

**Evaluation of the Progressive,
Accelerated Certifications for
Employment in Information
Technology (PACE-IT) Program for
Edmonds Community College**

Oct. 1, 2015 – Sept. 30, 2016

September 2016

Submitted by:

SESRC

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Oct. 1, 2015 – Sept. 30, 2016**

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September 2016



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TABLE OF CONTENTS

Executive Summary	i
Introduction.....	1
Review of Work Plan Performance	2
PACE-IT Student Description	13
PACE-IT Program Enrollments, Completions, Industry Certifications, and Employment Outcomes	15
Enrollments and Completions.....	15
Completion Rates by Demographics.....	17
Industry Certifications.....	19
Employment Outcomes	23
PACE-IT Successes, Challenges, and Contributions to the Future.....	24
PACE-IT Program Successes	24
Certifications.....	24
Student Resources	24
Competency-Based Education.....	25
Accreditation	25
PACE-IT Program Challenges and Lessons Learned	25
Self-Paced Education	25
Faculty Roles and Contracts.....	26
College Systems	27
Curricula Updates	27
Leadership Turnover.....	27
No Tuition	27
Contributions to the Future	27

What Will Continue	27
How PACE-IT May Influence the College	28
Conclusions.....	29

LIST OF FIGURES

Figure 1: Student Gender	13
Figure 2: Student Race.....	13
Figure 3: Student Descriptors: Percentage of Incumbent Workers, Eligible Veterans, Persons with a Disability, Pell Grant Eligible, and TAA Eligible	14
Figure 4: Prior Education	14
Figure 5: PACE-IT Counts of Enrollments and Completions per Certificate Program	15
Figure 6: PACE-IT Completion Rates per Program.....	16
Figure 7: PACE IT Completion Rates by Gender, Incumbent Worker Status, Veteran Status, and Disability Status	17
Figure 8: PACE-IT Completion Rates by Race	18
Figure 9: PACE-IT Completion Rates by Prior Education	18
Figure 10: PACE-IT Number of Industry Certifications per Certificate Program	19
Figure 11: PACE-IT Industry Certification Pass Rates Per Program: First Attempt and Final Result	20
Figure 12: PACE-IT Industry Certification First Attempt Pass Rate and Final Pass Rate per Certification: Counts of Certifications Passed and Failed	21

LIST OF TABLES

Table 1: Definitions of Assessment Scores.....	2
Table 2: Assessment of Work Plan Performance	3
Table 3: PACE-IT Industry Certification First Attempt Pass Rate and Final Pass Rate per Program: Counts of Certifications Passed and Failed	20
Table 4: Count of PACE-IT Program Completers and Non-Completers Attempting and Achieving Industry Certifications: Number of Certifications per Student	22
Table 5: Percentage of PACE-IT Program Completers and Non-Completers Attempting and Achieving Industry Certifications: Number of Certifications per Student.....	22

EXECUTIVE SUMMARY

Evaluation of the Progressive, Accelerated Certifications for Employment in Information Technology (PACE-IT) Program for Edmonds Community College: Oct. 1, 2015 – Sept. 30, 2016

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Background

In October of 2012, Edmonds Community College received a Department of Labor (DOL) Trade Adjustment Assistance Community College and Career Training (TAACCCT) Grant. This four-year, \$3 million grant funded the Progressive, Accelerated Certifications for Employment in Information Technology (PACE-IT) program. PACE-IT is focused on developing five competency-based, self-paced, asynchronous online certificate programs:

1. Technology and Integration Support Certificate
2. Web Development and Design Certificate
3. Ethical Hacker Certificate
4. Network Security Certificate
5. Data Management Certificate

Edmonds Community College's current TAACCCT grant was awarded in October of 2012. The evaluation is tasked with tracking PACE-IT program implementation and reporting on the effectiveness of the various program components. This report covers the final year of the grant: October 1, 2015 through September 30, 2016.

Findings

Overall, the evaluation finds that Edmonds PACE-IT program has achieved the expected progress on all four priority areas. The five certificates were launched on schedule, the enrollment and retention targets have been met and exceeded, as have the certification goals.

PACE-IT Student Demographics

Among the 373 students who enrolled in the five PACE-IT certificates, 37% were female, and 36% were of minority backgrounds (other than white). Forty-one percent (41%) of the students were incumbent workers; 5% were eligible veterans; 3% had a disability; 2% were eligible for a Pell grant; and 1% were TAA eligible. Over half of the students (56%) had already earned at least a bachelor's degree when they entered the certificate programs.

PACE-IT Program Enrollments and Completions

The two programs with the highest enrollment were Web Developer (158 students) and Technology and Integration Support (95 students). A contributing factor to the high enrollment could be that these were the first two programs launched, in the fall of 2013. Data Management (57 students), Ethical Hacker (46 students), and Network Security (35 students) were launched a year later, in the fall of 2014.

As of July 14, 2016, the overall completion rate for PACE-IT was 23% (86 of 373 students). Ethical Hacker had the highest completion rate (52%), followed by Data Management (44%), Network Security (29%), Technology and Integration (25%), and Web Developer (6%).

Completion Rates by Demographics

Male students were more likely to complete certificates (26%) than female students (18%). Incumbent workers (12%), veterans (15%), and persons with disabilities (10%) were less likely to complete a program than their counterparts.

Hispanic (N=11) and African American (N=18) students had the highest completion rates (Hispanic: 36%, African American: 29%). Close to one-quarter (24%) of the white students (N=188) and Asian students (N=38) completed their certificate programs. Twenty percent (20%) of the Pacific Islanders (N=5) completed their programs, as did 13% of the multi-racial students (N=14). Please note that the sample sizes of all groups other than white are small so caution should be taken when drawing conclusions from these results.

Students who had completed a postsecondary degree or certificate prior to enrolling in the PACE-IT program had higher PACE-IT completion rates (over 20%) than those whose highest prior education was high school (14%) or some college (19%).

Industry Certifications

Number of Certifications Attained: A total of 242 industry certifications have been earned through the PACE-IT program, with a first attempt pass rate of 89% and a final pass rate of 92%.

While the Web Developer certificate program had the lowest certificate completion rate, it resulted in the highest number of certifications attained, at 98 certifications, 97 of which were earned in the students' first attempt.

Data Management students earned 51 certifications, as did the Technology and Integration students. Ethical Hacker students attained 29 certifications, and Network Security students achieved 13 certifications.

Number of Students Attaining Certifications: A total of 175 students attempted at least one certification (47% of the 373 students), and 160 students attained at least one certification (43%).

Among the PACE-IT program completers (N=86), 84% attempted at least one exam, and 81% passed at least one exam. Over one-third (36%) of the students who did not complete their PACE-IT certificate (N=287) attempted a certification exam, and 31% passed. This finding suggests that many of the students who did not complete their programs still achieved a valuable outcome.

Employment Outcomes

DOL Outcome 7: Forty-seven of the 86 program completers were unemployed at entry to the program. Of these, four were employed in the quarter after completion.

DOL Outcome 8: Of the four students who met Outcome 7, only two students exited the program early enough for three quarters of employment data to be available. Both of these students retained employment in the 2nd and 3rd quarters after completion; therefore, two students met Outcome 8.

DOL Outcome 9: Of the 373 students who participated, 211 were employed at entry to the program, and a total of 182 (86% of 211) received a wage increase in at least one quarter after entry.

PACE-IT Program Successes

The PACE-IT program had many successes during the four years of the grant:

Certifications: Since the curricula were specifically developed with the goal of enabling students to pass certification exams, the high pass rates and numbers of certifications earned are signs that this goal was met.

Student Resources: PACE-IT management credited several student resources created through the grant as being an asset to the students and the campus, including the Navigator Hour (employer presentations), Labs (with Skype), Student and Certificate Mentors, and the Prometric Testing Center.

Competency-Based Education: Through the PACE-IT program, Edmonds Community College gained the expertise to implement competency-based education, which was an innovation at the college.

Accreditation: Because of the PACE-IT program, Edmonds Community College obtained approval (a substantive change) through the accrediting body (Northwest Commission on Colleges and Universities) to offer PACE-IT and other competency-based education in the future.

PACE-IT Program Challenges and Lessons Learned

As a completely new paradigm for Edmonds Community College, it is not surprising that this pilot program was an excellent learning opportunity for the college. Challenges, lessons learned, and suggestions for other colleges that would like to implement similar programs include the following:

Self-Paced education: In the early days of PACE-IT, program managers assumed that students would take advantage of the self-paced nature of the program to complete the certificates quickly and move forward with their careers. However, lacking incentives to complete the PACE-IT certificates quickly, many students progressed through the certificate programs slowly, which led to high retention rates but low numbers of completions in the early years of the grant.

Faculty roles and contracts: The grant was designed to take a collaborative team approach to both curriculum development and student support. In addition to faculty, the grant involved an instructional designer, Subject Matter Experts (SMEs) from industry, and student mentors. Each of these professionals took on roles that, historically, had been held solely by the faculty at the college. Moving towards this new model required a shift in college culture and expectations.

College systems: The PACE-IT program was based on self-paced modules and continual enrollment. The college enrollment and student management systems were not set up to accommodate these aspects of PACE-IT.

Curricula updates: Since the curricula were so closely tied to the content and competencies in the certification exams, when the exams were updated, the curricula also needed to be updated.

Leadership turnover: Since the PACE-IT program started, many of the college administrators in place at the beginning of the grant have left the college. It can be a challenge to keep momentum on a project while also taking into consideration the new priorities of new leadership.

No tuition: Because the PACE-IT program was offered to students tuition-free, it is difficult for the college to determine what the demand will be for the program once the grant ends and tuition begins.

PACE-IT Program Contributions to the Future

While the PACE-IT program will not continue as a stand-alone program past the end of the grant, aspects of the program will be sustained, and the program may influence future directions at the college. The Computer and Information Systems (CIS) department will continue the following PACE-IT elements:

- **Navigator Hour**
- **Protocols and procedures for awarding credit for prior learning:** Students who enter the CIS department with a certification that matches the learning objectives of a course will be awarded five credits for that course
- **Lab managers as student mentors:** Lab managers will take on the role that the student mentors filled in the PACE-IT program, providing weekly or bi-weekly support to online students through phone calls.
- **PACE-IT modules incorporated into CIS courses:** Over half of the modules from all five certificates have already been incorporated into CIS courses, and there are plans to continue integrating the materials.

Moving forward, many of the lessons learned through the PACE-IT program may influence future directions at the college, including the following:

- **Accreditation:** The substantive change in the accreditation means that the college is approved to offer competency-based education in the future.
- **Open-source curricula:** Since all five certificate courses will be uploaded to the DOL Skills Commons, they will be available to anyone pursuing certification, which is a boon to the industry.
- **College systems:** As explained above, one challenge faced by the college was that the enrollment and student information systems were not set up for a program like PACE-IT. The college is currently in the process of preparing to transition to PeopleSoft Campus Solutions and is closely considering how to structure the system to accommodate programs like PACE-IT.
- **Faculty contracts:** In the next year, administrators will begin the conversations with faculty to come to an agreement about teaching competency-based education.

Conclusions

Overall, the evaluation finds that the PACE-IT project has successfully achieved its grant goals. The five certificates were launched on schedule; articulation agreements were executed with two universities; and prior learning assessments were created. Through the PACE-IT program, students had access to a rich support system, including student and certificate mentors, physical and virtual labs, the Navigator Hour, and on-campus internships, among others.

The enrollment and retention targets were exceeded, as were the certification goals. The high pass rates are a strong indication that the curricula development process successfully embedded the competencies from the certification exams. Another sign of the success of the PACE-IT program is that a total of 182 students received wage increases after enrolling in the program (96 in grant year three and 86 in grant year four).

INTRODUCTION

In October of 2012, Edmonds Community College received a Department of Labor (DOL) Trade Adjustment Assistance Community College and Career Training (TAACCCT) Grant. This four-year, \$3 million grant funded the Progressive, Accelerated Certifications for Employment in Information Technology (PACE-IT) program.

PACE-IT is focused on developing five competency-based, self-paced, asynchronous online certificate programs:

1. Technology and Integration Support Certificate
2. Web Development and Design Certificate
3. Ethical Hacker Certificate
4. Network Security Certificate
5. Data Management Certificate

Additional PACE-IT program elements include the following:

- Students will earn an industry certification as part of their coursework.
- Students will be required to have work-based experience before program completion, through activities such as an internship, job shadow, or capstone project. PACE-IT will help coordinate access to these opportunities.
- Students in the PACE-IT program will have their tuition waived.
- Students will have access to certificate mentors (for certificate subject matter questions) and student mentors (for all support needed outside of subject matter questions).
- Students completing the program will receive job placement assistance.

The evaluation is tasked with tracking PACE-IT program implementation and reporting on the effectiveness of the various program components. This report covers the final year of the grant: October 1, 2015 through September 30, 2016. This report is based on interviews with Steven Hailey, PACE-IT Project Director and Edmonds Community College Computer and Information Systems Department Chair; Terry Cox, Edmonds Community College Vice President for Workforce Development and Training; and Eva Smith, Edmonds Community College Director of IT, as well as analysis of employment data from the Washington State Employment Security Department (ESD), and review of quarterly reports to the DOL, the PACE-IT work plan, and the PACE-IT proposal.

This report is presented in four sections: 1) A review of progress on the work plan, 2) PACE-IT student description, including demographics, 3) PACE-IT program enrollments, completions, industry certifications, and employment outcomes, and 4) a review of PACE-IT program successes, challenges, and aspects of the program that will continue after the grant ends.

REVIEW OF WORK PLAN PERFORMANCE

By the end of the grant (September 2016), the project has achieved all four priorities: (1) accelerate online, competency-based learning for credentials leading to employment and continued education, (2) improve student achievement through intensive supports, (3) build student knowledge and experience through business and industry involvement, and (4) strengthen pathway to employment and/or continue education. Progress on project implementation was assessed using a four-point scale, from little or no progress to strong progress. The assessment scores are defined below in Table 1.

Table 1: Definitions of Assessment Scores

Progress Assessment Score	Assessment Score Definition
1: Little or no progress	Planning may be completed and/or work may have just started.
2: Moderate progress	Some useful work has been accomplished, but much more remains to be done.
3: Good progress	There has been considerable accomplishment. Additional work is needed, but product/activity should eventually lead to desired impact.
4: Strong progress	Well-developed product or activity with desired impact.

Table 2 below summarizes the proposed grant activities, deliverables, and progress made in each area. The Progress Assessment column includes the status, as reported on the Quarterly Narrative Progress Report for the period ending June 30, 2016, as well as progress assessment scores created by the evaluators. The June 30, 2016 report was the most recent report available when the evaluation report was being written. In some cases, the goal was achieved but service delivery continues in that area, as of June 30, 2016. In those cases, the progress assessment is marked as “Ongoing (Goal Achieved)”.

Table 2: Assessment of Work Plan Performance

Activities	Deliverables	Progress	Progress Assessment	
Priority 1: Accelerate online, competency-based learning for credentials leading to employment and continued education				
Strategy 1.1	Develop open online self-paced, stackable certificate modules based on industry skill requirements	1.1.1. Online Open Certificate Programs developed in five areas, including: 1) Computer Support (September 2013); 2) Web Development & Design (September 2013); 3) Ethical Hacker (April 2014); 4) Network Security (April 2014); and 5) Data Management (September 2014).	1.1.1. All five certificate programs launched on schedule. Students enrolled in all. Ongoing improvement of curriculum was implemented. Certificates have been updated to maintain consistency with revised industry certification exams.	1.1.1. Status: Complete Assessment score: 4
		1.1.2. All certificate program curricula made available at Washington Online open-course library	1.1.2. Three modules have been submitted to Washington Online. All modules will be submitted to the DOL Skills Commons by September 2016.	1.1.2. Status: Ongoing (Goal Achieved) Assessment score: 4
		1.1.3. Curriculum framework established for developing online courses using Quality Matters during curriculum development processes.	1.1.3. Curriculum framework established for developing online courses. Implemented in all five certificates.	1.1.3. Status: Complete Assessment score: 4

Activities		Deliverables	Progress	Progress Assessment
Strategy 1.2	Pilot, implement and evaluate online certificate programs	1.2.1. Online Certificate Programs offered in 1) Computer Support (September 2013); 2) Web Development & Design (September 2013); 3) Ethical Hacker (April 2014); 4) Network Security (April 2014); and 5) Data Management (September 2014).	1.2.1. (See 1.1.1.) All five certificate programs launched on schedule. Ongoing improvement of curriculum was implemented. Certificates have been updated to maintain consistency with revised industry certification exams.	1.2.1 Status: Complete Assessment score: 4
		1.2.2. 303 students enter program and 270 complete by March 2016.	1.2.2. Three hundred seventy three (373) students enrolled in at least one program. As of July 14, 2016, 86 students have achieved a certificate.	1.2.2. Status: Ongoing Assessment score: 3
		1.2.3. Research report on efficacy of PACE-IT strategies.	1.2.3. This evaluation report satisfies this goal.	1.2.3. Status: Ongoing (Goal Achieved) Assessment score: 4

Activities		Deliverables	Progress	Progress Assessment
Strategy 1.3	Develop and Implement student summative and formative assessments, including intake, learning, and certification assessments	1.3.1. Prior Learning Assessment (PLA) criteria documented and disseminated (intake assessment).	1.3.1. PLA criteria documented and disseminated. Students can receive prior credit by passing external industry certification exams.	1.3.1. Status: Complete Assessment score: 4
		1.3.2. Agreements with certification vendors in place, prior to enrollments of participants to enable them to take certification exams as determined via the curriculum development process (e.g. industry-recognized exams utilized to support competency-based format.	1.3.2. Signed agreements in place with Certified Internet Web Professional (CIW) and Institute for Certification of Computing Professionals (ICCP), enabling PACE-IT to proctor exams online.	1.3.2. Status: Complete Assessment score: 4
		1.3.3. Industry-recognized certification requirements are embedded in the five college certificate program curricula.	1.3.3. All five certificates are aligned with industry specifications via DACUMs and certification requirements. Certifications are embedded into the curricula. Certifications include: Technology & Integration <ul style="list-style-type: none"> A+ and Network+ Web Developer <ul style="list-style-type: none"> CIS JavaScript Specialist CIW Site Development Foundation 	1.3.3. Status: Complete Assessment score: 4

Activities	Deliverables	Progress	Progress Assessment
		<ul style="list-style-type: none"> • CIW Internet Business Associate <p>Intro to Network Security</p> <ul style="list-style-type: none"> • Security+ <p>Data Management</p> <ul style="list-style-type: none"> • Information Systems Core Examination <p>Ethical Hacker</p> <ul style="list-style-type: none"> • Certified Ethical Hacker 	
	1.3.4. Capstone objectives established for each certificate program and embedded in the five certificate program's curricula.	1.3.4. Capstone objectives have been established for all five certificates.	1.3.4. Status: Complete Assessment score: 4
	1.3.5. At least 200 students by March 2016 take industry-recognized certification exams (formative and summative competency assessments) as a part of their progress towards certificate program completion.	1.3.5. As of July 14, 2016, 175 PACE-IT students have taken at least one certification exam, and 160 passed at least one exam.	1.3.5. Status: Ongoing Assessment score: 3
	1.3.6. (See 1.2.3) Research report on efficacy of PACE-IT strategies	1.3.6. (See 1.2.3) This evaluation report satisfies this goal.	1.3.6. Status: Ongoing (Goal Achieved) Assessment score: 4

Activities		Deliverables	Progress	Progress Assessment
Priority 2: Improve student achievement through intensive supports				
Strategy 2.1	Create and manage drop-in IT lab (Sandbox) that provides student technical support and work experiences	2.1.1. Students receive hands-on experiences working in and managing Sandbox lab on-campus.	2.1.1. Students have access to several on-campus and virtual labs.	2.1.1. Status: Ongoing (Goal Achieved) Assessment score: 4
		2.1.2. 303 participants receive technology assistance to upgrade skills and receive instructional assistance from Mentors and IT Specialist.	2.1.2. A total of 373 students began PACE-IT certificates and received assistance from student mentors and certificate mentors.	2.1.2. Status: Complete Assessment score: 4
		2.1.3. Expand/modify on-campus internship model to ensure sustainability and provide meaningful work-place experiences (as measured by student survey and assessment of sustainability in final report).	2.1.3. Students continue to participate in on-campus internships with the START program and as IT Lab Managers with the CIS department.	2.1.3. Status: Ongoing (Goal Achieved) Assessment score: 4
		2.1.4. (See 1.2.3) Research report on efficacy of PACE-IT strategies.	2.1.4. (See. 1.2.3) This evaluation report satisfies this goal.	2.1.4. Status: Ongoing (Goal Achieved) Assessment score: 4

Activities		Deliverables	Progress	Progress Assessment
Strategy 2.2	Student support infrastructure enhanced for online learner	2.2.1. Students receive an array of individualized and group supports to enhance learning and retention. These components are assessed as to their effectiveness via participant surveys deployed beginning in Fall 2013, (concluding March 2016). In addition the impact of these supports (e.g. Sandbox lab, tutoring, mentors, etc.) is assessed through 3 rd party evaluation as to their impact on student retention and in relation to the comparison cohort's retention rates. ¹	2.2.1. Students had weekly contact with student mentors, who monitored student progress, identified barriers to completion, and helped find solutions to barriers. Students were also assigned certificate mentors, who provided help with course content, as needed.	2.2.1. Status: Ongoing Assessment score: 4
		2.2.2. 146 participants retained	2.2.2. As of November 13, 2014, of 328 participants who began the program, 200 were retained.	2.2.2. Status: Complete Assessment score: 4
		2.2.3. Research report on efficacy of PACE-IT strategies supporting learning, participant retention and progression.	2.2.3. This evaluation report satisfies this goal.	2.2.3. Status: Ongoing (Goal Achieved) Assessment score: 4

¹ It was determined that there was no appropriate comparison cohort at Edmonds Community College so this analysis was not performed.

Activities	Deliverables	Progress	Progress Assessment	
Priority 3: Build student knowledge and experience through business and industry involvement (internal and external)				
Strategy 3.1	Provide internships and other work project-based experiences on-campus and in community.	3.1.1. Technology solutions to meet industry needs.	3.1.1. Five asynchronous, competency-based, self-paced, and fully online certificates launched.	3.1.1. Status: Complete Assessment Score: 4
		3.1.2. Participants receive real work experiences.	3.1.2. Students continue to receive real work experience through on-campus internships with the START program and as IT Lab Managers with the CIS department.	3.1.2. Status: Ongoing (Goal Achieved) Assessment score: 4
		3.1.3. A stronger connection with employers	3.1.3. Program connections with employers have also been strengthened through the “Navigator hour” career presentations. Employers engaged with the project through participating in DACUM panels, authoring curriculum materials, and, in some cases, teaching the material.	3.1.3. Status: Ongoing (Goal Achieved) Assessment score: 4
		3.1.4. Research report on efficacy of PACE-IT strategies including assessment/evaluation of the effectiveness and satisfaction of project-based learning and/or workplace experiences (final report, completed by September 2016).	3.1.4. This evaluation report satisfies this goal.	3.1.4. Status: Ongoing (Goal Achieved) Assessment score: 4

Activities	Deliverables	Progress	Progress Assessment	
Priority 4: Strengthen Pathway to Employment and/or Continue Education				
Strategy 4.1	Increase and enhance opportunities for seamless articulation and transferability of credits to other 2-year and 4-year education.	4.1.1. Signed articulation agreements.	4.1.1. Articulation agreement signed with Western Washington University. WGU agreed to accept credits, with preference for students completing a 2-year degree prior to transfer.	4.1.1. Status: Ongoing Assessment score: 4
		4.1.2. Students knowledgeable of educational and career options available to them.	4.1.2. Students gain knowledge of career options through communication with certificate mentors and the Navigator. In addition, the Navigator hour program brings in employers monthly to present about careers. The PACE-IT Linked In group also provides access to employers.	4.1.2. Status: Ongoing Assessment score: 3
		4.1.3. 56 PACE-IT participants complete their program of study, further their education by September 2016.	4.1.3. As of July 14, 2016, 12 students have completed a program and gone on to further education.	4.1.3. Status: Ongoing Assessment score: 3
		4.1.4. (See 1.1.2.) Modules available at WA Online open course library.	4.1.4. (See 1.1.2.) Modules have been submitted to Washington Online. All modules will be submitted to the DOL	4.1.4. Status: Ongoing (Goal Achieved) Assessment score: 4

Activities		Deliverables	Progress	Progress Assessment
			Skills Commons by September 2016.	
Strategy 4.2	Assist student in job seeking and job placement	4.2.1. (See 4.1.2) Students knowledgeable about educational and career options available to them, as assessed via student surveys.	4.2.1. (See 4.1.2) Students gain knowledge of career options through communication with certificate mentors and the Navigator. In addition, the Navigator hour program brings in employers monthly to present about careers. The PACE-IT Linked In group also provides access to employers. For several of the modules, students had to familiarize themselves with job searching tools and submit a resume for review.	4.2.1. Status: Ongoing Assessment score: 3
		4.2.2. Students are supported in job search.	4.2.2. Student job searches are supported by the student mentor, PI, and faculty. Job information is also provided via Linked In.	4.2.2. Status: Ongoing (Goal Achieved) Assessment score: 4
		4.2.3. 86 completers are placed in jobs; 64 completers are retained in employment; 73 receive wage increase by end of performance period.	4.2.3. Four completers who were unemployed at program entry were employed at the quarter after exit. Two of these completers were retained in employment in the 2 nd and 3 rd quarters after exit.	4.2.3. Status: Ongoing Assessment score: 3

Activities		Deliverables	Progress	Progress Assessment
			(The other two did not complete early enough to have data out to this point.) A total of 182 students received a wage increase.	

PACE-IT STUDENT DESCRIPTION

Among the 373 students who enrolled in the five PACE-IT certificates, 37% were female, and 36% were of minority backgrounds (other than white). (See Figure 1 and Figure 2)

Figure 1: Student Gender

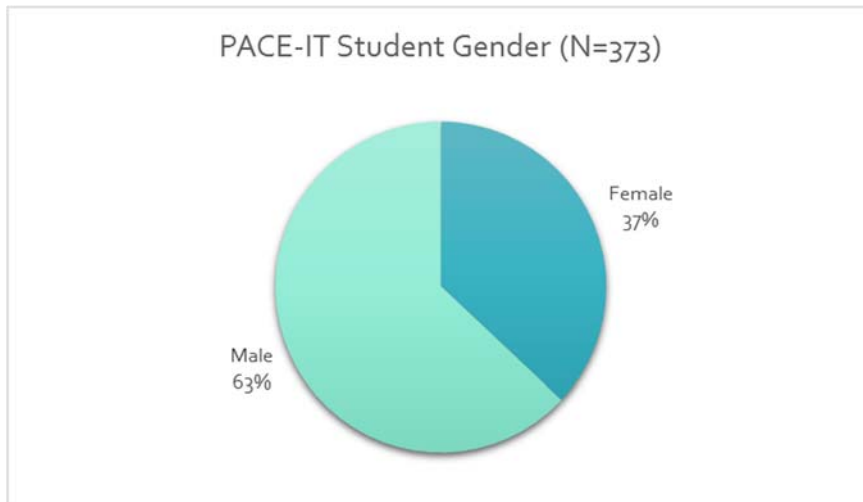
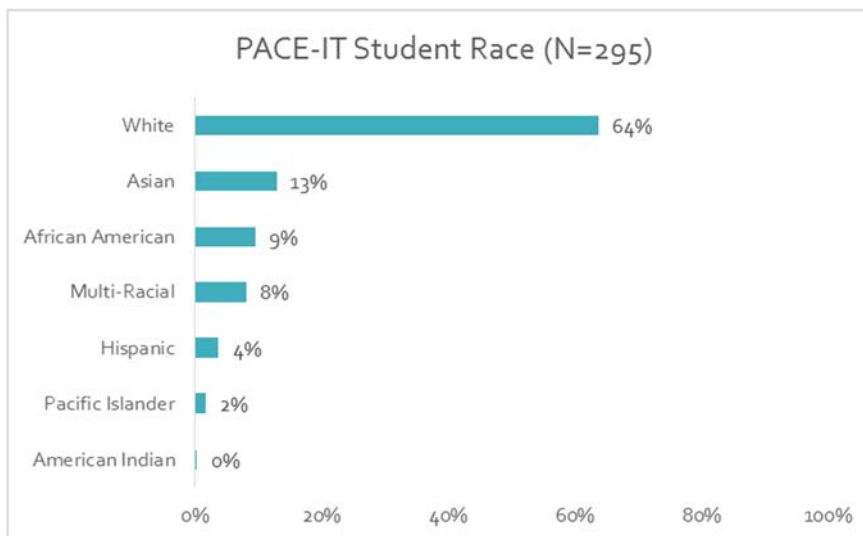


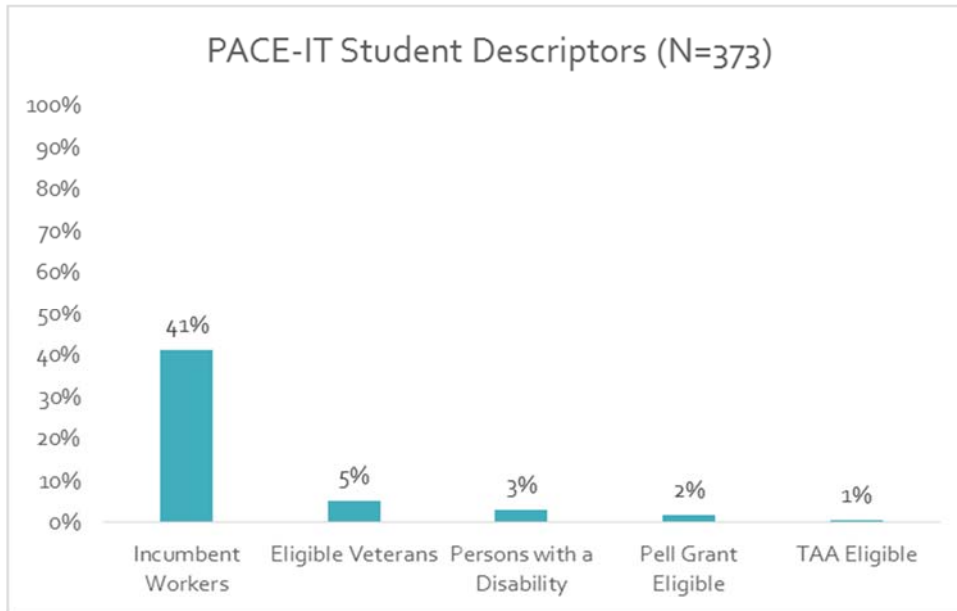
Figure 2: Student Race²



² Race percentages were calculated after removing the 73 "prefer not to answer" responses.

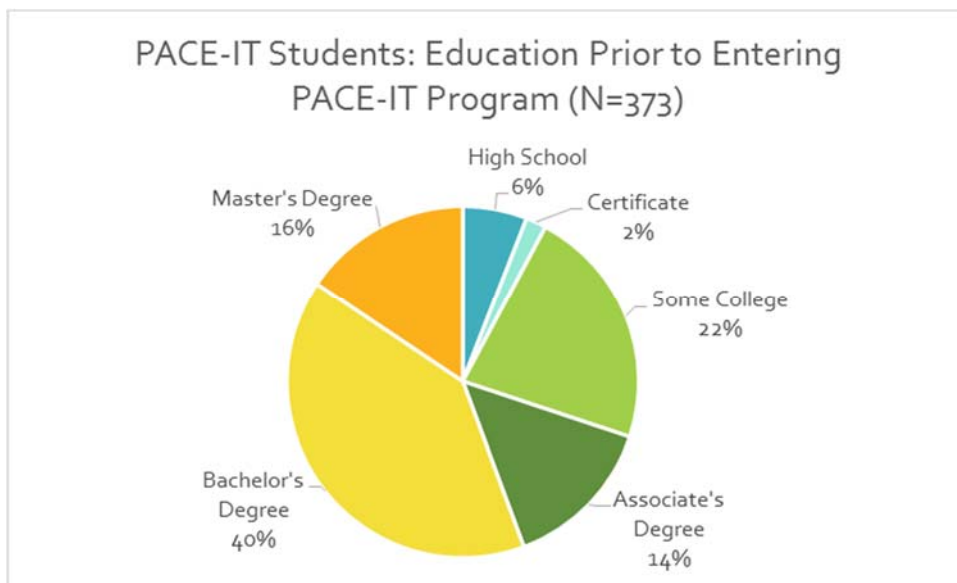
Forty-one percent (41%) of the students were incumbent workers; 5% were eligible veterans; 3% had a disability; 2% were eligible for a Pell grant; and 1% were TAA eligible. (See Figure 3)

Figure 3: Student Descriptors: Percentage of Incumbent Workers, Eligible Veterans, Persons with a Disability, Pell Grant Eligible, and TAA Eligible



The PACE-IT program appealed to students who were well educated. Over half of the students (56%) had already earned at least a bachelor's degree when they entered the programs.

Figure 4: Prior Education

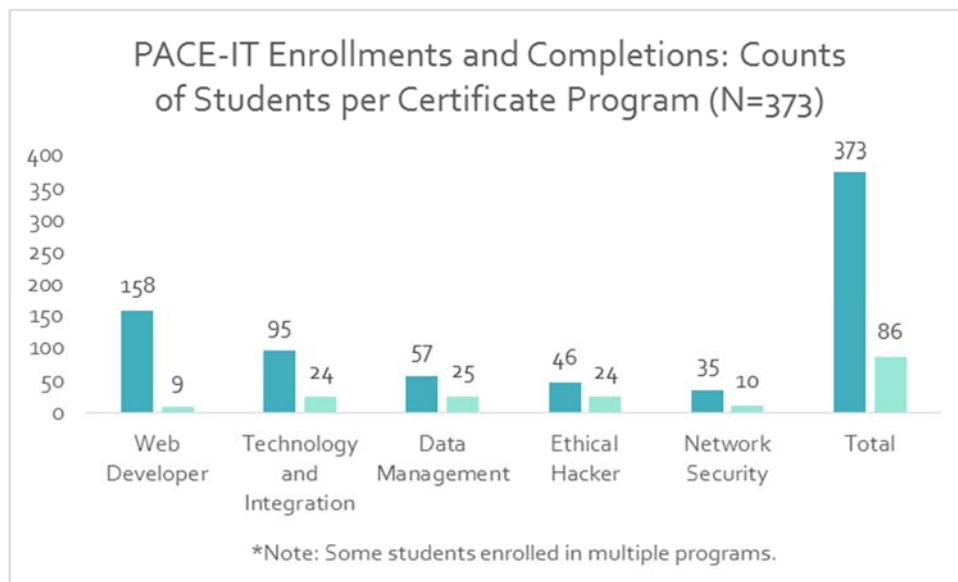


PACE-IT PROGRAM ENROLLMENTS, COMPLETIONS, INDUSTRY CERTIFICATIONS, AND EMPLOYMENT OUTCOMES

Enrollments and Completions

The two programs with the highest enrollment were Web Developer (158 students) and Technology and Integration Support (95 students). (See Figure 5) A contributing factor to the high enrollment could be that these were the first two programs launched, in the fall of 2013. Data Management (57 students), Ethical Hacker (46 students), and Network Security (35 students) had lower enrollment; they were launched a year later, in the fall of 2014.

Figure 5: PACE-IT Counts of Enrollments and Completions per Certificate Program

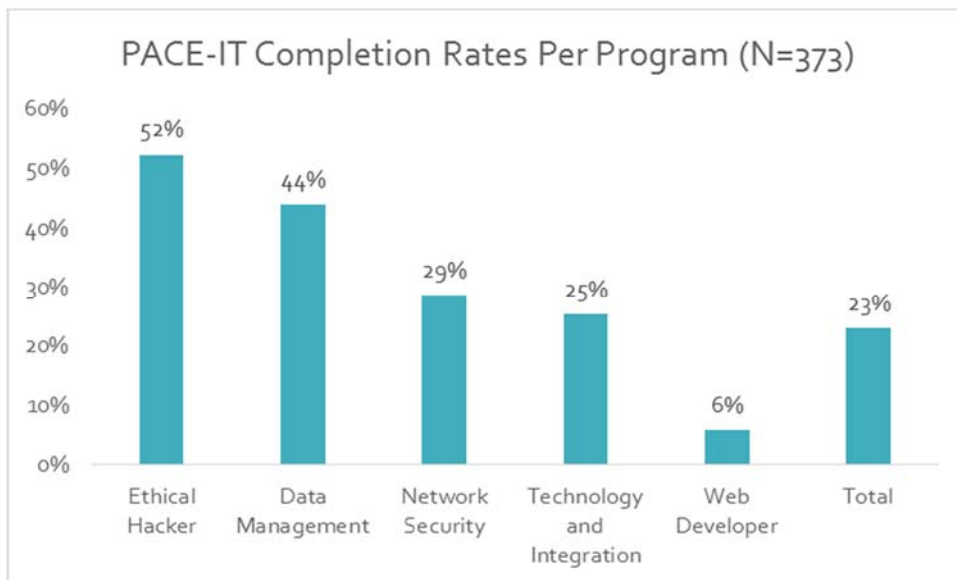


The majority of certificate completions have been in Data Management (25), followed by Technology and Integration (24), and Ethical Hacker (24), and then Network Security (10) and Web Developer (9). (See Figure 5 and Figure 6) There are several reasons why the Data Management program has been successful in moving students through to completion: it is a shorter program, requiring only 15 credits, and most of the students in the program were experienced upon entry. In fact, many already had industry experience or degrees in data management.

In contrast, there were several challenges in the Web Developer program, which led it to have the highest enrollment but the lowest completion rate of any certificate. First, it is a longer program, with 44 credits. If students take five credits per quarter, fall of 2015 is the earliest that the first students to enroll

would have been able to complete the certificate. At one point, the student mentors encouraged the students to take 10 credits per quarter instead of five so that they would complete the program faster, and the drop-out rate increased dramatically. For some students who were balancing school with employment and familial responsibilities, the increased course load of 10 credits per quarter was too much. Another characteristic of the Web Developer program that could have impacted the completion rate was the amount of work required from students; this was the program with the most hands-on exercises that students needed to complete. There was also turnover in the faculty leading the program; the lead faculty member had to leave the program due to illness partway through. In addition, the Web Developer program attracted students with a wider range of skills and experience than the Data Management program. A final factor that affected the completion rate was that some students were offered employment based on what they had learned in the program or after receiving their industry certifications – but before completing the program. In some ways, this could be viewed as an indicator of the demand for these students and the success of the program.

Figure 6: PACE-IT Completion Rates per Program



COMPLETION RATES BY DEMOGRAPHICS³

Male students were more likely to complete certificates (26%) than female students (18%). Incumbent workers, veterans, and persons with disabilities were less likely to complete a program than their counterparts. (See Figure 7) Please note that the sample sizes of veterans (N=20) and persons with disabilities (N=10) were small so caution should be taken when interpreting these results.

Figure 7: PACE IT Completion Rates by Gender, Incumbent Worker Status, Veteran Status, and Disability Status

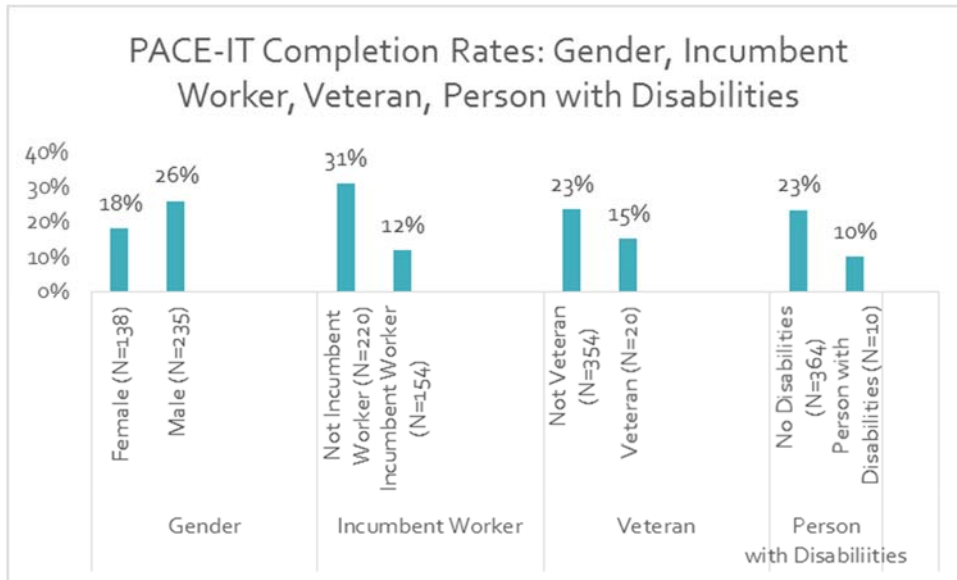
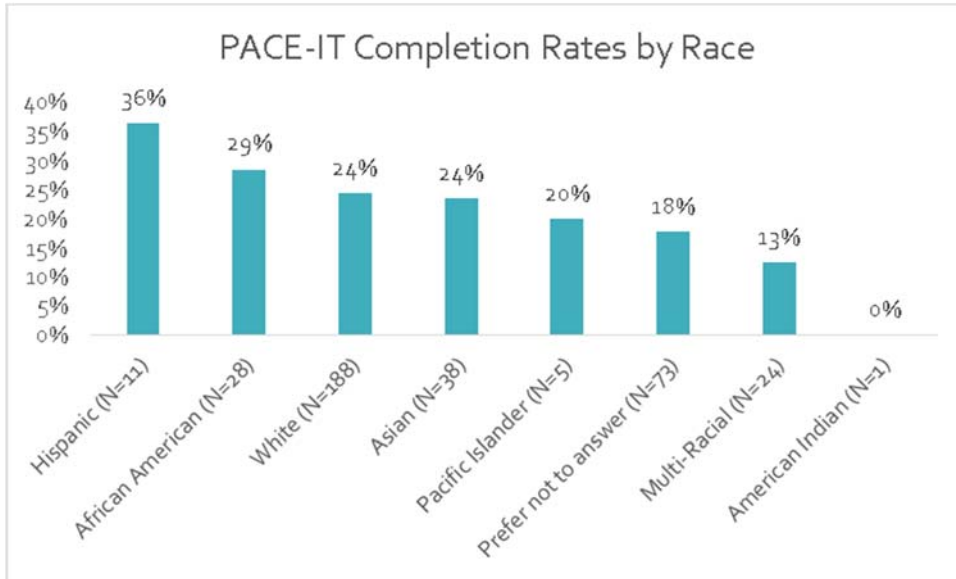


Figure 8 shows that Hispanic (N=11) and African American (N=18) students had the highest completion rates (Hispanic: 36%, African American: 29%). Close to one-quarter (24%) of the white students (N=188) and Asian students (N=38) completed their certificate programs. Twenty percent (20%) of the Pacific Islanders (N=5) completed their programs, as did 13% of the multi-racial students (N=14). The one American Indian student who participated did not complete the program of study. Please note that the sample sizes of all groups other than white are small so caution should be taken when drawing conclusions from these results.

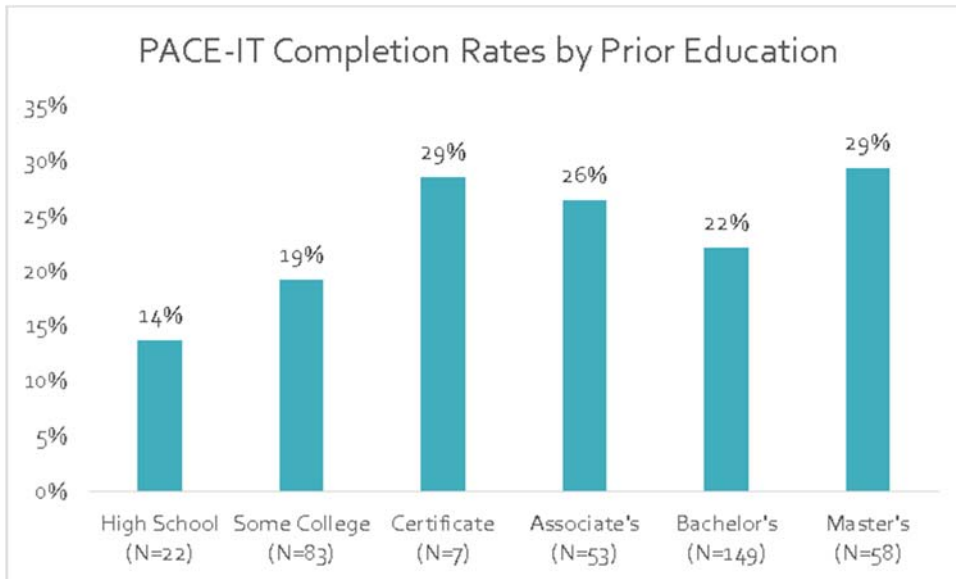
³ Please see the accompanying Excel workbook for breakdowns by demographics for completers and non-completers within each certificate.

Figure 8: PACE-IT Completion Rates by Race



Students who had completed a postsecondary degree or certificate prior to enrolling in the PACE-IT program had higher PACE-IT completion rates than those whose highest prior education was high school or some college.

Figure 9: PACE-IT Completion Rates by Prior Education



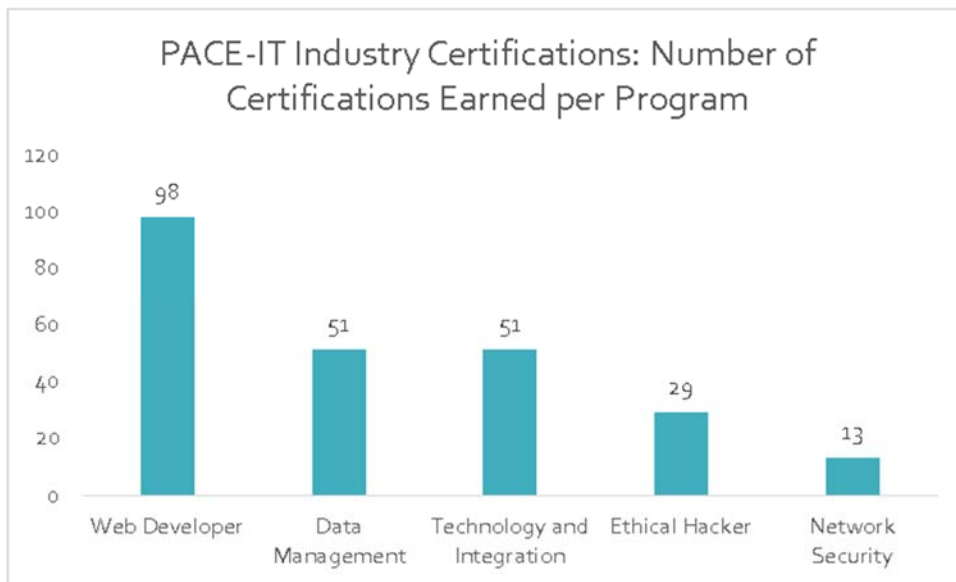
Industry Certifications

A total of 242 industry certifications were earned through the PACE-IT program, with a first attempt pass rate of 89% and a final pass rate of 92%. (See Figure 10 and Table 3)

It is worth noting that, while the Web Developer certificate program had the lowest program completion rate, it resulted in the highest number of certifications attained, at 98 certifications, and all but one were earned in the students' first attempt.

Data Management students earned 51 certifications, as did the Technology and Integration students. Ethical Hacker students attained 29 certifications, and Network Security students achieved 13 certifications.

Figure 10: PACE-IT Number of Industry Certifications per Certificate Program



The pass rates per program were very high. (See Figure 11) All of the certifications earned by Ethical Hacker students were achieved in their first attempt (First attempt pass rate: 100%). Students in the Web Developer program had a 98% first attempt pass rate and a 99% final pass rate. Technology and Integration students achieved 88% of their certifications on the first attempt and had a final pass rate of 89%. Network Security students had an 87% pass rate (both first attempt and final). Data Management pass rates were slightly lower, with 72% passing at first attempt and 80% passing eventually.

Figure 11: PACE-IT Industry Certification Pass Rates Per Program: First Attempt and Final Result

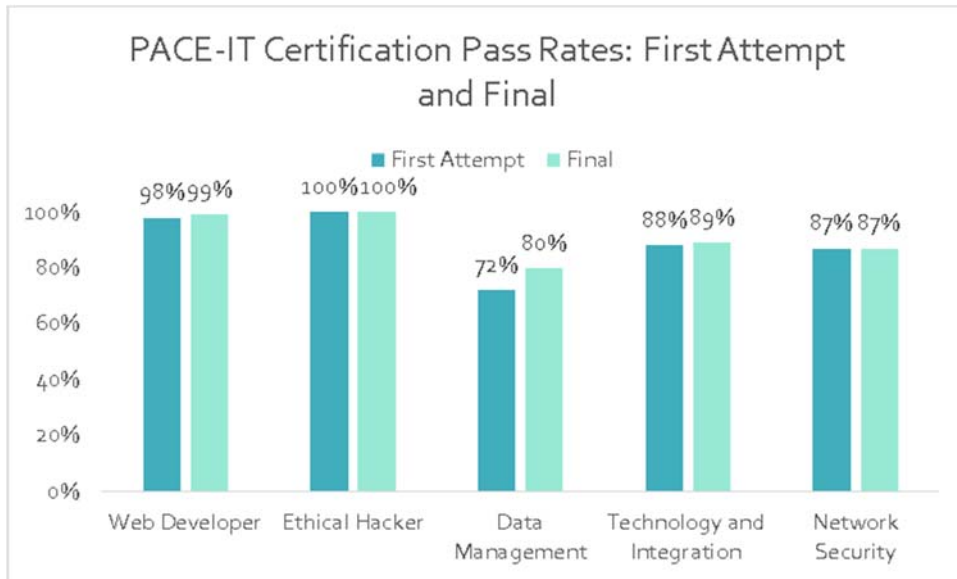


Table 3: PACE-IT Industry Certification First Attempt Pass Rate and Final Pass Rate per Program: Counts of Certifications Passed and Failed⁴

	First Attempt				Final Result			
	Passed	Failed	Total	Pass Rate	Passed	Failed	Total	Pass Rate
Web Developer	97	2	99	98%	98	1	99	99%
Ethical Hacker	29	0	29	100%	29	0	29	100%
Data Management	46	18	64	72%	51	13	64	80%
Technology and Integration	50	7	57	88%	51	6	57	89%
Network Security	13	2	15	87%	13	2	15	87%
Totals	235	29	264	89%	242	22	264	92%

Each certificate program led to multiple certification exams. Figure 12 displays the first attempt pass rate and final pass rate per certification exam. Fourteen (14) of the exams had 100% first attempt pass rates. This is impressive, though it should be noted that some certifications were only attempted (and achieved) by a single student.

⁴ Please note that in the final result pass rates, students are counted as successful if they eventually passed the test, regardless of the number of failed attempts.

Figure 12: PACE-IT Industry Certification First Attempt Pass Rate and Final Pass Rate per Certification: Counts of Certifications Passed and Failed

	Certifications	First Attempt				Final Result			
		Passed	Failed	Total	Pass Rate	Passed	Failed	Total	Pass Rate
Web Developer	CIW IBA Exam 1DO-61A	52	0	52	100%	52	0	52	100%
	CIW SDA Exam 1DO-61B	28	1	29	97%	28	1	29	97%
	CIW JS Exam 1DO-635	17	1	18	94%	18	0	18	100%
Ethical Hacker	Digital Forensics Examiner	24	0	24	100%	24	0	24	100%
	Cyber Security Forensic Analyst CSFA	4	0	4	100%	4	0	4	100%
	Certified Ethical Hacker	1	0	1	100%	1	0	1	100%
Data Management	ICCP DM Core Exam	20	12	32	63%	22	10	32	69%
	IS Core	14	4	18	78%	17	1	18	94%
	Data Governance and Stewardship	5	2	7	71%	5	2	7	71%
	Data & Info Quality	2	0	2	100%	2	0	2	100%
	Data operations and security	2	0	2	100%	2	0	2	100%
	Business Intelligence and Analytics	1	0	1	100%	1	0	1	100%
	Data Warehousing	1	0	1	100%	1	0	1	100%
Technology and Integration Support	Integrated Project Management	1	0	1	100%	1	0	1	100%
	CompTIA A+ 220-801	22	5	27	81%	23	4	27	85%
	CompTIA A+ 220-802	9	1	10	90%	9	1	10	90%
	TestOut PC Pro	8	1	9	89%	8	1	9	89%
	Technical Help Desk	5	0	5	100%	5	0	5	100%
	CompTIA Net+	4	0	4	100%	4	0	4	100%
Introduction to Network Security	TestOut Network Pro	2	0	2	100%	2	0	2	100%
	CompTIA Security+	7	0	7	100%	7	0	7	100%
	(ISC)2 SSCP	1	0	1	100%	1	0	1	100%
	TestOut Security Pro	5	2	7	71%	5	2	7	71%
	Totals	235	29	264	89%	242	22	264	92%

As noted above, many students attempted and achieved multiple industry certifications. A total of 175 students attempted at least one certification (47% of the 373 students in the PACE-IT programs), and 160 students attained at least one certification (43%).⁵ (See Table 4 and Table 5)

Among the PACE-IT program completers (N=86), 84% attempted at least one exam, and 81% passed at least one exam. Over one-third (36%) of the students who did not complete their PACE-IT certificate (N=287) attempted a certification exam, and 31% passed. This finding suggests that many of the students who did not complete their programs still achieved a valuable outcome.

Twenty-nine percent (29%) of the students achieved a single certification; 8% attained two; 5% earned three; 1% attained four; and one student earned 11 certifications.

⁵ Please see the accompanying Excel workbook for breakdowns of the number of certifications attempted and achieved for completers and non-completers within each certificate.

Table 4: Count of PACE-IT Program Completers and Non-Completers Attempting and Achieving Industry Certifications: Number of Certifications per Student

Number of Industry Certifications per Student	Number of Industry Certifications Attempted ⁶			Number of Industry Certifications Achieved ⁷		
	Program Non-Completer (N=287)	Program Completer (N=86)	Total (N=373)	Program Non-Completer (N=287)	Program Completer (N=86)	Total (N=373)
0	184	14	198	197	16	213
1	83	36	119	71	39	110
2	15	19	34	14	15	29
3	5	13	18	5	12	17
4	0	3	3	0	3	3
11	0	1	1	0	1	1
<i>One or more</i>	103	72	175	90	70	160

Table 5: Percentage of PACE-IT Program Completers and Non-Completers Attempting and Achieving Industry Certifications: Number of Certifications per Student

Number of Industry Certifications per Student	Number of Industry Certifications Attempted ⁸			Number of Industry Certifications Achieved ⁹		
	Program Non-Completer (N=287)	Program Completer (N=86)	Total (N=373)	Program Non-Completer (N=287)	Program Completer (N=86)	Total (N=373)
0	64%	16%	53%	69%	19%	57%
1	29%	42%	32%	25%	45%	29%
2	5%	22%	9%	5%	17%	8%
3	2%	15%	5%	2%	14%	5%
4	0%	3%	1%	0%	3%	1%
11	0%	1%	0%	0%	1%	0%
<i>One or more</i>	36%	84%	47%	31%	81%	43%

⁶ Multiple attempts on a single test are counted once per student.

⁷ A student is counted as completing if the last attempt is successful regardless of the number of failed prior attempts.

⁸ Multiple attempts on a single test are counted once per student.

⁹ A student is counted as completing if the last attempt is successful regardless of the number of failed prior attempts.

Employment Outcomes

DOL Outcome 7: DOL Outcome 7 asks for the total number of completers who were unemployed at entry to the program and were employed in the quarter after completion. The PACE-IT program had 86 completers, 47 of whom were unemployed at entry to the program. Of these, **four were employed in the quarter after completion.**

DOL Outcome 8: DOL Outcome 8 asks for the total number of completers who met Outcome 7 (unemployed at entry and employed in the quarter after exit) who retained employment in the 2nd and 3rd quarters after program exit. Of the four students who met Outcome 7, only two students exited the program early enough for three quarters of employment data to be available. (The most recent employment data was from 2016 Q1.) Both of these students retained employment in the 2nd and 3rd quarters after completion; therefore, **two students met Outcome 8.**

DOL Outcome 9: DOL Outcome 9 asks for the total number of students who were employed at entry and received an increase in wages after enrollment. Of the 373 students who participated in PACE-IT, 211 were employed at entry to the program, and a total of **182 (86% of 211) received a wage increase in at least one quarter after entry.** This includes 96 students who met this outcome last year (grant year 3), and an additional 86 who met this outcome by grant year four. Among the 86 meeting this goal in grant year four, 54 were male and five were veterans. Seventy (70) of the 86 were not program completers, and 16 had completed a certificate program.

PACE-IT SUCCESSES, CHALLENGES, AND CONTRIBUTIONS TO THE FUTURE

In interviews, PACE-IT program management (including the PI and administrators, some of whom had also served as PACE-IT instructors) identified successes of the PACE-IT program, challenges faced during program implementation, and contributions to the future: aspects of the program that will be sustained, and ways in which the program may influence future directions at the college.

PACE-IT Program Successes

The PACE-IT program had many successes during the four years of the grant.

CERTIFICATIONS

As noted above, 43% of the students who entered the program attained at least one certification, including 81% of the program completers and 31% of the non-completers. Among the students who attempted an exam, an average of 89% passed in the first attempt, and 92% passed after multiple attempts. Students attained a total of 242 certifications, with many students earning more than one certification. Since the curricula were specifically developed with the goal of enabling students to pass the certification exams, the high pass rates and high numbers of certifications are signs that this goal was achieved.

STUDENT RESOURCES

PACE-IT management credited several student resources created through the grant as being an asset to the students and the campus. These included:

- **Navigator Hour** (employer presentations). Students could attend the Navigator Hours in person or via telephone or Skype. The Navigator Hour was popular among both students and employers and was credited with making employer connections between the college and local industry and between the students and employers, in some cases, leading directly to students gaining employer mentors or finding jobs.
- **Labs**. There were several labs on campus, which the students could visit in person; alternately, they could communicate via Skype with an instructor in the lab to obtain one-on-one help.
- **Student and Certificate Mentors**. Through weekly contact, student mentors helped the online students stay in the program and helped them stay on track with their course requirements.
- **Prometric Testing Center**. Through the PACE-IT program, Edmonds Community College became a testing center for Prometric certification exams, which was convenient for the students.

COMPETENCY-BASED EDUCATION

Through the PACE-IT program, Edmonds Community College gained the expertise to implement competency-based education, which was an innovation at the community college level. They created the structure for students to be able to demonstrate their knowledge and skills and get credit for it.

ACCREDITATION

Because of the PACE-IT program, Edmonds Community College obtained approval (a substantive change) through the accrediting body (Northwest Commission on Colleges and Universities) to offer PACE-IT and other competency-based education in the future.

PACE-IT Program Challenges and Lessons Learned

The PACE-IT program was a completely new paradigm for Edmonds Community College. An online, competency-based program with ongoing enrollment and six-month terms had never before been attempted at Edmonds Community College. As such, it is not surprising that this pilot program was an excellent learning opportunity for the college. Challenges, lessons learned, and suggestions for other colleges that would like to implement similar programs include the following:

SELF-PACED EDUCATION

In the early days of PACE-IT, program managers assumed that students would take advantage of the self-paced nature of the program to complete the certificates quickly and move forward with their careers. (In fact, “accelerated” is the “A” of the PACE-IT acronym.) Most students progressed through the certificate programs more slowly than expected, however, and this lag was reflected in the completions in the early years of the grant. By the end of grant year two, only one student had completed a certificate, and by the end of year three, 35 students had completed certificates.

One factor that led to the slow pace was students balancing school with employment and family obligations. An indication of this is the lower completion rate for incumbent workers (12%), compared to students who were not working at program entry (31%).

Another factor that contributed to the slow pace was a mismatch of student expectations about online education. In some cases, students expected their online courses to consist of watching videos and reading, and the demanding hands-on component was a surprise. An indication of this is that the Web Developer certificate, which had the greatest number of hands-on activities, also had the lowest completion rate, at 6%.

The prior PACE-IT PI, Ed Sargent, reported that the slow rate of completions in a self-paced program was not unique to PACE-IT. He had had conversations with Western Governors University, where they had

also found that, lacking incentives to complete quickly, students in self-paced programs tended to progress slowly.

A silver lining to the slow completion rate was anecdotal reports of students indicating that they would not have been able to stay in the program if it was not self-paced; they would have had to drop out. With the student supports (e.g., student mentors) and flexibility of the self-paced curriculum, PACE-IT had high retention rates (e.g., 90.8% from year two to year three). However, convincing students to progress through the program was a challenge until the end of the grant, when students were faced with losing the benefit of the free tuition offered through PACE-IT, which would end at the close of the grant.

FACULTY ROLES AND CONTRACTS

The grant was designed to take a collaborative team approach to both curriculum development and student support. In addition to faculty, the grant involved an instructional designer, Subject Matter Experts (SMEs) from industry, and student mentors. Each of these professionals took on roles that, historically, had been held solely by the faculty at the college. Moving towards this new model required a shift in college culture and expectations. The new model also raised questions that may impact faculty pay and contracts, which will require union negotiation.

Further information about the roles of the instructional designer, SMEs, and student mentors is provided below:

Curriculum Development: The curriculum development for each of the PACE-IT certificates began with a Developing a Curriculum (DACUM) process, where a panel of industry **Subject Matter Experts** (SMEs) met and provided in-depth information on the skills necessary to succeed in the professions covered by each certificate. The results of the DACUMs were mapped to the contents of the industry certification exams to verify that they aligned. Next, the competencies in the certification exams were used as frameworks for constructing the curricula.

The **instructional designer** had a pivotal role in the curriculum development process. She created the aforementioned frameworks, provided guidelines on effective online curriculum design practices (such as limiting videos to 5-7 minutes in length), and acted as a project manager, coordinating all the pieces that needed to come together to create each curriculum. Each of the curriculum modules needed to be approved by all three stakeholders 1) the instructional designer, 2) SME, and 3) faculty before being included in the final curriculum.

Student Support: The grant took a case management approach to working with students, where students were supported by **student mentors** who provided non-academic support through weekly or bi-weekly calls. They helped the students create a plan for making their way through the certificates, identified barriers to the students completing the certificates, found solutions to the barriers, and acted

as advocates for the students. They supported the students in every way except providing direct assistance with learning the content.

COLLEGE SYSTEMS

The PACE-IT program was based on self-paced modules and continual enrollment. The college enrollment and student management systems were not set up to accommodate these aspects of PACE-IT. This situation engendered many “work-arounds”, which caused more work for the PACE-IT staff, as well as staff in many other departments at the college.

CURRICULA UPDATES

Since the curricula were so closely tied to the content and competencies in the certification exams, when the exams were updated, the curricula needed to be updated. This was not a surprise; there was always an expectation in the PACE-IT program that the curricula would continue to be fine-tuned and updated. Still, this ongoing curriculum development process is one that should be taken into consideration by other colleges considering implementing a similar program.

LEADERSHIP TURNOVER

Since the PACE-IT program started, many of the college administrators in place at the beginning of the grant have left the college. In addition, the PACE-IT PI changed in the final year of the grant. It can be a challenge to keep momentum on a project while also taking into consideration the new priorities of new leadership.

NO TUITION

During the period of the grant, the PACE-IT program was offered to students tuition-free. While this was a boon for the students, it caused a challenge for the college in that it is difficult to determine what the demand will be for the program once the grant ends and tuition begins to be charged.

Contributions to the Future

While the PACE-IT program will not continue as a stand-alone program past the end of the grant, aspects of the program will live on, and the program may influence future directions at the college.

WHAT WILL CONTINUE

Aspects of the program that will continue through the Computer and Information Systems (CIS) department include the following:

- **Navigator Hour.** The Navigator Hour will continue through the CIS department.
- **Protocols and procedures for awarding credit for prior learning.** Students who enter the CIS department with a certification that matches the learning objectives of a course will be awarded five credits for that course.
- **Lab managers as student mentors.** The PACE-IT PI is attempting to continue the most successful parts of the grant. One of the aspects of the grant that was widely praised was the student mentors. In order to continue that service after the grant funding ends, lab managers will begin to act as mentors for the students in the online courses.
- **PACE-IT modules incorporated into CIS courses.** Over half of the modules from all five certificates have already been incorporated into CIS courses, and there are plans to continue integrating the materials.

HOW PACE-IT MAY INFLUENCE THE COLLEGE

Moving forward, many of the lessons learned through the PACE-IT program may influence future directions at the college, including the following:

- **Accreditation.** As noted above, the substantive change in the accreditation means that the college is approved to offer competency-based education in the future.
- **Open-source curricula.** Since all five certificate courses will be uploaded to the DOL Skills Commons, they will be available to anyone pursuing certification, which is a boon to the industry. At least one professional organization is looking forward to sharing the links to the modules with its membership.
- **College systems.** As explained above, one challenge faced by the college was that the enrollment and student information systems were not set up for a program like PACE-IT. In October of 2017, Edmonds Community College will begin using PeopleSoft Campus Solutions. The college is currently in the process of preparing for the transition and is closely considering how to structure the system to accommodate programs like PACE-IT in the future.
- **Faculty contracts.** In the next year, administrators will begin the conversations with faculty to come to an agreement about teaching competency-based education.

CONCLUSIONS

Overall, the evaluation finds that the PACE-IT project has successfully achieved its grant goals. The five certificates were launched on schedule; articulation agreements were executed with two universities; prior learning assessments were created; curricula were developed through a collaborative team approach; and modules were uploaded to the DOL Skills Commons. Through the PACE-IT program, students had access to a rich support system, including student and certificate mentors, physical and virtual labs, the Navigator Hour, and on campus internships, among others.

The enrollment and retention targets were exceeded, as were the certification goals. A total of 160 students attained 242 certifications, with an 89% first-attempt pass rate and a 92% final pass rate. Well over three-quarters of the program completers (81%) earned certifications. The high pass rates are a strong indication that the curricula development process successfully embedded the competencies from the certification exams.

While the program did not meet the target number of student certificate completions identified in the proposal, the fact that 31% of the non-completers earned certifications is an indication that many of the non-completers still received value from the program, as is the fact that 81% of the students who received wage increases were not completers.

Another sign of the success of the PACE-IT program is that a total of 182 students received wage increases after enrolling in the program (96 in grant year three and 86 in grant year four).