1"> <tr><th>Year</th><th>Value</th></tr> <tr><td>Year 1</td><td>38</td></tr> <tr><td>Year 2</td><td>38</td></tr> <tr><td>Year 3</td><td>169</td></tr> </table>	Year	Value	Year 1	38	Year 2	38	Year 3	169	245
Year	Value										
Year 1	38										
Year 2	38										
Year 3	169										
6a	Total Number of Students Earning Certificates – Less Than One Year	<table border="1"> <tr><th>Year</th><th>Value</th></tr> <tr><td>Year 1</td><td>38</td></tr> <tr><td>Year 2</td><td>38</td></tr> <tr><td>Year 3</td><td>169</td></tr> </table>	Year	Value	Year 1	38	Year 2	38	Year 3	169	245
Year	Value										
Year 1	38										
Year 2	38										
Year 3	169										
7	Total Number Pursuing Further Education After Program of Study Completion	<table border="1"> <tr><th>Year</th><th>Value</th></tr> <tr><td>Year 1</td><td>4</td></tr> <tr><td>Year 2</td><td>6</td></tr> <tr><td>Year 3</td><td>15</td></tr> </table>	Year	Value	Year 1	4	Year 2	6	Year 3	15	25
Year	Value										
Year 1	4										
Year 2	6										
Year 3	15										
8	Total Number Employed After Program of Study Completion	<table border="1"> <tr><th>Year</th><th>Value</th></tr> <tr><td>Year 1</td><td>30</td></tr> <tr><td>Year 2</td><td>27</td></tr> <tr><td>Year 3</td><td>62</td></tr> </table>	Year	Value	Year 1	30	Year 2	27	Year 3	62	119
Year	Value										
Year 1	30										
Year 2	27										
Year 3	62										
9	Total Number Retained in Employment After Program of Study Completion	<table border="1"> <tr><th>Year</th><th>Value</th></tr> <tr><td>Year 1</td><td>28</td></tr> <tr><td>Year 2</td><td>25</td></tr> <tr><td>Year 3</td><td>57</td></tr> </table>	Year	Value	Year 1	28	Year 2	25	Year 3	57	110
Year	Value										
Year 1	28										
Year 2	25										
Year 3	57										
10	Total Number of Participants Employed at Enrollment Who Received a Wage Increase Post-Enrollment	<table border="1"> <tr><th>Year</th><th>Value</th></tr> <tr><td>Year 1</td><td>5</td></tr> <tr><td>Year 2</td><td>10</td></tr> <tr><td>Year 3</td><td>52</td></tr> </table>	Year	Value	Year 1	5	Year 2	10	Year 3	52	67
Year	Value										
Year 1	5										
Year 2	10										
Year 3	52										