Spring 2019

The credentialed workforce: Examining success rates across short-term noncredit training programs aligned with industry credentials

Rochelle Fisher

Follow this and additional works at: https://commons.lib.jmu.edu/master201019

Part of the Community College Leadership Commons, Educational Assessment, Evaluation, and Research Commons, and the Higher Education Commons

The Credentialed Workforce: Examining Success Rates across Short-Term Noncredit
Training Programs Aligned with Industry Credentials

Rochelle Fisher

A thesis submitted to the Graduate Faculty of

JAMES MADISON UNIVERSITY

In

Partial Fulfillment of the Requirements

for the degree of

Master of Arts

Department of Graduate Psychology

May 2019

FACULTY COMMITTEE:

Committee Chair: Deborah Bandalos, Ph.D.

Committee Members:

Robin Anderson, Psy.D.

Sara Finney, Ph.D.

Acknowledgements

There are several individuals that supported me while I completed this project. First, I am immensely grateful for the ongoing support of my advisor, Dr. Deborah Bandalos. Her continued patience and wisdom provided a foundation that allowed me to finish this thesis. Additionally, the knowledge, insight, and recommendations provided by my committee members, Dr. Sara Finney and Dr. Robin Anderson, have been invaluable.

I would also like to thank a few friends and family specifically. My dear friend, Jerusha Henderek, spent many evenings letting me ask her questions, vent frustrations, and provided me with never-ending support. I am forever grateful for her continued friendship and presence in my life. My sister, Bonnie Fisher, provided balance and stability when I wasn't sure I could finish this project. My fiancé, Michael Saltzer, provided constant love, support, and treats while I worked late hours. I cannot thank you all enough for being there for me.

Last, I want to thank my late father, Joel Fisher, for instilling in me a deep compassion for humanity and a desire to continue learning new things every day. I miss our long existential phone conversations and your warm hearty laugh.

Tables of Contents

List of Tables

List of Figures

Abstract

A new grant program implemented to provide subsidized training costs for students enrolling in short-term noncredit programs aligned with high-demand industry credentials leading to middle-skill jobs was implemented in July 2016. The grant program follows a pay-for-performance model where students are given a two-thirds discount on tuition but required to pay back an additional one-third if they do not successfully complete their short-term noncredit training. An exploratory study was conducted to provide training program completion and credential attainment rates for the overall program and by student demographic groups (age, race, and gender). Results showed little variation among training program completion rates among groups but showed considerable differences among programs and demographic groups for credential attainment rates indicating possible barriers to credential attainment. Supplemental information was collected via a survey sent to career coaches at the community colleges implementing the grant program. Responses indicated a need for additional resources (e.g. transportation vouchers) and support for students during program implementation (e.g. additional classroom resources). Overall, findings indicate a need for further research once additional enrollment data is available and additional collection of qualitative data from the colleges implementing the program to support programmatic improvement aligned with the grant outcomes.

Chapter I: Introduction

Currently, in the United States (US), there are approximately 30 million workers aged 25 to 64 employed in middle-skill jobs (Carnevale, Strohl, & Ridley, 2017). Middle-skill jobs are defined as any job that requires education beyond high school but not a four-year degree (Giani, 2016; National Skills Coalition, 2017). Examples of middle-skill jobs include welder, dental hygienist, and nurse aide (See Glossary). The jobs these individuals hold considered "good jobs" have reported median earnings of $55,000, require less than a bachelor's degree and are considered an important part of the workforce and economy (Carnevale, et.al). A large portion of these middle-skill jobs, 11.6 million, are filled by workers with a HS diploma or equivalent; however, that number is on the decline because increasingly, these middle skill jobs require some post-secondary experience or industry credential.

In a recent article, Tesfair, Dancy, and McCarthy (2018) summarized data from the Adult Training and Education Survey (ATES), administered in 2016 by the National Center for Education Statistics (NCES). The survey was designed to collect nationwide data on "nondegree credentials", which are defined as any certificate, licensure, or industry certification that does not result in a traditional post-secondary degree (e.g. Associates Degree). They collected responses from over 47,000 adults (16 to 65 years of age) who were not enrolled in high school. In their summary, Tesfair et al. highlight that 27% of US adults have at least one credential not requiring a degree and found that "these adults were more likely to be employed and earn more money than adults who did not hold a nondegree credential." (p.6). Results from another study completed by Ewert and Kominski (2014) found that 'professional certifications, licenses, and educational

certificates have labor market value, especially for those with low levels of education (i.e. below the bachelor's degree level) and people with professional degrees.

In a 2018 article, Carnevale, Strohl, Ridley, and Gulish presented three possible educational pathways aligned with "good jobs": the high-school, middle-skill, and bachelor's degree pathway. "Good jobs" are defined as jobs that pay at least $35,000 and an average of $56,000 for workers with less than a bachelor's degree. The focus of this thesis aligns with what Carnevale, et. al. deemed the middle-skills pathway. "The middle-skills pathway, which includes skilled-services and blue-collar employment, now accounts for about a quarter (24%) of good jobs." Because the availability of jobs that only require a high school education is on the decline, post-secondary education and training have become the pathway to gainful employment (Carnevale, Jayasundera, & Hanson, 2013).

Middle-skill jobs that require post-secondary training, less than a bachelor's degree, and have good wages are of interest to policymakers as they make up an increasingly important piece of the state's workforce. Policymakers have also taken note of the lack of workers who can fill middle-skill jobs Workers and policymakers are not the only ones impacted by the shift in educational needs for good jobs. "While millions of aspiring workers remain unemployed and an unprecedented percentage of the workforce reports being underemployed, employers across industries and regions find it hard to fill open positions" (Burrowes, Young, Restuccia, Fuller, & Raman, 2014, p. 2). A shift in educational requirements for employment opportunities is occurring, increasing the need for "sub-baccalaureate credentials with real labor market value". The shift will continue to impact local and statewide economies, and people are beginning to take notice (Giani,

2016, p. 101). "A growing array of approaches has evolved to prepare students for middle-skill jobs, including apprenticeships, on-the-job training, college and career technical education, customized training, non-credit education, certificates, certifications and associate degrees." (Carnevale, et. al., 2018)

Educational policymakers are faced with a problem; there are jobs available for workers with less than a bachelor's degree, but not enough adequately trained workers to fill them (Burrowes, et al., 2014; Stamper, Christopher, Babb, & Butterworth, 2017). In response to this problem, state legislators in a Mid-Atlantic state, in partnership with the educational stakeholders, designed and implemented a new grant program that subsidizes the cost of short-term noncredit training. Short-term noncredit training is training provided by institutions usually lasting less than 16 weeks and is provided through noncredit programs rather than traditional credit programs (e.g. Commercial Driver's License).

On July 1, 2016, a new pay-for-performance grant program was implemented across community colleges in a mid-Atlantic state. This program was designed to address the skills, affordability, and interest gaps identified by state legislators and educational stakeholders by providing subsidized tuition costs for short-term training programs and reimbursing educational institutions for student achievement (e.g. completion of the training program, credential attainment). The pay-for-performance program is a first of its kind grant where educational institutions are reimbursed using state funds for a portion of a student's tuition once students successfully complete their training program and attain the associated high-demand industry credential, certification or licensure. A high-demand credential is an industry credential, certification, or licensure aligned with a high-

demand occupation in a specific region (e.g. Commercial Driver's License awarded by the Department of Motor Vehicles). Students become eligible for enrollment by verifying domicile status, and then are required to pay one third of the listed tuition price at a community college for any of the approved training programs. This results in a two thirds discount of the tuition cost for eligible students. Upon successful completion of the training program, the state reimburses the community college for the second third of the listed tuition amount. The final third of the listed tuition amount is reimbursed to the college upon the student's attainment of the industry credential, certification, or licensure aligned with the training program.

This pay-for-performance program had a productive first year, utilizing all available funds aligned with the grant program. In the state code, a total of $12.5 million dollars was allocated to paying for student training program completions and successful attainment of industry credentials across fiscal years 2017 and 2018. A regional accrediting body is tasked with program administration of these grants across eligible institutions including the community colleges and higher education centers. Program stakeholders include state legislators (i.e., allocators of program funding), community college staff (i.e., instructors for the courses in the program), system wide community college administrators (i.e., recipients of the tuition from the state), regional accrediting body (i.e., overseers of grant administration), local industry and businesses (i.e., employers of program graduates), and economic developers. Because the program is state-funded through taxpayer dollars, program results are also of interest to residents of the mid-Atlantic state.

As mentioned previously, three gaps were identified by state policymakers and educational stakeholders: skills gap, affordability gap, and interest gap. The pay-for-performance program was designed to address the *skills gap* by creating and sustaining a demand-driven supply of credentialed workers for high-demand occupations. The pay-for-performance program should address and close the gap between the skills needed by employers and the skills of the available workforce. The pay-for-performance program addresses the *affordability gap* by expanding the affordability of workforce training and credentialing. The pay-for-performance program addresses the *interest gap* by increasing the interest of current and future workers in technician, technologist, and trade-level positions based on their competitive salaries and job availability in the labor market, thus filling the available and emerging middle-skill jobs.

State Legislation

In 2016 a house bill was passed outlining details of the pay-for-performance program. The bill was written to provide support and guidance for the implementation of the pay-for-performance program that reduces the upfront cost of workforce noncredit training for students. The program's design has a foundation in both economic development and accessible education. By decreasing the upfront cost for noncredit training and increased marketing, increase in enrollments in high-demand noncredit training is expected. The program is designed to provide affordable short-term training to workers and strengthen the workforce across the state while increasing economic output through additional income tax revenue.

The impetus for the program was the stakeholder's identification of pressing issues including loss of workforce productivity, decreased wages, and loss of tax revenue

due to a skills gap between vacant positions and the lack of workers to fill them. (Butterworth, 2016). These issues have ripple effects and create problems for economic development and social welfare regionally and across the state. The legislative stakeholders tasked the state educational stakeholders with investigating these issues and developing potential solutions. The educational stakeholders provided a roadmap to a proposed program that would be later known as the pay-for-performance program. The end program was developed through feedback and significant discussion across educational stakeholders and state legislators.

The program itself is centered on a new funding model. More specifically, when students enroll in a workforce training program, they are required to pay an initial one-third of the tuition cost (average one-third tuition cost is $843). In other words, they receive a discount of two-thirds of their tuition. If students successfully complete their training programs, the state will pay (reimburse) the educational institution the second third of the tuition cost. Finally, if a student successfully attains the industry credential aligned with the training program, the state will pay the educational institution the remaining third of the tuition cost (see Figure 1). Importantly, if students fail to successfully complete their training programs, the responsibility of the second third of the tuition cost falls to back to the student, who is required to pay back the second third of tuition to the college. If a student fails to attain the workforce industry credential, the college is responsible for the last third of the tuition. The student is provided with clear guidance of the grant program parameters and with a memorandum of understanding (MOU) to review and sign if they agree to the program terms. It is expected that students enrolled in the program will (a) successfully complete their training program, (b) earn the

associated industry credential, (c) enter employment in the aligned field of training, and (d) earn a living wage and pay income tax.

As an example, suppose a student enrolls in a Commercial Driver's License (CDL) training program at a community college with a course price of $3,000. The student pays an upfront tuition cost of $1,000. Their tuition cost is reduced by two thirds. When the student completes the CDL training program, their data is sent to the grant administrators and the funds are released for the second third of tuition, $1,000, to the college. If the student attains their CDL and verifies it with the college, the final third, $1,000, is sent to the college. As this example illustrates, the state grant monies only fund successful training program completions and credential attainments. Student records are sent to grant administrators and the overseeing body by the educational stakeholders on a regular basis for monitoring and fund distribution to eligible institutions. Pay-for-performance models that lower tuition cost and reimburse colleges for student performance have not been utilized across the community colleges until implementation of the program.

The focus of this thesis is on the pay-for-performance program implemented by the state educational stakeholders, more specifically short-term noncredit training programs that lead to high-demand industry credentials and the credential attainment rates for these programs. Because the program is newly implemented and unlike any currently available program statewide, the research being done will be considered investigative and exploratory in nature. In addition, because the program is new, stakeholders need information not only about whether program outcomes (i.e. training program completion and credential attainment rates) are being met, but also about the

student profiles of those enrolling in the program with regard to race, gender, and age. A demographic profile of student enrollments is the foundation to understanding the type of students the program is serving. Results and recommendations from this thesis will be made available to program stakeholders to encourage thoughtful discussion and evidence-based programmatic improvement.

Importance of Evaluating Program Outcomes

When state funds are utilized to support an educational program, stakeholders and legislators are invested in the outcomes of the program. In addition, these same stakeholders and legislators expect programmatic assessment to yield results for evaluating program effectiveness. The program is new territory for both colleges and stakeholders (e.g., legislators, program implementers, college faculty and staff). The outcomes associated with the program are vast (e.g., training program completion rates, credential attainment rates, and increased wages after credentialing) and require both quantitative and qualitative evaluation. In addition, because the program is very different from other implemented grants, new outcomes arise as stakeholders pose questions around program effectiveness and impact.

Program outcomes. The program has four primary outcomes: (a) successful completion of the training program, (b) attainment of the aligned industry credential, (c) employment in the field of training, and (d) wage increases and payment of state income taxes after entering employment post-credential attainment. For this thesis, research questions have been aligned with the first two outcomes: successful completion of the training program and attainment of the industry credential reported as percentage rates (e.g., 68% credential attainment rate). In addition, profiles of students enrolled in the

overall program based on age, gender, and race will be obtained. These profiles can be used by program administrators to gain an understanding of the types of students in the overall program. In addition, I will examine program completion and credential attainment rates for each demographic group to determine if variation across groups occurs. Last, training program completion and credential attainment rates will be obtained for each training program (e.g., Certified Nurse Aide) and each demographic group within each program. Interest in examining completion and credential rates by demographic groups stems from a need to understand if specific groups may need more assistance during training to aid in their successful completion of the program and attainment of the aligned high-demand industry credential.

Program effectiveness will be evaluated through audits of the college implementation processes (i.e., following stakeholder established protocol for implementation) that were followed while establishing the program at a college. In the next section, I will briefly review the process of these audits and their use in program evaluation for the program. While the results from these audits won't be included in this thesis, the results from audits may impact program implementation and changes in the future, making them a critical component of the assessment of the program.

Implementation fidelity. An important component of program assessment that is often overlooked is implementation fidelity (Fisher, Smith, Finney, & Pinder, 2014; Gerstner & Finney, 2013). Implementation fidelity is the comparison of the established program design with the actual program that was implemented (Carroll, Patterson, Wood, Booth, Rick, & Ballain, 2007). In other words, examination of implementation fidelity gives program stakeholders the opportunity to ask the following: "Was the program

successfully implemented as designed, or were there deviations from the designed program?" If programmatic assessment of outcomes occurs, but stakeholders are unaware of how the program was implemented, results may be misinterpreted (Lastica & O'Donnell (2007). That is, the outcomes may be (incorrectly) associated with the designed program instead of the delivered program that the students experienced.

To evaluate implementation fidelity, audits of the program at the community colleges occur on an outlined schedule. Results from these audits are not available as visits have not yet been conducted at all the colleges and college-specific data will not be released publicly. However, understanding the process highlights how the implementation fidelity data (once collected) can be coupled with the data from this thesis to inform program decisions. The audits are completed one college at a time. These audits are performed by a team of educational staff who oversee the grant program activities at an administrative level (e.g., program directors, assessment coordinators). During the audit, a detailed review of documents used for the program is conducted, followed by an on-site visit to the college to review program materials and processes. The audit is conducted to review standardized materials and processes created by the program's educational stakeholders (e.g., student registration, data collection, training program setup) that are supposed to be in place at the colleges. At the end of the audit, a summary report is provided to the chief workforce officer and the college president. In the report, the team provides comments about college processes and accuracy of data entry for enrollments, general observations regarding adherence to program guidelines, and corrective actions to be taken where program implementation was not aligned with the originally designed grant program. Reports created as a result of these audits are

provided to colleges. These reports outlined the misalignment between program implementation at the college and the standardized processes put in place by program stakeholders. Colleges are encouraged to use the provided reports to make programmatic changes to better align with the original program guidelines. In addition, the data available in the reports are utilized by educational stakeholders to inform decision-making at a college system level. In sum, the outcomes and implementation data can help inform program stakeholders when making decisions that will affect the program.

Given there is limited available data on community college students, especially noncredit enrollments (D'Amico, Morgan, Katsinas, Adair, & Miller, 2017; Grubb, Badway, & Bell, 2002; Phillippe & Sullivan, 2005), in the current research I aim to contribute to the literature on noncredit community college students. The current study will be useful not only to program stakeholders, but also to community college advocates who have interest in implementing a pay-for-performance noncredit program.

What questions will be answered? In this thesis, I will answer five research questions related to the grant program. First, what are the training program completion rates overall and by training program? A student who enrolls in a training program earns an 'S' grade if they complete the program requirements (e.g. attendance, assignments, tests) successfully. For the first research question, I will compute training program completion rates for the all programs combined and by training program. Short-term noncredit training programs have historically high completion rates, but a recent examination of rates for students enrolled through the current program has not been conducted. Due to the historically high completion rates for short-term noncredit training programs and a preliminary analysis completed shortly after program implementation, I

expect that the overall program completion rate will be high, but that rates will vary by training program.

Second, what are the credential attainment rates overall and by training program? For the second research question, I will compute credential attainment rates for all programs combined and by training program. Once a student has completed their training, they can attempt to take the aligned credentialing examination. For example, if a student enrolls in a truck driving class, upon completion, they can take the Commercial Driver's License (CDL) examination to earn their industry aligned credential. Because third-party examinations and tests to earn credentials are not created by the educational stakeholders, they differ in difficulty. For example, one credentialing exam may have a 40% nationwide pass rate, whereas another credentialing exam may have a 75% nationwide pass rate. This difference could be due to many factors including difficulty of subject area, length of test, hours available to study prior to test, etc. I expect credential attainment rates to be lower than program completion rates overall and, because of the varying factors (e.g., difficulty, length) affecting the credentialing exams, to vary by training program.

Third, what are the student characteristics associated with enrolling in the grant program overall? For the third research question, I will conduct frequency analyses to examine levels of enrollment for all programs combined across three demographic variables: age, race, and gender. Nontraditional students (e.g., older than 21 years of age) commonly enroll in short-term noncredit training programs; thus, I expect that individuals enrolled in the program will align more closely with the nontraditional student profile than with a traditional student profile (i.e., leaves HS and enters a four-

year school). Answering this research question will help build a student profile for use by stakeholders. Student profiles will be obtained for both the overall enrollment and for enrollment in individual programs.

Fourth, how do training program completion rates vary by student demographic variables (age, race, and gender)? For the fourth research question, I will compute overall training program completion rates by student demographic variables (age, race, and gender) to determine if variation occurs in training program completion rates across demographic groups overall and by program.

Fifth, how do training program credential attainment rates vary by student demographic variables (age, race, and gender)? For the fifth research question, I will compute overall training program credential attainment rates by student demographic variables (age, race, and gender) to determine if variation exists across demographic groups and programs. I expect there will be differences in training program credential attainment rates across demographic groups.

Last, a supplemental survey was created to better understand barriers to credential attainment and was sent to career coaches at the community college. Results from the survey will be presented alongside the results associated with research questions one through five. Questions in the survey align with research questions two and five related to credential attainment rates for the overall program and across individual training programs.

Results from the research questions and supplemental survey will not only provide insight into program outcomes but will also highlight areas of success or concern for stakeholders. With these results, stakeholders will be able to prioritize revisions to

training program elements such as curriculum, training methods, and scheduling across the community colleges. For example, identifying groups that fail to attain their credential will allow stakeholders to make recommendations to college staff to bolster their training programs and supportive services for these groups. If a training program has low credential attainment rates across groups, stakeholders can communicate these findings to training providers and this can result in changes to training, supportive services, testing availability and practice, scheduling, and other logistical elements of running a course aligned with a credential. Also, sharing of these results will initiate conversations with colleges to better understand what barriers to credential attainment might exist at the program level. Once a clear picture of the primary barriers to credential attainment are identified by stakeholders and college staff, a program improvement plan can be designed and implemented.

In chapter two, the literature review, information will be provided to assist the reader in better understanding the following: workforce development and the community college, the identified skills gap, historical overview of the community colleges (business needs and economic development, affordability, access, adaptability and efficiency, short-term noncredit training, funding noncredit programs, and the nontraditional student in noncredit training), industry credentials, and pay-for-performance programs. Toward the end of chapter two, proposed research questions are reiterated. Chapter three provides an outline of analyses aligned with each research question re-stated and a discussion of sample demographics. Data analysis and procedures are explained in detail. In chapter four, results aligned with each of the five proposed research questions will be provided. Additionally, results from a supplemental survey administered to career coaches at the

community colleges will be provided. Results from these analyses, in combination with future supplemental program data, will allow program stakeholders to make programmatic improvements in hopes of increasing credential attainment rates across training programs. In chapter five results aligned with the five research questions will be discussed and recommendations for future research will be provided.

Statement of Purpose

The grant program being evaluated is a new initiative. As with any new program, it is helpful to engage in programmatic assessment to encourage accountability and growth. Understanding student performance in this program is important to stakeholders, especially when they are tasked with using evidence to make programmatic changes for improvement of results and outcomes. The analyses completed in this thesis are aligned closely with programmatic outcomes and will provide foundational information for decision-making by stakeholders as well as contribute to available research in the field of noncredit community college education.

Chapter II: Literature Review

Mendoza et al. (2009) note, "In the current economic climate and job market, combined with a progressively globalized industry marketplace, meeting market needs demands renewed adaptability and innovation from the community college workforce development initiatives" (p. 867). In response to this call for renewed innovation, colleges and universities are devising plans for implementing different educational approaches to meet the needs of today's students and businesses. Specifically, the community colleges are playing an important role in increasing access to education, especially for those students who are from minority backgrounds or from lower socioeconomic backgrounds, through affordable tuition costs and open admissions (Dowd, 2003; Goldrick-Rab, 2010).

In this literature review, several topics related to short-term noncredit training are reviewed to provide a foundation for my research questions and analyses. First, a glimpse into the world of workforce development will situate readers to the topic at hand: training and credentialing in noncredit education, specifically for nontraditional students. Next information on the skills gap is presented, as it is the primary impetus for designing and implementing the program. Then, a presentation of the history of community colleges is provided including an overview of short-term noncredit training. The description provides a footing for understanding the specific type of training that is the focus of my thesis. An overview of the historically limited availability of funding for short-term noncredit programs followed by an introduction to the nontraditional student is presented next. Following this section, the reader is provided with an in-depth look into the world of industry credentials followed by an explanation of their importance within higher

education. A brief overview from a historical perspective on industry credentials is also provided followed by an introduction to high-demand credentials. Then, a review of a newer area of interest, pay-for-performance programming, and examples of programs utilizing this educational process are highlighted. While there are limited data available on noncredit training (D'Amico, et al., 2017; Voorhees & Milam, 2005), interest in noncredit training is increasing and more researchers are broaching these topics. Available and relevant data with be cited and utilized for the literature review.

Workforce Development and the Community College

Preparing students for the workforce is one of the main objectives of community colleges (Beach, 2012; D'Amico, et al., 2017; Grubb, Badway, Bragg, & Russman, 1997; Kasper, 2002; Vaughan, 2006). Workforce development is a combination of training and activities that prepare students to enter employment (Jacobs & Dougherty, 2006). Community colleges have integrated themselves into the world of workforce development by providing education and training aligned with specific occupations (Kasper, 2002). Jacobs and Dougherty (2006) note that "community colleges have become a significant factor in local workforce development by taking advantage of institutional strengths such as organizational flexibility, close proximity to private-sector enterprises, low cost, technical expertise, and experience in teaching adult learners" (p. 53). Importantly, workforce development divisions at community colleges support local business needs and economic development, are affordable, have increased efficiency for change, and are accessible to students (Kasper; Vaughan, 2006). Although community colleges continue to focus on attainment of a traditional degree for entrance into the

workforce, there is an increasing focus on employment preparation through noncredit training (D'Amico et al., 2017).

The Skills Gap

As referenced earlier, stakeholders have identified a skills gap between the skills of potential workers and the needs of employers. A skills gap is the separation between the skills and needs of employers and the capability of individuals in the workforce (Kochan, Finegold & Osterman, 2012; McCarthy, 2014; Fong, Janzow, & Peck, 2016). This notion is not isolated to specific regional areas; there has been a nationwide call for recognition and closing of the skills gap. Emsi (2013) states, "The skills gap has been a constant source of conversation and debate in the U.S., and for good reason – it's a national issue, with implications for employers, educators, and the competitive standing of the country itself." (p. 1.) Workforce industries often identify specific skills gaps aligned with their employer needs. For this paper, the skills gap refers to the overall lack of trained workers needed by employers and businesses. When the number of available workers is less than the number of open positions, employers and businesses either must hire unqualified workers and train them internally or leave the positions unfilled. If an employer or business does not have resources for training they may end up with unfilled positions.

A search for references mentioning a nationwide skills gap will leave you with a lengthy list of opinion-based articles referencing a broader skills gap across the country. However, published studies examining skills gaps for middle-skilled workers and employers in the southeast region of the U.S. are limited. Even more limited is regional skills demand analyses for counties and local areas at the state level. The remaining

paragraphs in this section reference the limited regional information available, studies examining the effects of skills gaps nationwide, and data from the National Skills Coalition (NSC) published Fact Sheet (2017).

A study done by the Virginia Tech Office of Economic Development examined a specific regional skills gap in the coal mining and manufacturing industries. The authors identified many contributing factors to the lack of trained workers including, (a) lack of awareness of worker competencies and how they might transfer to other jobs, (b) lack of certification or credentials, (c) decrease in higher earnings jobs, (d) lack of industry diversification, (e) low levels of educational attainment, (f) aging workforce, and (g) lack of supportive services (e.g., assistance for substance abuse, transportation, child care) (Workforce Skills Analysis: Southwest Virginia, n.d.). Importantly, they found that over 36% of employers surveyed in the coal industries indicated that finding skilled workers was their main business challenge.

In a nationwide supply-and-demand analysis of middle-skill occupations, Emsi (2013) found that there are notable shortages of "middle-skill" workers to meet the anticipated demand. A middle-skill job is defined by the NSC as any one of a number of jobs "which require education beyond high school but not a four-year degree" (NSC, 2017). A suggested strategy for eliminating skills gaps is creating relationships between businesses and training providers, specifically community colleges, to train workers in industry-specific skills (Emsi). As alluded to earlier, areas that are experiencing significant skills gaps are vulnerable to detrimental economic outcomes if jobs cannot be filled efficiently. Regional economies can face issues such as businesses leaving or shutting down in areas without enough workers (Emsi). Importantly, in follow-up

research and analyses, Emsi (2017) found that skills gaps are best identified regionally and in specific industries. In other words, it is untrue that there is an overall skills gap across the nation, in every region, and across every industry. Instead, Emsi recommends completing regional analyses by industry to determine areas that have a significant number of openings for skilled workers that are not being filled.

Using data from the NSC, state stakeholders have gathered evidence of a middle-skill-worker skills gap through labor market research and engaging employers and businesses in discussions surrounding business needs in terms of hiring qualified workers. Through an examination of data from the Bureau of Labor Statistics Occupational Employment Statistics, the NSC (2017) found that middle-skill jobs make up the biggest portion of the U.S. labor market in 2015. Examples of these jobs include nurse aide, paralegal, dental hygienist, welder, and truck driver. The NSC projected that from 2014-2024, 48% of available jobs will be middle-skill. Importantly, the NSC notes that while middle-skill jobs represent a large part of state labor markets (53%), only 43% of U.S. workers are trained to the middle-skill level. The 10% difference between the current state labor market and the trained workforce is the primary reference point for identifying the current skills gap.

One way of lessening the impact of the skills gap is through community college training. The next section will provide a brief background on the history of the community college and the importance of the specific types of educational pathways it provides to prospective students.

A Brief History of Community Colleges

Community colleges have been a part of our educational system since the early 1900s (American Association of Community Colleges, n.d.). The need for an educated population pushed by social equality movements led to the creation of junior colleges, later renamed as community colleges. In the 1950-60s community colleges provided affordable foundational education that usually led to transfer to a baccalaureate program at a college or university (Cohen & Brawer, 2003; Drummond, 2002). The community college role shifted more drastically in the 1970s due to a significant increase in enrollments as baby boomers entered post-secondary education age (Kasper, 2002). This led the community colleges to a more permanent and highly regarded place in the education sector with increased course offerings and bolstered general education, vocational training, and assistance for disadvantaged students (Beach, 2012; Cohen & Brawer). Because of the community colleges' ability to evolve quickly in response to economic and workforce needs it continues to be the fastest growing sector of education (American Association for Community Colleges, n.d.). "Since their inception, the overarching emphasis of community colleges is on providing access: offering open admission, affordable higher education and programs that meet the lifestyle needs of continually evolving populations of students" (Hachey, Conway, & Wladis, 2013, p. 2).

While an increasing number of community colleges are integrating their credit and noncredit programs, encouraging students to enroll in both to follow a specific career pathway, traditionally community colleges are broken into two sides: credit and noncredit, also known as academic and workforce development. The following section gives background on the workforce development side of community college education where the program is housed.

Business needs and economic development. For regional businesses to remain competitive and fully staffed, the current workforce needs to continue to engage in continued education and up-skilling (Carnevale & Desrochers, 2001). Kasper (2002) states in reference to community colleges that, "no other segment of postsecondary education has been more responsive to its community's workforce needs" (p.14). Community colleges are available to work with local businesses to create training aligned with the employer's needs (Carnevale & Desrochers). This is attractive to businesses because they can hire students trained to their specific business needs through a process called contract training. In this type of training, businesses subsidize training through community colleges and consult with the community college on curriculum and training program outcomes. In other words, a partnership is built between a business and the community college. Both are equally invested in the outcome and prioritize efficient learning and gainful employment. Community colleges are an integral piece of regional economic development because their training programs "attract new employers to a location while retaining existing ones" (Kasper, 2002, p. 16).

Community colleges work closely with businesses and their local governments to identify the most in-need industries and train workers to fill empty positions (D'Amico et al., 2017; Doughtery & Townsend, 2006; Kasper, 2002). "During the last quarter of the 20th century community/junior colleges were recognized as being the educational choice of business and industry as the prime provider for career and technology education" (Davis, 2008, p. 568). The ability to align quickly to business training needs is essential to building a local workforce and is especially important in rural areas where training opportunities can be limited (Kasper, 2002). Not only do community colleges work with

industry representatives and employers to better understand the type of in-demand industries, but also to better understand the types of industry credentials (including certifications and licensures) that are important to local employers (Ridley, 2018).

Growth in community college enrollments has been seen in workforce training where many noncredit programs have enrollments surpassing that of credit programs. (Van Noy & Jacobs, 2009). Workforce training has been touted for its essential part in adapting to industry needs (U.S. Government Accountability Office, 2008). In addition to the flexibility and adaptability that workforce training provides to meet the ever-changing needs of businesses and industry, community colleges also are known for their affordability, as explained in the following section.

Affordability. "Investing a substantial amount of time in a credential or degree is often not an option for students who don't have the financial means to be a full-time student." (Joint Economic Committee Democrats, 2018) Community colleges have filled an education gap by extending access through affordable training options (Xu & Ran, 2015). While cost of tuition and fees increase on a regular basis for most postsecondary institutions, the average cost of community colleges remains significantly less than for their public 4-year counterparts. Community colleges are often the most cost-effective option for students (Grubb, Badway, & Bell, 2003; Kasper, 2002). The benefits are especially felt in rural regions where access to four-year institutions are limited. It is also important to note that students from low socioeconomic backgrounds can be deterred from entering education when confronted with even a small tuition cost. (Grubb, 2003)

Xu and Ran (2015) note, "Noncredit programs, with their many advantages, such as low cost, open enrollment, and flexibility, have the potential to provide easier access to

higher education, compared with credit-bearing programs" (p. 29). According to the
College Board (2016), public two-year colleges are the most affordable training option at
an average published yearly tuition and fees of $3,440, compared to a public four-year
college cost (in-state) at $9,410. For out-of-state students at a 4-year public institution
this cost jumps to an average yearly cost of $23,890. Finally, students entering a private
four-year college pay an average of $32,410 per year. Noncredit training can be even
more affordable than the average yearly tuition at a two-year college. The average
training program costs $2,400 with the student responsible for $800 (one-third) of total
tuition.

To keep training costs low, community colleges are under constant pressure to
secure funding, usually through government grants at a federal, state, or local level,
requiring community college staff to become advocates and lobbyists for their programs.
Through these efforts, funds are secured for lowering training costs, increasing training
options, and providing supportive services to students with barriers to success. While
lower tuition costs make training more accessible to students, other benefits also play a
role, including accessibility.

Access. According to Grubb, et al. (2003), noncredit programs at community
colleges are "more flexible, less impersonal and bureaucratic than the credit divisions of
community colleges and they are likely to be in community-based facilities, closer to
where low-income students live" (p.3). If education is to have broad-reaching effects, it
needs to be accessible by all students. A large focus of community colleges is therefore
increased accessibility of services (Goldrick-Rab, 2010; Grubb & Worthen, 1999;
Hoachlander, Sikora, Horn, & Carroll, 2003). Accessibility in higher education has many

components. "Community colleges emphasize access through open admissions, affordable cost, and delivery of programs designed to meet the needs of local communities." (Kasper, p.8) In addition, community colleges often offer supportive services like stipends for childcare and transportation. By providing these types of resources, training can become an option for students who would not have been able to enroll otherwise. For example, the majority of community college students are working while enrolled in their training (Goldrick-Rab). Supplemental resources can allow working students to enroll and complete their training by providing assistance with barriers to success, such as limited funds for child care or transportation.

The short-term nature of many noncredit programs also contributes to increased accessibility for students. These noncredit training programs can usually be completed in months compared to years for credit programs, and students are able to test for their credential after completing training. Noncredit students are disproportionately nontraditional and often do not have the time to enter into full-time training programs. Their availability is often limited by a need to remain employed during training, dependents that require care, and lack of resources including transportation. When program duration is lowered, it increases accessibility for these students. In addition, other components of access include online training or more flexible scheduling such as nighttime classes. These features allow students to complete training without having to put other responsibilities aside.

Adaptability and efficiency. Community colleges are able to adapt quickly to the rapidly changing needs of local businesses and the growing economy. Training programs can be created and started in significantly less time than credit programs and can align

with specific employer needs (Boggs, 2010; Milam 2005; Soares, 2010; Van Noy, Jacobs, Korey, Bailey, & Hughes, 2008). Community colleges are a primary source for workforce training for businesses and industries (Davis, 2008). The ability to adapt in a quick paced economy is essential to filling positions in the local workforce. For example, employers and businesses are not able to wait four or more years for a student to finish a baccalaureate program when they need a worker trained to use new manufacturing equipment in the next month.

In an example like the one listed above, the employer can contact the community college and serve as a content expert in the design of training and curriculum for students. In such scenarios, the college serves as a connection between businesses/employers and students. The primary outcome for training, aside from gaining skills, is employment. Students enrolled in a program like this are often guaranteed employment upon successful completion of training and/or industry credential. This connection benefits the student, college, local business, and regional economy, and even has impacts at the state level through collection of state income taxes.

Short-term noncredit training. A large portion of community college enrollment is noncredit (Grubb, Badway, & Bell, 2002). D'Amico et al. (2017) highlighted that in 2016, the American Association for Community College (AACC) reported that five million students enrolled in noncredit training, which represents 40% of all community college enrollments for that year. With enrollment numbers of this size, it is difficult to understand the unavailability of data for the students and training involved in noncredit programs. However, lack of consistently reported enrollment records and the

varying types of training has led to limited availability of valid data for noncredit education (D'Amico et al., 2017; Grubb, et al.; Phillippe & Sullivan, 2005).

While the definition of short-term noncredit training often varies by institution, there are elements of noncredit training that are often consistent across community colleges (Milam, 2005). In Milam's study, 47 state agencies across multiple states responded to a survey inquiring about noncredit training administered by training providers. Milam summarized the responses of 20 (42.6%) agencies that indicated they have a prescribed definition of noncredit training. Definitional criteria for noncredit training included (a) not resulting in credit aligned with a degree (undergraduate or graduate), (b) not available as part of the academic curriculum, (c) typically offered through continuing education, (d) not funded through state financial aid, (e) not listed on credit transcript, and (f) aligned with a business or industry contract for training (Milam, 2005).

Short-term noncredit training provided through community colleges and other training providers usually lasts anywhere from 2-12 weeks (Grubb, et al., 2002). Noncredit training can include a vast array of offerings, including non-academic courses, industry specific training, and developmental courses. In terms of workforce development, "A major proportion of the workforce development performed by the community college is done through the noncredit sector." (Ryder & Hagedorn, 2012)

Noncredit training programs usually require less paperwork and have simple, straightforward applications for enrollment. They also tend to have more flexible scheduling and are provided more often (Grubb, Badway, & Bell, 2003) than credit courses. While there are a large number of course offerings at community colleges and

other training providers, for this thesis, I am referring to short-term training programs that align with an industry certification or licensure. Barriers to success are prevalent among noncredit students and can contribute to lack of successful completion and future enrollment in training. For example, in a 2015 study Xu and Ran examined enrollment patterns of noncredit students and found that more than 50% of students enrolled in a noncredit program left without returning to complete. This highlights the importance of short-term training that can be completed in a short timeframe and lead directly to employment (Xu & Ran, 2015).

Because of the nature of the training, short-term noncredit training is also prevalent in businesses because it allows employers to quickly train employees for skills needed in the workplace. As noted previously, businesses often partner with training providers or colleges to implement training for employees (Kasper, 2002; Grubb, Badway, Bell, Bragg, & Russman, 1997). Allowing the businesses to engage in the educational process is integral in structuring the training to align with employer needs. When industry and employers are engaged together in the educational process, a career pathway can be established. A student getting training with input from an employer will be better prepared to go into the workforce.

> "Workforce development has become a priority on many campuses as they can bring innovation to academic programs by aligning local labor markets to local educational entities, attract external funding and deliver education in new ways to meet new learners' needs and interests. With solid alignment of learning outcomes and articulation agreements, non-credit workforce education can support career pathways leading from short-term training for workforce

development to degrees and credentials associated with long-term workforce demands in areas such as healthcare, engineering, science and technology." (Keller, 2016 p.1).

Enrollment in noncredit education has steadily increased in recent years, even at schools where traditional credit programs are seeing a decline in enrollment (Van Noy, Jacobs, Korey, Bailey, & Hughes, 2008). This new trend in enrollment has sparked interest in understanding the draw of noncredit education by educational stakeholders. In their 2008 paper, Van Noy et al. (2008) summarized findings from their study investigating the role of noncredit training in education and the workforce across 20 community colleges. Van Noy et al. (2008) used two primary sources of data for their study: interviews with administrative staff from 20 community colleges across 10 different states and a review of current workforce education policies across all 50 U.S. states. Notably, Van Noy et al. (2008) found that noncredit training programs spanned a vast array of occupations and industries and that noncredit students are a distinct population that tend to be older than traditional undergraduate students and focused on gaining specific skills for employment.

Fouts and Mallory (2010) outline the importance of engaging businesses in the educational process through an economic development principle called the triple helix model (Zheng & Harris, 2007). The model focuses on the relationship between industry, government, and universities for fostering innovation. Each of the three entities has a unique role to play in the model. First, the educational entity creates knowledge through research that is supported financially by the government, then this information and knowledge is utilized by businesses to develop new technology, goods and services, and

knowledge (Fouts & Mallory, 2010). Support for this type of relationship among the colleges, businesses, and government agencies is found throughout workforce development and noncredit education. In workforce development, the direction of the relationships among industry, government, and universities is somewhat different from that in the triple helix model in that local industry creates employment demand and the community colleges train workers to fill those positions. The government supports the college directly and the businesses indirectly through supporting the college.

Funding noncredit programs. Legislators and policymakers have an interest in increasing engagement in the workforce through noncredit education and training and support increased funding in some states (Van Noy, et al. 2008). However, community colleges often face a shortage of financial resources to adequately serve their target populations (Kasper, 2002). Community colleges are responsible for sourcing funding to continue training at the local, state, and federal level. Relationships with industry partners and businesses can help sustain funding both through financial support of training by the businesses and increased interest from policymakers to support community college education with government funds (Kasper, 2002; Goldrick-Rab, 2010).

In a 2014 study investigating noncredit community college enrollments, D'Amico, Morgan, Robertson, and Houchins (2014) purported that the inability to efficiently report on noncredit enrollments, due to unavailability of data, may be contributing to inconsistent funding for noncredit programs. More specifically, the authors note that consistent and accurate collection and reporting of noncredit enrollment data, "may help institutions attract additional public and private sector clients for contract training, recruit students, and better prepare the workforce to serve the local economy" by

providing additional information and statistics on this specific population of students (p.158). Across some colleges, noncredit training generates less revenue than do credit programs due to shorter training times and part-time enrollment of students. (Goldrick-Rab, 2010). As a result, "noncredit students need to share resources, which are already more limited compared with resources provided for-credit students, with a larger number of students enrolled in the noncredit sector. As a result, it was and will continue to be difficult for colleges to provide sufficient services and support to noncredit students, such as child care, academic guidance, and career-oriented counseling, given traditional funding formulas" (Xu & Ran, 2015, p.34). Community college education training availability is not always consistent because of the community colleges' lack of available funding (Goldrick-Rab). At an administrative level, a primary goal of the community colleges is to find funds to support their mission of affordable education. The grant program is one of the funding programs available to meet the goal of continuing availability of affordable education across the state.

The nontraditional student in noncredit training. An important piece of understanding the shifting needs of higher education is identifying the types of individuals that will most benefit from short-term noncredit credentialing, and what barriers these individuals might face upon entering training. For example, a traditional student entering a four-year institution is more likely to enroll full-time, have no dependents, and be younger than 25. A student entering a community college is more likely to enroll part-time, have more than one dependent, have lower socioeconomic status, and be older than 25 (Kim, 2002) The student entering the community college is likely to face additional barriers to success. A comprehensive term used in higher

education to describe this type of student is nontraditional student (Kim). For this thesis, a nontraditional student will be considered an individual that meets any of the characteristics established by the National Center for Education Statistics (NCES) including race (minority status), gender (females in male dominated fields or vice versa), age (over the age of 25), socioeconomic status (poverty or low income by region), and level of employment (unemployed or underemployed and employment during training).. Compared to traditional four-year universities, the student population of community colleges is often more aligned with the regional demographics (Cohen & Brawer, 2003). In addition, Cohen and Brawer note that the socioeconomic status of community college students is often lower than that of students enrolled in traditional four-year universities.

The most discussed criterion for nontraditional status is entering education over the age of 25. (Kim, 2002). "Age acts as a surrogate variable that captures a large, heterogeneous population of adult students who often have family and work responsibilities as well as other life circumstances that can interfere with successful completion of educational objectives" (NCES, n.d.). Other important characteristics used to identify nontraditional students include enrollment criteria (delayed enrollment, part-time enrollment), financial and family status (socioeconomic status and number of dependents), employment (unemployed or underemployed and employment during enrollment), and high school graduation status.

Importantly, limited recent and relevant data are available on nontraditional students enrolled in noncredit education (Grubb et al., 2002; Kim, 2002; Leventoff, 2018; Milam, 2005; Voorhees & Milam, 2005; Xu & Ran, 2015). Even sparser is data comparing nontraditional and traditional student experiences in community college

education. This identified lack of data is one reason for carrying out additional research on nontraditional students enrolled in noncredit education. In addition, the importance of research on nontraditional students "helps to illuminate issues and programs relevant to the diverse community college student population" (Kim, p. 74). While the available data is limited, some researchers have touched on the topic in recent studies and emphasized the need for a continued examination of the nontraditional student experience in post-secondary education.

In a 2015 study, Xu and Ran found that nontraditional noncredit students had a different demographic makeup than traditional credit students. Noncredit students were on average 12 years older than credit students with an average age of 34 years. Interestingly, noncredit students tended to enroll in education on a part-time basis with a very low number enrolling in full-time classes when compared to credit students, one-third of whom enrolled full-time at the college. Noncredit students also had notable differences in race demographics when compared with credit students. For example, noncredit students were more likely to indicate Black or Hispanic as their race/ethnicity. In support of current anecdotal findings that indicate nontraditional students typically fall into lower income brackets, Xu and Ran also found that students enrolling in noncredit training are more likely "to be from lower socioeconomic backgrounds" (p.15). In Xu and Ran's study, socioeconomic backgrounds were measured using a combination of variables including "median household income, poverty rate, percentage of non-English speaking population, percentage of residents with a bachelor's degree, and the percentage working in professional occupation" (p.15).

In a 2003 paper, Grubb et al. summarized findings from interviews with officials at 13 community colleges across five U.S. states. The purpose of their paper was to highlight the importance of the role of the community colleges, specifically noncredit, in reaching nontraditional students and underserved populations. Grubb et al. found that the interviewees (directors of noncredit education and institutional researchers) cited low income as a primary indicator for enrollment in available noncredit training at their respective colleges. These findings are supported by those obtained from case studies completed by the Community College Research Center at Teachers College at Columbia University. The programs that are most convenient to this specific population of students are often those that are noncredit because of their low cost, scheduling (e.g. evening classes or online training), course start times (e.g. courses run more often), location, and supportive services (Grubb et al., 2003). While being low income is just one noted characteristic of nontraditional students, Grubb et al. found that in many community colleges income serves as a proxy, often highly related to other variables associated with nontraditional status (e.g., poverty rate, educational level). Notably, Grubb et al. found that community college staff referred to nontraditional students as having different goals than traditional four-year students and credit-enrollees at the community college. In addition, nontraditional students often need to become proficient in foundational academic areas, including literacy and math skills before entering training. (Grubb et al., 2003).

Nontraditional students are often faced with obstacles to entering education and training (Goncalves & Trunk, 2014). In a 2002 paper by Breneman and Pusser, the authors questioned whether nontraditional students were receiving access to education

equal to that of traditional students. Breneman and Pusser structured their research in terms of supply and demand in the educational marketplace. They recognized a shift in postsecondary education supply and demand in which nontraditional students were receiving additional assistance entering "pathways to access postsecondary education and training" (Breneman & Pusser, p. 3). Their aim was to provide recommendations for further research to better understand what impact the transitions in supply and demand in postsecondary education had on nontraditional students (Breneman & Pusser).

Nontraditional students comprise the fastest growing sector of enrollees in postsecondary education (Breneman and Pusser, 2002). The growth in this educational population has increased demand for a different type of educational training that aligns with the needs of these students. Breneman and Pusser recommended a database that houses information on nontraditional students including what courses they take, their access to educational funding, and the importance of education for their specific life needs. Breneman and Pusser encouraged the use of case study data, survey responses, noncredit course activity, and national data on nontraditional student demographics to examine equity and access in educational opportunities for nontraditional students.

In an exploratory qualitative research study done by Goncalves and Trunk (2014), barriers to educational success for nontraditional students were identified through interviews with ten nontraditional students. Goncalves and Trunk examined obstacles aligned specifically with student engagement as they felt that retention and success are related to student involvement with their academic environment. Goncalves and Trunk found that 70% of students indicated that their career was the reason for enrolling in training. Interestingly, all participants interviewed indicated that interaction with other

students was difficult and all interviewees reported feeling isolated. In one of the interviews, a student responded positively about student interactions when they do occur stating, "We share a lot of the same experiences…it is nice to talk to people who go through some of your daily struggles, you know, kids, school." (Goncalves & Trunk, 2014, p. 3) Overall, it was found that participant responses aligned with barriers to success identified in the current literature on the subject, including lack of financial resources and difficulty finding transportation (Goncalves & Trunk). Recommendations were made to increase positive experiences for nontraditional students who engage in in-person training on a college campus including increased flexibility for classes, changes to advising to align with nontraditional student needs, places for nontraditional students to access resources including computers, and more supportive services (Goncalves and Trunk, 2014).

Industry Credentials

In noncredit education, industry credentials and certifications are becoming increasingly popular (Kasper, 2002). Industry credentials and certifications provide evidence of learned skills to employers. A worker with an industry certification or credential has evidence of their competencies through passing the competency-based examination aligned with the credential (Kasper, 2002; Van Noy et al., 2008). Employers will hire workers with credentials before those without, knowing that they already have a basic level of knowledge in the field. Also, students interested in training programs leading to credentials note that attainment of the credential will allow them to make more money in the workforce (Flynn, 2002).

Importantly, industry credentials and certifications require completion of an assessment to provide evidence of proficiency in the subject area. Industry credentials provide students with evidence of their learning. Industry credentials, including licensures and certifications, are typically available nationwide through third-party vendors or certifying bodies (e.g. Board of Nursing). Some industry credentials, certifications or licensures require re-testing when moving to another state, while others are valid across states without any re-testing requirements.

Van Noy et al. (2008) found in a case study of community colleges that the industry credentials and certifications offered aligned with the needs of local employers. Industry certifications and licensures are becoming a more significant part of noncredit education. Kasper (2002, p.18) notes:

> The growth of certificate programs is an important trend, even though the number of certificates earned remains smaller than the number of associate degrees conferred. Most certificates involve specific, work-related training. Many community college students—especially older and part-time students who hold full-time jobs—neither want nor need to pursue lengthy educational programs. A growing number of experienced workers who have a bachelor's degree attend community colleges for computer classes and other instruction to keep current with new workplace technologies. The certificate programs appeal to those who want to upgrade their current skills or acquire new ones, increasing their job opportunities in the marketplace.

A high-demand credential is a 'catalyst' for employment. In other words, the credential itself is one of the primary criteria/qualifications for identifying a qualified

employee in each field. In addition, the credential must be upheld by foundational labor market demand as well as local and regional business support. For example, college-provided labor market reports must show evidence of open jobs requiring the credential and written support from local businesses noting they hire individuals with the credential or will hire students who attain the credential. Thus, "The role of community colleges in preparing students for occupational licensure and certification requires careful attention to the interests of the local public, the occupation, consumers, and employers." (Kasper, 2002, p. 16).

An example of a high-demand credential is the Commercial Driver's License (CDL) awarded by the Department of Transportation. This credential aligns with a short-term training program. Once the training program has been successfully completed, the student can take the competency-based examination to test their learned skills. If they successfully pass the requirements of the exam, they are awarded a license allowing them to drive commercial trucks. This licensure is a requirement for truck driving (and other) jobs in in the state.

Importance of industry credentials. Short-term noncredit training leading to industry credentials brings three main groups to the table: students/workers, employers/businesses, educators/training providers. According to Xu and Ran (2015), noncredit education has become an essential component of a robust economy. Credentialing students through short-term noncredit training is not a new concept, however, the notion has gained more attention in recent years. Credentialing students through short-term noncredit training allow students who may not have been able to

participate in traditional educational pathways to earn credentials that will lead to employment.

> "Though alternative credentialing in the form of certificates, short-term courses, licensing, badges and micro-credentialing have been around for some time, mainstream adoption is a relatively new phenomenon, reflecting student demand, increased engagement with business communities, and the additional revenue stream it provides to universities and colleges." (Chmura, Chmura, & Fong, 2017)

Because short-term noncredit training is more affordable and is provided at a low cost, it becomes a more appealing option for nontraditional students including those who are low-income, adult learners, and English-as-a-second language students (Xu & Ran, 2015). Additional benefits of these programs include flexibility to be revised and updated to align with current workforce needs.

In a recent study, Xu and Trimble (2014), analyzed data from both short and long-term credentialing programs across two community college systems to identify the impact of a non-degree certificate on wage earnings and employment. They identified significant increases in earnings for students who successfully completed a short-term or long-term certificate. In addition, further analyses identified that earning a certificate positively impacted likelihood of continued employment and earnings while employed.

While it has been established that community colleges are an important part of the post-secondary educational landscape, they are not always as highly regarded as their four-year counterparts. The community colleges are often at a disadvantage compared to four-year institutions in the measurement of degrees awarded (Flynn, 2002). Providing programs with high completion rates that end in a certification or licensure can increase

positive perceptions of noncredit education provided by the community college (Flynn, 2002).

High-demand credentials. An argument against community colleges is that they train students for low-income jobs. Most researchers would argue that community colleges should train individuals for jobs that get them out of poverty, not those that keep them in it (Grubb et al., 2002). Selecting high-demand programs aligned with available jobs in the community is one way of mitigating against the possibility that a student will be enrolled in training tied to a low-paying job. The following section outlines the parameters for the grant program being reviewed in this thesis.

Pay-for-Performance Program

The program of interest in this thesis is a pay-for-performance system designed to reward colleges for student success measured by completion of training programs and attainment of industry credentials. For this thesis, I will define credentials using a definition created by educational stakeholders involved in the creation and implementation of the grant program. The credentials identified by the educational stakeholders for inclusion in their grant program are considered high-demand. A high-demand credential is any credential, industry certification, or licensure that aligns with a high-demand occupational field in the state as approved by the workforce board. The high-demand fields are disciplines or fields in which there is a shortage of skilled workers to fill current or projected job openings. Importantly, these credentials and certifications must be industry recognized, or to demonstrate a competency or proficiency in the technical or occupation skills identified as necessary by employers. In addition, the certifications must be portable or recognized by more than one employer and, where

applicable, geographic region. Last, the credentials and certifications must have an external process in place for determining validity and relevance in the workplace. Examples include written recognition from an employer or industry third party citing the utility of the credentials, certification, and licensures.

One aspect of this process is that a business must explicitly express a demand for the credential. In the community college system, colleges must submit requests for inclusion in the pay-for-performance program. Local business demand must be identified in the request by either a labor market report for the region or inquiries from local business. If they are approved, the college can then provide the training and credentialing for the discounted price using state-allocated funds. The colleges track student progress through programs and upon completion request that the student provide evidence of their credential attainment. A primary outcome of the grant program is to leave the student ready to be employed and earn increased wages or enter gainful employment if unemployed. The grant program does not provide funding for all available credentialing programs; it provides funding only for those that have evidence through business engagement and labor market data for regionally available jobs that provide a living wage.

A comprehensive review process is used to vet credentials submitted by the colleges for inclusion in the grant program to ensure that those earning the credential are likely to obtain jobs. Community colleges submit a request for a program and aligned industry credential to be included in the pay-for-performance program to the educational stakeholders. Colleges provide relevant labor market and business engagement information as well as supplemental information such as letters of support from local

employers or agreements from employers to hire students if they complete training and successfully earn their industry credential. Training programs and their associated industry credentials need to have compelling evidence of demand through labor market information and supportive documentation of in-demand status in the local region. Documented support from local business and industry providers must be provided for the specific training program and industry credential. Programs are reviewed on a regular basis for continued high-demand status. The educational grant funds successful performance in training programs. This incentivizes the colleges to provide resources for students to be successful. While the program is open (pending fund availability) to any state resident, individuals enrolled in the grant program are often considered nontraditional (i.e., students are typically not recent high school graduates entering college for the first time). In many states, there is funding available for noncredit training, but most of this funding is not directly contingent on student performance. The program has provided a new model for funding students based on successful completion of their training program and subsequent attainment of the related industry credential.

Literature Review Summary

Review of research questions. The information in the previous sections provides context for the investigative research that follows. Although this research is considered exploratory in nature, five research questions will be addressed:

1. What are the training program completion rates overall and by training program?

2. What are the credential attainment rates overall and by training program?

3. What are the student characteristics associated with enrolling in the grant program overall?

4. How do training program completion rates vary by student demographic variables (age, race, and gender)?

5. How do training program credential attainment rates vary by student demographic variables (age, race, and gender)?

A supplemental survey aligned with research questions 2 and 5 was created to gather information to better understand varying credential attainment rates and barriers to credential attainment for community college students. The survey was comprised of eight questions including one qualitative optional open-ended question. The survey was sent via a Qualtrics link to 22 career coaches at the community colleges; 11 responses were recorded for a response rate of approximately 50%. The survey results will be reported in the results section and responses will be utilized to inform the discussion.

I anticipate that credential attainment rates will vary by program due to the varying level of difficulty of training programs and varying levels of nationwide credential attainment rates. Credential attainment rates nationwide vary due to differing levels of difficulty on the examinations.

The results for individual training programs will allow stakeholders to identify training programs that need changes to curriculum and implementation. If results are examined only at an overall grant program level, strengths and weaknesses within the individual training programs would not be identified. Although changes to the entire grant program might be needed, it is likely that differences are occurring at the training program level, making it necessary for analyses to be completed at that level. With

limited funding available for programmatic change, identifying specific areas where

program improvements are most necessary is important. In addition, when students are

deciding what training to enroll in, information on credential attainment rates for the

specific program is essential to help them decide if the program will be worthwhile for

them. "Administrators deciding whether to expand, eliminate, or reform specific

programs also need evidence about programs themselves, not average effects across an

entire field." (Xu & Trimble, 2016, p. 4).

Chapter III: Methods

The Methods section will be broken into two studies. Study 1 refers to analyses aligned with the five established research questions. Study 2 refers to the administration of the 8-question supplemental survey sent to career coaches at the community colleges. Results from Study 2 will be used to support findings from Study 1 and inform the Discussion chapter.

Study 1 Participants

Data for Study 1 were collected across a mid-Atlantic state's community colleges for students who met eligibility requirements and entered training under the pay-for-performance program beginning July 1st, 2016 with enrollments through January 10th, 2019. Their information is entered into a student system-of-record database. Data housed in the database include student information and enrollment records (e.g. course enrollment information, grades). Student demographic information is collected upon registration at the community colleges and is self-reported by the student. Enrollment record information is entered by college faculty and staff. Information is updated if a student returns to the college for subsequent training to ensure up-to-date records. College faculty and staff are tasked with entering status of completion for the training program and evidence of credential attainment for all students enrolled in training programs under the grant program. Attainment of industry credentials are verified by college staff through evidence provided by the student (e.g., copy of license or credential) or through third-party awarding entities (e.g., Department of Motor Vehicles).

The Study 1 student sample consisted of 13,691 training program enrollments. The number of students enrolled may be fewer than the number of enrollments, as

students may have enrolled in more than one training program. The sample was 61% male, 50.1% White, 28.1% Black, 4.7% Hispanic, 3.9% Asian, 1.1% American Indian, and 0.4% Hawaiian and 11.7% unreported/unspecified.

Student enrollments only become eligible for consideration in training program completion and credential attainment rates after the 30 and 120 day post course completion windows. These windows allow students time to complete their course and attempt their credential examination. A student who has recently successfully completed their training program may not have had time to attempt their credential examination and therefore would not be included in the credential attainment rate analyses but would be included in the training program completion analyses. Additionally, the windows allow for faculty and staff to enter grades and evidence of credential attainment into the student record database. Due to the varying eligibility for consideration in the training program and credential attainment rates, the enrollments evaluated for research questions vary. Research questions 1 and 4 have the largest sample size as they will be used to evaluate training program completion rates and only require 30 days posts course completion. Research questions 2 and 5 are answered using the same, smaller sample size as they will be used to provide credential attainment rates but require 120 days post course completion to be analyzed. Research question 3 is based on a separate sample as it is reflective of individual students within each program instead of enrollment counts used for the other four questions. Sample sizes for each research question are provided below.

- Research Question 1: What are the training program completion rates overall and by training program? $N = 11,501$ enrollments

- Research Question 2: What are the credential attainment rates overall and by training program? $N = 9{,}504$ enrollments

- Research Question 3: What are the student characteristics associated with enrolling in the grant program overall? N = 10,841 students

- Research Question 4: How do training program completion rates vary by student demographic variables (age, race, and gender)? N = 11,501 enrollments

- Research Question 5: How do training program credential attainment rates vary by student demographic variables (age, race, and gender)? $N = 9{,}504$ enrollments

Study 1 Data Screening

Data screening (i.e., data cleaning) is the process of removing erroneous records from a dataset. Data will be reviewed to identify any records that are incomplete, inaccurate, or contain an unacceptable value (e.g., the value is not allowable in the field) by examining frequencies for each variable aligned with the established research questions.

Study 1 Procedure

Research questions 1 and 4. Based on program guidelines and policy, enrollments become eligible for a computed training program completion rate once 30 days have passed since their training program end date. This window allows college faculty and staff to enter grades into the system-of-record. Enrollments are flagged with a '1' for the 'Completion Eligible' variable once 30 days have passed since their training

program end date. This indicator is then used to establish the subset of eligible enrollments used in the completion rate.

The training program completion rate is calculated by taking the number of eligible enrollments with a completion divided by the number of eligible enrollments total. This computation gives a percent of eligible enrollments with a completion (i.e., training program completion rate). The training program completion rate will be examined across all eligible program enrollments and by training program.

Research questions 2 and 5. Based on program guidelines and policy, enrollments become eligible for a computed credential attainment rates once 120 days have passed since their course end date. This window allows students time to attempt to take their credentialing examination. Enrollments are flagged with a '1' for the 'Credential Attainment Eligible' variable once 120 days have passed since their training program end date. Students can attempt their credential after the 120 day window.

Evidence of a credential can be provided to the college any time after they complete their program. For example, if a student enrolls in a program and does not earn the aligned high-demand industry credential until a year later, the college can still collect evidence of the attainment and have it count towards their attainment rates at that time. A student's credential attainment verification date is recorded, but not the exact date the credential was awarded so calculating length of time to earn a credential is not possible. Importantly, credential attainment rates are based on those students who attempted the credential examination and passed. Information on the number of attempts to credential are not available. Neither is information available if a student did not attempt the credential examination or attempted the credential examination and failed.

The training program credential attainment rate is calculated by taking the number of eligible enrollments with a credential attainment divided by the number of eligible enrollments total. This computation gives a percent of eligible enrollments with a credential attainment (i.e., credential attainment rate). The credential attainment rate will be examined across all eligible program enrollments and by training program.

Research questions 3, 4, and 5. All program enrollments will be deduplicated at a student level and then demographic data will be analyzed and reported. As noted earlier, students can enroll in more than one program, meaning that their demographic information could be present in the data file more than once. To analyze overall demographic data, duplicate instances of records will be removed, leaving one demographic record per student. When examining demographic data by program, students who are enrolled in more than one program have representation in each of the programs they are enrolled in. Three demographic variables will be analyzed (i.e. age, race, and gender). Age is calculated using a student's reported date of birth. Race is self-reported by the student (i.e., American Indian, Asian, Black, Hawaiian, Hispanic, and White). Students can choose not to report their race and are listed as unreported/unspecified. Gender is self-reported as Male, Female, or Unreported. Frequency distributions of reported age, race, and gender will be provided for the overall program and by training program. Frequency distributions for training programs will be reported by age, race, and gender.

Results by industry. Due to the large number of training programs being analyzed, supplemental results are provided for the five research questions by seven industry categories: business and customer service, education, healthcare, information

technology, logistics and transportation, skilled trades, and welding and manufacturing. Result summaries by industry allow for easier comparisons of the data across industry and demographic groups. The seven industries were established by utilizing occupational codes aligned with the training programs and indicated by the community college workforce board.

Software. The data screening and analyses will be performed in SAS Enterprise Guide v7.1 and SAS 9.4.

Study 2 Participants

Study 1 results showed that training program completion rates were consistently high (i.e., above 90%), whereas credential attainment rates were lower, with an average of 68%. Because credential attainment rates varied across programs and were approximately 22% lower than training program completion rates, Study 2 data were collected from community college career coaches via an online survey in hopes of better understanding the barriers to credential attainment that students face.

The Study 2 online survey was sent to 22 career coaches across the state's community colleges. A career coach is a staff member at a community college tasked with assisting students with processes such as reviewing available training programs, enrolling in noncredit workforce training programs, applying for financial aid, reviewing available supportive serves (e.g., transportation assistance) and providing resources for success once enrolled. The career coaches for this program aimed to support students before, during, and after enrollment to support completion of training programs and attainment of the industry credential. Respondents were asked to answer eight questions

via a prepared survey (Appendix A) including one open-ended question for additional feedback.

Study 2 Software

The survey data for this thesis was generated using Qualtrics software, Version [2018-2019] of Qualtrics.

Chapter IV: Results

The results will be broken into two studies. Study 1 includes results aligned with research questions 1 through 5. Study 2 includes results from the 8-question supplemental survey administered to career coaches at the community colleges. Results from Study 2 will be used to inform Study 1 and the discussion.

Study 1 Research Questions

Data screening. Frequency analyses were conducted on the age variable to identify any ages that would be considered outliers (e.g., participants less than 16 years old or greater than 80 years old). Nine individual records were removed due to falling outside the valid range identified by educational stakeholders. Completion, credential attainment, and demographic variables were reviewed by examining frequency analyses for each variable and identifying invalid characters or values. No invalid characters or values were identified.

Research question 1. What are the training program completion rates overall and by training program? Training program completion rates were calculated by taking the number of enrollments with a successful 'S' grade in the training program divided by the total number of eligible enrollments. Recall, only enrollments that were at least 30 days past their training program end date were eligible to be included in the analyses per the educational stakeholder guidelines. The overall training program completion rate for 11,501 eligible enrollments was 93.8%. Training program completion rates varied by program (see Table 1). Although training program completion rates were consistently high (on average, approximately 94%), some programs showed lower rates, including

Emergency Medical Technician training with 78% completion rate and Project

Management Professional training 75% completion rate.

Research question 2. What are the credential attainment rates overall and by

training program? Credential attainment rates were calculated by taking the number of

enrollments with a verified credential after completing the training program divided by

the total number of eligible enrollments. Recall, only enrollments with at least 120 days

past their training program end date are eligible to be included in the analyses per the

educational stakeholder guidelines. The overall credential attainment rate for the 9,504

eligible enrollments was 67.7%. Training program credential attainment rates varied by

program (see Table 2). Training program credential attainment rates had more variation

and tended to be lower than training program completion rates, with some as low as 0%

and others as high as 100%. The seven programs with credential attainment rates of 0%

included three programs aligned with the skilled trades industry: Heavy Equipment

Operations – Level 2, Contractor's License, and Facilities Maintenance Technician. The

remaining programs were in the healthcare, information technology, and

welding/manufacturing industries. The 14 programs with credential attainment rates of

100% included eight programs aligned with the skilled trades industry: EPA Section 608

Technician Certification, Electrical Levels 3 and 4, Plumbing Levels 2 and 4, HVAC

Level 4, Carpentry Level 4, and Power Industry Fundamentals Certification. The

remaining programs with credential attainment rates of 100% were in business and

customer service, healthcare, and welding/manufacturing industries.

Research question 3. What are the student characteristics associated with

enrolling in the grant program overall? Frequency analyses were conducted for student

demographics (i.e., age, race, gender) using a deduplicated enrollment list across all

enrollees. The median age of students was 33 years ($M = 35$, $SD = 12.35$). The sample

was 50.1% White, 28.1% Black, 4.7% Hispanic, 3.9% Asian, 1.1% American Indian, and

0.4% Hawaiian and 11.7% unreported/unspecified (see Table 3). Over 60% of the

population was male, with less than 3% of students not reporting.

Research question 4. How do overall and training program completion rates vary

by student demographic variables? Training program completion rates were broken out

by three demographic variables: age, race, and gender. Notable differences in training

program completion rates by demographic groups were observed.

Seven age categories were established to review completion rates for age. The

ages of 16 to 80 were broken into increments of ten years (e.g., 16 to 25 years old) to

align with categories referenced by the grant program stakeholders. Program completion

rates ranged from 93% to 100% across the seven age groups, with students in the age

range 75 to 80 years ($N = 7$) obtaining the highest completion rate of 100% (see Table 4).

The lowest completion rate (93%) was associated with age range 16 to 25 years old ($N =$

3,040). A supplemental review of age as a continuous variable found that the age with the

lowest completion rate was 18 years old (completion rate of 87%).

As previously noted, training program completion rates had little variation when

examining rates by age across all programs. However, when examining rates across age

groups for individual programs, more substantial variations were uncovered (see Table

7). For example, Phlebotomy Technician (PBT) training completion rates were between

64% to 100%, with students from age 36 to 45 completing 85% of the time and students

from age 16 to 25 completing only 64% of the time. Importantly, sample sizes vary

across groups. Some of these percentages are based on small samples and may change as more enrollment data becomes available. Training programs with the highest enrollment numbers (e.g., Commercial Driver's License) have more consistency in performance across age groups, indicating that increased enrollments may be needed to better understand varying rates across groups.

Training program completion rates were analyzed by seven available reported race categories (see Table 5). Completion rates across reported race had little variation ranging from 91% to 96%. The lowest completion rate was aligned with students who identified as Hawaiian (91%), and the highest completion rates (96%) were students who identified as Hispanic and Asian.

Importantly, while there were slight variations of training program completion rates across race categories, notable differences occurred in programs with low enrollment and rates may change over time as new enrollments are analyzed. Across reported gender categories completion rates ranged from 93% to 96% (see Table 6). Males had a slightly higher completion rate (94%) than females (93%). Examining training program completion rates by gender allowed for larger comparison groups than the examination of completion rates by age groups. Differences in rates occurred for males and females specifically in skilled trade programs such as 2-Stroke and 4-Stroke Engine Repair Certification, Certified Production Technicians and CNC Milling Operations. Ninety-seven percent of the males enrolled in 2-3 Stroke Engine Repair completed the program successfully whereas only 67% of the females enrolled completed the program. In the Emergency Medical Technician program, where completion rates are

lower than the overall average, males had notably higher completion rates than females at 87% whereas enrolled females had a completion rate of 67%.

      Research question 5. How do training program credential attainment rates vary by student demographic variables? Overall credential attainment rates were broken out by three demographic variables: age, race, and gender. Credential attainment rates were also analyzed by program and the three demographic variables.

      Overall training program credential attainment rates had more variation than program completion rates (see Tables 10 to 12). Across age categories, overall credential attainment rates ranged from 14% (75 to 80 years old) to 70% (16 to 25 years old). The second highest credential attainment rate was 69% (36 to 45 years old). Overall credential attainment rates varied across reported race categories from 44% to 75% (77% for those with unreported race). Students who reported Asian as their race had the lowest credential attainment rate at 44%, whereas students who reported their race as American Indian had an average credential attainment rate of 75%. The considerably large discrepancy between credential attainment rates for students with a reported race of White (72%) and students with a reported race of Black (59%) is notable, as these are the two largest reported race groups in the data. Overall credential attainment rates varied considerably between genders. Males on average had a credential attainment rate of 72% compared with females who had a credential attainment rate of 59%.

      Credential attainment rates varied by program and age categories (see Tables 13 to 15). Some programs saw more variation among age groups than others. For example, Certified Nurse Aide had credential attainment rates ranging from 44% to 73%, with students aged 46 to 55 and 56 to 65 years credentialing at rates of 61% and 73%. On the

other hand, Millwright Levels 1 and 2 saw similar percentages of students credentialing across group groups

For programs with larger enrollment numbers (e.g., Commercial Driver's License, Certified Nurse Aide, Clinical Medical Assistant), variations between race groups were notable. For example, for the Commercial Driver's License training program, Black students had a credential attainment rate 13% lower than that of White students.

Given there were varying credential attainment rates across genders overall, it was of interest to identify specific programs where gender differences were observed. Manufacturing Technician 1 (MT1) and Flux Core Arc Welding (FCAW) had differences between male and female credential attainment rates, with males having higher rates. Differences of as much as 20% were identified with males credentialing at a higher rate, especially in programs related to skilled trades and welding. However, for Commercial Driver's License, females had only a 3% lower credential attainment rate than males.

Results by industry. Training program completion rates and credential attainment rates are provided by the seven industries outlined in the methods chapter (see Tables 16 to 23). Training program completion rates ranged from 88% (education) to 96% (skilled trades) with little variation across industry with the exception of the education industry which has a completion rate 6% lower than the overall rate (94%). Credential attainment rates ranged from 19% (information technology) to 88% (education). Interestingly, information technology had a 94% training program completion rate, but only a 19% credential attainment rate indicating potential misalignment between the training program and the credentialing examination.

In the following section, responses collected via the administered supplemental survey sent out to career coaches at the community colleges are summarized. Results

from the survey are also used in the discussion to support conclusions and

recommendations for further research.

Study 2 Survey Responses

   Data screening. Survey responses were reviewed for completeness. Only 10

completed responses were collected out of 22 surveys distributed, for a response rate of

approximately 45%. One respondent began the survey, but only completed two questions

and was subsequently removed from further analyses. Questions from the supplemental

survey are aligned with credential attainment research questions 2 and 5.

   Survey question 1. Respondents were asked to rank order a list of barriers to

credential attainment and indicate whether they were a significant barrier, moderate

barrier, or not a barrier to credential attainment at their college. Responses varied;

however, financial issues, lack of available transportation, and being unprepared for

training were the top three responses indicated as a significant barrier. Health issues

(individual or family member), difficulty of credentialing examination, and not

attempting the credential examination were the top three barriers indicated as moderate

barriers. Lack of time due to other commitments was listed most often as not being a

barrier to credential attainment based on the available responses. Other qualitative

responses indicated by career coaches were testing anxiety, fear of failing, and lack of

available child care (see Appendix B).

   Survey question 2. Respondents were asked to select the training program

offered at their college that they believed had the lowest credential attainment rate. Three

out of the 10 responses indicated the CompTIA A+ training program (information

technology) as having the lowest credential attainment rate. Two out of the 10 responses

indicated Pharmacy Technician (healthcare) as having the lowest credential attainment rate. Interestingly, these self-reported responses align with calculated credential attainment rates with both programs reporting rates at 30% or lower.

Survey question 3. Respondents were asked to indicate the most significant barrier to credential attainment in the programs they indicated in question 2. Most respondents (67%) indicated that being unprepared to enter training was the most significant barrier to credential attainment, followed by difficulty of the credentialing examination (22%), and financial issues (11%).

Survey question 4. Respondents were asked to indicate what resources their college would need to increase the credential attainment rate aligned with the program indicated in question 2. Funding for classroom resources (e.g., training equipment, learning materials) was the response indicated most frequently, followed by funding for improved curriculum, and additional supportive services (e.g., transportation vouchers, and financial support for students). Thirty percent of respondents also indicated qualitative feedback for question 4 and noted the following additional resources: "clinical counseling group support sessions", "tutoring", "funding to purchase vouchers to retest".

Survey question 5. Respondents were asked to indicate the training program offered by their college that is the highest priority for increasing credential attainment. Interestingly, responses to question 5 did not directly align with responses to question 2 where respondents were asked to indicate the program that they believed had the lowest credential attainment rate. Instead, responses varied and included programs such as Commercial Driver's License (Class A & B), Certified Billing and Coding Specialist, Certified Medical Administrative Assistant, and Certified Nurse Aide.

Survey question 6. Respondents were asked to indicate the most significant barrier to credential attainment for students in programs indicated in question 5. While question 6 mirrors survey question 3, responses are distinct and provide insight on the programs indicated in question 5. Respondents indicated that financial issues (30%) and difficulty of credential examination (30%) were the most significant barriers to credential attainment for the specified programs, followed by being unprepared for training (failed examination) (20%) and not attempting the credential examination (10%).

Survey question 7. Respondents were asked to indicate what resources their college would need to increase credential attainment in the program specified in question 5. Most respondents (56%) indicated that funding for classroom resources (e.g., training equipment and learning materials) would be needed to increase credential attainment, followed by equal indication of additional supportive services for students, funding for improved curriculum, and additional faculty. Like question 4, a respondent indicated that funding to provide vouchers for retesting as well as a shorter time frame between the end of the training program and credential examination testing were the resources most needed for increasing credential attainment.

Survey question 8. Respondents were given the opportunity to leave qualitative feedback or responses related to credential attainment rates at their college (see Appendix C). Four respondents left qualitative responses aligned with credential attainment rates and priorities for the program. Notably, one respondent said, "I would like to see more resources to give to students to have after the classroom is over to help them study on their own for the certification tests". This comment indicated that students may need additional time after the training program ends to prepare for their certification

examination and that time spent in the classroom may not be sufficient enough to pass the

examination.

Chapter V: Discussion

This thesis project aimed to provide an examination of noncredit training

programs aligned with high-demand industry credentials delivered at community colleges

in a Mid-Atlantic state delivered through a new pay-for-performance grant program.

Training program completion rates and credential attainment rates were examined across

all student enrollments, by demographic groups (age, race, and gender) as well as by

individual training programs to identify potential differences among these groups and

programs. If considerable variations in performances occur across programs and

demographic groups, it could indicate a need for additional research into the cause of

differences as well as a need for programmatic improvements to address the causes of the

differing rates. Five research questions were developed to explore training program

completion and credential attainment rates. In an effort to provide supplemental data in

support of two of the primary research questions (questions 2 and 5), a survey was

developed and sent to career coaches across the community colleges who work with

students enrolled in the noncredit training programs described in this thesis.

Research Question 1

Recall, to address the first research question, training program completion rates

were examined overall and by program. The overall training program completion rate is

quite high at almost 94% leaving little room for improvement. When examining training

program completion rates by program, more variation occurs and programs with low

training program completion rates were identified.

Across the 123 programs with eligible enrollments, six training programs had

completion rates below 80% including two healthcare programs, Registered Medical

Assistant, and Phlebotomy Technician (PBT). Students enrolled in these healthcare programs may be experiencing more barriers to success including lack of transportation, financial issues, and inability to access adequate childcare as indicated by career coach survey respondents. Additionally, this may be because healthcare programs often see higher enrollments of female students who may be the primary caretaker for dependents, which could impact attendance, ability to complete coursework, and successfully complete training programs.

The combined program results indicate that the majority of enrolled students are completing the necessary requirements for successful completion of the training program. This may be due to several factors. First, the pay-for-performance program requires that a student pay back the second third of tuition if they do not successfully complete the training program. This stipulation may make students feel more responsible for completing the program as there is a financial consequence if they do not. Second, the training programs aligned with the grant program are considered short-term, meaning that a student's time commitment is much lower than a traditional two- or four-year program, typically less than 20 weeks. While training program completion rates are high overall, continued investigation into performance across programs with low rates could prove useful, specifically for programs that enroll more students as the program continues. A clearer understanding of training program completion rates can occur with continued monitoring of student enrollment and training program completion. Differences in the time it takes to complete these programs may impact completion rates.

Research Question 2

For the second research question in this thesis, analyses similar to the first research question were conducted to examine training program credential attainment rates. The training programs examined in this thesis each have a high-demand industry credential aligned with them. The grant program was designed to allow students to receive discounted training and attain their industry credential, increasing employment opportunities by providing evidence of skill attainment to employers. The overall training program credential attainment rate was 68%, almost 26% lower than the training program completion rate, indicating the presence of barriers when attempting to attain high-demand industry credentials. The supplemental survey results indicated that students need additional resources offered through the college to increase credential attainment rates for these programs.

One program, Contractor's License, with 26 eligible enrollments had zero credential attainments associated with it, resulting in a 0% credential attainment rate. Because examination attempt data is not available, we do not know if these students attempted the examination and failed, chose not to attempt the examination, or took the examination and passed but failed to report it to the college, making it difficult to determine the exact reason for the low rate. If colleges were able to obtain data on the number of attempts for credential examinations, it would allow them to follow up with a student if they failed the examination and provide remediation resources or vouchers for re-testing. Additionally, if the student did not attempt the credentialing examination, the college would be able to follow up with the student inquiring into the reasons why the credentialing examination wasn't attempted. The college could then potentially provide resources to the student that could alleviate any barriers to attempting the credential

examination that might be occurring (e.g. lack of funds available for retesting, lack of transportation). Attempt data would also allow the college to understand if the barriers to credential attainment are aligned with attempting the examination or failing the examination. Other notably low rates occurred in programs with higher enrollment numbers. For example, two credentials in the information technology field (CompTIA A+ and CompTIA Network+) had attainment rates just under 15% with enrollment numbers above 200 students. Interestingly, the CompTIA A+ training program has a program completion rate of 94%. CompTIA A+ and Network+ certifications were listed as the highest priority programs for improvement for two career coaches via the supplemental survey indicating alignment with the quantitative results. The low credential rate may indicate there may be misalignment between the training and the industry certification examination. For example, if a student enrolls in a training program and successfully completes the program but then fails the certification examination, it may indicate that they aren't receiving enough training in the classroom or that the classroom training is not aligned with the outcomes of the certification examination.

Other factors impacting the credential attainment rates may be occurring, such as students not attempting the examination, students failing the examination, or students not reporting evidence of the credential back to the college. Unfortunately, CompTIA (third-party awarding entity) does not report nationwide average pass rates for this credential examination. If nationwide rates were available a comparison between credential attainment rates for CompTIA programs and nationwide rates could be made which would help Further investigation into programs with vastly different completion and credential attainment rates is recommended. Notably, the training program with the

highest enrollment, Commercial Driver's License, has a higher than average credential attainment rate at 81%.

The notable difference in credential attainment rates is likely due to several factors. First, the pay-for-performance program does not require that a student attempt the credential. Students may be entering the program, completing the training, and never attempting the credential examination. Currently, there is not available data on testing attempts from third-party awarding entities provided to the educational stakeholders.

Second, the only financial responsibility in the pay-for-performance program is tied to training program completion, not credential attainment. This means that a student only needs to successfully complete the training program to ensure that they do not owe any money back to the college. If a student chooses not to attempt the credential, attempts the examination and fails, or attains the credential but does not report it back to the college, there is no repercussion to the student. Additionally, students may not need the industry credential to gain employment. If an employer is willing to hire a student without the third party awarded credential, the incentive to the student to attain the credential is lowered.

Third, training programs are not required to provide testing preparation. Thus, if training courses are not aligned enough with the credentialing examination for students to be able to pass, they are likely to fail the exam without additional individual preparation.

Last, credentialing examinations do not have to be embedded into the training program. Students complete their training and then need to attempt the credentialing examination on their own. Although they are provided a voucher by the college that covers the cost of the examination, students may not take the credential exam due to

barriers outlined in the supplemental survey (e.g., lack of transportation). Eliminating some of the barriers to credential attainment may help in increasing attempts and pass rates.

Research Question 3

A student profile was created to understand the demographics of students enrolling in the grant program. Previous research indicated that students enrolled in noncredit community college education often have demographic profiles that differ from their more traditional four-year public university counterparts. Students enrolling in noncredit community college education tend to be older than students enrolling in four-year public universities. Additionally, students enrolling in community college are more likely to be first-generation and have multiple dependents. A demographic overview of students enrolled in the grant program showed a profile distinct from the traditional 4-year public university student with a median age of 33 years. This is similar to nationwide reported data on students enrolled in noncredit community college education (Davaasambuu, Cinelli, D'Allesandro, Hamid, & Audant, 2018). Interestingly, males make up 60% of enrollment in the training program associated with the grant whereas females typically enroll at higher rates among 4-year public educational institutions (NCES, 2015).

Half of the students enrolled in the program indicated their race as White and close to one-third of students indicated their race as Black, with over 11% of students not reporting any race upon enrollment. This demographic profile of students may assist with identifying underrepresented groups in the enrolled population. Marketing and outreach could use this data to increase enrollment for groups with low enrollment numbers that

are living in the geographic region of one of the community colleges with training programs funded by the grant program. For example, if a community college is only seeing enrollments for a specific age group for a training program, outreach efforts could be developed to market to other age groups that are represented in the regional community where the community college is based

Additionally, understanding that the demographic makeup of the students enrolling in a program may help align barriers to credential attainment or training program completion to specific groups. For example, if female students enrolling in healthcare programs experience an inability to find consistent childcare or lack of transportation, supportive services could be funded at a college to help provide assistance to these students to help lessen the effects of these barriers.

Research Question 4

An investigation of training program completion rates by program and the three demographic variables (age, race, and gender) helped identify demographic variables that may be related to specific training program performance. Recall, overall training program completion rates were quite high across programs, but programs with lower than average rates were identified.

In general, completion rates were comparable across gender except for a few notable programs. For example, Emergency Medical Technician had similar enrollment numbers for males and females, but males had a 14% higher completion rate. In one of the programs with the lowest overall training program completion rate, Phlebotomy Technician (PBT), males had a completion rate 17% lower than females. In a field predominantly filled by males, Manufacturing Specialist, females completed at a rate

20% lower than males indicating that there may be a barrier to completion for females who enroll in similar programs. Females may be experiencing barriers in male dominated fields including isolation due to low representation of their gender group (Betz & Hackett, 1981; Haring & Beyard-Tyler, 1984; Roche, 2006). As the program continues and more enrollment data is available, further investigation of training program completion rates should be done to examine differences across gender in performance. Additionally, focus groups and interviews with students who are in enrolled in programs where they are the nontraditional gender (e.g., males in healthcare; females in manufacturing) may help to identify barriers to credential attainment for those groups (Grabowski, Rush, Ragen, Fayard, Watkins-Lewis, 2016).

Similar to the gender demographic analyses, examination of training program completion rates by race did not result in a considerable number of notable differences. However, there were programs where differences occurred. For example, in the Certified Billing and Coding Specialist program, Black students had a 10% lower completion rate when compared with all other reported race groups. This difference may be due to previously stated barriers to completion such as lack of transportation, financial issues, or insufficient remedial assistance in the program for students who need assistance. Greene, Marti, and McClenney (2008) note, "Black students exhibit greater academic risk than their White counterparts" (p. 513). More specifically Black students are often first-generation college students, more unlikely to be prepared to enter post-secondary education, more dependent on educational financial assistance to enter college, more likely to have family responsibilities that impact performance, and more likely to experience "institutional and cultural barriers" (Greene, Marti, & McClenney, p. 513).

Community colleges will want to acknowledge barriers that disproportionately affect Black students enrolling in training programs and implement supportive services that align with student needs.

For the examination of the age demographic, results were reported by age category. With high overall completion rates, variation as limited but did occur. It appears that for some programs (e.g., HVAC – Level 1), younger students were not completing at the same rate as their older counterparts, with 16 to 25-year-old students completing 78% of the time and students in all other age categories completing at rates 95% and above. These results indicate that age and experience might play a role in successfully completing some of the training programs (Bettinger & Long (2005); Kenner & Weinerman, 2011). This pattern is also seen in other programs (e.g., Emergency Medical Technician). As outlined in chapter three, nontraditional students typically have barriers to success in general, however students older than 25 years enrolled in these programs may have more experience in educational settings (e.g., taking notes, completing assignments), and may have been exposed to information in the related training program earlier in life. Further investigation of differences among completion for age groups should be completed to monitor performance differences.

Research Question 5

Training program credential attainment rates were calculated and examined by program and by three demographic variables (age, race, and gender). Variations in credential attainment by demographic variables across programs was notable, especially for gender and race. Recall, the overall credential attainment rate for females was 13%

lower than for males. In the program with the highest number of enrollments, Commercial Driver's License, females had only a 3% lower credential attainment rate.

Lower credential attainment rates for females may be due to difficulty of the credentialing examinations in healthcare fields where women are the majority gender group (e.g., 60% pass rate for Certified Medical Assistant examination nationwide). Programs aligned with skilled trades and manufacturing often had lower credential attainment rates for females when compared with males. Similarly, programs aligned with the healthcare field often had higher credential attainment rates for females when compared with males (e.g., Certified Nurse Aide, Males 5% lower). Because males are considered nontraditional in the majority of healthcare fields, they may be experiencing barriers to success due to being in the minority gender group in the field (Smith, 2006; McDowell, 2015). A similar result was found for women enrolling in typically male dominated fields such as skilled trades (e.g., manufacturing).

The exploratory examination of credential attainment rates by program and race shed light on some of the more considerable differences especially when comparing credential attainment rates of Black students with other race groups. Black students comprise the second largest enrollment group in the grant but saw notably lower credential attainment rates when compared to White students. For example, in the Pharmacy Technician program, White students credentialed at 72%, whereas Black students only attained their credential at a rate of 44%. Differences in attainment rates like this occurred in several other programs including Commercial Driver's License, Certified Billing and Coding Specialist, Certified Nurse Aide, and Clinical Medical Assistant. Black students may be impacted more by barriers to credential attainment and

experiencing lower credential attainment rates (Libassi, 2018; Sue et. al., 2008). In addition, Black students may be experiencing implicit racial biases while enrolled in the training program that could be impacting their success (Gaddis, 2014). These students may need increased supportive services and educational remediation to provide equal opportunity for credential attainment (Libassi, 2018; Melguizo, 2010). The credential examinations themselves may also contain bias that disproportionately affects Black students (Jencks & Phillips, 1998). The differences in credential attainment rate are notable and should be examined further.

The examination of credential attainment rates by program and age showed differences in programs; however, these age differences were not as considerable as those found for race and gender differences. Similar to completion rate differences in age groups, there was some increase in credentialing among older groups for programs like Certified Nurse Aide and Clinical Medical Assistant. In some programs, low attainment rates occurred for the last two age categories, though these groups had low enrollment numbers. In programs with high enrollment numbers, including Commercial Driver's License, tended to have more consistent rates across groups.

Limitations

For this exploratory study, several limitations were documented. First, enrollment numbers were not large enough to examine programs by additional variables such as college indicators and individual classroom indicators, in some cases, limiting the value of the reported information. While this study was aimed at gathering information, the utility of the data should be considered prior to utilization for programmatic decision-making. Additional analyses should be conducted as the grant program continues and

more enrollment data are available. In addition, an indicator to identify specific community colleges was not available for this specific study, limiting the data analyses by only providing training program completion and credential attainment rates for programs across multiple colleges. If specific programs and procedures are to be reviewed to establish program improvement protocol in the future, examinations will need to be conducted at the individual community college level by program and demographic groups.

As previously cited literature noted, limited data is available for noncredit educational data and limits the foundational knowledge we have around noncredit community college education (Xu & Ran, 2015). The data used in this study was a snapshot in time for a program enrolling new students each day. Results provided in this study are considered exploratory in nature and should only provide preliminary insights into the completion and credential attainment rates aligned with noncredit training and high-demand industry credentials.

A few additional notes should be considered about the data and grant program. Because students are not eligible to be considered in the rates until after 30 days for program completion and 120 days for credential attainment, delays in reporting rates will occur. In addition, if it is discovered that students need more than 120 days to attain their credential, rates may be calculated too early and be reported as lower than the actual rates. In many of the programs, students are not required to attempt to take the credentialing examination as part of the course requirement possibly lowering examination attempts. Additionally, students may be able to enter employment prior to receiving their industry credential removing the need to attain the credential. High-

demand industry credential data is reported as pass only, information regarding attempts or failures is not available. Students are also not required to provide evidence of credential attainment, so some rates may be low due to students not reporting their credential back to the college (in some cases the colleges have data agreements with third-party awarding entities to verify attainments).

Conclusions and Future Research

Short-term noncredit programs are becoming an increasingly popular educational option for students (Davaasambuu, et. al., 2018; Xu & Ran, 2015). Additionally, limited funding is available for enrolling in these noncredit training programs (Kasper, 2002; Xu & Ran, 2015). Examination of short-term and long-term performance of students in these programs is essential to understanding the utility and importance of noncredit training in education. Although data are limited for noncredit enrollments in general, even more limited is the availability of performance and outcome data related to short-term noncredit training with subsidized training costs via a pay-for-performance program. The preliminary findings in this study indicate that students enrolled in the pay-for-performance grant program aligning short-term noncredit training with high-demand industry credentials have varied training program and credential attainment rates by the three examined demographic variables (age, race, and gender). Differences in performance may be due to several factors including but not limited to financial issues, lack of transportation, lack of childcare, insufficient training, misalignment between training and the credential examination, or lack of resources at the college as indicated by the supplemental survey. Supplemental findings from the survey sent to career coaches

indicated that these issues causing barriers to success create a need for additional resources at their colleges.

Future researchers should continue to examine training program completion and credential attainment rates to identify areas where students are having trouble succeeding. Because barriers to success (training program completion and credential attainment) may exist for specific demographic groups, future research should examine rates across demographic groups and individual college programs. Examinations of rates should be occurring at the college and classroom level to identify specific areas of concern or needed improvement. Results should be paired with the implementation fidelity audit data captured by educational stakeholders to identify areas in which colleges are not adhering to the established program. The results from the five research questions paired with the supplemental survey responses indicate that barriers are occurring at the classroom, credential examination, and reporting level. More specifically, students need more resources in the classroom to successfully complete their programs and the aligned industry credential. Students need more preparation aligned with the credentialing examination and support for attempting their certification examination. The program needs additional information on examination attempts to better understand credential attainment rates across credentials.

In addition, a comparison of completion and credential attainment rates with students in similar training who do not receive funding aligned to a pay-for-performance grant may help stakeholders understand the impact of such funding. Including other program outcomes into research would provide a more holistic overview of student success including analyzing wage and employment outcomes for students who completed

programs. Importantly, an examination of outcomes at the individual community college and classroom level may provide beneficial data for stakeholders to better understand training program completion rates and credential attainment rates. Students may not be receiving the same quality of training across colleges and analyses at this level would help further identify concerns with program implementation.

Because students enrolled in the grant program are only required to pay back one-third of tuition to the college if they do not complete the training program, a pilot program requiring students to pay back the last one-third of tuition if they do not successfully attain their aligned high-demand industry credential would allow stakeholders to investigate the impact of the pay-for-performance model at the industry credential level. Last, collection of qualitative data from individual colleges, combined with quantitative performance data, would allow for a more holistic evaluation of the grant program.

Overall Recommendations

<u>Stakeholders should</u>

- Identify which of the training programs are aligned with industry credentials that are required to enter employment to help isolate reasons why students may not be attempting the credential examination.

- Gather qualitative data from students at the beginning and end of each training program about their intent to attempt the credential and intent reasons for enrolling in the program (e.g. to gain employment or for personal interest).

- Obtain data on the number of attempts students make to pass the credentialing exam.

- Examine the alignment of programs' curricula with the credentialing examinations.

- Examine whether programs have any test preparation embedded into the curriculum for a training program.

References

American Association of Community Colleges. (n.d.). History of Community Colleges. Retrieved September 1, 2018, from https://www.aacc.nche.edu/research-trends/history-of-community-colleges/

Bailey, T., Jenkins, D., & Leinbach, T. (2005). What We Know about Community College Low-Income and Minority Student Outcomes: Descriptive Statistics from National Surveys. *Community College Research Center*.

Bureau of Labor Statistics (https://www.bls.gov/oes/current/oes533032.htm)

Butterworth, C. (2016, January 14) Virginia's Community Colleges to Play Significant Role in Governor's Budget Proposal [Blog Post] Retrieved from http://www.vccs.edu/vccsblog_post/virginias-community-colleges-to-play-significant-role-in-governors-budget-proposal/

Burrowes, J., Young, A., Restuccia, D., Fuller, J., & Raman, M. (2014). Bridge the gap: Rebuilding America's middle skills. Boston, MA: *Accenture, Burning Glass, and Harvard Business School*. http://www. hbs. edu/competitiveness/Documents/bridge-the-gap. pdf.

Beach, J. M. (2012). *Gateway to opportunity?: A history of the community college in the United States*. Stylus Publishing, LLC.

Bettinger, E. P., & Long, B. T. (2005). Remediation at the community college: Student participation and outcomes. *New directions for community colleges*, *2005*(129), 17-26.

Betz, N. E., & Hackett, G. (1981). The relationship of career-related self-efficacy

    expectations to perceived career options in college women and men. *Journal of*

    counseling psychology, *28*(5), 399.

Boggs, G. R. (2010). Democracy's colleges: The evolution of the community college in

    America. *Prepared for the White House Summit on Community Colleges,*

    Washington, DC: American Association of Community Colleges.

Bragg, D.D., (2001) Community College Access, Mission, and Outcomes: Considering

    Intriguing Intersections and Challenges, Peabody Journal of Education, 76:1, 93-

    116, DOI: 10.1207/S15327930PJE7601_06

Breneman, D. W., & Pusser, B. (2002). Nontraditional learners in postsecondary

    education: emerging pathways to access and success. *Charlottesville: University*

    of Virginia, Curry School of Education.

Carnevale, A. P., & Desrochers, D. M. (2001). Help Wanted... Credentials Required:

    Community Colleges in the Knowledge Economy.

Carnevale, A., Strohl, J., & Ridley, N. (2017). Good jobs that pay without a BA: A state

    by state analysis. Georgetown University Center on Education and the Workforce.

Carnevale, A. P., Jayasundara, T., & Hanson, A. R. (2013). Career and technical

    education: Five ways that pay along the way to the BA.

Carroll, C., Patterson, M., Wood, S., Booth, A., Rick, J., & Balain, S. (2007). A

    conceptual framework for implementation fidelity. *Implementation science*, 2(1),

    40.

Cohen, A. M., & Brawer, F. B. (2003). *The American community college*. John Wiley &

    Sons.

College Costs: FAQs https://bigfuture.collegeboard.org/pay-for-college/college-costs/college-costs-faqs

Combs, J. L. (2012). The role of noncredit continuing education as a workforce revitalization partner.

Dadgar, M., & Trimble, M. J. (2015). Labor market returns to sub-baccalaureate credentials: How much does a community college degree or certificate pay?. *Educational Evaluation and Policy Analysis*, *37*(4), 399-418.

D'Amico, M. M. (2017). Noncredit Education: Specialized Programs to Meet Local Needs. *New Directions for Community Colleges*, *2017*(180), 57-66.

D'Amico, M. M., Morgan, G. B., Robertson, S., & Houchins, C. (2014). An exploration of noncredit community college enrollment. *The Journal of Continuing Higher Education*, *62*(3), 152-162.

D'Amico, M. M., Morgan, G. B., Katsinas, S. G., Adair, J. L., & Miller, M. T. (2017). A national analysis of noncredit Community College education: Enrollment, funding, accountability, and contextual issues. *Community College Journal of Research and Practice*, *41*(4-5), 288-302.

Davaasambuu, S., Cinelli, J., D'Alessandro, M., Hamid, P., & Audant, B. (2018). Noncredit Program Data Collection at Community Colleges: A Scoping Review. *Community College Journal of Research and Practice*, 1-15.

Davis, J. L. (2008). Community colleges: The preferred provider of career and technology education and training. *Community College Journal of Research and Practice*, *32*(8), 568-572.

Dougherty, K. J., & Townsend, B. K. (2006). Community college missions: A theoretical and historical perspective. *New Directions for Community Colleges*, *2006*(136), 5-13.

Dowd, A. C. (2003). From access to outcome equity: Revitalizing the democratic mission of the community college. *The ANNALS of the American Academy of Political and Social Science*, 586(1), 92-119.

Drummond, M. (2002). History of community colleges. In *Learning to Serve* (pp. 185-197). Springer, Boston, MA.

Emsi, & Wright, J. (2013, December 12). Analyzing Local Skills Gaps As Part of JPMorgan Chase's 'New Skills at Work' Initiative. Retrieved September 1, 2018, from https://www.economicmodeling.com/2013/12/12/analyzing-local-skills-gaps-as-part-of-jpmorgan-chases-new-skills-at-work-initiative/

Eppler, M. A., Carsen-Plentl, C., & Harju, B. L. (2000). Achievement goals, failure attributions, and academic performance in nontraditional and traditional college students. *Journal of Social Behavior and Personality*, *15*(3), 353.

Ewert, S., & Kominski, R. (2014). Measuring alternative educational credentials: 2012. *Household Economic Studies*, P70-138.

Fong, J., Janzow, P., & Peck, K. (2016). Demographic shifts in educational demand and the rise of alternative credentials. *Retrieved September, 10, 2018*.

Fouts, S., & Mallory, J. (2010) The Credit/Non-credit Divide: Breaking Down the Wall, The Journal of Continuing Higher Education, 58:3, 180-183, DOI:10.1080/07377363.2010.491775

Flynn, W. J. (2002). More Than a Matter of Degree--Credentialing, Certification and Community Colleges.

Gaddis, S. M. (2014). Discrimination in the credential society: An audit study of race and college selectivity in the labor market. *Social Forces*, *93*(4), 1451-1479.

Georgetown University Center on Education and the Workforce, *Good Jobs That Pay without a BA: A State-by-State Analysis*, 2017

Gerstner, J. J., & Finney, S. J. (2013). Measuring the Implementation Fidelity of Student Affairs Programs: A Critical Component of the Outcomes Assessment Cycle. *Research & Practice in Assessment*, 8, 15-28.

Giani, M. & Fox, H. (2017) Do stackable credentials reinforce stratification or promote upward mobility? An analysis of health professions pathways reform in a community college consortium, *Journal of Vocational Education & Training*, 69:1, 100-122, DOI: 10.1080/13636820.2016.1238837

Goldrick-Rab, S. (2010). Challenges and opportunities for improving community college student success. *Review of Educational Research*, 80(3), 437-469.

Goncalves, S. A., & Trunk, D. (2014). Obstacles to Success for the Nontraditional Student in Higher Education. *Psi Chi Journal of Psychological Research, 19*(4).

Grabowski, C., Rush, M., Ragen, K., Fayard, V., & Watkins-Lewis, K. (2016). Today's non-traditional student: challenges to academic success and degree completion. *Inquiries Journal*, *8*(03).

Grubb, W. N. (1997). The returns to education in the sub-baccalaureate labor market, 1984–1990. *Economics of Education Review*, *16*(3), 231-245.

Grubb, W. N., & Worthen, H. (1999). *Honored but invisible: An inside look at teaching in community colleges*. Psychology Press.

Grubb, W. N., Badway, N., & Bell, D. (2003). Community colleges and the equity agenda: The potential of noncredit education. *The Annals of the American Academy of Political and Social Science*, *586*(1), 218-240.

Grubb, W. N., Badway, N., Bell, D., Bragg, D., & Russman, M. (1997). Workforce, Economic, and Community Development. The Changing Landscape of the Entrepreneurial Community College.

Hachey, A., Conway, K., & Wladis, C. (2013). Community colleges and underappreciated assets: Using institutional data to promote success in online learning. *Online Journal of Distance Learning Administration*, *16*(1), 1-18.

Haring, M. J., & Beyard-Tyler, K. C. (1984). Counseling with women: The challenge of nontraditional careers. *The School Counselor*, *31*(4), 301-309.

Hoachlander, G., Sikora, A. C., & Horn, L. (2003). Community College Students: Goals, Academic Preparation, and Outcomes. Postsecondary Education Descriptive Analysis Reports.

Hoachlander, G., Sikora, A. C., Horn, L., & Carroll, C. D. (2003). Community college students. *Education Statistics Quarterly*, *5*(2), 121-128.

Jacobs, J. (2015). Promising practices of community colleges in the new age of workforce development. *Transforming US workforce development policies for the 21st century*, 305.

Jacobs, J., & Dougherty, K. J. (2006). The uncertain future of the community college

 workforce development mission. New Directions for Community Colleges,

 2006(136), 53–62. https://doi.org/10.1002/cc.259

Jeffreys, M. R. (2007). Nontraditional students' perceptions of variables influencing

 retention: A multisite study. *Nurse Educator*, *32*(4), 161-167.

Jencks, C., & Phillips, M. (1998). The black-white test scope gap: Why it persists and

 what can be done. *The Brookings Review*, *16*(2), 24-27.

Joint Economic Committee Democrats (US Senator Martin Heinrich Ranking Member)

 Expanding Opportunities Through Middle-Skills Education (January, 2019)

Joshua Wright, VP, Economic and Workforce Development, Emsi. (2017, May 22).

 Thinking Local: How to Find Manufacturing Talent - Area Development.

 Retrieved from http://www.areadevelopment.com/economic-analysis/Q2-

 2017/manufacturing-skills-gaps-and-talent-availability-best-diagnosed-

 locally.shtml

Juszkiewicz, J. (2017). Trends in Community College Enrollment and Completion Data,

 2017.Washington, DC: American Association of Community Colleges.

Kenner, C., & Weinerman, J. (2011). Adult learning theory: Applications to non-

 traditional college students. *Journal of College Reading and Learning*, *41*(2), 87-

 96.

Kane, T. J., & Rouse, C. E. (1999). The community college: Educating students at the

 margin between college and work. *Journal of economic Perspectives*, *13*(1), 63-

 84.

Kasper, H. T. "The Changing Role of the Community College." *Occupational Outlook Quarterly*, Winter 2002, pp. 1–8.

Kim, K. A. (2002). ERIC review: Exploring the meaning of" nontraditional" at the community college. *Community College Review*, *30*(1), 74-89.

Kochan, T., Finegold, D., & Osterman, P. (2012). Who can fix the "middle-skills" gap. *Harvard Business Review*, 90(12), 81-90.

Laboissiere, M., & Mourshed, M. (n.d.). Closing the skills gap: Creating workforce-development programs that work for everyone. Retrieved from

https://www.mckinsey.com/industries/social-sector/our-insights/closing-the-skills-gap-creating-workforce-development-programs-that-work-for-everyone

Lastica, J., & O'Donnell, C. (2007, April). Considering the role of fidelity of implementation in science education research: Fidelity as teacher and student adherence to structure. *In Annual Meeting of the American Educational Research Association, Chicago, IL.*

Leventoff, J. (2018). Measuring non-degree credential attainment. *Workforce Data Quality Campaign, National Skills Coalition*.

Marcotte, D. E., Bailey, T., Borkoski, C., & Kienzl, G. S. (2005). The returns of a community college education: Evidence from the National Education Longitudinal Survey. *Educational Evaluation and Policy Analysis*, *27*(2), 157-175.

McDowell, J. (2015). Masculinity and non-traditional occupations: Men's talk in women's work. *Gender, Work & Organization*, *22*(3), 273-291.

Melguizo, T. (2010). Are students of color more likely to graduate from college if they attend more selective institutions? Evidence from a cohort of recipients and nonrecipients of the Gates Millennium Scholarship Program. *Educational Evaluation and Policy Analysis*, *32*(2), 230-248.

Mendoza, P., Basham, M. J., Campbell, D. F., O'Daniels, T. M., Malcolm, Z., Felton, S., & Douma, D. (2009). Missions, values, and "flying monkeys": Critical issues for community colleges today and in 2019. *Community College Journal of Research and Practice,* 33(11), 866-882.

Milam, J. (2005). The role of noncredit courses in serving nontraditional learners. *New Directions for Higher Education*, 2005(129), 55-68.

National Skills Coalition (NSC) Middle Skill Fact Sheet (2017)

https://www.nationalskillscoalition.org/resources/publications/2017-middle-skills-fact-sheets/file/United-States-MiddleSkills.pdf

Nontraditional Undergraduates / Definitions and Data

https://nces.ed.gov/pubs/web/97578e.asp

Phillippe, K. A., & Sullivan, L. G. (2005). *National profile of community colleges: Trends & statistics.* Amer. Assn. of Community Col.

Ridley, N. (2018). *Forging Pathways to Good Jobs Without a BA: Assessing the Value of Sub-Baccalaureate Credentials [Interview]*

Roche, T. (2006) "Women in non-traditional careers". Graduate Theses and Dissertations. http://scholarcommons.usf.edu/etd/2676

Ryder, A. J., & Hagedorn, L. S. (2012). GED and other noncredit courses: The other side of the community college. New Directions for Institutional Research, 2012(153), 21–31. https://doi.org/10.1002/ir.20004

Shannon, H. and Smith, R. (2006). A case for the community college's open access mission. *New Directions for Community Colleges*, 2006(136), pp.15-21.

Soares, L. (2010). Community college and industry partnerships. *Center for American Progress*, 7-15.

Smith, J. S. (2006). Exploring the challenges for nontraditional male students transitioning into a nursing program. *Journal of Nursing Education*, *45*(7).

Stamper, R., Christopher, A., Babb, J., & Butterworth, C. (2017). Not Everyone Needs a Four-Year Degree. *Virginia Journal of Education*, 9-12.

Sue, D. W., Nadal, K. L., Capodilupo, C. M., Lin, A. I., Torino, G. C., & Rivera, D. P. (2008). Racial microaggressions against Black Americans: Implications for counseling. *Journal of Counseling & Development*, *86*(3), 330-338.

Taniguchi, H., & Kaufman, G. (2005). Degree completion among nontraditional college students. *Social Science Quarterly*, *86*(4), 912-927.

U.S. Government Accountability Office (GAO) Workforce Development: Community Colleges and One-Stop Centers Collaborate to Meet 21st Century Workforce Needs (Report to Congressional Requesters, 2008).

Van Noy, M., & Jacobs, J. (2009). The outlook for noncredit workforce education. *New Directions for Community Colleges,* 2009(146), 87-94.

Van Noy, M., Jacobs, J., Korey, S., Bailey, T., & Hughes, K.L. (2008). *Noncredit enrollment in workforce education: State policies and community college*

practices [Report]. Washington, DC: American Association of Community

Colleges and Community College Research Center. Available from the AACC

Web site: http://www.aacc.nche.edu/noncreditenroll.

Vaughan, G. B. (2006). *The community college story*. Amer. Assn. of Community Col.

Voorhees, R. A., & Milam, J. H. (2005). *The hidden college: Noncredit education in the*
United States. Curry School of Education, University of Virginia.

Xu, Di and Xiaotao Ran. 2015. "Noncredit Education in Community College: Students,

Course Enrollments, and Academic Outcomes." CCRC Working Paper No. 84,

September 2015. Community College Research Center, Teachers College,

Columbia University.

Xu, D., & Trimble, M. (2016). What About Certificates? Evidence on the Labor Market

Returns to Nondegree Community College Awards in Two States. *Educational*
Evaluation and Policy Analysis, 38(2), 272-292. doi:10.3102/0162373715617827

https://swvawdb.org/businesses/skills-gap-study/

Appendix A

Barriers to Credential Attainment Survey

Students completing training may or may not attain their credential. For use in a research project, I am examining why this might be the case. From the list below, please indicate whether each barrier is a Significant Barrier, Moderate Barrier, or Not a Barrier to credential attainment at your college.

Significant Barrier	Moderate Barrier	Not a Barrier to Credential Attainment
_____ Financial Issues	_____ Financial Issues	_____ Financial Issues
_____ Lack of Available Transportation	_____ Lack of Available Transportation	_____ Lack of Available Transportation
_____ Health Issues (Individual or Family Member)	_____ Health Issues (Individual or Family Member)	_____ Health Issues (Individual or Family Member)
_____ Unprepared for Training - Failed Examination	_____ Unprepared for Training - Failed Examination	_____ Unprepared for Training - Failed Examination
_____ Not Attempting Credential Examination	_____ Not Attempting Credential Examination	_____ Not Attempting Credential Examination
_____ Lack of Time Due to Other Commitments	_____ Lack of Time Due to Other Commitments	_____ Lack of Time Due to Other Commitments
_____ Difficulty of Credentialing Examination	_____ Difficulty of Credentialing Examination	_____ Difficulty of Credentialing Examination
_____ Other (Please Specify):	_____ Other (Please Specify):	_____ Other (Please Specify):

(1) You may indicate additional reasons by specifying them under 'Other' - then drag and place them in the appropriate category. You can re-order the barriers once placed in a category, please order them from most significant to least within each category.

(2) Please select the training program offered by your college that you believe has the lowest credential attainment rate.

(3) Please indicate the most significant barrier to credential attainment for students in this program?

- Financial Issues
- Lack of Available Transportation
- Health Issues (Student or Family Member)
- Unprepared for Training - Failed Examination
- Not Attempting Credential Examination
- Lack of Time Due to Other Commitments
- Difficulty of Credentialing
- Other (please specify)

(4) What resource(s) would your college need to increase credential attainment in this program? Select all that apply.

- Additional Supportive Services for Students (e.g. transportation vouchers, financial support for students)
- Funding for Improved Curriculum
- Additional Faculty
- Additional Staff
- Funding for Classroom Resources (e.g. training equipment, learning materials)
- Other (please specify):

(5) Please select the training program offered by your college that is the highest priority for increasing credential attainment?

(6) Please indicate the most significant barrier to credential attainment for students in this program?

- Financial Issues
- Lack of Available Transportation
- Health Issues (Student or Family Member)
- Unprepared for Training - Failed Examination
- Not Attempting Credential Examination
- Lack of Time Due to Other Commitments
- Difficulty of Credentialing Examination
- Other (please specify)

(7) What resource(s) would your college need to increase credential attainment in this program? Select all that apply.

- Additional Supportive Services for Students (e.g. transportation vouchers, financial support for students)
- Funding for Improved Curriculum
- Additional Faculty
- Additional Staff
- Funding for Classroom Resources (e.g. training equipment, learning materials)
- Other (please specify):

(8) Is there any other information you would like to provide regarding credential attainment at your college or in general?

Appendix B

Qualitative Responses (Survey Questions 1, 4, and 6)
Q1. Please indicate whether each barrier is a Significant Barrier, Moderate Barrier, or Not a Barrier to credential attainment at your college – Other:
Lack of reliable internet
Testing Anxiety
Marketing what is available
Fear of failing
Self-Esteem - overcoming the doubt they can do it!
Child care
succumbing to family & peer pressure to revert to old habits when successful change occurs
Q4. What resource(s) would your college need to increase credential attainment in this program?
Funding to purchase vouchers to retest
Tutoring
Clinical Counseling Group support sessions
Q6. Please indicate the most significant barrier to credential attainment for students in this program.
Students wanting to stop after a certain point
Q7. Please indicate the most significant barrier to credential attainment for students in this program.
Funding to purchase vouchers to retest
Shorter timeframe between training and testing

Appendix C

Qualitative Responses (Survey Question 8)
Also, some students have testing anxiety and will not pursue exam due to fear of failing.
I would like to see more resources to give to students to have after the classroom time is over to help them study on their own for the certification tests
This is the highest priority to management because it brings in the most money out of all credentials and has the highest number of people enroll throughout the year. Even though the CDL company has staff, there is a tremendous amount of paperwork for the career coaches and this needs attention.
It is imperative that Career Coaches understand the barriers that students face, especially in the underserved population. Often this group is not prepared intellectually, technically, nor in some cases emotionally. I've seen students who are not able to efficiently type, who have deficient computer skills, placed in programs that actually set them up for failure, simply because they are not able to navigate the system.

Glossary of Terms

Community college: *a college established to serve a specific community or region that is typically supported in part by local government and federal funds.*

High-demand credential: *an industry credential, certification, or licensure aligned with a high-demand occupation in a specific region*

High-demand occupation: *an occupation that is associated with job growth and a high-level of employment opportunities in a specific region*

High-demand training program: *a training program aligned with a high-demand occupation in a specific region*

Industry license, credential or certification: *A credential awarded by a certification body (not a school or government agency) based on individual demonstrating, through an examination process, a level of competency in a specific subject area*

Middle skill job: *any job that requires education beyond high school, but not a four-year degree*

Pay-for-performance program: *type of grant funding that requires a student to successfully complete their training or earn their industry credential to receive state funding for their tuition*

Short-term training program: *any noncredit training program lasting less than 20 weeks*

Workforce Credentials Grant program: *a grant program implemented July 1st, 2016 with a pay-for-performance model for funding noncredit workforce training that leads to a credential in a high-demand occupation*

Table 1

Completion Rates by Training Program

Training Program	Successful Completions	Eligible Enrollments	Completion Rate
2-Stroke Engine Repair Certification	38	40	95%
4-Stroke Engine Repair Certification	34	35	97%
Advanced Cardiovascular Life Support	9	9	100%
Advanced Customer Service and Sales	18	18	100%
Advanced Emergency Medical Technician	6	7	86%
Air Conditioning and Electrical	4	4	100%
Asphalt - Slurry Surfacing Certification	55	55	100%
Backflow Prevention Device Certification	48	49	98%
Basic Hydraulic Systems Certification	5	5	100%
Carpentry Level 1	9	10	90%
Carpentry Level 2	7	8	88%
Carpentry Level 4	1	1	100%
Apartment Maintenance Technicians	2	2	100%
Certified Billing and Coding Specialist	184	212	87%
Certified Ethical Hacker	45	45	100%
Certified Information Systems Security	15	15	100%
Certified Logistics Associate	74	75	99%
Certified Logistics Technician	58	59	98%
Certified Massage Therapist	6	10	60%
Certified Medical Administrative Assistant	87	97	90%
Certified Nurse Aide	622	657	95%
Certified Production Technician	3	5	60%
Certified Professional Coder	114	120	95%
Certified Welder	107	108	99%
Cisco Certified Entry Networking Technician	55	60	92%
Cisco Certified Network Associate	21	21	100%

Training Program	Successful Completions	Eligible Enrollments	Completion Rate
Clinical Medical Assistant (HCMA)	64	65	98%
Clinical Medical Assistant (CMAB)	597	631	95%
CNC Milling: Operations	32	38	84%
CNC Milling: Programming Setup and Operations	1	1	100%
CNC Turning: Operations	18	22	82%
CNC Turning: Programming	3	3	100%
Commercial Driver's License (CDL)	2,796	3,019	93%
CompTIA A+ Certification	340	362	94%
CompTIA IT Fundamentals	15	15	100%
CompTIA Network+ Certification	237	248	96%
CompTIA Security+ Certification	265	289	92%
Construction Program Management	21	22	95%
Contractor's License	32	33	97%
Core - Introductory Craft Skills	232	235	99%
Customer Services and Sales Certification	73	73	100%
Documentation & Record Keeping for Inspectors	7	7	100%
Driveline/Hydraulics Certification	6	8	75%
EKG Technician Certification	12	14	86%
Electrical Level 1	63	65	97%
Electrical Level 2	26	30	87%
Electrical Level 3	14	14	100%
Electrical Level 4	10	10	100%
Electrical Systems Certification	17	18	94%
Electrical Tradesman License Renewal	8	8	100%
Emergency Medical Technician (National Registry of EMTs)	32	41	78%
Emergency Medical Technician (EMS)	4	4	100%
EPA Section 608 Technician Certification	12	12	100%
Facilities Maintenance Technician	2	2	100%

Training Program	Successful Completions	Eligible Enrollments	Completion Rate
Flux Core Arc Welding	128	137	93%
Gas Metal Arc Welding	120	132	91%
Gas Tungsten Arc Welding	75	87	86%
Heavy Equipment Operations Level 1	20	22	91%
Heavy Equipment Operations Level 2	1	1	100%
HVAC Level 1	51	57	89%
HVAC Level 2	26	29	90%
HVAC Level 3	13	16	81%
HVAC Level 4	7	7	100%
HVAC Tradesman License Renewal	4	4	100%
Industrial Maintenance Electrical and Instrumentation Level 2	3	3	100%
Industrial Maintenance Electrical and Instrumentation Level 4	6	7	86%
IPC- A-610 Certification	4	4	100%
Job Planning, Benchwork, and Layout Certification	34	39	87%
JSTD-001 Certification	24	24	100%
Machining Level 1: Drill Press Skills	16	16	100%
Mammography Technologist	2	2	100%
Manual Milling Skills and Machining Certification	9	10	90%
Manufacturing Specialist	56	59	95%
Manufacturing Technician 1	372	381	98%
Maritime Certification	5	5	100%
Measurement, Materials, and Safety Certification	53	58	91%
Medical Assistant	41	45	91%
Medical Coding and Bill Specialist (BSBS)	36	41	88%
Medication Aide	71	73	97%
Millwright Level 1	10	10	100%
Millwright Level 2	10	10	100%
Millwright Level 3	8	10	80%

Training Program	Successful Completions	Eligible Enrollments	Completion Rate
Millwright Level 4	8	8	100%
Pharmacy Technician (National Board of Pharmacy)	85	89	96%
Pharmacy Technician (NHA)	39	41	95%
Pharmacy Technician (PTCB)	171	194	88%
Phlebotomy Technician (ASPT)	89	91	98%
Phlebotomy Technician (NCCT)	37	39	95%
Phlebotomy Technician (NHA)	237	251	94%
Phlebotomy Technician (PBT)	48	73	66%
Phlebotomy Technician (PCT)	2	2	100%
Photovoltaic - Entry Level	24	27	89%
Plan Reading for Inspectors	5	6	83%
Plumbing Level 1	23	26	88%
Plumbing Level 2	9	9	100%
Plumbing Level 3	12	13	92%
Plumbing Level 4	3	3	100%
Plumbing Tradesman License	6	6	100%
Power Industry Fundamentals Certification	97	97	100%
Power Line Worker	238	241	99%
Project Management Professional (PMP)	130	130	100%
Registered Medical Assistant	9	12	75%
Remote Pilot Airman Certification	199	201	99%
Roadway Construction & Drainage for Inspectors	54	62	87%
Shielded Metal Arc Welding	485	514	94%
SHRM Certified Professional	46	46	100%
SHRM Senior Certified Professional	13	13	100%
Siemens Mechatronic Systems Certification Level 1	27	28	96%
Site Manger Certification	42	45	93%
Six Sigma Green Belt Certification	66	67	99%

Training Program	Successful Completions	Eligible Enrollments	Completion Rate
Six Sigma Yellow Belt Certification	5	5	100%
Structures & Bridges for Inspectors Certification	77	95	81%
Surface Treatment Certification	57	57	100%
Surveying for Inspectors Certification	61	61	100%
Teaching License	160	181	88%
Turning Operations: Turning Between Centers Certification	5	5	100%
VDOT Asphalt Field Level 1	122	122	100%
VDOT Asphalt Field Level 2	82	82	100%
VDOT Asphalt Plant Level 1	25	25	100%
VDOT Asphalt Plant Level 2	14	14	100%
Welding Level 1	18	19	95%
Welding Level 2	18	19	95%
Work Zone Flagger Certification	173	177	98%
Total	10,792	11,501	94%

Table 2
Credential Attainment Rates by Program

Training Program	Credential Attainments	Eligible Enrollments	Credential Attainment Rate
2-Stroke Engine Repair Certification	15	21	71%
4-Stroke Engine Repair Certification	24	31	77%
Advanced Cardiovascular Life Support	4	4	100%
Advanced Customer Service and Sales	18	18	100%
Asphalt - Slurry Surfacing Certification	7	11	64%
Backflow Prevention Device Certification	20	49	41%
Carpentry Level 1	9	10	90%
Carpentry Level 2	5	6	83%
Carpentry Level 4	1	1	100%
Certified Billing and Coding Specialist (CBCS)	131	186	70%
Certified Ethical Hacker	26	33	79%
Certified Information Systems Security Professional	0	15	0%
Certified Logistics Associate	32	55	58%
Certified Logistics Technician	37	46	80%
Certified Massage Therapist	4	10	40%
Certified Medical Administrative Assistant	69	80	86%
Certified Nurse Aide	271	528	51%
Certified Production Technician	2	5	40%
Certified Professional Coder	12	104	12%
Certified Welder	54	104	52%
Cisco Certified Entry Networking Technician	7	54	13%
Cisco Certified Network Associate	2	21	10%
Clinical Medical Assistant (CMAB)	25	55	45%
Clinical Medical Assistant (HMCA)	376	462	81%
CNC Milling: Operations	27	38	71%
CNC Turning: Operations	7	21	33%

Training Program	Credential Attainments	Eligible Enrollments	Credential Attainment Rate
CNC Turning: Programming	0	2	0%
Commercial Driver's License (CDL)	2,220	2,745	81%
CompTIA A+ Certification	43	300	14%
CompTIA IT Fundamentals	7	10	70%
CompTIA Network+ Certification	29	215	13%
CompTIA Security+ Certification	56	253	22%
Construction Program Management	13	14	93%
Contractor's License	0	26	0%
Core - Introductory Craft Skills	173	190	91%
Customer Services and Sales Certification	39	42	93%
Driveline/Hydraulics Certification	6	8	75%
EKG Technician Certification	0	6	0%
Electrical Level 1	60	65	92%
Electrical Level 2	25	30	83%
Electrical Level 3	14	14	100%
Electrical Level 4	10	10	100%
Electrical Systems Certification	6	7	86%
Electrical Tradesman License Renewal	3	8	38%
Emergency Medical Technician (National Registry of EMTs)	14	29	48%
Emergency Medical Technician (EMS)	2	4	50%
EPA Section 608 Technician Certification	5	5	100%
Facilities Maintenance Technician	0	2	0%
Flux Core Arc Welding	101	134	75%
Gas Metal Arc Welding	50	85	59%
Gas Tungsten Arc Welding	50	82	61%
Heavy Equipment Operations Level 1	20	22	91%
Heavy Equipment Operations Level 2	0	1	0%
HVAC Level 1	39	48	81%

Training Program	Credential Attainments	Eligible Enrollments	Credential Attainment Rate
HVAC Level 2	26	29	90%
HVAC Level 3	13	16	81%
HVAC Level 4	7	7	100%
HVAC Tradesman License Renewal	2	4	50%
Industrial Maintenance Electrical and Instrumentation Level 4	6	7	86%
IPC- A-610 Certification	4	4	100%
Job Planning, Benchwork, and Layout Certification	37	39	95%
JSTD-001 Certification	18	20	90%
Machining Level 1: Drill Press Skills	14	16	88%
Mammography Technologist	0	2	0%
Manual Milling Skills and Machining Certification	3	5	60%
Manufacturing Specialist	35	56	63%
Manufacturing Technician 1	247	349	71%
Measurement, Materials, and Safety Certification	45	48	94%
Medical Assistant	35	45	78%
Medical Coding and Bill Specialist (BSBS)	16	27	59%
Medication Aide	10	42	24%
Millwright Level 1	10	10	100%
Millwright Level 2	10	10	100%
Millwright Level 3	8	10	80%
Pharmacy Technician (National Board of Pharmacy)	20	89	22%
Pharmacy Technician (PTCB)	50	167	30%
Phlebotomy Technician (ASPT)	20	60	33%
Phlebotomy Technician (NCCT)	24	27	89%
Phlebotomy Technician (NHA)	147	201	73%
Phlebotomy Technician (PBT)	10	73	14%
Phlebotomy Technician (PCT)	2	2	100%
Photovoltaic - Entry Level	9	15	60%

Training Program	Credential Attainments	Eligible Enrollments	Credential Attainment Rate
Plumbing Level 1	23	26	88%
Plumbing Level 2	9	9	100%
Plumbing Level 3	12	13	92%
Plumbing Level 4	3	3	100%
Plumbing Tradesman License	2	6	33%
Power Industry Fundamentals Certification	56	56	100%
Power Line Worker	158	169	93%
Project Management Professional (PMP)	37	100	37%
Registered Medical Assistant	7	12	58%
Remote Pilot Airman Certification	127	176	72%
Roadway Construction & Drainage for Inspectors	50	54	93%
Shielded Metal Arc Welding	341	439	78%
SHRM Certified Professional	20	35	57%
SHRM Senior Certified Professional	1	4	25%
Siemens Mechatronic Systems Certification Level 1	16	28	57%
Site Manger Certification	31	34	91%
Six Sigma Green Belt Certification	24	52	46%
Six Sigma Yellow Belt Certification	3	5	60%
Structures & Bridges for Inspectors Certification	57	62	92%
Surface Treatment Certification	10	13	77%
Surveying for Inspectors Certification	54	55	98%
Teaching License	160	181	88%
Turning Operations: Turning Between Centers Certification	3	5	60%
VDOT Asphalt Field Level 1	25	35	71%
VDOT Asphalt Field Level 2	8	14	57%
VDOT Asphalt Plant Level 1	8	12	67%
VDOT Asphalt Plant Level 2	1	2	50%
Welding Level 1	16	17	94%

Training Program	Credential Attainments	Eligible Enrollments	Credential Attainment Rate
Welding Level 2	16	17	94%
Work Zone Flagger Certification	155	165	94%
Total	6,431	9,504	68%

Table 3

Overall Program Enrollment Demographics (Race)

Race	N	Percent
White	5,433	50.1%
Black	3,048	28.1%
Hispanic	509	4.7%
Asian	426	3.9%
American Indian	116	1.1%
Hawaiian	38	0.4%
Unreported/Unspecified	1,271	11.7%

Note.

Table 4

Overall Program Completion Rates by Age Categories

Age Categories	Successful Completions	Eligible Enrollments	Completion Rate
16-25 years	2,841	3,040	93%
26-35 years	3,293	3,521	94%
36-45 years	2,225	2,373	94%
46-55 years	1,589	1,680	95%
56-65 years	740	779	95%
66-75 years	97	101	96%
75-80 years	7	7	100%
Total	10,792	11,501	94%

Table 5

Overall Program Completion Rates by Reported Race

Race	Successful Completions	Eligible Enrollments	Completion Rate
White	5,642	5,976	94%
Black	2,883	3,117	92%
Hispanic	516	540	96%
Asian	423	441	96%
American Indian	134	144	93%
Hawaiian	42	46	91%
Unreported/Unspecified	1,152	1,237	93%
Total	10,792	11,501	94%

Table 6

Overall Program Completion Rates by Gender

Gender	Successful Completions	Eligible Enrollments	Completion Rate
Female	3,551	3,820	93%
Male	7,062	7,494	94%
Unreported	179	187	96%
Total	10,792	11,501	94%

Table 7

Training Program Completion Rate by Program and Age Category

Training Program	16-25 yrs. Rate	26-35 yrs. Rate	36-45 yrs. Rate	46-55 yrs. Rate	56-65 yrs. Rate	66-75 yrs. Rate	76-80 yrs. Rate
2-Stroke Engine Repair Certification	100%	95%	100%	100%	83%	-	-
4-Stroke Engine Repair Certification	100%	100%	100%	100%	80%	-	-
Advanced Cardiovascular Life Support	100%	100%	100%	-	-	-	-
Advanced Customer Service and Sales	100%	100%	100%	100%	100%	-	-
Advanced Emergency Medical Technician	67%	100%	100%	-	-	-	-
Air Conditioning and Electrical	100%	100%	-	100%	100%	-	-
Asphalt- Slurry Surfacing	100%	100%	100%	100%	100%	100%	-
Backflow Prevention Device Certification	100%	100%	92%	100%	100%	-	-
Basic Hydraulic Systems	100%	-	-	-	-	-	-
Billing Coding Specialist (BCBS)	100%	89%	93%	83%	78%	100%	-
Carpentry Level 2	100%	50%	-	100%	-	-	-
Carpentry Level 4	100%	-	-	-	-	-	-
Carpentry Level 1	100%	80%	-	100%	-	-	-
Certificate for Apartment Maintenance Technicians (CAMT)	-	100%	100%	-	-	-	-
Certified Billing and Coding Specialist (CBCS)	80%	74%	93%	92%	92%	-	-
Certified Ethical Hacker (CEH)	100%	100%	100%	100%	100%	-	-
Certified Information Systems Security	-	100%	100%	100%	100%	-	-
Certified Logistics Associate	100%	95%	100%	100%	100%	100%	-
Certified Logistics Technician	100%	95%	100%	100%	100%	100%	-
Certified Massage Therapist	0%	67%	67%	50%	-	100%	-
Certified Medical Administrative Assistant (CMAA)	89%	76%	88%	100%	100%	-	-
Certified Nurse Aide (CNA)	96%	94%	96%	94%	87%	100%	100%
Certified Phlebotomy Technician (NHA)	93%	94%	98%	94%	100%	-	-
Certified Production Technician	100%	0%	0%	100%	100%	-	-
Certified Professional Coder (CPC)	91%	96%	98%	94%	91%	100%	-
Certified Welder (CW)	100%	97%	100%	100%	100%	-	-
CISCO Certified Entry Networking Technician (CCENT)	50%	90%	94%	92%	100%	-	-

Training Program	16-25 yrs. Rate	26-35 yrs. Rate	36-45 yrs. Rate	46-55 yrs. Rate	56-65 yrs. Rate	66-75 yrs. Rate	76-80 yrs. Rate
Cisco Certified Network Associate	-	100%	100%	100%	100%	-	-
Clinical Medical Assistant (HMCA)	92%	96%	95%	99%	100%	67%	-
Clinical Medical Assistant (CMAB)	100%	100%	92%	100%	100%	100%	-
CNC Milling: Operations	100%	69%	86%	100%	100%	-	-
CNC Turning: Operations	100%	60%	67%	100%	100%	-	-
Comm. Driver's License (CDL)	91%	93%	94%	90%	94%	100%	100%
CompTIA A+ Certification	90%	97%	91%	95%	93%	100%	-
CompTIA IT Fundamentals	100%	100%	100%	100%	100%	-	-
CompTIA Network+ Certification	94%	94%	97%	97%	100%	100%	-
CompTIA Security+ Certification	92%	88%	91%	98%	95%	100%	-
Construction Project Management	100%	100%	100%	100%	88%	-	-
Contractor's License	100%	100%	100%	100%	100%	50%	-
Core - Introductory Craft Skills	99%	99%	96%	100%	100%	-	-
Customer Services and Sales Certification	100%	100%	100%	100%	100%	100%	-
Documentation & Record Keeping for Inspectors	-	100%	100%	100%	100%	-	-
Driveline/Hydraulics Certification	-	0%	-	100%	100%	-	-
EKG Technician	100%	100%	100%	100%	-	-	-
EKG Technician	100%	0%	50%	100%	100%	-	-
Electrical - Level 1	100%	91%	100%	100%	100%	-	-
Electrical - Level 2	100%	73%	80%	100%	-	-	-
Electrical - Level 3	100%	100%	100%	100%	-	-	-
Electrical - Level 4	100%	100%	-	100%	-	-	-
Electrical Systems Certification	100%	100%	-	75%	100%	-	-
Electrical Tradesman License Renewal	-	-	100%	100%	100%	-	-
Emergency Medical Technician	68%	89%	100%	100%	100%	100%	-
EPA Section 608 Technician Certification	100%	100%	100%	100%	100%	100%	-
Facilities Maintenance Technician	100%	-	100%	-	-	-	-
Flux Core Arc Welding (FCAW)	96%	86%	100%	92%	100%	-	-
Gas Metal Arc Welding (GMAW)	92%	91%	95%	90%	71%	100%	-
Gas Tungsten Arc Welding (GTAW)	85%	95%	100%	88%	83%	0%	-
Heavy Equipment Operations - Level 1	86%	80%	100%	100%	100%	-	-

Training Program	16-25 yrs. Rate	26-35 yrs. Rate	36-45 yrs. Rate	46-55 yrs. Rate	56-65 yrs. Rate	66-75 yrs. Rate	76-80 yrs. Rate
Heavy Equipment Operations - Level 2	100%	-	-	-	-	-	-
HVAC - Level 1	78%	95%	100%	100%	100%	-	-
HVAC - Level 2	86%	100%	88%	67%	100%	-	-
HVAC - Level 3	50%	83%	83%	100%	-	-	-
HVAC - Level 4	-	100%	100%	100%	-	-	-
HVAC Tradesman License Renewal	-	-	-	-	100%	100%	-
Industrial Maintenance Electrical and Instrumentation Level 2	-	100%	-	100%	-	-	-
Industrial Maintenance Electrical and Instrumentation Level 4	100%	67%	100%	100%	100%	-	-
IPC-A-610 Certification	-	-	100%	100%	-	-	-
Job Planning, Benchwork, and Layout	89%	83%	83%	100%	100%	-	-
JSTD-001 Certification	-	-	100%	100%	100%	100%	-
Level 1 CNC Turning	100%	-	100%	-	-	-	-
Machining Level I: CNC Milling: Programming Setup and Operations	100%	-	-	-	-	-	-
Machining Level I: Drill Press Skills I	100%	100%	100%	100%	100%	-	-
Mammography Technologist	-	100%	100%	-	-	-	-
Manual Milling Skills 1, Machining	100%	100%	100%	-	50%	-	-
Manufacturing Specialist (MS)	93%	100%	94%	86%	100%	-	-
Manufacturing Technician 1 (MT1)	96%	99%	97%	97%	96%	-	-
Maritime Certification	100%	100%	100%	-	-	-	-
Measurement, Materials, and Safety	89%	94%	86%	100%	100%	-	-
Medical Assistant	100%	86%	100%	80%	75%	-	-
Medication Aide	94%	96%	100%	100%	100%	100%	100%
Millwright - Level 1	100%	100%	100%	100%	-	-	-
Millwright - Level 2	100%	100%	100%	100%	-	-	-
Millwright - Level 3	33%	100%	100%	100%	-	-	-
Millwright - Level 4	100%	100%	100%	100%	-	-	-
Pharmacy Technician	93%	90%	83%	92%	94%	100%	-
Phlebotomy Technician (ASPT)	98%	96%	100%	100%	100%	100%	-
Phlebotomy Technician (NCCT)	95%	100%	83%	100%	100%	-	-
Phlebotomy Technician (PBT)	64%	67%	85%	38%	100%	-	-

Training Program	16-25 yrs. Rate	26-35 yrs. Rate	36-45 yrs. Rate	46-55 yrs. Rate	56-65 yrs. Rate	66-75 yrs. Rate	76-80 yrs. Rate
Phlebotomy Technician (PCT)	-	-	-	-	100%	-	-
Photovoltaic - Entry Level	67%	89%	100%	100%	100%	-	-
Plan Reading for Inspectors	-	80%	-	100%	-	-	-
Plumbing - Level 1	78%	100%	50%	100%	100%	-	-
Plumbing - Level 2	100%	100%	-	100%	-	-	-
Plumbing - Level 3	75%	100%	100%	100%	-	-	-
Plumbing - Level 4	100%	100%	-	-	-	-	-
Plumbing Tradesman License Renewal	-	-	-	100%	100%	100%	-
Power Industry Fundamentals	100%	100%	100%	-	-	-	-
Power Line Worker 1	99%	98%	100%	100%	-	-	-
Project Management Professional (PMP)	-	100%	100%	100%	100%	100%	-
Registered Medical Assistant (RMA)	100%	100%	25%	100%	100%	-	-
Remote Pilot Airman Certification	92%	100%	98%	100%	100%	100%	-
Roadway Construction & Drainage for Inspectors	100%	89%	69%	100%	50%	-	-
Shielded Metal Arc Welding (SMAW)	95%	95%	85%	96%	100%	100%	-
SHRM Certified Professional	-	100%	100%	100%	100%	100%	-
SHRM Senior Certified Professional	-	-	100%	100%	100%	-	-
Siemens Mechatronic Systems Certification Program Level 1	100%	100%	83%	100%	100%	100%	-
Site Manager	100%	89%	100%	100%	88%	-	-
Six Sigma Green Belt	100%	94%	100%	100%	100%	-	-
Six Sigma Yellow Belt Certification	-	100%	100%	-	100%	-	-
Structures & Bridges for Inspectors	100%	79%	63%	100%	67%	-	-
Surface Treatment	100%	100%	100%	100%	100%	100%	-
Surveying for Inspectors	100%	100%	100%	100%	100%	-	-
Teaching License	-	96%	83%	86%	92%	-	-
Turning Operations: Turning Between Centers	-	100%	100%	-	100%	-	-
VDOT Asphalt Field Level 1	100%	100%	100%	100%	100%	100%	100%
VDOT Asphalt Field Level 2	100%	100%	100%	100%	100%	100%	100%
VDOT Asphalt Plant Level 1	100%	100%	100%	100%	-	-	-
VDOT Asphalt Plant Level 2	-	100%	100%	100%	-	-	-
Welding - Level 1	100%	100%	100%	100%	0%	-	-

Training Program	16-25 yrs. Rate	26-35 yrs. Rate	36-45 yrs. Rate	46-55 yrs. Rate	56-65 yrs. Rate	66-75 yrs. Rate	76-80 yrs. Rate
Welding - Level 2	100%	100%	100%	100%	0%	-	-
Work Zone Flagger Certification	94%	95%	100%	100%	100%	100%	100%
Total	93%	94%	94%	95%	95%	96%	100%

Table 8

Training Program Completion Rate by Program and Reported Race

Training Program	White Rate	Black Rate	Hispanic Rate	Asian Rate	American Indian Rate	Hawaiian Rate	Not Specified Rate
2 Stroke Engine Repair Certification	92%	100%	-	100%	-	-	100%
4 Stroke Engine Repair Certification	95%	100%	-	100%	-	-	100%
Advanced Cardiovascular Life Support	100%	-	-	-	-	-	-
Advanced Customer Service and	100%	100%	100%	-	-	-	100%
Advanced Emergency Medical Technician	100%	-	-	-	100%	-	-
Air Conditioning and Electrical	100%	-	-	-	-	-	-
Asphalt Slurry Surfacing	100%	100%	100%	100%	100%	-	100%
Backflow Prevention Device Certification	97%	100%	100%	100%	-	-	100%
Basic Hydraulic Systems	100%	100%	-	-	-	-	-
Billing Coding Specialist (BCBS)	83%	88%	-	100%	-	100%	100%
Carpentry Level 2	86%	100%	-	-	-	-	-
Carpentry Level 4	-	100%	-	-	-	-	-
Carpentry Level 1	88%	100%	-	-	-	-	-
Certificate for Apartment Maintenance Technicians (CAMT)	100%	-	-	100%	-	-	-
Certified Billing and Coding Specialist (CBCS)	91%	81%	93%	91%	100%	100%	100%
Certified Ethical Hacker (CEH)	100%	100%	100%	100%	100%	-	100%
Certified Information Systems Security	100%	100%	-	100%	-	-	-
Certified Logistics Associate	100%	97%	-	100%	-	-	100%
Certified Logistics Technician	100%	96%	-	100%	-	-	100%
Certified Massage Therapist	63%	50%	-	-	-	-	-
Certified Medical Administrative Assistant (CMAA)	95%	85%	88%	100%	100%	100%	100%
Certified Nurse Aide (CNA)	93%	96%	97%	94%	83%	100%	100%
Certified Phlebotomy Technician (NHA)	96%	91%	94%	100%	100%	100%	100%
Certified Production Technician	50%	100%	-	-	-	-	-
Certified Professional Coder (CPC)	95%	95%	100%	100%	100%	100%	86%
Certified Welder (CW)	99%	97%	100%	100%	100%	-	100%

Training Program	White Rate	Black Rate	Hispanic Rate	Asian Rate	American Indian Rate	Hawaiian Rate	Not Specified Rate
CISCO Certified Entry Networking Technician (CCENT)	100%	84%	100%	83%	-	-	100%
Cisco Certified Network Associate	100%	100%	-	100%	-	-	100%
Clinical Medical Assistant (HCMA)	97%	91%	97%	95%	100%	100%	91%
Clinical Medical Assistant (CMAC)	97%	100%	-	-	-	100%	100%
CNC Milling: Operations	88%	67%	-	100%	-	100%	100%
CNC Turning: Operations	89%	33%	-	-	-	-	-
Comm. Driver's License (CDL)	93%	92%	93%	95%	97%	75%	93%
CompTIA A+ Certification	95%	92%	95%	98%	80%	100%	83%
CompTIA IT Fundamentals	100%	-	-	-	-	-	-
CompTIA Network+ Certification	95%	93%	100%	96%	100%	0%	100%
CompTIA Security+ Certification	87%	92%	94%	96%	100%	-	100%
Construction Project Management	94%	-	100%	-	-	-	100%
Contractor's License	97%	-	-	-	100%	-	100%
Core Introductory Craft Skills	99%	98%	100%	100%	100%	-	100%
Customer Services and Sales Certification	100%	100%	100%	-	100%	-	100%
Documentation & Record Keeping for Inspectors	100%	100%	-	-	-	-	100%
Driveline/Hydraulics Certification	67%	-	-	-	-	-	100%
EKG Technician	100%	100%	-	-	-	-	-
EKG Technician	67%	67%	-	-	-	-	-
Electrical Level 1	100%	87%	100%	100%	-	100%	100%
Electrical Level 2	95%	83%	100%	-	0%	50%	100%
Electrical Level 3	100%	-	100%	-	-	-	100%
Electrical Level 4	100%	-	100%	-	-	-	100%
Electrical Systems Certification	100%	67%	-	-	-	-	100%
Electrical Tradesman License Renewal	100%	-	-	-	-	-	-
Emergency Medical Technician	100%	40%	100%	100%	0%	-	100%
EPA Section 608 Technician Certification	100%	100%	-	-	100%	-	-
Facilities Maintenance Technician	100%	100%	-	-	-	-	-
Flux Core Arc Welding (FCAW)	97%	83%	91%	-	100%	100%	83%
Gas Metal Arc Welding (GMAW)	93%	92%	100%	-	80%	-	67%

Training Program	White Rate	Black Rate	Hispanic Rate	Asian Rate	American Indian Rate	Hawaiian Rate	Not Specified Rate
Gas Tungsten Arc Welding (GTAW)	85%	100%	100%	-	100%	-	82%
Heavy Equipment Operations Level 1	93%	100%	100%	-	-	100%	100%
Heavy Equipment Operations Level 2	-	-	-	-	-	100%	-
HVAC Level 1	88%	100%	50%	100%	100%	-	80%
HVAC Level 2	95%	100%	100%	100%	0%	-	100%
HVAC Level 3	78%	100%	100%	-	-	-	80%
HVAC Level 4	100%	-	100%	-	-	-	-
HVAC Tradesman License Renewal	100%	-	-	-	-	-	-
Industrial Maintenance Electrical and Instrumentation Level 2	100%	100%	-	-	-	-	-
Industrial Maintenance Electrical and Instrumentation Level 4	100%	50%	-	-	-	-	-
IPCA610 Certification	100%	-	-	-	-	-	-
Job Planning, Benchwork, and Layout	89%	67%	-	-	-	100%	100%
JSTD001 Certification	100%	-	-	-	-	-	100%
Level 1 CNC Turning	100%	-	-	-	-	-	-
Machining Level I: CNC Milling: Programming Setup and Operations	100%	-	-	-	-	-	-
Machining Level I: Drill Press Skills I	100%	-	100%	-	-	-	100%
Mammography Technologist	100%	-	-	-	-	-	-
Manual Milling Skills 1, Machining	88%	-	-	-	-	-	100%
Manufacturing Specialist (MS)	93%	95%	100%	-	100%	100%	100%
Manufacturing Technician 1 (MT1)	100%	95%	100%	100%	100%	100%	98%
Maritime Certification	100%	100%	-	100%	-	-	-
Measurement, Materials, and Safety	93%	86%	-	100%	-	100%	89%
Medical Assistant	97%	100%	100%	-	-	-	57%
Medication Aide	94%	98%	100%	-	-	-	-
Millwright Level 1	100%	-	-	-	-	-	-
Millwright Level 2	100%	-	-	-	-	-	-
Millwright Level 3	80%	-	-	-	-	-	-
Millwright Level 4	100%	-	-	-	-	-	-
Pharmacy Technician	91%	87%	88%	100%	100%	75%	100%

Training Program	White Rate	Black Rate	Hispanic Rate	Asian Rate	American Indian Rate	Hawaiian Rate	Not Specified Rate
Phlebotomy Technician (ASPT)	98%	98%	100%	-	100%	-	-
Phlebotomy Technician (NCCT)	96%	100%	100%	-	100%	-	83%
Phlebotomy Technician (PBT)	63%	-	83%	100%	-	-	100%
Phlebotomy Technician (PCT)	100%	-	-	-	-	-	-
Photovoltaic Entry Level	95%	-	0%	-	50%	-	100%
Plan Reading for Inspectors	100%	100%	-	-	-	-	100%
Plumbing Level 1	92%	100%	100%	-	-	-	67%
Plumbing Level 2	100%	100%	100%	-	-	-	100%
Plumbing Level 3	91%	-	100%	-	100%	-	-
Plumbing Level 4	100%	-	-	-	-	-	-
Plumbing Tradesman License Renewal	100%	-	-	-	-	-	-
Power Industry Fundamentals	100%	100%	100%	-	100%	-	100%
Power Line Worker 1	99%	100%	100%	-	100%	100%	100%
Project Management Professional (PMP)	100%	100%	100%	100%	100%	-	100%
Registered Medical Assistant (RMA)	70%	100%	100%	-	-	-	-
Remote Pilot Airman Certification	99%	100%	75%	100%	-	-	100%
Roadway Construction & Drainage for Inspectors	93%	80%	100%	75%	100%	-	50%
Shielded Metal Arc Welding (SMAW)	94%	97%	100%	100%	92%	100%	94%
SHRM Certified Professional	100%	100%	100%	100%	-	-	100%
SHRM Senior Certified Professional	100%	100%	100%	-	-	-	100%
Siemens Mechatronic Systems Certification Program Level 1	100%	86%	100%	-	-	-	-
Site Manager	97%	100%	100%	-	-	-	83%
Six Sigma Green Belt	98%	-	100%	-	-	-	100%
Six Sigma Yellow Belt Certification	100%	-	-	-	-	-	-
Structures & Bridges for Inspectors	88%	79%	100%	57%	100%	-	50%
Surface Treatment	100%	100%	100%	100%	100%	-	100%
Surveying for Inspectors	100%	100%	-	100%	100%	-	100%
Teaching License	85%	100%	100%	100%	100%	100%	92%
Turning Operations: Turning Between Centers	100%	-	-	-	-	-	-
VDOT Asphalt Field Level 1	100%	100%	100%	100%	100%	-	100%

Training Program	White Rate	Black Rate	Hispanic Rate	Asian Rate	American Indian Rate	Hawaiian Rate	Not Specified Rate
VDOT Asphalt Field Level 2	100%	100%	100%	100%	100%	-	100%
VDOT Asphalt Plant Level 1	100%	100%	100%	100%	-	-	-
VDOT Asphalt Plant Level 2	100%	100%	100%	-	-	-	-
Welding Level 1	100%	94%	-	-	-	-	-
Welding Level 2	100%	94%	-	-	-	-	-
Work Zone Flagger Certification	97%	100%	100%	100%	100%	100%	100%
Total	94%	92%	96%	96%	93%	91%	94%

Table 9

Completion Rates by Program and Gender

	Female	Male	Unreported
Training Program	Completion Rate	Completion Rate	Completion Rate
2-Stroke Engine Repair Certification	67%	97%	100%
4-Stroke Engine Repair Certification	67%	100%	100%
Advanced Cardiovascular Life Support	100%	100%	-
Advanced Customer Service and Sales	100%	100%	-
Advanced Emergency Medical Technician	67%	100%	-
Air Conditioning and Electrical	-	100%	-
Asphalt- Slurry Surfacing	100%	100%	100%
Backflow Prevention Device Certification	100%	98%	-
Basic Hydraulic Systems	-	100%	-
Billing Coding Specialist (BCBS)	87%	100%	-
Carpentry Level 2	100%	83%	-
Carpentry Level 4	-	100%	-
Carpentry Level 1	100%	88%	-
Certificate for Apartment Maintenance Technicians (CAMT)	-	100%	-
Certified Billing and Coding Specialist (CBCS)	87%	88%	100%
Certified Ethical Hacker (CEH)	100%	100%	-
Certified Information Systems Security	100%	100%	-
Certified Logistics Associate	97%	100%	100%
Certified Logistics Technician	95%	100%	100%
Certified Massage Therapist	56%	100%	-
Certified Medical Administrative Assistant (CMAA)	90%	100%	0%
Certified Nurse Aide (CNA)	95%	91%	100%
Certified Phlebotomy Technician (NHA)	95%	88%	75%
Certified Production Technician	0%	75%	-
Certified Professional Coder (CPC)	96%	83%	-
Certified Welder (CW)	100%	99%	100%
CISCO Certified Entry Networking Technician (CCENT)	100%	90%	100%
Cisco Certified Network Associate	100%	100%	-

Training Program	Female Completion Rate	Male Completion Rate	Unreported Completion Rate
Clinical Medical Assistant (HCMA)	95%	94%	100%
Clinical Medical Assistant (CMAB)	98%	100%	100%
CNC Milling: Operations	50%	88%	-
CNC Turning: Operations	100%	81%	-
Commercial Driver's License	91%	93%	97%
CompTIA A+ Certification	91%	95%	100%
CompTIA IT Fundamentals	100%	100%	-
CompTIA Network+ Certification	98%	95%	100%
CompTIA Security+ Certification	92%	91%	100%
Construction Project Management	100%	95%	-
Contractor's License	100%	97%	-
Core - Introductory Craft Skills	100%	99%	100%
Customer Services and Sales Certification	100%	100%	100%
Documentation & Record Keeping for Inspectors	100%	100%	-
Driveline/Hydraulics Certification	-	75%	-
EKG Technician	100%	-	-
EKG Technician	60%	100%	-
Electrical - Level 1	100%	97%	100%
Electrical - Level 2	100%	86%	-
Electrical - Level 3	100%	100%	-
Electrical - Level 4	100%	100%	-
Electrical Systems Certification	-	92%	100%
Electrical Tradesman License Renewal	-	100%	-
Emergency Medical Technician	73%	87%	-
Emergency Medical Technician	100%	100%	-
EPA Section 608 Technician Certification	-	100%	100%
Facilities Maintenance Technician	-	100%	-
Flux Core Arc Welding (FCAW)	86%	95%	0%
Gas Metal Arc Welding (GMAW)	89%	91%	-
Gas Tungsten Arc Welding (GTAW)	88%	86%	-
Heavy Equipment Operations - Level 1	100%	89%	100%

Training Program	Female Completion Rate	Male Completion Rate	Unreported Completion Rate
Heavy Equipment Operations - Level 2	-	100%	-
HVAC - Level 1	100%	89%	100%
HVAC - Level 2	100%	89%	-
HVAC - Level 3	-	81%	-
HVAC - Level 4	-	100%	-
HVAC Tradesman License Renewal	-	100%	-
Industrial Maintenance Electrical and Instrumentation Level 2	100%	100%	-
Industrial Maintenance Electrical and Instrumentation Level 4	100%	83%	-
IPC-A-610 Certification	100%	100%	-
Job Planning, Benchwork, and Layout	-	87%	-
JSTD-001 Certification	100%	100%	-
Level 1 CNC Turning	-	100%	-
Machining Level I: CNC Milling: Programming Setup and Operations	-	100%	-
Machining Level I: Drill Press Skills I	-	100%	-
Mammography Technologist	100%	-	-
Manual Milling Skills 1, Machining	-	90%	-
Manufacturing Specialist (MS)	78%	98%	100%
Manufacturing Technician 1 (MT1)	97%	98%	100%
Maritime Certification	100%	100%	-
Measurement, Materials, and Safety	0%	93%	-
Medical Assistant	91%	-	-
Medication Aide	97%	100%	100%
Millwright - Level 1	-	100%	-
Millwright - Level 2	-	100%	-
Millwright - Level 3	-	80%	-
Millwright - Level 4	-	100%	-
Pharmacy Technician	88%	85%	100%
Pharmacy Technician	94%	100%	-
Pharmacy Technician	96%	94%	-
Phlebotomy Technician (ASPT)	98%	100%	-
Phlebotomy Technician (NCCT)	95%	100%	-

Training Program	Female Completion Rate	Male Completion Rate	Unreported Completion Rate
Phlebotomy Technician (PBT)	67%	50%	-
Phlebotomy Technician (PCT)	100%	100%	-
Photovoltaic - Entry Level	100%	87%	100%
Plan Reading for Inspectors	100%	80%	-
Plumbing - Level 1	100%	88%	100%
Plumbing - Level 2	-	100%	100%
Plumbing - Level 3	-	92%	-
Plumbing - Level 4	-	100%	-
Plumbing Tradesman License Renewal	-	100%	-
Power Industry Fundamentals	-	100%	-
Power Line Worker 1	100%	99%	-
Project Management Professional (PMP)	100%	100%	100%
Registered Medical Assistant (RMA)	75%	-	-
Remote Pilot Airman Certification	100%	99%	100%
Roadway Construction & Drainage for Inspectors	100%	86%	-
Shielded Metal Arc Welding (SMAW)	92%	95%	80%
SHRM Certified Professional	100%	100%	-
SHRM Senior Certified Professional	100%	100%	-
Siemens Mechatronic Systems Certification Program Level 1	-	96%	100%
Site Manager	100%	91%	-
Six Sigma Green Belt	92%	100%	100%
Six Sigma Yellow Belt Certification	100%	100%	-
Structures & Bridges for Inspectors	88%	81%	0%
Surface Treatment	100%	100%	100%
Surveying for Inspectors	100%	100%	-
Teaching License	90%	85%	100%
Turning Operations: Turning Between Centers	-	100%	-
VDOT Asphalt Field Level 1	100%	100%	100%
VDOT Asphalt Field Level 2	100%	100%	100%
VDOT Asphalt Plant Level 1	100%	100%	100%
VDOT Asphalt Plant Level 2	-	100%	100%

Training Program	Female Completion Rate	Male Completion Rate	Unreported Completion Rate
Welding - Level 1	100%	94%	-
Welding - Level 2	100%	94%	-
Work Zone Flagger Certification	100%	97%	100%
Total	93%	94%	96%

Table 10

Overall Credential Attainment Rates by Age Categories

Age Categories	Credential Attainments	Eligible Enrollments	Credential Attainment Rate
16-25 years	1,686	2,393	70%
26-35 years	1,979	2,971	67%
36-45 years	1,320	2,011	66%
46-55 years	960	1,392	69%
56-65 years	443	656	68%
66-75 years	42	74	57%
75-80 years	1	7	14%
Total	6,431	9,504	68%

Table 11

Overall Credential Attainment Rates by Reported Race

Race	Credential Attainments	Eligible Enrollments	Credential Attainment Rate
White	3,530	4,878	72%
Black	1,553	2,621	59%
Hispanic	265	452	59%
Asian	151	340	44%
American Indian	85	113	75%
Hawaiian	27	40	68%
Unreported/Unspecified	820	1,060	77%
Total	6,431	9,504	68%

Table 12

Overall Credential Attainment Rates by Gender

Gender	Credential Attainments	Eligible Enrollments	Credential Attainment Rate
Female	1,809	3,079	59%
Male	4,511	6,293	72%
Unreported	111	132	84%
Total	6,431	9,504	68%

Table 13

Credential Attainment Rates by Program and Age Category

Training Program	16-25 yrs. Rate	26-35 yrs. Rate	36-45 yrs. Rate	46-55 yrs. Rate	56-65 yrs. Rate	66-75 yrs. Rate	76-80 yrs. Rate
2-Stroke Engine Repair Certification	0%	88%	100%	100%	40%	-	-
4-Stroke Engine Repair Certification	0%	82%	100%	100%	60%	-	-
Advanced Cardiovascular Life Support	100%	100%	-	-	-	-	-
Advanced Customer Service and Sales	100%	100%	100%	100%	100%	-	-
Asphalt- Slurry Surfacing	100%	0%	50%	100%	100%	0%	-
Backflow Prevention Device Certification	33%	33%	33%	33%	86%	-	-
Billing Coding Specialist (BCBS)	-	33%	67%	50%	57%	100%	-
Carpentry Level 2	100%	50%	-	100%	-	-	-
Carpentry Level 4	100%	-	-	-	-	-	-
Carpentry Level 1	100%	80%	-	100%	-	-	-
Certified Billing and Coding Specialist (CBCS)	54%	60%	80%	69%	82%	-	-
Certified Ethical Hacker (CEH)	100%	63%	91%	57%	100%	-	-
Certified Information Systems Security	-	0%	0%	0%	0%	-	-
Certified Logistics Associate	25%	100%	62%	38%	50%	-	-
Certified Logistics Technician	0%	88%	73%	89%	80%	-	-
Certified Massage Therapist	0%	67%	33%	50%	-	0%	-
Certified Medical Administrative Assistant (CMAA)	88%	68%	83%	100%	92%	-	-
Certified Nurse Aide (CNA)	48%	54%	44%	61%	73%	50%	0%
Certified Phlebotomy Technician (NHA)	70%	73%	68%	86%	100%	-	-
Certified Production Technician	0%	0%	0%	100%	100%	-	-
Certified Professional Coder (CPC)	10%	14%	15%	7%	11%	0%	-
Certified Welder (CW)	58%	56%	44%	29%	33%	-	-
CISCO Certified Entry Networking Technician (CCENT)	0%	16%	13%	17%	0%	-	-
Cisco Certified Network Associate	-	13%	0%	14%	0%	-	-
Clinical Medical Assistant (HCMA)	77%	80%	81%	93%	96%	33%	-
Clinical Medical Assistant (CMAC)	38%	53%	25%	60%	40%	100%	-
CNC Milling: Operations	33%	69%	86%	100%	0%	-	-
CNC Turning: Operations	20%	40%	17%	100%	0%	-	-

Training Program	16-25 yrs. Rate	26-35 yrs. Rate	36-45 yrs. Rate	46-55 yrs. Rate	56-65 yrs. Rate	66-75 yrs. Rate	76-80 yrs. Rate
Comm. Driver's License (CDL)	84%	81%	79%	82%	75%	89%	0%
CompTIA A+ Certification	23%	10%	18%	12%	8%	0%	-
CompTIA IT Fundamentals	-	100%	67%	67%	0%	-	-
CompTIA Network+ Certification	8%	13%	11%	15%	30%	50%	-
CompTIA Security+ Certification	19%	18%	22%	36%	16%	50%	-
Construction Project Management	100%	100%	100%	100%	80%	-	-
Contractor's License	0%	0%	0%	0%	0%	0%	-
Core - Introductory Craft Skills	94%	89%	78%	100%	100%	-	-
Customer Services and Sales Certification	100%	92%	80%	100%	100%	100%	-
Driveline/Hydraulics Certification	-	0%	-	100%	100%	-	-
EKG Technician	0%	0%	0%	0%	0%	-	-
Electrical - Level 1	91%	86%	100%	100%	100%	-	-
Electrical - Level 2	100%	64%	80%	100%	-	-	-
Electrical - Level 3	100%	100%	100%	100%	-	-	-
Electrical - Level 4	100%	100%	-	100%	-	-	-
Electrical Systems Certification	-	50%	-	100%	100%	-	-
Electrical Tradesman License Renewal	-	-	0%	0%	60%	-	-
Emergency Medical Technician	25%	69%	100%	75%	0%	-	-
EPA Section 608 Technician Certification	100%	-	100%	100%	-	-	-
Facilities Maintenance Technician	0%	-	0%	-	-	-	-
Flux Core Arc Welding (FCAW)	73%	66%	86%	85%	100%	-	-
Gas Metal Arc Welding (GMAW)	58%	46%	71%	100%	50%	0%	-
Gas Tungsten Arc Welding (GTAW)	60%	70%	80%	75%	20%	0%	-
Heavy Equipment Operations - Level 1	86%	80%	100%	100%	100%	-	-
Heavy Equipment Operations - Level 2	0%	-	-	-	-	-	-
HVAC - Level 1	65%	88%	100%	80%	100%	-	-
HVAC - Level 2	86%	100%	88%	67%	100%	-	-
HVAC - Level 3	50%	83%	83%	100%	-	-	-
HVAC - Level 4	-	100%	100%	100%	-	-	-
HVAC Tradesman License Renewal	-	-	-	-	100%	0%	-
Industrial Maintenance Electrical and Instrumentation Level 4	100%	67%	100%	100%	100%	-	-

Training Program	16-25 yrs. Rate	26-35 yrs. Rate	36-45 yrs. Rate	46-55 yrs. Rate	56-65 yrs. Rate	66-75 yrs. Rate	76-80 yrs. Rate
IPC-A-610 Certification	-	-	100%	100%	-	-	-
Job Planning, Benchwork, and Layout	89%	92%	100%	100%	100%	-	-
JSTD-001 Certification	-	-	67%	100%	100%	50%	-
Level 1 CNC Turning	0%	-	0%	-	-	-	-
Machining Level I: Drill Press Skills I	67%	100%	100%	50%	100%	-	-
Mammography Technologist	-	0%	0%	-	-	-	-
Manual Milling Skills 1, Machining	100%	100%	50%	-	0%	-	-
Manufacturing Specialist (MS)	50%	77%	69%	71%	33%	-	-
Manufacturing Technician 1 (MT1)	77%	71%	73%	69%	54%	-	-
Measurement, Materials, and Safety	86%	93%	100%	100%	100%	-	-
Medical Assistant	83%	57%	100%	80%	75%	-	-
Medication Aide	40%	11%	14%	57%	50%	0%	0%
Millwright - Level 1	100%	100%	100%	100%	-	-	-
Millwright - Level 2	100%	100%	100%	100%	-	-	-
Millwright - Level 3	33%	100%	100%	100%	-	-	-
Pharmacy Technician	22%	25%	37%	29%	33%	50%	-
Phlebotomy Technician (ASPT)	41%	15%	17%	43%	43%	-	-
Phlebotomy Technician (NCCT)	88%	100%	75%	100%	100%	-	-
Phlebotomy Technician (PBT)	12%	0%	31%	13%	100%	-	-
Phlebotomy Technician (PCT)	-	-	-	-	100%	-	-
Photovoltaic - Entry Level	0%	50%	60%	100%	-	-	-
Plumbing - Level 1	78%	100%	50%	100%	100%	-	-
Plumbing - Level 2	100%	100%	-	100%	-	-	-
Plumbing - Level 3	75%	100%	100%	100%	-	-	-
Plumbing - Level 4	100%	100%	-	-	-	-	-
Plumbing Tradesman License Renewal	-	-	-	50%	0%	100%	-
Power Industry Fundamentals	100%	100%	100%	-	-	-	-
Power Line Worker 1	95%	89%	83%	100%	-	-	-
Project Management Professional (PMP)	-	47%	41%	25%	50%	0%	-
Registered Medical Assistant (RMA)	50%	100%	25%	100%	100%	-	-
Remote Pilot Airman Certification	100%	68%	73%	63%	83%	80%	-

Training Program	16-25 yrs. Rate	26-35 yrs. Rate	36-45 yrs. Rate	46-55 yrs. Rate	56-65 yrs. Rate	66-75 yrs. Rate	76-80 yrs. Rate
Roadway Construction & Drainage for Inspectors	92%	96%	89%	83%	100%	-	-
Shielded Metal Arc Welding (SMAW)	79%	75%	72%	78%	88%	100%	-
SHRM Certified Professional	-	73%	60%	25%	25%	100%	-
SHRM Senior Certified Professional	-	-	0%	33%	-	-	-
Siemens Mechatronic Systems Certification Program Level 1	50%	29%	67%	100%	40%	100%	-
Site Manager	100%	85%	100%	100%	86%	-	-
Six Sigma Green Belt	50%	50%	44%	46%	43%	-	-
Six Sigma Yellow Belt Certification	-	67%	100%	-	0%	-	-
Structures & Bridges for Inspectors	94%	96%	100%	67%	100%	-	-
Surface Treatment	100%	0%	100%	80%	100%	0%	-
Surveying for Inspectors	92%	100%	100%	100%	100%	-	-
Teaching License	-	96%	83%	86%	92%	-	-
Turning Operations: Turning Between Centers	-	100%	0%	-	67%	-	-
VDOT Asphalt Field Level 1	100%	64%	75%	75%	100%	-	0%
VDOT Asphalt Field Level 2	-	33%	83%	33%	100%	-	0%
VDOT Asphalt Plant Level 1	100%	80%	50%	50%	-	-	-
VDOT Asphalt Plant Level 2	-	100%	0%	-	-	-	-
Welding - Level 1	100%	100%	100%	100%	0%	-	-
Welding - Level 2	100%	100%	100%	100%	0%	-	-
Work Zone Flagger Certification	97%	100%	90%	92%	89%	86%	100%
Total	63%	66%	64%	73%	63%	46%	17%

Table 14

Credential Attainment Rates by Program and Reported Race

Training Program	White Rate	American Indian Rate	Asian Rate	Black Rate	Hawaiian Rate	Hispanic Rate	Not Specified Rate
2-Stroke Engine Repair Certification	71%	-	50%	0%	-	-	100%
4-Stroke Engine Repair Certification	75%	-	50%	75%	-	-	75%
Advanced Cardiovascular Life Support	100%	-	-	-	-	-	-
Advanced Customer Service and	100%	-	-	100%	-	100%	-
Advanced Customer Service and Sales	-	-	-	-	-	-	100%
Asphalt- Slurry Surfacing	67%	-	-	0%	-	-	0%
Backflow Prevention Device Certification	41%	-	0%	60%	-	100%	25%
Billing Coding Specialist (BCBS)	83%	-	-	43%	-	-	0%
Carpentry Level 2	80%	-	-	100%	-	-	-
Carpentry Level 4	-	-	-	100%	-	-	-
Carpentry Level 1	88%	-	-	100%	-	-	-
Certified Billing and Coding Specialist (CBCS)	79%	100%	63%	62%	50%	92%	100%
Certified Ethical Hacker (CEH)	67%	50%	83%	90%	-	67%	100%
Certified Information Systems Security	0%	-	0%	0%	-	-	-
Certified Logistics Associate	90%	-	100%	58%	-	-	40%
Certified Logistics Technician	86%	-	100%	72%	-	-	92%
Certified Massage Therapist	50%	-	-	0%	-	-	-
Certified Medical Administrative Assistant (CMAA)	91%	100%	100%	82%	100%	60%	50%
Certified Nurse Aide (CNA)	58%	83%	75%	43%	100%	54%	60%
Certified Phlebotomy Technician (NHA)	77%	-	100%	72%	0%	62%	17%
Certified Production Technician	25%	-	-	100%	-	-	-
Certified Professional Coder (CPC)	17%	0%	0%	3%	0%	0%	14%
Certified Welder (CW)	55%	0%	100%	34%	-	33%	75%
CISCO Certified Entry Networking Technician (CCENT)	10%	-	18%	11%	-	0%	0%
Cisco Certified Network Associate	25%	-	0%	0%	-	-	0%
Clinical Medical Assistant (HCMA)	86%	100%	79%	77%	100%	86%	77%
Clinical Medical Assistant (CMAB)	58%	-	-	37%	100%	-	0%
CNC Milling: Operations	72%	-	100%	67%	100%	-	100%
CNC Turning: Operations	35%	-	-	33%	-	-	-

Training Program	White Rate	American Indian Rate	Asian Rate	Black Rate	Hawaiian Rate	Hispanic Rate	Not Specified Rate
Comm. Driver's License (CDL)	88%	88%	84%	75%	75%	85%	77%
CompTIA A+ Certification	16%	0%	9%	11%	0%	14%	20%
CompTIA IT Fundamentals	70%	-	-	-	-	-	-
CompTIA Network+ Certification	13%	0%	14%	14%	0%	3%	22%
CompTIA Security+ Certification	27%	0%	14%	20%	-	23%	38%
Construction Project Management	89%	-	-	-	-	100%	100%
Contractor's License	0%	0%	-	-	-	-	0%
Core - Introductory Craft Skills	94%	100%	0%	83%	-	100%	100%
Customer Services and Sales Certification	100%	-	-	78%	-	100%	88%
Driveline/Hydraulics Certification	67%	-	-	-	-	-	100%
EKG Technician	0%	-	-	0%	-	-	-
Electrical - Level 1	92%	-	100%	87%	100%	100%	100%
Electrical - Level 2	90%	0%	-	83%	50%	100%	100%
Electrical - Level 3	100%	-	-	-	-	100%	100%
Electrical - Level 4	100%	-	-	-	-	100%	100%
Electrical Systems Certification	80%	-	-	-	-	-	100%
Electrical Tradesman License Renewal	38%	-	-	-	-	-	-
Emergency Medical Technician	89%	-	100%	0%	-	100%	0%
EPA Section 608 Technician Certification	100%	100%	-	100%	-	-	-
Facilities Maintenance Technician	0%	-	-	0%	-	-	-
Flux Core Arc Welding (FCAW)	78%	100%	-	66%	100%	78%	67%
Gas Metal Arc Welding (GMAW)	63%	100%	-	29%	-	50%	40%
Gas Tungsten Arc Welding (GTAW)	67%	100%	-	60%	-	20%	45%
Heavy Equipment Operations - Level 1	93%	-	-	100%	100%	100%	100%
Heavy Equipment Operations - Level 2	-	-	-	-	0%	-	-
HVAC - Level 1	78%	100%	100%	83%	-	50%	60%
HVAC - Level 2	95%	0%	100%	100%	-	100%	100%
HVAC - Level 3	78%	-	-	100%	-	100%	80%
HVAC - Level 4	100%	-	-	-	-	100%	-
HVAC Tradesman License Renewal	50%	-	-	-	-	-	-
Industrial Maintenance Electrical and Instrumentation Level 4	100%	-	-	50%	-	-	-

Training Program	White Rate	American Indian Rate	Asian Rate	Black Rate	Hawaiian Rate	Hispanic Rate	Not Specified Rate
IPC-A-610 Certification	100%	-	-	-	-	-	-
Job Planning, Benchwork, and Layout	96%	-	-	83%	100%	-	100%
JSTD-001 Certification	100%	-	-	-	-	-	83%
Level 1 CNC Turning	0%	-	-	-	-	-	-
Machining Level I: Drill Press Skills I	86%	-	-	-	-	0%	100%
Mammography Technologist	0%	-	-	-	-	-	-
Manual Milling Skills 1, Machining	50%	-	-	-	-	-	100%
Manufacturing Specialist (MS)	61%	100%	-	63%	100%	100%	100%
Manufacturing Technician 1 (MT1)	87%	100%	83%	54%	100%	67%	86%
Measurement, Materials, and Safety	97%	-	100%	100%	100%	-	78%
Medical Assistant	91%	-	-	80%	-	67%	29%
Medication Aide	38%	-	-	19%	-	0%	-
Millwright - Level 1	100%	-	-	-	-	-	-
Millwright - Level 2	100%	-	-	-	-	-	-
Millwright - Level 3	80%	-	-	-	-	-	-
Pharmacy Technician	72%	25%	33%	44%	0%	21%	0%
Phlebotomy Technician (ASPT)	50%	-	-	22%	-	0%	-
Phlebotomy Technician (NCCT)	86%	100%	-	100%	-	100%	100%
Phlebotomy Technician (PBT)	15%	-	0%	-	-	17%	0%
Phlebotomy Technician (PCT)	100%	-	-	-	-	-	-
Photovoltaic - Entry Level	70%	0%	-	-	-	0%	100%
Plumbing - Level 1	92%	-	-	100%	-	100%	67%
Plumbing - Level 2	100%	-	-	100%	-	100%	100%
Plumbing - Level 3	91%	100%	-	-	-	100%	-
Plumbing - Level 4	100%	-	-	-	-	-	-
Plumbing Tradesman License Renewal	33%	-	-	-	-	-	-
Power Industry Fundamentals	100%	100%	-	100%	-	100%	-
Power Line Worker 1	93%	100%	-	100%	100%	100%	100%
Project Management Professional (PMP)	27%	0%	67%	38%	-	0%	50%
Registered Medical Assistant (RMA)	60%	-	-	50%	-	0%	-
Remote Pilot Airman Certification	76%	-	0%	50%	-	50%	89%

Training Program	White Rate	American Indian Rate	Asian Rate	Black Rate	Hawaiian Rate	Hispanic Rate	Not Specified Rate
Roadway Construction & Drainage for Inspectors	95%	75%	67%	88%	-	100%	100%
Shielded Metal Arc Welding (SMAW)	79%	89%	50%	70%	67%	77%	83%
SHRM Certified Professional	-	-	0%	-	-	-	100%
SHRM Certified Professional (S	60%	-	-	44%	-	0%	-
SHRM Senior Certified Professional	0%	-	-	50%	-	-	-
Siemens Mechatronic Systems Certification Program Level 1	68%	-	-	29%	-	50%	-
Site Manager	95%	-	-	100%	-	100%	83%
Six Sigma Green Belt	48%	-	-	-	-	-	0%
Six Sigma Yellow Belt Certification	60%	-	-	-	-	-	-
Structures & Bridges for Inspectors	95%	100%	100%	73%	-	100%	100%
Surface Treatment	80%	-	100%	-	-	-	100%
Surveying for Inspectors	97%	100%	100%	100%	-	-	100%
Teaching License	85%	100%	100%	100%	100%	100%	92%
Turning Operations: Turning Between Centers	60%	-	-	-	-	-	-
VDOT Asphalt Field Level 1	74%	-	25%	75%	-	-	100%
VDOT Asphalt Field Level 2	57%	-	0%	0%	-	-	100%
VDOT Asphalt Plant Level 1	86%	-	50%	-	-	-	-
VDOT Asphalt Plant Level 2	0%	-	-	-	-	-	-
Welding - Level 1	100%	-	-	94%	-	-	-
Welding - Level 2	100%	-	-	94%	-	-	-
Work Zone Flagger Certification	94%	100%	100%	92%	100%	100%	92%
Total	72%	75%	44%	59%	68%	59%	73%

Table 15

Credential Attainment Rates by Program and Gender

	Female	Male	Unreported
Training Program	Rate	Rate	Rate
2-Stroke Engine Repair Certification	33%	78%	-
4-Stroke Engine Repair Certification	33%	78%	100%
Advanced Cardiovascular Life Support	100%	100%	-
Advanced Customer Service and	100%	100%	-
Asphalt- Slurry Surfacing	-	64%	-
Backflow Prevention Device Certification	0%	42%	-
Billing Coding Specialist (BCBS)	58%	100%	-
Carpentry Level 2	100%	75%	-
Carpentry Level 4	-	100%	-
Carpentry Level 1	100%	88%	-
Certified Billing and Coding Specialist (CBCS)	70%	69%	100%
Certified Ethical Hacker (CEH)	75%	80%	-
Certified Information Systems Security	0%	0%	-
Certified Logistics Associate	62%	54%	100%
Certified Logistics Technician	73%	87%	0%
Certified Massage Therapist	33%	100%	-
Certified Medical Administrative Assistant (CMAA)	87%	100%	0%
Certified Nurse Aide (CNA)	52%	47%	67%
Certified Phlebotomy Technician (NHA)	73%	77%	100%
Certified Production Technician	0%	50%	-
Certified Professional Coder (CPC)	11%	20%	-
Certified Welder (CW)	22%	55%	50%
CISCO Certified Entry Networking Technician (CCENT)	0%	15%	-
Cisco Certified Network Associate	0%	12%	-
Clinical Medical Assistant (HCMA)	81%	81%	-
Clinical Medical Assistant (CMAB)	43%	63%	0%

Training Program	Female Rate	Male Rate	Unreported Rate
CNC Milling: Operations	50%	74%	-
CNC Turning: Operations	100%	30%	-
Comm. Driver's License (CDL)	78%	81%	92%
CompTIA A+ Certification	16%	13%	33%
CompTIA IT Fundamentals	33%	86%	-
CompTIA Network+ Certification	11%	14%	100%
CompTIA Security+ Certification	15%	25%	-
Construction Project Management	100%	92%	-
Contractor's License	0%	0%	-
Core - Introductory Craft Skills	100%	91%	33%
Customer Services and Sales Certification	97%	82%	-
Driveline/Hydraulics Certification	-	75%	-
EKG Technician	0%	0%	-
Electrical - Level 1	100%	92%	100%
Electrical - Level 2	100%	82%	-
Electrical - Level 3	100%	100%	-
Electrical - Level 4	100%	100%	-
Electrical Systems Certification	-	86%	-
Electrical Tradesman License Renewal	-	38%	-
Emergency Medical Technician	98%	80%	-
EPA Section 608 Technician Certification	-	100%	-
Facilities Maintenance Technician	-	0%	-
Flux Core Arc Welding (FCAW)	57%	78%	0%
Gas Metal Arc Welding (GMAW)	83%	57%	-
Gas Tungsten Arc Welding (GTAW)	63%	61%	-
Heavy Equipment Operations - Level 1	100%	89%	100%
Heavy Equipment Operations - Level 2	-	0%	-
HVAC - Level 1	100%	80%	100%
HVAC - Level 2	100%	89%	-

Training Program	Female Rate	Male Rate	Unreported Rate
HVAC - Level 3	-	81%	-
HVAC - Level 4	-	100%	-
HVAC Tradesman License Renewal	-	50%	-
Industrial Maintenance Electrical and Instrumentation Level 4	100%	83%	-
IPC-A-610 Certification	100%	100%	-
Job Planning, Benchwork, and Layout	-	95%	-
JSTD-001 Certification	82%	100%	-
Level 1 CNC Turning	-	0%	-
Machining Level I: Drill Press Skills I	-	88%	-
Mammography Technologist	0%	-	-
Manual Milling Skills 1, Machining	-	60%	-
Manufacturing Specialist (MS)	33%	67%	100%
Manufacturing Technician 1 (MT1)	63%	72%	100%
Measurement, Materials, and Safety	0%	96%	-
Medical Assistant	78%	-	-
Medication Aide	25%	0%	-
Millwright - Level 1	-	100%	-
Millwright - Level 2	-	100%	-
Millwright - Level 3	-	80%	-
Pharmacy Technician	57%	26%	100%
Phlebotomy Technician (ASPT)	32%	100%	-
Phlebotomy Technician (NCCT)	88%	100%	-
Phlebotomy Technician (PBT)	15%	0%	-
Phlebotomy Technician (PCT)	100%	100%	-
Photovoltaic - Entry Level	50%	58%	100%
Plumbing - Level 1	100%	88%	100%
Plumbing - Level 2	-	100%	100%
Plumbing - Level 3	-	92%	-
Plumbing - Level 4	-	100%	-

Training Program	Female Rate	Male Rate	Unreported Rate
Plumbing Tradesman License Renewal	-	33%	-
Power Industry Fundamentals	-	100%	-
Power Line Worker 1	100%	93%	-
Project Management Professional (PMP)	41%	31%	100%
Registered Medical Assistant (RMA)	58%	-	-
Remote Pilot Airman Certification	68%	73%	67%
Roadway Construction & Drainage for Inspectors	100%	92%	-
Shielded Metal Arc Welding (SMAW)	78%	77%	100%
SHRM Certified Professional	61%	43%	-
SHRM Senior Certified Professional	50%	0%	-
Siemens Mechatronic Systems Certification Program Level 1	-	56%	100%
Site Manager	100%	89%	-
Six Sigma Green Belt	22%	54%	0%
Six Sigma Yellow Belt Certification	100%	50%	-
Structures & Bridges for Inspectors	71%	95%	-
Surface Treatment	0%	83%	-
Surveying for Inspectors	100%	98%	-
Teaching License	90%	85%	100%
Turning Operations: Turning Between Centers	-	60%	-
VDOT Asphalt Field Level 1	50%	73%	-
VDOT Asphalt Field Level 2	50%	58%	-
VDOT Asphalt Plant Level 1	100%	60%	100%
VDOT Asphalt Plant Level 2	-	0%	100%
Welding - Level 1	100%	93%	-
Welding - Level 2	100%	93%	-
Work Zone Flagger Certification	100%	94%	92%
Total	59%	72%	84%

Table 16

Overall Training Program Completion Rates by Industry

Industry	Successful Completions	Eligible Enrollments	Completion Rate
Business & Customer Service	669	722	93%
Education	160	181	88%
Healthcare	2,142	2,305	93%
Information Technology	993	1,055	94%
Logistics & Transportation	3,127	3,354	93%
Skilled Trades	2,016	2,098	96%
Welding & Manufacturing	1,685	1,786	94%
Total	**10,792**	**11,501**	**94%**

Table 17

Overall Credential Attainment Rates by Industry

Industry	Credential Attainment	Eligible Enrollments	Credential Attainment Rate
Business & Customer Service	339	599	57%
Education	160	181	88%
Healthcare	986	1,773	56%
Information Technology	170	901	19%
Logistics & Transportation	2,416	3,022	80%
Skilled Trades	1,237	1,460	85%
Welding & Manufacturing	1,123	1,568	72%
Total	**6,431**	**9,504**	**68%**

Table 18

Completion Program Rates by Age and Industry

	16-25 years rate	26-35 years rate	36-45 years rate	46-55 years rate	56-65 years rate	66-75 years rate	76-80 years rate
Business & Customer Service	90%	86%	96%	95%	93%	100%	-
Education	-	96%	83%	86%	92%	-	-
Healthcare	92%	93%	93%	94%	96%	95%	100%
Information Technology	91%	94%	94%	97%	96%	100%	
Logistics & Transportation	92%	94%	94%	92%	95%	100%	100%
Skilled Trades	97%	94%	94%	99%	96%	97%	100%
Welding & Manufacturing	94%	95%	94%	96%	93%	67%	-
Total	**93%**	**94%**	**94%**	**95%**	**95%**	**96%**	**100%**

Table 19

Completion Rates by Race and Industry

Industry	White	Black	Hispanic	Asian	American Indian	Hawaiian	Unreported
Business & Customer Service	96%	88%	95%	95%	100%	100%	90%
Education	85%	100%	100%	100%	100%	100%	92%
Healthcare	92%	93%	95%	97%	91%	93%	95%
Information Technology	94%	92%	97%	96%	91%	67%	97%
Logistics & Transportation	94%	92%	92%	96%	97%	75%	93%
Skilled Trades	97%	95%	95%	92%	90%	88%	93%
Welding & Manufacturing	95%	93%	99%	100%	94%	100%	94%
Total	**94%**	**92%**	**96%**	**96%**	**93%**	**91%**	**93%**

Table 20

Completion Rates by Gender and Industry

Industry	Female	Male	Unreported
Business & Customer Service	92%	98%	90%
Education	90%	85%	100%
Healthcare	93%	91%	92%
Information Technology	94%	94%	100%
Logistics & Transportation	92%	93%	97%
Skilled Trades	98%	96%	98%
Welding & Manufacturing	92%	95%	79%
Total	**93%**	**94%**	**96%**

Table 21

Credential Attainment Rates by Age and Industry

Industry	16-25 years	26-35 years	36-45 years	46-55 years	56-65 years	66-75 years	76-80 years
Business & Customer Service	65%	54%	59%	51%	64%	29%	-
Education	-	96%	83%	86%	92%	-	-
Healthcare	52%	55%	55%	65%	72%	40%	0%
Information Technology	23%	15%	20%	23%	15%	29%	-
Logistics & Transportation	84%	80%	79%	79%	75%	88%	0%
Skilled Trades	91%	83%	80%	85%	78%	60%	33%
Welding & Manufacturing	72%	71%	73%	75%	61%	33%	-
Total	**70%**	**67%**	**66%**	**69%**	**68%**	**57%**	**14%**

Table 22

Completion Rates by Race and Industry

Industry	White	Black	Hispanic	Asian	American Indian	Hawaiian	Unreported
Business & Customer Service	59%	52%	63%	61%	63%	50%	45%
Education	85%	100%	100%	100%	100%	100%	92%
Healthcare	60%	49%	62%	58%	74%	64%	48%
Information Technology	20%	16%	16%	15%	9%	0%	31%
Logistics & Transportation	86%	75%	83%	83%	88%	75%	77%
Skilled Trades	86%	81%	91%	62%	78%	75%	86%
Welding & Manufacturing	74%	62%	66%	79%	92%	89%	80%
Total	**72%**	**59%**	**59%**	**44%**	**75%**	**68%**	**77%**

Table 23

Credential Attainment Rates by Gender and Industry

Industry	Female Credential Attainment Rate	Male Credential Attainment Rate	Unreported Credential Attainment Rate
Business & Customer Service	59%	41%	83%
Education	90%	85%	100%
Healthcare	56%	49%	67%
Information Technology	16%	20%	50%
Logistics & Transportation	76%	80%	87%
Skilled Trades	85%	85%	91%
Welding & Manufacturing	65%	73%	62%
Total	**59%**	**72%**	**84%**
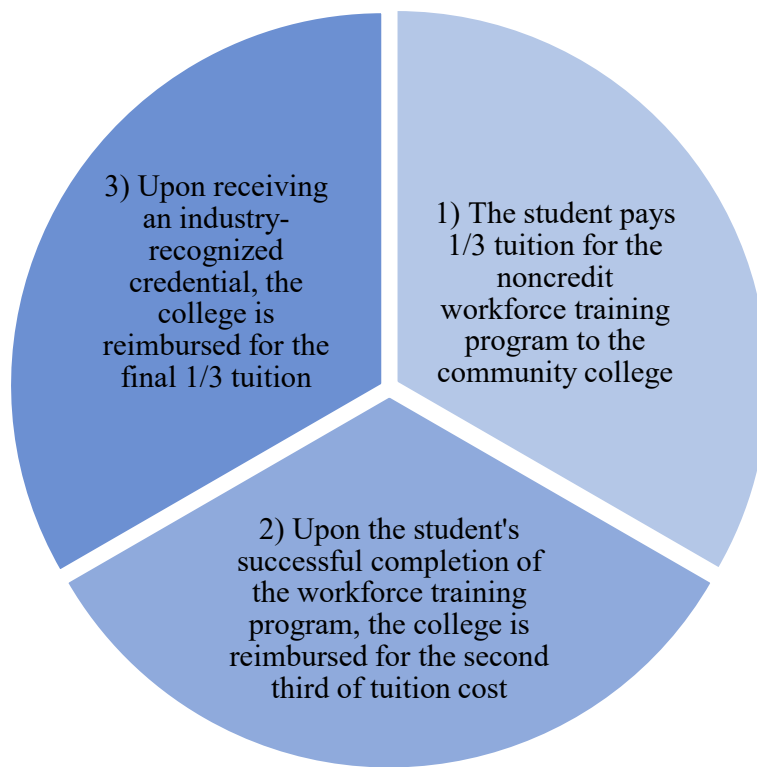
Figure 1. Funding model for the pay-for-performance program.