Evaluation of Richland College's Veterans-Focused Engineering Technology Project

Final Report Executive Summary

Sara B. Haviland, Ph.D., Michelle Van Noy, Ph.D., Li Kuang Ph.D., Justin Vinton, and Nikolas Pardalis

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RUTGERS
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TAACCCT PROGRAM/INTERVENTION DESCRIPTION AND ACTIVITIES

Project and Purpose

In response to economic instability and the tight labor market in the manufacturing and electronics industry, and the comeback these industries are making in the greater Dallas area, Richland College's Veterans-Focused Engineering Technology Project (VFETP) aims to prepare students for immediate entry into manufacturing and electronics jobs. To this end, the VFETP grant expands the college's program offerings in advanced manufacturing and electronics through a comprehensive set of reforms, including changes to the physical space and equipment of the programs, reforms and expansions to the curricula, student support services and advising, and the engagement of local employers. The main goals of the grant were to align curriculum and instruction directly with local employer needs by purchasing state-of-the-art equipment and technology and integrating nationally recognized credentials from the National Institute for Metalworking Skills (NIMS) and the International Society of Certified Electronics Technicians (ISCET), develop a student navigator model in order to improve student recruitment with an emphasis on veterans, and finally to have greater coordination and alignment with local employers to help support students' successful placement into internships and eventually into jobs.

Though the project was originally limited to Manufacturing and Engineering Technology (MET) programs, in spring 2017 the grant was amended to included Computer and Information Technology (CIT) programs as well. This increased scope fostered improved student outcomes. However, the CIT programs were a late addition and only received a "light" intervention; while the MET programs were subject to a complete overhaul, with new or reformed curriculum, the addition of preparation for national credentialing, new faculty, new lab spaces, and a career navigator to provide a more intensive and wraparound model of advising, the CIT programs only received a new career navigator and one faculty addition. Therefore, in this report the default analysis is of the MET programs; when appropriate and specified, we include outcomes from the CIT programs.

Interventions

The following key project implementation strategies were evaluated:

Intervention	Proposed Change Effect
Organize a team and organizational structure implemented with student navigator model and involving the lead work of a Project Director	Expand program capacity through increased enrollment, advising, student support, and employer engagement
Install new equipment and technology for classrooms and labs and integrate technology-enabled learning with simulation equipment	Demonstrate commitment of college to enhancing skills of the workforce in the manufacturing and electronics industry that are important to local area's economy
Develop or reform curriculum based on NIMS and ISCET standards and include online modularization with narrative video walkthroughs	Create more hands-on learning opportunities for students, as well as increasing employer awareness of the certificates and shaping their expectations of students from the college's certified programs.
Develop Peer-Led Team Learning (PLTL)-based program for contextualized learning and remediation via peer instruction	Present students with materials they will see in class and offer tutoring to improve learning
Incorporate prior learning assessment to facilitate articulation of prior learning experiences—non-credit courses and military experience	Assist non-traditional students with prior work experience in accelerating their path to certificates/degrees
Recruit students, with a focus on veterans	Offer more opportunities for veterans to obtain high-paying and in demand jobs
Engage with local employers through regular meetings and certification processes and develop co-ops and internships	Increase information sharing with employers and allow them to provide input on curriculum in order to provide better job opportunities to students
Coordinate with public workforce system and align with statewide workforce plans	Increase the amount of students referred to Richland

Populations Served

The VFETP program was designed to fill a labor market need in the greater Dallas Metropolitan area, primarily serving adult or otherwise non-traditional students with or without experience in manufacturing or electronics.

Evidence-based Model

The proposed strategies used in the VFETP project were based on research about career pathways, peer-led team learning (PLTL), prior learning assessments, advanced learning online and technology enabled learning, and employer engagement strategies. Career pathways have been shown to help hard-to-employ adults to achieve immediate short-term gains as well as long-term successes (Gash and Mack 2010), improve student success rates (Jenkins and Sung-Woo 2012), and facilitate program graduates who are better prepared for employment and have better employment outcomes (Maguire et. al 2010), Research indicates that PLTL can improve students' grades and pass rates, particularly in underrepresented minority groups (Gosser et. al 2001, Lewis 2011). Prior learning assessments were demonstrated to improve persistence and graduation rates and decrease time to degrees (Brigham 2010). Online learning has been shown to have similar educational outcomes as traditional in-class learning (Neuhauser 2002, US Department of Education 2009), and that students who have practical experiences and hands-on learning opportunities experience better success (Benson et. al 2005). Studies demonstrate that strong employer engagement helps improve the performance of career ladder programs (Maguire et. al 2010).

EVALUATION DESIGN SUMMARY

Goals of Evaluation

VFETP sought to address three major gaps in the college's programs—the lack of nationally recognized credentials, outdated instructional equipment in the Richland manufacturing and electronics programs, and an inadequate pipeline of students. The program consisted of two separate assessments—a process evaluation that analyzed the implementation and organizational structure of the project, and the outcomes analysis that analyzed the quantifiable impacts of the project on and its impact on students. With the help of the EERC, Richland developed a logic model (see Appendix A) to evaluate and summarize how the program's plan worked (programs inputs and activities) and how it produced results (short-term outputs, outcomes, and longer-term impacts), ensuring that all stakeholder had a shared understanding of the plan and goals of the project.

Data for the evaluation were collected in numerous ways and from multiple sources including:

- Site visits to college
- Telephone meetings and interviews with project leads
- Review of college and program documents
- Participant observation
- Student surveys
- Student administrative data
- Employer-contacts survey

- Telephone and in-person interviews with employers

Implementation Study Design

There are several overarching research questions that guided this evaluation. Other questions, activities, and interventions were also addressed in more detail and can be found throughout the main report.

Implementation Study Questions:

- How did the college implement new space and equipment and integrate tech-enabled learning with the new equipment?
- How was VFETP's curriculum developed, modularized, and reformed based on NIMS and ISCET standards as well as for PLTL?
- How was PLA implemented for easier articulation?
- How were interventions implemented for certificate and AAS degree programs in both Engineering Technology and Computer Information Technology?
- How did the college pursue articulation between grant and traditional courses?
- How was the student navigator implemented along with the STEM/CTS team?
- How did VFETP design its recruitment and programs to focus on adult learners, and especially on veterans?
- How did VFETP conduct its engagement and relations with local employers and the workforce development system?

Outcome Study Design

The outcomes study design was broken down into two main parts—a descriptive analysis of student demographics and outcomes (from Fall 2015 through Spring 2018), as well as a quasi-experimental analysis of student outcomes (during the same time period), using propensity score matching—comparing students in manufacturing programs touched by the grant (treatment group) to Computer Information Technology (CIT) students from the year prior to the addition of CIT to the VFETP grant (non-grant touched control group). Other specific outcomes were also examined—those are discussed in the main report.

Outcome study questions:

- What were the demographics of students enrolled in VFETP programs?
- Did student enrollment increase as planned, especially for veterans?
- What were the employment outcomes for students, including wages and employment status?
- Did the program help students stack and receive more credentials in order to complete?
- Did the program retain more students and have them earn more credits than other Richland students involved in other programs?

IMPLEMENTATION FINDINGS

Institutional Capacity

One of the main goals of VFETP was to develop a quicker and more effective pathway from certificate or degree programs to the workplace in manufacturing or electronics jobs in the greater Dallas Metro area, as employers have voiced a need to fill these types of roles.

In order for VFETP to develop this capacity, it focused heavily on creating a team of staff including faculty, a project director (whom also leads other academic programs), a project manager, and a student navigator. Another important resource for capacity was purchasing as well as maintaining lab equipment and technology for new classrooms and labs, which still remain an integral part of the program. Relatedly, the curriculum creation, reform, and development based on nationally recognized standards taught by knowledgeable faculty from industry were also a key focus in order for students to obtain better paying jobs, as well as a PLA system that could expand student opportunities for those with previous work or military experience and improve recruitment. Finally, developing and sustaining consistent employer connections in order to create a formalized institution around them, as they are key players in structuring a pathway for VFETP students, was another capacity building goal.

Key Steps Taken at Program Level

VFETP struggled with success in reaching its student outcomes goals, but did make progress in key implementation goals of the program, including the addition of technology and equipment, development and reformation of curriculum and certificates, the addition of the student navigator model, increased efforts regarding recruitment, and boosting employer relations.

Key steps:

- Space and Equipment
    - Prepare physical program spaces
    - Integrate tech-enabled learning with new equipment
    - Integrate online learning with simulations
- Curriculum
    - Enhance online modularized curricula with video walkthroughs
    - Use PLTL-based program for contextualized learning and remediation
    - Improve PLA to facilitate articulation
- Student Navigator Model
    - Provide guidance and emotional support for students
    - Provide intrusive advising and assist students through training programs and job placement
- Recruitment

- o Implement general and veterans-focused marketing strategies
- o Coordinate with local chambers of commerce to target veterans
- o Track all VFETP students after graduation
- Employer Engagement
  - o Establish EAC meetings
  - o Coordinate with NIM/ISCET certifications process
  - o Develop internships and co-ops
  - o Collaborate with public workforce system and align with statewide workforce plans

Strengths and Weakness at the College Level

There was both progress and setbacks throughout the VFETP program. Regarding strengths, VFETP was able to:

- Use technology and state of the art equipment across VFETP programs
- Make maintaining equipment a priority at the college
- Align curriculum and credentials with NIM and ISCET competencies
- Provide stackable certifications in both manufacturing and electronics programs
- Increase employer involvement in program activities

Related weaknesses included:

- The demand for national credentials is not yet high among employers, particularly with respect to ISCET.
- SCADA curriculum was developed with difficulty, and the program has not been implemented due to staffing challenges; it is not clear there will be great demand for it by students or employers without further communication efforts on the part of Richland
- Articulation and pathways to four-year colleges still need improvement
- The PLTL aspect of the program is unsustainable
- Recruitment of veterans has remained problematic
- Implement PLA processes was delayed due to a District-wide overhaul that was taking longer than expected
- Employer relations could use more coordination across staff
- Employers are still having trouble finding qualified workers
- Workforce development coordination has been slow

PARTICIPANT IMPACTS AND OUTCOMES

As the grant period was 3 years, VFETP served hundreds of students receiving multiple different credentials:

- A total of 478 unique students enrolled in TAACCCT-related courses (as of Fall 2017), many pursued more than one credential
- Over 200 students enrolled in each year from 2015-2016 through 2017-2018

The types of students served by VFETP as of Fall 2017 were:

- 66.5% part-time
- 85.2% male
- 22.4% financial aid
- 60.9% non-traditional
- 26.6% Hispanic; 16.7% Black; 35.6% white
- 8.6% veterans

VFETP had a minimal effect on number of credits earned, retention, and credentials earned (as of Fall 2017):

- 52% return rate for part-time students from fall 2015-fall 2016
- 66% return rate for full-time students from fall 2015-fall 2016
- 16% graduation rate for students who began at Richland in fall 2013
- 25% transfer-out rate for students who began at Richland in fall 2013
- 18% of students took "twice as long as normal time" time to graduate from Richland for students who began in fall 2012
- 16% of students took "twice as long as normal time" time to graduate from Richland for students who began in fall 2013
- 8.4 average total credits earned in first year of grant exposure (2015 and 2016 classes, N=114)
- 54.5% retained students after one year (enrolled any term after first)
- 13.9 average total credits earned in the first two years of grant exposure (2015 class, N=50)
- 60% retained students after two years (enrolled any term after first)
- Only one student completed a credential after two years

Quasi-experimental analysis using propensity score matching was also used to analyze the impact of manufacturing students touched by VFETP compared to CIT students that were not, and focused on retention and credits earned (treatment group N=114; control group N=294):

- No evidence of a positive impact of VFETP on student academic outcomes within the limited timeframe of the evaluation
- Non-VFETP had a statistically significant positive impact ($p < .05$) on total credits earned within 1 year compared to the treatment group; VFETP students on average earned almost 3 credits less than that of CIT students in the first year
- See main report tables for further analysis

Limitations

The main limitations regarding the results are that the study sample size around 160 students per academic year is small, while the first-time student sample is even smaller, with only 50 students in the program long enough to capture two-year outcomes. Additionally, the observation period of two years is not appropriate to examine more distal outcomes, such as students' graduate or retention rates, particularly given that these programs take one to two years to finish in the best case scenario (fulltime enrollment, no gaps). Moreover, the administrative data from Richland are purely demographic, and do not include family and social characteristics of students, which may be related to academic outcomes.

CONCLUSIONS

The main results are identified at three different levels: students, college, and community. At the student level, the longer term impacts are difficult to analyze, as the project was only in full operation for two years of the study; it may take more time for these outcomes to be realized at the college. In the evaluation, there was no evidence to support the efficacy of the VFETP—only 1 student out of 50 earned an MET certificate or degree. Furthermore, in the quasi-experimental analysis, the control group actually fared better in credits earned than the VFETP group, which may be attributable to the differences in curricula and the speed at which programs were implemented.

Although the ISCET certifications are still received will ambivalence among employers, there has been better reception with NIMS, and 78% of VFETP students that took the NIMS test passed. Richland has also progressed in developing pathways for students through advanced manufacturing and electronics certificates that are stackable into AAS degrees, which offered students the ability to enter and exit at different points in the program. However, more some programs required less credits than others, which was problematic for some students that had credits count towards a credential, while others did not.

PLAs were used on an ad hoc basis, and would have better served students if a more formalized process was developed. However, this formalized process is in development at the District level, and in the meantime the Dean was able to implement a more formally modeled process for VFETP students specifically.
About 1 in 10 students in the VFETP population was a veteran or spouse of a veteran, though the staff reported frustration in reaching veteran populations.

At the college level, employer relations were developed, through a combination of formal and informal means. The career navigator position, and the addition of a second navigator, were seen as critical to engaging local employers, as well as guiding students towards them and providing wraparound services.

It is difficult to assess the broader impact on the community that Richland serves. Richland is tied into a large metropolitan area, and trying to train students to enter a booming industry in an economically growing area. It is too short of a time period to address how the VFETP has been able to address local workforce shortages in manufacturing and electronics industries, though the college itself has begun a pipeline and employers have started to take notice of what programs like these could potentially offer to the labor market. However, the curriculum overhaul and new lab spaces were positively received by students, faculty, staff and area employers, and there is reason to believe they will have a net positive impact on Richland and its surrounding communities in the years to come.

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