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A Program Evaluation of an Apprenticeship Program using Stufflebeam's CIPP Model

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Approval Page

This dissertation was submitted by Oai C. To under the direction of the persons listed below. It was submitted to the Gardner-Webb University School of Education and approved in partial fulfillment of the requirements for the degree of Doctor of Education at Gardner-Webb University.

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To my wife
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To My God
Only by Grace!

Abstract

A Program Evaluation of an Apprenticeship Program using Stufflebeam's CIPP Model. To, Oai C., 2017: Dissertation, Gardner-Webb University, Program Evaluation/ Apprenticeship/Apprentice/CIPP Model/Stufflebeam/Context-Input-Process-Product

This dissertation is a program evaluation of an apprenticeship program operated by Siemens Energy, Inc. in Charlotte, North Carolina. The evaluation was based on Stufflebeam's CIPP model of context (C), input (I), process (P), and product (P). The CIPP sought to evaluate (C) current and future objectives, (I) various strategies use to achieve the objectives, (P) the implementation of the strategies, and (P) the outcome of the program. The entire model provided insight into the effectiveness of the program and provided feedback for decision making and accountability toward current and future improvement of the program (Stufflebeam, 1971).

Four questions were cultivated to align with the CIPP model. The four CIPP questions were (a) Context: How are the objectives of the program matched up with the needs of Siemens and the apprentices; (b) Input: What characteristics help apprentices finish their program? (c) Process: Are the apprentices being successfully trained; and (d) Product: What was the outcome in meeting the program's strategic plan?

The research design methodology follows several pathways. Current apprentices took the online survey of the Noel-Levitz Adult Learner Inventory. They also completed the apprentice survey and were involved in a planned interview. The management team was administered a survey and was part of an interview. Other documents and data were reviewed and analyzed such as strategic plans, current and projected sales demand, applicant and apprentice information, training materials, graduation, retention, and employment information.

Based on the findings of the program evaluation, the apprenticeship program is effective and accomplishing its goals. The researcher has concluded three recommendations for consideration based on the evaluation findings: provide more support for apprentices, ensure the apprentices fully comprehend the curriculum requirements and expectations for their associate's degree, and develop a strategic plan with a mission and vision statement.

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Chapter 1: Introduction

Education has been structured in many different ways throughout history in developing the careers of young adults. The current pathway in the United States is through the process of graduating from high school and obtaining a 2- or 4-year degree from an institution of higher learning. This primary path in our education system ignores the advantage and benefits of other pathways to train and develop our young adults for future careers.

> Our current system places far too much emphasis on a single pathway to success: attending and graduating from a four-year college after completing an academic program of study in high school. Yet as we've seen, only 30% of young adults successfully complete this preferred pathway, despite decades of efforts to raise the numbers. And too many of them graduate from college without a clear conception of the career they want to pursue, let alone a pathway for getting there. (Symonds, Schwartz, & Ferguson, 2011, p. 24)

The college route is not the only way for young adults to achieve their career goal. Most students know their potential or desire to be college bound. The education system must change to provide more pathways to ensure success for everybody. All young people should have options and support to follow a variety of postsecondary education. The need for postsecondary education is most evident in the lifetime earning potential of our students. Depending on your education level, your career earnings can differ drastically. The below figure shows the difference in lifetime earning potential in relationship to achieved education level (DeNavas-Walt & Proctor, 2014).

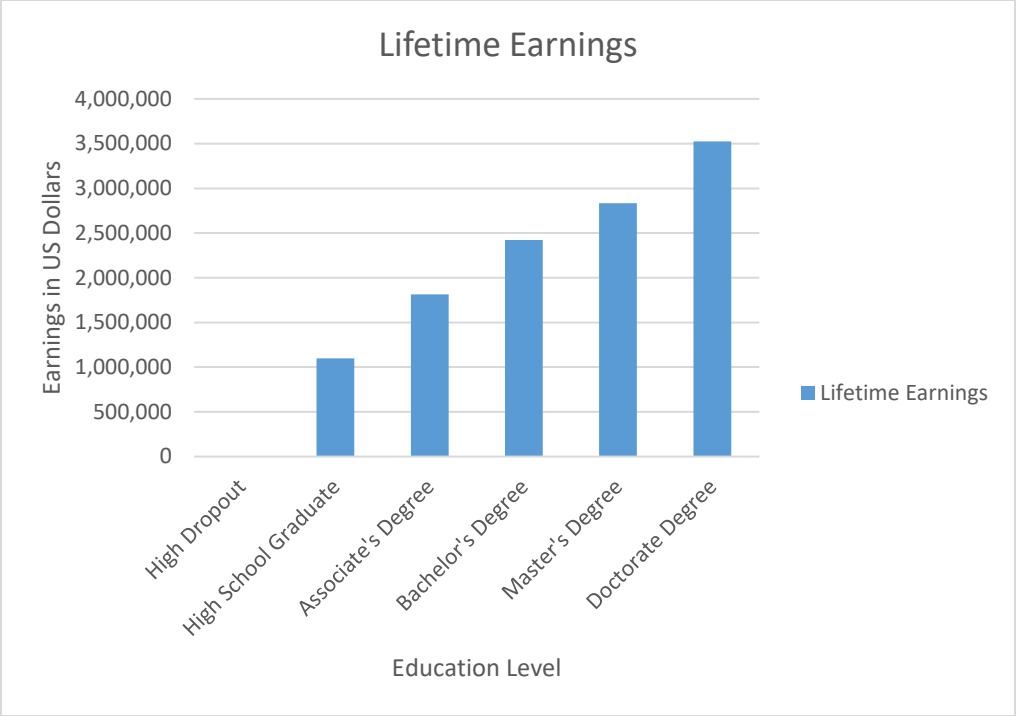

Figure. Lifetime Earnings Comparison with Educational Level.

For example, the difference in lifetime earning potential can be over a million dollars between a high school graduate and a postsecondary degree or certification (DeNavas-Walt & Proctor, 2014). Those differences in earning will determine each person's social-economic status. Furthermore, it will also reflect the country's social and economic success or failure.

The issue of education and careers begins in high school. The GradNation Report of 2015 shows the national high school graduation rate in 2013 was 81.4%. Even with gains of 15% since 2006 in graduation rates for minorities, non-Asian minorities were still finishing at a much lower level. The graduation rate in 2013 for Hispanics/Latinos was 75.2% and African-Americans was 70.7%. This is in comparison to high school graduation rates of 86.6% and 88.7% for Caucasians and Asians respectively. The data show that 18.6% of young adults did not graduate with their cohort. When examining the

results for Hispanics/Latinos and African-Americans, it shows a greater disparity for those subgroups achieving a minimum level of education for a career (DePaoli et al., 2015).

The dropout rates reflect poorly for the individual and the nation. One possible outcome for students who dropout is their likelihood to be on track for prison. According to a special report by the Bureau of Justice Statistics, 41% of prisoners do not have a high school diploma or graduate equivalent degree (GED) in the federal or state prison. This is in contrast to only 18% of people 18 and older in the public population (Harlow, 2003). In addition, state and local funding on prisons have increase by 324%, $17 to $71 billion, from 1979 to 2012. Within the same time period, public K-12 funding increased by only 107%, from $258 to $534 billion (Department of Education, 2016). Our focus on college pathways have created a pipeline to prison instead of careers. We must create career pathway options and encourage young people to transition from high school to a career.

> "We have huge numbers of young people who are dropping out of school, particularly in our larger metros, and there's significant numbers of young people who . . . graduate not very well-prepared for ongoing success in further education and a career," said Gary Hoachlander, executive director of ConnectEd, which promotes Linked Learning, the career pathway model Long Beach uses. (Webster, 2015, p. 4).

There are also issues when we examine college-level preparation for careers. In the Condition of Education report (Barmer & Velez, 2015), it showed that over 66% of high school graduates moved on to college in 2013. Of those going to college, 42% will attend a 4-year institution, while 24% will attend a 2-year institution. Of those who attended higher institutions of learning in 2012-2013, only 59.4% graduated from a 4-

year institution for full-time/first-time undergraduates within 6 years of beginning their program. For 2-year institutions, the graduation rate of full-time/first-time undergraduates was 29% within 3 years of starting their program (Kena et al., 2015).

When you correlate the data of high school dropouts, students who do not attend college after high school, and those who do not finish college, you have a huge segment of young people who have not been given a clear and supportive pathway to a career. The realization is very vivid if we just examine actual numbers of students who dropout and those who do not attend college after high school. For demonstration purposes, we will use a sample size of 100,000 students in quantifying the statistics for dropouts and those only finishing high school. With 18% of students who drop out, that equates to 18,000 students (Kena et al., 2015). Of the number of 82,000 students remaining, 34% do not attend college. This equates to 27,880 students who do not attend college. When you combine the two figures, it gives us 45,880 students. This means that over 45% of our students are not on a postsecondary education track; and this does not include young people who do not finish college. Thus, the data for high school and college demonstrate that too many of our youth do not attain the educational accomplishment needed to acquire a career of their choosing and meet the needs of our economy.

Problem Statement

It is expected that there will be 55.8 million new jobs by 2020. Of those new jobs, 30% of them are considered middle skill jobs that require additional education through training certificate or apprenticeship. In contrast, only 24% of the new jobs require a bachelor's degree. The other 36% are low skill jobs requiring a high school diploma or less (Carnevale, Smith, & Strohl, 2013). As cited by Jackson (2014), The stats from the PewResearch center show that 44 million baby boomers are currently still

in labor market. This accounts for 29% of the labor force. Baby boomers are reaching the retirement age of 65 at a rate of 10,000 per day and expected to continue for the next 14 years. Furthermore, the survey conducted by AARP shows that 54% of people turning 65 consider themselves retired, and 46% are working full time or part time (Love, 2010). The retiring baby boomers will demand new skilled workers to replace them, thus it is critical that our youth gain the skills and knowledge in order to have an opportunity to pave the path toward a career and meet the needs of the economy. As we attempt to provide our youth with a strong educational backbone, recent studies have shown that we are failing to provide the human capital necessary for a thriving and prosperous economy. According to the 2014 North Carolina Employers Needs Survey, 45% of respondents responded that they have difficulty hiring skilled workers (North Carolina Association of Workforce Development Boards, 2014). Nationally, it is at a similar rate of 45%, according to the State of Human Capital 2012 Report (Ray et al., 2012).

Furthermore, the 2013 Talent Shortage Survey from Manpower Group shows that 48% of employers had a hard time finding competent technical employees to fill open positions. Even during the Great Recession of 2008, 61% of employers surveyed by the Business Roundtable had problems filling vacancies with skilled workers during June to July of 2009. There is a severe shortage of skilled workers such as machinists, operators, craft workers, distributors, and technician according to a 2011 survey by Deloitte of American manufacturing companies. By 2012, there were 600,000 manufacturing jobs unfilled according to Deloitte (Olinsky & Ayres, 2013).

> The country faces a serious workforce problem when it comes to filling the jobs that require the highest level of skill and education. There aren't enough qualified job candidates, forcing companies to leave positions unfilled, hire people who are

> under-qualified, recruit talent outside of their home states or move business operations to new locations altogether. And in a global economy, in some cases Americans are competing for the highest-level jobs against a talent pool from around the world. (Malcolm & Webster, 2014, p. 3)

These reports indicate that four of five employers use in-house or on-the-job training to try to fill the "Skills Gap" in their hiring process. One such in house method is through an apprenticeship. Apprenticeships have existed since the beginning of mankind. As humans developed skills and talents to survive and thrive in the world, they have passed them down from one generation to another. The process of transferring those knowledge and skills ranges from simple agreement from master to trainee to more elaborated educational systems such as an apprenticeship. The formal apprenticeship system started around the Middle Ages which was controlled by the Craftsman Guild. It evolved into a system of government and industry control (DeMunck, 2007).

As companies decide to offer apprenticeship programs to meet their skilled employment needs, they must structure and process their program to be effective and efficacious (Olinsky & Ayres, 2013). The program must provide a successful alternative for them to meet their workforce needs while providing students a purpose and direction in completing their formal education resulting in potential employment.

Research and information on apprenticeship programs' success or failure are limited. Apprenticeship programs have been around for many centuries, but there are very small amounts of research evaluation about them. The researcher intends to add to the knowledge continuum by having evaluated an apprenticeship program. The evaluation determined the efficacy of the apprenticeship program by Siemens Energy, Inc. in Charlotte, North Carolina. The methodology was a mix approached of qualitative

and quantitative research. The study provided feedback and reflection for its stakeholders. In addition to enhancing the research in the field of apprenticeship, the evaluation model can be an example and/or a catalyst in demonstrating and guiding other companies that are exploring or implementing their own apprenticeship programs.

Program Description

In 1846, Mr. Werner von Siemens and Johann Georg Halske invented an electric telegraphy machine that pointed to a letter instead of using Morse Code and the Gutta Perchas Press that made it possible to create seamless insulation for copper wire. Their inventions lead to the start-up business of Telegraphen-Bauanstalt von Siemens & Halske. This initial company would eventually become Siemens Corporation (Siemens Archives, 2008). Mr. Siemens said, "in my youth, I dreamed of founding an enterprise of world standing comparable to that of the Fugger dynasty" (Siemens AG, 2016, p. 6).

According to the Siemens AG (2016) Company Report, it is a world-wide corporation that offers products and service operations in power and gas, wind power and renewables, energy management, healthcare, building technologies, mobility, digital factory, process industries and drives, and financial services. It had a revenue of 18,996 million Euros at the end of the second quarter of 2016.

Siemens employs 153,000 people around the world. In the U.S. alone, it employs over 52,000 people in 50 states. The company invests over 250 million Euros into their employee training and education programs. They built and fully equipped the Mandela School of Science & Technology in South Africa. There is also a training center for employees and customers being built in Egypt. Siemens has extensive apprenticeship programs all around the world (Siemens AG, 2016). The corporate philosophy is that "vocational training and integration are key enablers" for developing employees and

being an “employer of choice” (Siemens AG, 2016, p. 20).

Siemens Energy, Inc. in Charlotte, North Carolina, manufactures and services generators, steam turbine engines, and gas turbine engines for the power industry. It employs over 1,600 people and has over one million square feet of manufacturing space. The Siemens Charlotte Energy hub offers apprenticeships in the areas of machining and industrial maintenance. It has been in operation since 2011. The program works in conjunction with Central Piedmont Community College (CPCC). Recruitment begins in the fall with the apprenticeship team visiting and presenting the program to young adults in high schools and community colleges. In late January, CPCC collaborates with Siemens, Bosch, and Groninger to host an apprenticeship day. During the day, candidates tour all three company facilities. They receive information about CPCC and each company’s apprenticeship program. Candidates must apply to CPCC with a cover letter, transcript, resume, and recommendation letters and take the Accuplacer test. In addition, parents and candidates must sign a Family Education Rights and Privacy Act (FERPA) release form in order for CPCC to release information about each candidate to the three companies. They must also give a preference on which company apprenticeship program they wish to join. Based on grade point average (GPA), Accuplacer score, and other submitted information from the candidates, the review team invites selected candidates to an orientation session. During the 4-day orientation, candidates are evaluated based on hands-on safety and machine project, a written test, and an aptitude test (Collins, 2015b).

After completing the orientation, eight top candidates are offered an invitation for a final selection process in a paid summer internship. The candidates are paired with a current apprentice and mentors for additional evaluation during the 6-week (June-July)

internship. They attend two classes at CPCC and get further hands-on training. At the end of the internship in July, the final candidate(s) are selected to join the apprenticeship program that begins in the fall. During the 4-year apprenticeship program, the apprentice will take two to three classes a semester. They will complete their classroom coursework in 3.5 years and must maintain a 2.8 GPA. The 4 years are broken down into beginners, immediate, upper immediate, and fourth (last) year. Currently, there are four apprentices in the beginner year, seven apprentices in the immediate year, two in upper immediate, and two in their fourth year. The program has graduated 11 apprentices since the inception of the program. Apprentices must pay back the cost of books and tuition to Siemens if they fail to complete the program. Upon completion of the apprenticeship program, they must work at least 2 years with Siemens to fulfill their monetary obligation. Otherwise, they must repay Siemens the full cost of their books and tuition (Collins, 2015a).

The apprentice will get 1,600 hours of classroom instruction at CPCC and 6,400 hours of on-the-job training at the Siemens Charlotte plant. Their books and tuition are paid by Siemens. In additional, they will earn hourly wages during their on-the-job training. Upon completion of the apprenticeship program, the North Carolina Department of Commerce will bestow the apprentices with a journeyman certification as a machinist or mechatronics technician. Furthermore, they will receive a computer integrated machining technology or mechatronics engineering technology associate degree in applied science from CPCC. Within the mechatronics certificate, they can specialize in either a mechanical or electrical pathway (Collins, 2015a). The courses required to pass in order to receive the respective certification are listed in Appendices A, B, and C.

Graduates of the apprenticeship program are guaranteed a job with Siemens based on available positions. Siemens also offers $5,250 per year in tuition and books reimbursement for employees wanting to pursue their bachelor's, master's, or a doctorate degree through Siemens Educational Assistance program (Collins, 2015b).

The program coordinator has been managing the Siemens apprenticeship program since 2013. Since his graduation at the Newport News Apprentice School, he has worked at Siemens as a machinist, supervisor of machining and balance and currently as technical training specialist (Collins, 2016). The program falls under the umbrella of the training department at Siemens Energy, Inc. in Charlotte, North Carolina (Braswell, 2016).

With the Siemens Charlotte apprenticeship in its fifth year, it is critical to understand the program's reasons for success and the challenges it faces today and in the future. The study examined three areas: (a) the skills and knowledge students gain, (b) the performance of the program, and (c) how well the program meets the workforce needs of the company.

The long-term results from this study could include (a) suggestions for improvements or changes that can be useful in ensuring continued success of the program and (b) a model for other companies to replicate to meet their hiring needs for skilled workers.

Program Evaluation Model

This dissertation examined an apprenticeship program using the CIPP model of program evaluation by Daniel Stufflebeam. The model's guidelines examine the program goals, plans, actions, and outcomes.

The CIPP model consists of four parts. The first part of the evaluation analysis is the context of the program. It explores the needs, assets, and resources of Siemens

Corporation by qualitative and quantitative analysis of data collection, document review, and stakeholder interviews. The second part of the evaluation analysis is the input of the program. This involves examining the mission, goals, and plan of the program to determine how well the program meets the needs of the company. The third part of the evaluation analysis is the process. It explores the staffing and activities of the program. It determines how well they are planned and executed in making the program successful. The last part of the evaluation analysis is the product of the program. It involves exploring the outcome of the apprentice at the conclusion of the program (Stufflebeam & Shinkfield, 2007). "I believe that the CIPP model does provide a sound framework for both proactive evaluations to serve decision making and retroactive evaluation to serve accountability" (Stufflebeam, 1971, p. 2).

Research Questions

In order to determine the efficacy of the apprenticeship program at the Siemens Charlotte North Carolina plant, the CIPP model research method was used by the researcher. Following the guidelines of the CIPP model concept, four questions were cultivated to align with the evaluation of context, input, process, and product.

1. Context: How are the objectives of the program matched up with the needs of Siemens and the apprentices?
2. Input: What characteristics help apprentices to finish their program?
3. Process: Are the apprentices being successfully trained?
4. Product*:* What was the outcome in meeting the program's strategic plan?

The research questions were answered through a mixture of methodologies. The researcher conducted surveys and interviews with apprentices and management. The qualitative and quantitative data were processed and analyzed to answer each of the CIPP

model questions. The specific details are discussed in Chapter 3 on the participants, instruments, procedures, and limitations of the research.

Summary

The discussion in this chapter demonstrates the downfall and need to change many of our focuses on postsecondary education that would lead to a career for our young adults. The current system does not incentivize all students to finish high school and pursue postsecondary education. For those who do finish high school, many are floundering in entry-level employment. Even for those who pursue college pathways, many do not finish their studies. They end up not being prepared and trained for a career. These situations have caused a loss of human capital to help businesses and society be successful.

As the chapter demonstrates some of the possible solutions, this research evaluated one of those solutions, an apprenticeship program by Siemens Energy, Inc. in Charlotte, North Carolina. The research used the CIPP evaluation model to analyze the context, input, process, and product of the apprenticeship program. The evaluation demonstrates the program's value to all stakeholders. Furthermore, the evaluation research hopes to create some discourse about apprenticeship and provide some guidance for other businesses to create their own program.

Chapter 2: Literature Review

This program evaluation studied the efficacy of the Siemens Charlotte Energy Hub apprenticeship program in Charlotte, North Carolina. The research used the CIPP model of program evaluation through a mix approached of qualitative and quantitative research. The examination used data from company and program documents, literature review, surveys, and interviews from apprentices and management to answer four questions that were embodied in the CIPP concepts of context, input, process, and product.

In examining the literature review, this chapter focuses on issues related to development and policy reports of apprenticeship, overview of other working apprenticeship programs, and discussions of various models used for program evaluation.

Evolution of Apprenticeship

Throughout history, humanity has had to learn how to do things to meet the needs of people. All of these skills and knowledge have been passed down from teacher to students for generations. This process of "learning by doing" has been essential for the growth of every social and economic system. Apprenticeship evolved from private agreements between a student and a master craftsman to craftsman guild control to government and industry control (Hamilton, 1990).

It has ranged from an informal system of passing down skills and knowledge to formal learning system of apprenticeship from guild society to modern day apprenticeship program. This entire system has shaped societal education and industrial structure. The process of obtaining occupational skilled workers has been an important capital in the success of industry and business. Before human communities developed, most needs and wants were supplied by the family entity. Once the human population

grew enough around the area, there was a need to specialize in skills and trade. This specialization became the formal structure of apprenticeship in the Middle Ages with the craftsman guild, around 1000 AD-1300 AD (Munck, Kaplan, & Soly, 2007).

The guild excised a great deal of power over the craftsman. They dictated the amount of money they should be paid for different kinds of work. They said work was to be done during daylight. They set the guidelines for apprenticeship. The apprentice would begin around the age of 13 or 14 so they could be completed by the age of 20 or 21. In addition to learning the craft, they were also taught literacy and math. Most of it was done at a church school. As it was expected, they would need both skills to function and do business in the communities. The guild even spoke of how many apprentices a master craftsman can take on, usually one or two depending on the trade. The master craftsman would receive the monetary compensation of the apprentice work but must provide for shelter, food, and clothing (Harvey, 1975). Their dressing was indicative of their position and status within the society (Munck et al., 2007).

When the apprentices finished their training, they became craftsmen. If they traveled from town to town to get work as a skilled person, they were called journeymen. In modern day, it is represented by somebody who has gained the basic trade skills and is working on honing their skills to a mastery level. In order to move from craftsman or journeyman to a master level, they would have to meet the requirement of the guild. The guild provided the framework for determining when a skilled worker reached the level of master (Munck et al., 2007).

There were exams or demonstrations to prove mastery. At other guilds, there were different levels to achieve. One example toward the end of the Middle Ages was German rules dictated a system of five levels for lodge masons: apprentice, journeyman,

Parlier (warden), Kunstdiener master, and master-in-charge/workmaster (architect). This shows a further development of specialized skills for those who built verses those who designed the structure. The system of craftsman was ingrained so much that there were taxes (license) to practice their trade. One example during this time period was York, England. Records show they levied taxes to 116 occupations (Harvey, 1975).

The power of the guild to regulate apprenticeship shifted to the government by the Pre-Industrial period. The passing of the Statute of Artificers around 1562 created a national apprenticeship system in England. The new statutes brought together and updated all individual rules and laws in the local municipalities and boroughs. It helped streamline the system to promote high standardization and allow more poor folks to be trained to aid in the industrial development. It removed many problems of patronages from the craftsman guild. Furthermore, the act helped to set standards for wages earned for each trade. Another reason for its passage was the thought that it would help rise the wealth of common folks. In return, it would increase the money flowing into the Crown's treasury. Their need to increase funds was also tied to increasing trade abroad. The increased in trained craftsman would increase the production of products (Dunlop, 1912). Until the new law, most trades were organized into guilds. The law required that anyone wishing to practice their craft must be trained through an apprenticeship. In addition, the law allowed any apprentice who had finished their training to practice anywhere in the country (Wilson, 1965).

The standardization of apprenticeships codified many of the standing rules existing in many craftsman guilds that required a minimum of 7 years of apprenticeship services. The apprentice hours were from 5 am to 8 pm during the months of March through September. From September through middle of March, they would work "from

the spring of the day until night" (Dunlop, 1912, p. 175). They would work every day except for religious days and celebrations. The rule states that apprentices should not leave until they reach the age of 24. For the apprentice, the rules made it a lawful requirement that the master craftsmen house, feed, clothe, and fully teach their crafts. The government was responsible for ensuring compliance between the master craftsman and apprentice. By 1626, most guilds changed their approach and charter to become companies. They became more like an association in providing guidance and helping to enforce the national law.

Starting around the early 1700s through 1840, the apprenticeship system was in a decline due to several reasons. During the English Civil War of 1642 with the Scotts, the Statute of Artificers was a failing law due to the lack of ability for enforcement. The government, both local and national, did not enforce the requirements of the Statute such as registering or limiting the number of apprentices you could take on. There was also low entrance of apprentices because they were drafted into the war. In addition, more craftsmen were available from abroad (aliens) and those who did not complete an apprenticeship program (Dunlop, 1912).

By the 17th century, merchants were creating markets for the craftsman and displacing them. There was no longer a direct link from the craftsman to the buyers. Merchant capitulation was changing the structure of manufacturing and industry. Land became important as a commodity to gain resources and products such as wool, timber, coal, and iron. It led to the need to be more specific in task and status of people in a production and commerce economy (Wilson, 1965).

The decline was further exacerbated with the transition to the Industrial Revolution between 1760 and 1840. As factories and machinery took over the

production and manufacturing industry and market competition, mass amounts of people moved into them and away from apprenticeship. People were not indentured for long periods of time and did not need broad and complex skills to do their work in factories (Dunlop, 1912). With a population of over five and a half million people in 1688, you had around half a million people who earned a very good living in the trade and manufacturing of goods. They earned a higher return as compared to those tied to the land (Wilson, 1965).

The Stature of Artificers was so ignored that it was eventually repelled in 1814. The repeal of the law removed the requirement of an apprenticeship to be able to work in industry. This did not eliminate the process and purpose of an apprenticeship. Apprenticeship was redefined for industrial proposes. It became specialist skills in many parts of the factory, yet the apprenticeship did survive in some specialist crafts such as watchmakers (Dunlop, 1912).

During the colonial age of the 1700s and 1800s, local governments controlled the apprenticeship. Apprenticeships were used in limited numbers as compared to indentured servants and slaves. The apprenticeship and indentured servants were regulated by the Governing Servile Labor law passed by the Colonies in 1715. It provided obligations and terms of action by the master and apprentice. One of those requirements dictated that the master had to "provide competent Dyet, Clothing & Lodging" while putting limits on punishment and term of services (Zipf, 2005, p. 10). The colonies in 1741 ratified the Act of Concerning Servants and Slaves of 1741. In contrast, there were forced court-ordered apprenticeships that were guided by county courts. These were court-contracted apprenticeships binding the minors with the masters. Usually, it was without the consent of the child or parents. With providing the masters with the labor, they were required to

"raise the child in such a way that he or she would not become a burden upon the county" (Zipf, 2005, p. 10). The county court initiated involuntary apprenticeships due to the minor being an orphan or one taken from homes they considered insufficient in providing good growth and welfare. Ultimately, the North Carolina involuntary apprenticeship evolved into a system controlled by an "apprenticeship code." These codes encompassed a combination of judicial opinions and legislative acts that operated outside the normal realm of contractual relations.

During this era, there was a difference in how the apprenticeship was used between the North and the South. In the North, apprenticeships provided "bound labor" for the work force. During the 1770s in Philadelphia, 80% of the work force was comprised of apprentices, slaves, and indentured servitude. In Philadelphia in 1787, there were apprentices who were trained to smith nails in the "Nail Factory." In the South, apprentices served a harsher treatment. Most of them learned and worked on the farm. In this era, apprenticeship "was an institution employed by the white patriarchal elite as a measure of social control" and provided cheap labor from orphans, single family parents, and free Black children (Zipf, 2005, p. 7). It had a bad reputation and was not used to improve the workforce.

In the late 18th century and early 19th century, apprenticeships in the south were not used as much due to the use of slaves. It was never a big source of labor during that time due to large plantations rather than industry. In addition, due to racial discrimination, Black apprentices had fewer choices in types of learned trade than their White counterparts. One well known apprentice was Andrew Jackson, the seventh President of the United States. He was an apprentice as a tailor in North Carolina. He and his brother ran away from their apprenticeship and eventually opened a shop in

Tennessee. By 1865, apprenticeships declined to almost nonexistent. In the North, the free labor system was preferred by employers. In the South, conscription laws, loss of young men due to the war, and fleeing African-Americans reduced available apprentices and masters. The involuntary apprenticeship ended in 1919 with the replacement of the Child Welfare Act in North Carolina (Zipf, 2005).

In the 20th century, a major reason for the cap in growth and usage of apprenticeships was due to the industrial revolution. Eli Whitney's invention of interchangeable parts made manufacturing simple enough to use unskilled labor. Furthermore, the use of machines to produce parts reduced the need for specialist craftsman. In addition, good wages attracted young man into factory jobs (Hamilton, 1990).

Due to apprenticeships' checkered history, slavery, industrial revolution, and timing in history, they never took hold like in Europe. Factory owners and investors were not interested in training workers. They taught only the specific skills needed to get the job done. Their main interests were to keep costs down and profits high. Workers had long hours and low pay. Children were exploited and worked as much as 12 hours a day. It was not until child labor laws were enacted in the mid-1800s that exploitation of children workers began to change (Zipf, 2005).

There were few apprenticeship opportunities around. The ones that were available paid very little. The Pennsylvania Railroad began its apprenticeship program in 1865 and paid apprentices only 50 cents per day for a 10-hour workday. After 620 days of apprenticeship, they could start earning 80 cents per day. Another example is in a machine shop in 1883. Apprentices in their first month earned 5 cents an hour for a 60-hour work week. Furthermore, apprentices had no promise of a job when they finished

training (Paquette, 2005).

As the years passed, workers and unions pushed for changes and legislation. The first law enacted for apprenticeship was in Wisconsin in 1911. It stipulated that an apprenticeship was governed by the Industrial Commission and that the apprentice should have classroom training for a minimum of 5 hours.

With the isolationist mindset of the country before World War I that limited immigration and the industrial growth of the United Stated after the First World War, the country faced a skilled worker shortage. In order to increase skilled workers and promote apprenticeships, the National Apprenticeship Act was passed in 1937. It was also called the Fitzgerald Act in reorganization of the sponsor, Congressman William J. Fitzgerald (D-CT). The law created the Federal Committee on Apprenticeship. The group was represented by employers, laborers, and a representative of the U.S. Office of Education. Then the Apprentice-Training Service under the Department of Labor was used to direct the law. It was later changed to the Bureau of Apprenticeship. The national standards, program development and registration, and coordination with states are handled by the U.S. Department of Labor Office of Apprenticeship and Training. More recently, all apprenticeship matters are handled by ApprenticeshipUSA (2015) under the U.S. Department of Labor Employment and Training Administration. The department has state offices in all 50 states and the District of Columbia (Paquette, 2005).

Today, the Department of Labor under the office of ApprenticeshipUSA (2015) provides information, handles the registration, and sets the standard for apprenticeship programs. The registered programs pay for most if not all the cost of the classroom and on-the-job training. They are required to have at least 144 hours of classroom instruction per year and have at least 2,000 hours of work experience. Since apprentices are

employees, they are paid at least minimum wages. Most programs start their salary at 50% of their skilled worker's wages. The salary increases as their skill level and responsibilities increase (Paquette, 2005).

In 2015, there were 447,929 apprentices developing their skills in 20,910 active apprenticeship programs in the U.S. The programs graduated over 52,500 apprentices while enrolling more than 197,500 new apprentices in 2015. Overall, there was an 8% increase in active apprentices from 2014. Some of the industries participating in the registry are construction, manufacturing, telecommunications, transportation, wholesale trade, accommodation and food services, finance and insurance, arts/entertainment and recreation, information technology/networking, service and retail industries, healthcare and social services, military, agriculture/forestry/fishing and hunting, mining/quarrying/ oil and gas extraction, utilities, and public sector. These represent over 850 apprentice occupations (ApprenticeshipUSA, 2015).

Review of Other Apprenticeship Programs

Job Corps. Job Corps is a governmental program that provides vocational and educational development for young adults from ages 16 to 24 years old at no cost. The program is overseen by the United States Department of Labor through the office of Job Corps. It was established in 1964 through the Economic Opportunity Act of 1964 and recently reauthorized through the Workforce Innovation and Opportunity Act of 2014. Its key mission is to endeavor young adults who are economically disadvantaged to teach them employable skills and/or further their educational pursuit. Furthermore, it provides career support services (Job Corps, 2015).

The program has 125 job centers throughout the 50 states, District of Columbia,

and Puerto Rico. These campuses are operated by private contractors. They serve over 60,000 young adults each year. Students have the options of commuting to the center or living on campus. Most students live on campus. They are provided free housing, meals, healthcare, monetary allowance, training, and career support. While living on campus, they establish a routine schedule of classroom/study and training time, recreational and intramural activities, fulfilling personal and campus responsibilities, and community service projects. Activities are coordinated and overseen by campus counselors (Job Corps, 2013).

Students can earn their high school equivalency credential, college credits, or receive technical training in over 100 career areas that are aligned to industry standards. Some of the career technical training areas are advanced manufacturing, automotive and machine repair, construction, finance and business, healthcare, homeland security, hospitality, information technology, renewable resources and energy, retail sales and services, and transportation. Each center offers a variety of different training areas. Along with the classroom training, they also can get on-the-job training and experience (Job Corps, 2013).

Students are accepted through an application and screening process. Some of the criterion are legal U.S. resident, low-income status, consent from parent or guardian for students under 18, no behavioral issues, and no record of illegal drugs. Once accepted, counselors will work with the young adults to develop a career plan. Their career plan with Job Corps may take between 1-2 years to complete. They progress through the plan at their own pace depending on their ability, technical training, and educational goals. Once they have achieved their career plan, the program provides for job search skills and up to 21 months of career transition support (Job Corps, 2015).

With the Job Corps spending approximately $1.5 billion on 60,000 young adults each year, two program evaluations found it not effective in serving low-income youth. The United States Department of Labor authorized a different study of the Jobs Corps in 1993. Unlike the previous evaluations that only focused on selected sites and used limited data in comparing enrollees to high school dropouts and other youth in low enrollment areas serviced by Job Corps, the new study was a national study based on a comprehensive experimental design. In the 81,000 applicant pool, young adults were grouped into a group of accepted enrollees and those not accepted into the program. Approximately 6,000 young adults were in the not accept group. The study examined the outcomes of the program and control group members for 4 years after acceptance or rejection of the applicants. Furthermore, the study examined the income earning of the two groups for 9 years since the start of the evaluation (Schochet, Burghardt, McConnell, 2008).

The results between the experimental and control program were significant in some areas. Students in the program had a 15% increase in receiving their GED. In the area of vocational, technical, or trade certificate, there was a 22.3% increase in the experimental group verses the control group, yet there was nearly no difference in the two groups pursing a 2- or 4-year college degree. The two groups had a .2% difference. The earning differences between the two groups were small. The average earning of the experimental group was $6,828, while it was $4,485 for the control group. The difference of $2,343 was in line with the previous two studies. In addition, there was also a difference between the two groups with regard to arrest and incarceration during the beginning 4 years of the program for less serious crimes. The control group had 33%, while the experimental group had 29% (Schochet et al., 2008).

Overall, the evaluation conducted a benefit-cost analysis based on the cost of $16,500 per Job Corps participant. The data for the 4 years demonstrated less than a $4,000 gain between the two groups, yet the evaluation showed that the additional training and experience gained an economic benefit that persisted in the older youth. Thus, as the years progress, the overall benefits for the lifetime of the participants increase in the long term (Schochet et al., 2008).

Newport News Apprentice School. Newport News Apprentice School provides educational training in shipbuilding careers that provides apprenticeship through Newport News Shipbuilding Yard. It is a private for-profit company that was founded in 1919. Their mascot is the Builder. The school is located in Newport News, Virginia. The company's programs are hands-on experience through apprenticeships. It offers training careers in electrical technology, heating and air conditioning, pipefitting, rigging, sheet metal, welding, advanced shipyard operations, and marine design. The school has around 725 students. Students who apply for the school are expected to have completed high levels of math, science, and technology courses (The Apprentice School, 2015a). The acceptance rate for the school is around 5%. Harvard University has an acceptance rate of 5.9%. Duke University has an acceptance rate of 12.4% (Lessig, 2015).

The school is housed in an 85,000 square-foot building with state-of-the-art technology that opened on May 3, 2012. It is a world class machine shop and steel fabrication facility. There are workshops for extensive work in sheet metal and wood. In addition, the school has shops to repair or completely rebuild motors. This includes a repair facility for propulsion shafts up to 65 tons. The facility also handles repair and calibration of high-capacity pumps and valves (The Apprentice School, 2015b).

All apprentices receive wages and benefits while attending school and getting on-

the-job training. The pay rate depends on their schedule of completion, academic and shop grades, and attendance. Students are paid overtime. The benefits include life and unemployment insurance, paid holidays and vacations, medical and pension plans, Social Security, and worker compensation. Based on the general apprentice wage schedule, an apprentice can earn a starting hourly pay of $17.08. Depending on which track is followed, a first-year apprentice can earn an annual salary between $36,400 to $47,500. When they finish their program, their starting salary can range from $54,000 to $66,380 (The Apprentice School, 2015c).

The school partners with Ingalls Shipbuilding for their apprenticeship program. The apprentices can receive specific job training as electricians, boilermakers, structural welders, pipe welders, composite mechanics, pipefitters, painters, and machinists. Along with classroom teaching, trade experts supervise student on-the-job training. Their apprenticeship program consists of 4- and 5-year tracks. Students earn the status as a journeyman with the completion of the program. In addition, they can earn an Associate of Applied Science degree in Occupational Education with completion of additional course work (Huntington Ingalls Industries, 2015).

Ingalls Shipbuilding is also better known as Newport News Shipbuilding. It is own by Huntington Ingalls Industries. Their work with the U.S. Navy and commercial consumers involves designing, building, overhauling, and repairing of many different kinds of ships. It employs over 21,000 workers. The company is the only builder of nuclear-powered aircraft carriers. Furthermore, it is one of only two builders in the nation for nuclear-powered submarines (Daily Press, 2016).

Even though it cost Huntington Ingalls close to $270,000 to cover the apprentice schooling and salary, the C.E.O. of Huntington Ingalls Industries, Mike Petters, considers

the apprentice and future employee a public good and an asset for the company. He is proud that the apprenticeship program leads to well-paying jobs that allow people to have a middle-class life without any college debt. Once the apprentices gain full employment with the company, they can further their education with a college degree from Old Dominion University paid by Huntington Ingalls (Schwartz, 2015).

Examining Policy Reports

Educational and career topics have been researched and discussed in many policy reports from various organizations. Those reports discuss many of the same issues and concerns about the status of our postsecondary education. The key concern in all the policy reports can be summarize in the following statement: "Within the U.S. economy, there is also a growing evidence of a skill gap, in which many young adults lack the skills and work ethic needed for many jobs that pay a middle-class wage" (Symonds et al., 2011, p. 1).

High schools are not setting the foundation for students to compete in the global economy that requires highly skilled and deep knowledge bases. This is evident in the numbers of students needing remedial courses in colleges. At the 4-year public colleges, 29% of students are enrolled in remedial courses; while at 2-year public colleges, 43% of students are enrolled in those courses. It is also evident in the completion rate of students in colleges. Only 56% of students finish at a 4-year institution within 6 years, and approximately 30% of students finish at a 2-year institution within 3 years (Strong American Schools, 2008).

When you examine students who do not enroll in colleges, most of those students enter the job market in low-skill or entry-level jobs. Some end up working and trying to

obtain a postsecondary education. The effect of transitioning from high school to completing a postsecondary certificate or degree is approximately 10 years. For these students, only 10% of 18- to 22-year-old employees get training related to their job. This is in contrast to other countries that get over 15% such as Sweden, Belgium, Switzerland, and Norway. In Austria, France, and Slovak Republic, over 20% of young adults get job-related training. The United States' lower job training rate results in higher economic cost and lower productivity. Depending on certificate and field of study, students with a postsecondary education below a 4-year degree can earn anywhere between 13-23% more than a high school graduate. Based on the U.S. census for 2011, the lifetime median annual earnings of a high school graduate is $1,371,00, while a bachelor's degree graduate is $2,422,000. The comparison with an associate's degree graduate is $1,813,000 (Julian, 2012).

The difference in wages are exacerbated by the change in the future labor market. The demands of the labor market have changed drastically since 1973. The workforce in 1973 was made up of 72% of people with a high school education or less. By 2007, it had reduced to 41% of the labor force with a high school education or less. Despite the growth of 63 million new jobs since the 1970s, the available jobs for workers with a high school education or less dropped by 2 million. All of the new jobs require at least an associate's degree or occupational certificate. Basically, new jobs that require some kind of college education went from 28% in 1973 to 59% in 2007. The number of new jobs available for high school graduates or less will be 36%. This means that over 60% of new jobs will require some sort of education beyond a high school diploma (Olinsky & Ayres, 2013).

The issue with postsecondary education and training is so important that on

February 24, 2009, President Obama, in a speech to a joint session of Congress is quoted saying,

> I ask every American to commit to at least one year or more of higher education or career training. This can be community college or a four-year school, vocational training or an apprenticeship. But whatever the training may be, every American will need to get more than a high school Diploma. (Kuczera & Fields, 2013, p. 17)

The presidential statement stressed the need to focus on the importance of an inclusive postsecondary education for all young adults. When you examine information from the report, The College Payoff, concerning the U.S. labor force and their corresponding level of education, you get 11% with postgraduate qualification, 21% with bachelor's, 10% with an associate's, 14% with come college experience, 24% with a high school or GED degree, and 8% with no high school degree. By the year 2020, half of the 14 million new jobs will require people with postsecondary education of an associate's degree or occupational certificate (Carnevale, Rose, & Cheah, 2011).

Even with the knowledge and information on future job forecast,

> the U.S. education and training system is not on pace to meet future workforce demands, with damaging consequences for workers, businesses, and America's global competitiveness. Academic and industry analysis have shown that the United States is on track to experience a shortage of skilled workers within the next decade, as our economy increasingly requires workers to have some formal education or training after high school. (Olinsky & Ayres, 2013, p. 4)

Many organizations ranging from Partnership for 21st Century Skills (members include Microsoft, Apple, Cisco, and Pearson), Child Trends, and the Conference Board,

in Are They Ready to Work, reported the gaps and lack of the skills in critical thinking, high personal expectations, self-management, problem solving, creativity, and communication. This also includes "soft skills" such as spiritual development, positive identity, and healthy habits. Most educational schools emphasize and encourage college readiness (Casner-Lotto, 2006). The issue is "that a focus on college readiness alone does not equip young people with all of the skills and abilities they will need in the workplace or to successfully complete the transition from adolescence to adulthood" (Symonds et al., 2011, p. 4).

With the low college completion rate, the United States has earned the distinction of having the "highest college dropout rate in the industrialized world," according to the Organization for Economic Cooperation and Development (OECD, 2008, p. 21). One of the main reasons often sited is the projection of the small pathway to succeed through college education that does not reflect the reality of the labor market. During the years after World War II, most students finished high school and were able to get a well-paying job. Those with the ability pursued a college education. The times have changed for young adults. The labor market now demands a variety of skills and educational levels to serve the workforce. The system did not evolve and change to embrace the broader economy. Two-year and credentials education were not highlighted as a strong alternative pathway to a successful career. Recent accountability studies of over $400 billion spent on colleges gave inconsistent results. The underlying question is how do we increase the attainment of postsecondary education and credentials? One key answer is to provide concrete guidance to career opportunities available through all avenues of postsecondary education. The intense career guidance will provide stronger links and motivation to complete their education from high school through postsecondary

education (Symonds et al., 2011).

As we reflect on our situation through the lenses of other countries, we are shown lessons we can implement to improve our educational system. Countries in Europe have closer ties between educational programs and the labor market. For example, 40-70% of students in Austria, Denmark, Finland, Germany, the Netherlands, Norway, and Switzerland choose to obtain a vocational diploma or certificate that comes with classroom and workplace experience. This system of apprenticeship is structured in two ways. The first way involves company and state corroboration. The students attend 3-4 days of workplace training while receiving 1-2 days of classroom instruction. This method is widely used in Germany and Switzerland. It is best known in Germany, so much that it now offers 350 different occupations through this process. The second structure exposes and give students experience and knowledge in a variety of different occupations. By the time they are in the eleventh grade, students have begun to focus on specific occupational training pathways. Students would receive classroom training with some work-based experience. Parents and students do not have to make occupational pathway choices in middle school like Germany or Switzerland but are given additional time through the ninth grade to pursue their pathway like Finland and Denmark. Even through most Americans would criticize the early decision for occupational pathway use in Germany and Switzerland, their apprenticeship system has achieved "rigor, relevance, and relationships" (Kuczera & Fields, 2013, p. 51). Students who have completed their apprenticeship program would have an educational equivalence of a technical degree in a community college (Kuczera & Fields, 2013).

Companies can train and socialize students to meet their labor needs by paying as much as half or more in educational costs through apprenticeship and classroom

education. In addition, most companies only have to pay them training wages and terminate the relationship if things do not work out. For these reasons, over a quarter of German and Swiss companies are involved with the apprenticeship program. In general, the ability to tie work and schooling has given students in these countries a high rate of attainment of postsecondary education. It is reflective in the fact that the U.S. has fallen in high school graduation from first place in the 1970s to 13th place in the 2000s, according to OECD, 2008). Furthermore, the U.S. has fallen to 12th place with 40.4% of young adults between the ages of 25-34 years old who have earned an associate degree or higher according to the College Completion Agenda 2010 Progress Report (Hughes, 2013).

One way to reflect on our low percentage of earned postsecondary degrees or credentials is to examine data comparison of OECD's (2009) PISA of other countries. The PISA is a test of 15 year olds across 12 industrialize nations that measures student ability to solve and deal with problems and situations from what they have learned in literacy, math, and science. It does not test the retention of learned curriculum. This skill and thinking ability to problem solve is one of the most sought-after traits by employers. The U.S. has a 17th ranking in science and 25th ranking in math (OECD, 2009). The Education at a Glance report in 2008 described other countries with over 50% of young adults in vocational education and training (VET; OECD, 2008).

The lessons from other countries in the two reports from OECD (2006, 2010) demonstrate the prospective reasoning for work-based learning. Work-based learning provides support and developmental transitions from adolescence to working adulthood. The reports pointed out that 80% of trained young adults find work within 6 months of completion of their program, while only 48% in the U.S. find work. The conclusion of

the reports was that countries with high integration of work and learning such as an apprenticeship program better prepare and secure jobs for their young adults. In another framed perspective, "Economic prosperity and social cohesion depends on an appropriately skilled and employed workforce" and "School learning is abstract, theoretical and organized by disciplines while work is concrete, specific to the task, and organized by problems and projects" (Symonds et al., 2011, p. 19).

Apprenticeships are real jobs that pay them while learning a career. They can earn anywhere from 50-60% of their eventual professional pay. Once apprentices finish their training, their salary increases dramatically. Most of them start off at an annual salary of $50,000. In addition, apprentices get hands-on training, industry or educational certification, and accrue little or no educational debt. The apprenticeship program has benefits for both employee and employer: "The return on investment for apprenticeships was found to be substantially higher than for any other workforce training program – including community colleges" (Strong American Schools, 2008, p. 13).

As we examine and workout possible paths to increase the 54% attainment of postsecondary education, one area to examine is postsecondary career and technical education (CTE). While the United States uses CTE to refer to vocational education and training (VET), other countries use the acronym VET. As such, it is difficult to compare the system of CTE verses VET. The United States CTE systems are comprised of regional and state systems of courses that add to the principles of a comprehensive high school that does not directly develop into a career. In other countries, their VET systems are comprehensive skill and training education platforms that lead young adults into a career. With over 15 million students enrolling in high school and postsecondary CTE courses, the evolution of CTE from vocational education has carried with it the stigma of

low-quality education for the minority. It has been used as a dumping ground for students not pursing a college pathway. This mentality by educators and the public must be addressed and changed. CTE programs must provide career counseling. They need to provide quality programs that provide occupational alignment that leads to certification credentials or degrees. Those available credentials and degrees must be responsive to local labor markets. If structured and operated properly, CTE programs can be a very effective training tool and career pathway (Kuczera & Fields, 2013).

Since CTE is not a comprehensive postsecondary career training program, we must diagnosis some of the factors contributing to the lack of postsecondary education for our young adults. First, we must ensure valuable student time and resources are being used to guide and prepare students for postsecondary education. Second, we need to change the law to allow federal and state money, Carl Perkins, to be more targeted toward school based career training such as certificate and apprenticeship programs (Kuczera & Fields, 2013). Finally, we must change the mindset of the education system. Education must prepare students for a career, no matter what track the students pursue. This includes career guidance and exposure to all possible paths to a postsecondary education.

Over 60% of 2-year degrees awarded are for work certification, while the rest are for academic preparation toward a 4-year degree. Many other countries have similar 2-year postsecondary institutions such as TAFEs in Australia, professional academies in Denmark, and Fachschulen in Germany. The transition for high school graduates in most developed countries is straightforward. Most graduates go into a postsecondary vocational education training or a college and university track. In other countries, young adults have better training and skills by their early 20s. One of the causes for the lack of

employment preparation is that each state has its own system of high school attainment. There is no national exam or standard set across all the state or regional areas. This has led to concerns about high school graduates who are not college ready (Kuczera & Fields, 2013).

In addition, many are concerned that the CTE system does not prepare students for postsecondary education. The United States' system of community colleges allows anybody to enroll as long as they take a placement test and meet the standards or bring their level up by taking remedial courses in their area of deficiency. Public 2-year colleges have over 90% open acceptance into the school, while public 4-year colleges have under 20% acceptance rate. The high acceptance rate has led to higher dropout rates. Most European countries have some sort of qualification for the postsecondary educational programs. For those European institutions that have an open acceptance policy, they face similar dropout rates as the U.S. One distinction for the U.S. postsecondary education is the high rate of people who have some college education. With the ease of entry into 2-year colleges, people would start and stop their education throughout their careers (Kuczera & Fields, 2013).

One of the key factors in helping young adults achieve postsecondary credentials or degrees is employer involvement. The employer can provide a key link to work-related education. Businesses and corporations must be "deeply engaged in multiple ways at an earlier stage in helping to set standards and design programs of study; in advising young people; and most importantly, in providing expanded opportunities for work-linked learning" (Symonds et al., 2011, p. 30). Just like in other countries, employers play a major role in cultivating future employees for themselves and others. They provide career counseling, job shadowing, workplace tours, job fairs, internships,

apprenticeship, and critical feedback in setting career educational training standards. The employer becomes a training partner and cheerleader to ensure student success. This is reflected in high attainment of postsecondary education in countries with strong employer participation. Student success rates soar with employer mentors and potential job prospective when they complete their study and training both in high school and postsecondary (Symonds et al., 2011).

The Pathway to Success Report (Symonds et al., 2011) discussed many different strategies being used by public and private organizations to address the need for postsecondary education. First, there was some initial federal involvement in building a relationship between students and employers in the 1990s with the School-to-Work Opportunities Act (STWOA). The small funded program attempted to build a system of local, state, and employer collaboration in training and educating young adults. It lasted for 5 years with limited success. Today, experts are calling for a more in-depth involvement of all parties in training and educating young adults. There are several examples of programs geared up to assist young adults. U.S. First is a program sponsored by over 3,000 corporations and 70,000 adult volunteers that offers learning opportunities in engineering through robotics competition from elementary through high school. It was co-founded by Dean Kamen in 1989. It has grown from 28 teams in 1992 to 55,000 high school participants by 2011.

Another program is the Wisconsin Youth Apprenticeship Program. It is the nation's largest apprenticeship pathway for high school students that started in the early 1990s. It offers college credit and up to 900 hours of work-based course credits to high school juniors and seniors. The apprenticeship ranges from healthcare to manufacturing and information technology. It serves approximately 2,000 students in over half the

school district of Wisconsin. It has a tremendous success rate with over 75% of its students continuing with technical college or university. Furthermore, the completion rate at the postsecondary level is over 60% with over 85% of students employed upon their program completion (Symonds et al., 2011).

The National Academy Foundation (NAF) is another organization that is helping to expose career options to students. Its five main themes are finance, hospitality, tourism, information technology, and engineering. It currently has approximately 500 career academies with over 50,000 students in 41 states. It provides 6-10 weeks of paid internship sponsored by over 2,500 corporate partners. According to NAF's record, 90% of participants graduate from high school. From those students, 80% of them go on to college with a completion rate of 52% within 4 years.

Another good example is the Year UP program that helps young adults with a high school degree or GED be immersed in a 6-month training and internship program in the IT and financial services. The completion rate of this program is 83% with over 75% finding a job within 4 months. Furthermore, employers involved with this program are satisfied and would recommend it to other employers. Illinois is starting a "learning exchange" that offers career clusters in health sciences, agriculture, and manufacturing through a consortium of public, nonprofit, professional organizations along with industry employers to promote and participate in work-based education (Symonds et al., 2011).

In A Skills Beyond School Review of the United States report (Kuczera & Fields, 2013), several programs are highlighted in their efforts to change postsecondary education. The first example is the Project Lead The Way (PLTW). It is a program that offers 4-year sequence engineering classes that go from a broad focus to a narrow engineering field such as biotechnical and electronic. The program also has a biomedical

science curriculum. The survey shows that 80% of students who have completed this program plan on pursuing this field in college. The second program is The Career Academy Movement. The academy focus on college-prep along with integrated career theme and work-based experiences. A third program call Linked Learning Initiative provides for demanding academic and technical education with supported services for career counseling and work-based learning. There are also many other efforts in many states such as Massachusetts and Florida to improve CTE. In Washington state, they have the Integrated Basic Education and Skills Training (I-BEST) that helps with remedial English and math skills that are integrated into CTE programs at the college level that range from nursing to auto repair. The state of Tennessee has 27 technology centers that provide training which leads to 50 occupational field certificates and diplomas.

All of these programs demonstrate the need for postsecondary education that links classroom education to work-based learning. Young adults can learn in the classroom while getting work experiences that tie to their studies and career major. It can be in the form of co-operative education which is used sparsely. It can also be apprenticeship which is used widely in other counties. Work-based education can be very beneficial for employers involved in the program by providing them a pipeline for qualified and motivated employees (Symonds et al., 2011).

As we proceed to make changes and improve our system to provide postsecondary licenses and credentials to young adults, society must embrace a new contract with young adults. All educators, employers, and governments must endow to reach the goal of providing young adults “by the time they reach their early 20’s, every young adult will be equipped with the education and experience he or she needs to lead a

successful life as an adult" (Symonds et al., 2011, p. 34). Furthermore, all programs must help students "develop an individualized pathway plan that would include career objectives; a program of study; degree and/or certificate objectives; and work-linked learning experiences" (Symonds et al., 2011, p. 28).

Models of Evaluation

Educational evaluations go back to the period of 1838 to 1850. This informal process was being used by Horace Mann in his detail reports of educational concerns and conditions to the Board of Education of the Commonwealth of Massachusetts. The evolutions of educational evaluation continued to a formal level with Edward Lee Thorndike in the early 1900s. Measurement of educational elements was championed by him for all educational observations and reports. Mr. Thorndike became known as the founder of the movement for educational testing. This continued with John Dewey with the progressive education movement. Educational evaluation went into high gear with the challenge of the space race after the launch of Sputnik I in 1957. The National Defense Education Act created and solidified new curriculum that came with new measurements to determine their success. Furthermore, this process continued with the Coleman Study in 1966 that lead to the Elementary and Secondary Education Evaluation (ESEA) law. The act added additional testing requirements to ensure that millions of federal monies were spent according to the law. As evaluation continued to broaden and evolve, a joint committee was setup in 1975 with representatives from professional education associations to examine the status of educational evaluation. The Joint Committee on Standards for Educational Evaluation released a set of principles to guide educational evaluations called the Standards for Evaluations of Educational Programs, Projects, and Materials in 1981. These standard principles (Joint Committee Standards)

have been the guidelines for all development of educational evaluation models (Worthen & Sanders, 1987). The standards were revised in 1994. The categories are utility, feasibility, propriety, accuracy, and evaluation accountability. From these categories, you have 30 standards (Yarbrough, Shulha, Hopson., & Caruthers, 2011).

By 1997, educational evaluation models became known as program evaluations. Worthen, Sanders, and Fitzpatrick (1997) defined evaluations as,

> Inquiry and judgement methods, including (1) determining standards for judging quality and deciding whether those standards should be relative or absolute, (2) collecting, relevant information, and (3) applying the standards to determine value, quality, utility, effectiveness, or significance. It leads to recommendations intended to optimize the evaluation object in relation to its intended purposes(s). (p. 3)

From this definition, Worthen et al. (1997) put forth six approaches: objective-oriented evaluation, management-oriented evaluation, consumer-oriented evaluation, expertise-oriented evaluation, adversary-oriented evaluation, and participant-oriented evaluation. These six approaches have ballooned into five categories of evaluations that have a total of 26 approaches as defined by Stufflebeam and Shinkfield (2007). The four categories are pseudo-evaluation, quasi-evaluation, social agenda and advocacy, and eclectic evaluations. The first category of pseudo-valuation consists of five approaches that deal with evaluations of political objectives. The quasi-evaluations use the 14 approaches to answer one or a few questions or use single research methods. The category of improvement/accountability deals with the substance and value of the project or program. The social agenda/advocacy category deals with social justice issues. The final program evaluation category is the eclectic evaluation. It is an evaluation process

that the evaluator can select any part or piece from the other four categories and 25 approaches (Stufflebeam & Shinkfield, 2007).

When you rate the 26 approaches based on the categories of the Joint Committee Standards, approach 20 (decision and accountability-oriented studies) had the most excellent ratings compared to all the other approaches. The decision and accountability-oriented studies approach is reflected through the CIPP evaluation model (Stufflebeam & Shinkfield, 2007). Furthermore, the American Society for Training and development survey found that the favorite evaluation model of its members is the CIPP model (Zhang et al., 2011).

The decision and accountability-oriented approach examines the program's efficacy in achieving its core values in relation to the goals, plans, actions, and outcomes. Since the evaluation is based on values, the political and managerial influences are removed from the process. The CIPP model was developed from the basic principles of the decision and accountability-oriented approach. The core ideology of CIPP is to perform a complete assessment of a program's value. The model represents a formative and a summative evaluation. There are four evaluation parts of CIPP: context, input, product, and process (Stufflebeam & Shinkfield, 2007).

The context evaluation deals with the goals of the program. The evaluator determines if the goals meet the assessed needs of the program. In addition, the goals are reviewed to see if it is recruiting the appropriate people to meet the assessed needs. Then the evaluator explores and identifies what resources and assets are used for the engagement and deployment of the program. It also identifies any possible issues in achieving the goals. The evaluation could be achieved through interviews and surveys of apprentices, trainers, program leaders, and management. Other factors that are

scrutinized are research and examination data on completion rates, hiring ratios to apprentice ratios, and other relevant data documents (Stufflebeam & Shinkfield, 2007).

The input evaluation stage carries out the function of examining resources and capabilities. It probes the plans and strategies in accomplishing the program goals. The examination can include budgets, scheduling, design process for implantation, human and material assets, and cost-benefit analysis. The intent of this evaluation is to ensure that appropriate and sufficient resources and plans are allocated to ensure the success of the program (Stufflebeam & Shinkfield, 2007).

The process evaluation stage cross-examines the implementation of the program. The evaluator queries program activities and events to document and assess the results. The evaluator gives feedback on how the program carried out its plans and strategies. Part of the evaluation can involve staff and stakeholder observations and surveys. It can also involve collecting end user data for monitoring and analysis. For example, the evaluator could examine the number of apprentices who have completed their training program within the allotted time frame. The evaluation would also attempt to uncover any kinks in the program design and implementation (Stufflebeam & Shinkfield, 2007).

The final building block to CIPP is product evaluation. The outcomes are collected and analyzed for their short- and long-term results. The results may be positive or negative with intended or unintended consequences. It will also be appraised of its valuation in correlation with the goals of the program. A mixed methodology would be used to collect all outcomes including hard data and all stakeholders. The final supposition to this evaluation would also be used to reflect a recommendation for any modification and change to the program (Stufflebeam & Shinkfield, 2007). In summary,

The CIPP evaluation model is designed to systematically guide both evaluators

> and stakeholders in posing relevant questions and conducting assessments at the beginning of a project. (Context and Input evaluation), while it is in progress (input and process evaluation), and at its end (Product evaluation). (Zhang et al., 2011, p. 59)

To facilitate the use of the CIPP model, a checklist was developed by Stufflebeam (2007). The checklist consists of 10 components, one of which is optional. For each component, it has a part for the evaluator and one for the stakeholder. It is designed to guide the evaluator's process and activities. Furthermore, it helps the clients and stakeholders understand the expectation and activities of the evaluator. The checklist offers "checkpoints" during the evaluation process for evaluators and stakeholders.

The first component is contractual agreements. The checklist consists of activities that need to be planned and agreed upon ahead of time before the start of evaluation. The second component is the context evaluation. It outlines the research area in terms of the assessed needs, issues, and available capital. The third component is the input evaluation. This section reviews the strategic plans and monetary assets of the program's pathway. The fourth component is the process evaluation. The evaluator physically exams the program's activities through observation and document research. The fifth component is the impact evaluation. This process determines how well the program achieved its goal for the intended audience.

The sixth component is the effectiveness evaluation. This step studies the resultant value and worth of the program. The seventh component is the sustainability evaluation. It inspects the stability and long-term contribution and success of the program. The eighth component is the transportability evaluation. This is an optional component that probes how successful the program can be replicated at another location.

This component would only be done at the request of the stakeholder. The ninth component is the metaevaluation. It is a discussion and possible research to self-reflect on the completed evaluation. The final component is the final synthesis report. This process is to give a final report of all that was done and the outcome of the evaluation to all stakeholders (Stufflebeam, 2007).

Summary

This literature review chartered a broad outline to ensure that all reviewers of this research understand the complexity of apprenticeship through its background, current needs and status, and the circuitry of this research. It is hoped that the understanding will provide an introspection of what can be done to create an alternative postsecondary education and career pathway for our young adults.

Chapter 3: Methodology

This dissertation studied one of the apprenticeship programs used by companies in order to fulfill their employment need of skilled workers. The research focused on the apprenticeship program by Siemens Energy, Inc. in Charlotte, North Carolina. The apprenticeship program takes 4 years to complete. The apprentices received 6,400 hours of on-the-job training at the plant. In addition, they also got 1,600 hours of classroom instruction at CPCC.

The apprenticeship program research was conducted using a mixed-methods approach. The mixed-methods approach allowed for qualitative and quantitative research to "complement each other" and "provide richer insights" (Gall, Gall, & Borg, 2007, p. 32). The methodology procedures in answering each of the four questions, validation measures, limitations, and delimitations of the study are discussed in this chapter.

Participants

The research sample was 15 apprentices between the ages of 18 and 23. They were enrolled in the Siemens Charlotte apprenticeship program at the time of the research. The apprentices were surveyed and interviewed. The apprentices consisted of four in the beginning year, seven in the immediate year, two in the upper immediate year, and two in the fourth year of the program. Furthermore, the coordinator of the apprentice program and the head of the training department were also surveyed and interviewed.

Research Design

In examining the Siemens apprenticeship program, the researcher used the CIPP evaluation model. The CIPP model provided for the structure of four main questions to be answered originating from the concepts of context, input, process, and product (Stufflebeam, 2007). The evaluation demonstrated the program's value to all

stakeholders. Furthermore, the evaluation research hoped to create some discourse about apprenticeships and provided some guidance for other business to create their own programs.

The CIPP model sought evaluation in four areas: context, input, process, and product. These four areas corresponded to the CIPP acronym. The context area evaluated current and future objectives. The input area explored the various strategies used to achieve the objectives. The process area examined the implementation of the strategies. Finally, the product area inspected the outcome of the program. The entire model provided insight into the effectiveness of the program. The framework of the CIPP model gave feedback for decision making and accountability toward current and future improvement of the program (Stufflebeam, 1971).

The four questions "provide the direction, foundation, and focus for the evaluation" (Worthen et al., 1997, p. 517). The questions were

1. Context: How are the objectives of the program matched up with the needs of Siemens and the apprentices?
2. Input: What characteristics help apprentices to finish their program?
3. Process: Are the apprentices being successfully trained?
4. Product: What will be the outcome in meeting the program's strategic plan?

An overview of the methodology process is detailed below in Table 1 and Table 2 which will anchor the discussion for Chapters 3, 4, and 5.

Table 1

Methodology Procedures for Context and Input

CIPP Concept	Research Questions	Data Sources	Methods
Context (A)	How are the objectives of the program matched up with the needs of Siemens and the apprentices?	Apprentices	Interviewed apprentices
		Company and program documents	Reviewed and analyze documents such as demographic and performance data, priority needs, and goals
		Management	Interview management team
		Program Administrator	Interview program administrator
		Literature Review	Administered Noel-Levitz Adult Learner Inventory (Community College Version)
		Surveys	Literature review reflection
		Interviews	Apprentice surveys
			Employer surveys
Input (B)	What characteristics help apprentices to finish their program?	Recruitment Data	Interview apprentices
		Company and program documents	Reviewed and analyze documents
		Apprentices	Interview program administrator
		Program Administrator	Administered Noel-Levitz Adult Learner Inventory (Community College Version)
		Literature Review	Literature Review Reflection
		Surveys	Apprentice Surveys
		Interviews	Employer Surveys

Table 2

Methodology Procedures for Process and Product

CIPP Concept	Research Questions	Data Sources	Methods
Process (C)	Are the apprentices being successfully trained?	Apprentices	Interview apprentices
		Program Administrator	Interview program administrator
		Management	Interview management
		Surveys	Administered Noel-Levitz Adult Learner Inventory (Community College Version) Literature Review Reflection
		Interviews	Apprentice Surveys
		Literature Review	Employer Surveys
Product (D)	What was the outcome in meeting the program's strategic plan?	Graduation & Retention Data	Reviewed & Analyze Data
		Employment Data	Interview management team
		Program Administrator	Interview program administrator
		Management	Administered Noel-Levitz Adult Learner Inventory (Community College Version)
		Survey	Literature Review Reflection
		Interviews	Apprentice Surveys
		Literature Review	Employer Surveys

Instrumentation

The program evaluation research used surveys and interviews from apprentices and management. It was important to involve both stakeholders to ensure that all information and insight were provided and given so they have a forum to review, accept,

and empower to contribute for a change environment (Stufflebeam, 2007). Furthermore, the evaluation reviewed current strategic plans, discussions with the apprentices and management, apprentice application data, completion and retention rates, and current and historical program and corporate data. Scholarly literature was used to supplement the research information.

The survey and interview questions consisted of two separate entities. One survey and interview questions were created to be used by the apprentice as shown in Appendices D and E. The other survey and interview questions were administered to management as shown in Appendices F and G. The questions for the survey and interviews were synthesized from reviewing questions used by the Department for Business, Innovation, and Skills (2013) in the United Kingdom (UK) and Department of Data Production and Dissemination of Statistics Canada (2015).

The Department for Business, Innovation, and Skills surveyed both the apprentices and employers in England during the years of 2011, 2012, 2013, and 2015. Since the full report has not been released for the 2015 research, the researcher used the reports from 2013. The Department for Business, Innovation, and Skills (2013) released the researched paper number 123, "Apprenticeship Evaluation: Employer" and research paper number 124, "Apprenticeship Evaluation: Learners." Those two reports disclosed the questions used and the results of the research. The other review source, Statistics Canada (2015), conducted the National Apprenticeship Survey (NAS) across Canada in 1989, 1995, 2007, and 2015. The survey was only focused on the apprentices. The NAS report of 2015 released the questions and results of the research.

In addition, the surveys and interviewed questions from the doctoral dissertations by Millicent Burke-Sinclair and Victoria Hanchell of Gardner-Webb University were

reviewed to assist in the development of the researcher's surveys and interview questions. Despite the fact that Drs. Burke-Sinclair's and Hanchell's surveys and interview questions were geared toward the evaluation of higher education programs, their themes and structure methodology contributed to the development of the researcher's survey and interview questions.

The survey for the apprentices consisted of 50 multiple choice questions. Twenty-five of those questions were Likert-scale questions involving levels of satisfaction and agreement derived from the anchor response pattern of Vagias (2006). In part I, questions 1-4 dealt with general demographic information. In part II, questions 5-23 were general multiple choice questions. In part III, Likert-scale questions were used in items 24-38. The questions were framed agreement questions: strongly disagree, disagree, neither agree or disagree, agree, strongly agree, and not applicable. In questions 39-50, Likert-scale questions were used in terms of satisfaction. The choices were poor, fair, average, good, excellent, and not applicable. The interview questions for the apprentices consisted of 10 questions ranging from specific to broad topics.

The research on the management survey and interview questions had similar frameworks as the apprentice survey and interview questions. The coordinator of the apprentice program and head of the training department were asked 10 interview questions. Those questions ranged from specific to broad topics. The survey for management consisted of 20 multiple choice questions. The questions were constructed in a Likert-scale style involving levels of agreements: strongly disagree, disagree, neither agree or disagree, agree, strongly agree, and not applicable. Just like the apprentice survey, the use of a Likert-scale allowed the data to be quantified in several ways. First, the choices were given a value range from 1-5: strongly disagree (1), disagree (2), neither

agree or disagree (3), agree (4), and strongly agree (5). The rating of 1 was the lowest, while the rating of 5 was the highest. Management was also able to select "not applicable" depending on their comfort and knowledge level. All surveys and interview questions were reviewed by S. Joseph Woodall and Joseph Merill. Dr. Woodall is an adjunct professor at the University of Maryland. He earned his Doctorate in Industrial and Organizational Psychology. Dr. Woodall is a North Carolina Licensed Professional Counselor with a Master's of Education in Counseling and Human Relations. He has worked extensively in the training and education of firefighters. He is currently the Fire Protection Program Chair at Rowan-Cabarrus Community College (Woodall, 2016). Mr. Merrill is an admissions representative with Universal Technical Institute. He has worked closely with students, teachers/trainers, and training programs for many years (Merrill, 2016).

While the surveys and interviews were specifically targeted at the on-site training program, the last part of the research instruments was administered through an online survey of the Ruffalo Noel Levitz Adult Learner Inventory. The Adult Learner Inventory survey was geared toward understanding apprentices in the community college classroom in order to collaborate their classroom and on-the-job experiences. It was important to examine apprentice classroom experiences since they will pursue an associate degree in one of three degree programs from CPCC. Those curriculum programs were computer integrated machining, mechatronics engineering technology in mechanical, and mechatronics engineering technology in electrical. The computer integrated machining program curriculum required 68 credit hours. The mechatronics engineering technology program in mechanical track curriculum required 76 credit hours. The mechatronics engineering technology program in electrical track curriculum required 72 credit hours.

All three program curricula take 3½ years to complete, including summer semesters. They are shown in Appendices A, B, and C.

The Adult Learner Inventory was developed by Ruffalo Noel Levitz based on the Council for Adult and Experiential Learning (CAEL) Principles of Effectiveness for Serving Adult Learners. Mr. Levitz's first survey was conducted in 2002 for college students. In 2005, he conducted his first survey for community college students. Since the start of his first survey, it has been given to almost 133,000 students at over 272 institutions. The Adult Learner Inventory survey gave the researcher insight into what was important to college students and their satisfaction experiences in their classroom. The Adult Learner Inventory has two versions: 4-year college/university and community college. Students in the apprenticeship program were given the Two-Year Community College Version Form B (Ruffalo Noel-Levitz, 2015-2016a).

The Adult Learner Inventory has a coefficient alpha of 0.79 for importance and 0.83 for satisfaction. It has 47 Likert-scale questions based on the rate of importance and satisfaction. There were 18 demographic questions. Twenty questions were based on student opinions for selecting the program. Ten questions were selected by the researcher. Two questions summarized the participants' overall view with six choices to choose from: "How would you rate your overall satisfaction with this program" and "Would you recommend this program to other adult learner" (Ruffalo Noel-Levitz, 2015-2016a, pp. 1, 2)? There was an option for two additional demographic questions. Finally, there was an option to survey and analyze the participant's major and their four-digit course code. The main 47 Likert-scale questions provided the data for eight composite scales. Those scales were outreach, life and career planning, financing, assessment of learning outcomes, teaching-learning process, student support systems,

technology, and transitions (Ruffalo Noel-Levitz, 2015-2016b). With the exception of transition, the other seven Adult Learner Inventory scales were similar in context to CAEL's Principles of Effectiveness for Serving Adult Learners. The definition of each scale is shown on Appendix H. The Adult Learner Inventory survey tool cost $250.00 to process and setup. It also cost $2.30 for each participant to take the survey. All costs were paid by the researcher.

The use of multiple survey questions, interviews, and Adult Learning Inventory created data concordance for the researcher to understand the status of the apprenticeship program. Those instruments, procedures, analyses, and data are discussed in specific detail for each of the four CIPP components.

Data Collection Procedures

With the help of the coordinator of the apprenticeship program, the researcher sent an email asking for participation. The researcher met with each apprentice and provided a personal invitation to participate. All participants received a letter describing their role if they chose to be part of the research. They were advised that their involvement would be strictly confidential. The participants were told that they could receive a copy of the survey and results by contacting the researcher. The informed consent forms for the apprentices and management are found in Appendices I and J.

The apprentice survey and interview were conducted in approximately the same time frame. The apprentice survey schedule was set up with the assistance of Siemens management during a time when all apprentices could gather at one time. During this time frame, all apprentices completed their survey during two of the meetings. The large gathering approach minimized disruption to the company and the apprentices. While apprentices gathered to complete their survey, food and drinks were provided onsite. The

interviews were conducted and recorded on an individual basis. The researcher worked with management and apprentices to schedule the time and location to meet with each person. Before the start of the interview, the participants were reminded of the purpose of the interview. They were assured that their views would remain confidential. Along with the initial notification that the interview would be recorded, the researcher informed and made sure that the participants approved of the recording before the start of the interview.

Once the apprentice survey and interviews were completed, apprentices were given a personal and email invitation to participate in the Adult Learning Inventory survey. They received an email describing their role and the intent of the research. They were advised that their involvement would be confidential and private. The 77 survey questions took approximately 30 minutes to answer. Each participant took their survey online through the Ruffalo Noel Levitz portal. The link to the portal was emailed to the participants. They were asked to complete the Adult Learner Inventory survey by a given deadline.

The management survey was given to the coordinator of the apprenticeship program and department head. They took the survey at their leisure with a request to be completed by a specific deadline. The researcher scheduled a time and location with the coordinator and department head to conduct the interview. The interview was conducted and recorded on an individual basis. They were reminded of the purpose of the interview before the start of the interview. Assurance was given that their views would remain confidential. Along with the initial notification that the interview was recorded, the researcher informed and made sure that the participants approved the recording before the start of the interview.

Once all surveys and interviews were completed, an email was sent out to all participants thanking them for their help. They were reassured again that their answers and views would remain confidential. If they had any questions or concerns, they could email or call the researcher at any time.

Data Analysis

The data came from surveys and interview questions completed by apprentices and management. The data were cross-referenced and tabulated into key words and themes that allowed the researcher to separate and group specific questions for analysis that provided answers for each concept question.

The use of a Likert-scale in the apprentice survey allowed the researcher to quantify the data in several ways. First, the choices of part II were given a value range from 1-5: strongly disagree (1), disagree (2), neither agree or disagree (3), agree (4), and strongly agree (5). The rating of 1 was the lowest, while the rating of 5 was the highest. Apprentices were able to select "not applicable" depending on their comfort and knowledge level. Using the reference value number of each response, answers were put into the Statistical Package for the Social Sciences (SPSS). This was also done for part III of the apprentice survey. Values were given for each answer choice from 1-5: poor (1), fair (2), good (3), very good (4), and excellent (5). Those value reference numbers were input into SPSS. The data in SPSS allowed the researcher to determine the average, cross-tabulate the results, and create a frequency chart for each concept question grouping. Each apprentice interview and survey question was cross-referenced with a CIPP concept model question to derive key words and themes for reflection.

The frequency table allowed the researcher to use an appropriate statistical method to determine if the answers provided general agreement among the participants.

The pairing of value to each Likert survey question also provided another way to determine the surveys' reliability. Since these surveys did not have correct answers, Cronbach's alpha (coefficient alpha) was a good method to determine internal consistency reliability (Salkind, 2006). The researcher determined the coefficient alpha for each section of the apprentice survey and the entire apprentice survey.

In the management multiple choice questions, the reference value number of each response was inputted into SPSS. The data in SPSS allowed the researcher to determine the average, cross-tabulate the results, and create a frequency chart. Once again, the researcher conducted an appropriate statistical analysis. Then a Cronbach's alpha calculation was done to determine the internal consistency reliability of each section of the employer survey and the entire employer survey. The management interview recordings were transcribed and coded for analysis. The researcher examined the transcription for key words and themes.

When all apprentices completed the Adult Learner Inventory surveys, the researcher received the raw data with the answers along with several reports and stats. Those reports and stats were demographic report, scale report, item report, standard campus report, summary items report, item percentage report, comparative summary report, target group reports, single group reports, average scores, performance gap, standard deviation (SD), mean difference, statistical significance, strengths and challenges identification, enrollment factors and information sources, and strategic planning overview. In addition, there were options to pay for custom reports and year-to-year reports. In particular, the summary report gave the SD of the apprentice and the national group to determine the significance through a twin-tailed *t* test. This statistical significance of each question of the Adult Learner Inventory survey was closely

examined to gain insight and answers for the four CIPP model questions (Ruffalo Noel-Levitz, 2015-2016b).

Context

How are the objectives of the program matched up with the needs of Siemens and the apprentices? The answers to this question were derived from several sources. The researcher reviewed and analyzed company and program documents. Past and current strategic plans were compared and analyzed. It also involved items such as current and projected demands in sales. This correlated with current and future production capabilities. The data involving numbers of applicants who applied to the apprenticeship program were also examined. The apprentice survey and interview data were analyzed in correlation to the CIPP concept question context. The management survey and interview questions were also analyzed based on correlation of the CIPP concept question context. In addition, the researcher analyzed the data from the Adult Learner Inventory based on the reports and stats from all the Adult Learner Inventory scales.

Input

What characteristics help apprentices to finish their program? This question was answered using company recruitment data and program documents. Furthermore, the apprentice and management survey data were analyzed based on all the questions that correlated to the CIPP concept question input. The apprentice and management interview questions were also analyzed based on correlation of the CIPP concept question input. The results of the interviews with both the apprentice and employer were arranged by key words that were similar in terms which were placed in a frequency distribution table. The table allowed the researcher to analyze for any correlation in answering the CIPP concept

question input in correlation with the Adult Learner Inventory survey scales.

Process

Are the apprentices being successfully trained? The methods used to utilize the answer came from several areas. Documentation from community college and training materials were reviewed for analysis. The apprentice and management survey data were analyzed based on all the questions that correlated to the CIPP concept question process. Apprentice and management interview questions were also analyzed based on correlation of the CIPP concept question process. In addition, the Adult Learning Inventory survey reports and stats for the eight scales were analyzed to provide understanding from the classroom component of the apprenticeship training.

Product

What was the outcome in meeting the program's strategic plan? In order to consider the outcome of the apprentice program, the researcher reviewed the strategic plans, graduation, retention, and employment data. The apprentice and management surveys and interviews were also analyzed based on the CIPP concept question product. The apprentice and management interview questions were analyze based on correlation of the CIPP concept question product. The Adult Learning Inventory survey results was also used to gain knowledge and understanding of the product in the CIPP model.

Expected Outcome

In conducting this study, the researcher aimed to determine the efficacy of this program. The research is expected to inform all stakeholders of the positive and negative aspects of the program in order to continue or make necessary improvements to maximize the benefits of an apprenticeship program for all involved.

Limitations

For the purpose of this study, some specific limitations could have occurred during the process of this research. Some of these could include bias from the researcher, apprentices, and management. The experience and knowledge of the practitioner of the study could also have limited the depth and strength of the research. In addition, the small number of participants could have affected the reliability of the study.

Delimitations

Within the scope of this research, it was not feasible to involve everyone who could be in the web of connectivity such as the floor employee, other management officials, engineers, and consumers; other members of the community college; other general community members; and other similar apprenticeship programs. In addition, the scope and the singular frequency of the research may not uncover all the data and knowledge of the apprenticeship program. It would be recommended for yearly follow-up to increase validity and assess implemented changes made to the program.

Summary

By using the CIPP model of program evaluation through a mixed-methods approach of qualitative and quantitative research, the researcher determined the efficacy of the Siemens Charlotte apprenticeship program. This was completed by using data from company and program documents, literature reviews, surveys, and interviews from apprentices and management to answer four questions that were embodied in the CIPP model of context, input, process, and product.

Chapter 4: Data Analysis

Introduction

The purpose of this study was to evaluate a company apprenticeship program in Charlotte, North Carolina. The framework for the study was Stufflebeam's CIPP Model of Evaluation. The researcher used both qualitative and quantitative collection methods such as document analysis, surveys, and interviews. This chapter presents the data collected from the interviews, researcher-created survey, and the Adult Learner Inventory 2-year college survey by Ruffalo Noel Levitz. The reports were organized by the CIPP model components based on the four questions: (a) How are the objectives of the program matched up with the needs of Siemens and the apprentices; (b) What characteristics help apprentices to finish their program; (c) Are the apprentices being successfully trained; and (d) What was the outcome in meeting the program's strategic plan?

Interviews

The interviews were conducted with the apprentices and management personnel. The current apprenticeship program consisted of 15 apprentices and two management staff. All 15 current apprentices were contacted to participate in the research. In addition, the coordinator of the apprenticeship program and the department head of the company training program were contacted to participate in the research. Thus, the goal of 15 apprentices and two management personnel was the focus sample goal of the research. The researcher set a 5% precision rate that would yield a confidence level of 95% for all participants for this research. The final participation rate was 100% for both the apprentice and management interviews. The interviews were conducted between February 15th and March 14th.

The interview questions consisted of two separate entities. The questions for the apprentices consisted of 10 questions. The management interview questions had 10 questions. Both sets of interview questions ranged from specific to broad topics. They are shown in Appendices E and G. The interviews were transcribed and coded for thematic themes. Based on apprentice and management answers, a thematic context analysis was conducted based on the number of responses that correlated with the CIPP questions. The thematic analysis within the context and input areas revealed several themes. Within the process and product areas, a thematic analysis demonstrated agreement or disagreement with those two questions.

The first CIPP context question was, "How are the objectives of the program matched up with the needs of Siemens and the apprentices?" The thematic analysis showed two themes as displayed in Table 3. The apprentices were looking for a career, good salary and benefits, and future growth opportunity with a frequency (*f*) of 34 (50%). The company wanted highly skilled employees who produced a quality product, cited 34 times (50%).

Table 3

Interview Responses – Context Question Themes

	Frequency	Relative Frequency	Percent Frequency
Career, Salary & Benefits	34	0.5	50%
Highly Skilled, Quality Product	34	0.5	50%
Total	68	1	100%

The second CIPP input question was, "What characteristics help apprentices to finish their program?" Table 4 displays the results of the survey. The thematic analysis resulted in seven themes that answered the input question. The following items were the characteristics that helped apprentices finish their program: company paid for an

associate degree, on the job training that resulted in a journeyman license, job placement with the company after training, company mentor to teach them, good production facility, budget for the apprenticeship program, and parent support for the program. The two highest frequency were on-the-job training (*f*=70, 29%) and paid tuition for degree (*f*=60, 25%).

Table 4

Interview Responses – Input Question Themes

	Frequency	Relative Frequency	Percent Frequency
On-the-job training	70	0.29	29%
Paid tuition for degree	60	0.25	25%
Job placement	42	0.17	17%
Production facility	32	0.13	13%
Mentor	15	0.06	6%
Budget for program	13	0.05	5%
Parent support	12	0.05	5%
Total	244	1	100%

The third CIPP process question was, "Are the apprentices being successfully trained?" The thematic analysis demonstrated agreement or disagreement with this question. The analysis showed that it was mentioned 23 times (77%) by apprentices and seven times (23%) by management in agreement as displayed in Table 5. Furthermore, the interviews did not reveal any disagreement to the question.

Table 5

Interview Responses – Process Question Themes

	Frequency	Relative Frequency	Percent Frequency
Apprentices, Agree	23	0.77	77%
Management, Agree	7	0.23	23%
Total	30	1	100%

The last CIPP product question was, "What was the outcome in meeting the program's strategic plan?" Since the apprenticeship program, training department, and

the company plant did not have formal mission statements, objectives, and goals, a strategic plan was inferred from the company literature, survey, and interview. The surmised strategic plan for the apprenticeship program was to find, train, and employ highly qualified and skilled individuals in positions as a machinist or industrial service technician. Thus, the thematic analysis revealed a total frequency agreement of 57 times that the program met its strategic plan by apprentices and management. Table 6 shows the frequencies by apprentices at 37 times (65%) and management agreement at 20 times (35%). The researcher was not able to discern any thematic coding that indicated a disagreement to the strategic plan.

Table 6

Interview Responses – Product Question Themes

	Frequency	Relative Frequency	Percent Frequency
Apprentices, Agree	37	0.65	65%
Management, Agree	20	0.35	35%
Total	57	1	100%

Adult Learner Inventory Survey

The second part of this report presents data from the Ruffalo Noel Levitz Adult Learner Inventory online survey. The Adult Learner Inventory survey helped the researcher understand apprentices in the community college classroom in order to collaborate their classroom and on-the-job experiences. Since apprentices pursued an associate's degree in one of three degree programs from the community college, it was important to examine apprentice classroom experiences to help answer the four questions in the CIPP model. The Adult Learner Inventory Community College survey was administered online when apprentices logged in with their given special code. The apprentices answered 77 questions about their experiences and courses at the community

college. From those questions, 47 of those Likert-scale questions provided the data for eight composite scales. Those scales were outreach, life and career planning, financing, assessment of learning outcomes, teaching-learning process, student support systems, technology, and transitions (Ruffalo Noel-Levitz, 2015-2016b). With the exception of transition, the other seven Adult Learner Inventory scales were similar in context to CAEL's Principles of Effectiveness for Serving Adult Learners (Ruffalo Noel-Levitz, 2015-2016b). The scale scores produced a reliability coefficient (alpha) of 0.8 by which the inventory was completed twice using a sample of 155 students that was assessed for test-retest consistency. The coefficient alpha 0.79 and 0.83 for satisfaction were used to calculate the homogeneity of the survey evaluation with the internal validity of the final scale contained in the Adult Learner Inventory (Ruffalo Noel-Levitz, 2015-2016b).

The apprenticeship program had 15 apprentices in the program. In order for the researcher to meet with all apprentices, two meetings were set up, February 15th and February 21st. At that time, the apprentices were personally invited to participate in the Adult Learner Inventory online survey. In addition, an invitation email was sent out to apprentices to complete the Adult Learner Inventory online survey on February 21st. Of the 15 emails uploaded to the Noel-Levitz website, 14 emails successfully delivered the invitation. The fail email address was revised with the assistance from the apprenticeship office. The final Adult Learner Inventory survey was completed on March 6th with the resultant completion rate of 100%.

The entire Adult Learner Inventory survey that shows each question with a percentage score for individual and national average is located in Appendix K. The demographic frequencies along with the percentage of students who completed the Adult Learner Inventory survey is reported in Tables 7-14. The demographic information

helped the researcher in several ways, “depending on the populations studied and research questions asked, information regarding the participants cultural group, age, gender, educational level and other characteristics may aid in the interpretation of results, and allows for comparison across replications of studies” (Beins, 2009, p. 87).

The Adult Learner Inventory survey showed that 100% of the apprentices were male. It demonstrated a lack of diversity in the area of gender. Another consideration was that all apprentices were 24 years or younger as shown in Table 7. This was important information in helping the apprentice program plan their support for a young group. For example, the apprentices spoke about the need for time management training at the beginning of their apprenticeship journey. For many of these young adults, this was their first time out in the real world.

Table 7

Noel-Levitz Adult Learner Inventory – Age of Apprentices

	N	Percent
24 or Younger	15	100%
25 to 34	0	0%
35 to 44	0	0%
45 to 54	0	0%
55 to 64	0	0%
65 or over	0	0%
Total	15	100%
No Response	0	

In Table 8, most apprentices were single at the high frequency rate of 13 (86.67%). Since most of the apprentices were single, it would be logical that most of them did not have dependents. Table 9 shows that 12 (80%) apprentices did not have dependents. There were three (20%) apprentices who did have dependents. Thus, management should consider these two factors in their policy and decision process. As

for Table 10, there were 14 (93%) students classified as part time or full time.

Table 8

Noel-Levitz Adult Learner Inventory – Marital Status of Apprentices

	N	Percent
Single	13	86.67%
Married/domestic partner	2	13.33%
Total	15	100%
No Response	0	

Table 9

Noel-Levitz Adult Learner Inventory – Dependents of Apprentices

	N	Percent
Yes	3	20%
No	12	80%
Total	15	100%
No Response	0	

The data from Tables 10-12 give insight into the academic realm of the apprentices. Six (39%) of the apprentices had college credits before they started the apprenticeship program. Ten (66%) of the apprentices had just finished their high school education prior to the program. Two (13%) apprentices already held some form of an associate's degree, and two (13%) others had some college courses under their belt. There were three (20%) apprentices who would be the first person in the family to attend college. The last demographic information in Table 14 was the ethnicity and race of the apprentices. Thirteen (86%) of the apprentices identified themselves as White/ Caucasian; one (6%) identified as multi-racial; and one (6%) identified as Hispanic or Latino. The data show low diversity levels.

Table 10

Noel-Levitz Adult Learner Inventory – Current Class Load of Apprentices

	N	Percent
Full time (12 hours or more)	2	13.33%
Half time (6-11 hours)	12	80%
Part time (less than 6 hours)	1	6.67%
Total	15	100%
No Response	0	

Table 11

Noel-Levitz Adult Learner Inventory – Credit Received from

	N	Percent
Previous college credits earned.	4	26.67%
Learning from military training	0	0%
Learning from prior job/life experience	1	6.67%
Credit through testing	2	13.33%
Other sources	1	6.67%
Not applicable	9	60%

Note. Apprentices may select more than one options. Percentage may be greater than 100%.

Table 12

Noel-Levitz Adult Learner Inventory – Prior Education of Apprentices

	N	Percent
Grade school	0	0%
Some high school	1	6.67%
High school or GED	10	66.67%
Some college classes	2	13.33%
Associate's degree	2	13.33%
Bachelor's degree or higher	0	0%
Total	15	100%
No Response	0	

Table 13

Noel-Levitz Adult Learner Inventory – First in Family for College of Apprentices

	N	Percent
Yes, first in family for college	3	20%
No, not first in family for college	12	80%
Total	15	100%
No Response	0	

Table 14

Noel-Levitz Adult Learner Inventory – Ethnicity/Race Apprentices

	N	Percent
Alaskan Native	0	0%
American Indian	0	0%
Asian	0	0%
Black/African-American	0	0%
Hispanic or Latino	1	6.67%
Native Hawaiian or Pacific Islander	0	0%
White/Caucasian	13	86.67%
Multi-Racial	1	6.67%
Other	0	0%
Total	15	100%
No Response	0	

The Adult Learner Inventory survey scale for outreach offered an understanding to the CIPP context question, "How are the objectives of the program matched up with the needs of the company and the apprentices?" Survey questions 1, 7, 13, 24, 26, 30, and 40 were used to create the outreach scale. The students' overall average level of satisfaction in the assessment of learning outcomes was 6.08 as compared to the national average of 5.74.

Table 15

Noel-Levitz Adult Learner Inventory – Institutional Scores for Outreach

	Institution Under Evaluation			National 2-Year Adult Learners			
Scale Item	Impor-tance	Satisfac-tion/SD	Perfor-mance Gap	Impor-tance	Satis-faction/ SD	Perfor-mance Gap	Mean Differ-ence
Outreach	**6.25**	**6.08 / 0.80**	**0.17**	**6.48**	**5.74 / 1.17**	**0.74**	**0.34**
1. My program allows me to pace my studies to fit my life and work.	6.27	5.73 / 1.53	0.54	6.55	5.61 / 1.52	0.94	0.12
7. Staff are unavailable to help me solve unique problems I encounter.	6.40	6.40 / 0.74	0.00	6.39	5.63 / 1.57	0.76	0.77
13. Processes and procedures for enrolling here are convenient.	6.13	6.13 / 0.83	0.00	6.47	5.93 / 1.41	0.54	0.20
24. I receive the help I need to stay on track with my classes.	6.53	6.20 / 0.86	0.33	6.49	5.68 / 1.56	0.81	0.52
26. I am able to choose course delivery that fits my life circumstances.	6.00	5.53 / 1.73	0.47	6.53	5.74 1.56	0.79	-0.21
30. I am able to obtain information I need by phone, fax, e-mail, or online.	6.20	6.27 / 1.16	-0.07	6.51	6.02 / 1.34	0.49	0.25
40. I receive the help I need to make decisions about courses and programs that interest me.	6.20	6.27 / 0.96	-0.07	6.41	5.59 / 1.61	0.82	0.68

The Life and Career Planning assessment scale of the Adult Learner Inventory survey made available data to answer the CIPP context question, "How are the objectives of the program matched up with the needs of Siemens and the apprentices," and input question, "What characteristics help apprentices to finish their program?" The scale data were derived from survey questions 2, 8, 15, 35, and 44 as shown in Table 16. The students' overall average level of satisfaction in the assessment of learning outcomes was

6.01 as compared to the national average of 5.34. The difference was 0.67 between the institutional and national average.

Table 16

Noel-Levitz Adult Learner Inventory-Institutional Scores for Life and Career Planning

	Institution Under Evaluation			National 2-Year Adult Learners			
Scale Item	Impor-tance	Satis-faction/ SD	Perfor-mance Gap	Impor-tance	Satis-faction/ SD	Perfor-mance Gap	Mean Differ-ence
Life And Career Planning	**6.12**	**6.01 / 0.53**	**0.11**	**6.36**	**5.34 / 1.39**	**1.02**	**0.67**
2. Sufficient course offerings within my program are available each term.	6.36	6.20 / 0.68	0.16	6.46	5.25 / 1.67	1.21	0.95*
8. This college provides students with the help they need to develop an education plan.	6.33	6.00 / 1.20	0.33	6.42	5.60 / 1.57	0.82	0.40
15. Advisors are knowledgeable about requirements for courses and programs of interest to me.	6.07	5.87 / 0.92	0.20	6.49	5.59 / 1.68	0.90	0.28
35. Mentors are available to guide my career and life goals.	5.93	6.13 / 0.92	-0.20	6.17	5.30 / 1.75	0.87	0.83
44. I can receive credit for learning derived from my previous life and work experiences.	5.93	5.87 / 1.46	0.06	6.22	4.84 / 2.00	1.38	1.03*

Note. *Difference statistically significant at the .05 level.

The Adult Learner Inventory scale for Student Support Systems provided insight to answer the CIPP input question, "What characteristics help apprentices to finish their program?" The Student Support System scale was derived from survey questions 11, 19, 22, 28, 31, and 34. The results are shown in Table 17. The students' overall average level of satisfaction in the assessment of learning outcomes was 5.78 as compared to the national average of 5.56. The results showed that the community college was doing as

well as most schools to help their students complete their college program.

Table 17

Noel-Levitz Adult Learner Inventory-Institutional Scores for Student Support Systems

	Institution Under Evaluation			National 2-Year Adult Learners			
Scale Item	Impor-tance	Satis-faction/ SD	Perfor-mance Gap	Impor-tance	Satis-faction/ SD	Perfor-mance Gap	Mean Differ-ence
Student Support Systems	**6.04**	**5.78 / 0.87**	**0.26**	**6.24**	**5.56 / 1.26**	**0.68**	**0.22**
11. This college offers strategies to help me cope with the multiple pressures of home, work, and my studies.	5.60	5.00 / 1.65	0.60	6.05	4.99 / 1.78	1.06	0.01
19. I receive timely responses to my requests for help and information.	6.20	5.67 / 1.50	0.53	6.54	5.73 / 1.53	0.81	-0.06
22. I receive the help I need to develop my academic skills, including reading, writing, and math.	6.40	6.00 / 0.88	0.40	6.35	5.83 / 1.43	0.52	0.17
28. This college initiates many opportunities for me to connect with other adult learners.	5.80	5.87 / 0.99	-0.07	5.78	5.32 / 1.69	0.46	0.55
31. This college makes many support services available at convenient times and places.	6.20	6.20 / 0.94	0.00	6.31	5.65 / 1.52	0.66	0.55
34. This college provides “one-stop shopping” for most student support services.	6.07	5.93 / 1.58	0.14	6.36	5.84 / 1.46	0.52	0.09

The technology scale of the Adult Learner Inventory survey provided insight to answer the CIPP input question, “What characteristics help apprentices to finish their program?” The data were derived from survey questions 5, 12, 18, 32, and 39 as shown in Table 18. The students’ overall average level of satisfaction in the assessment of learning outcomes was 6.15 as compared to the national average of 5.87. The result

showed that the school was leveraging the use of technology for academic use just as well as other community colleges.

Table 18

Noel-Levitz Adult Learner Inventory-Institutional Scores for Technology

	Institution Under Evaluation			National 2-Year Adult Learners			
Scale Item	Impor-tance	Satis-faction/ SD	Perfor-mance Gap	Impor-tance	Satis-faction/ SD	Perfor-mance Gap	Mean Differ-ence
Technology	**6.36**	**6.15 / 0.75**	**0.21**	**6.33**	**5.87 / 1.10**	**0.46**	**0.28**
5. I receive the help I need to improve my technology skills.	6.57	5.87 / 1.19	0.70	6.11	5.62 / 1.48	0.49	0.25
12. Technology support is available to me when I need it.	6.60	6.40 / 0.83	0.20	6.30	5.78 / 1.45	0.52	0.62
18. This college uses technology on a regular basis to communicate with me.	6.13	6.33 / 0.72	-0.20	6.31	6.16 / 1.20	0.15	0.17
32. Technology enables me to get the services I need when I need them.	6.00	6.13 / 0.99	-0.13	6.49	6.10 / 1.24	0.39	0.03
39. Information is available online to help me understand what I need to do next in my program of study.	6.47	6.00 / 1.20	0.47	6.43	5.68 / 1.53	0.75	0.32

The scale of teaching-learning process in the Adult Learner Inventory survey made available data to answer the CIPP process question, “Are the Apprentices being successfully trained?” The scale data were derived from survey questions 10, 17, 29, 36, 38, 43, 45, and 46 as shown in Table 19. The students’ overall average level of satisfaction in teaching learning was 5.92 as compared to the national average of 5.76. The results continued to demonstrate the college was doing as well as must community colleges in successfully training their students.

The Adult Learner Inventory scale for assessment of learning outcomes provided

data to answer the CIPP process question, “Are the Apprentices being successfully trained,” and product question, “What was the outcome in meeting the program’s strategic plan?” The data were derived from survey questions 4, 20, 25, 37, and 42. The results are shown Table 20. The students’ overall average level of satisfaction in the assessment of learning outcomes was 5.79 as compared to the national average of 5.59. The data indicated that the program was matching the results of the national comparison in terms of training the apprentices successfully and meeting the program’s strategic plan.

Table 19

Noel-Levitz Adult Learner Inventory-Institutional Scores for Teaching-Learning Process

	Institution Under Evaluation			National 2-Year Adult Learners			
Scale Item	Impor-tance	Satis-faction/ SD	Perfor-mance Gap	Impor-tance	Satis-faction/ SD	Perfor-mance Gap	Mean Differ-ence
Teaching – Learning	**6.14**	**5.92 / 0.73**	**0.22**	**6.34**	**5.76 / 1.20**	**0.58**	**0.16**
10. I have a clear understanding of what I'm expected to learn in my classes.	6.67	6.13 / 1.19	0.54	6.62	5.95 / 1.37	0.67	0.18
17. My instructors provide timely feedback about my academic progress.	6.00	5.27 / 1.10	0.73	6.56	5.67 / 1.57	0.89	-0.40
29. My instructors respect student opinions and ideas that differ from their own.	6.33	5.93 / 1.10	0.40	6.38	5.79 / 1.54	0.59	0.14
36. Most instructors use a variety of teaching methods.	5.80	5.87 / 1.06	-0.07	6.29	5.69 / 1.49	0.60	0.18
38. My instructors encourage student-to-student interactions through a variety of techniques.	6.00	6.29 / 0.83	-0.29	5.89	5.72 / 1.42	0.17	0.57
43. The frequency of interactions with my instructors is satisfactory.	6.00	6.00 / 1.13	0.00	6.44	5.92 / 1.42	0.52	0.08
45. Instructors incorporate my life and work experiences in class activities and assignments.	6.20	6.00 / 1.07	0.20	5.99	5.25 / 1.75	0.74	0.75
46. The learning experiences within my program of study challenge me to reach beyond what I know already.	6.13	5.93 / 1.16	0.20	6.48	6.04 / 1.31	0.44	-0.11

The Adult Learner Inventory survey scale for transitions offered an understanding to the CIPP product question, "What was the outcome in meeting the program's strategic plan?" Survey questions 6, 14, 21, 27, 33, 41, and 47 framed the transitions scale. The results are shown in Table 21. The students' overall average level of satisfaction in the

assessment of learning outcomes was 5.88 as compared to the national average of 5.51. Even though the difference of 0.37 was not higher between the institutional and national average, it was another indicator along with data in Table 18 showing that the program was meeting the program's strategic plan.

Table 20

Noel-Levitz Adult Learner Inventory-Institutional Scores for Assessment of Learning Outcomes

	Institution Under Evaluation			National 2-Year Adult Learners			
Scale Item	Impor-tance	Satis-faction/ SD	Perfor-mance Gap	Impor-tance	Satis-faction/ SD	Perfor-mance Gap	Mean Differ-ence
Assessment of Learning Outcomes	**5.89**	**5.79 / 0.85**	**0.10**	**6.17**	**5.59 / 1.24**	**0.58**	**0.2**
4. My instructors involve me in evaluating my own learning	5.73	5.77 / 0.73	-0.04	6.12	5.54 / 1.51	0.58	0.23
20. This institution periodically evaluates my skill level to guide my learning experiences.	5.33	5.47 / 1.60	-0.14	6.09	5.18 / 1.71	0.91	0.29
25. I'm evaluated on the knowledge and skills I'll need in my life and career.	6.27	5.53 / 1.46	0.74	6.34	5.57 / 1.52	0.77	-0.04
37. I have many ways to demonstrate what I know.	6.13	6.14 / 0.86	-.01	6.15	5.62 / 1.41	0.53	.052
42. This institution evaluates students' academic skills for placement in reading, writing and math.	6.00	6.07 / 1.16	-0.07	6.13	5.97 / 1.34	0.16	0.10

Table 21

Noel-Levitz Adult Learner Inventory-Institutional Scores for Transitions

	Institution Under Evaluation			National 2-Year Adult Learners			
Scale Item	Impor-tance	Satis-faction/ SD	Perfor-mance Gap	Import -ance	Satis-faction/ SD	Perfor-mance Gap	Mean Differ-ence
Transitions	**6.20**	**5.88 / 0.87**	**0.32**	**6.28**	**5.51 / 1.29**	**0.77**	**0.37**
6. I receive Timely direction on how to transfer to 4-year colleges and universities.	6.21	5.14 / 1.66	1.07	5.89	5.03 / 1.8	0.86	0.11
14. I receive guidance on which classes will transfer to programs here and elsewhere.	6.29	5.36 / 1.74	0.93	6.31	5.23 / 1.77	1.08	0.13
21. My studies are closely related to my life and work goals.	6.40	6.27 / 1.58	0.13	6.57	6.06 / 1.27	0.51	0.21
27. I am encouraged to apply the classes I've taken towards a degree or certificate.	6.27	6.40 / 0.74	-0.13	6.40	5.90 / 1.43	0.50	0.50
33. This college explains what is needed for me to complete my program here.	6.33	6.27 / 0.88	0.06	6.58	5.83 / 1.53	0.75	0.44
41. Staff are available to help me with the employer tuition reimbursement process.	6.00	6.07 / 1.14	-0.07	6.08	5.35 / 1.74	0.73	0.72
47. When I miss a deadline or fall behind in my studies, someone from the college contacts me.	5.87	5.60 / 1.24	0.27	5.95	4.75 / 2.05	1.20	0.85

The Adult Learner Inventory has two summary questions that add an additional dimension in answering the CIPP questions of process, "Are the Apprentices being successfully trained," and product, "What was the outcome in meeting the program's strategic plan?" Table 22 rates the students' overall satisfaction with the college program. In Table 23, the data revealed student recommendations of the program to other adult learners. Both of these ratings demonstrated the students' opinion on how

well they have done and if the institution has served their academic needs to be a successful apprentice. The student summary of overall satisfaction was 6.13 as compared to the national average of 5.82.

Table 22

Noel-Levitz Adult Learner Inventory- Summary of Overall Satisfaction

Summary Item	Institution Under Evaluation	National 2-Year Adult Learners	Mean Difference
How would you rate your overall satisfaction with this program?	**6.13**	**5.82**	**0.31**
1=Not satisfied at all	0%	1%	
2=Not very satisfied	0%	2%	
3=Somewhat dissatisfied	6%	4%	
4=Neutral	6%	5%	
5=Somewhat satisfied	6%	12%	
6=Satisfied	26%	38%	
7=Very satisfied	53%	35%	

Table 23

Noel-Levitz Adult Learner Inventory – Summary of Recommendation to Adult Learners

Summary Item	Institution Under Evaluation	National 2-Year Adult Learners	Mean Difference
Would you recommend this program to other adult learners?	**6.40**	**6.05**	**0.35**
1=Definitely not	0%	2%	
2=Probably not	0%	2%	
3=Maybe not	0%	1%	
4=I don't know	6%	4%	
5=Maybe yes	6%	9%	
6=Probably yes	26%	28%	
7=Definitely yes	60%	50%	

The Adult Learner Inventory survey also provided an additional layer of data dealing with the overall summary of strengths and challenges the institution faced from

apprentice opinions. The strengths listed on Table 24 demonstrated items of high importance and high satisfaction that were significantly higher than the national average. The challenges on Table 25 revealed items of high importance but were lower in satisfaction than the national average. The two factors of strengths and challenges will be an important discourse laid out in Chapter 5 as to the relevance in future consideration and research.

Table 24

Noel-Levitz Adult Learner Inventory- Strengths / Challenges of Institution and Comparison to National Student Group with Significant Satisfaction Differences

STRENGTHS	
Strengths (High Importance and High Satisfaction)	vs. National Student Comparison Group
12. Technology support is available to me when I need it.	
24. I receive the help I need to stay on track with my classes.	
21. My studies are closely related to my life and work goals.	
7. Staff are available to help me solve unique problems I encounter.	
2. Sufficient course offerings within my program are available each term	
33. This college explains what is needed for me to complete my program here.	*Lower Satisfaction Level*
27. I am encouraged to apply the classes I've taken towards a degree or certificate.	
30. I am able to obtain information I need by phone, fax, email, or online	
31. This college makes many support services available at convenient times and places.	
40. I received the help I need to make decisions about courses and programs that interest me.	
18. This college uses technology on a regular basis to communicate with me.	

Note. National Group Means are based on 9,494 records.

Table 25

Noel-Levitz Adult Learner Inventory – Strengths/Challenges of Institution and Comparison to National Student Group with Significant Satisfaction Differences

Challenges	
Challenges (High Importance and Low Satisfaction)	vs. National Student Comparison Group
10. I have a clear understanding of what I'm expected to learn in my classes	
5. I receive the help I need to improve my technology skills.	
39. Information is available online to help me understand what I need to do next in my program of study.	
22. I receive the help I need to develop my academic skills, including reading, writing, and math.	
29. My instructors respect student opinions and ideas that differ from their own.	*Higher Satisfaction Level*
14. I receive guidance on which classes will transfer to programs here and elsewhere.	
1. My program allows me to pace my studies to fit my life and work schedules.	
25. I'm evaluated on the knowledge and skills I'll need in my life and career.	
6. I receive timely direction on how to transfer to 4-year colleges and universities.	
19. I receive timely responses to my requests for help and information.	

Note. National Group Means are based on 9,494 records.

Apprentice and Management Survey

The third portion of the research was conducted using written surveys that were

completed by the apprentices and management. The apprentice survey consisted of 50 multiple choice questions. In part I, questions 1-4 dealt with general demographic information. In part II, questions 5-23 were general multiple choice questions. In part III, Likert-scale questions were used in items 24-38 to measure agreement. In questions 39-50, Likert-scale questions were used to measure satisfaction. There was 100% participation by all 15 apprentices. The data were examined using Microsoft Excel analysis tools and SPSS.

The basic demographic questions in part I, questions 1-4, were the same as the Adult Learner Inventory survey listed toward the beginning of this chapter. Since the demographic data have already been presented in the earlier chapter, there will be no further discussion with the second data set. In part II, questions 5 and 6 asked apprentices their current level in the program and the age they entered the program as shown in Tables 26 and 27. The data showed that 11 (70%) of the apprentices were within their first or second year of the program. Table 27 indicates five apprentices entered the program between the ages of 19 and 20. There were seven who chose not applicable because there was not an option for 17 and 18 years of age. According to the information from the interview sessions, the rest of the apprentices entered the apprenticeship program when they were 18 or 17 years of age. When you extrapolate these two data sets, you have 12 (80%) apprentices who entered the apprenticeship program at the age of 20 years old or younger.

Table 26

Apprentice Survey Response – 5) What is your current status with the apprenticeship program?

	N	Percent
1st Year	4	27%
2nd Year	7	47%
3rd Year	2	13%
4th Year	2	13%
Total	15	100%

Table 27

Apprentice Survey Response – 6) How old were you when you started the apprenticeship program?

	N	Percent
19-20 Years	5	33%
21-22 Years	1	07%
23-24 years	2	13%
25 or Older	0	0%
Not Applicable	7	47%
Total	15	100%

The other section of the survey consisting of questions 7, 8, 9, 10, and 18 provided some insight into the CIPP context question, "How are the objectives of the program matched up with the needs of company and the Apprentices?" The highest frequency tabulation in Table 28 showed that type of work (*n*=11, 24%) and educational opportunities (*n*=14, 19%) were identified by apprentices for choosing the company apprenticeship program.

Table 28

Apprentice Survey Response – 7) Why did you choose the Siemens apprenticeship program?

	N	Percent
Money	9	16%
Location	9	16%
Reputation	9	16%
Educational Opportunities	14	24%
Type of work	11	19%
Others	5	9%
Not Applicable	0	0.0%
Total	57	100%

Question 7 (Table 29) demonstrated that 10 (59%) of the apprentices went directly into the apprenticeship program after high school graduation. The results of question 9 showed the highest frequency choices were apprenticeship was an excellent path to gain work related experience and skills (*n*=12, 12%) and apprenticeship would help secure a job (*n*=13, 29%) as listed on Table 30. On question 10, the apprentices got their information about the apprenticeship program from family or friends (*n*=9, 47%) as listed on Table 31. Furthermore, 11 (73%) apprentices, shown in Table 32, knew about the apprenticeship program in high school derived from question 18.

Table 29

Apprentice Survey Response – 8) What were you doing before you started your apprenticeship program?

	N	Percent
Finishing high school	10	59%
In college	3	18%
In Military	0	0.0%
Employed at a different job	4	24%
Unemployed	0	0.0%
Not applicable	0	0.0%
Total	17	101%

Note. Apprentices may select more than one options. Percentage may be greater than 100%.

Table 30

Apprentice Survey Response – 9) Which of the following reasons guided your decision to go through an apprenticeship program?

	N	Percent
Wanted this specific career path	7	16%
Wanted to be paid while training	8	17%
Apprenticeship was an excellent path to gain work related experience and skills	12	27%
Apprenticeship would help secure a job	13	29%
Others	4	9%
Not Applicable	1	2%
Total	45	100%

Note. Apprentices may select more than one options. Percentage may be greater than 100%.

Table 31

Apprentice Survey Response – 10) Before you applied and were accepted into the apprenticeship program, where did you get the information about the apprenticeship program?

	N	Percent
Siemens Apprenticeship Program Speaker	1	5%
Current or previous employer	2	11%
Friend or Family	9	47%
School Resources	6	32%
Speaker / Presentation	1	5%
Employment Resource Center	0	0.0%
None of these	0	0.0%
Not Applicable	0	0.0%
Total	19	100%

Note. Apprentices may select more than one options. Percentage may be greater than 100%.

Table 32

Apprentice Survey Response – 18) Did you know about apprenticeship programs in high school?

	N	Percent
Yes	11	73%
No	4	27%
Not Applicable	0	0.0%
Total	15	100%

In questions 11, 12, 13, 17, 19, 20, 21, the data provided information about the CIPP input question, "What characteristics help apprentices to finish their program?" Question 11 in Table 33 showed that 10 (67%) apprentices responded that the process was either difficult or very difficult to be accepted into the apprenticeship program.

Table 33

Apprentice Survey Response – 11) Please rate the process being accepted into the Apprenticeship program.

	N	Percent
Very Difficult	4	27%
Difficult	6	40%
Neutral	5	33%
Easy	0	0.0%
Very Easy	0	0.0%
Not applicable	0	0.0%
Total	15	100%

The number of apprentices who were planning to go to college or postsecondary training was 12 (75%) according to the results from question 12, Table 34. The data demonstrated that candidates had a drive to succeed beyond the secondary school level. Initially, Table 35 shows that five (33%) of the apprentices felt "apprenticeship was my ideal choice," according to question 13.

Table 34

Apprentice Survey Response – 12) What other alternatives did you consider before starting an Apprenticeship program?

	N	Percent
Staying at current job	1	6%
Finding a job	2	13%
Moving to another job	1	6%
Going to college/University	11	69%
Attending a trade or job training school	1	6%
Did not considered any alternatives	0	0.0%
Not Applicable	0	0.0%
Total	16	100%

Note. Apprentices may select more than one options. Percentage may be greater than 100%.

Table 35

Apprentice Survey Response – 13) Was the Apprenticeship program your primary choice?

	N	Percent
Apprenticeship was my ideal choice	5	33%
Preferred something else	1	7%
Did not mind either one	2	13%
Not applicable	7	47%
Total	15	100%

In addition to the apprentices' personal choice of apprenticeship, there was a high frequency of 10 (67%) apprentices indicating that they participated in a trade or vocational or technical program or high school co-op or work experience as shown in Table 36 from question 17. Another good characteristic that helped apprentices finish their program was support by 12 (80%) of the apprentices having a high school GPA of 3.0 or higher. The GPA data came from question 19, Table 37.

Table 36

Apprentice Survey Response – 17) What courses or programs below did you take in high school?

	N	Percent
Trade or vocational or technical program	7	47%
High school co-op or work experience program	3	20%
Not applicable	5	33%
Total	15	100%

Table 37

Apprentice Survey Response – 19) What was your overall grade point average when you graduated from high school?

	N	Percent
4.0-3.5	8	53%
3.49-3.0	4	27%
2.99-2.49	3	20%
Below 2.5	0	0.0%
Not applicable	0	0.0%
Total	15	100%

Another characteristic that helped promote program completion was the expectation by 15 (100%) of the apprentices that their salary would increase when they finish the program as shown in Table 38. The pay increase was coupled with the belief in question 21 that 14 (93%) of the apprentices thought the program length was about right according to Table 39. Furthermore, question 22 provided information to both CIPP input question and process question, "Are the apprentices being successfully trained?" The answer in Table 40 was not applicable by 12 (80%) of the apprentices when asked if they were not happy with the training. The frequency may indicate that they truly have nothing to be unhappy about or there was a need for additional choices to reflect the apprentices' other opinions.

Table 38

Apprentice Survey Response – 20) What is your expectation of your salary after you finish the apprenticeship program?

	N	Percent
Increase	15	100%
Decrease	0	0.0%
Stay the same	0	0.0%
Not applicable	0	0.0%
Total	15	100%

Table 39

Apprentice Survey Response – 21) What is your opinion on the length of your apprenticeship program?

	N	Percent
Too long	1	7%
Too short	0	0.0%
About right	14	93%
Not applicable	0	0.0%
Total	15	100%

Table 40

Apprentice Survey Response – 22) Was there anything you were not happy with the training?

	N	Percent
Rarely saw the trainer	0	0.0%
Trainer had knowledge gaps or inexperienced	0	0.0%
Training was not useful for the job	0	0.0%
Not enough time spent in the classroom	0	0.0%
Not enough time spent on the job	2	13%
Inconvenient or inflexible time	0	0.0%
Others	1	7%
Not applicable	12	80%
Total	15	100%

Survey questions 15 and 16 provided information to answer the CIPP process question, “Are the Apprentices being successfully trained?” In question 15, 10 (66%) of

the apprentices indicated not applicable when asked if they were not satisfied with the apprenticeship program for any reason. The percentage spoke to the fact that the apprentices actually had no complaints or there was a need for additional choices to choose from in Table 41. Question 16 supported the CIPP process question by apprentices expressing that they had directly gained an "improved ability to do my job" (*n*=13, 22%) and "better skills and knowledge related to my work" (*n*=15, 15%), according to Table 42. Finally, part II of Table 43 helped to answer the CIPP product question, "What was the outcome in meeting the program's strategic plan?" The answers to question 14 demonstrated that 14 (93%) apprentices were planning to work 7 or more years at the company plant after completing the apprenticeship program. The apprentices' willingness to stay and work that many years at the plant achieves the strategic goal of finding, training, and employing highly qualified and skilled individuals. Question 23 (Table 44) gave a high frequency level of 10 (67%) in recommending and talking about the apprenticeship program. In addition, five (33%) apprentices chose "speak highly of apprenticeship if asked."

Table 41

Apprentice Survey Response – 15) Were you NOT satisfied with the apprenticeship program for any reason below?

	N	Percent
Badly organized	1	7%
Irrelevant course(s)	3	20%
Lack of support	0	0.0%
Problems with employer	0	0.0%
Didn't learn anything new	0	0.0%
No job at the end of training	0	0.0%
Problems with time frame/management	1	7 %
Not applicable	10	66%
Total	15	100%

Table 42

Apprentice Survey Response – 16) Have you directly gained anything listed below since starting your apprenticeship program?

	N	Percent
Improved ability to do my job	13	22%
Better skills and knowledge related to my work	15	24%
Use my skills and knowledge in a broad range of jobs and industries	8	13%
Improved my career prospects	11	18%
Better able to work with others	10	17%
Have improve my information and technology skills	0	0.0%
Others	2	3%
Not applicable	2	3%
Total	59	100%

Table 43

Apprentice Survey Response – 14) After you finish your apprenticeship, how many years do you plan to work for Siemens?

	N	Percent
1-2 years	0	0.0%
3-4 years	0	0.0%
5-6 years	0	0.0%
7 or more years	14	93%
Not Applicable	1	7%
Total	15	100%

Table 44

Apprentice Survey Response – 23) Which of the following ways would you speak about this apprenticeship program?

	N	Percent
Speak highly of apprenticeship without being asked	10	67%
Speak highly of apprenticeship if asked	5	33%
Be neutral towards apprenticeship	0	0.0%
Be critical of apprenticeships if asked	0	0.0%
Be critical of apprenticeships without being asked	0	0%
Not applicable	0	0%
Total	15	100%

The final two Likert sections (part III & IV) of the apprentice survey

encompassed questions 24-50. In order to compile and use the data in SPSS, reference numbers were used in the software to allow the data to be studied quantitatively. Each Likert-scale format response was assigned a number from 1-6. The lowest response rating was 1, and the highest was 6. The researcher found the survey had an overall Cronbach's alpha (*n*=27 questions) of 0.925. According to Crocker and Algina (1986), a survey needs to have a Cronbach alpha level above 0.80 to show evidence of reliability. The level demonstrated that the overall apprentice survey in this section was reliable.

From this point, the researcher examined the subscale data to answer the four CIPP questions. The CIPP context question, "How are the objectives of the program matched up with the needs of Siemens and the apprentices," gave us several pieces of information. Using the corresponding context survey questions 26, 27, 29, 31, 34, 35, and 36, the analysis gave us the Cronbach's alpha (*n*=7 questions) of 0.682. The rating does not meet the suggested Cronbach level of .80 for reliability (Crocker & Algina, 1986). The mean was 5.419, which was in the agree range of apprentice satisfaction. Even through agree suggests that most apprentices think that the apprentice program met their needs, the results may be flawed due to the unreliability of that section of the survey. The next CIPP input question, "What characteristics help apprentices to finish their program," resulted in the Cronbach's alpha (*n*=12 questions) rating of 0.894. The rating met the suggested Cronbach level of 0.80 for reliability (Crocker & Algina, 1986). The item mean was 5.29. This was in the agree range of apprentice satisfaction among questions 39-50. The results indicated that the program and individuals contain the appropriate characteristics to help apprentices complete their program.

In the CIPP process question, "Are the apprentices being successfully trained," the analysis gave the Cronbach's alpha (*n*=4 questions) rating of 0.70. The rating did not

meet the suggested Cronbach level of 0.80 for reliability (Crocker & Algina, 1986). The item mean was 5.33. The score was in the agree range of apprentice satisfaction among questions 24, 25, 33, 37. The subsection of the survey concludes the apprentices agreed that they were successfully trained, but the results were deemed flawed based on the unreliability of the Cronbach's alpha score. The final analysis in CIPP product question, "What was the outcome in meeting the program's strategic plan," resulted in the Cronbach's alpha (n=4 questions) score of 0.58. This rating did not meet the suggested Cronbach level of 0.80 for reliability (Crocker & Algina, 1986). The item mean was 5.30. The score was in the agree range of apprentice satisfaction among questions 28, 30, 32, and 38. Once again, we have agreement among apprentices but flawed data based on the survey not being reliable. Overall, parts III and IV of the survey were deemed reliable, but three of the four subsections were considered unreliable. One contributing factor to the low Cronbach alpha rating in the components of product, context, and process may be due to the low sample size.

The researcher also considered analyzing the data using the Kruskal-Wallis test. The analysis would determine if the demographic group population responses differ with the individual responses. Upon close review of the demographic information, it was determined that it would not provide a meaningful significance to conduct a Kruskal-Wallis test. The demographic data were mostly homogenous across the board. Most of the apprentices were all male, single, White, and young.

Management Survey

The management survey consisted of the coordinator of the apprentice program and department head of training. Both management personnel participated in the survey, resulting in 100% participation. The management survey consisted of 20 multiple choice

questions constructed in a Likert-scale style that involved levels of agreement. Similar to the apprentice survey, SPSS was used to compile and analyze the data. Reference numbers were used in the software to allow the data to be studied quantitatively. Each Likert-scale format response was assigned a number from 1-6. The lowest response rating was 1, and the highest was 6. The researcher found the overall Cronbach's alpha (n=20 questions) was -0.494. Furthermore, questions 2, 6, 8, 9, 12, 14, 16, 17, 18, and 19 were removed from the scale used to calculate the Cronbach's alpha. SPSS reported that those variables had zero or close to zero for its covariance matrix. Since the Cronbach alpha did not reach a threshold of 0.80 as recommended by Crocker and Algina (1986), the data were considered not reliable.

To determine if the same result would be true for the subscale section of the data, the researcher analyzed the questions that corresponded to each CIPP question. In the context scale, "How are the objectives of the program matched up with the needs of Siemens and the apprentices," the Cronbach's alpha was 0.889 using questions 2, 6, 7, and 11. In addition, questions 2 and 6 were removed from the calculation due to the determinant of the covariance matrix being zero or close to zero. The item mean was 4.25. This is in the range of agree. Since the Cronbach alpha level is above 0.80 with a mean above 4.00, management agrees that the apprenticeship program has met their objectives. As for the other three CIPP sections of input, process, and product, SPSS was unable to calculate the Cronbach alpha level. The software removed the variables from the scale for calculation due to the covariance matrix being zero or close to zero. Once the variables were removed, SPSS was unable to compute the Cronbach alpha level.

Considering that the overall Cronbach alpha level was in the negative range and only one of four CIPP subscale data could calculate the Cronbach's alpha, it led the

researcher to conclude that the entire management survey was not reliable. Under this condition, the management survey data cannot be used to help answer the four CIPP questions.

Summary

The Stufflebeam CIPP model was the configuration used to evaluate the apprenticeship program at the Charlotte company plant. The four research questions based on context, input, process, and product were used to gather information from the apprentices and management through interviews, surveys, and company documents. The data were analyzed and reported in Chapter 4 to answer each research question. In Chapter 5, the researcher further discusses the data and presents conclusions to the study. In addition, recommendations for improvement to the apprenticeship program and further study are deliberated in the chapter.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

Apprenticeship programs have been part of human history for centuries. Despite its longevity, only a small amount of research and evaluation knowledge exist about these programs (Paquette, 2005). The researcher intended to add to that knowledge pool by conducting research of a company's apprenticeship program in Charlotte, North Carolina. The research was based on the Stufflebeam's CIPP model. The model was built upon the four questions in the areas of context, input, process, and product (Stufflebeam, 2007). The four questions for this research were

1. Context: How are the objectives of the programed matched up with the needs of Siemens and the apprentices?
2. Input: What characteristics help apprentices finish their program?
3. Process: Are the apprentices being successfully trained?
4. Product: What was the outcome in meeting the program's strategic plan?

These four questions have been the basis for the organizational structure of this research from Chapters 2-5. The research evaluation used a qualitative and quantitative mixed-method approach that allowed a broader view of the apprenticeship program. The answers to the four questions were derived from surveys, literature reviews, and interviews. With the data analysis presented in Chapter 4, this chapter elaborates, concludes, and makes recommendations from the analysis of the data.

Context

The CIPP context question, "How are the objectives of the program matching up with the needs of the company and apprentices," was fully answered in several ways. The themes derived from the apprentice interviews demonstrated that the program met

the objectives for the apprentices. The apprentices felt that the apprenticeship program would eventually provide the career, salary, and benefits they were striving to achieve as reflected 34 times in their interviews. The trainees in the Job Corps program had the same opinions (Job Corps, 2015). From the company perspective, the management interviews mentioned 34 times that they have highly skilled employees who produce a quality product. As shown in the Olinsky and Ayres (2013) research, the company apprenticeship program achieved the production of a quality product by providing young adults an education and skilled development beyond a high school level. The Adult Learning Survey outreach scale report suggested that the classroom at the community college was also meeting the objectives for the apprentices based on a higher satisfaction rating than the national average. The apprenticeship program required all apprentices to finish their coursework in 4 years. During those 4 years, apprentice satisfaction ratings were above the national average when you examine the question, "My program allows me to pace my studies to fit my life and work." The higher rating demonstrated that the community college does a good job of matching the academic needs of an individual student while still satisfying the overall requirements of the apprenticeship program. Furthermore, the higher rating suggested that the classroom coursework was also meeting the objectives for the apprentices and the company. One of the key factors in a successful apprenticeship program is matching hands-on training and classroom education. The combination goes all the way back to the Craftsman Guild Age when apprentices had to learn literacy and math along with the skilled development (Harvey, 1975).

The Adult Learner Inventory Life and Career planning scale report further supports that the program matches the objectives for the apprentices and the company.

The reported satisfaction level of 6.01 was above the national level of 5.34. The difference showed that the apprentices felt the school was doing things above average to help them graduate with a degree. Looking specifically at subset question 2, "Sufficient course offerings within my program are available each term," there was a higher satisfaction level of 6.20 against the national average of 5.25. The mean difference of 0.95 highlighted that apprentices really appreciated the abundant course offerings to satisfy their program requirement. When the apprentices were able to take the courses that they needed to satisfy the program requirements, it was more likely the apprentices would complete their academic requirements on schedule.

The apprenticeship survey continued to reinforce the CIPP context that the objectives matched up with the needs of apprentices. Question 7, "Why did you choose the Siemens apprenticeship program," resulted in several high frequency answers. The top five answers were educational opportunities (n=14), type of work (n=11), reputation (n=9), location (n=9), and money (n=9). The combination of those choices corresponded to the theme of career, salary, and benefits from the apprentice interviews. The apprenticeship program met all objectives that the apprentices wanted. In question 8, apprentices were asked, "What were you doing before you started your apprenticeship program?" The majority of apprentices (n=10, 67 %) came directly out of high school into the program. This was another indication that the program met apprentice objectives by the fact that they chose this program straight out of high school. Furthermore, question 9, "Which of the following reasons guided your decision to go through an apprenticeship program," continued to support the fact that the program met apprentice objectives. It was further collaborated with the apprentices two top choices: "Apprenticeship would help secure a job" (29%) and "Apprenticeship was an excellent

path to gain work related experience and skills" (12 %). The last consideration was that the apprenticeship program would satisfy student objectives to the extent that they began consideration of the program before they completed high school. This was shown in the selected answers that the apprentices learned about the apprenticeship program from family and friends (47%) and knew about apprenticeship in high school (73%). In retrospect, most students have a negative stigma about CTE and the pathway to hands-on training for a postsecondary education (Kuczera & Fields, 2013). The apprentices' high regard for the company apprenticeship program was a refreshing change of attitude.

The apprentice survey for sections III and IV was reliable based on the Cronbach's alpha of 0.925 using SPSS. The rating was considered reliable based on Crocker and Algina's (1986) threshold of 0.80. When examining the specific subsection CIPP context questions, a different reliability score of 0.682 was received. The entire section III and IV had a sample size of 27 questions, while the subsection had seven questions. One recommendation for future study might be to increase the number of questions for this section of context questions. Looking from a different perspective, the mean score for this subsection was 5.419. The score fell into the range of agree. The apprentices chose agree with "confident about my abilities," "quality of life," "earn more after completing my training," "apprenticeship program is the best way to learn," and "secure in my job." Those statements followed similar feelings in the interviews, Adult Learner Inventory surveys, and other survey questions that affirmed the context question for which the objectives of the program matched the needs of the apprentices.

In the discussion of the management survey, the answers to the CIPP context were inconclusive due to the lack of the resultant analysis. The compilation and analysis of the overall data using SPSS showed Cronbach's alpha was -0.494. The rating is considered

not reliable based on Crocker and Algina's (1986) threshold of 0.80. In contrast, the subsection Cronbach's alpha rating was considered reliable at 0.889, yet this may be problematic considering questions 2 and 6 were removed from the SPSS calculation of four questions. The difference in reliability casted doubt in the results. The most likely cause for the negative reliability was having a sample size of two management personnel. This was an extremely small size for the research. In future research, it would be recommended that the management survey be expanded to include supervisors, plant managers, and other department heads. Another issue was the lack of a cohesive written set of objectives for the apprenticeship program. There were also no mission or goal statements. Furthermore, the researcher was unable to find any written mission statement, goals, and objectives for the company plant or the training department. If a mission statement, goals, and objectives had been established, the framework in answering the CIPP context questions could have been developed more precisely.

Input

What characteristics help apprentices finish their program? The apprentice and management interviews brought out several themes in answering the CIPP input question. The top five themes were on-the-job training, paid tuition for degree, job placement, production facility, and mentor. These themes were not surprising since they were the basis for most apprenticeship programs (Hamilton, 1990). The five themes were part of the core framework in the company apprenticeship program. The apprentices were paired with a machinist on the plant floor to get hands-on training. The company also paid for the apprentices to complete an associate's degree. In addition, the apprentices were paid to work during the 4-year program. The company apprenticeship program paid 100% of the cost verses 50% of the cost in most European companies. In Europe, the

government and companies usually share the cost of the apprenticeship program (Hughes, 2013). After completing the apprenticeship program, the apprentices were offered a job at the company. According to the management interviews, 100% of the apprentices have been offered a job with the company. In other countries, 80% of trained young adults find work within 6 months (Symonds et al., 2011). When examining the framework of the apprenticeship program, the successful Newport News Apprentices program also had a similar framework that has been around since 1919 (The Apprentice School, 2015a).

The Adult Learner Survey also answered the input question with reports from the Student Support Systems Scale, Technology Scale, and the Life and Career Planning Scale. The apprentices had a higher satisfaction rate than the national average in the Student Support Systems Scale. In this scale, the community college was a partner in helping the apprentices finish their program with the following top three items: "This college offers strategies to help me cope with the multiple pressures of home, work, and my studies," "I received timely responses to my requests for help and information," and "I receive the help I need to develop my academic skills, including reading, writing, and math." In the technology scale, the apprentices also had a higher satisfaction rating than the national average. Several statements in the scale scored higher in helping the apprentices complete their program. The statements were "I receive the help I need to improve my technology skills," "Technology support is available to me when I need it," "This college uses technology on a regular basis to communicate with me," "Technology enables me to get the services I need when I need them," and "Information is available online to help me understand what I need to do next in my program of study."

The Life and Career Planning also had several items that helped apprentices finish their program: "Advisors are knowledgeable about requirements for courses and

programs of interest to me," "Mentors are available to guide my career and life goals," and "I can receive credit for learning derived from my previous life and work experiences." These statements received a higher satisfaction rating than the national average. The three Adult Learner Inventory scale reports highlight additional characteristics that were unique to the academic portion which helped apprentices finish their program. Those characteristics were "receive accurate and timely information," "assistance in developing their academic skills," "assistance with management of responsibilities," "provide and assist with technology to achieve academic success," "advisors and mentors to help shape and guide them through their academic journey," and the "availability to receive course credit from other organizations."

The second part of the apprentice survey exposed several items that spoke to the characteristics which helped them to finish their program. The fact that 67% of the apprentices in question 11 felt that it was difficult or very difficult to get into the program was a testament to the high bar to clear for acceptance into the apprenticeship program. The qualification process through application and screening was also part of the Job Corps program (Job Corps, 2015). As such, the selected apprentices reflected the primary qualification to be successful in the program. The fact that 70% of the apprentices were originally planning to go to college adds to the factor of being highly qualified candidates. Another factor adding to the highly qualified candidate pool was the fact that 80% of the apprentices have a high school GPA of 3.0 or higher. These factors were coupled with the fact that 33% of the apprentices felt "apprentice was my ideal choice" and 67% of the apprentices participated in the "trade or vocational or technical program" or "high school co-op or work experience." The apprentices had a game plan before joining the apprenticeship program and had experiences that reinforced

their pathway. The last two factors to consider were that apprentices thought the program length was about right and they look forward to a higher paycheck. Those two factors were additional motivating characteristics for apprentices to finish the program. Section II of the apprenticeship survey showed additional intrinsic characteristics that helped apprentices finish their program. Most of the candidates who were accepted into the apprenticeship program were college bound, had high GPAs, personally chose apprenticeship, and had previous experiences in related fields. Furthermore, they were able to proceed with the belief that the program did not waste their time and they would be paid very well after completing the apprenticeship program. The ability to gain higher pay after completing the apprenticeship goes back to the Middle Ages (Harvey, 1975). The research from Schochet et al. (2008) found the same motivating characteristics for the Job Corps. The Newport News Apprenticeship program also provided the higher pay incentives (The Apprentice School, 2015d). Finally, 80% of the apprentices answered not applicable when they answered the question, "Was there anything you were not happy with the training?" By not choosing any items that would express their displeasure, the apprentices indicated that they were content with all the characteristics of the training program.

Part IV of the apprentice survey dealt with the CIPP input section. It was considered reliable with a Cronbach alpha rating of 0.894. It was worth noting that there were 11 questions for this section of the survey versus only seven questions with the CIPP context. The higher sample size could have increased the reliability analysis in SPSS. When these questions were analyzed, the item mean was 5.29. This was in the range of average to good. Those choices could be an additional list of characteristics that helped apprentices finish their program. The choices were "Organization of the

program," "Quality of Instruction," "Quality of tools," "Textbooks and learning materials," "Practical training experience," "Content was up to date," "Content used was relevant," "Quality of training from community college," "Balance of training between classes and hands on training," "The way you were assessed on the job," and "Support you received from the company." As for the management survey in determination of CIPP input, the results were inconclusive. The SPSS compilation and analysis resulted in all the variables with the subsection for CIPP input being thrown out. The small sample size of four questions was probably the reason for the failure of the analysis. In future research, it would be important to increase the sample size and questions for this subsection. With the limited perspective and data from the failed management survey, we may not have a complete story from the management side of what characteristics helped apprentices finish the program.

Process

Are the apprentices being successfully trained? The thematic analysis from the apprentice and management interviews shows that they think apprentices are being trained successfully. It appears to be the same opinion from the Adult Learning Survey data. In the Teaching-Learning Process scale that reflects the CIPP process, apprentices felt more satisfied with their Teaching and Learning Process section than the national average. In addition, all satisfaction ratings for each question in the section were higher than the national average. Another supporting report came from the Assessment of Learning Outcome scale report. One of the results from the report was that apprentices had a higher satisfaction rate than the national average. This was reflected in the apprentices' high satisfaction ratings with the questions "This institution periodically evaluates my skill level to guide my learning experiences" and "I'm evaluated on the

knowledge and skills I'll need in my life and career."

The apprentice survey data reflected a similar opinion that they were being successfully trained. In question 15, 66% of the apprentices answered not applicable when asked, "Were you NOT satisfied with the apprenticeship program for any reason below?" The apprentices chose this answer despite having seven other broad choices. The high percentage demonstrated that they had no complaints and generally agreed that they were satisfied with the training program. The apprentices also agreed that they were being successfully trained, according to question 16. They "improved ability to do my job" (22%) and gained "better skills and knowledge related to my work" (24%). The survey data showed that apprentices felt prepared to do the job as designed by the apprenticeship program. The design was to horn the apprentices' skills to a level of mastery. The mastery preparation gave apprentices self-worth and skills needed to do a quality job (Munck et al., 2007). In section III of the apprentice survey, the Cronbach's alpha's rating for process was below 0.80. Despite the rating being unreliable, the mean was 5.33. The mean range fell in the agree section. It was worthwhile to acknowledge several aspects of the agreement from the questions. Most of the apprentices "became more enthusiastic about learning" from the apprenticeship program. It also helped them to get "a better idea about what to do in life." The agree portion extended to apprentices planning "to complete my apprenticeship program" and helped them to focus on "doing better at my job." These agreements indicated positive responses to the CIPP process question.

As with the aspect of the management survey, the subscale CIPP process data were inconclusive. Once again, SPSS was not able to calculate the Cronbach's alpha. The calculation of the variables was removed due to the covariance matrix being zero or

close to zero. Without being able to determine some level of reliability, the entire CIPP process subsection was eliminated. The subsection data can be improved by involving more participants in the management survey.

Product

The last CIPP product question was, "What was the outcome in meeting the program's strategic plan?" The first issue to be resolved was the strategic plan. The main corporate strategies were based on three concepts: "We make real what matters," "Always act as if it were your own company," and "Together we deliver" (Siemens AG, 2014, p. 7). These were broad strategies that fit the diverse businesses of the corporation. It has a world-wide business that offers products and service operations in power and gas, wind power and renewables, energy management, healthcare, building technologies, mobility, digital factory, process industries and drives, and financial services (Siemens AG, 2016). Some locations have more a specific strategic plan for their core business. The company in Singapore has a strategic plan that "uses their knowledge in the field of electrical engineering and electronics and electrical engineering to benefit customers throughout the world" (Siemens, 2008, p. 2). The researcher was unable to find any literature that stated the strategic plan for the Charlotte company location. Furthermore, there was no written strategic plan for the training department or apprenticeship program. The researcher inferred a strategic plan from all the information and data gathered through company literatures, surveys, and interviews. The constructed strategic plan for the apprenticeship program was to find, train, and employ highly qualified, skilled individuals in positions as machinists or industrial service technicians.

The thematic analysis of the apprentice and management interviews showed several indications of agreement with the strategic plan. The apprentice interview had a

frequency agreement of 37 times on the strategic plan. The management touched on the strategic theme 20 times. Both management and apprentices felt that the apprenticeship program accomplished the strategic plan. In addition, the analysis did not show any thematic coding which indicated the apprentices and management felt the program did not meet the strategic plan. In addition, the Adult Learning Inventory survey had two scale reports that provided information on the CIPP product question. The Assessment of Learning Outcomes scale had a satisfaction level of 0.2 higher than the national average. Specifically, there were two statements with high satisfaction ratings: "I have many ways to demonstrate what I know" and "This institution evaluates students' academic skills for placement in reading, writing and math." The two statements highlighted the ways apprentices showed learning mastery in their academic realm leading to the achievement of the strategic plan of the apprenticeship program.

In addition, the transition scale report had a satisfaction rating higher than the national average. Within the report, two questions stood out in relationship to the strategic plan: "My studies are closely related to my life and work goals" and "I am encouraged to apply the classes I've taken towards a degree or certificate." The rating on the two questions demonstrated that the apprentices were gaining knowledge and skills that would train them to be a good machinist or technician. In reflecting on some of these results, one important reason the apprenticeship program met its strategic plan was because the program design far exceeded the federal apprenticeship guidelines of 144 hours of classroom instruction and 2,000 hours of work experience (Paquette, 2005). The company apprenticeship program requires 1,600 hours of classroom instruction and 6,400 hours of work experience (Collins, 2015b).

The Adult Learner Inventory survey had two additional questions that helped in

answering the CIPP product question. The apprentices had a satisfaction rating higher than the national average when asked, "How would you rate your overall satisfaction with this program?" and "Would you recommend this program to other adult learners?" The high satisfaction level with the academic study indicated that the community college was meeting the training needs of the apprenticeship program. The apprentices' willingness to recommend the college program to other adult learners was another indication that the college program was meeting the strategic plan. Both data sets suggested the community college was successfully training and meeting the strategic plan when compared to the national average. The community college was an important component. In the Kuczera and Fields (2013) research, the 2-year degrees awarded for work certificate in many other countries contributed to the success of their apprenticeship program.

Two additional questions in the apprentice survey helped to further answer the CIPP question in the accomplishment of the strategic plan. Question 23 asked apprentices, "Which of the following ways would you speak about this apprenticeship training?" The apprentices chose "Speak highly of apprenticeship without being asked" (67%) and "Speak highly of apprenticeship if asked" (33%). The high level of praise for the apprenticeship program provided additional indications that the apprentices felt they were being highly trained with the skills they needed to be employed with the company. Section III of the apprentice survey had a Cronbach's alpha rating of 0.58. The low number below the threshold of 0.80 (Crocker & Algina, 1986) was probably due to the small sample size of four questions. In future surveys, it is recommended to include additional questions for this subsection. Despite the subsection Cronbach's alpha showing that the data were not reliable, the item mean was in the agree range. Most of

the apprentices felt they achieved a high level of qualification to excel at their job. They agreed that they were more likely to pursue additional learning and training. The apprentices were "given or taken more responsibilities in my job." They also plan to continue working with the same employer for the next 2-3 years. Last, the apprentices had such a solid foundation in their apprenticeship training that most agreed that "when I finish my apprenticeship program, I will undertake further training or education." The agreements in the subsection offered more evidence that the strategic plan was achieved.

The management survey using SPSS to analyze the subsection Cronbach's alpha for the CIPP product question had the same results as with the CIPP input and process. The software could not calculate the variables due to the covariance matrix being zero or close to zero. Since no reliability measurement could be retained for those data, all the data were considered corrupt and not useable. Once again, this was due to the low number of questions for the subsection. It is recommended to increase the number of questions for this subsection.

Demographics

There were several demographic data points that reflected on the apprenticeship program. The apprentices consisted of all males, mostly White/Caucasian (86%). The low diversity may have caused the company to miss out on the opportunity to hire talented and culturally enriched employees. The apprenticeship coordinator has acknowledged the low level of diversity in the program. As he recruits people for the apprenticeship program, he has expressed his desire to have a more diverse applicant pool. During his information and recruitment visits to schools, he provided extra encouragement to potential female candidates to apply to the program. In the earlier years of the apprenticeship program, females were part of the apprenticeship program.

Another factor to consider was that 80% of the apprentices were 20 years old or younger. Management has stated in their interviews that sometimes it was good to hire a young person who knows nothing and can be taught the way the company wants things done. Furthermore, the younger employee has the potential of staying with the company for a longer period of time. This would also reduce the turnover rate, thus saving money on training new apprentices. Along with a high level of young adults, it was not surprising that the majority of apprentices were single (86.67%). The company should examine what additional support it might provide these apprentices in order to help them overcome obstacles that normally go with being young and single. Some considerations might include workshops dealing with time management, housing, lifestyle management, and financial management.

The apprentices also worked full time and attended classes as part-time or full-time students (93%). The dual responsibility required careful juggling by the apprentices. In order for the apprentices to meet the demand as a worker and a student, management needs to provide a certain level of consideration and understanding when it makes decisions and policies. This also holds true for the three apprentices who would be the first person in their family to attend college. The expectations for the first person in college may add additional pressures for them to do well and finish their education. The company should examine the need for additional mentoring to ensure they get the maximum benefit from their college experience.

Strengths and Challenges

The Adult Learning Inventory survey had challenge and strength reports that listed the highest challenges and strengths as compared to the national student group. In the challenge report, apprentice satisfaction level was much lower in several areas as

compared with the national group. In the first area, they did not feel like they had a clear understanding of their curriculum program. This was expressed in questions 1, 10, and 39. A suggestion would be for the community college and the company to work to together to clarify the expectations and the curriculum program. A workshop could be given before the start of school that presents the complete curriculum requirements and expectations for their associate's degree. The second area was the lack of assistance they felt when trying to get help in general information and skill development in technology and academic skills as reflected in questions 5, 19, and 22. The community college must make sure that the apprentices get to know their school advisors and other contact personnel for assistance. It would be helpful if each apprentice received a detail fact sheet on how to contact their school advisor and access other resources. The third area of challenges was the ability to get information on course credit in receiving and transferring from other institutions within a reasonable time limit. The resolution could involve a partnership with the company and community college. When the company selects the final people to join the apprenticeship program, it should help in identifying the new apprentices who have credits to transfer to the community college. The need for identification was demonstrated by the fact that 26% of apprentices responded in the Adult Learning Inventory survey that they have some college classes or an associate's degree. The final area of challenge was the personal interaction of the community college with the apprentices. They felt that the evaluation system was not based on the knowledge and skills that went with their life and career as indicated in question 25. In question 29, they did not feel like their opinions and ideas were respected. One suggestion would be to include discussions about the school evaluation process and communication options when conducting the workshop on curriculum and expectation.

The last report on the strengths of the community college dealt with many positive points with which the apprentices felt more satisfied than the national average. In order to maintain those strengths and convert the challenges to strengths, the apprenticeship program and community college must encourage and maintain an open line of communication. It could involve a suggestion box or consistently asking for feedback on activities and events.

Recommendation and Further Research

The researcher's recommendations are based on analyzed data and compiled from an apprentice and management survey, Noel-Levitz Adult Learning Inventory survey, literature reviews, and apprentice and management interviews. In order to better evaluate the company apprenticeship program, the researcher recommends that the program includes the process of developing a mission statement, visions and objectives, and a strategic plan. The mission/vision profile will provide guidance to apprentices and management. Furthermore, it will improve the way future evaluators frame and evaluate the apprenticeship program. In addition, it is also recommended that the apprenticeship program has another program evaluation in the near future to determine if improvements have been made and the program's objectives and strategic plan are still on track.

In a future program evaluation, it is recommended that more apprentice survey questions be developed for each CIPP questions. The low number of questions in each subsection created low reliability ratings. This limitation can be solved by increasing the number of questions for each subsection. Another expansion of survey questions should be done in the management survey. The SPSS analysis for the Cronbach alpha level resulted in a negative range. Furthermore, only one of four CIPP subsection data could calculate the Cronbach's alpha. The increase in questions should come in the form of a

larger sample size. The management survey should include supervisors, plant managers, and department heads. The inability for SPSS to calculate the Cronbach alpha led the researcher to conclude that the entire management survey was not reliable. Since the management survey data could not be used, the research lacked an important component in answering the four CIPP questions. In addition, there was also a concern with the small sample size in the management interviews. The small sample size may not provide sufficient data from the management perspective to support the CIPP questions. Future management interviews should include more supervisors and department heads at the company.

Last, the researcher realized that there was a need to have more literature review information in the academic component of an apprenticeship program. The research lacked the depth of literature review to expand and support the community college research data. The researcher failed to consider this factor in the research design. Furthermore, there was very little information on the academic component of an apprenticeship program during the literature review research. In either case, it is recommended that future research design and literature review research increase the attention to this important component.

Summary

This dissertation was a program evaluation of a company apprenticeship program using the Stufflebeam CIPP model. The framework of the apprenticeship program evaluation was to answer four CIPP questions: context, “How are the objectives of the program matched up with the needs of Siemens and the apprentices”; input, “What characteristics help apprentices to finish their program”; process, “Are the apprentices being successfully trained”; and product, “What was the outcome in meeting the

program's strategic plan?" Surveys, literature reviews, and interviews were used to ascertain the answers to those CIPP questions. The researcher has conveyed the status of the program and identified areas of improvements based on the answers to those questions. Overall, it appears that the apprenticeship program was achieving its objectives and strategic plan. The researcher hoped that the additional knowledge of the company apprenticeship program would assist other companies in exploring and creating their own apprenticeship program.

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Appendix A

Computer Integrated Machining Program Curriculum

Computer Integrated Machining Program Curriculum

Central Piedmont Community College - Academic Program: 2015-2016
Computer Integrated Machining Program Curriculum (A50210)

Course Code	Course	Credit
Fall Semester		
MAC 111AB	Machining Technology I	3
MAC 111BB	Machining Technology I	3
MAC 114	Introduction to Metrology	2
MAC 121	Introduction to CNC	2
MAC 131	Blueprint Reading	2
MAT 110	Math. Measurement and Literacy	3
CIS 111	Basic PC Literacy	2
	Total	17
Spring Semester		
MAC 142	Machining Applications II	4
MAC 122	CNC Turning	2
MAC 124	CNC Milling	2
EGR 120	Engineering and Design Graphics	3
MAC 152	Advanced Machining Calculations	2
SOC 210	Introduction to Sociology or Other Social/Behavioral Science options.	3
	Total	16
Summer Semester		
ENG 111	Expository Writing	3
ART 111	Art Appreciation or Other Humanities Options	3
	Total	6
Fall Semester		
MAC 222	Advanced CNC Turning	2
MAC 231	CAM: CNC Turning	3
MAC 224	Advanced CNC Milling	2
DFT 154	Intro to Solid Modeling*	3
ENG 114	Prof. Research & Reporting	3
COM 110	Intro to Communication	3
Note. *Add. Tech. Electives ISC132, WLD112, WBL112, 122, or MAC 172		
	Total	16

Spring Semester		
MAC 232	CAM: CNC Milling	3
MAC 234	Advanced Multi-Axis Machining	3
MAC 228	Advanced CNC Processes	3
MAC 143	Machining Applications III	4
	Total	13
Total Credit Hours		68

Notes: MAC 111AB plus MAC 111BB = MAC 111
Computer Numerical Control Milling = CNC

Appendix B

Mechantronics Engineering Technology
Program Curriculum – Mechanical Track

Mechatronics Engineering Technology Program Curriculum – Mechanical Track

Central Piedmont Community College - Academic Program: 2015-2016
Mechatronics Engineering Technology Program Curriculum - Mechanical Track (A40350)

Course Code	Course	Credit
Fall Semester		
ENG 111	Expository Writing	3
MAT 121 or	Algebra/Trigonometry 1	
MAT 171	Pre-Calculus Algebra	4
EGR 125	App. Software for Technician	2
ELC 131	Circuit Analysis	4
ISC 112	Industrial Safety	2
	Total	14
Spring Semester		
ENG 114 or	Prof. Research & Reporting	
ENG 112 or	Argument-Based Research	
ENG 113	Literature Based Research	3
ELC 130	Adv. Motor Control	
DFT 154	Intro to Solid Modeling 2 2 3	3
MAT 122 or	Algebra/Trigonometry 2	
MAT 172	Pre-Calculus Trigonometry	3
PHY 131	Physics-Mechanics	
PHY 151	College Physics I	4
	Total	16
Summer Semester		
COM 110	Intro. to Communication	3
ECO 251	Prin. Of Microeconomics	3
ELC 213	Instrumentation	3
MAC 234	Adv. Multi-Axis Mach	3
	Total	13
Fall Semester		
EGR 250	Statics/Strength of Mater	5
ISC 212	Metrology	2
ELN 260	Program Logic Controllers	4
MEC 130	Mechanisms	3
MEC 161	Manufacturing Processes I	3
	Total	17
Spring Semester		
MEC 265	Fluid Mechanics	3

ATR 112	Intro. to Automation	3
MEC 270	Machine Design	4
MEC 180	Engineering Materials	3
Elective	Humanities/Fine Arts/ Behavioral/Social Sciences	3
	Total	16
Total Credit Hours		76

Appendix C

Mechantronics Engineering Technology
Program Curriculum – Electrical Track

Mechatronics Engineering Technology Program Curriculum – Electrical Track

Central Piedmont Community College - Academic Program: 2015-2016
Mechatronics Engineering Technology Program Curriculum - Electrical Track (A40350)

Course Code	Course		Credit
Fall Semester			
ENG 111	Expository Writing		3
MAT 121 or	Algebra/Trigonometry 1		3
MAT 171	Pre-Calculus Algebra		4
DFT 154 or	Intro to Solid Modeling		
EGR 120	Eng. and Design Graphics		3
ELC 131	Circuit Analysis I		4
EGR 125	Application Software for Technician		2
ISC 112	Industrial Safety		2
		Total	17/18
Spring Semester			
ENG 114 or	Prof Research & Reporting		
ENG 112 or	Argument-Based Research		
ENG 113	Literature Based Research		3
ELC 135	Electrical Machines		3
MAT 122 or	Algebra/Trigonometry II		3
MAT 172	Pre-Calculus Trigonometry		4
PHY 131 or	Physics-Mechanics		
PHY 151	College Physics I		4
		Total	12/13
Summer Semester			
COM 110	Intro to Communication		3
ECO 251	Principles of Microeconomics		3
ELC 213	Instrumentation		4
Elective	Humanities/Fine Arts Elective		3
	Behavioral & Social Sciences		
		Total	15
Fall Semester			
ELC 133	Circuit Analysis II		4
ELN 133	Digital Electronics		4
ELN 260	Program Logic Controllers		4
MEC 130	Mechanisms		3
	Total		15
Spring Semester			

ELC 136	Electrical Machines II	4
ELN 131	Analog Electronics I	4
MEC 265	Fluid Mechanics	3
ATR 112	Intro. to Automation	3
		14
Total Credit Hours		72

Appendix D

Apprentice Survey Questions

Apprentice Survey Questions

Part I – Basic Demographic Information

1. Marital Status: Single Married Widowed Divorced

2. Gender: Male Female

3. Ethnicity: African American Asian Caucasian Hispanic Other

4. Age: 18-19 20-21 22-23 24-25 26-27 28-29 30 or Over

Part II

5. What is your current status with the apprenticeship program?

   a. 1st Year
   b. 2nd Year
   c. Not Applicable

6. How old were you when you started the apprenticeship program?

   a. 19-20 b. 21-22 c. 23-24 d. 25 or Older e. Not applicable

7. Why did you choose the Siemens apprenticeship program? (Circle all that apply)

   a. Money

   b. Location

   c. Reputation

   d. Educational opportunities

   e. Type of work

   f. Others

   g. Not applicable

8. What where you doing before you started your apprenticeship program?

   a. Finishing High School
   b. In College
   c. In Military
   d. Employed at a different job
   e. Unemployed

f. Not applicable

9. Which of the following reasons guided your decision to go through an apprenticeship program? (Circle All that Apply)

a. Wanted this specific career path
b. Wanted to be paid while training
c. Thought apprenticeship was an excellent path to gain work related experience and skills.
d. Thought Apprenticeship would help to secure a job.
e. Other
f. Not applicable

10. Before you applied and were accepted into the apprenticeship program, where did you get the information about the apprenticeship program?

a. Siemens Apprenticeship Program Speaker
b. Current or previous employer
c. Friend or Family
d. School Resources
e. Speaker/Presentation
f. Employment Resource Center
g. None of these
h. Not applicable

11. Please rate the process being accepted into the Apprenticeship?

a. Very Difficult b. Difficult c. Neutral d. Easy e. Very Easy

d. Not Applicable

12. What other alternatives did you consider before starting an Apprenticeship program?

a. Staying at current job
b. Finding a job
c. Moving to another job.
d. Going to a college/University
e. Attending a trade or job training school
f. Did not considered any alternatives
g. Not applicable

13. Was the Apprenticeship program your primary choice?

a. Apprenticeship was my ideal choice.
b. Preferred something else.
c. Did not mind either one.
d. Not applicable

14. After you finish your apprenticeship, how many years do you plan to work for Siemens?

    a. 1-2 years b. 3-4 years c. 5-6 years d. 7 or more years

    e. Not Applicable

15. Were you NOT satisfied with the apprenticeship program for any reasons below? (Circle all that apply)

    a. Badly organized
    b. Irrelevant Course(s)
    c. Lack of support
    d. Problems with employer
    e. Didn't learn anything new
    f. No job at the end of training
    g. Problems with the time frame/management
    h. Not Applicable

16. Have you directly gained anything listed below since starting your apprenticeship program? (Circle all that Apply)

    a. Improved ability to do my job.

    b. Better Skills and Knowledge related to my work.

    c. Use my skills and knowledge in a broad range of jobs and industries

    d. Improved my career prospects

    e. Better able to work with others

    f. Have improve my information and technology skills

    g. Others

    h. Not applicable

17. What courses or programs below did you take in High School? (Circle All That Applies)

    a. Trade or Vocational or Technical Program (Also commonly known as CTE Courses)
    b. High School co-op or work experience program
    c. Not applicable

18. Did you know about apprenticeship programs in high school?

a. Yes b. No c. Not applicable

19. What was your overall grade point average when you graduated from high school?

a. 4.0-3.5 b. 3.49-3.0 c. 2.99 – 2.49 d. Below 2.5 e. Not applicable

20. What is your expectation of your salary after you finished the Apprenticeship program?

a. Increase. b. Decrease c. Stay the same d. Not applicable

21. What is your opinion on the length of your apprenticeship program?

a. Too long b. Too short c. About right d. Not Applicable

22. Was there anything you were not happy with the training? (Circle all that Apply)

a. Rarely saw the trainer
b. Trainer had knowledge gaps or inexperienced
c. Training was not useful for the job.
d. Not enough time spent in the classroom
e. Not enough time spent on the job
f. Inconvenient or inflexible time
g. Others
h. Not applicable

23. Which of the following ways would you speak about this apprenticeship training?

a. Speak highly of apprenticeships without being asked.
b. Speak highly of apprenticeships if asked.
c. Be neutral towards Apprenticeship
d. Be critical of apprenticeships if asked.
e. Be critical of apprenticeships without being asked.
f. Not applicable

Part III

In the following questions, please indicate your level of agreement with the following statements based on your experience with the Siemens apprenticeship program.

24. Became more enthusiastic about learning.

a. Strongly Disagree b. Disagree c. Neither Agree or Disagree d. Agree

e. Strongly Agree f. Not Applicable

25. Got a better idea about what you want to do in your life

a. Strongly Disagree b. Disagree c. Neither Agree or Disagree d. Agree

e. Strongly Agree f. Not Applicable

26. Became more confident about my abilities.

a. Strongly Disagree b. Disagree c. Neither Agree or Disagree d. Agree

e. Strongly Agree f. Not Applicable

27.Expect to improved my quality of life.

a. Strongly Disagree b. Disagree c. Neither Agree or Disagree d. Agree

e. Strongly Agree f. Not Applicable

28. More likely to pursue more learning and training.

a. Strongly Disagree b. Disagree c. Neither Agree or Disagree d. Agree

e. Strongly Agree f. Not Applicable

29. More satisfied with my job.

a. Strongly Disagree b. Disagree c. Neither Agree or Disagree d. Agree

e. Strongly Agree f. Not Applicable

30. Given or taken more responsibilities in my job.

a. Strongly Disagree b. Disagree c. Neither Agree or Disagree d. Agree

e. Strongly Agree f. Not Applicable

31. “Earning less while on an apprenticeship program is worth it because I will earn more after completing my training.”

a. Strongly Disagree b. Disagree c. Neither Agree or Disagree d. Agree

e. Strongly Agree f. Not Applicable

32. Plan to continue working with the same employer for the next 2-3 years.

a. Strongly Disagree b. Disagree c. Neither Agree or Disagree d. Agree

e. Strongly Agree f. Not Applicable

33. Plan to complete my apprenticeship program.

a. Strongly Disagree b. Disagree c. Neither Agree or Disagree d. Agree

e. Strongly Agree f. Not Applicable

34. Apprenticeship program is the best way to learn a trade?

a. Strongly Disagree b. Disagree c. Neither Agree or Disagree d. Agree

e. Strongly Agree f. Not Applicable

35. Feel more secure in my job

a. Strongly Disagree b. Disagree c. Neither Agree or Disagree d. Agree

e. Strongly Agree f. Not Applicable

36. Completion of my Apprenticeship will give me significantly more chance of finding work in the future.

a. Strongly Disagree b. Disagree c. Neither Agree or Disagree d. Agree

e. Strongly Agree f. Not Applicable

37. Doing better at my job.

a. Strongly Disagree b. Disagree c. Neither Agree or Disagree d. Agree

e. Strongly Agree f. Not Applicable

38. When I finish my apprenticeship program, I will undertake further training or education.

a. Strongly Disagree b. Disagree c. Neither Agree or Disagree d. Agree

e. Strongly Agree f. Not Applicable

Part IV

Please indicate your level of agreement with the following statements based on your experience with the Siemens apprenticeship program.

Rate the following questions based on your experience at the Siemens Training Facility.

39. Organization of the program?

a. Poor b. Fair c. Average d. Good e. Excellent

f. Not applicable

40. Quality of Instruction?

a. Poor b. Fair c. Average d. Good e. Excellent

f. Not applicable

41. Quality of tools, equipment and technology used for training?

a. Poor b. Fair c. Average d. Good e. Excellent

f. Not applicable

42. Textbooks and learning materials?

a. Poor b. Fair c. Average d. Good e. Excellent

f. Not applicable

43. Amount of practical training experience?

a. Poor b. Fair c. Average d. Good e. Excellent

f. Not applicable

44. Content was up to date with current technology and process?

a. Poor b. Fair c. Average d. Good e. Excellent

f. Not applicable

45. Content used was relevant to my future career?

a. Poor b. Fair c. Average d. Good e. Excellent

f. Not applicable

46. Quality of training you received from the community college?

a. Poor b. Fair c. Average d. Good e. Excellent

f. Not applicable

47. Balance of training between classes and hands on training?

a. Poor b. Fair c. Average d. Good e. Excellent

f. Not applicable

48. The way you were assessed on the job?

a. Poor b. Fair c. Average d. Good e. Excellent

f. Not applicable

49. Support you received from the company?

a. Poor b. Fair c. Average d. Good e. Excellent

f. Not applicable

50. Overall experience with the training program?

a. Poor b. Fair c. Average d. Good e. Excellent

f. Not applicable

Appendix E

Apprentice Interview Questions

Apprentice Interview Questions

1. When do you expect to finish your apprenticeship program?
2. What do you think about the application and selection process of apprenticeship program?
3. Why did you choose this apprenticeship program?
4. What challenges or difficulties did you experience in this apprenticeship program?
5. How relevant was the hands-on training meeting the skills and knowledge requirements for your job?
6. How relevant was the classroom training at Central Piedmont Community meeting the skills and knowledge requirements for your job?
7. What is motivating you to complete your apprenticeship program?
8. What do you feel are the strengths of the apprenticeship program?
9. What area do you feel need improvement in the apprenticeship program?
10. Would you recommend this apprenticeship program to another individual?

Appendix F

Management Survey Questions

Management Survey Questions.

Please indicate your level of agreement with the following statements based on your experience with the Siemens apprenticeship program.

Rate the following questions based on your experience at the Charlotte Siemens Apprenticeship Program.

1. Training provided to your apprentices met your expectation and needs.

    a. Strongly disagree b. Disagree c. Agree d. Strongly agree

    e. Not Applicable

2. Apprentices select for the apprenticeship program met your expectation.

    a. Strongly disagree b. Disagree c. Agree d. Strongly agree

    e. Not Applicable

3. Required paperwork or governmental bureaucracy was not burdensome.

    a. Strongly disagree b. Disagree c. Agree d. Strongly agree

    e. Not Applicable

4. Support and communication from your apprentice met your expectation/needs.

    a. Strongly disagree b. Disagree c. Agree d. Strongly agree

    e. Not Applicable

Able to control and shape the framework, content, delivery, and duration of the training.

    a. Strongly disagree b. Disagree c. Agree d. Strongly agree

    e. Not Applicable

6. Level of support, guidance and information for those interested in your apprenticeship program met your expectation.

    a. Strongly disagree b. Disagree c. Agree d. Strongly agree

    e. Not Applicable

7. Quality of applicants met your expectation/needs.

a. Strongly disagree b. Disagree c. Agree d. Strongly agree

e. Not Applicable

8. Support and communication from your trainers met your expectation/needs.

a. Strongly disagree b. Disagree c. Agree d. Strongly agree

e. Not Applicable

9. Would recommend apprenticeships to other employers.

a. Strongly disagree b. Disagree c. Agree d. Strongly agree

e. Not Applicable

10. Plan on increasing the number of apprenticeship.

a. Strongly disagree b. Disagree c. Agree d. Strongly agree

e. Not Applicable

11. Recruitment approach and methods met your expectation/needs.

a. Strongly disagree b. Disagree c. Agree d. Strongly agree

e. Not Applicable

12. Plan on continuing the apprenticeship program.

a. Strongly disagree b. Disagree c. Agree d. Strongly agree

e. Not Applicable

13. Support by the government or other non-governmental agency met your expectation/needs.

a. Strongly disagree b. Disagree c. Agree d. Strongly agree

e. Not Applicable

14. Progression and completion rate met your expectation.

a. Strongly disagree b. Disagree c. Agree d. Strongly agree

e. Not Applicable

15. Apprenticeship program funding met your expectation/needs.

a. Strongly disagree b. Disagree c. Agree d. Strongly agree

e. Not Applicable

16. Level of support from corporate office met your expectation/needs.

a. Strongly disagree b. Disagree c. Agree d. Strongly agree

e. Not Applicable

17. Quality of training you received from the community college met your expectation/needs.

a. Strongly disagree b. Disagree c. Agree d. Strongly agree

e. Not Applicable

18. Quantity of tools, equipment and technology used for training met your expectation/needs.

a. Strongly disagree b. Disagree c. Agree d. Strongly agree

e. Not Applicable

19. Apprentices that completed the program fulfil your employment needs.

a. Strongly disagree b. Disagree c. Agree d. Strongly agree

e. Not Applicable

20. Overall, the apprenticeship program met your expectation/needs.

a. Strongly disagree b. Disagree c. Agree d. Strongly agree

e. Not Applicable

Appendix G

Management Interview Questions

Management Interview Questions

1. Why did the company start an apprenticeship program?
2. How is the apprenticeship program funded?
3. How did you determine the number of apprentice position to offer in the apprenticeship program?
4. What methods and approaches did you used to recruit apprentices?
5. What do you think about the application and selection process of apprenticeship program?
6. What are your expectation in the training of your apprentice?
7. What challenges or difficulties did you experience in this apprenticeship program?
8. What do you feel are the strengths of the apprenticeship program?
9. What area do you feel need improvement in the apprenticeship program?
10. Would you recommend this apprenticeship program to another individual?

Appendix H

Definition of The Adult Learner Inventory Interpretive Guide Scales

Description of The Adult Learner Inventory Interpretive Guide Scales

Outreach – measure the methods college uses to connect with students by working through obstacles such as time, place, and tradition so that students can receive and achieve a lifetime of educational opportunities.

Life and Career Planning - determine the way college uses its resources to help students achieve their life and career goals before and after they are enrolled at the college.

Financing - measure the methods college provides financial options for payment in order for students to best structure their finances.

Assessment of Learning Outcomes - examines the way college determines student academic achievement based on knowledge, skills, and competences resulting from their curriculum and student's experiences.

Teaching / Learning Process – measures the methods and pathways the faculty and institution uses to teach and help students learn the course curriculum.

Student Support System – examines the institutional system's academic and support system to assist and develop student's personal and academic success.

Technology – examines the way college uses information technology to enrich student's learning experience.

Transitions – measures how well the college support and guide student's transitions from the academic classroom to the society to attain their career and educational plan.

Appendix I

Informed Consent for Apprentices

GARDNER-WEBB UNIVERSITY

INFORMED CONSENT

FOR PARTICIPATION IN AN EVALUATION RESEARCH - APPRENTICE

Study Title: A Program Evaluation of an Apprenticeship Program using Stufflebeam's CIPP Model

Researcher: Oai C. To, Doctoral Candidate in the Doctor of Education program at Gardner-Webb University. He will be conducting a program evaluation for his dissertation.

Thank you for your interest in participating in this research. Before you agree to take part in the study, please read the following explanation of the purpose and procedures. You will receive a copy of this Informed Consent form to keep. The participation in this study is voluntary. Decision not to participate will not affect you in any way at work or in the classroom. If you participate in the study, you can stop your involvement with the study at any time.

This research is conducting a program evaluation of the Siemens Energy, Inc.'s apprenticeship program in Charlotte, North Carolina. It will be based on the CIPP model using the concept of Context, Input, Process, and Product. The research will evaluate your attitude, feelings, and knowledge about the apprenticeship program and your academic study at Central Piedmont Community College.

The study will involve current apprentices and management in the apprenticeship program. There is no cost to you for being involved in this research. If you decide to participate, you will be asked to complete a written and online survey. In addition, the researcher will conduct a recorded interview. All information gathered will be strictly confidential. All participants will be assigned an identification code for references in the research.

Your participation is greatly appreciated. Your input and involvement is valuable to this dissertation research. Since the researcher is committed to your privacy, a written authorization (permission) must granted in order to use your opinions and responses in the research study. If you are willing to participate in the program evaluation, please review and sign the consent form.

Sincerely,

Oai C. To

Doctoral Candidate, Gardner-Webb University

Consent Form for Participating in the Program Evaluation - Apprentice

Research: A Program Evaluation of Siemens Energy, Inc.'s apprenticeship program in Charlotte, North Carolina using Stufflebeam's CIPP Model of Context, Input, Process, and Product.

Researcher: Oai C. To, Doctoral Candidate in the Education Doctorate program at Gardner-Webb University.

What will you do in this research: Complete a written and online survey. In addition, participate in a recorded interview.

Time required: The written and online survey is anticipated to take no longer than 30 minutes for each survey. The interview is estimated to take around 30 minutes.

Compensation: You will not receive any monetary gift for your participation. Furthermore, participation will not increase your evaluation rating at work or in the classroom. There is no cost to you for being involved in this research.

Risks: Other than possible discomfort or embarrassment from some of the questions, there are no anticipated risk.

Confidentiality: All information gathered will be strictly confidential. All participants will be assigned an identification code. The identification code will be the only references use in the study or publication. Your actual identity will not be revealed at any time. All participants' data will be stored in a secure site away from Siemens Energy, Inc. and Central Piedmont Community College.

Participation and Withdrawal: The participation in this study is voluntary. Decision not to participate will not affect you in any way at work or in the classroom. You may withdraw from the study at any time by informing the researcher, no questions will be asked.

Contact the Researcher: You can contact the researcher, Oai C. To, on his cell phone at any time: XXXXX. Email at XXXXX.

Other Contact: If you have any concerns or questions about this research, suggestions, or complaints that are not being addressed by the researcher, you can call Gardner-Webb University Institutional Review Board Office at (704) 406-4724.

Agreement: I have read the written notes above and understand what is involved with the study. I agree to participate in this study.

Signature: _____ Date: _____

Name (print): _____

Appendix J

Informed Consent for Management

GARDNER-WEBB UNIVERSITY

INFORMED CONSENT

FOR PARTICIPATION IN AN EVALUATION RESEARCH - MANAGEMENT

Study Title: A Program Evaluation of an Apprenticeship Program using Stufflebeam's CIPP Model

Researcher: Oai C. To, Doctoral Candidate in the Doctor of Education program at Gardner-Webb University. He will be conducting a program evaluation for his dissertation.

Thank you for your interest in participating in this research. Before you agree to take part in the study, please read the following explanation of the purpose and procedures. You will receive a copy of this Informed Consent form to keep. The participation in this study is voluntary. Decision not to participate will not affect you in any way at work. If you participate in the study, you can stop your involvement with the study at any time.

This research is conducting a program evaluation of the Siemens Energy, Inc.'s apprenticeship program in Charlotte, North Carolina. It will be based on the CIPP model using the concept of Context, Input, Process, and Product. The research will evaluate your attitude, feelings, and knowledge about the apprenticeship program.

The study will involve current apprentices and management in the apprenticeship program. There is no cost to you for being involved in this research. If you decide to participate, you will be asked to complete a written survey. In addition, the researcher will conduct a recorded interview. All information gathered will be strictly confidential. All participants will be assigned an identification code for references in the research.

Your participation is greatly appreciated. Your input and involvement is valuable to this dissertation research. Since the researcher is committed to your privacy, a written authorization (permission) must granted in order to use your opinions and responses in the research study. If you are willing to participate in the program evaluation, please review and sign the consent form.

Sincerely,

Oai C. To

Doctoral Candidate, Gardner-Webb University

Consent Form for Participating in the Program Evaluation - Management

Research: A Program Evaluation of Siemens Energy, Inc.'s apprenticeship program in Charlotte, North Carolina using Stufflebeam's CIPP Model of Context, Input, Process, and Product.

Researcher: Oai C. To, Doctoral Candidate in the Doctorate of Education program at Gardner-Webb University.

What will you do in this research: Complete a written survey. In addition, participate in a recorded interview.

Time required: The written survey is anticipated to take no longer than 15 minutes to complete. The interview is estimated to take around 30 minutes.

Compensation: You will not receive any monetary gift for your participation. Furthermore, participation will not increase your evaluation rating at work. There is no cost to you for being involved in this research.

Risks: Other than possible discomfort or embarrassment from some of the questions, there are no anticipated risk.

Confidentiality: All information gathered will be strictly confidential. All participants will be assigned an identification code. The identification code will be the only references use in the study or publication. Your actual identity will not be revealed at any time. All participants' data will be stored in a secure site away from Siemens Energy, Inc. and Central Piedmont Community College.

Participation and Withdrawal: The participation in this study is voluntary. Decision not to participate will not affect you in any way at work. You may withdraw from the study at any time by informing the researcher, no questions will be asked.

Contact the Researcher: You can contact the researcher, Oai C. To, on his cell phone at any time: XXXXXX. Email at XXXXXX.

Other Contact: If you have any concerns or questions about this research, suggestions, or complaints that are not being addressed by the researcher, you can call Gardner-Webb University Institutional Review Board Office at (704) 406-4724.

Agreement: I have read the written notes above and understand what is involved with the study. I agree to participate in this study.

Signature: _____ Date: _____

Name (print): _____

Appendix K

Noel-Levitz Adult Learner Inventory Percentage Scores Questions

Noel-Levitz Adult Learner Inventory Percentage Scores Questions

	Institution Under Evaluation			National 2-Year Adult Learners			
Scale Item	Impor-tance	Satisfac-tion/SD	Perfor-mance Gap	Impor-tance	Satis-faction/ SD	Perfor-mance Gap	Mean Differ-ence
1. My program allows me to pace my studies to fit my life and work.	6.27	5.73 / 1.53	0.54	6.55	5.61 / 1.52	0.94	0.12
2. Sufficient course offerings within my program are available each term.	6.36	6.20/0.68	0.16	6.46	5.25 / 1.67	1.21	.095
3. This college assists students who need help with the financial aid process.	5.86	6.33 / 0.98	-0.50	6.37	5.69 / 1.63	0.68	0.64
4. My instructors involve me in evaluating my own learning	5.73	5.77 / 0.73	-0.04	6.39	5.63 / 1.57	0.76	0.77
5. I receive the help I need to improve my technology skills.	6.57	5.87 / 1.19	0.70	6.11	5.62 / 1.48	0.49	0.25
6. I receive Timely direction on how to transfer to 4-year colleges and universities.	6.21	5.14 / 1.66	1.07	5.89	5.03 / 1.8	0.86	0.11
7. Staff are unavailable to help me solve unique problems I encounter.	6.40	6.40 / 0.74	0.00	6.39	5.63 / 1.57	0.76	0.77
8. This college provides students with the help they need to develop an education plan.	6.33	6.00 / 1.20	0.33	6.42	5.60 / 1.57	0.82	0.40
9. I receive adequate information about sources of financial assistance available to me.	5.79	6.21 / 0.89	-0.42	6.37	5.27 / 1.82	1.10	0.94
10. I have a clear understanding of what I'm expected to learn in my classes.	6.67	6.13 / 1.19	0.54	6.62	5.95 / 1.37	0.67	0.18

11. This college offers strategies to help me cope with the multiple pressures of home, work, and my studies.	5.60	5.00 / 1.65	0.60	6.05	4.99 / 1.78	1.06	0.01
13. Processes and procedures for enrolling here are convenient.	6.13	6.13 / 0.83	0.00	6.47	5.93 / 1.41	0.54	0.20
14. I receive guidance on which classes will transfer to programs here and elsewhere.	6.29	5.36 / 1.74	0.93	6.31	5.23 / 1.77	1.08	0.13
15. Advisors are knowledgeable about requirements for courses and programs of interest to me.	6.07	5.87 / 0.92	0.20	6.49	5.59 / 1.68	0.90	0.28
17. My instructors provide timely feedback about my academic progress.	6.00	5.27 / 1.10	0.73	6.56	5.67 / 1.57	0.89	-0.40
18. This college uses technology on a regular basis to communicate with me.	6.13	6.33 / 0.72	-0.20	6.31	6.16 / 1.20	0.15	0.17
19. I receive timely responses to my requests for help and information.	6.20	5.67 / 1.50	0.53	6.54	5.73 / 1.53	0.81	-0.06
20. This institution periodically evaluates my skill level to guide my learning experiences.	5.33	5.47 / 1.60	-0.14	6.09	5.18 / 1.71	0.91	0.29
21. My studies are closely related to my life and work goals.	6.40	6.27 / 1.58	0.13	6.57	6.06 / 1.27	0.51	0.21
22. I receive the help I need to develop my academic skills, including reading, writing, and math.	6.40	6.00 / 0.88	0.40	6.35	5.83 / 1.43	0.52	0.17

24. I receive the help I need to stay on track with my classes.	6.53	6.20 / 0.86	0.33	6.49	5.68 / 1.56	0.81	0.52
25. I'm evaluated on the knowledge and skills I'll need in my life and career.	6.27	5.53 / 1.46	0.74	6.34	5.57 / 1.52	0.77	-0.04
26. I am able to choose course delivery that fits my life circumstances.	6.00	5.53 / 1.73	0.47	6.53	5.74 1.56	0.79	-0.21
27. I am encouraged to apply the classes I've taken towards a degree or certificate.	6.27	6.40 / 0.74	-0.13	6.40	5.90 / 1.43	0.50	0.50
29. My instructors respect student opinions and ideas that differ from their own.	6.33	5.93 / 1.10	0.40	6.38	5.79 / 1.54	0.59	0.14
30. I am able to obtain information I need by phone, fax, e-mail, or online.	6.20	6.27 / 1.16	-0.07	6.51	6.02 / 1.34	0.49	0.25
31. This college makes many support services available at convenient times and places.	6.20	6.20 / 0.94	0.00	6.31	5.65 / 1.52	0.66	0.55
32. Technology enables me to get the services I need when I need them.	6.00	6.13 / 0.99	-0.13	6.49	6.10 / 1.24	0.39	0.03
33. This college explains what is needed for me to complete my program here.	6.33	6.27 / 0.88	0.06	6.58	5.83 / 1.53	0.75	0.44
34. This college provides "one-stop shopping" for most student support services.	6.07	5.93 / 1.58	0.14	6.36	5.84 / 1.46	0.52	0.09
35. Mentors are available to guide my career and life goals.	5.93	6.13 / 0.92	-0.20	6.17	5.30 / 1.75	0.87	0.83
36. Most instructors use a variety of teaching	5.80	5.87 / 1.06	-0.07	6.29	5.69 / 1.49	0.60	0.18

methods.							
37. I have many ways to demonstrate what I know.	6.13	6.14 / 0.86	-.01	6.15	5.62 / 1.41	0.53	.052
38. My instructors encourage student-to-student interactions through a variety of techniques.	6.00	6.29 / 0.83	-0.29	5.89	5.72 / 1.42	0.17	0.57
39. Information is available online to help me understand what I need to do next in my program of study.	6.47	6.00 / 1.20	0.47	6.43	5.68 / 1.53	0.75	0.32
40. I receive the help I need to make decisions about courses and programs that interest me.	6.20	6.27 / 0.96	-0.07	6.41	5.59 / 1.61	0.82	0.68
41. Staff are available to help me with the employer tuition reimbursement process.	6.00	6.07 / 1.14	-0.07	6.08	5.35 / 1.74	0.73	0.72
42. This institution evaluates students' academic skills for placement in reading, writing and math.	6.00	6.07 / 1.16	-0.07	6.13	5.97 / 1.34	0.16	0.10
43. The frequency of interactions with my instructors is satisfactory.	6.00	6.00 / 1.13	0.00	6.44	5.92 / 1.42	0.52	0.08
44. I can receive credit for learning derived from my previous life and work experiences.	5.93	5.87 / 1.46	0.06	6.22	4.84 / 2.00	1.38	1.03
45. Instructors incorporate my life and work experiences in class activities and assignments.	6.20	6.00 / 1.07	0.20	5.99	5.25 / 1.75	0.74	0.75
46. The learning experiences within my program of study challenge me to reach beyond what I know already.	6.13	5.93 / 1.16	0.20	6.48	6.04 / 1.31	0.44	-0.11

47. When I miss a deadline or fall behind in my studies, someone from the college contacts me.	5.87	5.60 / 1.24	0.27	5.95	4.75 / 2.05	1.20	0.85