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Developing the future workforce through apprenticeships : a case study of an industry-education partnership.

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DEVELOPING THE FUTURE WORKFORCE THROUGH APPRENTICESHIPS: A CASE STUDY OF AN INDUSTRY-EDUCATION PARTNERSHIP

By

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DEDICATION

This dissertation is dedicated to my husband

Ekow Arthur-Mensah

you have been the wind beneath my wings

and

to my children

Vivian and Douglas

who inspire me every day to be a better person; I hope you soar higher.

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ABSTRACT

DEVELOPINGTHE FUTURE WORKFORCE THROUGH APPRENTICESHIPS: A CASE STUDY OF AN INDUSTRY-EDUCATION PARTNERSHIP

Nana K. Arthur-Mensah

March 27, 2015

In recent years economic and demographic changes, concerns with high school dropout and academic achievement, high college incompletion rates and a skills gaps in the labor market have caused policy makers, educators and employers to seek solutions to the education and training of students that enhance their skills to make them college and career ready. Apprenticeships have resurfaced as an educational approach that can bridge the gap between education and work when aligned with the values and expectations of major key players, namely students, employers and educators, with the substantive support of policy makers. The purpose of this qualitative case study was to describe an apprenticeship program targeted at high school students and aimed at addressing the employer skills needs in an advanced manufacturing company located in the Midwestern United States. The participants included students, teachers, administrators, and employers involved in the program. The main research question guiding the study was, what is the role of apprenticeships in enhancing adolescents' college and career readiness and meeting employer skills needs? Additional sub-questions provided insights into participants' experiences as they engaged with the program. Study findings revealed how a strong collaborative partnership between the employer and educational institutions was

critical to the successful organization and implementation of the program. The uniqueness of the program was how it was structured to allow for career exploration and progression into higher education. Students reported that their academic, technical and employability/soft skills had been enhanced as a result of participating in the program. The study also revealed the importance of aligning students' career goals with the employer's goals. Findings from this research may be of interest to employers looking to partner with educators to address their skills needs. Additionally, lessons learned from this program could inform future programs targeted at high schoolers enrolled in skilled trades programs in career and technical education. A logic model that provides the basis for an effective high school-industry apprenticeship program that can address the skills gap was proposed. Buiding on the traditional framework of youth apprenticeship, the model also stressed flexibility and progression: values that are central to American youth in the 21st century.

Keywords: apprenticeships, college and career readiness, skills gap

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INTRODUCTION

Despite current federal initiatives to spur reforms in American education such as the No Child Left Behind Act of 2001 (NCLB) and Race to the Top (2009) which were aimed at making American youth competitive in the global economy, the skills gap in the United States (U.S.) has not eased (Cappelli, 2008; Christman, 2012; Lerman, 2012) as a mismatch between the skills employers want and what students – potential employees – present in the labor market continues to exist. Incidentally, economic and demographic changes, concerns with high school dropout and academic achievement, high college incompletion rates and a skills gaps in the labor market have generated interest in how best to engage students and make them college and career ready (Alfeld, Charner, Johnson & Watts, 2013; Darche, Nayar & Bracco, 2009b; Guy, Sitlington, Larsen & Frank, 2009; Lerman, 2012; Stone & Lewis, 2012). This challenge has caused policy makers, educators and employers to seek solutions to the education and training of students that enhance their skills to meet employer needs. Additionally, clarion calls have been made for educators to provide multiple career pathways for American youth and also to provide work based learning activities that promote practical, as well as academic, learning (Symonds, Schwartz & Ferguson, 2011).

The current education debate in the U.S. has centered around preparing all students to be college and career ready (CCR) by equipping them with academic,

technical and employability skills by the time they leave high school (Hein, Smerdon, Lebow & Agus, 2012; Stone & Lewis, 2012). However, the skills gap between what employers seek and what students – future labor market entrants – possess has raised concerns about how the educational system prepares high school students to become college and career ready in order to meet the needs of the labor market (Stone &Lewis, 2012). Without providing the necessary academic, technical and employability skills that will help American youth transition smoothly into careers and college, these youth will continue to be underprepared for the labor market while employers react by bemoaning the existence of a skills gap among labor market entrants (Halpern, 2009; Lerman, 2012; Stone & Lewis, 2012).

Lerman (2008) contended that policy makers have tried to address the skills gaps and workplace changes (due to global labor market changes) by increasing educational attainment through more rigorous academic initiatives. These efforts though, while well intentioned, have neglected the potential for other learning models. Lerman thus argued that more schooling does not necessarily make for more successful careers. Similarly, Cappelli (2008) contended that, while education is a good foundation for success, having students take more rigorous academic courses does not ensure that they will be ready for the labor market – and that should be a cause for concern. He further argued that in reality, the problem of skills gaps ultimately lays in the area of work-based skills. Thus, while academic skills are important, employers are more interested in how workers can translate their education into productive and efficient practices in the workplace.

Research shows that, despite reforms to raise academic achievement among high school students, a large proportion of American youth (approximately 40%) do not attend

or complete college (Lerman, 2009) and subsequently enter the labor market inadequately prepared (Stone & Lewis, 2012). Hence, when the main focus is getting more youth into college, despite the evidence that a large majority of students do not complete their degrees or obtain jobs in their fields, society runs the risk of creating students who neglect their vocational futures since their choices may lack a clear connection to their goals. Consequently, such students often enter college with no clear sense of direction (Schneider & Stevenson, 1999; Zimmer-Gembeck & Mortimer, 2006).

Consistent with this view, Halpern (2009) challenged the implicit assumption in the U.S. that everybody needs some traditional, post-secondary education to be successful in the labor market since most of the educational reforms have rested on the belief that all students should be encouraged to pursue college degrees. For this reason, Symonds, Schwarz and Ferguson (2011) contended that identifying alternative pathways is essential to preparing students as the traditional, academic, classroom-based approach is not suitable for the majority of American youth as it often causes such students to disengage from learning and graduate from school without the necessary skills to succeed in careers or higher education. In that regard, when students are well prepared for careers or education, high levels of unemployment are reduced, students are given a sense of purpose and direction, and the time spent floundering after high school is reduced (Hamilton, 1990; Stone & Mortimer, 1998; Taylor & Watt-Malcolm, 2007). Moreover, focusing on college and career readiness means that all students at the high school level can be engaged in relevant learning experiences that meet their needs and learning styles and, ultimately, the needs of the labor market (Stone & Lewis, 2012).

Work based learning (WBL), particularly apprenticeships, have resurfaced as an important pedagogical strategy in the context of providing an alternative to the current educational system in the U.S. and also in the context of offering multiple pathways to success (Symonds et al., 2011). Given the right resources and support, youth apprenticeships have the potential to effectively transition adolescents into adulthood (Hamilton & Hamilton, 1997; Halpern, 2009). It must be noted, however, that apprenticeships in the U.S. targeted at adolescents declined in the past as they were criticized for preparing individuals for specific trades or occupations, thereby limiting their learning of other skills. Furthermore, programs such as the School to Work Opportunities Act of 1994, which saw federal initiatives to fund youth apprenticeships in the United States, were not sustainable after federal funding ended. Consequently, the popularity of these apprenticeships in the 1980s and 1990s faded.

Nevertheless, in recent years, workplace changes and other factors including recent successes in other countries have pushed apprenticeships back to the forefront as an alternative pathway of developing career and life skills among youth. An important factor is the realization of the value of apprenticeships in bridging the education and work gaps when aligned with the values and expectations of the major key players, namely students, employers and educators, with the substantive support of policy makers (Cappelli, 2012; Crowson, Wong, & Aypay, 2000; Hamilton & Hamilton, 1997; Pittman, 2010; OECD, 2010; Stone & Lewis, 2012; Symonds et al., 2011). For that reason, the current economic and labor market conditions require a re-conceptualization of pedagogical models that meet the learning needs of a large majority of American youth and prepare them for success in the future (Nielsen & Pedersen, 2011; Symonds et al.,

2011). Furthermore, the models must consider the needs of the students, employers and educators and the general trends in learning and work (OECD, 2010; Resnick & Perret-Clermont, 2004).

Apprenticeship programs do not exist in a vacuum. They involve an array of stakeholders such as educators, employers, students and policymakers, to ensure their effective adoption and implementation (Darche, Nayar & Bracco, 2009). Participation involves active engagement and commitment to the growth and development of apprentices which ensures students' success while meeting employer needs (Onstenk & Blokhuis, 2007). Additionally, employer involvement requires an assurance of providing quality on-the-job learning experiences and providing access and equity to underrepresented youth (Bailey, 1993).

Problem Statement

Over the years, several educational initiatives (No Child Left Behind Act of 2001 [NCLB]; Race to the Top, 2009) have been developed to increase the academic achievement and presumably the competitive advantage of American high school students. Despite the well-placed intentions of these initiatives, concern still exists that the educational system is not adequately preparing students with the skills needed to enter the labor market or to pursue higher education as the effects of these reforms have been modest (Lerman, 2008; Lerman & Pouncy, 1990; Stone & Lewis, 2012). Furthermore, the educational policy that emphasizes high-stakes testing and increasing the number of students entering science, technology, engineering, and math (STEM) fields has marginalized a significant proportion of high school students whose learning styles, as well as academic and career interests, do not align with educational reforms or the needs

of the labor market (Lerman, 2008; Symonds et al., 2011; Stone & Lewis; 2012; Trilling & Fadel, 2009). Thus, even though improving schools is necessary, it is not a sufficient response to the labor market and global and technological changes. Students need to have opportunities to pursue other career paths that help them succeed as they transition into productive adulthood (Conley, 2010; Green, 2005; Hamilton, 1990; Lerman, 2008; Stone & Lewis, 2012). Furthermore, insights from a report by the Organization for Economic Co-operation and Development (OECD) on *Learning for Jobs* suggests the success of apprenticeship programs targeted at youth in countries such as Germany, Great Britain, Australia and Canada and also in Asia can be attributed to the societal support and active engagement of employers.

Notably, while apprenticeships have been successful in other developed countries, little research has been conducted in recent years on apprenticeships targeted at adolescents in the U.S. Moreover, research on apprenticeships in the U.S. generally has focused on adult apprentices typically in their mid- to late twenties (Glover & Bilginsoy, 2005; Hamilton & Hamilton, 1992; Lerman, 2012). Hence, this study sought to address the gaps in the literature on apprenticeship programs targeted at youth in the United States.

Purpose of Study

The purpose of this study was to describe an apprenticeship program targeted at adolescents and aimed at addressing the employer skills needs in a small, advanced manufacturing company. Examining the experiences of students, employers and educators engaged in apprenticeships revealed how such programs can enhance college and career readiness among students and address employer skills needs. Additionally,

developing a rich description of the structure and organization of the program established the context for apprenticeships and provided insights into the challenges and opportunities of those engaged in the program. This study engaged the stakeholders – students, teachers, administrators and employers – involved in the apprenticeship program to gain a better understanding of how each group worked together to equip students with the relevant college and career readiness skills and to address the skills needs of the employer.

Research Question

The main research question underpinning this study was: What is the role of apprenticeships in enhancing adolescents' college and career readiness and meeting employer skills needs?

Additional sub-questions that provided insights into the phenomenon were:

- How are apprenticeship programs organized and implemented to prepare high school students to be college and career ready?
- How are employers meeting their skills needs in their industries?
- What are the experiences of the stakeholders in the program, and how do they influence the program?

Research Design

A qualitative case study approach was determined to be the best method to obtain the information needed to answer the research question and sub-questions. Qualitative research allows the researcher to study participants in their natural setting in order to "make sense of, or to interpret a phenomena in terms of the meanings the people bring to them" (Denzin & Lincoln, 2000, p. 3). Similarly, Merriam (1998) explained that

"qualitative researchers are interested in how people interpret their experiences, how they construct their worlds, and what meaning they attribute to their experiences" (p. 5).

This study was conducted as a single instrumental and embedded case study and focused on a high school apprenticeship program at a local organization in a Midwestern city in the United States during the 2103-2014 academic year. Case studies are appropriate when studying a contemporary, real life situation that is bounded in time and location (Creswell, 2013; Yin 2009). Stake (1985) noted that instrumental case studies are chosen to provide insights into phenomena and, as such, the case itself serves a supportive role. For that reason, using a case study approach facilitated an understanding of youth apprenticeships as it revealed the nuances and complexities of high school apprenticeship programs, their contribution to college and career readiness and how they addressed employer skills needs.

Case Selection

Purposeful sampling was used to select participants for this study. In purposeful sampling, the "researcher selects individuals and sites to study because they can purposefully inform the understanding of the research problem and central phenomenon" (Creswell, 2013, p. 156). The research site was known locally and recognized for establishing a partnership with local high schools to provide apprenticeship training to adolescents and had been operating the apprenticeship program for over a year at the time of this study. Consequently, the site provided a rich embodiment of the phenomenon and offered rich data needed to understand apprenticeships and the experiences of those involved in the program.

Participants

Three units of analysis were examined and fourteen participants were selected within those units.

- Unit of Analysis 1: The youth apprenticeship program within the organization. The participants selected were the owner of the company, the coordinator of the apprenticeship program and the supervisors of the apprentices.
- Unit of Analysis 2: High school setting. Participants selected were the coordinator of apprenticeships at the district office, two teachers of CTE at the high school and two high school principals.
- Unit Analysis 3: The students involved in the apprenticeship program. Four participants were included within this unit.

Data Collection

In this study, the data were collected primarily through interviews with participants and supplemented with observations and document review. Interviewing participants is an ideal and important tool since it allows the researcher to gain insights into the feelings and thoughts that are not readily observed and are usually the most important tool in qualitative research (Merriam, 2009; Patton, 2002). An interview protocol was developed using semi-structured interviews to aid in organizing ideas and ensuring that vital questions were not missed. Individual, face- to- face interviews were conducted in all cases and additional information was gathered through emails and phone conversations. The participants were interviewed at different times and in different locations.

Data Analysis

Once the interviews were completed, the data were transcribed and folders for each of the participants were created and labelled. A contact summary form was used to reflect on each interview and summarize the key points and trends identified in a particular interview. The next step in the analysis process involved a review of the data to get a sense of it. This enabled the researcher to review pertinent information and to understand how each participant's answers provided information to the research question. The data were then described and interpreted by forming categories that best represented the data. Creswell (2013) noted that this critical phase involves building detailed descriptions by describing what is seen and interpreting the data in light of the views or the perspectives in the literature.

The next step involved coding the data by condensing the text and providing codes based on evidence from the database, a process that required appropriately describing the information collected. After identifying the themes in the data, the next step involved interpreting the data by "abstracting the codes and themes to the larger meaning of the data" (Creswell, 2013). Throughout the interpretation process, meanings were attributed to the themes by grouping the information and relating those groups to the study questions and also linking them to literature.

Theoretical and Conceptual Framework

To appreciate the potential of apprenticeships, a discussion of theories and relevant concepts such as adolescent development theory, Dewey's theory of pragmatism and signaling theory that lend support to work based learning (WBL) and specifically apprenticeships are presented in the upcoming subsections.

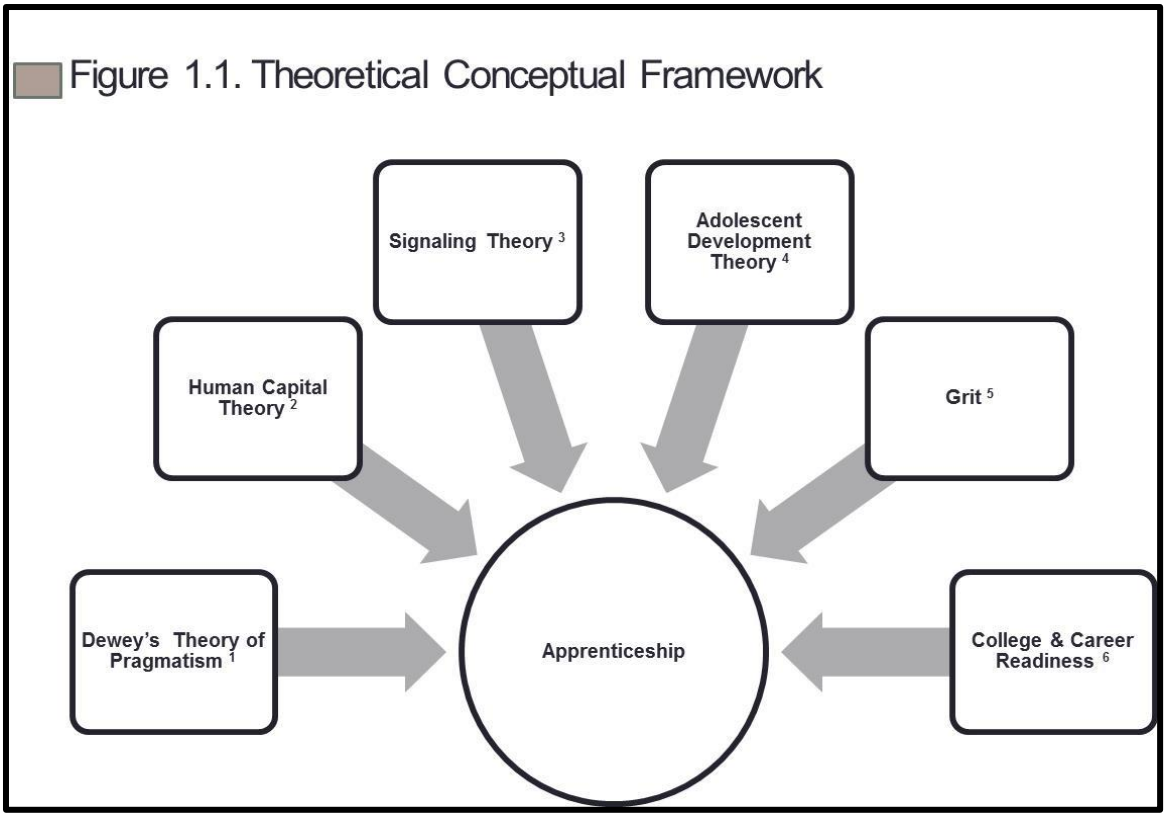

Figure 1.1. Theoretical Conceptual Framework.

Dewey's Theory of Pragmatism

Dewey's ideas of blending academic and practical knowledge offer an epistemology and ontology to WBL and how WBL can make a positive contribution to the student's overall learning experience (Kelleher & Leonall, 2011; Thøgersen & Jørgensen, 2010). Dewey (1938) argued that traditional education programs tended to be passive and static and did not incorporate enough experiential learning which he believed was vital to helping students retain what they had learned. He argued that learning should reflect the realities of life and not be focused on inundating students with information that was disconnected from real life experiences. Furthermore, he believed that education could serve as a means of passing on skills and knowledge and helping students build on problem solving skills and reflexivity. It was thus the teacher's

responsibility to provide thoughtful, meaningful experience. With practical, hands-on experience, students could relate the academic content to real world activities thereby deriving purpose in their learning.

In essence, learning occurred when students were able to put their thoughts into action. Dewey also explained that experience and learning are embedded in culture and social contexts and that high quality experiences that were interactive and engaging helped students reflect on their experience as they learned from others. Dewey's notion of the importance of learning through experience works to promote overall learning. From a learning and experience perspective, learning that happened in the mind could not be separated from the active, experiential learning. In a study of teachers' beliefs in pragmatism, Kelleher and Leonall (2011) found that teachers believed their students grasped concepts better when knowledge transfer included hands-on activity instead of the teaching of abstract concepts.

It is important to note that Dewey did not support vocational education. He believed that it was wrong to separate children and train some students for civic duty while training others for industry. In his view, training children for industry was just a form of producing a channel of skilled labor for employers at the expense of the public. Thus, separating vocational education from general education would "leave general education with all its vices and its remoteness from the urgent realities on contemporary life untouched" (Dewey, 1913, p. 145). Nevertheless, a major implication of Dewey's theory for WBL is that experiential learning provides the opportunity to acquire problem solving skills and critical thinking skills since students get to learn in real work contexts and solve tangible work-related problems. Roberts (2008) noted that Dewey's focus on

experience and contextual learning is action based. Therefore, having the ability to meet the needs of a changing world of products and services that students work on is essential. To that end, Dewey's theory of pragmatism can lend support to WBL, particularly apprenticeships where students are placed in real work environments and given the support and resources necessary as they learn relevant academic, technical and non-technical skills that can help them transition to college or career.

Human Capital Theory

Work based learning also can be framed in human capital theory since it provides an understanding of the investment made in education. The basic tenet of human capital theory is that an investment in education and training yields positive returns to the individual, organization and community (Becker, 1975; Schultz, 1961). In a similar vein, Mincer (1989) explained that "human capacity is largely acquired and developed through formal and informal education at home, school, training, experiences and mobility in the labor market" (p. 27).

Moreover, these activities have direct and indirect costs to both the individuals and the organizations, and the benefits are usually realized in the future. Mincer (1989) also emphasized that human capital plays an integral part in the process of economic growth since the stock of human capital rises with economic development. He further argued that with advances in technology, organizations and schools need to play "catch up" by investing in human capital and other segments of the workforce in order to ensure a channel of skills and labor. Thus, human capital theory explains how and why investment in education and skills training are made by individuals and organizations as well as the economic benefits that can be derived from the investment (Sweetland, 1996).

Similarly, Gray and Herr (1998) explained that there is a "nexus between workforce education, a skilled workforce and economic development because the value of a nation's workforce depends on the occupational and intellectual skills its members possess" (p. 41).

From an economic perspective, investing in education and training of human capital is essential in the fast changing world of work since the capacities of the workforce to increase their knowledge and use modern technology are seen as drivers of economic development both at the national and regional levels (Blair, 2011). Thus, investment in people, as opposed to other forms of expenditure, underscores the importance of skills and competencies in the current knowledge economy. Notwithstanding, Cappelli (2012) argued that recent labor market conditions and the changes in expectations of employers and employees have caused organizations to invest less in workforce training.

In the context of apprenticeships, human capital theory explains the investment that employers make when they provide learning opportunities and resources for students to work and gain the necessary technical and employability skills needed to be successful in their future careers within an organization. Similarly, students invest their time and talents into work-based programs, particularly long-term programs such as youth apprenticeships, with the hope that their education and training will give them a competitive advantage and the necessary credentials in the labor market, thus increasing their chances of obtaining jobs.

The application of human capital theory in educational programs has, however, been criticized by Fitzsimons (1999) for focusing solely on economic benefits and

neglecting the influence of political and cultural values, thereby suggesting the need to consider other theories that add value to the education and development of adolescents Thus, while human capital theory explains the investment in training from the supply side of the labor market, it does not give sufficient explanation to the demand side, i.e., how students' skills and certifications are rewarded in the labor market and how adolescents mature and develop as part of their education and training. The following section describes how other theories such as signaling theory and adolescent development theory can further enhance the value of apprenticeships.

Signaling Theory

Employers are unsure of the productive capabilities of a prospective employee and, as such, this uncertainty causes them to attach value to certifications based on certain indicators and professional expectancies (Spence, 1973). Due to the difficulties in defining skills, proxies such as certifications, degrees and other qualifications are used and are acquired through some kind of education (Grugulis, Warhurst & Keep, 2004). According to Bartlett (2012), an occupational certification sends signals to employers in the labor market as it affirms the competencies held by the certificate holder. The certification also signals to potential employers that the holder has the skills, knowledge and attitudes that are relevant to an organization. Some evidence shows that, in the absence of strong labor market signals, employers turn to traditional college degrees as a proxy of credential for industry certification for occupations that typically may not require a bachelor's degree. The implication is that employers may still have difficulties filling positions (Burning Glass, 2014).

For that reason, students who engage in high quality and intensive work based learning programs such as apprenticeships graduate from high school with degrees and certifications in their relevant occupational fields that are recognized by industry (Castellano, Stone & Stringfield, 2005). Thus, for many students, possessing certifications in occupational fields increases their chances of finding meaningful jobs after graduation. As wage and occupation trends indicate, several career opportunities exist for those who do not pursue higher education but acquire these alternative certifications (Holzer & Lerman, 2007; Stone & Lewis, 2012). In essence, the diversity in training can prove challenging in assessing skills and competencies. Thus, certifications hold some value to employers in the labor market. In the context of apprenticeships, those students who graduate with certifications have a competitive advantage over those who graduate with just high school certifications.

Adolescent Development Theory

Whereas human capital theory and signaling theory underlie the value of work based learning from an economic and career perspective, adolescent development theory provides a framework for WBL. Adolescent development theory provides a framework for WBL because involvement in programs such as apprenticeships offers adolescents a chance to develop their identities and provides them with a sense of purpose as they develop personally and professionally and transition into adulthood (Hamilton, 1990; Halpern, 2009).

Erickson (1950, 1968) noted that the main task during the adolescent period is identity development where individuals go through several phases and are influenced by socio-cultural factors as they establish their identities. Thus, the adolescent period has

been described as a period where individuals begin to explore their characteristics to determine where they fit in society (Steinberg & Morris, 2001). This process begins during early adolescence, typically around the age of puberty, and ends in the late teens as individuals emerge as adults (Arnett, 2000).

Adolescent development theory is essential to apprenticeships targeted at adolescents in high school since many students, particularly in the U.S., typically engage in some form of part-time employment during their high school years even though most of these jobs may be in the service sector and are not directly related to adolescents' future careers (Greenberger & Steinberg, 1981). Nonetheless, these job opportunities can provide students with valuable workplace skills. In view of that, interaction with peers and other adults in the workplace can foster a sense of identity and help to develop cognitive skills that can enhance students' success in the workplace. Halpern (2009) contended that apprenticeships provide all the ingredients for developing the adolescent's identity because they provide for "experimentations and commitments, a chance to try on new roles, learn to engage the world around them and allows the adolescent to realize their talents, interests and limits" (p. 40).

Nevertheless, it must be noted that the impact of work on adolescents has remained controversial. Some researchers contended that exposing adolescents to the workplace has a positive impact on their social and cognitive development in the form of soft skills such as critical thinking, time management and interpersonal skills (Steinberg et al., 1982; Stone & Mortimer, 1998; Zimmer-Gembeck & Mortimer, 2006). Other studies, however, showed that the workplace could have a negative impact on adolescent development as adolescents could be exposed to drug use, smoking and other adult vices.

Furthermore, the workplace could interfere with educational attainment and positive development if adolescents spend more than twenty hours a week in stressful work environments (Greenberger & Steinberg, 1981). Notwithstanding, an understanding of adolescent development theory provides insight into how the developmental needs of adolescents can be met and how workplace activities can be structured to enhance positive adolescent development.

Twenty-First Century Skills

The theories described in the previous subsections argue for what is captured in the phrase, "21st century skills," highlighting the non-cognitive or soft skills needed to enhance the technical and academic skills of students. Trilling and Fadel (2009) contended that, in the current knowledge-age economy that is driven by information and global networking, the ability to convert information into services and niche products by using expertise and technological innovations is highly valued. For that reason, they advocated teaching innovation and creativity through projects and WBL in order to expose students to the realities of the labor market. Trilling and Fadel further explained that these forces are converging and thrusting the U.S. towards new ways of learning.

In a similar vein, Cassidy (2006) contended that employability skills are fast becoming basic requirements for employment rather than desirable attributes. The most widely used attributes of employability skills can be found in the 1991 Secretary of Labor's Commission of Achieving Necessary Skills (SCANs) report which identified what was termed workplace "know-how." These attributes consisted of competencies and skills that every student must possess in order to function in the workplace such as basic skills (reading, writing, math, speaking and listening skills), thinking skills

(problem solving, decisions making and reasoning, etc.), and personal qualities (individual responsibility, etc.). Additionally, the report noted skills including: (a) effective use of time and resources; (b) the ability to gather and use data; (c) the understanding of systems and complex interrelationships; (d) interpersonal skills such as working well with others; (e) technology skills. Accordingly, the importance of such desired skills must be evident in learning and training programs that enhance college and career ready skills. Apprenticeship programs that focus on college and career readiness can partner with organizations that are able to help students acquire these essential skills.

Possessing Grit

A relatively new concept that can lend support for long term WBL such as apprenticeships is *grit*. Grit is defined as passion and perseverance over the long term which can be a good predictor of success in life and school as compared to one's intelligence quotient (Duckworth & Peterson et al., 2007). As a non-cognitive trait, grit is essential to achieving long-term goals and favorable outcomes. Relating grit to work based learning, such as apprenticeships that have the potential to last for up to two years in high school, students must demonstrate a high level of commitment – or grit – in developing and demonstrating the relevant skills and certifications needed to successfully enter the workforce or advance to higher education. This concept is salient to academic achievement and engagement, particularly among student who are disconnected from the traditional high school curriculum and are labeled as being "at risk." From a psychological perspective, Duckworth and Peterson (2007) suggested that understanding what motivates students and their commitment to achievement and success can help educators develop programs and interventions that meet their needs.

College and Career Readiness

College and career readiness requires that students possess three basic set of skills, namely academic, employability and technical skills, after high school (Stone & Lewis, 2012). Academic skills involve the basic theories and concepts of core academic standards such as math, reading, science and technology (core content) and their applications to authentic problems (Hein, Smerdon, Lebow & Agus, 2012; Stone & Lewis, 2012). Such skills can be developed in school, specifically in high school, through rigorous college preparation courses, or other pathways such as Career and Technical Education (CTE) programs. Technical knowledge and skills are unique to each field or occupation (Hein et al., 2012; Stone & Lewis, 2012) and demonstrate students' mastery of the skills in their chosen occupations. Employability skills refer to soft skills such as critical thinking, interpersonal skills, problem solving and time management that students must possess to function and that are applicable in all workplace settings (Stone & Lewis, 2012). Each of the skills, academic, technical and employability, builds on the others. Accordingly, Stone and Lewis (2012) explained that the high school curriculum must involve elements that enable students to build employability skills and suggest that rigorous WBL such as apprenticeships can be an effective pedagogical opportunity to build such skills.

Findings from the Study

In this study, the employer took the lead in addressing the skills gap challenge in the advanced manufacturing industry by working with educators to get more high school students interested in the field. The employer chose to focus on adolescents because of his beliefs that nurturing young talent was beneficial as evidenced by successful

examples that had been shown in other industrialized countries. The structure of the apprenticeship program provided expansive and authentic learning experiences for the students in order to develop industry-relevant soft and technical skills. The development of soft skills such as team work, critical thinking, communication skills and interpersonal skills was also embedded in the training that the apprentices received.

The novelty of the program constituted a change in practice for the employer while dealing with the realities of developing apprenticeships within the U.S. education and labor market contexts. This included adopting a broad social agenda and allowing apprentices to explore their career interests while in the program. A major challenge the program faced was a disconnect between the expectations of the employer and the students. This disconnect could be attributed to the employer's initial decision to allow apprentices to explore the possibilities of working in the industry as well as the challenge of working with high schoolers.

The partnership with educators was facilitated by effective collaboration and communication. However, working with high school students involved certain challenges in terms of alignment of the apprentices' training to the state's academic requirements. Despite those challenges, both the employer and the educators worked out a system where the apprenticeship program served as an extension of the apprentices' academic experiences.

The apprentices' experiences provided insights into the various aspects of apprenticeship as seen by students. Whereas some experiences such as learning, growth and maturity, and exposure to different aspects of industry were beneficial to students, other aspects such as balancing high school and working was a challenge to some of

them. Additionally, the support received from family and friends and other adults was influential in the students' continued involvement in the program. In regards to college and career readiness, while educators focused on the academic standards in fulfilling the elements of college and career readiness, the apprenticeship program focused on the practical elements of college and career readiness such as the technical and soft skills needed for students to become ready for college or career or both.

Significance of the Study

Findings from this study may be used to improve the quality of high school and industry partnerships in apprenticeship programs. Specifically, this research may be of interest to employers looking to partner with educators to provide rigorous work based learning opportunities for youth. Additionally, educators and policy makers may use findings from this study to offer learning opportunities for high schoolers, particularly those enrolled in career and technical education, as educators and policy makers seek to provide multiple pathways for students and to develop efficient processes that enhance the implementation of apprenticeship programs. Equally important, lessons learned from this program could inform future programs targeted at high schoolers enrolled in skilled trades programs.

By providing an in-depth understanding of youth apprenticeship programs through a qualitative case study, policy makers and practitioners could gain an understanding of how to engage businesses and the educational community to achieve successful outcomes for students enrolled in youth apprenticeship programs. The findings from this study could garner support and interest among policy makers in youth apprenticeship programs in order to enhance the students' learning experiences and offer

an alternative pathway to develop the skills of youth in an ever-changing work environment.

Furthermore, by focusing on one case, the structure, organization and experiences of those involved in the program can be understood. Yin (2009) explained that focusing on a single case offers readers and the researcher the opportunity to draw out the uniqueness of the case by providing a comprehensive understanding of all stakeholders impacted by the phenomenon. Information gleaned from the case could offer other schools and employers with information needed to develop efficient youth apprenticeship programs. Finally, the study of apprenticeships to enhance college and career readiness will contribute to the growing body of literature of ensuring that the workforce of the future is adequately prepared to transition into adulthood either by entering the labor market upon graduating from high school or pursuing higher education which ultimately will lead them into the workforce.

Definition of Key Terms

The following definitions provide uniformity and understanding of these terms as used in the study.

Key Terms

Academic skills. Academic skills entail the basic theories and concepts of core academic standards such as math, reading, science and technology (core content) that students need to graduate from high school (Hein, Smerdon, Lebow & Agus, 2012; Stone & Lewis, 2012).

Adolescence. The transitional period between puberty and adulthood characterized by physical and psychological changes (Erikson, 1968). This period is typically known as the teenage years (Arnett, 2000).

Apprentice. Refers to a worker who is at least 16 years of age, except where a higher minimum age standard is otherwise fixed by law, who is employed to learn an occupation.

Apprenticeship. A structured program of vocational preparation sponsored by an employer that juxtaposes part-time education with on-the-job training and work experiences leading to a recognized vocational qualification of a craft or at a higher level (Ryan & Unwin, 2001).

Career ready. A career ready student is preparatory (has completed two credits and is enrolled in a third credit) for a CTE major, has received either an approved industry certification or state certification related to his or her career major and has met the benchmark on ACT Work Keys or the ASVAB.

College and career readiness. College and career readiness requires that students possess three basic sets of skills, namely academic, employability and technical skills, after graduating high school (Stone & Lewis, 2012).

College and career ready. A college and career ready student is preparatory for a CTE major, has received an approved industry certification or state certification and has qualified to be college ready.

College ready. In the state in which this study took place, a student is deemed college ready when he or she meets the benchmark on the ACT in English, Math and Reading or passes either the COMPASS or other placement tests.

Employability (soft skills). Employability skills refer to the soft skills such as critical thinking, interpersonal skills, problem solving skills and time management skills that students must possess to function in the workplace.

Skills gap. Gaps in the workforce exist where the workforce lacks the needed skills to meet current and future business objectives of an organization (Westwood, 2004).

Sponsor. Refers to any person, association, committee or organization operating an apprenticeship program or in whose name the program is (or is to be) registered and/or approved.

Technical skills. Technical skills are skills unique to an occupation or cluster and demonstrate the students' mastery of their programs (Hein et al., 2012; Stone & Lewis, 2012).

Work based learning. Work based learning is a pedagogical approach that combines classroom instruction with workplace activities and offers a means of increasing students' engagement and preparing them for the workforce (Hamilton & Hamilton, 1997).

Youth apprenticeship. Youth apprenticeship is a program that integrates school and workplace learning and emphasizes learning by working under the tutelage of experts and addresses the personal and occupational development of young people (Bremer & Madzar, 1995).

Limitations of the Study

This case study provided an in-depth description of one high school industry apprenticeship program. The fact that the study focused on one program could be

perceived as a limitation. Although the findings may be relevant to other organizations, generalizations of the findings to other contexts such as an established program or another industry may have severe limitations. Additionally, a comparative case would provide additional insights and boost the findings of the study. Another limitation is that the study focused on a program that had been in existence for only a year before the study was conducted. A more mature program could, perhaps, have provided more insights into high school apprenticeships. The case study was also limited to the identified stakeholders who were directly involved in the program. While the apprentices, educators and employers provided insights into parental involvement and support, parents were not invited to be participants as the apprentices were regarded as mature adolescents. Nevertheless, questions posed to students involved their parents' perceptions of the program.

Organization of the Study

Chapter I includes the background and rationale of the study, statement of the problem, purpose of the study, theoretical and conceptual framework for the study, findings from the study, significance of the study, limitations, and definitions of terms. Chapter II includes a review of related literature and research. A discussion of college and career readiness and WBL with a focus on apprenticeships targeted at adolescents is included. A synopsis of apprenticeships and their benefits and opportunities is also discussed. The chapter concludes with a summary and justification for the research study. Chapter III includes specific information about the qualitative research method and how the study was conducted. A description of the case study design as well as a discussion of the rationale for utilizing this method for this particular study is included.

An in-depth description of the apprenticeship program and the participants of the study are included in the final report. The chapter also includes a discussion of data collection and analysis methods used during the study. Chapter IV provides the findings of the study. Chapter V provides interpretations of the findings along with implications and suggestions for research on apprenticeships targeted at adolescents.

CHAPTER II

REVIEW OF LITERATURE

This review of literature was undertaken to establish the need for this research study. While a general consensus exists that students graduating from high school must have the necessary college and career ready skills in order to transition to productive adulthood and meet the skills needs of the labor market, there is also debate about how best to prepare them. Work based learning (WBL), particularly apprenticeships, has emerged as a pedagogical approach that can help enhance college and career readiness among students, enable a smooth transition into the workforce or post-secondary education, and also help employers address their skills needs. The goal of this study was to gain an understanding of how apprenticeship programs targeted at adolescents in high school can enhance college and career readiness and address employer skills needs. To achieve this goal, the review of literature focused on the following sections: (1) Overview and History of Apprenticeships; (2) Apprenticeships as Work Based Learning; (3) Stakeholders in Apprenticeships – employers, students and educators; (4) Apprenticeships and College and Career Readiness; (5) Re-conceptualizing Apprenticeship in the United States. Due to the limited research on apprenticeships in the United States, literature from other countries with defined apprenticeship systems was included in the review.

Overview and History of Apprenticeships

Apprenticeships have been in place in the United States (U.S.) for centuries as settlers to the New World brought the system with them, and it served as a major form of education for young men over the years. An apprenticeship system in its traditional form involved a formal agreement that covered a definite period and bound a young apprentice to the employer who provided training, food and shelter in return for work (Gordon, 1999). Young apprentices were said to be indentured to a master craftsman who transferred his skills and knowledge about a particular trade to them. A young boy was said to be on a journey when he started his training as an apprentice, moved on to become a journeyman and finally a master craftsmen. A typical apprenticeship program lasted up to four years (Gordon, 1999).

Over the years, the apprenticeship system underwent a series of changes to accommodate the needs of the labor market and the workplace. With the rise in formal education and industrialization in the nineteenth century, the traditional form of apprenticeship began to decline significantly as skills development was mostly done in the educational system where people were enrolled in manual or vocational training (Kliebard, 1999). Although apprenticeships persisted in the U.S. in different forms, it was not until 1937 that the federal government passed the Fitzgerald Act to regulate apprenticeships and on-the-job training programs in the U.S. By the enactment of the Act, the federal government was able to establish minimum standards for apprenticeships.

Apprenticeship is described as a work based learning model that provides an opportunity for individuals to learn valuable trade skills in the workplace while earning a

wage. Students in apprenticeships attend formal school and work part-time at a defined workplace. The system differs from other forms of skills training in that it involves a structured program that is sponsored by employers and typically lasts between one to four years. The system combines theoretical and practical courses that are related to a particular trade or profession and result in certification in a skilled trade. Additionally, apprentices sign contracts with their sponsors that outline the kind of skills to be learned, the length of time involved, and wages to be earned (Ryan & Unwin, 2001; Lerman, 2008; Crosby, 2002). The goals of apprenticeship programs are to ensure a high level of proficiency in the skilled trades, instill a high degree of professional and personal identification in the apprentices, and ensure that the qualification earned is acceptable in society and industry, leading to better career prospects and opportunities for advancement (Weihrich, Seidenfuss &Goebel, 1996).

Status of Apprenticeship in the United States

Currently, the apprenticeship system in the U.S. is managed by the Employment and Training Administration (ETA) of the United States Department of Labor (DOL) under the Office of Registered Apprenticeship Programs. The Office oversees and is responsible for issuing standards, monitoring state agencies, and promoting registered apprenticeship. It is also responsible for overseeing the structure, organization and practices of apprenticeship at the state level by providing technical and administrative assistance through the State Apprenticeship Agencies (SAA). The role of the State Apprenticeship Program is to ensure that policies and practices are fair, to issue certifications and to monitor the safety and welfare of apprentices. Another major role of the DOL and the State Apprenticeship Program is to ensure that there is no discrimination

of women and minorities (Jones, 2011; Lerman, 2012). Furthermore, the federal government has developed a credentialing system for recognizing specific skills, competencies and accomplishment for apprenticeship programs (Gordon, 1999).

The registered apprenticeship programs are operated by a partnership network of sponsors such as employers, employer groups' labor unions, and government and educational institutions. The role of the sponsors is to register the programs with the appropriate federal and state agencies and also recruit, train, mentor and pay the wages of the apprentices. Typically, apprentices must complete about 2,000 hours of on-the-job training as well as 144 hours of classroom and theoretical training. Although the apprenticeship system is overseen at the federal level, individual states are given a level of discretion on how their systems are managed. Thus, the U.S. apprenticeship program is described as highly decentralized (Lerman, 2008). The DOL in 2012 reported that there are over 21,000 registered apprenticeship programs across the nation and about 1,700 new programs were established in the same year. To that end, there were about 358,000 people in registered apprenticeships with about 147,000 entering the program in the same year. Currently in the U.S., registered apprenticeships tend to be concentrated in traditional fields such as construction and manufacturing (electrical, pipe-fitting, carpentry, shipbuilding, maintenance, machining, welding, and tool and die). However, in recent years, other emerging industries have participated in apprenticeship programs such as healthcare, law and technology (Glover & Bilginsoy, 2005; Lerman, 2008).

Youth Apprenticeship

Whereas the traditional form of apprenticeship originally was focused on young boys, the typical age of an apprentice is the U.S. is about 27 years of age, unlike other

Western industrialized countries where students enter apprenticeship programs in their adolescent years (Hamilton & Hamilton, 1990). Apprenticeships targeted at youth have been traditionally underutilized in the U.S., making the U.S. an outlier in the world in its ability to engage its youth in apprenticeships. For one thing, apprenticeships were deemed as an inferior form of education as certain practices in the past led to tracking segments of the population, including minorities and people with disabilities, into apprenticeships; thus, the lack of widespread adoption of youth apprenticeships was due to cultural and historical underpinnings (Kliebard, 1999).

Notwithstanding that, policy makers over the years have sought to develop and train American youth, particularly those who planned to enter the workforce after high school, with relevant skills to ensure a seamless transition from school to work and to address the high levels of youth unemployment (Rosenbaum et al., 1992). Notably, in 1994, the Clinton administration passed the School to Work Opportunities Act (STWOA) with the aim of allocating funds to establish a national apprenticeship system that would develop partnerships among schools, businesses and labor to prepare young students with knowledge and skills required for employment in the workplace. Unlike past practices, the STWOA of 1994 focused on all students who had an interest in developing skills to enter the workforce. In this regard, Hamilton and Hamilton (1992) explained that youth apprenticeships could avoid the stigma by focusing on those in the "middle achievement range, who did well enough in schools but did not expect to pursue a four year degree immediately after high school" (p. 46). Several guidelines were outlined for stakeholders to incorporate into their programs for effective implementations and functioning. These guidelines included paid work experience and structured learning for students, integration

of academic and workplace learning, the receipt of widely accepted credentials, and the involvement of institutional partners to oversee the implementation of apprenticeship programs (Berryman, 1992).

Educators embraced youth apprenticeships for their ability to motivate students by placing them into real life workplaces and to enable educators to learn about the workplace changes and adapt their teaching to meet workplace needs. Employers, on the other hand, were attracted to the potential of getting skilled labor (Rosenbaum, 1992). Nevertheless, the widespread interest in youth apprenticeships faded after funding for the STWOA Act ended. Despite its allure and promise for businesses, educators and policymakers, the sustainability of youth apprenticeships was challenging (Halperin, 1992). Reasons for its unsustainability included the unequal implementation across states and states' discretion to allocate and utilize the funds for training and resources (Brown, 2002). Few states such as Wisconsin and Georgia sustained their youth apprenticeship programs which, to date, continue to provide occupational training and certification for youth (Holzer & Lerman, 2014). Indeed, the wide scale adoption of youth apprenticeships in the U.S. in the past were challenging because of the exploratory nature of high school education (Bailey, 1993; Lerman, 2008; Rosenbaum et al., 1992). Nevertheless, Lerman et al. (2009) argued that employers in the U.S. can create a system of recruiting and retention that works for them in their contexts. Furthermore, educators and policymakers have been encouraged to provide multiple career pathways for students through rigorous work based learning programs such as apprenticeships (Symonds et al., 2011; Stone & Lewis, 2012; OECD, 2010).

Comparison with Other Countries

Glover and Bilginsoy (2005) described the U.S. apprenticeship system as a "small low profile scheme by the standards of Germany or Switzerland where apprenticeships train a majority of youth" (p.338). In contrast, apprenticeship programs were and continue to be the mainstay of many industries in such countries and have served to sustain their respective economies by developing their youth to meet the socio-economic needs, thereby rapidly increasing the skills levels of their workforces (Bailey, 1993; Hamilton, 1990; Holzer & Lerman, 2014; OECD, 2010; Symonds et al., 2011). For instance, the apprenticeship system in Germany has been touted as one of the most successful in the world and is widely valued in German society. Students in upper secondary schools (beginning at age fifteen) enroll in either a company training apprenticeship program or a part-time, school-based program where they gain training in companies. This system offers about 350 training occupations that are recognized in the labor market by integrating work and school based learning, thus preparing students for future employment (Field, Hoeckel, Kis, & Kuczera, 2009; OECD, 2010; Walden & Troltsch, 2011). On the other hand, the U.S. apprenticeship system relies on employment-based, post-secondary training for young adults where the average age of the apprentice is 27 years (Glover & Bilginsoy, 2005; Hamilton & Hamilton, 1992; Lerman, 2012). Further studies of apprenticeship systems in Canada (Taylor & Watt-Malcolm, 2007) and Great Britain (Fuller & Unwin, 2005) show that their programs contribute to preparing a sizeable number of youth for careers.

One major factor that has contributed to the success of apprenticeships in other countries is the difference between the U.S. labor market structures and the educational

systems as compared to those of the other countries which affects the policy, implementation and practices involved in operating apprenticeship systems (Rosenbaum, 1992). For instance, the success of apprenticeship programs in Germany has been influenced by the role of employers, labor unions and government in sponsoring apprenticeship programs.

Weihrich, Seidenfuss and Goebel (1996) contended that U.S. industries in general are not committed to investing in the skills development of individuals through apprenticeships as the socio-economic environment does not provide incentives and protections for employers. By contrast, Harhoff and Kane (1995) explained that employers are willing to bear the cost of apprenticeships in Germany for several reasons including the influence of unions on restricting workers' mobility by sanctioning poaching which gave employers a sense of assurance that other firms could not easily poach their apprentices after they had invested in training them. Additionally, the existence of industry-wide agreement on wages deterred mobility from one program to the other. Furthermore, apprenticeship training is an accepted socio-cultural norm with which firms simply comply. Similarly, Fuller and Unwin, (2007) noted the United Kingdom's (U.K.) national apprenticeship model has undergone several reforms over the years and has recently gained prominence as a credible career pathway with the introduction of new initiatives such as the modern apprenticeship (MA) program which were introduced to reverse the decline and make significant contributions to the stock of the U.K.'s intermediate technical skills. (Although some successes have been noted, challenges of increasing employer participation and awareness and changing the perception of students in relation to making career choices in high demand fields still

exist (Fuller & Unwin, 2007; Spielhofer & Sims, 2004). Additional initiatives include the Higher Apprentice Initiatives in 2011 where individuals could progress through higher education institutions in order to gain higher apprenticeship credentials (Anderson, Bravenboer & Hemsworth, 2012). Whereas employers, governments and unions have been able to standardize the apprenticeship programs in countries like Germany and U.K., the lack of uniformity and flexibility of American labor and educational structures have caused discrepancies in recruiting and retaining apprentices (Bailey, 1993; Bassi & Ludwig, 2000). The invisibility of such programs in the U.S. has been attributed to the lack of connections between apprenticeship programs and secondary and post-secondary education, the inconsistent support from policy makers and the focus on getting all students to attend college (Lerman, 2008; OECD, 2010).

Although the scale of apprenticeship is minimal in the U.S. compared to other countries, the U.S. apprenticeship system continues to offer benefits to students and employers and has served as a major contributor of labor market skills in some industries such as construction and manufacturing (Glover & Bilginsoy, 2007; Gonzales, 2010). In the next section, a review of the literature on apprenticeships as a form of work based learning is presented.

Apprenticeships as Work Based Learning

Work based learning (WBL) such as apprenticeships has resurfaced as an important pedagogical strategy in the context of providing multiple pathways to success for American youth (Symonds, Schwartz & Ferguson, 2011). This resurfacing is due to economic and demographic changes, concerns with high school dropout and academic achievement, high college incompletion rates, general skills gaps in the labor market as

well as the debate on how best to engage students to make them college and career ready (Alfeld et al., 2013; Darche et al., 2009; Lerman, 2012; Stone & Lewis, 2012). Work based learning encompasses an array of work experiences at the workplace that ranges from job shadowing for a few hours or days, internships and school-based simulated learning to youth apprenticeships that can last for more than a year and are seen as more rigorous (Alfeld et al., 2013; Hamilton & Hamilton, 1997; Stone & Lewis, 2012). Work based learning serves several purposes including engaging and motivating students by linking academic work to practical real world experiences, developing workplace skills and competencies, increasing achievement and high school completion rates, enabling students to explore career options, meeting employer needs in the labor market and transitioning students into adulthood, career or higher education (Bailey, Hughes & Moore, 2004; Darche et al., 2009; Hamilton & Hamilton, 1997; Halpern, 2009; OECD, 2010; Stone & Lewis, 2012; Taylor & Watt-Malcolm, 2007). As students engage in WBL, they develop cognitive skills by learning through engagement with ideas and resources, thereby reinforcing academic instruction. Furthermore, work based learning activities enhance social and emotional development as students engage with others in the workplace and thus make an important contribution to the adolescents' development (Falconer & Pettigrew, 2003; Hamilton & Hamilton, 1992; Holzer & Lerman, 2014). WBL encompasses a wide array of activities; however, not all of them possess the kind of rigorous and intentional programs that can ensure that students are equipped with skills at the level desired by policy makers and employers in the labor market. Hamilton and Hamilton (1997) explained that simply placing students in a work environment does not guarantee that they will learn and acquire the necessary skills; thus, it is important that

their learning is intentional and structured in order to benefit them and yield positive results. Youth apprenticeships have been identified as an intense and rigorous form of WBL in that they provide in-depth focus on training and education over an extended period of time.

Despite the benefits of WBL to adolescents' growth and development, not everyone believes that having adolescents in the workplace is entirely positive. Steinberg and Greenberger (1981) contended that having adolescents in the workplace could be detrimental to adolescents' development, as spending a significant amount of time at work diminishes students' engagement with school, family and friends. Similarly, Steinberg, Greenberger, Ruggiero, Garduque and Vaux (1982) argued that an exposure to adults in the workplace also could lead adolescents to develop negative habits such as smoking and drug use, thus impeding on the development of the adolescents. The authors emphasized that, for the workplace to be an enabling environment for adolescents' success, the workplace needs to be designed with the learning and developmental needs of the adolescents in mind and must consider the amount of time adolescents spend at the workplace. This is critical because when work and school compete for the adolescents' focus and attention, their development can be inhibited (Zimmer-Gembeck & Mortimer, 2006).

The effectiveness of WBL, particularly apprenticeships, in preparing students to be ready for the workplace is determined by how well the programs are designed and implemented and the extent in which they enhance student learning and increase the level of engagement with the curriculum. These factors are further influenced by the breadth and depth of their work based experiences (Onstenk & Blokhuis, 2007; Taylor & Watt-

Malcolm, 2005) and the level of commitment and support of employers (Asher, 2005; Bailey, Hughes & Barr, 2000; Lerman, Eyster & Chambers, 2009). Lewis (2007) advocated community based and work based learning programs that provide enriching and creative practical experiences for youth while simultaneously providing incentives to attract more employer participation in order to create placement opportunities for training. As the inclusion and participation of committed stakeholders is critical to the successful implementation of apprenticeships, the following section reviews the literature on different stakeholders.

Stakeholders in Apprenticeships

Due to the fact that each group brings its unique goals and needs to bear on the program, students, employers and educators play a vital role in the efficiency and effectiveness of apprenticeships, particularly youth apprenticeships, as they work in tandem as part of a system.

Students

The nature and structure of apprenticeships requires a high level of commitment from students and other stakeholders (Crosby, 2002; Fuller & Unwin, ####; Jones, 2011, OECD, 2010). For example, past studies of youth experiences in apprenticeship programs found that the apprentices were passionate about the opportunities that the programs afforded them because the programs exposed apprentices to the newest technology at the workplace and also expanded their skill sets (Scribner & Wakelyn, 1998). Additionally, some students reported an increase in their confidence that enabled them to transition into the labor market directly after their programs or to pursue higher education. Advocates of youth apprenticeships note that apprenticeships also offer

adolescents a means of transitioning into adulthood where they learn to negotiate self-identity, self-doubt and learning to achieve and experience a sense of accomplishment (Halpern, 2009).

Additionally, students are able to develop themselves and their careers while developing occupational identity, professional ethics and self-esteem while experiencing a sense of accomplishment. Furthermore, the skills and knowledge that apprentices learned during their training became lifelong skills which they could draw upon rather than abstract academic theory which could be easily forgotten (Hamilton, 1990; Halpern, 2009; Lerman, 2008; Taylor & Watt-Malcolm (2007).

Taylor and Watt-Malcolm (2007) reported that in a study of apprenticeship programs in Canada, students believed that the support and resources available to them were helpful in their development. Furthermore, the dynamics of the workplace exposed students to everyday work life and helped them to understand issues such as organizational culture, power relations at work and discrimination. An exposure to the work environment helped students to develop critical skills such as team work, critical and higher order thinking, time management, and communication and interpersonal skills which are essential for success in the workplace (Halpern, 2009; Woods, 2012). In a study of apprentices in England, Shaw and Ogilvie (2010) reported that students believed that engaging in their programs enhanced their learning skills, academic studies, job performance and job satisfaction. Similarly, another study found that students in work based learning programs reported learning from their peers and their community of practice, thus lending support to how individuals learn in a social context (Siebert, Mills & Tuff, 2009).

Mentorship and guidance for students. A supportive learning and working environment is critical to the success of students in apprenticeship programs (Taylor & Freeman, 2011) and mentoring provides apprentices with the personal and professional support they need to ensure their success and completion. In a typical apprenticeship program, journeymen serve as teachers and mentors since their personal experiences as former apprentices help them to understand the struggles of the newer apprentices. In addition, some employer groups also assign mentors who are not journeymen to assist the students (Halpern, 2009; Christman, 2012).

Scribner and Wakelyn (1998) found in their study that, while some students had positive experiences with their mentors, some felt that the people assigned to them as mentors were not adequately equipped for their roles or had other responsibilities that hindered their involvement with apprentices. This finding indicated that mentors play an important role in the overall learning experience of apprentices and underscored the importance of adequately preparing and equipping mentors with the resources needed to make them successful (Billet; 1994; OECD, 2010). Similarly, Du Plessis, Corney, Broadbent and Papadopoulos (2012) addressed the importance of providing services to meet the socio-psychological needs of young apprentices. They explained that the transition from school to work for some students tended to be challenging as the young students grappled with new work routines, working with adults, and other complexities. This was particularly so for young males in male-dominated industries such as construction, manufacturing and the technical fields where the young students feared exposing their vulnerabilities and being perceived as weak. In another study, Taylor and Freeman (2011) emphasized the importance of socialization at the workplace and the

impact on apprentices' abilities to complete their programs and gain certifications indicating that, while the focus of learning and development was the acquisition of relevant industry skills, additional socio-emotional support to apprentices, especially adolescents in the workplace, was vital to a successful learning and apprenticeship experience. Due to the changing nature of the workplace, mentorships and guidance is critical to sustaining youth in apprenticeships.

Career progression for students. Major incentives for individuals to pursue apprenticeships are to gain the competencies and skills in their chosen fields and to enable them to find employment and succeed in their professions. To that end, individuals pursuing apprenticeships need to establish themselves in the labor market and earn higher wages (McIntosh, 2005). As an avenue for career progression, Hamilton & Lempert (1996) noted that apprenticeships serve as a foundation to careers to the extent that those who end up in large firms tend to be exposed to higher quality and well-rounded training systems. The equipment used in this training tends to be more modern and the allocation of resources in large firms is greater than the allocation of resources in smaller companies. One major advantage, though, of available resources in smaller companies may be the accessibility of mentors and co-workers in such firms, and there also may be more career ladders or opportunities for career progression as those in smaller firms are likely to be trained in general skills that are transferable to other industries (Spielhofer & Sims, 2004). Furthermore, with the focus of lifelong learning and post-secondary education, the ability to integrate theory into practice is vital to the success and career progression of the apprentices (Glover & Bilginsoy, 2005; Jones, 2011).

Challenges for students. Factors such as the lack of connection between school and work, lack of emotional and psychological support and lack of adequate academic preparation have been found to cause challenges for apprentices. For instance, in a study to identify reasons why some students did not complete apprenticeship programs, Taylor and Freeman (2011) found that the written examinations for some students were a challenge as they struggled with reading and writing. Thus, while students had the technical skill sets, they were unable to incorporate their theoretical knowledge. The study also found that, for some students, the lack of connection between classroom learning and practices in the workplace hindered their abilities to integrate their knowledge and skills.

Lerman et al. (2009) also reported that some sponsors attributed non-completion to the apprentice receiving a craft license and taking other jobs before official completion. In some work environments, the success of students and their ability to complete and gain certification were dependent on employers' goodwill and aspirations for the apprentices which provided the needed support to complete their programs and earn certifications (Taylor & Freeman, 2011).

Additionally, Taylor & Freeman found that some students felt a disconnect between classroom and workplace, and they also believed their employers did not offer them a chance or exposure to the breadth of learning in the designated fields. This finding was consistent with Hamilton and Hamilton (1992) who cautioned that some workplaces were "more educational than others"; therefore, placing apprentices in roles that limited their overall learning was detrimental to their development. In a similar vein,

Halpern (2009) noted that variations in resources and the types of learning experiences could have an adverse effect on students.

Another factor that leads to student incompletion and ineffectiveness of apprenticeship programs is that the connection between workplace and school learning may be inconsistent due to "structural, cultural and pedagogic factors in each workplace as well as the fact that some schools do not make allowances in their curriculum for work based learning activities even in traditional vocational education courses" (Onstenk & Blokhuis, 2007, p. 496).

Lerman et al. (2009) also reported that some sponsors attributed non-completion to the apprentice receiving a craft license and taking other jobs before official completion. In some work environments, the success of students and their ability to complete and gain certification was dependent on the employers' goodwill and aspirations for the apprentice. This provided the needed support to complete their programs and earn certifications. Active engagement and commitment to the growth and development of apprentices by employers ensures students' success (Berryman, 1992; Rosenbaum; 1992). In the next subsection, literature on employers' roles and participation is presented.

Employers

Sustained commitment from employers is critical to the success of apprenticeships as well as the overall personal and professional development of apprentices (Fuller & Unwin, 2007; OECD, 2010, Symonds et al., 2011). A recent White House report in 2014, *Ready to Work: Job-Driven Training and American Opportunity*, noted that employers and industry play a critical role in shaping the kinds of training

individuals and as their activities, such as partnerships with educational institutions, determine the kinds of skills in demand (Biden, 2014). Furthermore, students and potential workers decide on jobs and careers based on their perceptions of employers and industry. Thus, the active engagement of businesses and employers is vital to ensure that training and education delivers the skills needed to be productive and decently rewarded in rapidly changing industries and a global economy.

In discussing the role of employers in supporting youth apprenticeships in the U.S., Bailey (1993) recommended high and committed employer involvement, assurance of providing quality on the job learning experiences for youth, and providing access and equity to underrepresented youth. Bailey noted that when employers saw an investment in youth training as a means of securing well-trained and highly skilled workers for the future success of the firm, they were more inclined to participate in training. Bailey, Hughes and Barr (2000) also emphasized the centrality of organizations and contended that, while the simulation of the workplace and service learning offered positive learning experiences, simulation and service learning did not offer the comprehensive and broad skills that apprenticeships and other school-to-work programs offered. This difference was due to workplaces affording students the opportunity to learn other employability skills not readily learned at school, thus contributing to expansive learning opportunities, particularly for adolescent students, which, in turn, evoked broader appeal among stakeholders (Taylor & Watt-Malcolm, 2007). Additionally, since skills training is driven by employers, they are able to develop relevant skills to address the skills mismatch (Holzer & Lerman, 2014).

In recent years, employers have taken an interest in investing in apprenticeships to meet their human capital needs (Lerman et al., 2009). In that regard, Westwood (2004) stressed that "employers must understand that the labor market is just like any marketplace, so if there is a skills gap then they need to pay more or train more" (p. 53). Several reasons exist for employer participation in apprenticeship programs. Given the average years involved in a typical apprenticeship program, success requires time, effort and commitment on the part of organizations that train and sponsor the apprentices. Bailey, Hughes and Barr (2000) contended that the reasons for employers' participation in apprenticeship programs include a sense of responsibility to their communities, the idea that participation can lead to economic and political benefits, the use of students as a source of cheap labor and a means of gaining access to talented students in order to grow their firms' labor pools.

Despite the benefits that employers can accrue from sponsoring apprentices, Bailey (1993) argued that getting a lot of employers to buy into the apprenticeship system can be a challenge; hence, it is important that policy makers look at alternatives that do not rely heavily on employer involvement. This line of argument, although valid, undermines the essence of apprenticeships because, with the growth and interest in apprenticeships in recent years, the centrality of employers' commitments have been reinforced as vital to the success of programs. For instance, in a study to understand the perspectives of sponsors of apprenticeship programs in the U.S., Lerman, Eyster and Chambers (2009) found that most sponsors of apprenticeships were satisfied with their program and about 80% of the sponsors reported that the main benefit of the program was its ability to help them meet their demand for skilled workers. Similarly, Spielhofer

and Sims (2009) reported that companies that sponsored apprenticeships in the U.K. reported benefits from the programs in terms of developing well-rounded employees and improving their recruitment and retention efforts by providing training and career pathways for apprentices. The companies also believed that their involvement in the program offered those with less academic abilities a chance to gain useful qualifications.

In many respects, successful recruitment and retention of apprentices depends on the outcomes for students in the apprenticeship programs, and this is particularly true for high demand and highly skilled workplaces (Spielhofer & Sims, 2004**)**. The quality of jobs that adolescents perform need to be structured to expand learning opportunities for them. It is through structured learning opportunities that organizations are able to capitalize on the students' skills as organizations develop learning activities that provide a variety of tasks and an opportunity to work with others (Halpern, 2009; Hamilton & Hamilton, 1997, OECD, 2010; Stone & Mortimer, 1998; Zimmer-Gembeck & Mortimer, 2006). The different learning environments – classrooms and workplaces – offer opportunities for different kinds of learning. Academic rigor should be incorporated into the training so that apprentices develop higher order skills that are necessary for career progression, mobility and lifelong learning. These can enable the apprentices to pursue higher education if they desire.

Providing work opportunities that involve activities such as cross training, job rotation, job enrichment, self-managed teams and the extensive use of technology to perform routine tasks can broaden the learning experience for apprentices and leads to positive outcomes for them (Halpern, 2009; Hamilton & Lempert, 1996; Stone & Mortimer, 1998; Zimmer-Gembeck & Mortimer, 2006). Taylor and Malcolm-Watt

(2007) stressed that the learning environment is important for overall learning outcomes as the different learning environments – school and work – provide a broad range of experiences for apprenticeships. In many ways, students and educators become aware of the shortcomings related to the students' under preparation in academic skills and technical skills. In the workplace, students have the opportunity to learn through hands-on applications of theory and to develop other employability skills such as critical thinking, creativity, team work and interpersonal skills that are not readily learned at school.

In examining the opportunities and limits of learning among apprentices in Canada, Taylor and Watt-Malcolm (2007) reported that the students believed that the support and resources available to them were helpful in their development. Furthermore, the dynamics of the workplace exposed students to everyday work life and helped them to understand issues such as organizational culture, power relations at work and discrimination. An exposure to the work environment helped students to develop critical skills such as team work, critical and higher order thinking, time management, and communication and interpersonal skills, all of which employers cite as skills that are essential for success (Halpern, 2009; Woods, 2011).

Despite the advantage of apprenticeships in countries with defined national programs such as the United Kingdom, there are still challenges to the programs. Spielhofer and Sims (2004) reported that, even though employers faced skills gaps and had access to a national apprenticeship program, due to lack of awareness of the benefits of the programs and employers' perceptions of the programs' relevance to their business needs, some businesses did not use apprenticeships to their advantage. The quality of

apprenticeship programs has been found to vary across employers and industries. However, while some workplaces offer opportunities for growth and development through participation in multiple communities of practice and possibilities of feedback, some apprenticeships programs offered a narrow range of training that may not be relevant to the students' knowledge bases, thereby limiting the progress of the apprentices (Onstenk & Blokhuis, 2007; Taylor & Freeman, 2011). In their study of apprenticeship experiences, Scribner and Wakelyn (1998) reported that some students were not given broad exposure to their fields and were kept in a single area for long periods as some employers used apprentices to fill labor shortages in their organizations. Some employers have been known to rely on apprentices in the past just to fill labor shortages in their organizations, thus stunting the apprentices' growth and progress.

U.S. employers traditionally have been wary of investing in apprenticeships (Harhoff & Kane, 1995). Nonetheless, Lerman et al. (2009) reported that even though sponsors were concerned with poaching of trained apprentices by other organizations, it did not deter them from sponsoring apprenticeships. The major concern was with working with youth, a group that tended to have high turnover rates (Zemsky, 1994). Bassi & Ludwig (2000) found that, while some firms see training as an investment in their workforce for skills development, others find that, due to some governmental policies and financing polices, there may not be incentives for them to incur the cost of training individuals prior to hiring them. Thus, to encourage more employer participation, incentives such as funding and resource support were helpful to employers.

Educators

The role of educational institutions in supporting apprenticeships is mainly to work closely with organizations that sponsor apprentices to ensure effective integration between school and work. A major tenet of a successful apprenticeship program is that work activities are structured to complement the school curriculum. Onstenk and Blokhuis (2007) emphasized that for the apprenticeships in the twenty-first century to be effective, they must involve "intensive interactions between schools and the workplace" (p. 489). Educators and employers involved in apprenticeships seek similar outcomes for students as each group needs the other to meet its needs – schools have an obligation to teach the academic skills that apprentices need, and employers have an obligation to recruit and train students with good academic skills (Rosenbaum, 1992). Through this mutual commitment, apprentices feel the need to be successful both at school and in the workplace. Furthermore, a strong partnership enables schools to adapt their instruction to meet employers' needs as both educators and students are exposed to the latest technologies in the workplace (Symonds et al., 2011; OECD, 2010).

Just as employers and educators are stakeholders in the apprenticeship system, policy makers play an integral role in the success of programs. The decisions they make and the resources that are made available to support apprenticeship programs influence how and why employers and students participate in programs. The following subsection discusses the role of policy and its impact on apprenticeships.

The role of policy. Public policy impacts apprenticeships by creating an environment where employers are assured of the support from policy makers. Bassi and Ludwig (2000) contended that the imperfections in the U.S. labor market facilitates or

inhibits firms' investment in training. This decision of whether to invest in training is multifaceted: while some firms see training as an investment in their workforce for skills development, others find that, due to some governmental policies and financing polices, there may not be incentives for them to incur the cost of training individuals prior to hiring them.

The focus of education policy in recent years has been getting more students into college (Rosenbaum, Stephen & Rosenbaum, 2010). Despite this noble cause, a high percentage (approximately 40%) of students exists who do not attend or graduate from college. Lerman (2009) contended that, given that one in four students fails to complete high school and a majority number fail to complete college, attention and money must be invested in "career focused training" (p. 67). Thus, apprenticeships that offer work, wages and an occupational certification at the end of the program can become a viable choice for students entering the labor market. Consistent with this view, Jones (2011) contended that the low graduation rates of colleges and high dropout rates in high schools suggest that the academic route may not suit some students. Jones suggested that, instead of policy makers trying to increase college enrollment and retention rates of students, policy makers should look to expand other forms of training that broaden and accommodate other segments of the workforce.

As an alternative pathway into careers, the appeal of apprenticeships is for students to understand how their skills are valued and compensated in the workforce. To that end, McIntosh (2005) maintained that, in order to promote the value of apprenticeship as a career pathway, it is important that stakeholders have the right information to compare apprenticeships to other forms of career preparation. This need

for the right information is due to the fact that the labor market places a higher value on some kinds of apprenticeships over others – and this has some implications for social policy.

Policy makers have focused solely on increasing academic achievement in schools by adding more testing and rigor to the academic curriculum in hopes of meeting the skills gaps challenge in the current labor market (Lerman, 2008; Stone & Lewis, 2012). In reality, some of the testing and academic courses do not necessarily equip students with the kinds of skills that are needed in the labor market; thus, there is a need to broaden the pathways that provide the necessary skills and education that can ensure a sustainable career in a particular profession.

Apprenticeships and College and Career Readiness

The current education debate in the U.S. has centered on preparing all students to be college and career ready (CCR) by equipping them with academic, technical and employability skills by the time they leave high school (Hein, Smerdon, Lebow & Agus, 2012; Stone & Lewis, 2012). The current policy on college and career readiness has stemmed from criticism that education in the U.S. is narrowly focused due to federal reform initiatives such as the No Child Left Behind (NCLB) act of 2001 and Race to the Top (2009) which emphasize high stakes testing as well as a presumed need to increase the number of students entering science, technology, engineering, and math (STEM) fields and to focus on "college for all" as the only pathway. As a result, these efforts have marginalized a significant proportion of high school students whose learning styles and academic and career interest do not align with the educational reforms (Hamilton,

1990; Jones, 2011; Lerman, 2008; Symonds et al., 2011; Stone & Lewis; 2012; Trilling & Fadel, 2009).

The misalignment of both the policy changes and of student objectives is exacerbated by a skills gap that has grown over the years, and Lerman (2008) contended that policy makers have tried to address this skills gap and workplace changes resulting from global forces by increasing educational attainment through more science, math and reading courses in schools. These efforts, while well intentioned, have neglected the potential for other learning models to meet the skills needs. Lerman argued further that more schooling does not necessarily make for more successful careers since, in reality, middle-level skills that require less than a four-year college degree continue to make up roughly 47% of the labor market. Therefore, instead of focusing on all students going to college, there should be recognition that there are occupations that pay well and require less than a traditional college degree (Rosenbaum, Stephen & Rosenbaum, 2010).

In a similar vein, Cappelli (2008) contended that, while education is a good foundation for success, having students take more rigorous academic courses does not ensure that they will be ready for the labor market and advocated expanding work-based education through programs at the workplace or through programs that attempt to combine work and classroom experiences to address the skills gap. This suggests that, while academic skills are important, employers are more interested in how workers can translate their education into productivity and efficiency in the workplace (Cappelli, 2008). The issue of skills gaps has been contested. Cappelli (2012) challenged the notion of a skills gap and contended that the problem of skills gaps in the labor market is due to the employment structure in organizations where employment managers set

unrealistic expectations for labor market entrants who are expected to have a degree of experience before entering the market. In essence, Cappelli argued that the real issue is that of a training gap instead of a skills gap because if employers were willing to invest in training new recruits through apprenticeship programs or other training mechanisms, then the gaps could be filled.

On the other hand, Nielson and Pederson (2011) proffered that the lack of skills exists because educational institutions have not been able to adapt to the reconceptualization of knowledge in the postmodern society fast enough. In their view, there are three kinds of knowledge: (a) pragmatic knowledge, which requires learners to transfer their skills and knowledge to practical application; (b) exemplary knowledge, which requires applying knowledge to innovative and creative cases; (c) technical innovation of knowledge, which requires learners to update their knowledge and skills to adapt to technology. For that reason, these new conceptualizations of knowledge have illuminated the skills gap in the labor market as these require specific training to meet the challenges of the market and, given the standardization of schooling and a focus on testing, policymakers may have missed an important piece of solving the problem of skills gaps by adopting a different approach to learning that prepares students to enter the labor market.

Pittman (2010) suggested that the concept of college and career readiness refers to the gap between being fully credentialed and fully prepared to enter the workforce or to pursue continuing education after high school, and, as such, schools are not solely responsible for equipping students with these skills as people and organizations outside of the school system have resources and talent that can be shared. To that end, their

contributions towards preparing students must be encouraged to fulfill the potential of college and career readiness. College and career readiness requires that students possess three basic set of skills, namely academic, employability and technical, after high school (Stone & Lewis, 2012). Academic knowledge can be expressed in technical or academic terms, and, as such, serves as a foundation regardless of an educational path. Academic skills involve the ability to apply the basic theories and concepts of core academic content from courses such as math, reading, science and technology (core content) that students need to graduate high school (Hein, Smerdon, Lebow & Agus, 2012; Stone & Lewis, 2012). Such skills are developed in the early years of school and, specifically, in high school through rigorous college preparation courses or other pathways such as Career and Technical Education (CTE) programs. Technical knowledge and skills are unique to each field or occupation and demonstrate students' mastery of skills in their chosen occupations (Hein et al., 2012; Stone & Lewis, 2012). Lastly, employability skills refer to the soft skills such as critical thinking, interpersonal skills, problem solving and time management that students must possess to function and that are applicable in all workplace settings (Stone & Lewis, 2012). Hooker and Brand (2009) noted that college and career readiness encompasses a broader expectation of how students can succeed in post-secondary education and in the labor market and argued for the essence of such skills as essential – they enable students to undertake rigorous post-secondary education and provide them cultural knowledge to understand the expectations of the labor market and of employers.

Furthermore, focusing on college and career readiness means that all students at the high school level are engaged in relevant learning experiences that meet their needs

and learning styles, thus ensuring that they just do not graduate from high school, but are prepared for post-secondary education or employment (Bloom, 2010; Stone & Lewis, 2012). Consequently, students who are college and career ready are better equipped for a successful future, well equipped for continuing their education and careers, face lower levels of unemployment and enter adulthood with senses of purpose and direction (Alfeld et al., 2013; Stone & Lewis, 2012). Additionally, such students spend less time floundering in the job market after high school (Hamilton, 1990; Stone & Mortimer, 1998).

Despite the public policy focus on both college and career readiness, it has been noted that more emphasis is placed on the college readiness portion of the concept as college readiness is sometimes equated to career readiness. Hooker and Brand (2009) contended that, although there may be some disagreements as to whether college readiness differs from career readiness, the skills needed to succeed in either college or career are the same. This implicit philosophy ignores the possibilities for students who may wish to enter the labor market directly after high school or combine meaningful work with continuing education. It also ignores the reality of the labor market demand for sub-baccalaureate skills (Carnevale, Smith & Stroh, 2010; Holzer & Lerman, 2007; Stone & Lewis, 2012).

Given that college and career readiness requires mastery of academic, technical and employability skills, apprenticeships can be situated in the context of college and career readiness as a promising pedagogical strategy. Rigorous WBL programs that combine technical, academic and employability skills have the potential to increase student achievement, increase engagement in learning and help transition students to

college or the labor market (Gemici & Rojewski, 2010; Raelin; 1997). In the context of college and career readiness, youth apprenticeships offer the potential for meeting the skills needs in the labor market, increasing educational achievement and facilitating a seamless transition into the workforce or higher education (Stone & Lewis, 2012).

Consistent with this view, Symonds et al. (2011) contended that it is essential to identify alternative pathways to prepare students as the "traditional academic classroom based approach does not work for a majority of American youth" (p. 8). They recommended a high quality WBL approach such as apprenticeships that connects student learning to the needs of the labor market, as has been successfully achieved in other countries. Educational programs that incorporate rigorous WBL activities have resurfaced as an alternative to traditional academic education that meets the learning needs of some students and employer skills needs. The value of apprenticeships has resurfaced due to the fact that the skills gap in the U.S. has not eased in recent years despite more than three decades of education reforms. As well, these reforms have had little to no measurable impact on student achievement outcomes and the increased enrollment in higher education (Lerman, 2008; Lerman & Pouncy, 1990; Christman, 2012). The following section discusses the resurgence of apprenticeship in the U.S. and the implications for developing and training youth to meet the current and future workplace needs.

Re-conceptualizing Apprenticeship in the United States

In his 2014 State of the Union address, President Obama called for an examination of America's job training programs and urged a common goal for the systems as the need to "train Americans with the skills employers need, and match them

to good jobs that need to be filled right now. That means more on-the-job training and more apprenticeships that set a young worker on an upward trajectory for life." Similarly, in recent years, institutions such as the OECD Center for American Progress have encouraged countries to expand apprenticeship programs to meet the needs of the workforce. Furthermore, there has been an interest in developing American youth with skills and knowledge to meet the needs of the changing workforce and in helping a significant proportion of students not interested in pursuing traditional post-secondary education develop industry-relevant skills (Stone & Lewis, 2012; Cappelli, 2012; Symonds et al, 2011).

Hamilton (1990) advised that neither the old-style of apprenticeships where young men learned at the feet of masters, nor the current system where apprenticeship focuses on certain skilled trades, would solve the current skills gaps among American youth. Thus, Hamilton recommended a system "typifies the diversity, flexibility and openness of the American educational system and labor market" (p. 135). In developing apprenticeship programs that appeal to a wide range of stakeholders, some enduring guidelines such as understanding the structure and values of the American educational system and the labor market environment were noted (Rosenbaum, 1992). As a result, the apprenticeship system must be designed such that the program can enhance general education and provide developmental support and resources for adolescents instead of being limited to a specific skills training (Rosenbaum et al., 1992).

Hamilton (1990) recommended four major objectives of youth apprenticeship programs, namely (a) they must be closely linked to schooling and job skill credentials; (b) they must assume diverse forms to meet varied needs of the youth and labor market

conditions; (c) they must be open to allow entry at various points; (d) they must lead to different schooling and employment options. To that end, almost a couple decades after Hamilton's recommendations, policy makers and national leaders have re-engaged in efforts to promote work based learning programs including apprenticeships. The value of apprenticeships has recently resurfaced as one solution to the issue of skills gaps in the U.S. which have not eased even with school reforms and the increased enrollment in higher education (Jones, 2011; Lerman, 2008; Lerman, 2012). Along those lines, Christman (2012) called for "a new perspective and understanding of apprenticeships in the 21st century" (p. 22).

Another perspective is offered by Neilson and Pederson (2011) who contended that the resurgence of apprenticeships in a postmodern society is due largely to the reconceptualization of knowledge. The emphasis of exemplary knowledge in modern society fits into the framework of apprenticeships where learners apply their knowledge in exemplary cases such as designing new forms of software and learning specific forms of the trade. Pragmatic knowledge focuses on learning by doing where the learners are able to transfer their skills and knowledge to the practical applications of the trade. In such cases, learning is built upon as the novice is able to move from one form of mastery to the next. Technological innovation of knowledge means that the learners must keep up their knowledge with the rate of technological change and apprenticeship provide a means for learners to update their knowledge. Given the importance of apprenticeships in the labor market, Lerman (2012) posed a significant question about the inability of the U.S. to establish a significant apprenticeship system given its potential to deal effectively with skills mismatch: wage inequalities and declines in manufacturing.

Rose (2004) argued that implicitly some work in the U.S. has been deemed as more dignified and aspirational than others. Consequently, this perception has caused a devaluing of potentially well-paying jobs served by apprenticeships that provide not just meaningful careers, but pedagogical approaches that offer a pathway to help adolescents transition into adulthood (Hamilton & Hamilton, 1990; Halpern, 2009). Work that uses the "hand instead of the brain," it is argued, requires a high level of critical and higher order thinking and involves rigorous preparation and academic aptitude. As such, it must not be discounted as undignified (Crosby, 2002; Rose 2004). In occupations such as construction and manufacturing where apprentices are typically used, successful programs have been able to meet the skill needs of industry as well as that of students who otherwise would be enrolled in other career preparation programs for which they are not suited or in the traditional academic preparation track. In light of the demand for skilled workers, organizations that sponsor apprentices are able to meet their workforce needs and also deliver instruction that is timely and relevant to the industry. A benefit of apprenticeship is the ability to "earn as you learn," which fits the lifestyle of many individuals by providing stable income and a career pathway (Jones, 2011). Furthermore, the national recognition of certification enables career mobility for those who are able to reach higher apprenticeship status.

Summary

In this chapter, research relating to the study on apprenticeship, its role as a pedagogical approach in developing skills, the role of stakeholders and how the current debate on college and career readiness relates to apprenticeships was summarized. The summary began with the history and context of apprenticeships in the United States.

From that we learned that the implementation and widespread adoption of apprenticeship have been mixed. While it is widely accepted as a skills development approach which has been successful in other countries, the U.S. apprenticeship system has been challenging due to the American labor market structure and the educational system. Even though the U.S. cannot wholly adopt systems from other countries, the discussion provides insights into the elements that have contributed to the performance of apprenticeship programs.

Secondly, changes in the 21st century have necessitated the review of apprenticeships targeted at American youth and how lessons from previous attempts can inform the development of new apprenticeships programs. Though apprenticeships and work place learning activities are not the panacea for all education problems, they offer benefits and opportunities not readily available through school based learning. Furthermore, they offer a pathway to ensure that all students graduating from high school are college and career ready. High schools are the first entry points to adulthood, and it is important that students have the necessary skills which can serve them (Stone & Lewis, 2012; Halpern, 2009; Hamilton, 1990).

Sustained commitment from stakeholders – students, employers and educators – is critical to the success of apprenticeships. Employers need to ensure a channel of skilled workers to sustain their organizations and the economy as a whole. Given the right support and incentives, employers are willing to partner with educational institutions to train apprentices.

Policy makers and educators, seeking to address the skills gaps by developing college and career readiness skills, can revisit these apprenticeship programs and adopt

them to the unique American culture. Being college and career ready also means that students have a goal and a sense of purpose after graduation. Apprenticeship programs can shape their perception of future careers and even serve as a foundation for future higher education pursuits. Exposure to the workplace enhances employability skills such as problem solving, critical thinking, team work and collaboration that are highly valued in the workplace. Additionally, apprenticeships offer students the opportunity to relate academic concepts with practical concepts, and, for a majority of students who are kinesthetic learners, apprenticeship programs can engage them with the curriculum and offer a chance to increase their academic outcomes.

Traditionally, apprenticeships have been perceived as a track for less academically inclined students. This is a misconception which limits the potential and appeal of such programs. Given the rigor and relevance that such programs can offer, they could be viewed as a foundation for promising careers and even a pathway into higher education.

This literature review serves as a framework for studying an apprenticeship program targeted at youth using a qualitative approach. In Chapter III, the qualitative research methodology is discussed in detail. The chapter also outlines the data collection and analysis methods used in the study.

CHAPTER III

METHODOLOGY

The purpose of this study was to describe an apprenticeship program targeted at adolescents and aimed at addressing the skills needs in an advanced manufacturing company. The study involved three main stakeholders: students, educators and employers engaged in the apprenticeship program. The intent was to gain a better understanding of how each group worked together to equip students with the relevant college and career readiness skills and meet employer skills needs. Examining the experiences of students, employers and educators engaged in apprenticeships revealed how such programs can enhance college and career readiness among students and address employer skills needs. Additionally, developing rich descriptions of the structure and organization of the program established the context for the apprenticeship and provided insights into the challenges and opportunities of those engaged in the program.

This study used a qualitative case study methodology (Creswell, 2013; Merriam, 1998; Stake, 1995; Yin, 2009) to explore the "why" and "how" of the phenomenon of apprenticeship and to also guide the data collection, analysis and the reporting of the study. Components addressed in this section are: (a) research design; (b) data collection and analysis; (c) ethical considerations to ensure validity and trustworthiness of the study. Additionally, the philosophical assumptions and the role of the researcher will be discussed.

Research Question

The study sought to understand the experiences of educators, employers and students involved in a high school apprenticeship program and the main research question that underpinned the study was as follows:

What is the role of apprenticeship in enhancing adolescents' college and career readiness and meeting employer skills needs?

Additional sub-questions that provided insights into the phenomenon were:

- How are apprenticeships programs organized and implemented to prepare high school students to be college and career ready?
- How are employers meeting their skills needs in their industries?
- What are the experiences of the stakeholders in the program, and how do they influence the implementation of the program?

Methodological Approach

A qualitative case study approach was determined to be the best method to obtain the information needed to answer the central research question. Qualitative research allows the researcher to study participants in their natural setting in order to "make sense of, or to interpret a phenomena in terms of the meanings the people bring to them" (Denzin & Lincoln, 2000, p. 3). Similarly, Merriam (1998) explained that "qualitative researchers are interested in how people interpret their experiences, how they construct their worlds, and what meaning they attribute to their experiences" (p. 5).

Additionally, qualitative studies provide richness and holism to the analysis of the phenomenon under study (Miles & Huberman, 1994) and, since such studies occur in natural settings, researchers can examine a phenomenon within its context. Marshall and

Rossman (1999) noted that documenting and describing a phenomenon at the research site will illuminate the salient actions, beliefs, attitudes, social and economic structures that are occurring in the phenomenon. A qualitative approach enables the researcher to understand the meaning and purpose that individuals ascribe to their activities (Guba & Lincoln, 1994) by ascertaining intangible factors and contextualizing the participants' experiences. Also, qualitative research affords the researcher an opportunity to understand an issue or phenomenon that cannot be easily quantified (Merriam, 1998; Creswell, 2013). For these reasons, a qualitative methodology is suited for exploring the phenomenon of apprenticeships within the context of the program which is geared towards equipping adolescents with industry-relevant skills and addressing employer skills needs. Conducting a case study on apprenticeships within the context of a local organization and examining this intersection of employers, students, and educators enabled the researcher gain a holistic understanding of their experiences. It also allowed the researcher to delve into the complexities and subtleties of the phenomenon and provide an opportunity to explore policy, knowledge and practice as they relate to apprenticeship programs.

Research Design

Case studies are appropriate when one is studying a contemporary, real life situation that is bounded in time and location (Creswell, 2013; Yin 2009). Stake (1985) noted that instrumental case studies are chosen to provide insights into phenomena, and, as such, the case itself serves as a supportive role. For that reason, using a case study approach facilitated an understanding of youth apprenticeships as it revealed the nuances and complexities of high school apprenticeship programs, their contribution to college

and career readiness and how they addressed employer skills needs. Yin (2009) noted that a case study design permits the researcher to interview the participants of the phenomenon under study (in this case, the apprenticeship programs) and also observe first-hand the participants as involved in the study. Furthermore, case studies involve rich, contextual descriptions that allow the researchers to study internal and external factors that influence a phenomenon. Although case studies are typically not generalizable, the value of case studies is that they provide a deeper and richer understanding of a phenomenon, suggest complexities for further investigations or refine theory, and also help to establish the limits of generalizability (Yin, 2009). When done well, the case study can provide a vicarious experience that can garner support and action for a phenomenon (Creswell, 2013; Stake, 1995; Yin, 2009). By using a case study approach, the hope is that this study will provide detailed information on how apprenticeships can be developed and advanced as a pedagogical approach that enhance the skills needed by adolescents as they transition into adulthood and meet employer skills needs.

Single Case Study

Multiple case studies are deemed preferable to single case studies because comparison from other examples provides valuable knowledge to the audience and are perceived to be more rigorous. However, Yin (2009) contended that a single case study is an appropriate design when the aim of the researcher is to describe an unusual case "that deviates from everyday occurrences as the findings may reveal insights about a process or a program and provide value for large number of people beyond those impacted by the particular case" (p. 53). Furthermore, Yin (2009) explained that

focusing on a single case offers readers and the researcher the opportunity to draw out the uniqueness of the case by providing a comprehensive understanding of all stakeholders impacted by the phenomenon. In regard to the current study, the study of a single apprenticeship program enabled the researcher to uncover the complexities of the program and understand how each of the stakeholders contributed to the goals of the study.

In a similar vein, Stake (2000) argued that when researchers focus on comparisons of multiple cases, "uniqueness and complexities can be glossed over, because when readers are presented with other cases to compare with, they often focus on one case as readers and generally do not learn much from other compared cases" (p. 444). Nevertheless, Yin (2009) suggested that sub-units can be incorporated into the unit of analysis to create an embedded single case study design or to enhance the rigor of a single case study design. Thus, in the current study, the apprenticeship program within the employing organization was identified as the unit of analysis. Embedded within the case was the participating high school students and the district educational personnel. Although an embedded design adds richness and rigor, it is not without pitfalls. Yin (2009) noted that to ensure an embedded design's trustworthiness, the researcher will need to make a concerted effort to tie the results of each of the sub-units to the larger unit of analysis so the original phenomenon of interest (in this case, the apprenticeship program) remains the target of the study.

Case Selection

Purposeful sampling was used to select participants for the study. In purposeful sampling, the "researcher selects individuals and sites to study because they can

purposefully inform the understanding of the research problem and central phenomenon" (Creswell, 2013, p. 156). This study was conducted as a single instrumental and embedded case study and focused on a high school apprenticeship program at a local organization in a Midwestern city in the United States during the 2013-2014 academic year. The research site was known locally and recognized for establishing a partnership with a local high school to provide apprenticeship training to adolescents and had been operating the apprenticeship program for over a year at the time of this study. Consequently, it provided a rich embodiment of the phenomenon and offered rich data needed to understand apprenticeships and the experiences of those involved in the program.

Units of Analysis

Three units of analysis were examined and fourteen participants were selected within those units. A description of the units and the participants is provided below.

Figure 3.1. Units of Analysis

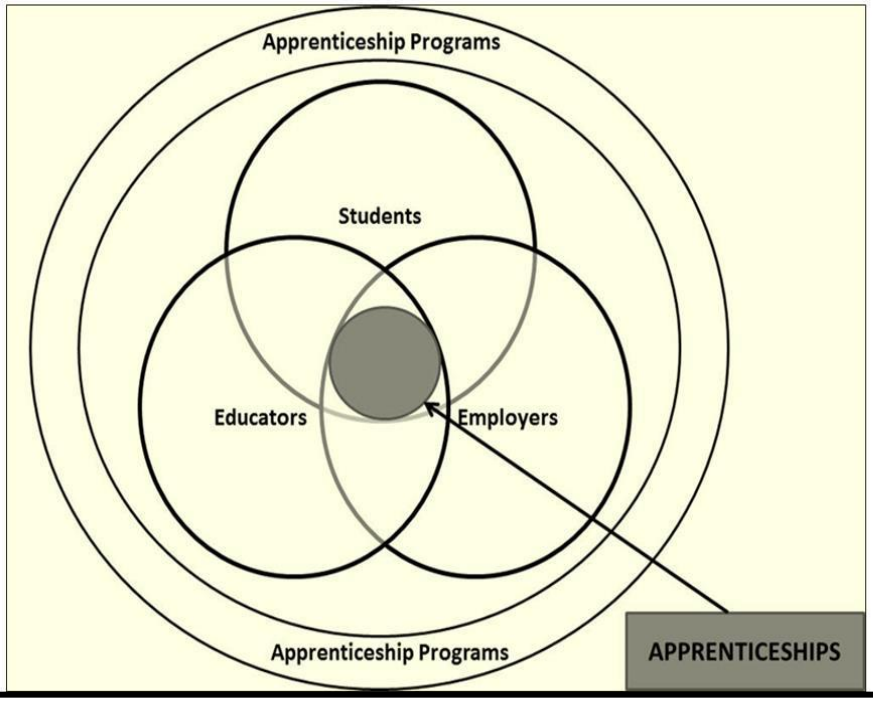

Figure 3.1. Units of Analysis.

The figure above is a visual representation of the three units of analysis engaged in the phenomenon of apprenticeships within the context of the organization.

- Unit of Analysis 1: The youth apprenticeship program within the organization. The participants selected were the owner of the company, the coordinator of the apprenticeship program and the supervisors of the apprentices.
- Unit of Analysis 2: High school setting. Participants selected were the coordinator of apprenticeships at the district office, two teachers of CTE at the high school and two high school principals.
- Unit Analysis 3: The students involved in the apprenticeship program. Four participants were included within this unit.

Fourteen participants were included in the study. The participants in the study agreed to participate on the condition that their identities would be protected. Thus, pseudonyms were assigned to each of them to help maintain confidentiality. The following paragraphs introduce the participants in the three units of analysis (the employer, the students and the educators) and provide a summarized biography of each participant.

Table 3.1

Names and Roles of Participants in Study

Names	Role
Jeff	CEO of company
Melinda	HR director
Jake	Director in charge of program
Jude	Supervisor in charge of students
Francis	Unit supervisor
Tina	Employee and former apprentice
David	High school principal
Fred	CTE teacher
Bill	High school principal
Manny	CTE teacher
Lisa	District coordinator
Spencer	Apprentice – High school senior
Jim	Apprentice – High school senior
Josh	Apprentice – High school junior
Barry	Apprentice – High school senior

The five main participants from the employer group were (a) Jeff, the owner and chief executive officer (CEO) of the company; (b) Melinda, the director of human resources (HR); (c) Jake, the director of engineering, who also was in charge of the apprenticeship program at the company; (d) Jude, the manager in charge of tooling at the company, who also served as a mentor to the apprentices. These four participants were involved with the design and implementation of the apprenticeship program from its inception. Additional participants from the employer were Steve, a tool and die supervisor, and Tina, a worker in the tool room, who was a former apprentice. Steve was included in the study after initial interviews due to positive comments from the students and others at the organization who described him as an informal mentor and one who loved "working with the kids." The other person was Tina who worked in the tool room at the plant and was one of the apprentices from the first year of the program. Tina had completed high school the previous year and worked full time at the plant. She was chosen to participate because of her experience as an apprentice and also to provide insights into her activities upon graduation as an apprentice from the program. As the researcher was interested in the structure and organization of the apprenticeship program, the experiences of the participants, the challenges and opportunities of the program as well as lessons learned from the program, interviews with participants from the employer were scheduled and conducted at the research site on two different days.

The students. The second unit of analysis involved four high school students who worked as apprentices at the organization. Spencer, a senior in high school, focused on computer assisted design (CAD) and planned to pursue a degree in engineering. He shared that his reason for joining the program was "for knowledge of the skill" and his

dream job was to become a mechanical engineer. While Spencer was not the traditional CTE student, he was selected to be in the program because he demonstrated an interest in manufacturing and scored well on the math test. Whereas Spencer planned to pursue a four-year degree after the program, he was gaining essential skills that would help him with his future academic and career plans.

Jim was also a senior in the machine tool and die program and was focused on the welding program in his school. Unlike the other students in the apprenticeship program, Jim participated in the first year program as a junior; therefore, he had been in the program for two years. He shared that he was motivated to join the apprenticeship program after his welding teacher told him about it during his sophomore year, and Jim "thought it would be a good experience to go and learn about all this stuff." During his two years in the apprenticeship program, Jim noted that he had learned a lot about machining, tool and die and fabrication, but was more interested in pursuing a career and education in welding. He shared that his knowledge of welding and machining were useful, and he "would be able to translate the skills learned in one area to the other." He was thus enrolled in a six-month welding program in another state after graduating from high school and was looking forward to pursuing the program.

Barry was a senior in the machine and tool and die CTE program in high school and had enrolled in the apprenticeship program during the period of the study. He explained that he joined the program because it "was available" and he wanted to "learn more skills and gain real world experience before graduating from school." He shared that he was not sure what he wanted to do after graduation, but liked the idea of working

as an auto mechanic or staying in the manufacturing field. He had also considered joining the four-year apprenticeship program offered by the employer.

Josh was a junior in the machine tool and die program and a first year participant in the apprenticeship program. He seemed the most enthusiastic about being in the program and mentioned that he enjoyed the practical hands-on learning and was always interested in the field. He also shared that both his parents were in manufacturing, so they had a big influence on him. Josh planned to continue with the apprenticeship program in his senior year and, ultimately, enter the four-year apprenticeship program offered by the organization.

The educators. The third unit of analysis consisted of the educators involved with the program. As an industry-educational partnership, the educators – teachers, principals and facilitators from the school district – were critical in developing the structure of the program and maintaining an effective partnership to ensure that the students' and employers' needs were satisfied. Five participants were interviewed under this unit.

David was the principal of one of the high schools and was instrumental in developing the partnership with the employer from its inception. He shared that he was motivated to develop the relationship because he believed that it was important for students, particularly those in the CTE program, to get out of the school and experience the real world work setting. This value was captured in the following statement:

> It had been a desire all along that we find a way to get students learning, especially in their senior year, out of the building and into the work place.

> Usually we had big co-ops in the past, but we really wanted to figure out some ways to increase our kids' learning outside of the schools in the field.

As the principal, David remained actively involved in the daily activities of the students by ensuring that the program was structured to mitigate the effects of interrupting the students' academic lives. He also maintained a good relationship with the employer and had appeared at events in the city with the employer to discuss the apprenticeship program and share experiences from a principal's perspective. His involvement in the selection and recruitment of apprentices to the program ensured that the identified students met the academic and behavioral requirements of the employer.

Fred was a CTE teacher in the same high school as David and was also involved with the program from the onset. He had taught some of the apprentices in the program for over a year and shared that he "had seen them mature as a result of being in the program." Although he worked closely with just one of the apprentices, he was involved with most of apprentices from the previous year. Fred demonstrated the same passion as David and was hopeful that the apprenticeship program would grow to become a flagship program within the district and beyond.

Bill was the principal of the other school that joined the apprenticeship program in the second year. The school joined the program because of its proximity to the employer and the fact that it offered a similar machine tool and die program as the original school that began the partnership with the organization. Bill shared that essentially his school built on to an existing relationship built by the first high school. He explained that his school was motivated to join the program because it had been "trying to find various means for kids to do relevant work" and had learned about the program

based on the experiences of the previous school and students from the first year. As a result, his school approached the employer to participate in the program.

Manny was the CTE teacher in same school as Bill and was the one who worked directly with the employer. He was involved in daily communication with the apprentices in the program. He also was responsible for identifying students, introducing them to the program and helping them with their application materials. As a teacher, Manny was excited about being part of the program and expressed the importance of the program's impact on the school and the importance of preparing the students to be successful in the program.

Lisa worked in the school district and oversaw the CTE programs in the district. Lisa was instrumental in facilitating the partnership between the employer and the schools and was actively involved in helping the other stakeholders develop the structure of the apprenticeship program. As Lisa explained, her role was to make the partnership work and to ensure that the stakeholders' needs from the program were met. Additionally, she worked with the company to identify state and federal policies that needed to be addressed to ensure the smooth functioning of the program. Lisa had appeared at events in the city and state to discuss apprenticeships in the context of high school-industry partnership programs and was involved in all informational sessions held at the school.

Data Collection Plan

Data collection involves a series of interrelated activities that adds depth and breadth to a study by producing the best answers needed to answer a research question (Creswell, 2013; Merriam, 1998; Yin, 2009). In this study, the data were collected

primarily through interviews with participants and supplemented with observations and documents' review. Interviewing participants is an ideal and important tool since it allows the researcher to gain insights into the feelings and thoughts that are not readily observed and are usually the most important tool in qualitative research (Merriam, 2009; Patton, 2002). An interview protocol was developed using semi-structured interviews to aid in organizing ideas and ensuring that vital questions were not missed. Individual face-to-face interviews were conducted in all cases and additional information was gathered through emails and phone conversations. The participants were interviewed at different times and in different locations as described below.

The interviews with the students occurred in their schools instead of the worksite because the employer felt that an interruption in the students' work would impact other employees who had to give up their time to work with the apprentices. With the consent of the principals and the students at the respective schools, the interviews with the apprentices were scheduled during school period when they had elective classes such as aiding or study skills so as to not interfere with their core courses. The interview questions to the students focused on their experiences as apprentices, lessons learned and their future plans in relation to the program. The apprentices provided insights into their perceptions of the program and the benefits and challenges involved. Interviews with the educators were conducted at their respective schools as well as in the district coordinator's office. The interview questions posed to the educators provided insights into the challenges and opportunities of the partnership program with the employer organization. Interviews with participants from the employer group were conducted within the organization. Interview questions focused on the reasons for starting the

program, their experiences, challenges and opportunities in developing and implementing the program and overall goals of the program.

At the beginning of each interview, I explained the purpose of the study and the interview, reiterated how long the interviews would take and explained to participants their rights. The interviews were structured to last no more than one hour. Creswell (2013) suggested that a researcher use "open ended, general and focused questions that are aimed at understanding the central phenomenon of a study" (p. 163). To that end, most of the interview questions were open-ended in order to generate rich information from participants. Additionally, probing statements and questions such as "Tell me more," "Can you explain further?" or "You had mentioned that…" and "Can you elaborate on that?" were used to elicit further information or clarify points made by participants. Each of the interviews was recorded, transcribed and stored on a password-protected computer as well as an external hard drive.

Creswell (2013) noted that the use of multiple sources of data is helpful in providing "corroborative evidence for validating the accuracy of a study" (p. 302). Additional data were collected through observations I conducted at the organization while the apprentices were at work. Data from observations typically include activities, actions and behaviors, while data from documents can include records, correspondence and official publications, photographs and other physical artifacts (Patton, 2002). During that time, I observed activities, behavior and other observable experiences among the participants as they performed their daily routines. In addition, documents such as training manuals, apprentices' handbooks and other materials were analyzed to uncover more insights that would supplement interview data. I also used field notes and journals

to record insights and feelings that were useful in helping me understand and interpret my findings.

An important part of the data collection process involved developing a timeline so that the process would run smoothly. Due to the participants' schedules, data were collected over a three-month period. After identifying gatekeepers at the research site, I met with each of them to explain the purpose of the study and sought their approval to use their organizations as study sites. Once approval from the university's Institutional Review Board (IRB) and the local school district had been received, letters of consent were sent to each of the participants. Furthermore, parental consent was sought from parents of the students who were under 18 years of age. The signed letters of consent were collected prior to the interviews.

Due to the emergent design of a qualitative study, I had to remain flexible and adaptable to changing the approach. Sales and Folkman (2010) explained that "flexibility and tolerance are important attributes at the planning stage"; therefore, when researchers are "inflexibly wedded to a particular design" that can hinder them from designing a plan that is scientifically and ethically sound, "it can result in major ethical violations as researchers" (p. 13). This principle of flexibility was applied when adjustments were needed to accommodate the schedules of participants and when the inclusion of other participants was suggested.

Data Analysis

Qualitative studies tend to produce volumes of data and, to avoid getting lost in a sea of data, the data collection and data analysis process should be interwoven. This helps the researchers in managing the data and also provides opportunities to identify

gaps in their data collection (Creswell, 2012; Merriam, 2009; Miles & Huberman, 1994). Once the interviews were completed, the data were transcribed and folders for each of the participants were created and labeled. A contact summary form was used to reflect and summarize the key points and trends identified in a particular interview. The next step in the analysis process involved a review of the data to get a sense of them. Yin (2009) referred to this process as "playing with your data" (p. 129). The goal here was to immerse myself in the data in order to understand what was going on before proceeding to the next steps. This enabled me to review pertinent information and to understand how each participant's answers provided information to the research question. After exploring the database to get a grasp on the data, I described and interpreted the data by forming categories that best represented the data. Creswell (2013) noted that this critical phase involves building detailed descriptions by describing what is seen and interpreting the data in light of the views or the perspectives in the literature.

The next step involved coding the data by condensing the text and providing codes based on evidence from the data. Coding is an essential step in the analysis as it helps the researcher identify the major themes in the data and allows the emergent nature of qualitative research to evolve (Creswell, 2013; Yin, 2009). During this process, I chose codes that appropriately described the information gleaned. After identifying the themes in the data, the next step involved interpreting the data by "abstracting the codes and themes to the larger meaning of the data" (Creswell, 2012). Throughout the interpretation process, I attributed meanings to the themes by grouping the information and relating those groups to the study questions and also linking them to literature.

The tentative findings were discussed with co-advisors. The findings were further refined, and a draft report was sent to the co-advisors for their review and feedback. The data were then presented in a table format to illustrate the different levels of abstraction (Creswell, 2012) and to outline how I arrived at the conclusion and results of the interpretation. The final report of the case study was then included in a detailed description of the apprenticeship program and its context. Providing a history of the program helped to organize the data and provide the reader with a context within which the research study was conducted. It concluded with a description of the experiences of the stakeholders (employer, students and educators) and how those experiences influenced the implementation and operation of the program. Miles and Huberman (1994) noted that using interpretive and material sources in qualitative research makes the world visible to readers by "turning the world into a series of representations including field notes, interviews and memos to self" (p. 3). Interview participants told their personal stories and were encouraged to explain the actions and activities that occurred as the program evolved. Many of the findings were told through the voices of the participants. Thus, direct quotes from the participants were incorporated into the final report to reflect their voices.

Examination of Philosophical Assumptions and Interpretive Frameworks

It is beneficial for consumers of research to understand the philosophical assumptions of the researcher in relation to the nature of reality (ontology) and the nature of knowledge (epistemology) as well as the values that underpin the research process (Merriam, 2009; Creswell, 2013; Glesne, 2010). Beliefs about the world and what reality is (ontology) are influenced by factors such as worldview which, in turn, determine the

kinds of questions for which answers are sought. These factors determine what is considered to be reality (Creswell, 2012; Glesne, 2011).

My ontological belief is that reality is known through my participation with the different participants in the apprenticeship program as each participant would present multiple realities based on their views, experiences, worldviews, and contexts. Thus, when studying individuals, it is important to understand that reality is subjective as seen through many views, and my intent as the researcher should be to report the multiple views of participants as presented to me. Creswell (2013) explained that epistemological beliefs help the researcher determine what counts as knowledge. This knowledge is gained by getting close to the participants to understand their views and experiences. My epistemological stance required that I conduct my research in the participants' environments in order to gain a holistic understanding of apprenticeship and how the participants' contexts and experiences bore upon the phenomenon. By getting close to the participants and listening to them with an open mind, I understood their knowledge claims. For that reason, my choice of research methodology enabled me to study an apprenticeship within the context of an organization to understand the experiences and perceptions of the participants.

From an axiological standpoint, qualitative research is value laden as researchers bring their values and biases to bear on a study and how findings are interpreted (Creswell 2012; Glesne, 2011). Dahlberg, Drew and Nystrom (2001) thus encouraged researchers to adopt an open stance and be receptive to information about the phenomenon under study as it is presented, as this allows researchers to see things in a new way. In view of that, my duty as a researcher required that I maintain an open stance

and make myself available to what I was studying and be willing to listen and understand what I was being told without any judgment on my part. For my part, it was important that I suspended my assumptions and be open to learning from participants and not make any assumptions about what my participants knew or did. Through my extensive review and my experiences with the concept of apprenticeships, I had to continuously monitor my assumptions and biases and separate them from the data being presented by my participants. Furthermore, I had to be cognizant of how my previous knowledge about apprenticeships could influence my interpretation of the data. To prevent this from happening, I endeavored to jot down my feelings and perceptions about the information I received. In addition to gaining more insights into the phenomenon, adopting an open stance enabled me to identify dissenting views and report such evidence in this study, thereby enriching the study with information that could be beneficial to the different stakeholders interested in apprenticeships.

The social constructivist or interpretivist framework (Creswell 2013) guided the interpretation of the study. Through this viewpoint, I strove to co-construct the meaning of the world in which the participants lived and worked. Given the varied factors that influence the success of apprenticeships, it was important to uncover the complexity of views that each of the participants held, as their views would be informed by the context in which they worked, the resources available to them, and the cultural, economic and political environments in which participants found themselves. It is through my interaction with the participants that I was able to explore and describe the role of apprenticeships in enhancing college and career readiness skills and to address employer skills needs. As a result, the knowledge I gained and my findings were co-created with

my participants. Due to the value-laden nature of research, I acknowledge that my background and values could influence the interpretations that I make throughout the study. Thus, in order to ensure credibility and trustworthiness in my research, my values and role as a researcher and what influenced my interest to this topic and research is discussed in the next subsection.

My Role as a Researcher

My interest in apprenticeship programs for high school youth stems from my readings and scholarly work as a graduate student that focused on workforce development and the need to address the skills gaps in the labor market. My interest was initially piqued during a study on the emergence of technical vocational education and training (TVET) or Career and Technical Education (CTE) as is commonly referred to in the United States as an alternate pathway for skills development and also as a means of equipping adolescents with relevant skills that can help them transition into adulthood.

The notion of apprenticeship is personal to me as one born and raised in Ghana. In the Ghanaian educational system, attainment of a college degree is seen as the only path to success. However, the educational system and available resources privilege only a small number of students who are able achieve a college degree. Consequently, a large population of the youth neither has a college degree nor acquires any employable skills after high school. Although the introduction of technical vocational education and training (TVET) systems allows for apprenticeship training in the secondary school system, there are minimal partnerships with core industries that can help students as well as drive the economy. Therefore, there is little realization of the economic benefits from these programs since most of the training is for low impact industries resulting in low

wages and with little interest to students. As compared to countries with well-established apprenticeship systems where public policy, education, industry and student interest are aligned to benefit all stakeholders, these elements do not integrate well in a place like Ghana. My hope is that this research will shed better understanding of how such elements integrate and can be refined and adapted to meet different contexts.

Most of the literature I reviewed indicated a need to focus on high schools as a means of attracting students into apprenticeships. I realized through scholarly readings and experiences that the concept of apprenticeship had been an ongoing initiative in the United States for many years. However, with the push for college and higher education, the focus of training individuals to enter the labor market had shifted to formal schooling over the years. Despite the rise in formal schooling, changes in educational policies aimed towards a better educated workforce to meet the needs of the 21st century labor market do not indicate how the perpetual skills gap among labor market entrants can be fully addressed. This is evident from the concerns expressed by employers that a large proportion of American youth graduating from high school enter the labor market with no knowledge of relevant skills – academic, technical or career-related – to succeed (Stone & Lewis, 2012). Consequently, as stakeholders seek to address the problem of skills gaps, apprenticeship programs have re-emerged as a possible career pathway, despite their controversial implementations in the past which had resulted in varying degrees of success or failure. The problem with the apprenticeship system in the U.S is that programs tend to be arbitrary and discrete, with the averaging apprentice age about 27 years when they enter into apprenticeship programs. Also, many young adults stumble into apprenticeships as a means of last resort, only to find out that those apprenticeships

indeed offered a stable and consistent career through the acquisition of industry-relevant skills.

This topic is important to me because in the communities where I have lived, many kids were left behind when they failed to pursue the traditional academic route. I also believe such programs, when well thought out and coordinated, may offer a possible way out and a means to advancement in people's lives. On a personal level, I enjoy the academic stimulation of engaging and sharing my ideas and research which can impact society in general. It is my belief that, when supported with the right resources and vested stakeholders, apprenticeships can offer our young people a sense of purpose and meaning. They also provide several professional and personal benefits to those stakeholders who pursue them such as the organizations that sponsor and hire these apprentices.

Ethical Considerations

This section outlines steps that were taken to ensure the trustworthiness and credibility of the study. Once the case was identified, I connected with gatekeepers of the organizations involved to explain the purpose of the study and to gain access to the participants for the study. Prior to collecting data, approval was sought from the Institutional Review Board (IRB) at the University of Louisville as well as the local high schools. Approval also was sought from the educational district office since the study included students from the district who are considered a protected group. To gain approval to begin the study, I developed a consent form for participants and an assent form for the parents of apprentices under the age of 18. The form described in detail the purpose of the study, its benefits to the participants, how much time would be spent

collecting data and how the findings would be used. Furthermore, participants were notified of their rights to terminate their involvement in the study as well as measures that would be taken to ensure confidentiality and anonymity. Due to my obligation as a researcher to protect the anonymity of participants, pseudonyms were used.

The trustworthiness and credibility of a qualitative study is determined by the extent the researcher takes to ensure that ethical considerations are adhered to in all the phases of the study (Lincoln & Guba, 1985). To gain an in-depth understanding of apprenticeships, their structure and organizations as well as the experiences of those living the phenomenon, it was important to spend a substantial amount of time in the field interviewing and observing the participants. While this was a necessary step, I had to be respectful of the participants' time and make sure our meetings or interactions were done at their convenience so as not to disrupt their lives. The prolonged engagement in the field was necessary to build trust with the study participants and to understand the nuances of the phenomenon. Furthermore, it helped me to identify issues salient to the study.

To corroborate the findings and to ensure that researchers gains comprehensive information, Yin (2009) advised that researchers use diverse data gathering tools such as interview, observations, archival records and physical evidence where available. The process of triangulation is an ethical expectation that enables the researcher to illuminate a theme or perspective while ensuring the rigor and validity of the study (Creswell, 2013).

Since the dissertation process is a solo process, it was important that I had debriefings and peer review sessions with my dissertation committee and peers who

could provide an objective perspective and reveal any blind spots by asking me questions about my conclusions and assumptions. To that end, I scheduled meetings with my co-advisors to provide them progress updates and to seek feedback from them.

Data collected were stored on a password-protected computer as well as on an external hard drive. Furthermore, to maintain confidentiality, I ensured that the information received from interviews was not shared with others without the consent of the participants. Although this kind of research posed no significant risk to participants due to the nature of my questions and the characteristics of participants, I realized that no research study is completely void of risks, and, thus, it was important to respect the research sites. Also, the participants' time was respected so as to not inconvenience stakeholders.

Once the major themes were developed in the analysis phase, the information was shared with participants in order to judge if I had ascribed the correct meanings to the data and if there were any discrepancies in the interpretation of the data. This member checking process was vital in determining the credibility of the research study (Creswell, 2013; Lincoln & Guba, 1985; Merriam, 1998). To make an impact on the targeted audience and to allow them to draw conclusions from the study, the final report included rich descriptions of the participants and the contexts of the study (Stake, 1995) as well as direct quotes from the participants which provided a rich, vicarious experience to the target audience.

Summary

The researcher of this study adopted a qualitative methodology to describe a high school-industry partnership that offered apprenticeship training to students. In the

following chapter, the results are presented using thick, rich descriptions. The findings illuminate practices that enhance apprenticeship programs and provide an understanding of the opportunities and challenges faced by stakeholders.

CHAPTER IV

FINDINGS

The study reported in this dissertation examined in detail how a high school apprenticeship program was developed to address college and career readiness among students and to address employer skills needs in a small advanced manufacturing company. This chapter begins with a review of the study purpose, the research question that provided the impetus for the study, and three sub-questions posed in Chapter I. This is followed by the history and context of the apprenticeship program described in this study.

In this discussion, the findings from the study regarding how the apprenticeship program was organized and implemented are described. Providing a history of the program helped to organize the data and provide a context for the study. Additionally, a discussion of how the program prepared students to be college and career ready and how employers addressed their skills' needs are presented. This section concludes with a description of stakeholder experiences (employer, students and educators) and how those experiences influenced the implementation and operation of the program. Archival documents and public records complemented the interview data and helped identify emerging themes. Interview participants told their personal stories and were encouraged to explain the actions and activities that occurred as the program evolved. Many of the findings are told through the voices of the participants.

Purpose of Study

The purpose of this study was to describe an apprenticeship program targeted at adolescents and aimed at addressing the skills needs in a small advanced manufacturing company. Examining the experiences of students, the employer and educators engaged in apprenticeships revealed how such programs could enhance college and career readiness among students and address employers skills needs. Additionally, developing a rich description of the structure and organization of the program established the context for apprenticeship and provided insights into the challenges and opportunities of those engaged in the program.

The main research question underpinning the study was: What is the role of apprenticeship in enhancing adolescents' college and career readiness and meeting employer skills needs?

Additional sub-questions that provided insights into the phenomenon were:

- How are apprenticeship programs organized and implemented to prepare high school students to be college and career ready?
- How are employers meeting their skills needs in their industries?
- What are the experiences of the stakeholders in the program, and how do they influence the program?

A case study approach was used to address the question and sub-questions of the study. The findings of this study build on current knowledge of workforce skill preparation that is useful to education and industry partnership programs targeted at high school students. Additionally, this study's findings may provide valuable information to policymakers, employers and educational institutions as they advocate employer and

community engagement through work based learning (WBL), particularly apprenticeship programs, and help youth find career pathways while addressing the skills gap challenge in the advanced manufacturing industry.

History and Context of the Apprenticeship Program

This research focused on a high school apprenticeship program developed as a partnership between two local high schools and an advanced manufacturing company. The program which provided students with hands-on training at the company was developed by the company with the multi-purpose of introducing high school students to careers in manufacturing, addressing skills needs in the industry, and increasing community awareness of the role of employers in partnering with educational institutions to prepare a future pipeline of skilled workers. At the time of this research, the apprenticeship program had been in existence for one year at the organization and the first cohort of students had graduated from the program. This research began in the second year of the apprenticeship program.

How the Program Came About

The employer (sponsor) was a manufacturing and engineering company that manufactured components for the automotive and appliance industry in a Midwestern city in the United States (U.S.). At the time of the study, the advanced manufacturing industry was experiencing a renaissance in the U.S. Despite the growth of the industry, employers reported difficulties in recruiting skilled labor. The lack of a pool of skilled workers was influenced by key factors such as new manufacturing processes requiring more complex skills and outsourcing of manufacturing jobs over the past three decades decimating the skilled worker pipeline. As a result, many young people and their parents

held antiquated views of manufacturing work resulting in few youth with an interest in manufacturing. The problem faced by employers with regards to the lack of skills was captured by the following statements made by Jeff, the CEO of the company:

> What motivated us to start the program was the fact that, for the last 30 years, America has been sending jobs every place outside, and so now that the work is coming back or seems to be coming back, you look around for the people to do the work and they are not here.

Outsourcing of manufacturing jobs had led to a gap in manufacturing skills in the country and, consequently, the "future of manufacturing was in jeopardy." In view of that, the CEO was concerned for the future of the industry given the fact that there seemed to be a lack of qualified employees among the current pool of workers in the local community. Jeff referred to the gap as a "generational gap" among those choosing to enter the field of manufacturing and explained that:

> Kids today are now a generation or two removed from manufacturing. Their grandparents may have been involved in manufacturing, but the kids' parents today, generally speaking, are not. Their view of manufacturing is dirty, dangerous, and dark, and so for all those reasons, we could not find the balance in the field.

Jeff further noted that he was intrigued by how other countries prepared their youth and, as a result, visited Germany with some colleagues to learn about their apprenticeship models. The goal of the trip was to understand how apprenticeships were organized and structured and to learn some best practices that could translate to the U.S. After his return, he visited officials in Washington, D.C., to discuss his views on the potential of apprenticeship programs for adolescents and how that could be adapted to the U.S. However, he expressed a "disappointment in the lack of movement" and noted that "essentially nothing was happening, and so out of frustration and the fact that probably [he] needed to look in the mirror and get something done rather than just talking about

[it]," the apprenticeship program at his company was born. In essence, as an employer, he realized he had a role to play in helping the future of his company and industry and to address these challenges, it was imperative to focus on high school students to give them a chance to explore career options in manufacturing.

Nurturing Young Talent

Historically in the United States, unlike its European counterparts, apprenticeships have focused on adults (Glover & Bilginsoy, 2005; Hamilton & Hamilton, 1992; Lerman, 2012). Furthermore, apprenticeships had lost favor in American society over the years with the demise of labor unions and as students were encouraged to pursue college degrees. This company chose to focus on high school students in order to develop early career interest among adolescents. Thus, Jeff believed that in order to generate an interest in manufacturing, it was important to reach out to students in high school so they could explore possibilities in manufacturing, as he believed that an exposure to careers at an early age was an important factor in choosing a career path. Jake, the director of the program, reiterated the point:

> Historically, manufacturing has looked to work with adults, and apprenticeship programs have gone by the wayside. So we thought looking at the high school level, where a lot of the students are in the skilled trades, machine shop, or engineering CAD or welding, maybe, some of these students would not have the interest or a desire to go on to a 4-year degree. So, let us start working with them right now, give them opportunities to explore what a manufacturing environment is like, and hopefully motivate them to come work with us after they graduate high school.

For that purpose, the company reached out to high school students providing an avenue to make their work more exciting for younger people.

Structure of Program

First year of the program. To gain a better understanding of the program, an overview of the first year is presented in this section. The apprenticeship program was organized for high school juniors and seniors enrolled in CTE programs. Their specialties included machine tool and die, welding and design programs. Students were recruited for an academic year. They attended classes at school in the mornings and left at noon to work at the employer site each school day. The apprentices worked thirty hours each week as per state guidelines. The first year served as a pilot. Five students – three females and two males – were recruited from a CTE program to participate in the apprenticeship program. In the first year, the apprentices were compensated at $10 dollars an hour and were rotated among five units within the organization. Students in the pilot program were recruited based on their interest in the program and good behavior based on the recommendations of their school, and they were not required to take an assessment prior to their acceptance into program.

Second year of the program. The second year cohorts were from two different schools and were paid at $9 per hour. The employer explained that the rate was reduced by one dollar, and the difference in amount would be used as an incentive for students who joined the company after their training. Additionally, the reduction was to ensure that students were serious about being in the program to learn the skills trade as opposed to working other jobs that paid as much, but provided no significant skills training. The apprentices went through an eight-week rotation of four different areas in the plant: quality technician, tool room, fabrication and computer numerical controlled machining (CNC). This process provided the students with the breadth of skills necessary for

advanced manufacturing. In each of the areas, they worked closely with their supervisors who also doubled as their mentors. The supervisors were chosen due to their skills and positions as well as their ability and interest in working with young people. The students were required to wear bright, orange shirts with "Apprentice" written boldly on the back of their shirts. The human resources (HR) director explained that the bright, orange shirts served to make the apprentices visible to other members of the organization so they "would not lose track from a safety perspective and also that [it] would remind them that these are students, and there are limitations to what they can and cannot do in our environment." As per state guidelines and child labor laws within the state, apprentices were prohibited from working with any machinery that they are not exposed to within the school environment. For example, they could not run a press at the worksite because the schools did not have a press in their schools' shops.

Some significant changes were made to the program during the second year. Firstly, the employers modified the training program to focus on four areas of the plant instead of five in the first year. Secondly, the apprentices graduated with a NIMS certification – a certification that the employer was in the process of gaining during the first year of the program. During the course of the second year, the state agency began to provide incentives for employers to offer apprenticeship programs to high schools. The employer did not receive any incentives at the time of this study as their program was not part of the state's registered pre-apprenticeship program (which was introduced during the second year of the program). The employer, though, was working with the state agencies to refine its program and to ensure an alignment with the new state requirements.

Apprentice Selection Process

Students were selected through a rigorous process involving applications, interviews and math testing, as well as proof of good academic and behavioral reports. The employer took this approach to ensure that students who chose to be in the program would be committed to participating in the apprenticeship program. At the beginning of the school year, the employer held informational meetings at the school with students and their parents. Interested students and their parents were also given a tour of the manufacturing facility to gain a first-hand look at workplace. As was noted by the HR director, the main requisites for being in the program were familiarity with machine shop, mechanical aptitude, mathematical aptitude, as well as an interest and desire to be in a manufacturing or engineering field.

The employer paid special attention to students with attendance and disciplinary problems at the onset to avoid such problems with students down the line. The HR director stressed the importance of impressing on the students that the program was "not a chance to get out of school early and make some money." Thus, students had to understand the commitments they had to make. Furthermore, the director noted that "the program was not set up to track students into one area, but was designed so that students could explore the field and determine what is right for them."

Testing for mathematical aptitude was incorporated into the selection because the employer learned in the first year of running the program that, while the apprentices probably learned higher level math in school, they lacked understanding of basic math. For instance, Jeff explained that they had a huge problem in the first year when they realized some of the students "could not add fractions and did not know how to use a tape

measure and convert a fraction into a decimal," a fact that did not serve the students well in a manufacturing machine shop.

College and Career Readiness

This section aims to address the first sub-question posed in the research study: How are youth apprenticeships programs organized and implemented to prepare high school students to be college and career ready (CCR)?

The national dialogue on high school reforms and the policy of getting each student graduated from high school to be college and career ready makes high school an important focus for economic revival and success. In the state in which the research was conducted, there were certain benchmarks that students needed to reach in order to be college and career ready. For students to be deemed college ready, they had to attain a score of 19 points on the American College Testing program (ACT) in reading, math and English, or pass other state assessments that evaluate students' reading, writing or math ability. Students who fail one or more measures on the ACT, but pass the corresponding measure on one of the placement tests are college ready.

To be career ready, students must have an industry certification and pass an equivalent to the ACT such as the Armed Services Vocational Aptitude Battery test (ASVAB), the ACT Work-Keys or other industry certifications. Thus, a career ready student was one who was preparatory (had completed two credits and was enrolled in a third credit) for a Career and Technical Education (CTE) major, had received either an approved industry certification or state certification related to his or her career major and had met the benchmark on ACT Work Keys or on the ASVAB. A college and career

ready student would obtain an industry certificate and was college ready based on the above definitions.

In the current case study, students in the apprenticeship program were enrolled in CTE in their high school and were focused in machine tool and die or engineering design programs. Thus, the apprentices would graduate high school with the ACT or an industry equivalent. The apprenticeship program offered students an opportunity to develop technical skills that were critical to their field and also develop soft skills such as team work, reliability, critical thinking, interpersonal skills and time management skills that were essential for success in the workplace, all while developing the academic skills at schools.

How the Program Developed College and Career Readiness

The employer envisioned that the apprenticeship program would offer students the kind of experiences that developed college and career ready skills. The employer believed the program could enhance college and career readiness because the concept of CCR was a concerted effort between industry and education, as both stakeholders needed to understand how their efforts fit into the overall narrative of college and career readiness. For that reason, the operationalization and interpretation of CCR underpinned the learning experiences provided to the students to ensure the apprentices graduated from high school with a diploma and an industry certification. Although each of the stakeholders explained the concept of CCR differently, it is was obvious from the interviews that each of them understood the basic tenets of CCR and worked to achieve that from different perspectives. The educators conformed to the state guidelines for CCR outlined in the previous section. On the other hand, the employer perceived the

goal as providing relevant skills for the labor market in general and their industry in particular.

College readiness was enhanced by learning through practical hands-on activities; the students could make academic content more relatable and relevant as they applied their knowledge to real world content. For instance, one of the apprentices shared that "I am a lot better in math than I was. Everything is just a breeze now," while another apprentice stated that "I have gotten better at doing math in my head and stuff just because the machining is real precise – we have to use all kinds of decimal points." The apprenticeship program was structured such that the students were exposed to the technical aspects of manufacturing as well as the social aspect of working in such an environment. For instance, Josh, a first year apprentice, shared that he had "learned a lot, like being able to use all the tools" he was exposed to and was excited about the different things he could do with the different machines.

The educators and employer believed that participating in an apprenticeship program had the potential to develop the relevant skills needed for CCR. One of the principals expressed optimism about the implications of the program and how such skills were developed:

> I think kids leave [high school] a lot of times where they have the academic skills necessary, but they don't have the real world skills, what some call the soft skills, to be successful. So, things like working with colleagues, you know, identifying the problem and coming up with solutions, collaboration, presenting findings to somebody, and selling that as the solution. So, I think when kids develop those [skills], I think it translates back to what they do in school.

From a career readiness standpoint, the program was set up such that each student graduating from the apprenticeship program would earn a National Institute of

Manufacturing (NIMS) certificate. Jeff believed the program offered students the opportunity they needed to learn skills for a career and added:

> The good things about it is [sic] these kids can come here and take their high school education and be career ready if they want a career. I mean, if they do well here and play by the rules and behave themselves, we have told them you have a job here if you want.

Jake supported this view by explaining that the program was geared towards career readiness more than college readiness in that the program provided students "a real life exposure to manufacturing" and also helped them make a decision on what they want to do going forward from a skill trades training standpoint while they worked towards a nationally-recognized accreditation. However, he acknowledged that the program did not discourage the apprentices from pursuing post-secondary education, but offered them support if they decided to move on. Melinda explained that the program was structured to provide different options upon graduation and noted that the apprentices would be eligible to enter into a formalized four-year apprenticeship program offered at the company which included schooling and hands-on, practical training in the state-approved program. Furthermore, if the apprentices were interested in pursuing a college degree such as engineering, the employer had established relationships with a couple of local universities where they could pursue their degrees as they arranged engineering co-ops in their company. Throughout the interview, Jeff stressed the importance of career and educational progression for the students and noted that the students were told they "don't have to just stop here [high school apprenticeship], but could work within the company in different areas" while they pursued their education and gained the necessary skills needed to enhance their careers upon graduation. While this view of college readiness deviated from the established understanding of college readiness from the standpoint of

educational policy, it was evident that the apprentices were encouraged to pursue a college degree to realize that an apprenticeship does not preclude them from pursing career and educational advancements.

In as much as the educators adhered to the state guidelines, they understood the broader implications for college and career readiness. From their perspective, apprentices developed the necessary skills as they participated in the program as it offered them "rigor and relevance" in the field of manufacturing. Fred, a teacher at the school, noted that their "first and foremost objective as part of that program was to prepare students for college and career readiness, primarily career readiness in our area, because they were trying to get the students industry certified before they graduated." He further explained that the certifications students received in school and at the company would enhance career readiness. He acknowledged that although an apprenticeship program was typically geared towards career readiness, the employer encouraged students to develop the skills needed to pursue a college degree. He shared:

> In some cases, these students are trying to develop their skills to go on to college. And so, even though it is a manufacturing facility, [the owner] always lets them know that they have opportunities. They can do another level of apprenticeship like machining association apprenticeship or something outside of their facility, or they can go to a 2- or 4-year college and develop more skills and maybe not necessarily leave the company, but actually work their skills up to where they can get into the engineering field inside the company. So just because it is a manufacturing facility, it is not just concentrated on career readiness, but it is also focused on college readiness.

The development of soft skills such as teamwork, critical thinking, communication skills and interpersonal skills was also embedded in the training the apprentices received. Lisa, the district coordinator, shared that the program provided "rigor and relevance" in that the students developed responsibility and time management skills just by leaving school at a

specific time each day and going to their workplaces on time. In addition, the students got to experience and understand what "people did on a daily basis to earn a living and the types of pressures that adults faced in the working place as they juggled multiple roles." Thus, while educators focused on the academic standards in fulfilling the elements of college and career readiness, the apprenticeship program focused on the practical elements of college and career readiness such as technical and soft skills needed for students to become ready for either college or career or both.

How Employers Use Apprenticeships to Address their Skills Needs

This section presents the findings related the second research question: How are employers using apprenticeships to meet their skills needs?

Focusing on High School Students

As the owner of a manufacturing plant, Jeff was acutely aware of the impact on manufacturing if employers could not recruit qualified talent. He explained that his motivation for beginning the apprenticeship program was firstly to provide an opportunity for the youth to learn about the real world of manufacturing, and secondly to train future talent, not only for his organization, but for the industry as a whole.

Jeff also shared that the widely held notion of "college as the only path to success was proving to be a myth to a large swath of youth who were pursuing college degrees and ending up with skills that were not relevant to employers and accumulating loads of debts." Alternatively, he believed that given the shortage of qualified talent in the skills trade, students in apprenticeship programs could be more marketable as they would graduate with both a high school diploma and an industry certificate in high skill demand industries. Additionally, the employer believed that focusing on adolescents would

"hopefully generate a verbal excitement at the high school level and have students talking to students, explaining what a good opportunity [the apprenticeship program] was." Thus Jake, the director of the program, shared that having young students in the workplace was essential because there were "fellows [traditional employees] that were just about ready to hang it up," and that was "where the real skill level lay." Consequently, as "they retired and move on, the whole industry would be in trouble." To that end, adopting an apprenticeship model focused on high school students enabled the generation of retiring workers to transfer their skills to the youth through training. Lisa also supported this view with a perspective that adolescents were "children of the recession who had seen their parents struggle with unemployment." Therefore, it was important for those who would not pursue college to realize that there was a future in manufacturing if they had the right skill sets.

Although some advanced manufacturing organizations had begun to offer apprenticeship programs, their efforts were focused on adults. Nonetheless, the employer believed that they could emulate some of the adult apprenticeship models for a different demographic group. Jeff acknowledged that "four or five students per year were just a drop in the bucket," but that number of students was within their organization's means and that was still a contribution to the field of advanced manufacturing.

Taking Leadership in Addressing Skills Gap Challenge

Lisa captured the role of the employer in addressing the skill gap challenge stating:

> For someone like Jeff, seeing beyond the current environment and understanding what the future held, that they would not find qualified employees within the ranks, i.e., the unemployed, underemployed and adult community at large, it was

> important to him that employers adopt a strategy that would address these challenges in the long term.

The employer believed that the educational system by itself could not solve the skills gap challenge in any one industry. Therefore, it was imperative for the industry to partner with educators to help address the problem. As Jeff pointed out:

> One of the reasons we did it was that businesses need to take a leadership role in this area and begin to help the education system. This is because the education system by itself is failing, so we need to be jumping in and doing our part to help.

While Jeff was enthusiastic about the response from educators, he expressed that most employers typically shied away from apprenticeships because of the fear of other companies poaching their trained employees, or the perception that committing resources to train adolescents was an unnecessary expense. To that end, some business owners had adopted the attitude that it was the role of educators to provide them with the skills they needed. To him, such an attitude belied the short-sightedness of the business community as educators needed help from employers in industry to make preparing the workforce feasible.

Developing Partnerships in the Community

To build on the vision of growing the talent of the future, the employer reached out to educators and other stakeholders in the community to help shape the idea of having high school students in the workplace for an extended period of time. One of the school principals involved in the program shared that it was Jeff who reached out to the educational community to work together by "expressing an interest in beginning an apprenticeship – not a co-op, but a real apprenticeship for kids whereby they would actually learn through their company." He further explained that he was attracted to the idea of forming a partnership and was struck by the CEO's sense of "urgency and the

desire to get moving on it quickly." The district coordinator shared that over the years, there had been a good relationship between co-op students and the company, whereby the company recruited students on a casual basis. Thus, the company "drew on a relationship that was already there and just expanded on it to include a more formalized apprenticeship program." Furthermore, Jeff commented on the quick response of the school district as they worked to make the apprenticeship program a reality. In essence, the timing was right for the stakeholders, particularly the educators who were looking for opportunities in industry to provide practical, hands-on experiences for students. The approval and insights from district-level administrators, who understood the nuances and the legalities involved in developing a high school apprenticeship program, also were sought by the employer. This was to ensure the fidelity of the program and the importance of involving school leaders who had the authority to adapt schedules and also understand the legal implications of the process. Moreover, from the perspective of the educators, the apprenticeship program was a great opportunity for their schools and their students would earn valuable work experience and credentials, thus raising the profile of their school and making their students more attractive to potential employers.

A partnership in its essence requires collaboration between stakeholders. It requires a well-defined and mutually beneficial relationship between two or more organizations to achieve a common goal (Mattessich & Monsey, 1992). Furthermore, some elements such as trust, communication, environmental factors, favorable social and political climate, flexibility and adaptability must be present in order for collaboration to be effective (Mattessich & Monsey, 1992).. Given that the apprenticeship program had no precedent within the school district, David, one of the school principals, pointed to the

fact that maintaining trust and communication allowed the stakeholders to overcome the initial roadblocks involved in establishing the program. When describing the nature of the relationship between the school and the employer, David noted:

> I think the nature of our relationship is very collaborative, where we are continuously trying to figure out a way to make it better. This is because there was no blue print for us to say this is how it should work. And so just being collaborative, talking about struggles and how we can improve and what we can do better next year, has been a big part of our relationship.

Apprenticeship programs can succeed only with the deep commitment of employers. From the human capital theory perspective (Becker, 1975), employers invest in the training and education of employees to ensure that they have the skills and competencies needed to secure a competitive advantage in the market. Running an apprenticeship program involves costs, materials, time and human resources – that the employer has to be willing to invest. David, one of the principals, acknowledged that, "even though the school had to make some adjustments in terms of scheduling and getting some paper work in order," the company took on a big challenge when it decided to start the apprenticeship because "they had to create something new by taking on young students and bringing them into their workplace and deciding how best to train them effectively on a daily basis so that they got the skills they needed."

Allowing Students to Explore Career Options

The uniqueness of this program was the willingness of the employer to allow the apprentices to explore career options as they developed their skills in manufacturing. The employers acknowledged that, although the outcome for the first-year graduates was not encouraging [out of the five apprentices, one came back to work full-time for the company; another returned as a senior in the program; and the other three apprentices

pursued different options], they realized that as high school students, the apprentices were young and still exploring what they wanted to do with their lives after graduation. The CEO captured that notion when he commented that "it's important to understand that these kids are 17- and 18-years old and they are not mature; they have all quirks that come with being a 17- or 18-year old kid trying to make their life." Similarly, this idea was captured in the following statement made by the human resources (HR) manager:

> These 17- and 18-year old kids are in a machine shop, taking tools and die or welding, and they think that is what they want to do. So, if that is truly what they want to do, it's nice since we are able to give them a rotation in different areas. They can really get a good picture of what a true manufacturing facility looks like and the different opportunities so they can decide whether or not this is really something they want to do with their lives.

Jeff's idea of allowing students to explore career options was evidenced in the diverse backgrounds of the students in the program. Each of the students was enrolled in the build or design career academy in their high schools, such as computer assisted design (CAD), welding or machine tool and die. They entered the apprenticeship program to learn about and explore careers in advanced manufacturing as well as to develop the technical and soft skills needed for success in the workplace. To illustrate career options that apprentices could pursue, Jude, one of the supervisors, said that with just the CNC experience that was offered, there was a whole host of career opportunities for students who wanted to go in that direction. Opportunities could be found in fields such as aircraft and automotive industries. To that end, rotating the apprentices in

different areas provided expanded learning experiences in the field of advanced manufacturing.

Influencing Curriculum

Besides providing practical work opportunities, employers play a critical role in shaping curriculum in classrooms. This can be done in various ways, including providing equipment and requiring the teaching of certain courses. As a result, students would be better prepared with the skills and knowledge needed to succeed in the workplace. However, in a typical high school program, the employers may not have the broad liberties to determine the curriculum wholly in the schools as the school must adhere to certain state standards. When asked if the employers had curriculum that they shared with the school, the CEO noted that they had to work within the confines of the educational system, particularly in high schools. Jeff commented that this would pose a challenge for the school:

> I am not sure if it makes sense [to share curriculum]. If I am sitting over at the high school, to have an employer dictate curriculum because [the principal] has got challenges about getting his kids to meet certain state hurdles and other things that do not have anything to do with what we were doing over here. And besides, the principal's pay, rewards and bonuses and all that stuff is going to be tied to how he does against the state standards.

In essence, the company described its program as an "extension of the students' high school experience" and provided training for the apprentices that led to broad learning experiences in advanced manufacturing. That said, both the educators and employer found creative ways to influence curriculum that was aligned to the workplace. For instance, when the employer complained about the lack of basic math skills among students, the school quickly responded to this concern by organizing what Jeff referred to as a "boot camp" for the students to familiarize themselves with the kind of math that was

required to function successfully in their new roles, thereby infusing content in the school's curriculum in response to employer needs.

Additionally, the employer offered externships in the summer to teachers from different disciplines within the partnership schools to enable them to learn about the manufacturing environment. Jake believed that by having the teachers work closely in the manufacturing environment, they "actually got a feel of what manufacturing was about and how it was separated from the high school." Thus, the ultimate goal was that the teachers would be exposed to the new processes and equipment in the current workplace and would return to school armed with knowledge to help focus their curriculum to be more in line with real world.

In addition to a high school diploma, the apprentices earned the National Institute of Manufacturing (NIMS) certification. To formalize the NIMS process within the organization, a select group of employees (mostly mentors and supervisors) were trained and received certification through NIMS that authorized them to teach and grade the apprentices on their exams. Receiving certification through NIMS helped the mentors and supervisors align their training with what the apprentices needed to be certified.

Developing the Right Skills Sets

For the company, part of its role was to develop essential employability and soft skills among the apprentices as such skills have been found to be deficient among labor market entrants. In Jeff's view, his company's role was more than just developing technical skills. Thus, when asked about the kinds of skills that employers wanted to see among the apprentices, they (both management and technical leaders) referred to the importance of soft skills such as good work ethics, personal responsibility, critical

thinking and good communication skills. Although technical skills were equally important, the employer knew that the apprentices could easily acquire such skills through their daily workplace and classroom training. However, it was the soft skill that rated high on the employer's expectations of skills developed. The HR director noted that "we are looking for students who develop a maturity level over time and that includes good attendance, dependability, reliability and the spirit of team work – someone who comes to work with integrity and things like that." From Jeff's perspective, inasmuch as the technical skills were essential for the work in advanced manufacturing, the soft skills would set the students apart and make them successful in their field and enhance their careers. He noted that:

> The work we do here is not very hard. We are making parts for appliances and cars and all-in-all it is not that hard – yes, there are some things that are really important and are critical and so the skills I would like them to have are coming to work, knowing how to dress properly for work, knowing how to associate with their peers and our employees, knowing how to speak intelligently about what it is they are trying to do, knowing how to organize their lives and the work that they are doing so that the work gets done.

In that regard, such skills were incorporated into the apprentices' training. For instance, one of the supervisors explained that he developed critical thinking skills in the students by reminding them that they had to be able to understand how the parts they made contributed to other appliances in order to be able to diagnose and fix machines when they are broken. He stressed the importance of communication skills even in the technical field to the apprentices by saying:

> If you can't communicate to the next tool maker or press operator what is going on, it does not matter how good a press operator or a tool maker you are. You have to be able to get that point across in some way, somehow so that someone else can understand it.

Additionally, to help develop and enhance communication skills, the apprentices were regularly invited to share their experiences with community members in their schools and at the workplace. Also, the apprentices sometimes were given the opportunity to come up with solutions to a problem, i.e., brainstorm ideas on how to fix it and present their findings through PowerPoint presentations to their supervisors. Jude also provided examples of how they developed critical thinking skills among the apprentices. He explained how they allowed students to fail within reason while working on a task so they could go back and analyze where they made mistakes, commenting that 'if we stop them every time, they are just going to learn to rely on someone to come help them all the time."

In addition to the above-mentioned skill sets, the employer tried to instill awareness for safety in the manufacturing environment. Safety was important due to the number of large machines and equipment that workers used. To that end, training in safety procedures was emphasized throughout the apprentices' time at the workplace. One of the directors noted the importance of safety for the students. He said that if the students could learn the importance of being aware of their surroundings when they were in a factory or in a situation other than their home or school, it would be an invaluable lesson for them as they matured and entered the workforce. Furthermore, one of the directors noted the importance of imparting critical skills that would serve them well in the future:

> You know they may never go on to do anything again in their life with it [working in manufacturing industry], but the critical thinking, work ethics and some basic machining skills – if we can get that across to them, then we have done as much as we could do with the time we have with them.

The development and use of soft skills in the work environment has become essential in the 21st century workplace. According to the 2009 Business Roundtable survey, employers reported that some of the most critical skills that were lacking among the workforce included personal accountability for work, strong work ethic, punctuality, professionalism, oral communication skills, teamwork and critical thinking.

Adopting a Broad Social Agenda

Given the historical underpinnings of apprenticeships in the U.S. as well as the educational system and labor market, employers working with high school students may have to adopt a broad social agenda in their efforts to make apprenticeships an attractive option for students. Jeff realized he had to adopt a broad social agenda that would allow students the flexibility and choice in their career pursuits after graduation. As a novel program that he hoped would grow, he accepted the fact that the apprentices his company trained may end up in other organizations. The HR director shed light on the idea of the broad social agenda:

> Jeff's whole point was that in an effort to address the skills needs in the industry, he really did not care where they [students] went after graduation. It could be GE or Ford; it does not matter so long as they were involved in manufacturing because as a country, we need people who are interested in manufacturing.

This view was similarly expressed by the director of the apprenticeship program. Jake commented that inasmuch as the company would like to retain the apprentices after the program, they did not want the students to feel obliged to stay with the company:

> You know if they get into manufacturing in [the city], that's great. We do not want the students feeling this deep obligation; it would be like a kind of trauma, saying that we paid you for one or two years so you'd better come work for us. We would not like them to have that.

Inasmuch as the employer believed in the adopting the social agenda, the CEO was somewhat disappointed in the fact that others in his cohort of company owners were not eager to adopt and develop high school apprenticeship programs despite their high regard for the company's program. In many respects, Jeff was championing and financing a cause that required substantial tangible and intangible resources because of his belief in attracting individuals to the industry at a young age.

To summarize the findings, it can be said that the employer took the lead in addressing the skills gap challenge in the advanced manufacturing industry by working with educators to get more high school students interested in the field. The employer chose to focus on adolescents because of his belief that nurturing young talent had been successful in other countries. The employer worked to provide expansive and authentic learning experiences for the students in order to develop industry-relevant soft and technical skills. The novelty of the program constituted a change in practices for the employer while dealing with the realities of developing apprenticeships within the U.S. education and labor market context, which included adopting a broad social agenda and allowing apprentices to explore their career interests while in the program. The partnership with educators was facilitated by effective collaboration and communication. However, working with high school students involved certain challenges in terms of alignment of the apprentices' training to the state's academic requirements. Despite that, both the employer and the educators worked out a system where the apprenticeship program served as an extension of the apprentices' academic experiences.

Stakeholder Experiences

In the following sections, the experiences of the stakeholders are presented. It begins with the employer's experiences, followed by the apprentices, and concludes with the educators' experiences.

Employer Experiences

This following section describes opportunities and challenges faced by the employer in running the apprenticeship program. It discusses the employer's experiences working with high school students as well as their insights on community support and engagement with apprenticeships.

Working with youth. The supervisors and mentors expressed satisfaction with working with students and seeing them grow and mature over time. One of the supervisors mentioned that the students were "a great bunch of kids" who came to the program with "great attitudes, wanting to learn," thereby "putting effort" into learning. Inasmuch as the apprentices were high school juniors and seniors, one of the directors mentioned the need to "treat the students as adults and not baby them too much" as they had done with the students from the previous year. By that, she meant that while recognizing that the apprentices were young, they were required to adhere to the same rules and regulations as other employees and demonstrate maturity in their work and relationships with others. She mentioned the importance of regarding the apprentices as "mature students who were looking for a profession and had to learn to ask for help and build relationships with other employees during their time in the program to help them adjust to the demands of the workplace."

Working with the apprentices was rewarding. The employer mentioned the "intrinsic value" they derived from teaching and mentoring the apprentices as well as how other employees voiced their appreciation of the company for reaching out to the youth in order to develop them as the next generation of workers in the industry. Jeff shared how other employees complimented the leadership on the adoption of the program and how they expressed pride in the company taking the lead in developing the youth. Additionally, supervisors mentioned their satisfaction with "giving back to the next generation" and how others on the shop floor were proud to see the students' enthusiasm and pride in understanding the work process as they saw final outcomes and products they manufactured.

Aligning of students' goals with program's goals. As the CEO stressed throughout the interviews, his aim was to get more youth interested in manufacturing. However, he expressed his disappointment over the apprentices' career decision after the first year of the program as only one student stayed on with the company while the other apprentices pursued career interests that were totally unrelated to manufacturing. While interviewing the current apprentices, this researcher found that they each had different aspirations. Two of them wanted to be in different industries; one wanted to pursue engineering; and only one student wanted to pursue a career in manufacturing. Incidentally, that one student was let go by the end of program due to disciplinary issues, while one other apprentice stayed on as a part-time worker while he pursued a degree in engineering. Jeff described the outcome as "disappointing" and commented that there were times when he asked "if it was really worth the effort." For all intents and purposes, there was a swell of student interest at the schools to participate in the program. Given

the selection criteria and the emphasis on math skills, some students who could be genuinely interested in manufacturing may not have had the chance to participate in the program.

The current apprentices expressed a desire to learn about manufacturing as a means of exploring the field. However, it seemed the expectations of students and employer were not aligned. The district coordinator acknowledged this quandary and explained that it would be hard for that to happen since most of the students did not have much prior knowledge of the field. According to her, finding the right students who had a passion for manufacturing and knew they would want to stay on after graduation would be a challenge for all the stakeholders "because of what manufacturing did when they [sic] left the country." She noted that because there had been a break in manufacturing for several years in the country, there were fewer kids who identified with manufacturing. Thus, it would be hard to find the kind of students who had a passion for manufacturing. Such passions had to be nurtured and developed. Jeff referred to the misalignment as a disadvantage, saying:

> One of the negatives is that now I am taking people away from trying to get their job done to just spending time with a bunch of high school kids. This is fine, as long as the kids are serious about what they are doing here and are not just turning around and blowing it off, as was our experience in the first year. Because I just invested hundreds of hours of my best people in your future and now you are going off and leaving and going into the military or carpentry union or to retail. What I have said all along is that I do not care if you come here. I mean, I hope you come here if you're a good person, but if you go to GE, [or any of the car manufacturers] that is fine, but go into manufacturing. That is the investment that we are making here; it is to help the manufacturing industry.

Bridging the cultural gap on apprenticeships: Societal expectations. The employer compared the educational system and the labor market structure of the U.S. to that of Germany, saying that in Germany "the whole of society supports this [youth

apprenticeship]." However, in the U.S., although there was much debate and praise for the German apprenticeship system and its ability to develop a channel of skilled workers, he noted that, "nothing in our system supports this." He shared his frustration about the lack of enthusiasm from other employers to join in the efforts to train their youth:

> I am really depressed about how few businesses are doing what we are doing. I mean they are just not signing up for it. In Germany, when they talk about the apprentice program, the entire society understands what it is. So the [German] kids come prepared and they fight for it, I mean they are competitive about it. But here [U.S.], they look at us like we have three eyes. I mean, we don't understand what an apprentice program is at all.

In his view, the apprenticeship system, particularly for the youth, was not well understood and not well aligned with our educational system and cultural environment. He believed there needed to be more community awareness and education on how our youth could be trained and also how to get more parents to be interested in apprenticeships. He conceded that although there was a lot of national debate on the benefits of apprenticeships on a macro level, the message had not really been embraced at the micro level.

With regard to working with educators, the employer commented on the enthusiastic response from the educational community which perceived the program as a great opportunity to get students into the workforce and learn in the real world. Jeff commented about the feedback he had received from the school system, saying "with the schools and the school district, the feedback I get is nothing but positive and very appreciative and very complimentary, but I am not sure about the kids and their families." He noted that, whereas the apprentices were happy to have the learning opportunity, he was concerned about what they made out of their experiences in the future and wondered

if the apprentices saw the program as a better alternative to working at a fast food restaurant while still in school.

While the employer bemoaned the lack of parental involvement in the program, the educators, on the other hand, believed parents showed interest in the programs as demonstrated by the number of parents who joined their children to attend informational meetings about the programs at the school. They pointed to the fact that there was growing interest of parents in alternative career pathways for their children. According to Lisa, the district coordinator, with the rise in college tuition, parents were drawn to the idea of pursuing apprenticeship as an alternative career pathway, and, that for most of the parents, the rigor of the apprenticeship program was not a deterrent, as they believed in hard work for themselves and their children. However, their main concern was educational and career progression for their children if they pursued apprenticeships. She noted:

> The parents were not concerned about the work; they wanted their children in line for good jobs, but they wanted to know about continuing education – about where this might lead them. Was there tuition reimbursement? Could they go to college and was there education on the job? These are families [who] knew they couldn't afford a traditional college experience for their children out of pockets, and they are looking for alternative ways for that.

This was notable because for that generation of American parents, they had seen the consequences of not pursuing post-secondary education or additional skills training in a fast-changing work environment and did not want their children to experience the same consequences. The educators also expressed glimpses of hope for more young people entering into the skilled trades through apprenticeships and noted that "there is a cultural issue to bridge [about apprenticeships] where many parents think this kind of education is a lesser type of education – and that it is a great thing for everybody's kids but mine."

However, from the two years the apprenticeship program had been in existence, and the interest parents and children had expressed in the opportunity, this led them to believe people were coming around, albeit slowly, about how society needed to change its perception of apprenticeships as a viable career pathway.

Retaining apprentices. The CEO explained that one of the problems with retention was the location of the company, given the fact that it was in a large urban area and, as such, students had more opportunities for jobs other than in manufacturing:

> The long-term benefits would be growing and recruiting our own. That would be a significant benefit if we could get the kids and if they would come back, stay and grow with us. The problem with being where we are geographically, there are so many more opportunities for these guys to go off and do other things so that it will be hard for us to retain them. So the benefits are that we are in fact making a positive impact on getting them trained in skilled trades and that is really about it. It is not a one to one pay back at all. I mean we are putting out far more than we are getting back.

Jeff believed that other organization in non-urban areas had a higher probability of retaining the apprentices after they graduated.

Investment of resources. Developing and implementing a year-round apprenticeship program involves a substantial investment from employers. Four apprentices in the workplace at a salary of $9 an hour for thirty hours a week from August through June was a significant financial investment in the program. Although Jeff insisted he was "not too concerned about the money," he shared that his company did not seek or receive any financial assistance from the state or federal government for running the program at the time of the study. For this employer, investing in four students in the program was within its capacity, and they considered the number of students "a drop in the bucket." However, the intangible cost such as investment of

mentors' and supervisors' time was a challenge to the employer, as these employees had to dedicate time to train the apprentices.

Each of the students was assigned a mentor who dedicated time to train the students. Jeff understood that the mentoring program was of importance to the overall development of the apprentices and was a cost to the company in that they were using some of their most valuable associates as mentors to the students. He shared that "all of these guys [mentors] are really busy, but they have to carve out some time to devote to develop these kids, so they are getting the best of who we have here." To that end, he was concerned that some of the students would not take their apprenticeship experiences seriously and "just blow it off,' as was his experience with some of the apprentices from the previous year. Over time, the employer came to realize that it needed an individual who would dedicate his time to administering the program, a cost that the company could not afford to incur at the time. One of the directors mentioned that "the amount of time it takes to really mentor and teach a young person in something that they have limited or no experience with was more than what we actually thought." Nevertheless, Jeff was passionate about the program and he felt a social responsibility to give back to his community and contribute to his industry by helping to develop a channel of skilled workers.

Sustaining the program. Whereas there was increased recognition and high regard for the apprenticeships program in the community, the CEO realized that there needed more organizations in the advanced manufacturing industry to join in the effort of partnering with high schools to train the future workforce. However, he lamented the lack of a "grand swell of enthusiasm from other companies around town." He noted that

"if they [other companies] joined, it would be worthwhile as there would be enough people doing it to make a difference." Jeff admitted that the current payoff was "not one-to-one," but conceded that the program was in its infancy, and they would still continue to train apprentices to enter manufacturing. This idea was captured in the following statement:

> We are going to keep doing it, and we will make an investment, but is not immediately obvious that is worth the effort. I love to tell the fact that we are helping the schools. I love the fact that we are helping these kids. It has made a difference in terms of the younger people that we now have in the business, but the costs are very real.

However, Jude presented another perspective on their efforts. He believed that "word of mouth" was one of the best ways of attracting other students to the program. He noted:

> What we are doing is getting a few younger kids involved in manufacturing and seeing the possibilities of it, because right now there is a huge gap in the workforce in manufacturing. And you know if we take these four kids this year and they go back to school and talk about it, it gets other kids interested in it and it will start to spread. But then some kids may never even come here, but they may go to the vocational school or something just because one of them heard about it and was interested in it.

To that end, the employer shared an example of how a current employee, who had just graduated from high school and had heard about the program from other students, had walked into the company to apply for a job in the machine shop.

Jeff had a mission to contribute to his industry by developing a channel of skilled workers, but conceded that having four kids in the organization was not going to make a huge difference to the industry. He believed it could make a difference for his company in terms of getting an employee or two who would stay with them. The following statement by Jeff captured the hopes and challenges of his company in partnering with local high schools and their experiences with the program:

> I know others [employers] may not be as enthusiastic about this as I am. But if I look at it, it's not just the apprentices who have worked here. It is their peers from high school who have now graduated high school and are now working here. We probably have 10 or 12 people in their late teens and early 20s that are now working here as welders, as press operators, and part of why some are here had to do with their exposure to the apprentice program through other people. And we need new blood, new thinking in the business. We are going to continue to do it.

Given the relatively short period of the program, Jeff realized that inasmuch as the program was still in its infancy, there needed to be continued student interest in staying in the field of advanced manufacturing as well as the inclusion of more employers willing to partner with high schools to offer apprenticeship opportunities to students for the apprenticeship program to be sustainable.

Student Experiences

The following section focuses on students' experiences as apprentices. This section has been set apart to illuminate the students' perceptions of the program. Highlighting students' experiences is important for several reasons. Firstly, the sustainability and success of the program is largely influenced by students' interest. Secondly, students could become the best advocates for apprenticeships, and lastly, it provides important feedback to other stakeholders.

Becoming an apprentice. The four apprentices enrolled in the program for various reasons, but chief among them was the opportunity to gain skills and knowledge to enhance their chances of entering the workforce or pursuing post-secondary education after high school. Additionally, each of them enjoyed working with their hands and saw the program as a natural fit for them. For instance, Josh commented that "I joined the program because it really just interests me and I like doing hands on stuff." He further shared that since he wanted to go into manufacturing after graduation, the program was

"the base of his future plans" and thus felt he was "lucky to get into the program." In the case of Barry, who was a senior in the machine tool and die program at his school, he mentioned that he joined the program because he "needed a job, so it was convenient." That said, since joining the program, he had considered the four-year apprenticeship [offered by the company] after graduation. Spencer, who was not from the traditional machine tool and die program like the other apprentices, explained:

> The reason I joined is for knowledge and a skill, because my goal or my dream job is becoming a mechanical engineer, so I thought that was a good chance to learn all the stuff before I go into engineering. It will open more doors for future roles. I mean, I can be anything in future. By doing this, I am just preparing for [the] future because I can't guarantee I will get the engineering jobs.

Jim, who was in his second year, mentioned that he joined the program in the first year after his teacher told him about it and was thus motivated to join because "it would be a good experience to go and learn about all the field."

Developing relevant skills. Much of the concerns from employers about the skills gap has centered on the lack of soft skills, or employability skills, of labor market entrants. Additionally, the debate on college and career readiness has focused on the acquisition of technical, academic and employability skills.

Employability skills. As part of participating in the program, the apprentices reported that they had developed the skills that would benefit them later in their lives. The students had become cognizant of their skills development as a result of the program. One of the students noted that before the program, he tended to be long-winded in his communications with others. He expressed that "when I first started, when I talked, I had a long talk before I got to the main point, but that has been shortened now; I have learned to get to the point quickly." Another student noted, 'it has helped with my social skills –

doing better when talking with people and everything else. I gotta say it is social skills and then just the job skills that they have taught me while I have been here." Even the principal from one of the schools shared his insights about the increased confidence in one of the apprentices and how he had seen a marked increase in the students' communication and leadership abilities since being in the program:

> I can speak for [the student]; I have witnessed him step up into more of a leadership role in his area because I try to bring business and other folks here to school to see what we have. And so he has given tours a couple of times with adults. This is significant because even many of the adults don't like to talk with people. But you know, for a twelfth grader to be in front of 30 business folks and talk about his program and what it has meant to him, that is a big deal. I have watched him do that, and I don't think that he would have been able to do that a year ago.

Other important skills the students mentioned included time management, problem solving, self-motivation, and adaptability. One of the students expressed that he had gotten better at enduring and accomplishing tasks, and noted that self-motivation was one skill he had learned because "sometimes I would quit doing something when it gets really hard, but I now will convince myself I have to do it in future and so learning [to] do it will help me out in the future." The students also reported learning to take initiative and becoming confident in their abilities. They had become aware of the difference between working in the adult environment and working in school to the extent that, as part of their training, they had to work like any other employee. One of them mentioned that "over there, you actually have to get stuff done. There are no teachers in there. Everybody that you are working with has another job to do, so you have to figure stuff out for yourself a lot more."

Technical skills. The apprentices believed their technical skills had improved as a result of being in the program. As Josh expressed, "I have learned how to run all kinds

of different machines and the different techniques of using them." In the case of Spencer, who was not in the traditional machine tool and die program like the others, he expressed his increased knowledge over time:

> I learned a lot of stuff. Before I started working, I did not know the names of the tools, I didn't know anything really about the field except CAD, but they don't really do much CAD there. What I learned there so far is mainly welding and fabrication. So I fabricate pretty much well, and right now I am learning quality too.

Even for those students who were used to working with similar machines at school, they mentioned their increased competence in working with machines. Josh, a first year apprentice, shared that "I have learned a lot, like being able to use all the tools in front of me, just the different things I can do on the different machines and stuff like that."

Academic skills. In relation to academic skills, most of the students mentioned an increase in math ability as a result of using math in their daily work activities. One of the students mentioned, "I am a lot better in math than I was. Everything is just a breeze now." Another apprentice stated that "I have gotten better at doing math in my head just because the machining is real precise and we have to use all kind of decimal points." Barry, another student, described how his knowledge of manufacturing impacted his academic performance, saying "for me, it motivated me to pass my classes." In addition to gaining more academic skills, Spencer reported that, although he was not in the machining program at his school, he had gained a lot of experience and noted, "I wasn't really prepared when I first went there, but I learned everything that they learned in the machining tool class there, so I'm pretty comfortable with that now."

Overall, the educators indicated that students in the program did well academically since that was the requirement for entering into the apprenticeship program.

Furthermore, the students were imbued with messages from the employer as well as their teachers about keeping up their grades, maintaining good behavior, and learning to manage their time while in the program.

Growth and maturity. Spencer described how he had matured and felt more efficient over the course of the program:

> When I first entered, it was a shock; I had never been in a manufacturing environment. I didn't understand much of that, but over time I caught on to all the stuff. It was like learning a new culture or language; once you put someone inside a new place, they don't understand and are shocked at first, but over time they get used to the people who live there.

Furthermore, the apprentices began to understand the importance of safety in their environment and the importance of following certain basic procedures. For instance, Barry, who suffered an injury during work, commented that he was more aware of his environment after the incident:

> It is different; you got to be aware so you don't get hit by forklift and stuff, always got to pay attention. They got the big cranes and you can't be underneath something while they are moving it. So I've become more disciplined. I mean, you have to be careful really with safety and stuff.

Similarly, Spencer explained noted that "I have to be more careful now when you are there because you can get hurt. So yeah, I have grown up more and I understand that stuff."

Working in the real world. As the students looked to graduation and beyond, i.e., entering the workforce directly or pursuing post-secondary education, they perceived their experiences in terms of transitioning into adulthood and experiencing the real world as adults. They commented that they had matured as a result of their participation. As Jim shared:

> Well, it taught me discipline and stuff. I have matured a whole lot since I started the apprenticeship program. Before, I didn't really take anything seriously. But then getting out in the work force and stuff, it just taught me discipline. So, I think I have grown a lot. I mean, my parents, my friends, they all noticed that I have grown up a whole lot just because I am always either at school or work or sitting at home. I don't really do anything else. It is kind of school and work and that is it. So, I have just kind of grown up from it, I have matured a whole lot by going through it.

Spencer expressed a similar belief:

> This really gave me a new look on work, about how it is going to be in the future – every single day. It has really just matured my thoughts in the work environment, and I've just grown as a person altogether through the program.

The students acknowledged that that their experiences were preparing them for real life regardless of their plans after graduation. For instance, Spencer, who was planning to pursue a college degree, expressed that "it is good way of studying before real life – meaning after high school. It is prepping me because I'm planning to go to college and work at the same time, so it's going to be the same."

Support from family and friends. The novelty of high school apprenticeships within the district entailed that students were given sustained support and encouragement from their community, such as family members and friends, to encourage them to pursue the program. While some parents were initially reluctant to have their children participate in the program, some of them came around when they realized the potential benefits for their children. The issue of parental support has been a major driving force in the widespread adoption of apprenticeships. Given the age of the apprentices, the educators and employers realized that for the program to become embraced, they needed to involve parents every step of the way. The four apprentices reported varying support from their families and friends. Josh shared that since his parents were both in

manufacturing, they had a big influence on his decision to pursue the apprenticeship. He noted:

> My parents were both in manufacturing, so they had a big influence on me. They are really proud of me for going through and getting in. They think it is cool that I am going through that and they support me all the way.

Similarly, Barry mentioned that his parents thought the program provided a good opportunity for him and were "really supportive of it." On the other hand, Spencer and Jim provided a different perspective of their parents' support. They indicated that their parents were initially unsure about the value of the program until they explained to their parents the potential benefits of the program to their future career plans. Spencer shared that he had to convince his mother of the benefit of the program and noted:

> Well, first my mom, she thought it was a program where it supports me for college, as in a scholarship. I think you do get one at the end. But then she kept asking 'Why are [you] joining this if it does not relate to your field?' So I told her that it is good knowledge because the worst thing you want to do is to be an engineer and who does not understand what it feels like down there. So I want to join this so I get to know what it feels like [in manufacturing], so when I get up higher in the job, when I design stuff as an engineer, I will know what it will feel like and also how those who use my stuff – how they feel. That is mainly the reason why I did it and that is what I told my mom, and she was like 'All right, well, as long as you are doing whatever you believe is right, you can go ahead and do it.'

Jim's experience with his parents was quite different. He mentioned that his "dad at the beginning, he was veered more towards me going to a 4-year college, but he supports me now and he thinks it is good that I am going through all this."

The experiences of the four apprentices illustrate parents' influence on the students' decisions to pursue an apprenticeship. The cultural mythology of apprenticeships as an inferior form of education still persists in the country as parents prefer for their children to pursue a college degree. Both the educators and employer

mentioned that the biggest challenge to growth of apprenticeships is the parents' perception of apprenticeships as a lesser kind of education. Thus, throughout the program, they worked to bring parents onboard to share the experiences with their children. They believed that parents and students would be the best advocates for the program when they realized the benefits for their children.

Support from friends. The students also reported support from their peers (friends at school and other apprentices). When asked about what their friends thought about them being in the program, one of them mentioned, "my friends, they were kind of jealous to be honest. They thought it was pretty cool." Another mentioned that "yeah, all of them were like, go ahead, it is an opportunity, we all applied for the program. One of my close friend[s], he applied with me, but he didn't make it. But I made it, and he was just like 'Go ahead and take my place.'"

***Support from other employees in the organization*.** All four apprentices shared that they had received substantial support from employees and each of them noted that other employees were always available and willing to teach them what they needed to know. Josh shared his experiences with other employees and noted:

> It's really good. They treat you as an adult, but I mean, they are still careful – they will be careful because you are still an apprentice, not like a full-time worker, so they will treat you as a student, but also an adult at the same time. If you do something wrong, they will always correct you and teach you the right way to do it.

Besides work, some of the apprentices mentioned they had spent time outside of work with their supervisors and other employees. They mentioned attending sporting events with their supervisors and mentors. One of the students who was laid back during the interview suddenly lighted up when asked about his relationships with employees and

colleagues outside of work. He said, "They are all pretty cool. Joe (he is my mentor right now) and I and a couple guys went to the hockey game a few weeks ago, and it was great." With regard to relationships among the apprentices, Spencer mentioned that one of them who had been in the program the year before was helpful. He noted about Jim:

> He is the one that taught me stuff, because he knows more and has been in the program for a year, and I only started this year, so he is the one who tell[s] me just go step by step and you'll see how to do stuff.

Becoming advocates for the program. The sustainability of the program depends on factors such as the employer's willingness to continue and students' continued interest in the program. Over time, the apprentices could serve as advocates for the program. Josh shared that he had had opportunities to talk to students about the program and what they needed to do to be eligible to participate. He shared that he had encouraged other students to "just keep good grades, pay attention is [in] class and have good behavior, so they could enter the program in your [their] senior year." Barry expressed surprised about some students who had been selected into the program, but declined to participate. He commented that it "makes no sense to me. I have no idea what better job they want to have; I guess they just didn't want to get the stress."

Balancing school and work. Participating in a year-round apprenticeship program while in high school required that students meet academic and professional requirements such as good grades, good behavior and showing up for work every week day. While the apprentices reported getting used to the routine, they shared that it could be challenging at times. Thus, it was important that they learned to manage their time wisely. For instance, Spencer, who participated in afterschool activities, shared that it was challenging at times:

> Time-wise, it is a little tight because as soon as I get off of school, I have to go to work and then after work, I have to go to Taekwondo and then I go home. I have two hours to do my homework because when I get home it will be around 9 or so. So then, I have a couple of hours before I go to sleep, so it has been really tight, time-wise. I try to do my homework then, or I do that in the morning.

On the other hand, students like Jim commented:

> Sometimes it might get a little hard, but it is not very often. I mean, it has been pretty easy to manage going to school. When I get out of the school – that is pretty early to get out of school – and then I go to work and work from about 12 until 5 or 6, then I go home. So I have plenty of time to do homework if I have to do any.

Jim did not participate in any afterschool programs and therefore had enough time to do his homework. He went on to share how he enjoyed working:

> I actually really like it. I mean when [I] get out of school at 11, I look forward to going to work. This is because I like working. I just think it is fun. A lot of people don't like working, but I do and to me it is fun.

Notwithstanding the time constraints, each of the apprentices has settled into a routine that worked for them. As high school students, they understood the sacrifices they made when they joined the program and believed that their learning outcomes were worth the effort as they could get a leg up in the workforce after graduation.

Commitment and sacrifice. Another challenge of enrolling in a yearlong apprenticeship program while in high school was the apprentices' inability to participate in regular high school activities due to their work schedules. David, the principal of one of the high schools, noted:

> If a student decides to do this, they are essentially leaving here at noon and going into the apprenticeship. What they are giving up is the ability to really participate in school activities because they are leaving here and then driving over to the other side of town from 12 to about 4. So it essentially takes them out of afterschool clubs and sports. So it is a sacrifice for the kids in a way because they are coming out of the traditional school culture of, if we have a pep rally here at the end of the day, they are not going to that. If we have any afterschool thing

> that is going on, they might not be going to it. It does not mean they cannot participate in something later on, but the time makes it difficult.

Even though the students may have enjoyed working and earning money, they realized that being in the program curbed their ability to be regular high school students. For this group of students, they had made a choice and were willing to stick with the program. Josh noted that:

> I mean one challenge for me is, I love working, but sometimes I'm missing out with my friends. I would say that's probably the biggest challenge, it is getting over to the workplace and not hanging out with your friends after schooling and stuff like that.

Barry, who was a senior too, commented that he was "missing out on a lot of the stuff that you should you be able to do in senior year."

Integration of learning in school and at work. Both the school and the employers realized that they offered different aspects of training, and the goal of the apprenticeship program was to offer students an opportunity to work in a real life advanced manufacturing environment. Consequently, while students may have been exposed to one area such as welding or machine tool and die in their school environment, what they learned at school did not always translate to the workplace. Jim shared this point:

> With the fabrication aspect of this, when I am fabricating stuff, it blends together well, but what I am doing over there in welding class and what I am doing over there [at the company] is kind of different. Welding does not really have anything to do with machining and in manufacturing the work is more machining. So my apprenticeship over there is different from over here at school. They don't really collide very well.

From the company's standpoint, its role was to expose the apprentices to advanced manufacturing and to become an "extension of their high school experience." This statement may seem counterintuitive to the goals of the apprenticeship program

representing as it does the misalignment of industry and academic interests and goals. Nevertheless, the students' statements were helpful in seeing how their participation in the program enhanced their overall academic ability and sharpened their skills and relevance to academic content. Experiencing both practical and academic content provided a deeper level of learning to the students.

Alignment of program with future goals. The extent to which the apprentices believed their experiences enhanced their academic performance at the high school could be attributed to the program's alignment to their future career and personal plans. Not all the students planned to enter the advanced manufacturing field. Jim, who planned to pursue welding after high school, noted:

> You need some of the machines for welding. But I mean, if I wanted to pursue something in machining like tool and die or something, then it would help me transition over to that. But what I learned [in the program], I learned a little bit about fabrication that will help me transition over to welding school.

Nevertheless, Jim indicated that if he ever found himself in machining or fabrication, he could use his knowledge and skills learned as a fabricator or machinist. He shared, "I feel like eventually down the road if I ever need to use it, I think I could." On the other hand, some of the apprentices who planned to stay in the field after graduation saw their participation in the program as part of their future plans. For instance, Josh, a first year apprentice, shared:

> It's been really good. I have learned a lot and I still have a lot more to learn. So I am hoping throughout the next year and a half, I will be able to just get more knowledge in the field and be able to put it in the work while I am there. I am going to try to get into their four-year apprenticeship program for tool and die. I see myself either at [this company] with my certification for tool and die, or at Toyota or Ford. Generally, I hope to get knowledge on what I am doing, and right now we are actually doing different NIMS certifications. So I am hoping to get all the different NIMS certifications that we are going to be working on.

Barry, who was unsure of his future plans, shared that he was open to staying with the company or pursuing another mechanical field in a different industry. He admitted that he did not know what he wanted to do career-wise, but had considered pursuing the four-year apprenticeship program (for adults) that was offered by the same company. He stated:

> I don't know what I want to do career-wise. I was thinking maybe go to diesel mechanic school. I want to be working and graduated from something with certification. I have considered it [four-year apprenticeship at company], but unless I do something else, that is my plan.

For Spencer, who planned to pursue an engineering degree, "manufacturing-wise, I am not really fully interested in it, but it's alright. I like tool and die though; it's become my second passion." He indicated that the skills he learned in tool and die could be useful to him at a point. While the four apprentices had varied career plans, they acknowledged that being in the program had exposed them to advanced manufacturing and also made them aware of areas in the field they preferred. It had also helped them determine what careers they wanted to pursue in the future. As a researcher, it was quite disheartening to me to hear from some of them that they did not know what they wanted to do after graduating from high school. A program such as this was established to expose students to possible careers, and the employer had indicated during the interview that the company would, at the end of the apprenticeship, offer the students employment letters and encourage them to consider other career possibilities within the company such as finance and accounting. Although the students were not exposed to such fields during their apprenticeships, the employer rationalized that for those who were unsure of their future plans, their interests could possibly be aligned with non-technical fields. Also, the students would be accustomed to the company culture and could easily transition into

other areas in the organization. Although the company expressed a desire to retain the apprentices within their company or in the advanced manufacturing field, they were pragmatic and realized that at 17 or 18 years of age, it was not uncommon or unusual for the apprentice to be unsure of his future plans. For that reason, the CEO stressed throughout the interview that "these were kids." He mentioned, "It is important to understand that these kids are 17- and 18-years old and they are not mature. I mean, you [sic] they have all quirks that come with being a 17- or 18-year old kids trying to make their life." This sentiment was also captured in the following statement made by Jim, one of the apprentices:

> Honestly, I don't know because I mean I am going to the welding school. But I don't know if that is what I want to do for the rest of my life. I mean, I am only 18-years old, and I have the rest of my life ahead of me to do whatever I want. I may be working at a welding job here in [the city] eventually, but I don't know exactly what I am going to do as I get older. I don't know.

Being a second year student. Jim was the only student to have continued from the first year. Josh was a junior and indicated his plans to continue in the apprenticeship program during his senior year and enter into a four-year apprenticeship program after high school. That said, the current training was not structured to fully accommodate the learning needs of students in their second year of the program. Therefore, although the second-year apprentices demonstrated a higher level of competency and familiarity with their work, there were telling signs of a lack of challenge the second time around. The following comment made by Jim was particularly telling:

> I went through it again because last year I had fun with it. This year I haven't learned as much because I learned a lot last year – a lot of stuff that the apprentices are still learning about, I already know. I am not saying I know everything, I just know a lot already and this year I'm just kind of going through it again and see[ing] if I can learn more. I mean, I am getting paid to do it, this is my job, and I didn't want to just quit my job.

Although he acknowledged that he had "already gotten a lot as a result of being in the program," he perceived the program as more of a job than a learning experience. Even one of the supervisors commented that he had noticed Jim was getting bored. This scenario presented a dilemma for the company and educators as students entered into the program in their junior years and planned to stay for their senior years. In addition to the student's expressing a lack of challenge, Jim also shared his views on the current structure of the program. He indicated that programs and areas for rotation from the previous year "were better than the fields this year." Jim explained that two new fields added in the second year, namely press and quality, were areas he was not interested in and further noted that the other apprentices were not interested in the two areas as well. He stated:

> In my opinion, I just don't think anybody, no teenager wants to grow up and operate a press. I mean, that is just my opinion, and I don't think anybody has to. Also quality [another area of rotation] is just all about learning how you check the quality of parts. It might be a good idea to show us that, but at the same time, I am going through it for 7-8 weeks and then doing press operation.

This statement is telling of the student's perception of what he learns and provides an opportunity for the company to structure the program and create different levels of training based on the length of time an apprentice has been in the program. From the statements, one can infer that the benefits of some of the areas were not readily apparent to some of the apprentices as they could not relate their learning experiences to their personal and professional goals. On the other hand, one of the first year apprentices mentioned that, although he did not enjoy his time as a quality technician, he was "open to learning about all things manufacturing" and expressed that although he did not

particularly care for that area and would not pursue a career there, he realized it was a critical area in a manufacturing environment.

Educators' Experiences

Although the voices of the educators have been incorporated into the findings presented in the preceding sections, this section elaborates further on some of the themes pertinent to the educators.

Taking a strategic approach to partnerships. The educators expressed the importance of taking a strategic approach to the partnership, whereby they worked to develop the "kind of students, who had the right skills, needed by employers." Fred, one of the CTE teachers, explained that given the school's program offerings and the proximity to industries in the area, it was important to be seen as a school from which organizations would be happy to recruit. This was captured in his following statement:

> One of the benefits is that it provides a great opportunity for the students to get real world experience, and if you look at the [CTE] program in this school, it helps promote the program. Also it provides opportunities for students to realize that they can go through this program and find employment and be successful in their careers.

It also provided an opportunity for the school system to be able to showcase examples of how students applied their academic content to the real world and to be able to showcase their commitment to expanding learning opportunities for students.

Preparing students in response to employer needs. There was no precedent in the school district for this kind of program. Therefore, commitment from all stakeholders was required, especially as each of them had to make tangible and intangible investments in the program. From the standpoint of the educators, it was imperative that they removed, or at least mitigated, the obstacles to the efficient running of the program and to

ensure that the students' schedules were not unnecessarily interrupted so as to impact their academic activities. To that end, the principals worked to alter the students' schedules with the help of the school counselors and district administrators so that the apprentices would take their core academic courses in the morning, which would free them up to leave school in the afternoon to work at the company. In addition, the teachers committed to following up with students to check on their attendance and progress at the workplace.

As noted earlier, math testing was included in the selection criteria. However, David, the principal of one of the high schools, expressed his surprise that math testing was made a requirement for the current apprentices and explained that inasmuch as it worked for the employer, it also eliminated some potential kids from the program. To that end, he commented that "I have got a few kids here that are just dying to be in the program, but didn't pass that math portion." He believed that the math requirement could be a detriment to the program as some students who had a genuine passion for the field could not participate. To help mitigate the math requirement, David shared that they were considering introducing additional courses such as manufacturing math that were relevant to the manufacturing industry. Although it would result in additional cost to the school, the educators were committed to providing relevant courses that would help the apprentices and facilitate the employer's training efforts. He explained that the courses were necessary "so when kids walk out of here they know that they have what is necessary for them to be successful." Furthermore, one of the teachers shared that they were eager to work together and enhance the curriculum to the point where students were much better prepared for what they did at the workplace. To that end, they maintained

communication with the employer to get feedback on the students to ensure that the schools were "doing what was necessary so that the company got the best quality students from the skill standpoint."

Ensuring students' success. The educators expressed their appreciation that the employer reached out to them to discuss the possibility of co-developing the apprenticeship program. They welcomed the opportunity for a partnership, particularly since they had been looking for ways to get students (particularly seniors) "out of the school building and into the workplace in order to increase students' learning in their chosen fields." They acknowledged that as much they tried to provide learning experiences within the schools, the workplace afforded the students real life experiences that could not be easily acquired in the classrooms. Equally important to the educators was the fact that the apprenticeship would provide relevant work and not just menial tasks as was common in the working experiences of typical high school students.

With regards to the students' learning, the educators understood that what the apprentices learned in school would be a broader exposure to manufacturing. Additionally, they felt that the training schedule the employer shared with them demonstrated a commitment to broad learning. Bill, one of the high school principals, shared that the employer's rotation process, whereby students learned under the tutelage of experienced employees, showed that they "were developing the whole student." Another teacher expressed a similar view that the opportunities at the school and the workplace offered a way of "enhancing the student's learning by experiencing a multitude of things such as a good work ethic, other aspects of manufacturing and generally gaining more knowledge than what they would get from high school." Lisa

further explained that allowing the employer to develop a different curriculum also ensured that the program would not be "bogged down with rules and regulations as to what the apprentices needed to be taught while at the workplace" because that could limit the employers and students would begin to feel like the apprenticeship was school in the classical sense.

Guiding the high schoolers. Given the age and the educational level of the apprentices, the educators had a responsibility to ensure that the apprentices were able to fulfill their academic responsibilities. As Lisa explained, the main concern was that the program would not "deviate from the norm" by causing students to alter their schedule. As a result, a major consideration for the educators was how the program could impact academic standards and high school graduation. This comment underscored the importance of high stakes testing and accountability standards in the state and their impact on school ratings as well as on the principals' careers. Fred explained that to address those concerns, teachers had detailed conversations with students to explain the schools' expectations if they wanted to pursue the apprenticeship in addition to their responsibilities as students. He stressed to his students that once they committed to it [the program], the school held them accountable for that; therefore, they had to be "responsible and mature and fulfill their obligations." Nevertheless, students were made to understand that, if they had genuine problems such as schedule conflict, or were struggling to keep up with their school work, or even realized that the apprenticeship program was not aligned to their interests, they had the option of leaving. He also stressed to his students the "value of endurance and perseverance" because that was what they would "experience in the real world." In addition to that, teachers and principals

paid close attention to the students' grades in all their classes and followed up on students' progress with debriefing sessions.

The future direction of the partnership. The educators were optimistic about the program and believed that it could continue to grow and recruit more students from within the schools. The following statements from Lisa captured the educators' hope for the direction of the program:

> What we want to do on a high school level is to have a classroom of students – maybe 12 industries that supports this and everybody contributes something financially to support that program and then as the school system, we help recruit the students into it. This would then feed out into these industries as apprentices graduate.

The educators also expressed glimpses of hope for more young people entering into the skilled trades through apprenticeships and noted that there is a cultural issue to bridge [about apprenticeships] where many parents think this kind of education is a lesser type of education. However, the two years the apprenticeship program had been in existence, as well as the interest that parents and children expressed in the opportunity, led them to believe that the program outcomes were successful.

Summary

The findings presented in this chapter described how the apprenticeship program was implemented and how it addressed college and career readiness among students and the employer skills needs. It also discussed the experiences of the stakeholders and how that influenced the program. For instance, the apprentices' experiences as outlined in the chapter provide insights into the various aspects of apprenticeship. Whereas some experiences such as learning, growth and maturity and the opportunity to be exposed to the field were of benefit to the students, other aspects such as balancing school work and

on the job responsibilities were a challenge to some of the students. Additionally, the support students received from family and friends and other adults was influential in their continued involvement in the program.

The employer participation in the program was seen as a crucial step in reaching out to young people to provide them with opportunities to explore careers. The educators welcomed the partnership and worked to ensure that students had the necessary opportunities to succeed in the program and that they also provided employers with well-prepared students. These findings described the employer's experiences in implementing and running the apprenticeship program. In as much as the employer was committed to developing skills among adolescents for the benefit of the company and the industry as a whole, the return on investment in the second year of the program was somewhat limited. For this company, the financial obligations were not a deterrent to their mission, but there was palpable frustration in the lack of engagement from other seemingly capable manufacturing organizations, thus underscoring the lack of support from other businesses in pursuing apprenticeships.

Like any novel program, there were challenges that stakeholders tried to address as the program progressed to ensure that it functioned effectively and was beneficial to all of them. The implications of the various aspects discussed in this chapter will be outlined in Chapter V.

CHAPTER V

DISCUSSIONS, CONCLUSIONS AND IMPLICATIONS

The purpose of this study was to understand how an industry-education partnership, using an apprenticeship program targeted at high school students, could develop the relevant skills among students and address the skills needs of a small advanced manufacturing organization. It also sought to understand the phenomenon of apprenticeships from the perspectives of the stakeholders – students, employer and educators – in order to gain deeper insights into the experiences of each group as they engaged with the program. A review of the literature and the experiences of the participants in the study revealed the opportunities and challenges of promoting apprenticeships targeted at adolescents. As part of this study, the employer's perspectives provided insights into his expectations of and aspirations for the program as well as the nuanced complexities involved in targeting high school students. Similarly, the educators' feedback revealed their challenges and their hopes of developing stronger partnerships with industry to help develop students with desirable skill sets. With regard to the apprentices, the findings highlighted how they made meaning of their experiences and how such experiences fit within their own personal and professional goals. This study was grounded in adolescent development theory, human capital theory, college and career readiness and experiential learning.

Discussion

The following themes emerged from the findings and provided answers to the overarching research question: What is the role of apprenticeship in enhancing students' college and career readiness and meeting employer skills needs? Answers to the following sub-questions provided insights into the overall research question: *How are youth apprenticeships programs organized and implemented to prepare high school students to be college and career ready?*

Educators and the employer were clear about the kinds of skills that the apprenticeship program would develop in the apprentices. For instance, the employer emphasized the need for strong math skills because of the nature of the advanced manufacturing environment and the need for precision measurement and analysis. As a novel program, it was important to recruit students with relatively high academic skills to facilitate a seamless training program. The apprentices discussed how the apprenticeship experience enhanced their academic abilities, particularly in math as they were able to transfer their math skills to the workplace. This transfer of learning provided the crucial link between academics and industry. This lends support to Dewey's theory of pragmatism (1938) that expounds that students engaged in experiential learning were more able to retain academic content. According to Stone and Lewis (2012), college and career readiness involves the acquisition of academic, employability and technical skills before graduating from high school. From the analysis, it was apparent that the students were able to develop technical skills in machining tool and die as well as in computer numerical control while in the workplace. As some of the apprentices revealed, they had little to no prior knowledge of the different kind of tools and equipment used in the

manufacturing environment, but over the period they worked there, they learned how to use the equipment and tools in an efficient manner. For students in apprenticeship programs, earning a certification at the end of the program was the ultimate goal as it served as a proxy of skills they had acquired (Stone & Lewis, 2012). The employer committed resources in the form of employees to teach and certify apprentices in NIMS certification. Simultaneously, the apprentices' training in school was designed to prepare them for the same certification. Thus, integrating class based and work based learning strengthened students' knowledge and skills that prepared them for their certification.

In addition to the technical and academic skills, the apprentices developed soft skills such as time management, critical thinking, problem solving, and communication skills. The use of soft skills in the work environment has become essential in the 21st century workplace. According to the 2009 Business Roundtable survey, employers reported that some of the most critical skills that were lacking among the workforce included personal accountability for work, strong work ethic, punctuality, professionalism, oral communication skills, teamwork and critical thinking – soft skills. Additionally, the widespread use of technology in the advanced manufacturing organization provided students the opportunity to develop and use higher order thinking, creativity and technical skills to attend to their job tasks. These skills have also been identified as crucial to the 21st century workplace which is driven by knowledge and technology (Trilling & Fadel, 2009).

It must be noted, however, that what the students learned in their CTE programs at their schools was different from what they learned and did in the organization due to the nature of the workplace. Although on the surface this seems counterproductive,

expecting high schools to conform to employer needs is challenging in the American education context due to the rigorous testing and accountability requirements for high school graduation. That said, both the principal and the CEO alluded to the fact that for this particular program, the role of the company was not to duplicate efforts in the CTE program, but to complement the academic efforts by developing broad sets of skills through exposure to the advanced manufacturing industry. In essence, the program was structured to enhance the college and career ready skills among the apprentices that would serve them in their future roles.

Sub-question 2 is: *How are employers meeting their skills needs in their industries?*

The second category of findings addressed how employers addressed their skills needs. As discussed in the following subsections, reaching out to form educational partnerships within his community, committing resources, and dedicating himself to nurturing the youth for potential employment were strategies the employer adopted to address his needs.

Partnership

Traditionally, employers have been critical of educators for not preparing students with the necessary skills needed in the workplace. On the other hand, educators have complained about the lack of adequate resources and assistance from industry to help them provide learning opportunities for students. Consequently, society has been left with two factions, each distrustful of the other, who, in reality, have common goals and must work in tandem to complement each other's efforts to develop the future workforce. Nevertheless, in recent times, employers in industry are partnering with educational

institutions at all levels to address the skills gaps. Thus, there seems to be a shift in thinking in recent years of both educators and employers in industry as both factions work to meet each other's needs.

This study showed that some employers are willing to work with educators to address the training and learning needs of students as the employer in this study took the lead to partner with local high schools. From the educators' point of view, the partnership was a welcome addition to their efforts to develop students with college and career readiness skills and to prepare students to meet the challenges of the future. This case also illustrated the educator's quick response to the employer's ideas as they made efforts to undercut bureaucracy and rally important stakeholders. As a result, it underscored the mutual interest and a common purpose in addressing how to develop the youth for future success as well as a high degree of commitment from the educators. Additionally, the partnership incorporated and exhibited the basic elements of successful collaborations, patience, trust, flexibility and adaptability (Mattessich & Monsey, 1992), as each group worked to sort out their roles in a mutually beneficial relationship.

This study also highlighted the need for a multi-dimensional approach to addressing the skills needs of the industry and the career aspirations of the youth. As the findings revealed, developing the program involved re-arranging students' academic schedules to free them up in the afternoons to focus on working at the employer's site. Also, the employer had to re-orient employees and their schedules to enable them to work closely with the apprentices, all of whom had never been exposed to a real world manufacturing environment.

Committed Leadership

Given the history of youth apprenticeships in the U.S., bold and committed leadership in the form of an industry champion is essential to develop and maintain an apprenticeship program. The CEO in this study firmly believed in nurturing young talent for the long-term benefit of the company and ultimately the manufacturing industry. Whereas in the past, educators and policy makers had been at the forefront of the debate of providing work based learning opportunities to students, the CEO of the company took the initiative of exploring the possibilities of implementing a European-style youth apprenticeship program in his community. His leadership and vision earned him recognition among city and state leaders as he espoused the potential of focusing on high school students. Consequently, educators have come to rely on his insights on how best to provide and structure apprenticeship programs to benefit all stakeholders. As one educator expressed about the CEO, this program was not about churning out employees for his organization, but was about helping the educational community develop students as well as providing learning experiences that could enhance students' technical and academic abilities.

In essence, the employer found it necessary to reach out to his community and begin to grow his own employees from within the high school students enrolled in the skilled trade programs. By focusing on adolescents, the employer was intent on reaching out to the younger generation as had been done in other countries and exposing them to a growing industry in need of skilled employees. The focus on moving adolescents into apprenticeships in the U.S. has been minimal over the years. Admittedly, they are some challenges as will be discussed in the next subsection. Nevertheless, this approach

presents opportunities for industries to develop a sustained channel of skilled workers. In that case, nurturing young talent over the years would reduce "floundering" (Stone & Mortimer, 1998) in the labor market for years. The following subsection discusses the challenges and opportunities for the stakeholders as they engaged with the program and focused on the third sub-question: *What are the experiences of the stakeholders in the program and how do they influence the program?*

Focusing on High School Students

While nurturing young talent has positive, long-term benefits, the analysis also revealed the challenges of focusing an apprenticeship programs among high schools students. This study revealed the employer's struggle to retain apprentices after the program. As stated in a previous chapter, one apprentice was going to college to be an engineer, another was planning to attend welding school after the program, another was unsure of what his plans were and only one student was clear about wanting to pursue a career in manufacturing. While this was not the outcome that the employer had hoped for, it revealed how each of the apprentices made meaning of the program and aligned it to their personal goals. Nevertheless, one must use caution in interpreting this as a negative outcome as each of them had plans to pursue advancement in their fields.

The inability to retain these students could be attributed to the exploratory nature of the program, whereby apprentices entering the program were given indications that they were not expected to stay with the employer after their training ended. Moreover, the employer accepted the risks of focusing on high school students who did not seem to have a strong sense of what they wanted to do with their lives, as part of the process of "being teenagers." This presented a conundrum for the employer, although the idea of

choice and exploration is a typical American educational value. To that end, the employer understood the risks involved in pinning students down to a particular area that did not align with their personal goals, a mistake that had caused the widespread efforts to promote apprenticeships fail in the past. To avoid that, the stakeholders had to strike a balance between flexibility and a desire to retain students. Furthermore, the educators believed the flexibility of the program was what made it an attractive option to get the buy-in from parents, as many of them wanted their children to pursue their passions while taking advantage of opportunities.

Another challenge that emerged was the recruitment of students into the program. Despite the increased interest of students, as demonstrated by attendance at informational sessions at the high schools, the employer and educators realized that adolescents in America were removed from manufacturing. Thus, it was unrealistic to expect to find a large number of students who were passionate about it or had prior exposure to the field. In essence, there seemed to be a misalignment of expectations. While the employer expected that some or all of the students would stay with the company after their training, either by continuing to work while attending post- secondary education, or by working full time as a machinist, the study revealed that each of the students had different aspirations. Some of the students saw the program as a "job" that was not clearly linked to their future plans. This seemed counterintuitive to the goals of the apprenticeship program and, perhaps, the initial recruitment of the students may have been the problem. The educators contended that there were other students who were eager to participate in the program, but who were unable to do so due to constraints in the employer's capacity as well as the math testing requirement that students had to undergo. It may be safe to

say that some students with a real passion for manufacturing may have been excluded in the selection process. Nevertheless, one educator admitted that the challenge of finding the "right kids with a passion for manufacturing" was partly due to the decline of manufacturing in the last few decades and the lack of exposure to the industry. This was an issue that educators were finding ways to address and even suggested providing a basic manufacturing math class for students in the future. I believe addressing this issue could lead to the recruitment of a high caliber of student who would be interested in manufacturing and would want to pursue that career path.

Return on Investment

From a human capital theory perspective (Becker, 1975), employers invest in training and educational programs in the hopes of improving human capital by developing skilled employees who can contribute to the organization's goals. This research demonstrated the employer's willingness to invest in the education and training of the workforce with the hope of developing a pipeline of skilled workers. The program involved a significant investment in monetary and non-monetary resources such as wages for apprentices, time involved in training and mentoring apprentices as well as training employees in certification processes.

Even though four apprentices were involved in the program (which was within the employer's capacity), the employer noted that they were not receiving a significant return on his investment as he had hoped due to their inability to retain the trained apprentices. Given the employer's hope of training and developing a channel of skilled workers for the organization and the manufacturing industry as a whole, the outcomes of the apprenticeship program were not encouraging to him at the time of this study. This

underscores the challenge of apprenticeships in the United States as compared to countries that have used apprenticeships to sustain their economies. For instance, in Germany, there is a critical mass of employers who are supported by a society that overwhelmingly believes in the benefits of apprenticeships. For instance, since apprenticeships are widespread within an industry in Germany, if youth move around, an employer is just as likely to get a well-trained worker as another one moves on. Thus, poaching, or the idea of wasting investments in training individuals who would not stay, was not a major concern as those who moved around would be equally skilled. That said, the partnership in this study was a novelty in the district and was still in its infancy. What was encouraging was the employer's commitment to nurturing the youth, an effort that was appreciated by the educators and the community.

Career and Educational Progression of Students

As discussed in an earlier chapter, the appeal of this apprenticeship program was the flexibility and the potential for higher education and career progression. This is counter to the widespread notion of youth apprenticeships lacking rigor and stifling opportunities for students to pursue higher education, as such has bedeviled apprenticeship opportunities in the past. The diverse backgrounds and career interests of each of the apprentices revealed how the program allowed each student to pursue his or her own interests and the opportunities available, both for those who would enter the workforce directly and for those who would pursue post-secondary education.

The apprentices were given broad training through a rotation of departments in the company which provided an opportunity for those who decided to continue as employees after graduating a better chance of moving up the career ladder since they

would have an understanding of the entire operations at the plant. This is in contrast to the opportunities that would be available to a regular employee who joined the organization with just one or two skill sets, such as machinist or tool and die operator, and performed that particular role for many years. In essence, the exposure gained in the program was intended to open doors to different career fields in the company. On the other hand, for those apprentices who wished to pursue higher education and continue to work at the organization after completion, the company demonstrated the willingness to support this aspiration and was committed to providing them future opportunities for other positions within the company. Eventually, such programs could address the issue of apprenticeships stifling opportunities for growth.

Personal Growth and Maturity of Apprentices

The apprentices reported an awareness of their own personal growth and development as they engaged with the program over time. Consistent with adolescent development theory (Arnett, 2000; Steinberg & Morris, 2001), the period of adolescence offers opportunities for adolescents to explore the world and society to find where they fit. The study additionally revealed the apprentices' perceptions of their personal maturity as a result of being in the program. For them, the exposure to an adult working environment provided insights into the demands of daily work as well as the socio-cultural norms that exist in the workplace.

Furthermore, as they experimented with new roles, they were able to determine their interests and abilities in a safe environment. This finding was consistent with Halpern (2009) who argued that an apprenticeship program that allowed for experimentations and explorations of talents and interests helped in the identity

development of adolescents. Another avenue for growth and development was evident in the apprentices' demonstration of tenacity as they balanced school, work and life in high school. Even though some of them reported that it was a challenge at times balancing school and work, they understood the need to stick with the program in order to achieve their personal goals in the future. This ability to persist in the program demonstrated *grit* – the passion and perseverance over the long term which can be a good predictor of success in life and in school compared to one's intelligence quotient (Duckworth & Peterson, 2007). Thus, for an apprenticeship program where students were required to be present at the workplace every day after school, it underscored the apprentices' commitment to staying in the program and developing the relevant skills for future success. From the educators' perspective, the ability of the apprentices to delay gratification and persevere in the program helped them appreciate and recognize their own growing process.

Being in an adult working environment and developing real products gave the apprentices a sense of accomplishment as they saw firsthand how their work added value to the company's products and processes. Additionally, they had the opportunity to make mistakes and learn from them within a safe environment. The apprentices understood and appreciated what their adult coworkers did on a daily basis to earn a living. Each of the apprentices mentioned the significance of the program to their growth and development and explained that they would recommend the program for other students. This suggests that those who participated in the program could potentially become advocates for apprenticeships in the future.

Community Acceptance

The lack of widespread adoption of youth apprenticeships in the United States stems from failed attempts in the past, the cultural perception of apprenticeship as an inferior form of education, the structure of the educational system and the labor market, and the focus on college as the pathway to success. Despite these factors, there is ongoing debate on how to connect learning at school with practical hands-on experiences, thereby bridging the gap between education and work. Findings from this study revealed that employees were eager to help develop the students and derived satisfaction from teaching the apprentices and transferring their skills and knowledge to the younger generation. Similarly, parents of the apprentices as well as other students showed a lot of interest in the opportunities the program presented, as was evidenced at informational sessions and other community seminars on providing work based learning to students. The apprentices commented on their parents' encouragement as they pursued the program and how their parents came to understand that the program could be a potential pathway in advancing their child's career. Educators welcomed the partnership and expressed their gratitude to the company for reaching out to them to help train students for future careers. As one of the principal's mentioned, his school had "been looking for ways to get students, especially those in the CTE programs, out of the classroom and into the real world to gain relevant work experiences." The educators also expressed glimpses of hope for more young people entering into the skilled trades through apprenticeships and noted that from the two years the apprenticeship program had been in existence, people were coming around, albeit slowly, to the notion that the culture of how society

perceived pathways to careers and success seemed to be changing. That said, there needed to be more awareness of the program to expose the program to a wider section of the community.

Sustaining the Program

What emerged from this study was a sense of frustration from the employer who felt that, even though businesses understood and appreciated the company's efforts to nurture the youth for future careers in manufacturing, there seemed to be a general unwillingness in the business community to commit to working with the youth. As the CEO commented, "they just are not signing on." This comment underscored the challenges of establishing a European-style apprenticeship program in the U.S. While many policy makers and employers decry the lack of skills among labor market entrants and compare our efforts to countries like Germany, where the entire society accepts apprenticeships, the CEO lamented that there wasn't a "grand swell of enthusiasm" in the United States to compel other employers to buy in to the program. In other words, some business owners had adopted the attitude that it was the role of educators to provide them future employees with the skills their businesses needed and, as the CEO pointed out, that attitude belied the short-sightedness of the business community since educators needed help from employers in industry to make preparing the workforce feasible. This, once again, highlighted the lack of a critical mass of employers who could work to address the skills gaps on a large scale.

Another source of frustration also was expressed by some members of the employer's organization who, although they appreciated the company's efforts, realized the need to re-evaluate the program and make some necessary changes. Some of the

changes included the addition of a dedicated individual at the company who was solely responsible for managing the apprenticeship program, an option that was quite costly for the organization at the time. From a business standpoint, that was an important step because, as stated earlier, their first priority was to run a business. That said, there was unanimous agreement on the benefit of the program and the need to continue to offer apprenticeship training for ensuring a pipeline of trained employees in the immediate future. It is also noteworthy that this was a single employer who faced these initial challenges in designing and executing the apprenticeship program. In reality, "lone" employers who commit to such programs would be dealing with many issues that do not exist in matured European environments. In that regard, the CEO expressed a desire to see more companies participate and become involved in his efforts and take on student apprentices in their organizations. This would ultimately create a consortium of employers who would train students and, consequently, help to create a pool of future employees for the manufacturing industry.

The subsection above highlighted the role of apprenticeships in enhancing adolescents' college and career ready skills and addressing employer skills needs and addressed some challenges that stakeholders faced. Although there were some inherent challenges, this apprenticeship program served as a precedent and embodied a framework for other partnerships. Outlined below are lessons learned from the program. These lessons and recommendations for elements required for establishing an effective apprenticeship program discussed in the following sections could inform future programs.

Lessons Learned

- Developing high school apprenticeship program requires strong partnerships, trust, flexibility and patience
- The program has potential to develop college and career ready skills
- The program is capable of promoting personal and professional growth among students
- Programs can be flexible to allow for exploration of careers as students determine what path is best for them
- Career and educational progression can eliminate perception of apprenticeships as rigid
- Alignment between employers and students' goals are important
- Lack of critical mass of employers makes the efforts of a single employer challenging
- Despite the challenges of working with youth, a need still exists to find the best way to expose students to careers (especially manufacturing) at an early age in order to develop a pool of future employees

Based on the discussion and the lessons learned, the following sections address the implications of the study. It also presents a model describing some basic elements that need to be present in a modern day, twenty-first century, industry-education partnership if apprenticeship programs are to be successful in enhancing college and career readiness among students and address employer skills needs.

Implications of Study

Practical Implications

The goal of this study was to contribute to the understanding of efforts by employers and educators to address the skills gaps in industries and to uncover the challenges and opportunities involved for those engaged in the program. Additionally, the study was intended to provide policy makers, educators and employers a deeper understanding of educator-employer partnerships aimed at skills development of the future workforce. The academic literature and policy debates are replete with studies and discussions on how best to educate American youth to meet the demands of the 21st century workforce without genuine discussion of the potential of intensive work-based learning. This study can inform that discussion.

Educators have sought to find effective ways to prepare students to meet the needs of the workforce hamstrung by the absence of this discussion. This has led to a focus on college and career readiness standards in the K-12 educational system from an educator perspective. Even accepting that all students should graduate from high school equipped with relevant academic, technical and employability skills that will help them function successfully as they enter the workforce, the conversation has been one-sided. This study thus highlights the dual challenge of developing students with relevant skills and meeting employer skills needs and the implications for stakeholders.

Matching the right students to the program. Admittedly, very few students in high schools are exposed to careers in manufacturing due to the decline of the industry in the American labor market in the past few decades. Nevertheless, manufacturing is now making a comeback in the United States and, expectedly, employers report having challenges filling vacant positions. That means it is the job of society (educators,

communities and employers) to expose students to the options in the industry. Unlike some past apprenticeship programs targeted at students with lower academic standards, apprenticeships for the modern advanced manufacturing environment require students with high technical and academic capabilities and the willingness to learn and grow in the industry. Such students may have aspirations for higher education and, consequently, apprenticeship programs must make allowances for educational progression. To achieve this, when students enter into apprenticeship programs in high school, teachers, supervisors and other adults should provide guidance and career planning to encourage the students to stay in the industry after completion. Thus, more career-focused services are needed for students who enter into such programs. In essence, the apprenticeship programs should be more than "just a job" for those who participate in the program; it should be aligned with students' passions and career interests.

Clear connections between apprenticeships and college and career readiness. To be college and career ready requires a high school diploma, passing academic tests and industry examinations, preferably with an industry certification. Since, this is the main requirement for graduating from high school, educators need to make employers aware of the role that apprenticeships play to help students meet their academic requirements while meeting employers' needs as well. There are obvious challenges with the current system when working with students. However, if there is alignment between academic and business needs, the program can be structured to provide mutual benefits to all stakeholders.

Additionally, educators need to embark on a rigorous community awareness program to promote the benefits of apprenticeships to high school students. I believe

when students and their communities understand the expectations of employers who invest in apprenticeships and the benefits of the program, more students whose career goals are aligned with the employers' goals will pursue apprenticeships in their desired career fields. Moreover, students who complete apprenticeship programs can serve as advocates for the program and help reach out to other potential apprentices. Equally important, enlightening communities about apprenticeships provides an opportunity for educators to showcase how students can apply their learning to real world practices. It also showcases career opportunities that exist in small- to medium-sized manufacturing companies.

Need for dedicated administrator. As found in this study, while supervisors and mentors took the apprentices under their wings to train them, the employer realized he needed a dedicated individual to administer the program who also would represent the needs of the partnerships. Such an individual would be responsible for the coordination of the program and also for liaising with educators on a regular basis. As one of the directors explained, the company was a busy manufacturing company that was eager to help address the apprentices' needs; however, dealing with their apprentices' schedules and other needs took away a substantial amount of time from the employees' own tasks. As other employers look to develop such programs, they will have to consider assigning an individual who assumes the administrative responsibilities.

Working with youth. Efforts at connecting school to work for American youth are usually compared to apprenticeship programs in countries such as Germany, which has a highly defined apprenticeship program that is part of most adolescents' experience. While the U.S. cannot wholly adopt what has worked in other countries, America can

steer its youth in certain directions by exposing them to new fields and making the allowance for exploration to assess what fits better with American educational values. This requires a concerted effort from society, particularly from educators who are charged with providing career counseling to students.

Employers are wary of investing in training youth due to concerns such as immaturity and high turnover (Rosenbaum, 1992). While this may be a valid concern, most employers will participate in apprenticeships when they see a potential financial and human capital benefit. To that end, small- to mid-sized companies can partner with other employers with similar interest and form a coalition of employers who can take on small numbers of apprentices individually and develop a pool of workers.

Furthermore, employers must understand that young people appreciate an opportunity to learn from other working adults, especially those young people entering the workforce after high school. They see the apprenticeship programs as a means for self-development and maturity. Moreover, the adults who train and invest in the youth report a sense of fulfillment at a chance to prepare the future generation. Thus, with proper resources and assistance, the high schooler of today has the potential to be the well-trained employee of tomorrow. Additionally, policy makers should offer incentives to employers who offer apprenticeship programs to high school students.

As has been observed from this study, employers want to help, but the efforts of one employer can be limiting. Thus a coalition of similar-minded employees in industries should work in tandem with schools to prepare students interested in their fields through apprenticeship programs, building a critical mass of industry-based apprenticeships. In the end, when other companies see how apprenticeship programs can

be developed even on a small basis, they can be encouraged to grow their own employees. It is from these small steps that apprenticeships can become an attractive option for students and employers.

Theoretical Implications

From the perspective of employers, the human capital theory (Becker, 1975) provides an understanding of employers' willingness or lack thereof in participating in apprenticeships. The study revealed the costs of developing and implementing such programs. Inasmuch as this particular employer was enthusiastic about contributing to his organization and industry by preparing a channel of skilled workers, the employer also experienced low retention. In the final analysis, employers are concerned with their bottom line and the effectiveness of their investment in training. Thus the human capital theory provides a framework to facilitate dialogue and to outline processes that ensure that employers, who are willing to work with youth, are not overly burdened by lack of financial and non-financial resources.

In respect to adolescent development theory (Erickson, 1950), the study provides an understanding of how young people mature and develop their identify over time, as well as how their interactions with adults in a real world environment can help shape their identity as they transition into adulthood. With the focus of apprenticeships on youth, this study provides further insights into different issues that youth have to contend with as they make personal and professional choices about their futures. Thus, an understanding of adolescent development theory provides insight into how the developmental needs of adolescents can be met and how workplace activities can be

structured to enhance positive adolescent development. Viewing apprenticeships through this lens can help broaden its appeal to society.

In a fast changing workplace where the demand for skills is getting increasingly complex, Dewey's theory of pragmatism can lend support to high school apprenticeship program, whereby students can become engaged with academic content as they apply it to practical hands on activities. This is particularly important in technological workplace as learning can be adapted to meet the changing needs of the workplace thereby keeping pace with technological advances.

Signaling theory can offer insights into how certifications enhance marketability of the certificate holder in the labor market. In the context of apprenticeships, students who graduate with a certification have a competitive advantage over those who graduate with just a high school certification. With the resurgence of manufacturing the United States, those who are preparing to enter the labor market after high school should be made cognizant of certifications required in high growth areas.

Furthermore, this study provides an understanding of how apprenticeships can enhance college and career readiness. This is significant in that the driving educational framework of the current period focuses on preparing each student with academic, technical and employability skills by the time they graduate from high school. To that end, industry- educational partnerships that address stakeholder needs can help shape conversations on how to address skills gaps.

Elements Required for Effective Youth Apprenticeships

The logic model presented below provides the basis for a high school-industry apprenticeship program. An important aspect of the proposed approach is that it builds

on the traditional apprenticeship models and incorporates perspectives of the employers, students and educators – the direct stakeholders of youth apprenticeships. Additionally, it stresses flexibility and progression, values that are central to American youth in the 21st century. Based on this model, when the right inputs and activities are present, the outcomes have the potential to address skills gaps in the long term.

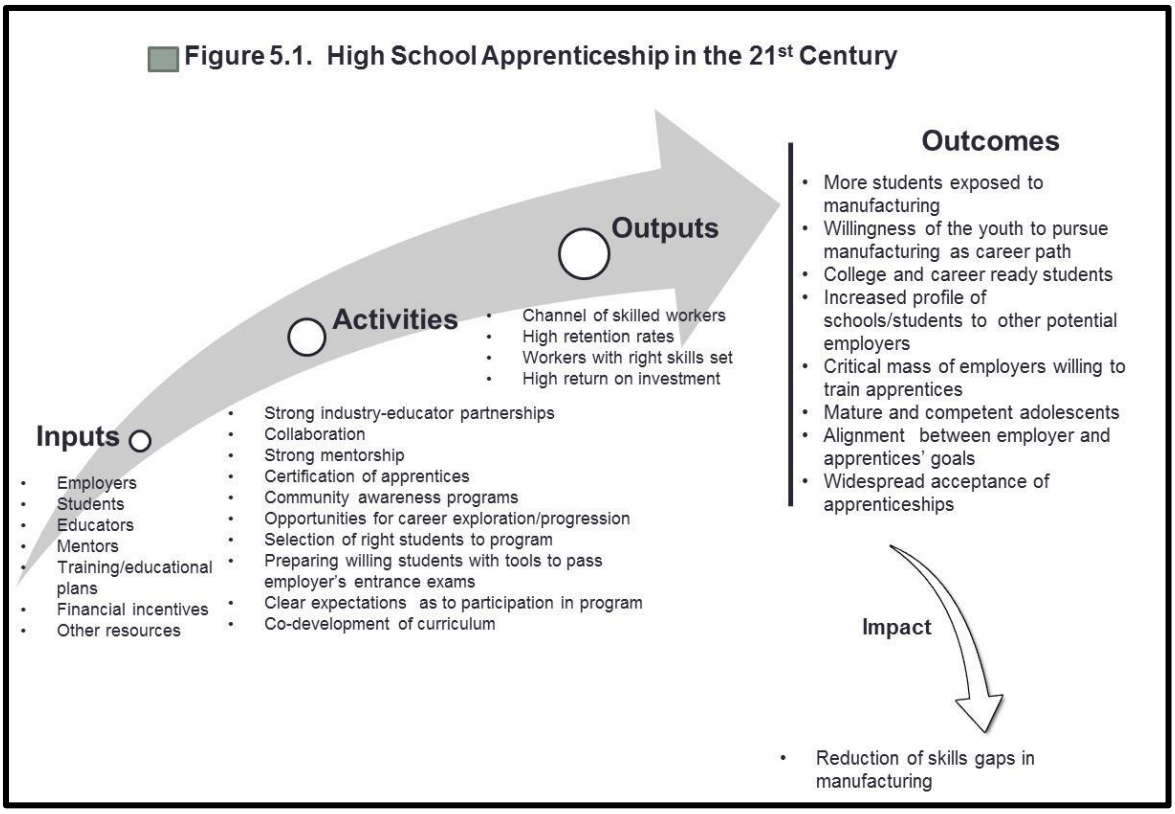

Figure 5.1. High School Apprenticeships in the 21st Century.

Note: Given the goals of youth apprenticeships, all the elements presented in the logic model must be present to satisfy the diverse needs of stakeholders and to ensure that programs targeted at youth have a long lasting impact.

Significance of the Study

Findings from this study may be used to improve the quality of high school and industry partnerships in apprenticeships. Specifically, this research may be of interest to

employers looking to partner with educators to provide rigorous work based learning opportunities for youth. Additionally, educators and policy makers may use findings from this study to offer learning opportunities for high schoolers, particularly those enrolled in career and technical education, as they seek to provide multiple pathways for students and develop efficient processes that enhance the implementation of apprenticeship programs. Equally important, lessons learned from this program could inform future programs targeted at high schoolers enrolled in skilled trades programs.

Limitations of the Study

This case study provided an in-depth description of one high school industry apprenticeship program. The fact that the study focused on one program could be perceived as a limitation. As a qualitative study, it is not generalizable and an additional limitation is that the study focused on a program that had been in existence for only a year before the study was conducted. Perhaps a more mature program could have provided more insights into high school apprenticeships. The case study was also limited to the identified stakeholders who were directly involved in the program. While the apprentices, educators and employers provided insights into parental involvement and support, parents were not invited to be participants as the apprentices were seen as mature adolescents.

Recommendations for Future Research

Additional research could focus on more mature programs and include other stakeholders such as agencies, public policy officials and parents of students involved in apprenticeships in a particular city or state. Insights from parents may shed light on the retention of students after they complete the program. A longitudinal study on the

program as it matures would provide insights into the program and explore how such programs can be sustained. Furthermore, a comparative case study involving two or more programs would provide further insights into the experiences of both cases and how their practices and processes may produce similar or different outcomes. Studies on high school students enrolled in the skills trades and their perception of apprenticeships would shed light on the appeal of apprenticeships to students and inform other stakeholders on the direction to take with such programs. Additional research opportunities will exist for apprenticeship programs that are part of a coalition to determine the extent to which students are retained by companies.

Summary

This dissertation explored how a high school apprenticeship program could enhance the college and career readiness of students and address employer skills needs in an advanced manufacturing company. Through this lens, the challenges and opportunities for students, educators and employers involved in the program were uncovered. The research revealed that, if there is to be an increase in youth apprenticeships, there needs to be a committed leader who believes in the value of developing youth. Additionally, there need to be incentives from local and federal governments that create a conducive environment for industry-education partnerships. The educational system by itself cannot fully meet the needs of employers as it has to focus on the educational and career progression of students based on state accountability standards for high schools. Furthermore, efforts targeted at high school students present unique challenges since students are still developing and figuring out what their personal and professional options could be. Given the nationwide focus on pursing post-

secondary education despite conflicting evidence of the wisdom of this approach as well as the reality of the current adult-focused apprenticeship system, focusing on high schools has a potential to provide early alternative career pathways for all students. In the final analysis, it is known that there is a way forward and a potential for high school apprenticeships to expose young students to careers in manufacturing. What needs to be sorted out is how to get the right students into the program and also manage the expectation of employers as they work with the youth. If American youth are not given the opportunities to explore programs such as the one presented in the study, society runs the risks of perpetuating the problem of inadequate preparation of the future workforce as the future workforce misses out on opportunities to develop technical, academic and soft skills at an early age.

Epilogue

After the study, I learned that the employer had discontinued the apprentice program for high school students for the next academic year and had begun plans to join a coalition of employers focused on apprenticeships for high school graduates in advanced manufacturing. Thus, educational partners would now be post-secondary institutions and the apprenticeship program had evolved into a post-secondary program. Not surprisingly, this validates one of the main points addressed in the study about the challenges of a single employer developing an apprenticeship program. However, an important lesson here is the employer's continued commitment to nurturing young talent. Perhaps the focus is rightly placed on high school graduates who have a desire to pursue careers in advanced manufacturing. Furthermore, without the restrictions of the high school environment in the form of compliance with accountability testing and child labor laws, the employer can focus on meeting his organization's skills needs.

While this turn of events may better suit the employer's needs, and it is fair that employers make strategic decisions to meet their organizational goals, the downside for students is that they will miss out on opportunities to be exposed to careers in manufacturing. From the educators' perspective, they are once again left with the question of how best to prepare students to be college and career ready by connecting students to meaningful work based learning opportunities before they graduate.

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APPENDICES

Appendix A. Interview Protocol for School Personnel

Date:
Time:
Interviewee:
Thank participant for agreeing to meeting
Explain my interest in program
Explain Interview Outline
Reiterate participants rights and receive consent to begin interview/recording

---

1. I am interested in knowing how this program came about
    a. What motivated you to start a partnership with [redacted]
2. What is the nature of the relationship between [redacted] High School
    a. What has been your experience with the partnerships at [redacted]
3. What kind of support/ resistance did you encounter in developing this partnership
4. How do you select your students?
5. Do school personnel (teachers) visit the apprentice at the work?
6. How does the school collaborate with the employer to develop curriculum for the apprentices
    a. Is there a curriculum that is shared with the employer?
    b. Are they allowed to create their own curriculum?
7. Are the lessons and skills learned at the jobsite evident in the students' academic work?

College and Career Readiness

8. In your view to what extent does the youth apprenticeship program provide rigorous and experiences to make the students college and career ready
    a. What are some of the skills that students must demonstrate in the program to be college and career ready
9. How does the setting at the school and workplace help students handle frustration/ failure/success
10. Do you see evidence of cognitive growth and development in students as a result of participating in the program

Benefits/Challenges to School

11. In your opinion what are some of the benefits and opportunities for the school
12. What challenges have you encountered in the program?
    a. How would you change that in the future?
    b. Any concerns about viability and sustainability of the program?
13. Can you tell me about students who graduated from the program last year

a. Where are they now
b. Did they continue in the same/different field

14. What is your hope for the program

Appendix B. Interview Protocol for Students

Date:
Time:
Interviewee:
Thank participant for agreeing to meeting
Explain my interest in program
Explain outline
Reiterate participants rights and receive consent to begin interview/recording

---

1. Tell me about your experience in this program
2. What motivated you to join this program?
3. What does being an apprentice mean to you?
4. What did your friends and family think about you joining this program?
5. What is your relationship with your colleagues like?
6. What was it like being in an adult work environment
7. What is your relationship with your supervisor/mentors like?
8. How did your education prepare you for this program
9. How has being in this program helped you with your academic studies
10. Do you have any plans of continuing your education in this field?
11. What skills have you acquired that you believe will help you transition to either college or the workforce
12. How do the school setting and the workplace setting facilitate or enhance your learning
13. What do you like/ not like about this program?
14. What are some of the challenges you face as a student in the program
15. What resources were made available to you to help you as an apprentice
16. How do you believe you have grown as a result of being in the program
17. What do you hope to get from this program and what are your plans after leaving this program?

Appendix C. Interview Protocol for Apprenticeship Sponsor (Employer)

Date:
Time:
Interviewee:
Thank participant for agreeing to meeting
Explain my interest in program
Explain Interview Outline
Reiterate participants rights and receive consent to begin interview/recording

---

1. I am interested in knowing how this program came about
    a. What motivated you to start this program?
2. How do you select your students?
    a. Specific vocational programs in high school
3. What is the nature of the relationship between nth works and the student?
    a. How often are they in school?
    b. How often are they at company?
    c. Is there monetary compensation
    d. Is that arranged with the school or the students?
4. What is the nature of the relationship between [redacted] High School

5. Is there a curriculum that is shared with the school or is your curriculum entirely different?

6. Is this program an extension of student's high school experience?

College and Career Readiness

7. To what extent does the youth apprenticeship program provide rigorous and integrated school and work based educational experiences
8. In what ways does the program enhance the learning experiences and career opportunities of apprentices
9. What are some of the skills that students must demonstrate in the program
10. What skills do you hope students graduate with
11. How does the setting at the workplace help students handle frustration/ failure
12. Do you see evidence of cognitive growth and development in students as a result of participating in the program
13. How is students' learning assessed in the program

Benefits to Company

14. How are mentors chosen
15. Are mentors provided with specific training
16. In your opinion what are some of the benefits and opportunities for your organization
17. How do you think this is perceived by?
    i. Students

ii. Parents/school

18. Are you concerned about other companies "poaching" after your apprentices graduate from the program
19. What challenges have you encountered in the program

    How would you change that in the future?

    Any concerns about viability and sustainability of the program?

Appendix D. Subject Informed Consent Document

Developing College and Career Readiness through Apprenticeships

LIST OF INVESTIGATORS

Dr. James Stone
University of Louisville
350 Education Bldg.
1905 S 1st Street
Louisville KY 40292
Ph: 502-852-0639
Email: james.stone@louisville.edu

Nana Arthur-Mensah
University of Louisville
350 Education Bldg
1905 s 1st Street
Louisville, KY 40292
Ph: 502-298-7586
Email: nkarth01@louisville.edu

Site(s) where study is to be conducted: [redacted]

Phone number for subjects to call for questions: 502-852-0639/502-298-7586

Dear Participant,

We would like to invite you to participate in our research study entitled; Developing College and Career Readiness Apprenticeships. We are inviting you to be a part of this study because you are currently involved in an apprenticeship program at [redacted].

The purpose of this study is to describe a partnership between a local high school and employer that provides a youth apprenticeship program to students to develop college and

career ready skills. Specifically, the researchers will examine (a) the structure and organization of the apprenticeship programs (b) the experiences of the stakeholders, namely: students, employers and educators.

The timeline for data collection will be January 2014 to April, 2014. We will employ the following information gathering procedures during our time at [redacted] High School; Semi-structured in depth interviews lasting no longer than 45 minutes, observations and document analysis. All interviews will be recorded for transcription purposes. The transcribed documents will be kept in a locked office and destroyed after the study. Additionally, the researchers will be conducting an observation of students in the apprenticeship program performing their duties at the organization, and will be performing a document analysis related to the apprenticeship program. Please note that you may decline to answer any questions that may make them uncomfortable.

Your responses will be anonymous to ensure that they cannot be linked to you. If we write a report about this study, we will do so in such a way that you cannot be identified. The information you provide will be kept confidential. However, the University of Louisville Institutional Review Board (a committee that reviews and approves research studies) may inspect and copy records pertaining to this research.

There are no foreseeable risks to those choosing to participate in the study although all studies may encounter unforeseen risks. The benefit of this study may include (a) discovery of new information concerning high school apprenticeship programs (b) insights into experiences of stakeholders involved in the apprenticeship program and (c) possible best practices for developing a high school apprenticeship program.

The analytical framework structuring this study provides the fields of Educational Leadership and Organizational Development with means to examine how work based learning programs; particularly apprenticeships contribute to college and career readiness among high school students as they graduate and transition to higher education or the labor market.

Your participation in this research study is completely voluntary. If you decide not to be in this study, or if you stop participating at any time, you will not be penalized or lose any benefits for which you are otherwise entitled.

If you have any concerns or complaints about the study or the study staff, you have three options.

You may contact the principal investigator at 502-852-0639.

If you have any questions about your rights as a study subject, questions, concerns or complaints, you may call the Human Subjects Protection Program Office (HSPPO) at (502) 852-5188. You may discuss any questions about your rights as a subject, in secret, with a member of the Institutional Review Board (IRB) or the HSPPO staff. The IRB is an independent committee composed of members of the University community, staff of

the institutions, as well as lay members of the community not connected with these institutions.

If you want to speak to a person outside the University, you may call 1-877-852-1167. You will be given a chance to talk about any questions, concerns, or complaints in secret. This is a 24 hour hot line answered by people who do not work at the University of Louisville.

This paper tells you what will happen during the study if you choose to take part. Your signature means that this study has been discussed with you, that your questions have been answered, and that you will take part in the study. This informed consent document is not a contract. You are not giving up any legal rights by signing this informed consent document. You will be given a signed copy of this paper to keep for your records.

_____	_____
Signature of Subject/Legal Representative	Date Signed
_____	_____
Signature of Person Explaining the Consent Form (If other than the Investigator)	Date Signed
_____	_____
Signature of Investigator	Date Signed

Appendix E. Parental Consent Form

Developing College and Career Readiness through Apprenticeships

LIST OF INVESTIGATORS
Dr. James Stone
University of Louisville
350 Education Bldg.
1905 S 1st Street
Louisville KY 40292
Ph: 502-852-0639

Nana Arthur-Mensah
University of Louisville
350 Education Bldg
1905 s 1st Street
Louisville, KY 40292
Ph: 502-298-7586
Email: nkarth01@louisville.edu

Site(s) where study is to be conducted: [redacted]

Dear Parent/Guardian,

You/your child are invited to participate in a research study. The study is being conducted by Dr. James Stone III (PhD) & Nana Arthur-Mensah (PhD Candidate). The study is sponsored by the University of Louisville, Department of Organizational Leadership and Learning. The study will take place at [redacted] and approximately five students will be invited to participate.

Purpose

The purpose of this study is to describe a partnership between a local high school and employer that provides a youth apprenticeship program to students to develop college and career ready skills. Specifically, the researchers will examine (a) the structure and organization of the apprenticeship programs (b) the experiences of the stakeholders, namely: students, employers and educators.

Procedures

In this study, your child will be asked to participate in no more than two interviews to share their experiences in the apprenticeship program. We will conduct semi-structured in depth interviews lasting approximately 45 minutes. All interviews will be recorded for transcription purposes. The transcribed documents will be kept in a locked office and destroyed after transcriptions. Additionally, the researchers will be conducting an observation of your child performing their duties at the organization. Please note that your child may decline to answer any questions that may make them uncomfortable.

Potential Risks

There are no foreseeable risks to those choosing to participate in the study although all studies may encounter unforeseen risks.

Benefits

The possible benefits of this study include (a) discovery of new information concerning high school apprenticeship programs (b) insights into experiences of stakeholders involved in the apprenticeship program and (c) possible best practices for developing a high school apprenticeship program (c) a contribution to the literature on benefits and challenges of stakeholders in an apprenticeship program Although the information collected may not benefit you directly, the information learned in this study may be helpful to others.

Confidentiality

Total privacy cannot be guaranteed. You/your child's privacy will be protected to the extent permitted by law. If the results from this study are published, you/your child's name will not be made public. While unlikely, the following may look at the study records: The University of Louisville Institutional Review Board, Human Subjects Protection Program Office. Data collected for this study will be secured and kept on a password protected computer and kept in a locked file cabinet in the researcher's office.

Voluntary Participation

Taking part in this study is voluntary. You/your child may choose not to take part at all. If you decide to be in this study you may stop taking part at any time. If you decide not to be in this study or if you stop taking part at any time, you will not lose any benefits for which you may qualify.

Research Subject's Rights, Questions, Concerns, and Complaints

If you have any concerns or complaints about the study or the study staff, you have three options.

You may contact the principal investigator at 502-852-0639.

If you have any questions about your rights as a study subject, questions, concerns or complaints, you may call the Human Subjects Protection Program Office (HSPPO) (502) 852-5188. You may discuss any questions about your rights as a subject, in secret, with a member of the Institutional Review Board (IRB) or the HSPPO staff. The IRB is an independent committee composed of members of the University community, staff of the institutions, as well as lay members of the community not connected with these institutions. The IRB has reviewed this study.

If you want to speak to a person outside the University, you may call 1-877-852-1167. You will be given the chance to talk about any questions, concerns or complaints in secret. This is a 24 hour hot line answered by people who do not work at the University of Louisville.

This paper tells you what will happen during the study if you choose to take part. Your signature means that this study has been discussed with you, that your questions have been answered, and that you will take part in the study. This informed consent document is not a contract. You are not giving up any legal rights by signing this informed consent document. You will be given a signed copy of this paper to keep for your records.

_____	_____
Signature of Subject/Legal Representative	Date Signed
_____	_____
Signature of Person Explaining the Consent Form (If other than the Investigator)	Date Signed
_____	_____
Signature of Investigator	Date Signed

Appendix F. Subject Assent Form

IRB # 13.0907: Developing College and Career Readiness through Apprenticeships

I am invited to be in a research study being done by Dr. James Stone III (PhD) & Nana Arthur-Mensah (PhD Candidate). When a person is in a research study, they are called a "subject". I am invited because I am enrolled in an apprenticeship program at [redacted].

This means that I will be interviewed by the researcher to learn about my experiences as a student in the apprenticeship program. These risks are minimal and questions posed to me will be limited to my role as an apprentice.

This overall study will last approximately three months, however my participation in the study will last approximately two weeks, where I will be asked to participate in in no more than two interviews to share my experiences in the apprenticeship program. The benefit to me for participating in this study is (a) discovery of new information concerning high school apprenticeship programs (2) insights into experiences of students enrolled in apprenticeship program.

My family, the professor and the researcher as well as my teachers and supervisors in my apprenticeship program will know that I'm in the study. If anyone else is given information about me, they will not know my name. A number or initials will be used instead of my name.

I have been told about this study and know why it is being done and what I have to do. My parent(s) have agreed to let me be in the study. If I have any questions I can ask Dr. Stone and Nana Arthur-Mensah and they will answer my questions. If I do not want to be in this study or I want to quit after I am already in this study, I can tell the researchers and they will discuss this with my parents.

Printed Name of Subject	***Signature of Subject***	***Date Signed***
Printed Name of Parent/Guardian	***Signature of Parent/Guardian***	***Date Signed***
Printed Name of Investigator	***Signature of Investigator***	***Date Signed***

CURRICULUM VITA

Nana K. Arthur-Mensah
nkarth01@louisville.edu

EDUCATION

Ph.D. Educational Leadership and Organizational Development, University of Louisville (2015)

Concentration: Organizational Leadership and Learning
Dissertation: Developing the Future Workforce through Apprenticeships: A case study of an Industry–Education Partnership

Master of Science, Human Resource Education, University of Louisville (2006)
Bachelor of Science, Business Administration, University of Ghana, Legon (1993)

RESEARCH INTEREST

- Apprenticeships
- Workforce development and HRD
- Technical vocational education and training(TVET)
- Women in non-traditional occupations(NTO) and HRD
- Organizational learning

TEACHING EXPERIENCE

- Graduate Teaching Assistant, University of Louisville. Leading Change in Organizations-ELFH 442 Fall, 2013 (Two classes per semester - Asynchronous online & Seated/In-Class)
  Developed lesson plans, taught lessons and graded papers
- Graduate Teaching Assistant, University of Louisville. Leadership & Management-ELFH 490 Spring, 2014 (Two classes per semester - Asynchronous online & Seated/In-Class)
  Developed lessons plans, taught lessons and graded papers and projects
- Graduate Teaching Assistant, University of Louisville. Evidence Based Research in HROD-ELFH 617 Spring, 2015 (Synchronous online)

PUBLICATIONS

- Arthur-Mensah, N. K., & Shuck, B. (2014). E-Learning in developing countries: Implications for workforce training and development in Africa. *New Horizons in Adult Education and Human Resource Development, 26(4),* 40-45.
- Arthur-Mensah, N., & Alagaraja, M. (2013). Exploring technical vocational education and training systems in emerging markets: A case study on Ghana. *European Journal of Training and Development*, *37*(9), 835-850.

Book Chapter

- Alagaraja, M., & Arthur-Mensah. N. (2014). National and Organizational Imperatives for HRD in Ghana. In Poell, R. F., Rocco, T. S., & Roth, G. L. (Eds.) *The Routledge companion to human resource development.* London: Routledge.

PRESENTATIONS

- Arthur-Mensah, N. (2012). Vocational Education and Training in the 21st Century. *Paper presented at Spring Research Conference.* Louisville, KY.
- Arthur-Mensah, N., & Alagaraja, M. (2013). NHRD in Ghana: Exploring vocational education and training issues. In K.M. Dirani, and J.Gedro (Eds.), *Academy of Human Resource Development Conference Proceedings* (pp.3895-3902). Washington, DC: AHRD
- Arthur-Mensah, N. (2014). Preparing the workforce of the future through work based learning: A conceptual and theoretical argument. *Paper presented at The Academy of Human Resource Development International Conference of the Americas*. Houston, TX: AHRD
- Arthur-Mensah, N. (2014). Increasing access and opportunities for women in non-traditional occupations: The role of community colleges and HRD. *Paper presented at The Academy of Human Resource Development, International Conference of the Americas*. Houston , TX: AHRD
- Arthur-Mensah, N. (2015). Taking on the skills gap challenge: A Case Study of Employer Participation in Apprenticeships. *The Academy of Human Resource Development, International Conference of the Americas*. St. Louis, MO

PROFESSIONAL DEVELOPMENT ACTIVITIES

- Registration Chair- Student Research Conference University of Louisville (2011-2012)
- Delphi U 2013 Organization- University of Louisville Center for Teaching and Learning (2013)
- Graduate Teaching Academy- University of Louisville (2014)
- Grant Writing Academy – University of Louisville (2014)
- Reviewer- Academy of Human Resource Development (2014)
- Committee Member – Student Research Conference University of Louisville (2014)

AWARDS and SCHOLASHIPS

- Southern Regional Education Board (SREB) State Doctoral Scholar 2014-2015

COMPUTER TECHNOLOGY and SKILLS

- Data Analysis SPSS, NVivo
- Word Processing Microsoft Word, Excel, PowerPoint
- E-learning: Adobe Captivate
- Web Design Dreamweaver
- Graphics Adobe Photoshop
- Instructional: Blackboard, Jing

PROFESSIONAL EXPERIENCE

Marketing and Public Relations Coordinator (2008-2009)
North American Connection, Solihull West Midlands, United Kingdom

- Increased revenue from advertising sales and sponsorship by 15% by actively engaging business that support expatriates in the West Midlands (UK)
- Identified and coordinated with third party resources to promote transition and adaptation to British culture for members of expatriate organization

Learning Analyst 2007
Humana Inc. Louisville, KY

- Researched and analyzed data in various markets on workforce development resources/grants in the US to identify funding streams to support Humana's training and learning activities resulting in the development of a comprehensive company-wide resource tool
- Introduced new educational resource partnerships to Humana through identified educational partnership with various agencies to support company's growth and learning
- Presented findings to identified stakeholders and produced handbook on available grants in different states that Humana could utilize for its educational purposes

Claims Consultant 1999-2003
Assurance Agency Ltd, Rolling Meadows, IL

- Received and reported on professional liability and property claims for selected nursing homes
- Provided clients and risk management consultants with claim trends analysis feedback in order to minimize potential client liabilities and premium increases
- Monitored client benefits and educated clients on correct interpretation of coverage resulting in increased client satisfaction

Human Resource Analyst 1993-1995
Volta Aluminum Company, Tema, Ghana

- Developed educational materials and conducted employee benefit training sessions for new employees and departments
- Led and conducted management training on company policies and procedures for new supervisors
- Educated and supported employees in the correct procedures of filing for benefits