A PHENOMENOLOGICAL STUDY OF EMPLOYERS’ PERCEPTIONS OF HEATING, VENTILATION, AND AIR CONDITIONING (HVAC) GRADUATES

by
Howard Hendren
Liberty University

A Dissertation Presented in Partial Fulfillment
Of the Requirements for the Degree
Doctor of Education

Liberty University
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APPROVED BY:

Dr. John Duryea, Ed.D., Committee Chair
Dr. Joan Fitzpatrick, Ph.D., Committee Member
Dr. Terry Murphy-Latta, Ed.D., Committee Member
Scott Watson, Ph.D., Associate Dean, Advanced Programs
ABSTRACT

In the state of Kansas, career technical education (CTE) has undergone major changes. The Kansas Board of Regents, the Technical Education Authority, and business and industry joined together to align Heating, Ventilation, and Air Conditioning (HVAC) programs to make a comprehensive program beneficial to students, graduates, and business and industry. CTE provides students and adults with technical skills, knowledge, and training. Post-secondary education is designed to instruct students concerning careers, career readiness, and the 21st century workplace. The purpose of this transcendental phenomenological study was to understand and describe employers’ perceptions of HVAC graduates. Through the use of a survey, focus group, and interviews, the perceptions of 21 HVAC employers were studied. The evidence collected in this study was analyzed to gain a complete understanding of the employers’ perceptions of the HVAC graduates. The results of the research revealed three overarching themes relevant to recommended alterations to future HVAC programs: (a) emphasize basic fundamentals classes, (b) focus on technical skills and include more hands-on learning, and (c) incorporate soft skills or people-oriented skills training into each class.

Keywords: career construction theory (CCT), career development, career readiness, career and technical education (CTE), constructivism, employers’ perceptions, HVAC, workforce development.
Dedication

I dedicate this dissertation to my family. Each of you has influenced me and encouraged me to do my best. To my parents, the late Howard and Alma Hendren, thank you for giving me the tools in life to be the person I have become, and to my aunt, the late Sue Barton, who was like a mother to me, who shared her compassion, love, and wisdom with a hard-headed young man. I wish all three of you could be here to celebrate this milestone.

To my daughter, Katherine, thank you for being a beautiful person inside and out. You are the light and the song in my heart. I am praying for you as you continue your own educational endeavors and reaching your own goals in life. Finally, to my wife, Melisa, thank you for being my rock. Thanks for being the world’s best encourager and supporter.
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A special thank you goes to Dr. Fred Milacci, who served as my research consultant. It was your support, advice, and direction that transformed the initial proposal development into this dissertation. Lastly, an appreciative thank you goes out the HVAC employers who gave their time and were willing to assist me in the research that allowed this study to become a reality.

I would also like to thank the faculty, staff, and HVAC students at Johnson County Community College who made a point to ask how the dissertation was coming over this past year. This encouragement was one of the things that kept me going when the process became tedious.
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List of Abbreviations

Air Conditioning Contractors of America (ACCA)
Air Conditioning, Heating, and Refrigeration Institute (AHRI)
Associates of Applied Science (AAS)
Bureau of Labor Statistics (BLS)
Career Construction Theory (CCT)
Career and Technical Education (CTE)
Classification of Instructional Program (CIP)
Environmental Protection Agency (EPA)
General Educational Development (GED)
Heating, Ventilation, and Air Conditioning (HVAC)
Industry Competency Exam (ICE)
Inquiry Based Learning (IBL)
Institutional Review Board (IRB)
Kansas Board of Regents (KBOR)
Midwest Community College (MCC)
National Center for Construction Education and Research (NCCER)
North American Technician Excellence (NATE)
Occupational Safety and Health Administration (OSHA)
Problem Based Learning (PBL)
Science, Technology, Engineering, and Mathematics (STEM)
Technical Education Authority (TEA)
Zone of Proximal Development (ZPD)
CHAPTER ONE: INTRODUCTION

Overview

According to the United States Bureau of Labor Statistics (BLS) Occupational Outlook Handbook (2014–2015), technicians employed in the Heating, Ventilation and, Air Conditioning (HVAC) industry have a tremendous growth potential. The opportunities available to current HVAC technicians and the high demand for more people to enter the HVAC workforce are evidence of the promising employment prospects in this field. The BLS (2014) projected a 21% growth in the HVAC field over the next 10 years. The challenge that companies are experiencing is finding employees with the academic preparation, technical abilities, and career readiness skills that meet the marketplace demands (Shankel, 2010). Education is more important than ever for an HVAC technician because of the increasing complexity of the HVAC systems being used and the increasing seasonal energy efficiency ratings placed on the HVAC systems. As a result of the increased skills required to operate, maintain, and service the equipment, the HVAC industry is facing a shortage of employees.

Anesi (2013) noted that there are severe employment problems looming not only in the HVAC field, but in most of the career educational fields. The most obvious problems are: (a) an aging workforce, (b) retirements, (c) a shortage of qualified candidates, (d) lack of applicable degree or certification, and (e) lack of experience. As a result of the increased growth in the HVAC industry, an aging workforce and the demand for new graduates and employees to enter the HVAC field, HVAC employers are being asked: What kind of training is needed for HVAC employees to enter the workforce and to be career ready? Anesi (2013) asked the question, “Who is responsible for the gap between what graduates need to know and what employers expect from the HVAC graduates?” (p. 16). As of today, there is no definite answer. In this
study, I examined employers’ perceptions of HVAC graduates and the skills considered necessary for an HVAC graduate to possess in order to be considered career ready and employable.

Mason, Williams, and Cranmer (2009) suggested that from the perspective of HVAC employers, employability of HVAC graduates refers to work readiness; the possession of the necessary skills, knowledge, attitudes, and capacity to make productive contributions to the employer. Employers acknowledged that while academic achievement is important, the problem is finding entry-level employees who have essential career-readiness skills such as: (a) critical thinking, (b) problem-solving, and (c) communication skills. These skills are required in addition to soft skills such as: (a) teamwork, (b) punctuality, and (c) the ability to follow directions (Boettcher, 2014; Drage, 2009; Jamal & Mandal, 2013). Cai (2013) advised that “when it comes from transitioning from education to the workplace, employers’ perspectives are crucial” (p. 460). To address this, the Kansas Board of Regents (KBOR) has put forth an initiative to help with the demand for skilled employees. The KBOR (2014d) started a workforce development that focuses on preparing workers in Kansas for high-priority fields of employment.

Katsinas (1994) defined workforce development as “the education and training programs for participants or those who wish to participate in the workforce, delivered through formal and informal means, that are designed to enhance the skills of people to gain or maintain socio-economic status” (p. 9). Washbon (2012) noted that many employers are “seeking workers with specific technical knowledge and skills typically gained in post-secondary educational programs and the employers expect workers to possess strong foundational skills” (p. 44). Shankel (2010) suggested that employers should work with the community and technical colleges in order to
keep the career educational programs aligned with the business and industry needs and to develop new programs.

Cai (2013) expressed that one of the basic functions of community colleges is to educate people to meet the needs of the labor market. Almost two-thirds of tomorrow’s workforce will require between one to three years of technical training above the secondary level (Carnevale, Strohl, & Smith, 2009; Daniels, 2000). Weeks (2009) noted that faculty at community colleges have a history of preparing qualified technical graduates who are career ready for the workforce and are able to meet the needs of the local industries. The relationship between business and industry and community colleges needs to be seen as a win–win partnership. Aragon, Woo, and Marvel (2005) and Lebesch (2012) noted that Career and Technical Education (CTE) programs have been an integral part of the mission of community colleges since their inception. The CTE programs were designed for students to learn advanced skills above the high school level. The intent was to serve students in the community by preparing them for employment and serve industries by supplying them with trained employees.

Cai (2013) suggested that “colleges are trying to meet the employers’ needs of qualifying employees” (p. 466). Washbon (2012) noted that in the face of these changes,

The key questions for educators are not just what kind of skills, knowledge, and abilities are needed in the workplace, but how the community colleges can align workplace needs to ensure that workers are prepared for initial employment and over the course of their lifetime.

Washbon went on to suggest, “Colleges should develop industry-based advisory boards, conduct employer surveys, gather information from focus group discussions, working collaboratively with business and industry to develop curriculums that mirror the needs of the industry” (p. 47).
In this phenomenological study, I sought to gain an accurate understanding of employers’ perceptions of HVAC graduates, the professional value of students in a CTE program of study and HVAC workforce training. Younger (2011) reported that in the state of Kansas, the members of the KBOR described CTE programs as “comprehensive learner-centered programs that develop academic, technical, and workplace skills” (p. 2). The KBOR (2014b) directed the members of the Kansas Postsecondary Technical Education Authority (TEA) to “ensure that CTE programs align with business and industry needs for current and emerging high skill and high wage occupations” (p. 1).

This synchronization between the members of the TEA, KBOR, and business and industry will result in the preparation of future employees who have mastered the skills that are essential and valuable to both the graduates and the employers. Academics provide students with a foundation for successful integration into the workforce and prepare students for the practical application of learned skills demanded in business and industry. With this academic preparation, the graduates of community colleges should be able to accomplish their assigned tasks as professional HVAC technicians. Faculty at these programs prepare students by “aligning the educational courses and utilizing industry-based assessments to verify the skills of the graduates and those graduates attaining credentials recognized and valued by business and industry” (KBOR, 2014a, p. 2).

The members of KBOR, TEA, and business and industry concluded that four primary objectives should be established for HVAC students in community and technical colleges. The objectives are: (a) allow business and industry leaders to identify value-added exit points within the program, (b) identify and support student acquisition of nationally recognized third party industry credentials, (c) identify common courses that can serve as a bridge for articulation, and
(d) decrease the variability in program length (KBOR, 2014d). As a result, implementing these guidelines led to the establishment of new criteria for the HVAC certificate and degree in the community and technical colleges in the state of Kansas.

Based upon the HVAC realignment process, the members of KBOR and business and industry are addressing the needs of the TEA (KBOR, 2014c). For an associate’s degree, the maximum number of hours is capped at 67 hours, with a minimum of 15 hours of general education courses (KBOR, 2014d). For an HVAC certificate, the maximum number of hours is capped at 44 hours. The exit points for the certificates and degrees are based upon industry competencies and recognized as the endpoints upon which students have acquired the basic knowledge that an HVAC technician should possess as he/she enters the HVAC workforce. Third-party credentialing tests are required by KBOR as a method of establishing competency levels within the HVAC programs in Kansas (KBOR, 2014d). These third-party tests are administrated by community college staff under the guidance of facility staff. The purpose of the third-party certifications is to determine that the student can meet the HVAC industry-recognized competencies. Thus, when graduates interview with a prospective employer, they can provide evidence that they possess recognized industry-based credentials. The testing options are limited to four accredited certified training establishments: (a) the North American Technician Excellence (NATE), (b) HVAC Excellence, (c) National Center for Construction Education and Research (NCCER), and (d) Industry Competency Exams (ICE) (KBOR, 2014b).

Community college staff plays an important role in preparing students for employment (Cai, 2013). They provide students with: (a) the requisite skills, (b) the foundation of their knowledge, and (c) qualities that employers seek. In order to bridge the gap between what employers want and what is being taught in community colleges, it is necessary to establish
partnerships between the administrators at community colleges and the leaders of businesses and industries who employ the graduates. Pawlowski (2007) defined a business coalition as any organized group of businesspeople who focus on the issues that affect their business. Through their mutual efforts, it is possible to increase the opportunities for addressing challenges for the business environment and the community colleges.

CTE has been referred to by many names over the years, including: (a) vocational education, (b) life skills, (c) apprenticeships, (d) work-based learning, (e) cooperative education, and (f) trade and industrial education, among other names (Wang & King, 2008). The objective of the CTE programs is for the faculty to educate students for a specific career. In this research study, I will focus on employers’ perceptions of the attributes, competencies, and skills of students in the HVAC field. Vocational and career education programs are designed to provide specialized instructional methods that allow students to obtain an occupational competency (Budzik, 1996; Rojewski, 2002). Workforce development incorporates a hands-on approach to learning, current techniques, and procedures that are applicable to the current trends in HVAC.

Hyslop (2008) noted that “the concept of workforce development credential has emerged to attempt to validate work-ready skills” (p. 40). In response to the increased need for qualified technicians with the skills that employers seek, many employers have utilized the workforce-readiness credentials as a mechanism to identify new employees. The criteria by which employers evaluate new employees are: (a) general aptitude, (b) foundational knowledge, and (c) soft skills (Hyslop, 2008).

HVAC graduates need to have a strong command of theory, application, and knowledge when they work in the field (Feutz & Zinser, 2012). Budzik (1996) reported that skilled HVAC workers are vital for the continued growth of the HVAC industry. Due to the rapid expansion in
the number of HVAC service and technical jobs, these positions need to be filled with highly skilled and qualified technicians (Budzik, 1996). Murray (2011) found that graduates who have attained a high level of training can earn substantially more than those with lower levels of training. Moreover, in certain industrial trades, there are additional requirements to ensure that the technicians are qualified to work on certain equipment and in specialized jobs (Murray, 2011).

Career education differs from traditional student education. In 1998, Knowles, Holton, and Swanson, further developed the concept of the learning theory of adults (Knowles, Holton, & Swanson, 1998). In post-secondary education systems, the majority of the students are adults. Daniels (2000) noted that the average age of students who are enrolled in CTE programs at community colleges, is between 28 and 32 years of age.

Typically, the faculty of local community colleges conducts training for adult students who want to enter the HVAC workforce or for employees who are already in the HVAC field. Those students who are already employed in the HVAC trade enroll in the community college in order to continue their education, upgrade their skills, or learn a new or different trade. According to Matkin (2012), new students enroll for one or more of the following reasons: (a) to alter their current employment path and engage in a different learning environment, (b) to acquire different skill sets, or (c) to become more highly skilled within the same profession. Students who enter the HVAC education programs can become qualified graduates within a few semesters. After acquiring these updated or new skills, students are more attractive candidates for employers in the HVAC field.

Bunch (2009) suggested that CTE students “want to know that the skills they are being asked to learn will directly benefit them in the job market” (p. 261). Doyle (2012) noted that
“the demand is rising for highly trained and skilled individuals in the United States and around the world” (p. 53). The HVAC technician must have a good understanding of the scientific principles of an HVAC system and be able to clearly express to the employer, home owner, or co-worker the problems within a system and the procedure to remedy those problems (Althouse, Turnquist, Bracciano, Bracciano, & Bracciano, 2014).

According to Shankel (2010) a looming problem for the leaders of industry and business is a shortage of a skilled workforce. It is becoming increasingly difficult to find skilled workers, because many youth are disinterested in blue collar work. Packard, Leach, Ruiz, Nelson, and DiCocco (2012) observed that socioeconomic status can place restrictions on some career opportunities. Packard et al. (2012) reported that students with lower socioeconomic backgrounds or first-generation college students feel pressure to complete school quickly, and these students may have negative perceptions concerning career exploration. Additionally, Frendburg (2013) noted the trend in secondary schools is toward more focus on college preparatory course work and less on technical courses and the trades.

Lerman (2008) reported that in a majority of manufacturing firms, there is a shortage of employees with basic skills. The primary skills needed are customer service skills. Business owners have complained that secondary schools do not prepare students for workforce demands. In some circumstances, both students and parents are inadequately informed about the benefits of employment within the trades.

Due to the large number of current HVAC workforce members, who will soon retire, there is a growing need in the HVAC field for trained, younger individuals to fill this gap (Frendburg, 2013). Shankel (2012) reported that the average age of the current skilled HVAC workforce is 56 years of age, and many of these employees are due to retire within the next
5–15 years. For this reason, it is important for community colleges and business leaders to develop partnerships in order to find solutions to the problem of this impending workforce deficit.

The education of adult students should mutually benefit all concerned parties including educators, business leaders, and students. In order to build student interest in the CTE programs, both educators and business leaders need to work together to find solutions. The initial step is to increase students’ interest in the HVAC field. To achieve this, it is necessary to develop a curriculum that is both educationally sound and inclusive of gainful employment skills. Roessger (2012) observed that the presence of an active learning environment is conducive to experiential learning, which is the framework of a sound CTE program. When students actively engage in the learning process, their interest in the subject matter is heightened and they can build their foundational knowledge for application of the subject (Powell & Kalina, 2009).

Background

In this study, the objective was to obtain employers’ perceptions of current HVAC programs and to determine the degree of alignment between the course of studies and the employment standards of the HVAC industry in Kansas (KBOR, 2014d). Recently, the members of the KBOR and the TEA, along with individuals from the community and technical colleges and professionals from the HVAC industry, joined together to establish the criteria for the new classes, credit hours, competencies, objectives, and content for several HVAC classes currently being taught at the community and technical colleges in Kansas (KBOR, 2014a).

In the CTE field of HVAC, the training is predominantly a hands-on approach to learning. By determining the value of the program of study from several employers’ perspectives, I hope to determine whether the HVAC programs in Kansas meet the needs of the
employers in business and industry, who are currently in need of a talented and skilled workforce (Vickers-Koch, 2011).

The theoretical framework of this study is based upon career construction theory (CCT) (Brown & Brooks, 1996; Del Corso, Rehfuss, & Galvin, 2011; Glavin & Berger, 2012; Hodge & Lear, 2011; Patton & McMahon, 1999; Sampson, McClain, Musch, & Reardon, 2013; Savickas, 2005; Savickas, 2012; Savickas & Lent, 1994; Swanson & Fouad, 1999). CCT is grounded in the understanding of the skills associated with a trade and can be used to identify the career readiness of the individual. Application of this theoretical framework to the HVAC graduates and workforce development allowed me to better identify the effectiveness of an HVAC program and the benefit of workforce development to the employers hiring HVAC graduates.

According to Merriam (2002), the purpose of qualitative research is to attempt “to understand and make sense of phenomena from a participant’s perspective” (p. 6). Stanage (1987) maintained that “a phenomenological approach to adult education opens up new directions for research and uncovers new layers of clarity in perceptions, conceptions, action, and practices” (p. 45). Creswell’s (2013) phenomenological approach to research was used in this study to examine the lived experiences of the participants.

**Situation to Self**

This research is of particular interest to me because as an associate professor and a department chair of an HVAC program at a community college in Kansas, I want to understand the employers’ perceptions of the HVAC graduates. I also want to know: (a) how I can facilitate employers’ needs, now and in the future; (b) what changes should be made to the programs to ensure that the community college faculty meet the needs of the students, and; (c) what courses
are relevant to both students and employers. It is my hope that the findings from this study can be used to identify the factors important to the HVAC employers.

As the department chair of an HVAC program of study at a community college institution, this information is critical to ensure that my colleagues and I are preparing the students for successful employment. Both students and the industry will benefit from a fuller understanding of the needs of the HVAC industry. A vast amount of the instruction used in the HVAC classrooms and practical laboratory experiences are based upon the constructivist methodology. Yilmaz (2008) defined constructivism as a theory of learning, not a theory of teaching, stating that: “Knowledge is not discovered, but rather constructed by individuals based upon their experiences” (p. 162). When students are taught with a hands-on methodology, they are provided with a greater understanding of the complex issues that they will encounter in the field.

The principles of andragogy are effective for teaching adults (Knowles et al., 1998). Knowles et al. describe andragogy as a set of core adult learning principles that apply to adult learning situations. According to Ellis (2004) and Splitter (2009), instructors should allow students to take possession of the learning. An active and learner-centered instruction environment promotes an open and lively discussion of the learning objectives.

Further, facilitating a constructivist learning environment allows instructors to continue to use techniques derived from the principles of adult learning, which dictate how adults learn in the classroom and in a laboratory setting. A learner–centered environment leads to students’ natural discovery of knowledge and a greater understanding of the concepts that have been presented. It is important to know how training is associated with employers’ perceptions as it relates to hiring employees. Therefore, the findings from this study could provide valuable
insight into the teaching methods of faculty at the community and technical colleges and how these are associated with the skills employers seek in potential employees.

**Problem Statement**

The problem addressed in this study was whether the graduates of an HVAC program are prepared for the rigors of the HVAC field given the current workforce skills that employers view as applicable, current, and relevant (Hodge & Lear, 2011). Graduates of HVAC programs work in residential and commercial companies of various sizes. Feutz and Zinser (2012) noted that “the purpose of the CTE format of instruction is to prepare students for success in the workforce” (p. 12). They also prescribed that “more CTE programs should conduct qualitative follow-up studies of their graduates and the companies that employ them” (p. 17). This current study was based in Kansas and was designed to identify the effectiveness of an HVAC training program based upon the employers’ perspectives of the HVAC graduates.

Although there is no current benchmark research showing employers’ perceptions of HVAC graduates, the studies conducted by Feutz (2010) and Green (2006) have some implications for this study. Feutz focused on various aspects of students’ completion of a Bachelor of Science in HVAC from Ferris State University. Green assessed students’ responses in regard to their preparedness for working within the HVAC field. Both researchers used similar data collection processes to understand the perceptions of their participants.

Various other researchers conducted studies focusing on the following topics: (a) the qualities of CTE workforce training (Davis, 2013; Strain, 2000), (b) teacher efficacy (Younger, 2011), (c) analysis of community college courses and completion rates (Tomerlin, 2012), (d) employers’ satisfaction with workforce development (Coughlin, 2012), (e) preparation of CTE teachers (Pogliano, 2008) and the effects of a CTE curriculum on student achievement (Siegrist,
2012), (f) students’ career readiness in CTE (Strohschein, 2012), and (g) success of CTE graduates (Al-Alawneh, 2009; Tillman, 2005). The findings from each of these studies have contributed to the overall understanding of CTE students and graduates working towards obtaining employment in the marketplace.

**Purpose Statement**

The purpose of this phenomenological study was to understand and describe employers’ perceptions of career readiness of graduates from a community college HVAC program in Kansas. In particular, the study was conducted to ascertain what skills employers require when they hire HVAC graduates. Furthermore, I sought to determine whether the employers considered HVAC graduates ready for the rigors of the field.

The research method of phenomenology was an appropriate approach to this study and entailed exploring the lived experiences of HVAC employers to gain an accurate understanding of their perceptions in regards to the effectiveness and readiness of the graduates whom they employ. According to Stewart and Mickunas (1974), a phenomenological research method is employed as a starting point and is conducted free from assumptions. Ideally, the research questions and information obtained about employers’ perceptions of HVAC graduates should be concise, in-depth, and thought provoking.

As reported by Moustakas (1994), a phenomenological research methodology is one that is focused on an individual’s lived experience. However, each employer has his or her own standards and ideas about what characteristics constitute an ideal employee. In this phenomenological research study, the author sought to identify the commonalities of the characteristics for which these HVAC employers look when they hire recent HVAC graduates.
Significance of the Study

Moustakas (1994) described phenomenology as an appropriate methodology “for investigating human experiences” (p. 101). In this phenomenological study, I sought to identify the essence of the employers’ perceptions when they consider hiring HVAC graduates. The findings from this study are important to faculty of community and technical colleges to ensure that students are better prepared to work in the HVAC field with a high level of ability and competency. The findings of this study also have the potential to be helpful to those employers who hire HVAC graduates because of their input. Rojewski (2002) found that the purpose of CTE training is to effect “positive change in terms of support, preparation, and guidance” (p. 19).

Yilmaz (2008) noted that “familiarity with the subject matter is not enough” (p. 204) for students to be successful in the workforce. In the HVAC field, continual learning is a requirement in order to stay abreast of current technology and advances. In the HVAC industry, learning is a life-long and in-depth process. Teaching and training is an essential process because of the continual advancement of HVAC technology and equipment. Graduates need to be prepared for an ever-changing work environment.

Billett (2009) stated that “a shift in focus to occupational specific courses has also presented the expectations that graduates will enjoy a smooth transition from their studies into professional practice” (p. 827). When the students are taught current installation and servicing methods for HVAC equipment, instructors are able to foster students’ foundational skills, which directly impacts employers as graduates prepare to enter the workforce with the skills that employers expect. Hyslop (2008) noted that the use of “CTE provides an environment where the students can apply fundamental academic and employability skills to complex job related problems” (p. 41).
This study of employers’ perceptions of HVAC graduates contributes to the empirical literature because it provides an enhanced understanding of the potential strengths and weaknesses of current HVAC programs insofar as they relate to employers’ expectations of potential employees. Because virtually no studies have been published regarding employers’ perceptions of HVAC graduates, employers’ suggestions and ideas regarding HVAC graduates were directly sought in this study. The employers who participated in this research were owners of HVAC businesses or were employed in the HVAC industry. This study contributed to filling a gap in the current literature regarding employers’ perceptions of HVAC graduates and was integrated with the previous studies conducted by Feutz (2010) and Green (2006).

**Research Questions**

The purpose of this phenomenological study was to understand and describe employers’ perceptions of career readiness of graduates from a community college HVAC program in Kansas. By understanding the employers’ perceptions, I was able to determine the effectiveness of the program as it relates to the preparation of the HVAC graduates for employment. Additionally, the study was used to identify improvements that can be made to enhance the HVAC programs. The study was guided by the following research questions:

1. How do HVAC employers describe the career readiness of HVAC graduates of MCC as they enter the HVAC field?
2. How do HVAC employers describe the training the participants received from MCC?
3. What recommendations, if any, do employers believe are specifically necessary to improve the content of curricula utilized in the HVAC program at MCC?
Research Plan

Gay (1996) reported that research is the formal method to study problems and the goal of the science is to be able to predict or explain the phenomenon. Ary, Jacobs, Razavieh, and Sorensen (2006) maintained that a qualitative, phenomenological research study is descriptive and provides rich details of the contextual setting in order to understand the phenomenon. This research study was a phenomenological assessment of employers’ perceptions of HVAC graduates.

Creswell (2013) described a phenomenological study as one in which the researcher attempts to identify the commonality of meaning based upon data collected from several participants about their lived experience. According to Moustakas (1994), phenomenological research entails the discovery of new images and meanings based upon the lived experiences, perceptions, and realizations of the participants. The essence of this study was to understand the employers’ perceptions from the details provided by the employers themselves. These data were used to determine commonalities and establish themes based upon the employers’ own experiences in hiring HVAC graduates.

Delimitations and Limitations

Delimitations

Delimitations are identified within a research study in order to define the boundaries of a study (Creswell, 2013). The delimitation of this study was the inclusion of employers who were involved in the HVAC industry and who have hired recent HVAC graduates. As such, I conducted interviews with employers working in a large metropolitan area of Kansas to attempt to identify employers’ perceptions of characteristics that constitute a marketable HVAC graduate.
Limitations

Gay (1996) noted that qualitative studies are more often successful when a small sample is used. I analyzed the perceptions of 21 employers who represented various-sized companies in which HVAC graduates had been employed. Each of the interviews was conducted with HVAC employers who was active as Air Conditioning Contractors of America (ACCA) contractor members. The focus group participants were active in the ACCA organization as associate members. A survey was distributed to members of the HVAC advisory board of a community college. Therefore, the results of this study may be limited in generalizability to larger populations. Furthermore, the study was conducted in a metro area, so results may not be generalizable to rural areas. Additionally, the study was focused on the effectiveness of an HVAC training program in a specific community college, so the results may not be generalizable to graduates of other trade programs within the same community college or from other institutions.

Definitions

1. **Advisory Board** – For the purpose of this study, an advisory board is a group of faculty and community members who discuss program change and content. Advisory boards meet together on a regular basis to advise or guide the development of an educational program (Washbon, 2012).

2. **Associate’s Degree** – For the purpose of this study, an associate’s degree is a two-year undergraduate degree that is awarded in community and technical colleges and universities upon completion of a course of study (KBOR, 2014c).
3. **Career Development** – For the purpose of this study, career development is seen as the development of the whole person, with emphasis on gaining skills and experience applicable to a career (Sampson et al., 2013).

4. **Career readiness** – For the purpose of this study, career readiness requires possessing the skills needed to succeed on the job. These skills include technical skills that are required to perform necessary tasks, as well as soft skills applicable to working with people (Mason et al., 2009).

5. **Career and Technical Education (CTE)** – For the purpose of this study, CTE, formerly known as vocational education, is the educational term for a sequence of courses providing relevant academic and technical skills needed to train members of the 21st century workforce (U.S. Department of Education, 2007).

6. **Community College** – For the purpose of this study, a community college is a two-year institution of higher education that offers levels of instruction that are adapted to meet the needs of the local community. The courses at a community college usually include occupational programs, which prepare students for employment or a transfer curriculum, the latter of which prepares students to proceed to a four-year college or university (KBOR, 2014a).

7. **Contractors** – For the purpose of this study, a contractor is a person who or company that provides a service to the public (BLS, 2014-2015).

8. **Graduate** – For the purpose of this study, the term graduate is used to demarcate a person who has successfully completed a two-year career and technical program at a community college within a specific program of study (KBOR, 2014a).
9. *Program Alignment* – For the purpose of this study, program alignment describes the degree to which programs of study are aligned at the community and technical college level to meet the needs of business and industry (KBOR, 2014a).

10. *Soft Skills* – For the purpose of this study, soft skills include, but are not limited to communication and teamwork skills that enhance employment performance (Boettcher, 2014; Drage, 2009; Jamal & Mandal, 2013).

11. *Technical Skills* – For the purpose of this study, technical skills are related to the knowledge needed to complete specific tasks related to a specified industry (Staklis & Klein, 2010).

12. *Workforce Development* – For the purpose of this study, workforce development is the process of preparing people with the skills needed to compete for higher-skilled jobs and meet the demands of business and industry (Frendburg, 2013; KBOR, 2014a).

**Summary**

The purpose of undertaking a phenomenological research study was to examine the employers’ perceptions of HVAC graduates. The study included a three-part investigation that incorporated data from a survey from the advisory board members of a local community college, a focus group of ACCA associate members, and personal interviews with ACCA contractor members who had hired recent HVAC graduates.

In this chapter, the problem, significance of the study, research questions, and a brief outline of the research method were presented. The delimitations and limitations of the study were also detailed. In the next chapter, I provide a review of literature in order to establish the theoretical framework for the study.
CHAPTER TWO: LITERATURE REVIEW

Overview

The purpose of this chapter is to found this phenomenological study on research and theory relevant to the HVAC industry, employers, and graduates. Included in this comprehensive literature review on the HVAC industry are the various positions that are associated with the teaching of the HVAC graduates, the governmental identities that oversee the HVAC training, the skills necessary to work in the industry, the accreditation of the HVAC programs, the requirements for a degree or a certification, and the partnership and alignment with business and industry. The literature review also covers information concerning HVAC programs, the theoretical framework, the relationship between community and technical colleges, and business and industry.

In conducting this literature review on the topic of HVAC graduates, I found numerous studies related to the following themes: (a) the application of HVAC systems, (b) functionality, and (c) the overall dynamics of HVAC systems. However, I was unable to locate studies about HVAC employers’ opinions in regards to the knowledge and skills of community college graduates who seek employment in the HVAC field. In support of this research gap, Feutz and Zinser (2012) noted that HVAC employers’ perceptions of recent HVAC graduates have not been studied.

The HVAC research studies reviewed in this chapter that are most relevant to the current study, focused on characteristics of employers and graduates. Feutz (2010) conducted research at Ferris State University to determine whether students thought that they were fully prepared for the challenges of being an HVAC employee. Green (2006) found that hands-on teaching encouraged HVAC students to become competent in troubleshooting problems in HVAC
equipment. Five doctoral students (Coughlin, 2012; Lassiter, 2012; Pogliano, 2008; Siegrist, 2012; Strohschein, 2012) for their dissertations, examined the concepts of workforce development, but not in regards to employers’ perceptions concerning recent HVAC graduates. Additionally, Casner-Lotto and Barrington (2006) examined the basic skills of recent graduates from four-year universities and colleges, two-year colleges, and high schools. Each of these studies contributed to the literature base upon which this study was founded.

In this study, I sought to examine the employers’ perceptions of the overall development of HVAC graduates based upon the current trends of the HVAC industry. The theoretical framework of this study was based upon the theory of constructivism and CCT. By examining several educational concepts relevant to the development of HVAC graduates, it was hoped that this study would facilitate an understanding of the skills that are required for an HVAC graduate to possess and how to attain those skills needed to succeed in the HVAC industry.

The Technical Education Authority

The TEA was established by the Kansas Legislature in 2007. The purpose of TEA is to make recommendations to KBOR in regards to the coordination, planning, and improvements to the postsecondary technical education system in Kansas. The mission of TEA members is to review and approve changes to existing curriculum programs and be involved in the process of start-up programs. This task was in addition to development of accountability indicators and it creates a mechanism to transition students from the secondary school level to the post-secondary education levels. The strategic priorities of the TEA are to align career programs, enhance the programs, and lastly evaluate the programs on how well they have met the objectives.

KBOR (2014a) members emphasized that it is critical for the representatives of government and business and industry to work together collaboratively. The primary focus was
to develop a hiring relationship with the leaders of business and industry for the betterment of the state resources, the students, and the faculty members either in the secondary or postsecondary level. This was accomplished by ensuring that, not only are the programs receptive to the current and future needs of business and industry, but that business and industry members are provided with a voice in what is being done within the educational career programs and with the curriculum.

KBOR (2014c) members identified the components of the alignment process. This process consisted of the following four distinct objectives: (a) to allow business and industry to identify value-added exit points within programs, (b) to identify and support student acquisition of nationally-recognized third-party industry credentials, (c) to identify common courses that can serve as a bridge for articulation opportunities within the K–12 environment, and (d) to decrease variability in program length. In regards to the first objective, in conjunction with the Perkins Act of 2006, the alignment process consisted of specific exit points in programs of study. These industry-based exit points focused on standards, credentials, and authentic assessments, all of which are based on business and industry recommendations. Thus, there is an ongoing process to develop and alter programs that reflect the current standards in the student’s field of study. The final aspect of the alignment process was to promote articulation agreements between the two-year community colleges and the four-year colleges and universities so that the earned credits and credentials were cumulative (KBOR, 2014a).

The second objective was to enhance the current programs (KBOR, 2014a). To achieve this goal, it was necessary to raise student awareness and promote the CTE programs in Kansas by establishing and implementing marketing plans. This way, it has been possible to advocate and develop plans to support the CTE programs in the secondary and postsecondary levels.
The third and final objective of the TEA was to evaluate the process, which consisted of analyzing student enrollment and job placement and students’ completion of the programs of study (KBOR, 2014a). In addition, the TEA staff has been tasked to conduct a cost analysis of each program and examine the average wages that the graduates earn based upon their completion of either a certificate or degree in their program of study. The outcomes of the TEA were designed to align the curriculum and the programs and create a comprehensive program of study that was not only beneficial to students, but to employers, community colleges, business and industry, and the state. By joining these forces together, the TEA created an organization that is responsive to all involved in the CTE programs. Savickas (2012) noted that career outcomes and adaptability refer to the attitudes, beliefs, and competencies that are required for graduates as they enter the workforce.

Community Colleges

Zeidenburg and Bailey (2010) noted that “community colleges have three main objectives: (a) teach marketable vocational skills, (b) provide the first two years of a four-year bachelor’s degree program, and (c) to provide continuing education and enrichment for community residents” (p. 1). Williams and Southers (2010) stated that “the community college has become the access point to higher education for adult learners” (p. 26). Katsinas (1994) reported that community colleges have become predominant in workforce development. Further, Williams and Southers asserted that adult learners are an important, historically notable constituency for community colleges, and the education of adults is an important part of the community college mission.

Weeks (2009) observed that community colleges have an extensive and extraordinary record in regard to preparing a competent technical workforce to meet the pressing requirements
of local and regional businesses and industries. Zeidenberg and Bailey (2010) noted that one of the most central undertaking of the community colleges, the administrators, and the faculty is to encourage and endorse local economic development. The staff of the community colleges should have a detailed understanding and background knowledge of the local labor market, as well as the needs of local employers, in order to bridge the gap between the vocational curriculum of community colleges and the labor markets of the industries. Thus, it is important to constantly update the current information based upon employment, occupations, and occupational wages in the market (Zeidenberg & Bailey, 2010).

According to Sorden and Munene (2013), in order to attract and retain students, college staff and educators must look toward the future. Additionally, there is a vital need to develop innovative methods to meet the evolving challenges of the learner. Sorden and Munene found that there are “three significant constructs of blended learning: (a) social presence, (b) collaborative learning, and (c) student satisfaction” (p. 252). Blended learning occurs when two or more instructional methods are used to encompass the students in teaching a particular subject or topic. These instructional methods can occur with face-to-face, flipped classrooms, and online education among others. A flipped classroom is one in which students are given assignments prior to being taught the material in the classroom. Sorden and Munene further noted that there seems to be a recurring theme in the literature that students are social learners, strive to work together for greater understanding, and build valuable relationships based upon their interactions among the students in the classes that they take.

Treat (2011) held that community colleges should promote programs that are closely aligned to business and industry. These CTE programs have a high level of accountability and can quickly respond to the local employment needs. Callahan and Strong (2004) noted that when
students are exposed to realistic work characteristics, they can strengthen their skills as they begin their careers. For the most part, students who enroll in and graduate from local community colleges remain near the local labor markets.

Therefore, it is critical for community college staff to maintain contact with these graduates because graduates are a valuable source of information in regard to employment figures, new trends, and upgraded training that might be provided. Zeidenberg and Bailey (2010) suggested that tracking graduates can be accomplished with the use of two methods: surveys and state administrative data. The goals of tracking graduates from a community or technical college are to: (a) verify and identify where the graduates work, (b) determine their type of employment in regards to their education, and (c) compare the range of salaries of these graduates to their peers in the same field or across the state. The collection of these types of data contributes to the overall understanding and goals established by the federal and state governments in regards to the funding of the CTE programs and how efficient these programs are in producing workforce-ready graduates.

**Workforce Development**

Malo (2002) wrote that the foundation of businesses in the U.S. is the employees. Zinser (2003) stated, “In the past 20 years, postsecondary occupational education has become a central issue in workforce development and … community colleges are a logical source for employee skill development” (p. 51). The definition of employability varies, although it is greatly based upon the graduates’ abilities to adapt their learned academic skills to the personal skills that are needed in the workforce (Andrews & Higson, 2008). Finding, recruiting, and retaining skilled and qualified workers are of utmost importance. As a result, most business owners acknowledge that the community colleges are well positioned to continue to enhance the skill set of the
American worker (Malo, 2002). According to the BLS (2014), there are several qualities that HVAC technicians should possess when they work in the field: (a) customer service skills, (b) orientation to detail, (c) mechanical skills, (d) physical strength, (e) time-management skills, and (f) troubleshooting abilities. Each skill is important to master and an HVAC technician must be able to incorporate each of these skills sets into his or her repertoire.

Cai (2013) stated that in “the transition from education to the work place, employers’ perceptions are crucial” (p. 460). Bailly (2008) described the three stages of the inner workings of the employers’ belief systems related to hiring. In the first stage, the employer makes employment decisions based upon the information and educational credentials provided by the applicant. In the second stage, the employer needs to know which position is to be filled in regard to the expectations for the job, the expectations of the employee, and the expectations of employee production. The last stage of the hiring process occurs when the employer determines the real value of the employee. In each stage of hiring, the employer constantly changes and alters his or her perception of: (a) an ideal employee, (b) the employee’s credentials, and (c) the actual cost of hiring a new employee.

Kuijpers and Meijers (2012) advised that “the age of a student is related to career choices and competencies; the older the students are, the better they are prepared for career choices” (p. 453). Flexibility is also crucial in workforce development and the community college learning scenarios. Hyslop (2011) noted that in both the workforce development and the community college setting, students who have flexibility in classes and scheduling respond in a positive manner. Hartung, Porfeli, and Vondracek (2008) asserted that workers must continue to adapt to the changing demands and opportunities in the workforce in order to remain productive and gainfully employed.
Theoretical Framework

The theoretical framework of this study is based upon the theory of constructivism and CCT. Examining several other educational theories will enhance the understanding of what skills are required for an HVAC graduate to possess and how attaining those skills will allow them to succeed in the HVAC industry. The concepts of constructivism, CCT, and adult education are interwoven. The objective is for the HVAC graduate to be able to comprehend vital knowledge and the benefits of learner-centeredness instruction. Dewey (1938) focused on the idea of experience stating, “The main purpose or objective is to prepare the young for future responsibilities and for success in life, by means of acquisition of information and skills” (p. 18).

Constructivism

The first theory establishing a framework for this study is constructivism. Grier-Reed, Skaar, and Parson (2009) found that “college students need to feel empowered to construct their lives and forge their career paths” (p. 3). Washer, Fedorchak, Shellhorn, and Wales (2013) observed that “the vocational maturation process that influences career choice appears to be occurring much later in the students’ and graduates’ lives” (p. 20). Career choice readiness can be enhanced by: (a) modeling, (b) mentoring, (c) networking, and (d) caring relationships with others. The goal of all career development theories is to account for the placement of people in occupations through an overlapping set of constructs (Savickas, 2012). Additionally, Washer et al. suggested that in the popular and empirical literature, career decisions are being based upon external sources, friends, or job popularity rather than on factual decision making. Students who enter the HVAC program as a cohort or have a family member in the HVAC field have valuable resources already available to them. Moreover, Grier-Reed et al. (2009) noted that “self-reflection and self-examination are the cornerstones of constructivist career development” (p. 4).
Constructivism involves both the learner and the instructor. Yilmaz (2008) noted that when instruction is based on learning theory, the instructional design will have focus, clarity, and direction. The constructivist theory is used to describe this instructional design and the accompanying learning process and development (Yilmaz, 2008). This approach is often referred to as learner-centered instruction or student-centered instruction. Powell and Kalina (2009) suggested that constructivism was founded upon cognitive and social psychology. A notable impact that constructivism has had on the education field is that it shifts the classroom from teacher-centered to learner–centered (Gordon, 2009). Bay, Bagceci, and Cetin (2012) noted that within “the constructivist classroom setting, students take on the responsibility of their learning when performing authentic tasks” (p. 344). The benefit of using the constructivist methodology is that the learning occurs when the students are engaged in an activity that is built upon current knowledge and understanding that is formulated through actual experiences.

Yilmaz (2008) emphasized the fact that “constructivism is a theory of learning and not a theory of teaching” (p. 168). The constructivist approach is focused on how to learn rather than how to instruct. Kuijpers and Meijers (2012) stated, “The constructivist theory of learning is based upon the idea that learning is a process by which the learner transforms information into meaningful knowledge” (p. 451). Collins (2008) emphasized that “constructivist theory and the practice of applying it in the post-secondary learning environment presents both opportunities and challenges” (p. 1). Bunch (2009) noted that in vocational education it is important to connect school with work and the values that are represented in the culture of work.

Collins (2008) described the constructivist ideas of Huang (2002) as six integral parts that connect constructivism and andragogy: (a) learning should be interactive and collaborative, (b) collaborative learning should be facilitated in order to provide additional opportunities, (c)
classroom instruction should be held in a safe environment that provides encouragement for the student to ask questions and present ideas, (d) authentic learning should represent real-life experiences and be based upon internships and case studies, (e) the learner-centered methodology should be employed, and (f) learning experiences should be closely aligned with the real-world environment. Dewey (1938) emphasized that students should have a lived experience of the real world. Through the use of the constructivist methodology, students can be prepared for the real world.

The theory of constructivism is originally based upon Dewey’s (1938) constructs, while Piaget’s (1952) theory of cognitive development further advanced the position of the constructivist movement. According to Dewey, active participation and self-direction by students are imperative, and learners’ experience and worldview are critical to problem solving. Piaget’s contribution to the constructivist movement was related to how individuals construct knowledge. Piaget’s theory as applied to constructivism indicates that individuals cannot be given information that they can immediately understand and use. Instead, individuals must construct their own knowledge (Piaget, 1952). Ultanir (2012) suggested that the meaning of constructivism varies according to one’s perspective and position. Ultanir went on to write that “constructivism is not a social or educational theory; it is both a scientific and meta-theory which defines the possibilities and limitations of daily life theories” (p. 196).

The purpose of the constructivist learning theory is to: (a) align the curriculum, (b) integrate the course work with a hands-on approach to learning, (c) develop the students’ critical thinking and problem solving techniques, and (d) engage the student with authentic and real-world application. Scott and Sarkees-Wircenski (2001) noted that “technicians must have the functional academic skills, the theoretical principles related to the technology of the occupation,
and the practical skills and abilities the specialization requires” (p. 55). The emphasis of most CTE programs is established upon a real-life application (Clark, Threeton, & Ewing, 2010).

The theoretical framework of an HVAC program starts with constructivism theory, which is the foundation of the basic concepts of the HVAC industry. Powell and Kalina (2009) identified “constructivism as the best method for teaching and learning” (p. 241). Grier-Reed et al. (2009) maintained that constructivism is focused on how students can ascertain meaning or construct their learning by using the talents of the teachers as a guide and assimilating the knowledge presented by the facilitator. This allows the students to perform self-reflection and self-examination of the content of the course, subject, or class. This evaluation of the learning process is the cornerstone of constructivist methodology and learning theory. Roessger (2012) held that “constructivism underlies many adult learning theories and that the constructivist philosophy is influenced by theory and practice” (p. 375).

Kuijpers and Meijers (2012) noted in their research that “there are five distinctive career competencies that are present in the development of a working career: (a) capacity for reflection, (b) motivation for reflection, (c) work exploration, (d) career directedness, and (e) networking” (p. 451). As individuals enter the workforce, their careers are a trajectory. The successes achieved or limitations encountered are based upon the individual. To undergo a positive trajectory, employees should try to incorporate each of these capacities into their professional life. Additionally, the factors influencing students’ decisions to enter the HVAC field require them to gain certain competencies that allow them to move forward in the field. Mason et al. (2009) thought it was important for students to identify their skills in order to manage their own careers and to build upon their skills throughout their working careers. Keeping up with the advancements in HVAC technology and with the new equipment is necessary for all technicians.
Based upon the constructivist learning theory, Justice, Rice, Roy, Hudspeth, and Jenkins (2009) stated, “Employers are looking for young men and women able to analyze issues, think critically, solve problems, communicate effectively, and take a leadership role” (p. 841). To incorporate this type of learning in community and technical colleges, students, faculty, and staff members must be proactive and responsive to the needs of the students. The courses and programs should be focused “on problem-based learning (PBL), discovery learning, experiential learning, cooperative learning, and inquiry-based learning (IBL) instruction” (Justice et al., 2009, p. 842).

When students are allowed to work in a collaborative setting, they can incorporate new skills, knowledge, and understanding for their own individual benefit (Del Corso et al. 2011; Powell & Kalina, 2009). Another format of collaborative teaching is to include the students’ peers in the role of the teacher. When classmates are given the opportunity to assist their fellow classmates, both the student mentor and the student mentees benefit. Bay et al. (2012) maintained that the sociocultural trait of constructivism is developed through the social context of learning between individuals and among friends.

Clark et al. (2010) noted that these different techniques are founded on the belief that there is not a one size fits all approach to learning or teaching. When courses are adjusted to fit into this learning format, the goal is for the student to be able to gain the skills employers seek when they hire graduates. According to Scott and Sarkees-Wircenski (2001), “Career and technical education programs are placing greater emphasis on critical thinking, social, and leadership skills to better prepare students for the modern workplace realities” (p. 17).

As a result of being involved in a constructivist methodology of learning, students who are in CTE programs “prefer learning in a hands-on environment, engaged learning experiences,
and want to know that the skills they are being asked to learn will directly benefit them in the job market” (Bunch, 2009, p. 261). Merriam, Cafarella, and Baumgartner (2007) defined constructivism as “a process of constructing meaning; it is how people make sense of the experiences” (p. 291). The goal of a constructivist facilitator is to create an authentic learning experience for students. The constructivist methodology of learning is based upon a learner-centered approach, and it guides the facilitators in prioritizing what is best for the learners within their own circumstances.

**Career Construction Theory**

The other key theory foundational in the theoretical framework for this study is CCT. Numerous authors have written extensively on CCT (Brown & Brooks, 1996; Glavin & Berger, 2012; Patton & McMahon, 1999; Sampson et al. 2013; Savickas, 2005; Savickas & Lent, 1994; Swanson & Fouad, 1999). CCT has been evoked in the explanation of why students sought or enjoyed employment in the field of HVAC. Del Corso et al. (2011) stated, “CCT is a career model that emphasizes a lifelong, adaptive approach to differential, developmental, and dynamic components of vocational behavior” (p. 89). The theory was developed to provide a method to explain how individuals choose a profession. CCT also is focused on employees’ entrance into the workforce, transformation into productive members of the workforce, and new guidelines detailing necessary requirements for being productive in the 21st century (Savickas, 2005).

Hodge and Lear (2011) acknowledged that Savickas’s (2005) CCT is a concept based upon individuals’ past and present experiences and their future goals that influence their work lives. Grier-Reed and Conkel-Ziebell (2009) noted that a tenant of CCT is that “finding one’s place in the world of work is based primarily on a matter of uncovering one’s traits and abilities, learning about the job market, and finding a match between these two factors” (p. 23). Lerman
maintained that learning new skills builds a sense of pride and creates a personal identity
with employers seeking employment.

In CCT, the constructs of identity and adaptability contribute to the formula of a new
model for comprehensive vocational behavior (Savickas, 2005). Within CCT, individuals build
careers by imposing meaning on vocational behavior. The focus is on how individuals use their
vocational personality to adapt to a sequence of changes in education, training, and employment.
Within CCT, there are four distinct segments that influence this theory: (a) identity, (b) life
themes, (c) vocational personality, and (d) career adaptability.

Identity. Identity involves how people think of themselves in relation to social roles
(Del Corso et al., 2011; Packard et al. (2012); Savickas, 2005; 2012). In regards to occupational
choices, individuals adapt a meaningful cultural script and then pursue this script in work roles
that matter to them and their communities. CCT provides a method of thinking about how
individuals choose and use work to their benefit (Savickas, 2005).

Life themes. Life themes give purpose and meaning to work and guide the expression of
vocational personality; additionally, individuals use them to adapt to the challenges involved in
the expectation to offer meaningful contributions to society (Packard et al., 2012). The life
theme component of CCT addresses the subject matter of work life and focuses on the why of
vocational behavior. The life theme factor of CCT emerged from Super’s (1957) theory, which
provides a framework for individuals to articulate into work-related terms their ideas on: (a) who
they are, (b) who enters into the occupation, (c) self-conceptualization, and lastly, (d) realizing
their potential and upholding their self-esteem (Savickas, 2012).

Vocational personality. Vocational personality refers to an individual’s career-related
abilities, needs, values, and interests (Savickas, 2012). An assumption of CCT is that vocational
personality types and occupational interests are similar socially constructed clusters of attitudes, knowledge, and skills. The focus of the vocational factor is on who an individual can become when he or she undertakes the occupation, as opposed the person they were before his or her employment. From the perspective of CCT, it is important to examine the process of adaptation and methods of coping with the vocational development task during occupational transitions. Life themes give meaning to vocational behavior and the basis by which individuals fit work into their lives.

**Career adaptability.** Career adaptability is a term used to describe how individuals learn to manage the challenges presented by changes in work conditions through problem solving or coping behaviors. Careers do not as simply evolve independent of the individual because employees must take thoughtful action to construct the process of career evolution (Packard et al., 2012). Training should follow a specific path: (a) presentation of points in regard to models, methods, and materials, (b) interventions that enable students to participate in observational learning, (c) evaluation of assignments so students can apply the theory of instruction, (d) analysis of students’ outcomes, service learning, and internships, and (e) competency assessments as a graduation requirement (Savickas et al., 2009). CCT dictates that individuals attempt to implement a self-concept in social roles, which allow for adaptation to a series of transitions: (a) from school to work, (b) from job to job, and (c) from occupation to occupation (Savickas, 2012).

Sampson et al. (2013) set forth the goal of improving the application of CCT to practice in order to help practitioners and researchers better identify and understand the potential impact of career-readiness outcomes. The influences that direct career readiness reflect the individual’s engagement in the learning process needed to explore and choose among the diverse
occupational, educational, training, and employment options. Readiness for career decision making is defined as the potential of an individual to make appropriate career choices. He or she must take into account the complexity of family, social, economic, and organizational variables that influence an individual’s career development. According to Del Corso et al. (2011), CCT is a model of career choice and vocational behavior based upon a person’s motivation. Thus, students’ or graduates’ choices are shaped by what they want to pursue. As a result, self-concepts develop over time and are based upon experience and maturity.

**Theories Supporting Career Construction Theory.**

CCT itself is based on several conjoining theories: (a) the self-concept theory (Super, 1957), (b) the social cognitive theory (Bandura, 1977), and (c) the theory of vocational types (Holland, 1997). In these theoretical concepts, which are aligned with CCT, the emphasis is on flexibility, adaptability, and life-long learning. Each of these theories is relevant to the needs of current workers and warrants a closer examination. CCT provides a way to understand how individuals: (a) choose their work, (b) use their work as a tool to better themselves, and (c) respond to the needs of other workers. Savickas et al. (2009) emphasized that there are actually “five C’s to CCT; they are viewed as concern, control, curiosity, confidence, and commitment” (p. 245). Busacca (2007) held that CCT is applicable and appropriate for educational attainment and that regardless of one’s socio-economical background or abilities, engagement in work can be meaningful for and respected by the individual.

**The self-concept theory.** Super (1957) noted that a person usually goes through stages of development in a career. In his work, Super identified the five stages of career development through which an individual progresses over a lifetime. According to Super’s theory, vocational development is a process of making vocational choices that represent an implementation of the
person’s self-concept. Vocational choices are viewed as a match between the person and the world of work. The fundamental aspect of Super’s theory is that vocational choices are shaped by self-concept.

**The social cognitive theory.** In addition to the self-concept theory, Bandura’s (1977) social cognitive theory is the basis of self-efficacy. There are four influential sources from which self-efficacy is derived: (a) personal performance, (b) vicarious experience, (c) verbal persuasion, and (d) physiological and emotional factors. Self-efficacy plays a central role in the cognitive direction of motivation and the ability to reach desired goals. The purpose of the social cognitive framework is to explain “the product of: (a) academic and career interest development, (b) career relevant choices, and (c) achievement of competencies of different levels of performance that match their educational and career pursuits” (Savickas & Lent, 1994, p. 83). The purpose of the social cognitive theory of career decision making is to guide the explanation of how individuals’ learning experiences influence their career decisions. Recently, the social cognitive theory has been applied to vocational development in order to help explain: (a) how individuals’ career interests develop, (b) how they make career choices, and (c) how they determine their level of performance (Swanson & Fouad, 1999).

**The theory of vocational types.** Along with the self-concept theory and the social cognitive theory, the theory of vocational types underpins CCT. Holland (1997) identified four common themes in his theory of vocational types. The common themes are: (a) occupations are an expression of the person, (b) individuals in occupational groups have similar personalities, (c) people in similar groups will respond similarly, and (d) occupational achievement, stability, and satisfaction depend on the person’s personality and job environment. Holland’s theory is based upon the underlying premise that career choice is an expression of one’s personality (Swanson &
The choice of a person’s occupation is an expressive act that is shaped by a person’s motivation, knowledge, personality, and abilities (Brown & Brooks, 1996).

**Adult Education Theory**

According to Merriam et al. (2007), there are four adult learning theories: (a) andragogical learning, (b) self-directed learning, (c) transformative learning, and (d) experiential learning. Each of the theoretical framework foundations of learning is similarly based upon one another. Several theorists have contributed to the body of knowledge on adult education. Roessger (2012) expounded upon Dewey’s (1938) ideas of experiential learning in noting that “all principles by themselves are abstract, however they become concrete from their application” (p. 377). Paige (2010) surmised that “adult learning is informally constructed through interactions with everyday events” (p. 299). As a result, adult learning is self-directed (Grow, 1991; Knowles, 1984; Kolb, 1984).

**Piaget.** Piaget’s theories are applicable to adult learning. Piaget (1977) wrote about how individuals construct knowledge through simulated internal cognitive conflict as learners try to overcome and resolve mental disequilibrium. Most of Piaget’s work is based upon cognitive constructivism. His theory has two significant parts: (a) predictions of understandings that children can and cannot grasp at different stages of life that correspond with age ranges and (b) cognitive development, which describes how learners develop cognitive abilities. Merriam and Caffarella (1999) reported that Piaget’s work in the field of cognitive development is renowned and identified as foundational in understanding age-related cognitive abilities. Relevant to working with adults, the final stage of development is characterized by having the ability to think abstractly and conceptually. Building upon the guidelines of constructivist philosophy, Piaget’s contributions to adult education emphasized the qualitative development changes, the importance
of attaching an active role of the person in constructing his or her knowledge, and the conception of the mature adult thought (Merriam & Caffarella, 1999).

Micheletto (2011) believed that Piaget (1952) incorporated constructivism in his notion that knowledge is based upon active discovery. Piaget proposed in his theory of cognitive development that people cannot be handed information that they will immediately understand and be able to use. Instead, people must construct their own knowledge based upon experience. This experience enables people to create schemas. There are two principles that apply to teaching and learning according to Piaget: (a) learning is an active process, and (b) learning should be authentic.

Piaget (1926, 1952) emphasized that individuals construct their own knowledge based upon their experiences. This idea, called equilibration, is widely held among theorists with constructivist orientations. Each experience a person has is organized into cognitive structures called schemata. The state of disequilibrium requires students to adapt to the uncertainty of the new information and learning. Powell and Kalina (2009) noted that “disequilibrium is a state of being uncomfortable when one has to adjust his or her thinking (schema) to resolve conflict or become more comfortable” (p. 243). Cognitive conflict results in disequilibrium and can be associated with a feeling that something is not correct and should be fixed.

Piaget (1952) expressed that these feelings motivate individuals to either assimilate or accommodate in order to return to equilibrium. Adaptation is the process of assimilation and accommodation. According to Piaget, assimilation occurs when people bring new knowledge to their own schemas and accommodation is when people have to change their schemas to accommodate the new information or knowledge. Piaget (1953) stated that a person’s intelligence develops through adaptation and organization.
Maslow. Another theory that addresses adult education is Maslow’s hierarchy of human needs (1943). Knowles (1980) recognized that in order for a person to reach the next level of Maslow’s hierarchy of human needs (1943), an individual must have the foundational building blocks of development. This conceptualization of development is associated with: (a) Piaget’s (1952) cognitive development, (b) Dewey’s (1938) experience methodology, and (c) Kolb’s (1984) learning model. The conceptual progress of an individual is based upon his or her readiness to learn, achieve, and move towards the next level. Each student progresses at a different rate and at different times. In the HVAC field, the structure of development is based upon the ability of the student to recognize, understand, and analyze the information that is being taught as well as how it impacts their education and employability.

Knowles. Knowles also explored adult learning, which is called andragogy. Knowles (1980) asserted that there are “four assumptions of andragogy: (a) self-concept, (b) experience, (c) readiness to learn, and (d) orientation to learning” (p. 43). Knowles (1984) later listed a fifth dimension of andragogy: the motivation to learn. He noted that adults should be held accountable for their own learning. In addition, Gom (2009) reported that adult learners are different from traditional pedagogy learners and that motivation is the stimulus that drives adults to achievement.

Kolb. Kolb’s theories relate to adult learning as well. Knowles, Holton, and Swanson (1998) reported that Kolb’s (1984) experiential learning model represents four stages of development, which are based upon different aspects of experience:

1. Concrete experience, student’s total involvement in the experience,
2. Observation and reflection, the individual reflects and observes the experiences,
3. Formation of abstract concepts and generalizations, the student develops the
observations and reflections into sound theories of learning, and

4. Testing implications of new concepts in new situations, the individual uses the methods of instruction and theories to assist in decision making process and to use as problem solving techniques. (p. 147)

Kolb (1984) described the learning process as “knowledge created through transformation of experience” (p. 38). Clark et al. (2010) observed that experiential learning is a notable model in the field of CTE education because it articulates the nature of learning a skill by seeing, talking, accomplishing the task, and finally, reflecting upon it. Experiential learning breaks down the task into four attainable parts. These four integral parts of experiential learning consist of: (a) abstract conceptualization, (b) active experimentation, (c) concrete experience, and (d) reflective observation.

Kolb (1984) suggested that experiential learning could also be known as hands-on knowledge. This is applicable in many circumstances within the CTE field of education, in which students build upon their previously attained knowledge and understanding. Mastery of a training progression is achieved by the repetition of attempting and accomplishing the task until it becomes secondary nature. The empowerment of learners occurs when they are taught in a hands-on environment; as a result, they achieve success. Lee (2011) posited the idea that “searching, exploring, and other trial and error behaviors are visible indicators that pave the way for a new state of equilibrium, learning, and development” (p. 150).

Bay et al. (2012) noted that problem solving techniques allow students to discover knowledge and add to the competencies that are designed to meet their needs in the instructional context. Simon et al. (2013) emphasized that one aspect of constructivism is service learning. Service learning is reflective in nature, because students can use and apply what they have
learned. Moreover, service learning allows students to embrace the learning situations and to take ownership of the problems posed in an education environment. By having situations that are authentic, problem-based, real-world, and genuine, the learning provides examples of problems the students might encounter once they enter the workforce. Service learning is based on the theory of experientialism and can be viewed as having a direct connection to Kolb’s (1984) experiential learning model.

**Vygotsky.** Vygotsky (1978) is most often associated with the social constructivist theory, yet his theories can be applied to adult learning. Vygotsky was influenced by the cultural and social context of learning, and he supported the model of discovery learning. Discovery learning entails an active participation between the instructor and the students in the service of discovering new knowledge. According to Krauss (1996), Vygotsky’s zone of proximal development (ZPD) is based upon the students’ “gap between the actual level of development and potential level of development determined by problem solving supported by facilitators and through collaboration with capable peers” (p. 196). Mastery becomes evident after a trial and error process.

**Grow.** Grow (1991) proposed the idea of the self-directed learning model. In this model, the focus is on the adult learner and how an adult recognizes his or her ability to respond to the teaching methods. By incorporating this methodology it is possible to match student/employee readiness to the task of being self-reliant. The overall objective for Grow’s self-directed learning model is for the employee to become a self-directed learner and have the ability to work independently.

Grow’s (1991) self-directed learning model is the backdrop of the learning environment for HVAC graduates. Prior to graduating, the students must build a strong foundation of
knowledge, information, and skills. The foundational skills and the advanced training related to
the HVAC field are integral to the HVAC employers when they seek to hire these HVAC
graduates. Questions that could be asked regarding HVAC employers’ demands for skills in
graduates include: (a) what do employers seek, (b) what experiences do they consider relevant,
(c) what are the employers’ expectations, (d) can foundational knowledge be accepted as a
replacement for experience, and lastly, (e) is the training an HVAC graduate receives at a
community or technical college a strong indication that the graduate is employable in the
workforce?

Merging the frameworks of several theorists who have had an influence on CTE, CCT,
and constructivism provides a more nuanced understanding of what is required to work in the
field of HVAC. The aggregate theoretical background supports this study by providing a
framework with which to analyze the characteristics and experiences employers look for when
they hire HVAC graduates. This framework aids in exploring the in-depth lived experience of
the employers, specifically their perceptions of HVAC graduates (Feutz & Zinser, 2012).

Related Literature

Carl D. Perkins Act of 2006 (Perkins IV)

According to the United States Department of Education (2007) and Washer et al. (2013),
the aim of the members of Congress reauthorized the Perkins Act of 2006 was that the language
of the act could be construed as ordinary. This meant that the language that was used in the bill
should not be vague or risk misrepresentation. The new law emphasized that there would be: (a)
an increased focus on the academic achievement of CTE students, (b) a strengthening of the
connections between secondary and postsecondary education, (c) the establishment of the
program of study and its four components of coherent and rigorous content that prepares
students to succeed at the postsecondary level, (d) a new system to allow secondary students to acquire postsecondary credits, which would lead to an industry-recognized credential or certificate at the postsecondary level or an associate or baccalaureate degree, and (e) an improvement of state and local accountability. The most vital factors in the Perkins IV are the concepts of academic achievement and accountability. Further, Staklis and Klein (2010) stated that the Perkins IV requirements support accountability by providing “instruments to assess students’ technical skill attainment, including assessments, standardized exams, and certification exams developed by industry associations, or a combination of these approaches” (p. 3).

Levesque, Laird, Hensley, Choy, Cataldi, and Hudson (2008) stated, “At the post-secondary level, CTE is linked to the preparation for employment in specific occupations or careers” (p. 1). Staklis and Klein (2010) stated that “technical skills are usually defined through skill standard, abilities, and knowledge necessary for competent performance in carrying out responsibilities associated with the workplace” (p. 5). Levesque et al. held that academic education is defined as formal programs designated to convey the skills that represent the knowledge base in a career field.

**Career Clusters**

Scott and Sarkees-Wircenski (2001) noted that the CTE divisions encompass a wide range of individual programs of career readiness. Since the 1970s, the Department of Education began to establish broad career clusters of similar programs as a framework for the workforce preparation programs. In 2000, the U.S. Department of Education finalized the industry classification of the career clusters into 16 separate themes. These 16 career clusters consisted of all entry-level career programs through the professional-level occupations involving both academic and career technical skills (Scott & Sarkees-Wircenski, 2001). The career clusters
provides students with a context for studying traditional academics and the specific skills needed to enter a career.

Washer et al. (2013) specified the use of the Classification of Instructional Program (CIP) codes. In Kansas, the HVAC CIP code is 47.0201, which is a designator for the HVAC programs. Each CIP code is different. The use of this classification allows KBOR to keep track of the students who enter and are currently in the program, as well as how many students graduate. The CIP codes were developed by staff involved in the U.S. Department of Education’s National Center for Educational Statistics in 1980. The purpose of the codes is to provide a “taxonomic scheme that supports the accurate tracking and reporting of fields of study and program completion activities” (Washer et al., 2013, p. 18).

The CIP codes are necessary for community colleges to report factual content required for organization, including the use of funds. As a result, “the CIP codes are used at state and federal level, such as the career clusters and pathways, instructional programs, pathways and clusters are aligned to a specific CIP code” (Washer et al., 2013, p. 18). From the community college perspective, the CIP codes are easily identified as programs of studies. In institutional research, CIP codes can be used to determine how many students are in each program of study.

Zeidenberg and Bailey (2010) reported that in community colleges, the emphasis is on the career pathways strategy. The pathway strategy for career development connects education, training, and employment opportunities. As an outcome of career pathways, the community colleges facilitate the transition of highly skilled workers to businesses that might otherwise have difficulty in recruitment and hiring.

Levesque et al. (2008) noted that there are three basic career clusters from the CTE field: (a) architecture and construction, (b) manufacturing, and (c) science, technology, engineering,
and mathematics (STEM). From these career clusters, the career choices are further divided into subcategories. Wasbon (2012) reported that the federal government is equipped with sophisticated research statistical programs such as O*NET Online, which provide a precise evaluation of key attributes and uniqueness of personnel and occupations. From these statistical inferences, it is possible to obtain projections regarding the number of new employees that will be needed in each field.

**Career and Technical Education**

Packard et al. (2012) noted that there is little known about CTE graduates, even though they are an integral part of the workforce. For graduates of the two-year associate’s degree in CTE, the emphasis is on factors that impact their learning as well as the needs of the employers who hire these graduates. Students who enroll in CTE programs are primarily from lower socioeconomic families or are first-generation college-bound students (Packard et al., 2012). Savickas (2005) was instrumental in making the connection between the workforce development and CCT. He wrote that CCT “incorporates three central tenets as to its validation: (a) vocational personality, (b) life themes, and (c) career adaptability” (p. 135). Each one of these themes directly influences the career and employment opportunities students take.

Kolloffel and De Jong (2013) advised that there are two components in CTE: (a) textbook based instruction (theory) and (b) practical hands-on lessons (application). The information that is derived from text books provides factual information, which is based upon facts, figures, definitions, and the laws that apply to the HVAC field. This instructional method deals with theoretical information based upon the known facts and data attained from the HVAC field. The application and practical side of the vocational education is the hands-on approach to learning. This type of instruction is essential when working with HVAC equipment and is the basis of a
conceptual approach to a comprehensive HVAC understanding. Callahan and Strong (2004) advised that “every effort should be made to strengthen students’ skills by combining theoretical knowledge with practical application” (p. 45).

**History of Career Technical Education**

The first examples of teaching the trades were seen in the process of fathers handing down to their son’s information about how to continue the family business. In other families, parents would send their sons to local businessmen in order to become apprentices. In 1917, with the passing of the Smith-Hughes Act, the U.S. federal government began to support public vocational education (Rojewski, 2002; Scott & Sarkees-Wircenski, 2001). The primary focus of the Smith-Hughes Act was economics. The act was viewed as a mechanism to prepare young people for the jobs, created as a result of the Industrial Revolution. A secondary purpose of the Smith-Hughes Act was to provide an alternative to traditional education provided in the high schools (Rojewski, 2002). In high schools, the curriculum was designed to focus on the classics; as a result, a large segment of the population entered the workforce unprepared for the tasks required of them. The focus of this federal legislation was to allow students and graduates to gain valuable experience for entry-level employment. However, under the guidelines of the federal government, the Smith-Hughes Act evolved into something greater than its original scope. The passage of the Vocational Education Act of 1963 changed the focus for CTE programs from job preparation to a shared objective of economics and social awareness (Rojewski, 2002; Scott & Sarkees-Wircenski, 2001).

According to Dewey (1938), the main objective of school was to instill in the student the concept of work based upon individual experience. According to Wahlstrom (2010), Dewey established five points that reflected his beliefs about experience. Specifically, Dewey theorized
that experience entailed: (a) a relationship between a person and his or her social and physical environments, (b) an interaction in which change and modification can take place, (c) a movement toward the future and the unforeseen, (d) a connection to the environment, and (e) an interdependent relationship with reflection. More recently, CTE has played a notable role in the training of students to succeed in the workforce. Among the most essential partners and associates are employers, businesses and industry, and unions. It can be argued that businesses and industry should be involved in the design and implementation of CTE programs, because the logical endpoint for students is the point at which they are hired by employers at the businesses and industries after the graduates finish their program of study.

**Outlook for Career Technical Education**

According to the BLS (2014), the employment rate of HVAC workers is growing rapidly and is projected to grow 21% between 2012 and 2022. The data provided by the BLS indicate that there were about 267,600 jobs in the HVAC field in 2012. From the growth potential derived from the BLS, it can be estimated that approximately 56,000 HVAC jobs will be needed throughout the nation over the course of the next 10 years. According to the BLS a vast majority of HVAC technicians receive their education from community or technical colleges, which offer either certificates or associate degrees. On average, these CTE programs last between six months to two years.

The job prospects for HVAC technicians are expected to remain high particularly for the graduates who have completed their training through accredited schools (BLS, 2014). Cai (2013) emphasized that the research on graduates who transition from school to work, which first began in the 1990s is now being used as a key performance indicator to measure the effectiveness of the school and the program from which the graduate attained their certificate or
degree. Lerman (2008) noted that almost one-half of the occupations are classified as middle-skilled. Middle-skilled occupations are positions that require some college or up to an associate’s degree level of higher education. As a result, a majority of these openings are for skills and education that can be achieved through community college programs, occupational training, and/or work experience (Lerman, 2008).

**Entry-Level Employment**

For the most part, the community colleges’ curriculums and individual programs of study are designed to allow students to enter the workforce (KBOR, 2014a). The training that students receive at the community college is designed for an entry-level skill set. This entry-level skill set is possessed by employees who have some training but little to no experience. Jamal and Mandal (2013) found that in the area of CTE, specific skills are needed by employers and it is those skill sets that are important. Campbell (2012) maintained that the technical skills have always been recognized as an important contributor to personal economic prosperity. Only employers can effectively understand and know their employment needs. Allowing employers to have a voice in the curricula and educational matters of future hires is important to the recruitment of graduates from community colleges.

To understand the complexity of the labor market, the staffs at the community and technical colleges have to ensure that the students meet educational requirements as well as the employer’s needs. Carnevale et al. (2009) stated that “the emergence of post-secondary institutions as the primary workforce development outside the labor market is evident in the movement toward vocational and occupational education in postsecondary programs” (p. 25).

Frendburg (2013) reported that “the U.S. Department of Labor has predicted that the market for HVAC mechanics and installers will grow by over 24% between 2010 and 2020” (p.
7). The education and training of the next generation is critical for the HVAC industry. This is due to the large number of individuals currently working in the HVAC field who are nearing retirement age. When these individuals retire, there could be a sudden shortage of technicians (Harris, 2011). Additionally, Doyle (2012) emphasized the fact that “the demands for highly trained and skilled labor is rising in the U.S. while the need for low wage, low skilled workers is in a decline” (p. 53). As a result, education and workforce development can be seen as products of this increased demand.

With this increased demand in skills, the workforce is on the verge of lagging behind workforces in other areas of the world. Doyle (2012) maintained that U.S. citizens will need more members in the workforce, who have the technical skills and knowledge to compete effectively in the 21st century. The market forces of the old ways are changing. Technology has become incorporated into every aspect of current life. In the HVAC field, a person used to be able to diagnose a problem with a few tools; now, with the advancement of technology, working on a furnace or an air conditioner requires more than a few tools. It takes diagnostic skills and advanced tools to accurately determine and rectify problems with the HVAC equipment.

Washbon (2012) noted “the newly introduced technology as not a simple substitute for existing technology; it is transformative in changing core occupational practices” (p. 44). Baughman, Brumm, and Mickelson (2012) advised that the new definition of “workplace competencies is the application of knowledge, skills, attitudes, values, and behaviors” (p. 116). Not only does transformative change take place in the workplace environment but with the employees themselves. The range of cognitive abilities is increasing, but the qualities employers need are a result of the employers’ personal choices and the qualities the employer considers to be important.
Twenty-First Century Skills

Cai (2013) defined the concept and perception of employability as “a set of achievement skills, understandings, and personal attributes that lead to gainful employment, success in their chosen occupations which benefits themselves, the workforce, the community, and the economy” (p. 458). According to Jordan, Dechert, and Wainwright (2012), CTE instructors should work with students in “three key areas of development; technical skills, academic skills, and 21st century skills” (p. 10). Weeks (2009) advised that “the skills area that stands out are troubleshooting, reading comprehension, critical thinking, active listening, deductive reasoning, oral comprehension, problem sensitivity, and near vision” (p. 71).

Hodge and Lear (2011) surveyed a group of business owners as to what were the most important skills for new employees. They found that the “five most attributes that business owners wanted to have in new employees were: (a) professionalism, (b) teamwork, (c) oral communication, (d) ethics and social responsibilities, and (e) reading comprehension” (p. 31). Business owners need to have employees with the skills with which they can respond to a customer’s needs and complete the assigned tasks. Tanyel, Mitchell, and McAlum (1999) identified a study conducted in 1993 by Raymond, McNabb, and Mattaei. Raymond et al. assessed the students’ and employers’ perceptions of the most essential skills that entry-level employees should have when they enter the workforce. The employers’ responses were based upon the attributes of the applicants: (a) oral skills, (b) dependability, (c) interpersonal skills, (d) written skills, and (e) self-motivation. Interestingly, the entry-level employees’ responses were similar to the employers: (a) oral skills, (b) interpersonal skills, (c) dependability, (d) motivation, and (e) written skills. Based upon the survey, both the employers and entry-level workforce employees knew and understood the value of specific contributions to the success of a business.
The new criteria for the development of the 21st century skills have undergone notable changes over the past few years; that is, “the outcomes of student achievement are now based upon what a student has learned rather than what has been taught” (Weeks, 2009, p. 71). Mason et al. (2009) emphasized that “employability refers to work readiness; that is seen as possession of the skills, knowledge, attitudes, and commercial organization objectives soon after commencing employment” (p. 1). Schwartz (2011) quoted the U.S. Department of Education Secretary Arne Duncan, who defined career readiness as “having the academic skills to be able to engage in postsecondary education and training without the need for remediation” (p. 1). Aragon et al. (2005) stated that skill standards consist of “two significant components: (a) a description of the responsibilities needed for competent performance and (b) description of knowledge and skills necessary to carry out these responsibilities” (p. 36). The impact of the national skills standards and student certification at the community college level should improve subsequent hiring by employers as well as provide job placement for the graduates (Aragon et al., 2005).

The staff of the community colleges needs to continue to help students acquire graduate levels of competencies; similarly, faculty members must stay current with the newest technologies used in the HVAC field. For the students to be able to understand the newest technologies in the field, the instructors have to be able to teach the concepts and applications relevant to the new equipment. Weeks (2009) suggested that the local HVAC business and industry members must become involved with the community and technical colleges.

Hodge and Lear (2011) stated that “nothing replaces the value of experience and hands-on training in the job market, however, every worker has to start somewhere and a post-secondary education makes entering the workforce easier for some jobs” (p. 28). Additionally,
Hainline, Gaines, Feather, Padilla, and Terry (2010) maintained that a “challenge to the 21st century skills-sets of students is providing career relevant education that produces critical, enlightened thinkers, and life-long learners” (p. 8).

In the HVAC field, the ability to problem solve is a requisite tool of the technician. Continuing education is a required aspect of being an HVAC technician because there are continual advances in technology, which is always changing. Fox-Turnbull (2010) wrote about problem solving techniques as mechanisms for individuals to inter-think by means of sharing understandings and coming to conclusions together with colleagues.

Anesi (2013) noted that major HVAC and electrical manufacturers commented that there is a considerable gap between the number of candidates for jobs and the number of those who are qualified to fill those jobs. These manufacturers reported that “85% of employers found it difficult to hire qualified applicants at the entry-level position with the skills they need to be successful” (p. 16). Hodge and Lear (2011) stated that “businesses want workers who can help increase profitability by reducing the cost associated with training, turnover, and production” (p. 30). The responsibility of the employee will expand to encompass skills that should be learned in educational environment and applied to the workforce. The skills that employers seek are based upon the skill sets of “critical thinking, problem solving, communication, teamwork, social responsibilities, and the foundational skills of math and reading” (Hodge & Lear, 2011, p. 30).

**HVAC Curriculum**

Wrenn and Wrenn (2009) stated that “students not only need to learn theory and understand why theories are important, but also to learn how to apply the theoretical framework to practice” (p. 258). Hainline et al. (2010) emphasized that instruction is being developed through active learning, self-guided instruction, and group work. Use of these instructional
methods transforms the approach to education, as it enables students to move away from the past methodologies of passive learning and toward an approach that is focused on student achievement and greater student understanding. With this new emphasis on active learning, strategies for training reflect new elements of the curriculum and instruction, which includes peer teaching according to the concepts inherent in cooperative learning. Discovery learning allows the students to become leaders and developers in their own acquisition of knowledge under the guidance of a facilitator. The learning that takes place should be incorporated with previous educational experiences through the use of scaffolding (Krauss, 1996).

Reio and Sutton (2006) stated that “business and industry leaders and educational accrediting agencies are now calling for the incorporation of experiential learning opportunities in the curriculum” (p. 305). According to Fox-Turnbull (2010), the “constructivist curriculum does not necessarily have its primary focus on content knowledge, but rather it promotes a way of learning or teaching process as an integral part of the program leading to autonomous thinking and reasoning” (p. 24).

With use of this method, students are encouraged to explore a particular topic through self-discovery and exploration. Reio and Sutton (2006) noted that “cooperative education is assumed to have inherent benefits to both the students and the employers” (p. 306). In addition, “cooperative education is an integrated program of theory and practice, it can provide students with the competencies and skills that are needed in the workplace” (p. 305).

Bunch (2009) wrote about the concept of spiraling the curriculum and the sequence of courses; this concept was a direct response to Bruner’s (1960) idea of mastering the concepts of learning. In the use of spiral instructional design, students are continually connected to the subject matter by a series of increasingly complex tasks that are directly related to the overall
subject being studied. As the student is continually involved, the student develops a greater and a wider range of understanding. In the HVAC field, the subject matter of the refrigeration cycle is complex, but as a student becomes aware of the topic, the instructor can bring different components into the subject matter. The foundational knowledge does not change, but continually learning about the topic allows the knowledge to become increasingly complex and abstract. An outcome of the educational experience is that the classroom becomes a setting for rehearsal and peer input, rather than oration and direct instruction (Bunch, 2009). Wrenn and Wrenn (2009) noted that it is important for the instructors to create an environment where students can take risks and enjoy the possibilities of failure. Failure should not be perceived as a defeat, but an opportunity to learn from one’s mistakes.

Drage (2009) recommended that technology should be incorporated into CTE curricula programs. When technology is integrated into the curriculum, students will better understand the content of the instruction. In some instances, the use of technology can replace some aspects of teaching or at least reinforce what has been taught. Use of technology in conjunction with instruction and application establishes an environment wherein students receive the best of all three spheres of influence. Use of the CTE format of curricular design and the addition of technology to the application creates an in-depth understanding to solve problems; additionally, using real-world problems carries a higher value to the classroom and to the students than problems that would not realistically be encountered in the real world (Drage, 2009).

Washbon (2012) stated that “technology can change the way we apply knowledge and skills to control and adapt to our environment” (p. 43). The advancement of HVAC technology in the workforce is increasing each year by the means of advancements in computer applications, as well as the billing methods by which parts are kept track and warranty issues. However,
recent advancements in technology should not be viewed as a substitute for current technology. Technology should be seen as transforming core occupational practices (Washbon, 2012). The emphasis is that employers seek employees with skills related to specific technical knowledge, which are typically the skills possessed by graduates of post–secondary programs.

**HVAC Certificates and Degrees**

According to Mupinga, Wagner, and Wilcosz (2009), students enrolled in community colleges can earn certificates and an Associates of Applied Science (AAS) degree. The certificate is seen as a viable tool to the graduate and to the employers and requires fewer hours to obtain than the associate’s degree. Mupinga et al. noted that “certificate programs provide intensive training in specialized technical fields” (p. 234). In Kansas, the HVAC certificate requires a total of 30 semester hours. The AAS degree is a 64 hour degree that has its major focus in the HVAC curriculum, and it also includes 16 hours of general education requirements.

Weeks (2009) stated that “community colleges have a long and impressive history of preparing well qualified technical workforce to meet the immediate and short-term needs of the local and regional industries” (p. 69). In the community and technical college settings, students can benefit when they attain the first steps of their education by completing a certificate that relates to a specific career. Bosworth (2011) noted that achieving a certificate can be seen as a stepping stone to success and as the first step of many to come in the students education. Vickers-Koch (2011) noted that by 2018, the United States will need over 4,000,000 new workers with post-secondary certificates. In Kansas, according to KBOR (2014b), the goal is for 60 % of the population to have achieved a certificate, associate’s degree, or a bachelor’s degree by 2020. Implementation of these initiatives means that there will be a continual need for employees to seek an education.
According to Bosworth (2011) a “certificate of occupational competence can be a valuable and manageable path to a good paying job” (p. 51). In the HVAC field, the benefits of a certificate allow the students to enter the workforce with a limited amount of educational training. For a vast majority of employers, one of the main obstacles for employment in the HVAC field is that the students are required to have the Environmental Protection Agency (EPA) refrigerant certificate. The EPA refrigerant certificate is required for all persons who handle refrigerant. In the HVAC programs at the community colleges, this course is required and usually taken in the first semester. It is seen as a building block to the rest of the HVAC certificate or degree. Zeidenberg and Bailey (2010) stated that once a student graduates with a certificate or an associate’s degree, the diploma represents an economic value to the graduate and to the employer.

Bosworth (2011) expressed “the Center on Education and the Workforce at Georgetown University forecast that 47,000,000 jobs will be created between 2008 and 2018 and nearly two-thirds of them will require at least some form of postsecondary education” (p. 54). This opportunity that is being presented to the colleges and universities can be seen as a win–win situation for the schools, students, and the employers. A White House (2014) spokesperson stated that earning a post-secondary degree or credential is no longer just a pathway to opportunity for a talented few; rather, it is a prerequisite for the growing number of jobs in the new economy. Additionally, the Obama Administration has called for an additional 5,000,000 graduates from community colleges by 2020 (White House, 2014). Murray (2011) reported that “America needs more workers with college degrees, certifications, and industrial certifications” (p. 26). Zeidenberg and Bailey (2010) added that occupational associate degrees led to greater earnings gains than did academic associate degrees.
Smith (2009) found that employment-ready certificates are recommended for expansion of the credentialing process to augment the quantity of technicians who are entering the HVAC field. Smith also noted that the increased number of employment-ready certificates is rising because of “three interesting factors: (a) there is an aging workforce of technicians, (b) younger technicians are not being attracted to the workforce, and (c) the skill sets demanded for technicians are changing” (p. 60). The impact of this finding means that the lack of qualified technicians is not only being felt in the HVAC industry, but across several industries and across the U.S.

In Kansas, the HVAC certificate and degree programs are a collaborative agreement between the members of KBOR, the TEA, and business and industry leaders. Together, those leaders concluded that the goals for the community and technical colleges should have four primary objectives: (a) allow business and industry to identify value added exit points within the program, (b) identify and support student acquisition of nationally recognized third party industry credentials, (c) identify common courses, which can serve as a bridge for articulation, and (d) decrease the variability in program length (KBOR, 2014d). The addition of having value added exit points in the certificate and degree programs should create interest for the graduates who have these additional qualifications. These tests need to be recognized as authentic credentials recognized by third parties. Lastly, the degree process for the community and technical colleges will be streamlined for the benefit of the students and graduates.

**HVAC Accreditation**

Mupinga et al. (2009) emphasized that “accreditation is conferred by an agency to certify an institution’s compliance with curriculum, faculty, and student service standards” (p. 234). Technicians with less than two years of experience or a background of only initial coursework
may take the *entry-level* certifications. Technicians who are employed in the HVAC field and have more experience can and should take specialized exams. Employers seek students and graduates with these types of certifications to ensure that the employee has the basic knowledge and understanding of the HVAC equipment on which they work. Both Dew (2012) and Schwartz (2011) suggested that all HVAC programs in community colleges should be accredited by an accrediting agency. The accreditation is an important indication that the school is an endorsed institution.

Sandler (2002) stated that, the ICE was developed in 1987 to measure entry-level skills of basic competency. The ICE test consists of three different emphases in the HVAC field: (a) residential, (b) light commercial, and (c) commercial. Dew (2012) asserted that accountability is becoming an increasing concern for institutions of higher education. As a result of the Perkins Act of 2006, it is required that programs of study in the HVAC field undergo third-party testing.

Third-party tests are developed through industry sources and experts to ensure that students have a high competency and knowledge level regarding various types of HVAC equipment. Third-party certification tests represent real world working knowledge of HVAC systems. Each exam is developed based on certain knowledge areas of expertise. In many community and technical colleges, these exams are used as exit points and turn-out exams.

Sandler (2002) reported noted that “the NATE certification exam is designed for technicians who have been in the HVAC field for more than two years” (p. 18). The NATE exams reflect the knowledge technicians need to have in order to install, service, and troubleshoot the high efficiency HVAC systems of today. Furthermore, Schwartz (2011) quoted Patrick Murphy, the Vice President of Certifications for NATE who stated that, “The NATE certifications are for seasoned technicians, not entry-level technicians” (p. 1).
According to Schwartz (2011), Warren Lumpson, the Director of Education for Air Conditioning, Heating, and Refrigeration Institute (AHRI), noted that some schools use these exams as exit points for their program of studies. In conjunction, Thomas Tebbe (2013) of HVAC Excellence noted that his organization offers employment-ready certification tests for students to assess themselves in regard to knowledge facts and skills that technicians should possess when they enter the HVAC field. Additionally, Tebbe noted that the employment ready certification tests show that “a student has learned the competencies in school and is ready to enter the workforce” (p. 1). Exit point competency tests in the HVAC field are: (a) ICE, (b) HVAC Excellence, (c) NATE, or (d) NCCER.

**Assessments and Accountability**

In terms of assessment and accountability, Anesi (2013) reported that “38% of the employers said that the candidates lacked the degree or certification and 53% said that candidates lacked on-the-job experience with an average time requirement of 3–4 years of experience” (p.16). Faculty members are responsible to the students, school, and the programs. In addition, faculty must prepare the students for the rigors that students will face in the field. Business and industry leaders speak about the possibility of a partnership between them and the schools. Partnerships that are formed could provide assistance where needed, and as a result, benefit all stakeholders.

Anesi (2013) reported that Howard Weiss of HVAC Excellence commented that staffs at schools are teaching the students the fundamentals, but they need to concentrate more on troubleshooting techniques. Green (2006) reached the same conclusion in his research study. Troubleshooting techniques are essential and a worthwhile investment to both the student and the community college. Additionally, Weiss noted that employers need to take a more active role in
their potential employee’s education (Anesi, 2013). Creating an environment where the employers and the community and technical college faculty members are engaged with one another is critical for a mutual understanding of each other’s needs.

The concept of advisory boards has been present for years, but recently, there has been a push to strengthen the position and influence of specialized advisory boards. In most community colleges, each program of study has an advisory board whose members assist the programs in the identification of: (a) expected problems, (b) forthcoming advances, and (c) issues impacting the profession. Murray (2011) recognized the influence of advisory boards and stated that “leaders from the colleges and advisory boards who are usually local employers should meet regularly to have a better understanding of the issues that are impacting the employer and what their needs are” (p. 26). Feutz and Zinser (2012) stated that “most technical educational programs have built in accountability to the community that hires its graduates; the curriculum and equipment must be kept up to date according to the needs of the industry” (p.13).

**HVAC Industry**

Kelley (2012) commented that PBL is an application that can be used in the HVAC curriculum. Kelley explained that the cornerstone of PBL is to allow students to acquire and to transfer learning from the facilitator to the students. Transformative learning “allows students to apply what was learned in new situations and to learn related information more quickly” (p. 36). Kelley and Kellam (2009) noted that using PBL in career education, increased student engagement, motivation, and multidisciplinary knowledge and could be used in relation to real-world learning activities. Additionally, PBL platforms require students to work together. This interaction can be the basis of the team building approach to learning among follow students and employees.
Knowledge of the HVAC occupation is garnered through experiences in practical settings. Billett (2009) expressed that “Dewey proposed two purposes of education for vocations: (a) to identify what occupations students are suited for and (b) to develop the capacities to realize their vocation” (p. 831). These can be understood as the goals for occupational preparation and these results can be achieved by implementing the best practices of training. Today, in the HVAC field, students are provided with a foundation of knowledge about the equipment, tools of the trade, and essential hands-on training; all of these factors are essential to the students. The process of learning in any trade should be perceived as ongoing.

Kim (2011) acknowledged that work-based learning occurs on a job site and is focused on: (a) work skills, (b) knowledge, and (c) the job itself. With the incorporation of these three concepts of work-based knowledge, the graduate can be provided with another learning format that might not have been available or as advanced in the classroom or in a laboratory. Kim maintained that work-based learning can be associated with on-the-job actions.

Alignment with Business and Industry

Reio and Sutton (2006) warned that “there is an overwhelming demand from business, industry, and the government to prepare graduates for the new workplace” (p. 306). Baughman et al. (2012) noted that “the use of postsecondary education is progressively responsive to the needs of business and industry, where the learning is closely tied to competencies and performance-based assessments” (p. 115). According to Boettcher (2014), it is difficult for some employers to find qualified employees based upon the industry-required competency assessments. When employers are not able to find employees with sufficient credentials and skills, this is known as a skills gap. Current CTE programs are being used as a conduit for the graduates who hold the appropriate credentials and skills that employers seek. Involvement
between employers and businesses and the schools is essential in order to foster a relationship that is mutually beneficial to both parties. The advantage of requisite competency-based learning is that the objectives are apparent and each student is aware and understands the learning goals and the outcomes (Baughman et al., 2012).

Baughman et al. (2012) maintained that competency models can be used by the employers in relation to the labor market. Competency models are directly related to knowledge being taught in the postsecondary education and are based upon the needs of the future employer. The definition of workplace competencies, which can take many forms within each type of business, is understood as the application of knowledge, skills, attitudes, values, and behaviors as they relate to the needs of the employers. The three skill sets that are applicable to the business side of employment are: (a) the hard skill set, (b) the soft skill set, and (c) technology. The hard skill set describes what the employee is able to accomplish, achieve, and produce. The soft skill set involve skills that relate to interactions with customers (Andrews & Higson, 2008). Del Corso et al. (2011) noted that the third aspect of the employee’s skill set is technology and innovation. Technology and innovation in the HVAC field is constantly progressing.

O’Reilly (2012) was adamant that there are several key items that relate to pursuing and acquiring employment in the student’s field of study. The author noted that prospective employees should: (a) conduct a background investigation of the company in which they want to be employed, (b) customize their résumé toward that particular job, (c) develop a specific skill set for the particular job, and lastly, (d) understand the market (O’Reilly, 2012). Being a well-qualified candidate is only one aspect of being offered a job; it is critical to have the right credentials and a positive attitude. In addition, O’Reilly recommended that one should make a connection with the employer and find common ground. Wilton (2012) noted that “69% of
employers expected the recent graduates to be able to effectively perform their jobs within six months of being hired” (p. 604).

Staying current in one’s chosen field and seeking further education is an integral formula for success in every business (Walker, 2009). Dunn and Jasinski (2009) reported that there is a new bond between employers and employees that is based upon continuous learning and growth. Smith (2009) advised that, in the future, employees should position themselves with greater skill flexibility.

**Partnerships**

Weeks (2009) insisted that leaders of community colleges and business and industry need to form win-win partnerships that will last and positively impact both parties. Torpey (2012) identified that the students who enroll and earn certificates are usually high school graduates or have earned a general educational development (GED). A certificate is usually recognized as an outcome for a specific occupation. A certificate can also be the means to help a student to reach his or her goal and assist them in “preparation for licensing program or other career related qualifications” (p. 3). Torpey specific that a marker of postsecondary education for HVAC graduates is the possession of a certificate, high school diploma, an associate degree, or a bachelor’s degree. Consequently, the graduates who work in the HVAC industry hold these types of certificates and degrees. In 2012, 72% of the students had a postsecondary certificate; 16% had a high school diploma, 3% had an associate’s degree, and less than 1% had a bachelor’s degree (Torpey, 2012). In total, 91% of the students had some postsecondary education. The remaining percentage would obtain their skills via on-the-job training without any education.

As evident from the categories listed previously, educational attainment and income advancement are related. There is a direct correlation between higher education and a person’s
income level. Torpey (2012) further identified that, in 2012, a high school graduate will earn a mean of $29,000 a year, a certificate graduate will earn a mean of $34,000, an associate’s degree graduate will earn a mean of $42,000, and a bachelor’s degree graduate will earn a mean of $53,000. According to the BLS (2014), the medium pay for an HVAC technician is $43,640.

**Summary**

The purpose of undertaking a phenomenological research design is to study the employers’ perceptions of HVAC graduates. The range of skills needed in HVAC graduates is wide and encompassing. This chapter detailed these skills as well as the topics of business and industry, employers, entry-level positions, and the future skills that are needed in this industry. The TEA, business and industry, and the community and technical colleges have joined together to form a comprehensive group that has investigated both the needs of the HVAC industry and the educational attainment of the HVAC graduates. This assessment covers the HVAC curriculum, HVAC standards, the HVAC certificate and degree from the community and technical colleges, workforce development, 21st century skills, the accreditation body of the HVAC industry, and the benefits of developing partnerships with business and industry.

The theoretical framework of CCT and constructivism comprise the elements of CTE. CCT can be used to explain the process in which a person imposes meaning and direction on their vocational and educational attainment behavior. The theory of constructivism guides an understanding of learning, in that learning should be active, authentic, and based upon real world activities. In this chapter, the body of literature relating to this study was reviewed. In the next chapter, the design of the study and the methodology used to collect and analyze data are presented.
CHAPTER THREE: METHODS

Overview

The purpose of this phenomenological study was to understand and describe employers’ perceptions of career readiness of graduates from a community college HVAC program in Kansas. Through analysis of the employers’ responses in regards to the HVAC programs in Kansas, I was able to determine whether the conceptual designs of the curricula met the needs of the employers of HVAC graduates. Van Manen (1990) described the method of phenomenology as “the systematic attempt to uncover and describe the structures of a lived experience” (p. 10). This phenomenological study was important because it was used to obtain information regarding the employers’ perspective regarding the requisite skills for new HVAC graduates when entering the workforce.

In this chapter, I describe the study methods and research design. Specifically, I collected data from the responses provided by HVAC employers who participated in this study. Three instruments of inquiry were used in order to collect information to answer the three research questions that constituted the foundation of this study. Additional topics detailed in this chapter include: (a) the setting of the study, (b) the method, (c) the data analysis, (d) the trustworthiness of the study, and (e) ethical considerations.

Design

A qualitative, transcendental phenomenological research design was used to analyze the data collected from employers who hired HVAC graduates from community colleges. Merriam (2002) stated that “the key to understanding qualitative research lies with the idea of meaning as socially constructed by individuals from interacting in their world” (p. 3). Qualitative research is a naturalistic inquiry entailed the collection of data from individuals in their own environment
about their personal experience (Creswell, 2013; Moustakas, 1994; Patton, 1990). According to Van Manen (1990), phenomenology is an immersion into a subject of interest, and it “describes how one orients to the lived experience” (p. 4). Moustakas’ (1994) transcendental phenomenological approach was utilized; the employers were provided with the opportunity to speak and provide meaning based on discussion points. Transcendental phenomenology is a method based upon the first person point of view, and it allowed the researcher to understand how people experience the phenomenon of interest and how these experiences are perceived. Creswell (2013) reported that the experiences related to a phenomenon are based upon a shared commonality among participants. The inquiry process started with a question that could not be answered based on the existing literature. The goal of this phenomenological research project was to gain an accurate depiction of the skills employers look for when they hire HVAC graduates.

To triangulate this study, a threefold methodological approach was used. Triangulation describes a process by which multiple methods are used to collect data on the same topic, which ensures the validity of the research (Ary et al. 2006; Creswell, 2013). The three methods included: (a) a survey instrument, which was distributed to the HVAC advisory board members of the local community college; (b) a focus group, which involved the local ACCA associate members; and (c) individual interviews with the local ACCA contractor members. These three stages of inquiry provided insight in regard to the employers’ perceptions of HVAC graduates. The term Group 1 was used for the advisory board members; Group 2 was used for the ACCA associate members; and Group 3 was used for the ACCA contractor members.

The study was based on three research questions. Piantanida and Garman (1999) maintained that the purpose of research questions is to address the foundational questions of a
study. Van Manen (1990) stated that “phenomenological questions are meaningful and they ask for the meaning and significance of the phenomena” (p. 23). From the information relevant to answering the questions, a deeper understanding of the topic was obtained. The answers to the questions are discussed in greater detail in Chapter Four. In Chapter Four, a rich description of the HVAC employers’ experiences and perceptions is described (Moustakas, 1994; Patton, 1990).

The three stages of inquiry were designed to assess from multiple directions the employers’ perceptions of HVAC graduates. By triangulating the data collected from the three inquiry techniques, I was able to fully explain the commonalities in the employers’ perceptions of the HVAC graduates (see Chapter Four).

**Research Questions**

The three research questions that served as the foundation of this study were:

1. How do HVAC employers describe the career readiness of HVAC graduates of MCC as they enter the HVAC field?
2. How do HVAC employers describe the training the participants received from MCC?
3. What recommendations, if any, do employers believe are necessary to improve the content of curricula utilized in the HVAC programs at MCC?

**Setting**

The participants for this study were drawn from a purposeful sample of 21 employers (members of the local ACCA membership and members of the local community college HVAC advisory board members) who had recently hired employees who graduated from the HVAC program. The Midwest Community College (MCC), a pseudonym, was selected as the research
site because it had a reputable HVAC program established in the state of Kansas. The HVAC program was initiated in 1982 and quality HVAC students have graduated from this program since its founding. The HVAC program is known for: (a) the quality of education of the graduates, (b) students’ technical skills, and (c) students’ ability to excel in the HVAC field.

MCC is located within a large Midwestern metropolitan area that straddles two state lines and has a population of over 2,000,000 residents. During the fall semester of 2015, over 19,000 students were enrolled in the college. The following percentages represent the ethnic breakdown of the school: 69% white, 8% Hispanic, 6% black, 4% Asian, and 1% Native American (KBOR, 2014a). The “other” 12% were identified as other or failed to disclose their ethnic background.

At MCC, students’ ages range from 17 to 65+ years (KBOR, 2014a). There are approximately 120 students enrolled in the HVAC program at any time. The student ratio is one-third full-time day students and two-thirds part-time night students. The ratio of day and night students is due to the fact that night students usually enroll in only one or two classes per semester, which means that it takes these students longer to complete the program and increases the number of students enrolled in an on-going status. Night students differ from the day students in that they return to the community college to: (a) finish their degree, (b) seek upgraded training skills in the HVAC field, or (c) seek retaining from another field.

Employers have long sought to hire graduates from MCC due to the quality of the HVAC program. In the HVAC program, students are taught the basic components of the HVAC curriculum, which enables the student to earn a certificate in HVAC. They can also enroll in the advanced curriculum, which culminates in an HVAC Associates of Applied Science (AAS) degree. The certificate program prepares the HVAC graduate for the basic job skills needed to service and maintain HVAC equipment. To complete the certificate, students learn the theory of
refrigeration as well as methods to service and repair furnaces, air conditioners, and heat pumps. The difference between the one-year certificate and the associate’s degree is the second year of instruction. All of the courses that are required in the one-year certificate are also required in the associate’s degree program. The second year of the associate’s degree program includes advanced courses in the HVAC curriculum. The content of the classes is more complex and advanced which allows students to acquire greater knowledge of the HVAC field.

The instructors in the HVAC program at MCC are experienced technicians; most of them have between 15 and 20 years of experience, and a few instructors even have 30 or more years in the HVAC trade. Most of the instructors have their master mechanical license and have taught HVAC courses at a postsecondary institution for a minimum of four years; a few have as many as 20 years of higher education experience. Each adjunct faculty member has been an owner of an HVAC business or has served as a general manager of an HVAC business.

**Participants**

A total of 21 employers participated in this study. Gay (1996) noted that a small sample can produce “in-depth understanding” (p. 213) in a qualitative study. The employers were selected through purposeful sampling, which was based from the larger population of the local employers who had hired recent HVAC graduates from MCC. Ary et al. (2006) advised that “qualitative researchers should select purposeful samples believed to be sufficient to provide maximum insight and understanding of what was being studied” (p. 472). Moustakas (1994) noted that the researcher and the participants of the research can be classified as co-researchers in a study.

The purposeful sample was established from a list of 24 members of the local ACCA membership and seven members of the local community college HVAC advisory board.
According to Patton (1990) purposeful sampling, leads to a more consistent focus, that allows the researcher to begin to identify the experiences of a particular subgroup. Employers who have hired recent HVAC graduates within the past two years were selected to be participants in this study. This criterion was set to maximize the likelihood that employers were able to provide a complete description of the criteria they used in the hiring of HVAC graduates, as their experiences of hiring graduates would be more recent than employers who had hired graduates of earlier classes, and thus more likely to be accessible to memory.

**Procedures**

Creswell (2013) noted that prior to collecting data, permission has to be obtained from the degree-granting institution. For this study, I obtained permission from the Institutional Review Board (IRB) at Liberty University (see Appendix A). This is a requisite step to ensure that the study was: (a) developed and designed in an appropriate, acceptable method; (b) aligned with the university standards; and (c) conducted in an ethical manner.

After IRB approval was obtained, I identified the participants for each stage of the study. The participant employers worked at various-size companies, the size being based upon the total member of employees who worked for the HVAC contractor. According to the Bureau of Labor Statistics (2014), heating and air conditioning contractors were classified as large companies if they had more than 51 employees, medium companies if they had 15 to 50 employees, and small companies if they had 15 or fewer employees.

As a faculty member at MCC, I had access to the email addresses of the HVAC advisory board members (Group 1). I sent an introductory letter of intent to invite seven members to participate in the survey (see Appendix B). All seven members agreed to participate in the study. I informed them of their right to withdraw from the study at any time and/or have their names
removed from the email list. Afterwards, I sent each participant a link to the survey using Survey Monkey. Each participant completed and submitted the survey.

Subsequently, I sent out 14 letters to ACCA associate members inviting them to participate in a focus group (see Appendix C). These employers were selected because they had a deep understanding of the HVAC trade or a direct relationship with the HVAC community. The focus group (Group 2) consisted of six employers who were associate members of ACCA. Creswell (2013) maintained that “finding individuals who can provide access to the research” (p. 151) is important and participants’ voices should be heard. I presented the focus group questions in a round-table discussion format. I used an audio recording device to capture the conversation that took place among the attendees. I transcribed the focus group dialogue in order to ensure that the essence of the focus group meeting was fully comprehended. I developed codes and themes based upon the focus group interactions, the transcript, and the field notes taken during the focus group meeting.

In regard to recruiting the ACCA contractor members, I contacted the Executive Director of the ACCA area in which the study took place in order to explain the purpose of this study and how it could impact local HVAC employers and community colleges. I requested the names, phone numbers, and email addresses of members on the membership list. Upon receipt of this information, I sent out 10 letters of introduction to the ACCA contractor members to inform them of this research study and request their participation in the interviews (see Appendix D). In order to reduce the number of possible participants, I only invited ACCA contractor members for the interviews.

I interviewed eight ACCA HVAC contractors (Group 3). The objective was to interview employers who represented various-sized HVAC businesses. The purpose of interviewing
employers of different-size businesses was to gain a cross sectional understanding of what types of employees were sought and of how each employer was different from others at companies of different sizes. When conducting the face-to-face interviews, an audio recording device was used to capture conversation. I transcribed the interviews to ensure the essence of the interviews was captured. I developed codes and themes using the transcripts and the field notes taken during the interviews. These data can be viewed in Table 4, which lists the codes and themes associated with the data collected during the focus group, and the interviews.

The Researcher’s Role

I am employed at a community college as a professor of an HVAC program. Previously, I was employed in the HVAC trade for over 17 years as an HVAC employee and later as an employer. My past experiences as an HVAC employer and now as a college professor helped me to understand the background of the research topic. From my time in the HVAC field, I have been awarded several notable qualifications: (a) master mechanical license, (b) master plumber license, (c) general contractor’s license, (d) sanitary backflow inspector’s license, and (e) refrigeration license, as well as other certifications that correspond with the trades.

Moustakas (1994) referred to the term *epoche* to describe a situation in which the researcher consciously suppresses his or her own thoughts, experiences, and perceptions in regard to the phenomenon being studied. Tufford and Newman (2010) emphasized that it is vital for researchers to *bracket* their preconceptions and stated that “one method of bracketing can take the form of writing memos throughout the data collection and analysis as a means of examining and reflecting upon the engagement of the data” (p. 86). As a result of being involved in this type of work both personally and as a past employer, I had to bracket my own ideas, impressions, and perceptions during the interviews and the focus group meeting.
To meet this challenge of bracketing, I used the four-step method described by Chan, Fung, and Chien (2013) to: (a) put aside all personal knowledge and impressions throughout the entire process; (b) use the literature review to set the guidelines of this study in order to gain a better understanding of the research questions that drive the study; (c) develop a predetermined set of questions for the face-to-face interviews; and (d) use the verbatim narratives from the literal transcripts of in-depth interviews as a guide for the data analysis, which enhanced the trustworthiness of the study. Tufford and Newman (2010) suggested that bracketing can be accomplished by the researcher “suspending or holding in abeyance any presuppositions, biases, assumptions, theories, or previous experiences” (p. 83), which enhances the researcher’s ability to objectively describe the phenomenon being studied.

Stewart and Mickunas (1974) indicated that bracketing of the material in the collected data “does not change one’s experiences, but helps to see it in a new light” (p. 48). Mertens (1998) acknowledged, “By using an inductive approach, the researcher attempts to make sense of a situation without imposing pre-existing expectations on the phenomena under study” (p. 160). As the researcher, it was my responsibility to remove my expectations of and assumptions about the participants’ responses and conduct the analysis only according to the themes and codes that emerged from the literal data collected from the survey, focus group, and the interviews. I did not have any relationship with these employers. I have working relationships with the members of the HVAC advisory board members, but the scope of these relationships are solely professional.

**Data Collection**

In this study, I sought to learn about the employers’ perceptions of recent HVAC graduates. The data collection occurred in three stages: (a) a survey (Group 1), (b) a focus group
(Group 2), and (c) individual face-to-face interviews (Group 3). The first stage of data collection involved administering a survey to the HVAC advisory board members. Having advisory board members answer closed-ended questions allowed me to analyze the raw numbers and convert the data into percentages that corresponded to the questions asked of the advisory board members. The second stage of data collection entailed inviting the associate members of ACCA to meet together and discuss the issues in a focus group setting. Having the associate members of ACCA together allowed me to interact with them and conduct an informal meeting to discuss their perceptions of HVAC graduates with prompts provided through a comprehensive interview. The third stage of data collection involved individual interviews with the contractor members of ACCA. The interview process allowed me to meet with local HVAC employers and gain a vast amount of information concerning their perceptions of HVAC graduates. The rationale for each segment was to build upon information that had been learned through previous steps. The use of the survey allowed me to gather introductory information about the participants’ experiences regarding HVAC graduates. The focus group and the individual interviews then allowed the participants to respond to open-ended questions, during which they answered openly and freely regarding their experiences of HVAC graduates.

In each stage of data collection, the data relevant to the research topic were collected (Creswell, 2013). The data collected during the survey, the focus group, and individual interviews were used to triangulate the results for this study (Creswell, 2013). Triangulation of a study requires the use of multiple and different sources, methods, and theories to corroborate the evidence (Creswell, 2013). Use of the triangulation method increased the validity of the findings. Ary et al. (2006) suggested that using multiple data sources increases the likelihood that the phenomenon being investigated can be understood from various points of view.
Survey

The first method of data collection was conducted using a survey. Gay (1996) noted that a survey is used to collect data from members of a certain population. The purpose of the survey instrument used in this study was to collect data from the local community college HVAC advisory board members (Group 1) in regard to their perceptions of the HVAC graduates. The survey was electronically distributed with the use of Survey Monkey. The feedback from the advisory board members was valuable because of their unique understanding of the HVAC graduates.

I began the survey process following steps detailed by Gall, Gall, and Borg (2007). The purpose of Step 1 was to define the research objectives. This was accomplished through development of the research questions that were used to guide this study. In Step 2, I identified the participants who were relevant to this study (Group 1). Step 3 involved designing the questionnaire, which elicited the HVAC employers’ perceptions of HVAC graduates (see Appendix E). Step 4 entailed contacting the employers who were members of the advisory board. I emailed seven HVAC advisory board members who were familiar with the HVAC program. Step 5 involved following up with non-responding participants. Lastly, in Step 6, the collected data was analyzed. During this analysis, the responses to the survey were converted from raw numbers to a percentage to enable comparisons of the data (Ary et al., 2006). Results from the survey are displayed and discussed in Chapter Four.

Focus Group

The second data collection method involved a focus group. Morgan (1988) defined that “focus groups are basically group interviews” (p. 9). Gall et al. (2007) identified six steps in conducting a focus group, which involved identifying: (a) the purpose of the interview, (b) the
selection of the sample, (c) the design of the interview format, (d) the development of the questions, (e) the parameters for conducting the interview, and lastly, (f) analyze the data.

According to Gay (1996), the purpose of sampling is to select a small representative sample of subjects to acquire an in-depth understanding of the phenomenon. I conducted a focus group to identify the experiences of a closely aligned population of the HVAC community. By using a focus group, I was able to analyze a wide spectrum of employers’ perceptions in a short amount of time. The purpose of the focus group meeting was to elicit feedback about employers’ perceptions of HVAC graduates. The ACCA associate members who participated in the focus group were selected from the associate membership ranks of the local chapter of ACCA (Group 2).

Gall et al. (2007) noted that focus groups are composed of individuals who have a vast amount of knowledge concerning the subject being studied. The ACCA membership is a national non-profit trade organization, the focus of which is on the advancement of the HVAC profession and promotion of the HVAC industry. The local ACCA chapter consists of contractor members and associate members. This is an association of HVAC business owners and professionals who have joined together in a partnership that focuses on success, quality, and integrity in the HVAC industry. The associate members are a group of business people aligned to the HVAC industry in the capacities of HVAC manufacturing supply distributors, utility corporations, insurance companies, or other closely aligned businesses related to the HVAC industry. The inclusion of other types of businesses involved in the local ACCA community provided a broader representation of the HVAC industry.

Patton (1990) noted that a focus group is a collection of “well informed people within the field of study” (p. 76). The function of the focus group in this study was to hone in on key areas
that were critical to this study. Patton added that the point of the focus groups was to “bring people together of similar backgrounds and experiences to participate in a group interview” (p. 173). There were six employers who participated in the focus group (Group 2). Morgan (1988) noted that, as a focus group is assembled, the interviews should be directed by the use of open-ended questions. The questions presented to the focus group are located in Appendix F.

The focus group is a special type of audience from which critical information is collected from members of a group clearly defined by the target audience (Gall et al., 2007). Data about their opinions and ideas were essential to determining the employers’ perceptions of HVAC graduates. The dialogue that took place among ACCA associate members during the focus group was productive and sometimes took on a new direction that I had not anticipated. The employers provided rich data and added value to the data emerging from each other’s experiences as they listened and commented upon the viewpoints of the other employers. This added value would have been difficult, if not impossible, to achieve in one-on-one interviews.

The responses provided by the focus group members reflected shared experiences among the ACCA associate members. Patton (1990) asserted that the members of a focus group do not discuss issues; rather, the sessions should be viewed as an intensive interview session. As such, data can be gathered from several people at the same time. These active interactions, which can provide a method of checks and balances, are the rationale for the use of a focus group (Patton, 1990).

**Interviews**

For the third data collection method, I located potential participants from the ACCA contractor segment of the population to conduct the individual interviews. I interviewed eight ACCA HVAC contractor members (Group 3) who were directly involved with the local ACCA
organization. These employers were important to the study because, as HVAC employers, they had hired recent HVAC graduates. Through the interviews with these employers, I gained an accurate description of the desired qualities these employers sought when they hired the HVAC graduates. These interviews provided further understanding into the employers’ principles regarding hiring HVAC graduates. Gay (1996) reported that the interview questions should follow a structured approach involving the use of planned questions and follow through with questions for clarification or further details.

Patton (1990) emphasized that “the purpose of interviewing is to understand how employers view the program and to capture the complexities of their individual perceptions and experiences” (p. 290). During the process, a researcher should be a good listener to the participants’ comments (Creswell, 2013). In the field of HVAC, there are several different industries: (a) residential, (b) commercial, (c) industrial, and (d) micro-businesses. Although HVAC business models may be similar, employers’ overall objectives as they hire graduates may be significantly different. The interviews were conducted individually and an audio recorder was used to capture the essence of the interviews. Each interview that was conducted followed the same order of questions and lasted approximately the same amount of time. The ACCA contractor interview questions are located in Appendix G.

The most common method of data collection in a qualitative research project is the use of open-ended questions during an in-depth interview (Creswell, 2013). For this study, the open-ended questions were designed to encourage open and free answers to the questions. This use of protocol questions during the interviews allowed the interview to proceed from one question to another, and yet, I was able to add questions if a given response revealed another avenue to explore. I kept field notes during the interview process, which helped to ensure that the
information from the interviews was accurate. The use of established interview techniques helped me code and connect the themes from the interviews. The interviews were conducted at the employers’ place of business and at a time convenient for both parties. Once the interviews were completed, I transcribed the interviews to ensure that the essence of the interview was fully understood and the data were accurate. With written transcripts, I was able to re-read the material multiple times and review the field notes in order to gain the most comprehensive sense of what the employers stated. The option of member checks and follow-up interview questions were available to corroborate the information or to clarify the content of the interviews.

**Data Analysis**

Moustakas (1994) guidelines for conducting a transcendental phenomenological study were used for the collection and analysis of the survey, focus group, and individual face-to-face interviews. Moustakas identified the first step in the analysis of transcendental phenomenology data as *epoche*. Creswell (2013) described *epoche* as bracketing, or setting aside the researcher’s own set of experiences. In conducting this study, I utilized a transcendental phenomenological design, which required that I carefully set aside my own beliefs and assumptions in regard to the topic. According to Moustakas, the use of transcendental phenomenology involves the researcher casting aside any of his or her previous knowledge. Creswell (2013) noted that bracketing is an effective method of suspending personal understandings in a reflective manner. Mertens (1998) stated “the key characteristic of phenomenology is the study of which members of a group or community interpret the world and life around them” (p. 169).

According to Moustakas (1994), the layering process of data analysis is a modification of the Stevick-Colaizzi-Keen method of analysis of phenomenological data. The analysis occurs through the following steps: (a) obtain a complete description of the experiences in regard to the
phenomenon, (b) consider each statement for rich description of experience, (c) list each important statement, (d) identify all non-repetitive or overlapping statements, (e) cluster meanings into themes, (f) synthesize the clusters and themes into textures of experiences, (g) reflect upon the experiences, and (h) build upon the meaning of the research and the essence of the study.

Once the surveys were complete, I used the raw data to compile percentages that represented the positions of the HVAC advisory board members. This provided preliminary information about their thoughts on how well the faculty is preparing the HVAC graduates for career readiness and soft skills training, as well as their beliefs about the rank order of significant HVAC classes. This information aided in the development of the themes and overarching themes, as the themes reflected the participants’ recommendations for future classes of HVAC programs in order to increase career readiness in graduates.

After conducting the interviews and the focus group meeting, I transcribed the audio-recordings of the interviews and the focus group meeting using a word processing document. As I completed the transcription of each interview, I started to see similar patterns in each of the employers’ responses. Each employer’s terminology varied to a degree, but was largely consistent.

In the beginning, I employed the horizontalization method, which entailed giving every statement equal meaning. While I was reading and listening to the data, specific words and phrases within each interview began to take shape. Utilizing the horizontalization method, I further categorized the list of the descriptors, phrases, and words into clusters. From those clusters of words and descriptors, I then was able to condense the clusters into five themes. By using the Stevick-Colaizzi-Keen method of data analysis of those five initial themes, I was able
to reduce the five themes down to three overarching themes relevant to the employers’ experiences with HVAC graduate’s career-readiness.

**Trustworthiness**

Trustworthiness in qualitative research is critical if peers are to accept the findings of a study. Trustworthiness includes important components such as credibility, dependability, transferability, and confirmability. Ary et al. (2006) noted that validity and trustworthiness cannot be taken for granted. Evidence must be corroborated by the use of different methods of data collection to provide and establish the validity of a study. To ensure trustworthiness, I focused on accuracy in the collection and analysis of data and in the description of the employers’ perceptions of the HVAC graduates.

To enhance accuracy in this research study, the position of reflexivity was continually taken in order to reduce any bias. Reflexivity is the process in which a researcher reflects on his relationships with the participants (Creswell, 2013). According to Mertens (1998), a researcher needs to have a heightened sense of self-awareness. Mertens also stated that “authenticity refers to the presentation of a balanced view of all perspectives, values, and beliefs” (p. 184).

**Credibility**

Guba and Lincoln (1981) noted that understanding and accepting a naturalistic research study is the key element of the issue of credibility. Therefore, the first point of trustworthiness is credibility. In this study, credibility was established through the use of triangulation of data sources. Creswell (2013) recommended this procedure and stated that triangulation is “the process that involves corroborating evidence from different sources” (p. 251). In addition, Gay (1996) and Patton (1990) stated that the use of multiple sources of data collection strengthens findings and generates a complete picture of the study. Triangulation for this study consisted of
the data collected from: (a) a survey, (b) a focus group, and (c) individual interviews. Patton noted the credibility of a qualitative inquiry is dependent upon methods used for the data collection, which is then carefully analyzed with attention to validity and reliability.

Furthermore, credibility can be established during interactions with the participants. Schloss and Smith (1999) held that a researcher must employ courtesy and professionalism in the conduct of research, including interviews and additionally during member checks. Ary et al. (2006) observed that member checking is a highly effective method to increase credibility of the data, because it provides an avenue for the participant to correct any errors that might reflect misrepresentation or misinterpretation by the researcher.

**Dependability**

A second key to establishing trustworthiness of a study is dependability. To achieve dependability in this study, each employer who participated in an individual interview was given a copy of the transcript of his personal interview to ensure that his statements were accurately reflected. This check in accuracy was designed to build both the trustworthiness of the study and trust the participants had in both me and the research (Creswell, 2013).

**Transferability**

Ary et al. (2006) noted that transferability is the degree to which findings of a study can be applied or generalized to other contexts or groups. Creswell (2013) noted that the acquisition of rich and thick data, collected in this study from the employers’ responses, ensure transferability of this study. The similarity of the responses from the employers yielded common themes. The presence of rich, thick, and descriptive data ensured that the details of the employers’ perceptions were accurate. The similarity of the employers’ experiences in regard to the topic of the study was established by connecting the common threads that emerged through
the participants’ descriptions, and information. The interconnection among the details was supported by use of the employers’ direct quotations detailed in Chapter Four.

**Confirmability**

The final important aspect of a study is its confirmability. Ary et al. (2006) stated that confirmability is comparable to the concept of objectivity, which means that the research is free of bias and reflects objective information. Guba and Lincoln (1981) maintained that in order to meet the requirements for the establishment of trust in a study, a researcher should be neutral and allow the information to speak for itself. That is, the “data should be factual and confirmable” (p. 125). Establishment of the truth is essential from a researcher’s standpoint in order to maintain credibility.

According to Guba and Lincoln (1981), the concept of confirmability moves the burden of proof from the researcher to the information itself. Being in a neutral position allows the information provided by the employers to stand on its own merit. Data confirmability relies on cross examination and triangulation to confirm the collected data from the employers.

**Ethical Considerations**

In any research project, the issue of ethics should be placed at the forefront of the investigation. Patton (1990) advised that a complete ethical disclosure should be provided to each participant before the research study begins and that the researcher should express a willingness to share the results with the participants at the closure of the study. The dignity, respect, and safety of the participants must be placed at the highest level and above any outcomes of the project (Ary et al., 2006; Gay, 1996).

Ary et al. (2006) noted that in order to ensure the high standards of a study, it is necessary to take specific actions to ensure alignment with ethical standards. In this study, each participant
was given a description of the study and asked to sign a consent form in order to participate in the study (see Appendices H, I, and J). Obtaining consent forms from each participant ensured that the participants volunteered of their own free will to participate in this study and had full knowledge of the benefits, potential risks, purpose, and scope involved in the study. Additionally, transcripts, field notes, journals, and recordings from the interviews were collected and held in a secure area, and electronic data were encrypted and protected by a password. All transcripts, field notes, journals, and audio recordings from the interviews were destroyed once the research was completed. Physical data were shredded and electronic data were permanently deleted from my computer. Lastly, I assigned a pseudonym to each employer. The removal of employers’ names ensured that their privacy remained intact. All responses were held to the highest standards of the ethical imperative of confidentiality. Gall et al. (2007) emphasized that building trust between the participants and the researcher creates a bond or a “convent of trust” (p. 167). To establish and maintain the trust that I had developed, I assured each employer that any information that the employers provided would be held at the highest level of confidentiality.

Summary

The purpose of this phenomenological study was to understand and describe employers’ perceptions of career readiness of graduates from a community college HVAC program in Kansas. Van Manen (1990) depicted transcendental phenomenology as an effort to describe the lived experience of a person or group of people. The objective of this study was to understand the experiences of the employers and to identify the qualities they perceive as desired in a new HVAC graduate.

To implement this research, a threefold methodological approach was used to understand the employers’ perceptions of HVAC graduates. The approach consisted of administering a
survey, leading a focus group, and conducting individual face-to-face interviews. Using triangulation in this study enabled me to more comprehensively elucidate the HVAC employers’ perceptions concerning the HVAC graduates.

In this chapter, the setting and participants of this study were described. Subsequently, the design of the study and the methodology for data collection and analysis were presented. Furthermore, I detailed the methods by which trustworthiness for this phenomenological study was established. Chapter Four contains the findings of this study.
CHAPTER FOUR: FINDINGS

Overview

The purpose of this transcendental phenomenology study was to understand and describe employers’ perceptions of career readiness of graduates from a community college HVAC program in Kansas. Participants provided rich and descriptive data that related to their perceptions of HVAC employees. Using a transcendental phenomenology research design entailed the collection of information from all participant employers about their experiences as related to the phenomenon being studied. Data were reduced, categorized, coded, and analyzed following Moustakas’ (1994) steps.

The gap in the literature that this research was designed to address was the lack of qualitative studies regarding employers’ perceptions of HVAC graduates. Thus, the focus of this study was to describe and identify similarities and shared experiences among HVAC employers related to the career readiness of HVAC graduates. The research questions for this study were:

1. How do HVAC employers describe the career readiness of HVAC graduates of MCC as they enter the HVAC field?
2. How do HVAC employers describe the training the participants received from MCC?
3. What recommendations, if any, do employers believe are specifically necessary to improve the content of curricula utilized in the HVAC program at MCC?

Participants

A total of 21 HVAC employers participated in this research study. The employers were grouped into three categories. Group 1 consisted of seven members of an HVAC advisory board who answered the survey questions. Group 2 included six ACCA associate members who participated in a focus group. Finally, Group 3 involved eight ACCA contractor members who
participated in the individual interviews. Each population that participated in this study was
critical because their input provided a complete understanding of the focus of the subject.

**Group 1: College Advisory Board Members’ Survey**

Out of the total population of the community college advisory board members, seven
employers volunteered to complete the survey regarding HVAC employers’ perceptions of
HVAC graduates. The HVAC advisory board members did not include their names or any other
identification when they completed the survey. The use of pseudonyms was not needed in this
manuscript because these members responded only to close-ended questions without including
any identifying information. In obtaining participants for survey administration, I aimed to
include employers who represented HVAC businesses of various sizes.

According to the BLS (2014) heating and air conditioning contractors are classified as
large companies if they have more than 51 employees, medium companies if they have 15 to 50
employees, and small companies if they have 15 or fewer employees. The purpose of having
companies of different sizes was to represent a wide variety of types of HVAC employers. All
of the HVAC advisory members were interested in the study and willing to share their ideas
concerning this research. The advisory board members were identified as Group 1.

The information gathered from Group 1, which consisted of seven HVAC advisory board
members from a community college addressed the first and second research questions. The first
research question was: How do HVAC employers describe the career readiness of HVAC
graduates of MCC as they enter the HVAC field? The advisory board members emphasized that
they perceived the graduates were career ready to enter the HVAC field based upon the training
that they had received from the community college. The second research question was: How do
HVAC employers describe the training the participants received from MCC? The advisory
board members noted that the HVAC program excelled in providing the necessary technical training to prepare graduates to enter the workforce.

**Group 2: ACCA Associate Members’ Focus Group**

The Executive Director of ACCA in the Midwestern area provided me with contact information for both the ACCA contractor members and associate members. I contacted 14 ACCA associate members and asked them if they would assist me and participate in a focus group discussion. The introduction letter to the ACCA associate members is located in Appendix C. I was selective in my requests because I wanted associate members who had a working relationship with the HVAC industry. The objective was to have a focus group that represented HVAC businesses of various sizes.

I explained to the focus group members what their roles would be in this research. After they agreed to participate in the focus group, I provided each participant with a consent form and explained the procedure of the focus group. Participants were made aware that they could withdraw from the study at any time. After each participant signed a copy of the consent form, one copy was distributed to the participants and another was retained for my records. The six ACCA associate members, who volunteered to participate in the focus group, were all closely aligned with the HVAC industry. This section of the chapter includes a description of these participants’ background and the location in which they work. Table 1 displays demographic information about the focus group participants (Group 2). A pseudonym was assigned to each employer who participated in the focus group.

Information gathered from Group 2 addressed all of the research questions. The first research question was: How do HVAC employers describe the career readiness of HVAC graduates of MCC as they enter the HVAC field? The focus group members noted that career
readiness means that graduates should have the knowledge and skills necessary to qualify for and succeed in entry-level jobs. To be career ready, graduates must have studied a rigorous and broad curriculum, grounded in academics, but also consisting of other subjects that lend themselves to a well-rounded education. Academic preparation alone is not enough to ensure postsecondary readiness, but it is an essential foundation for job success in the 21st century. When students are career ready, they are prepared for the next stage in their lives.

The second research question was: How do HVAC employers describe the training the participants received from MCC? This can be understood in terms of acquiring both the technical skills and the soft skills in the community college. The focus group members thought that the soft skills could be transferred to most any occupation. The technical skills that are learned within the program are closely tied to the HVAC industry, with the exception of the electrical class, which relates to various industries. Focus group members also believed it was important for the graduates to be able to perform simple to moderate tasks associated with the HVAC industry at the point at which they are hired by an employer. Examples of expected tasks include conducting maintenance on HVAC equipment, installing furnaces and air conditioning units, and providing introductory service. It was expected that the more complex tasks would be taught by the employer and other employees during additional training times.
Table 1

*ACCA Focus Group Participants’ Demographics*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Age</th>
<th>Years of Experience in HVAC</th>
<th>Years of Involvement in ACCA</th>
<th>Educational Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adam</td>
<td>61</td>
<td>40</td>
<td>7</td>
<td>HS</td>
</tr>
<tr>
<td>Brian</td>
<td>58</td>
<td>2</td>
<td>1</td>
<td>BS</td>
</tr>
<tr>
<td>Charlie</td>
<td>59</td>
<td>11</td>
<td>10</td>
<td>AS</td>
</tr>
<tr>
<td>David</td>
<td>49</td>
<td>15</td>
<td>2</td>
<td>CERT</td>
</tr>
<tr>
<td>Ed</td>
<td>47</td>
<td>30</td>
<td>5</td>
<td>HS</td>
</tr>
<tr>
<td>Alexandra</td>
<td>45</td>
<td>1</td>
<td>1</td>
<td>BS</td>
</tr>
</tbody>
</table>

*Note: Key to abbreviations in Table 1:*

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS</td>
<td>High school</td>
</tr>
<tr>
<td>CERT</td>
<td>Certificate</td>
</tr>
<tr>
<td>AS</td>
<td>Associate degree</td>
</tr>
<tr>
<td>BS</td>
<td>Bachelor’s degree</td>
</tr>
</tbody>
</table>

The third research question was: What recommendations, if any, do employers believe are specifically necessary to improve the content of curricula utilized in the HVAC program at MCC? The focus group members identified four recommendations that they perceived would assist the HVAC graduates and the program. They were: (a) increase students’ understanding of the newest technical skills, (b) incorporate soft skills training into each class, (c) focus on more hands-on learning, and (d) encourage the students to pursue their associate degree. Additionally, the focus group members examined the list of classes in the HVAC curriculum and agreed that the individual classes strengthen the HVAC program. The focus group members also agreed that the second year classes are more advanced and comprehensive than classes taken in the first year. The following sections provide rich descriptions of each employer (given pseudonyms) who participated in the focus group.
Adam. Adam has been involved in the ACCA organization for seven years and worked within the HVAC trade for 40 years as a manager for a large national HVAC distribution company. He has worked for several HVAC types of businesses and has many contacts within the HVAC trade. Currently, Adam is a territory sales manager for a large HVAC distribution company.

Brian. Brian has been employed at a large national HVAC distribution company for a couple of years. This is his first year of involvement with ACCA and of work within the HVAC trade. Brian has a business degree from a Midwestern university. Brian has worked in several HVAC related types of businesses in the past and has made several contacts within the HVAC trade. Currently, he is employed as an outside sales manager.

Charlie. Charlie has been employed at a small local HVAC distribution company for five years. Previously, Charlie was involved with ACCA for 10 years and worked in the HVAC trade for 11 years. He has worked at two HVAC businesses and has many contacts within the HVAC trade. Charlie holds three associate degrees from the local community college. Currently, he is employed as a sales counter manager.

David. David has been employed at a medium-size HVAC distribution company and has been involved in the ACCA trade organization for a couple of years. Prior to taking a position with an HVAC distributor, he was employed for almost 15 years in the HVAC trade as a service technician. He has worked for several HVAC companies and has many contacts within the HVAC trade. David holds a certificate from a local HVAC college. Currently, he is employed as a sales counter manager.

Ed. Ed has been employed at a large national HVAC distribution company. He has been involved in the ACCA trade organization for five years and in the HVAC trade for over 30 years.
He has worked at three different HVAC distributors. Currently, he is employed as an HVAC branch manager and has been with the same company for over 20 years.

**Alexandra.** Alexandra has been employed at a small HVAC distribution company for less than a year. She recently became involved with ACCA as an account manager for a small local HVAC distribution company. This is her first job within the HVAC industry. Alexandra holds a bachelor’s degree in accounting.

**Group 3: ACCA Contractor Members’ Interviews**

The third method that constituted the triangulation of this study was the individual face-to-face interviews. Triangulation involves using multiple data sources in an investigation to increase the comprehensive and accuracy of the understanding of the phenomenon of interest. The Executive Director of ACCA in the Midwest area provided me with the names and phone numbers of the ACCA contractor members. The objective was to purposefully select for interviews employers who represented various sizes of the HVAC businesses. According to the BLS (2014) heating and air conditioning contractors are classified as large companies if they have more than 51 employees, medium companies if they have 15 to 50 employees, and small companies if they have 15 or fewer employees. The employers represented large, medium, and small companies. The purpose of having employers from different-size companies was to gain a comprehensive representation of each type of employer sought and ways in which the preference of each employer differed.

I contacted 10 ACCA contractor members and asked them if they would assist me and participate in an interview. The introduction letter to the ACCA contractor members is located in Appendix D. Of the 10 ACCA contractor members whom I contacted, eight agreed to participate in the individual face-to-face interviews. Each of the ACCA contractor members who
participated represented a different size of HVAC business. After they agreed to be interviewed, I provided each ACCA contractor member with a consent form and informed them of the procedure involved in the interview. I explained to each employer that at any time they could remove themselves from the study. The consent form given to the ACCA contractor members is located in Appendix J. After each employer signed a copy of the consent form, I kept the consent form for my records, and I provided them with a copy of the consent form for their own records. Generally, the interviews lasted between 20 and 30 minutes.

The ACCA contractor members addressed interview questions related to each of the research questions. The first research question was: How do HVAC employers describe the career readiness of HVAC graduates of MCC as they enter the HVAC field? Career readiness is defined as being able to enter the work force with the necessary HVAC skills to begin working within the HVAC industry. Several of the employers noted that knowledge of the refrigeration cycle; knowledge of electrical circuits that include high and low voltage, ability to measure amps and capacitance; basic diagnostic skills, capacity to work as a team player, and the soft skills required to interact with customers are a must to be gainfully employed in the HVAC industry.

The second research question was: How do HVAC employers describe the training the participants received from MCC? The HVAC graduates who enter the workforce with an associate degree are usually more skilled than candidates without the introductory training and with only an HVAC certificate. Graduates of an HVAC training program can almost immediately start on an installation team and quickly move up to a service repair technician. Ability to complete tasks unique to a service technician and capacity to work on HVAC equipment are some of the highest skills that technicians can achieve when working in the residential and commercial HVAC field. Each of the employers noted that the graduates can
apply the information and knowledge that they received at the community college in various ways within the industry. An example of the students being able to apply the knowledge to the industry is application of knowledge of the refrigeration cycle. Every refrigerant cycle is primarily the same; if a student understands how the refrigerant cycles works with each component, he/she can apply that knowledge to the smallest appliance or the largest chillers. Another example is with the electrical training; electrical theory and application is interchangeable with every industry. Many of the same objectives that are taught at the community college in the second year parallel the knowledge that the HVAC employers are seeking in qualified candidates. This knowledge includes deep understanding of the basic fundamental skills, the technical skills required to complete the assigned tasks, and the soft skills required to interact with customers.

The third research question was: What recommendations, if any, do employers believe are specifically necessary to improve the content of curricula utilized in the HVAC program at MCC? The most substantial issues that the employers noted were the needs for the community and technical colleges to continue to teach the basic fundamental skills, focus on the electrical class, and emphasize the soft skills where appropriate. The employers noted that many graduates struggled with understanding the electrical components of HVAC equipment. These employers pointed out that a vast majority of the service calls in the HVAC industry are electrical in nature. Therefore, it is critical for HVAC graduates to have a firm understanding of electrical theory and application.

The employers suggested that faculty at the schools should place the students in as many real-world scenarios as possible and incorporate more hands-on learning. This would teach the graduates how to properly react to real-world situations once they enter the workforce. Most of
the employers suggested that faculty at the community and technical college should build a curriculum that is not only responsive to the needs of the students, but also to the needs of the HVAC employers.

The ACCA contractor members who were interviewed are described in the following section. The descriptions include a short biography, details about their workplace, and other information relevant to the context in which their perceptions and experiences of HAV graduates are grounded. A summary of demographic information of Group 3 participants is presented in Table 2. The participants’ actual names are not used, and a pseudonym was assigned to each employer who participated in the interviews to ensure anonymity. The interview participants are identified as Group 3.

Table 2

**ACCA Interview Participants’ Demographics**

<table>
<thead>
<tr>
<th>Participant</th>
<th>Age</th>
<th>Years of HVAC Experience</th>
<th>Years of Business Ownership</th>
<th>Educational Background</th>
<th>Industry Credentials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthony</td>
<td>59</td>
<td>35</td>
<td>31</td>
<td>BS</td>
<td>MM, MP</td>
</tr>
<tr>
<td>Bill</td>
<td>68</td>
<td>43</td>
<td>43</td>
<td>MS</td>
<td>MM, GC</td>
</tr>
<tr>
<td>Carl</td>
<td>37</td>
<td>19</td>
<td>12</td>
<td>AS</td>
<td>MM</td>
</tr>
<tr>
<td>Donald</td>
<td>56</td>
<td>34</td>
<td>19</td>
<td>HS</td>
<td>MM</td>
</tr>
<tr>
<td>Eric</td>
<td>36</td>
<td>15</td>
<td>8</td>
<td>BS</td>
<td>MM</td>
</tr>
<tr>
<td>Frank</td>
<td>34</td>
<td>2</td>
<td>0</td>
<td>MS</td>
<td>MM</td>
</tr>
<tr>
<td>Gary</td>
<td>34</td>
<td>19</td>
<td>10</td>
<td>AS</td>
<td>CERT</td>
</tr>
<tr>
<td>Holly</td>
<td>45</td>
<td>25</td>
<td>25</td>
<td>BS</td>
<td>CERT</td>
</tr>
</tbody>
</table>

*Note.* Key for Educational Background and Industry Credentials in Table 2:

- HS = High School
- AS = Associate degree
- BS = Bachelor’s degree
- MS = Master’s degree
- CERT = Certificate
- GC = General Contractors license
- MM = Master Mechanical license
- MP = Master Plumbers license

**Anthony.** Anthony has owned a large-size HVAC company in the metropolitan area for over 30 years. He has employed many newly trained HVAC graduates at this company. He has
worked in the HVAC trade since 1980. He holds a bachelor’s degree in accounting and business administration, as well as a master mechanical license, master plumber’s license, and many other certifications and licenses that apply to the HVAC and plumbing trade. As an HVAC business owner, Anthony has been involved in many civic organizations and is well known both in and out of the HVAC industry.

**Bill.** Bill has owned a medium-size HVAC company for over four decades, where leadership is currently transitioning to his son, who will eventually take over the business. Bill holds several industry recognized certifications, including a master’s degree, master mechanical license, and a general contractor’s license. Bill is entering his 50th year in the HVAC trade and has been a business owner for over 43 years.

**Carl.** Carl has owned a small HVAC company for over 12 years. He has worked in the HVAC trade since 1996 and has been an HVAC business owner since 2002. Among his credentials, he holds a master mechanical license and earned an associate’s degree.

**Donald.** Donald is an owner of a small-size HVAC company since 1996 and has worked in the HVAC trade since 1981. Among his credentials, he holds a master mechanical license and has several industry training certifications. Donald started working in the HVAC industry as a helper, then an installer, which led him to become a service manager and subsequently work his way up to become a business owner.

**Eric.** Eric has owned a small HVAC company since 2008 and has worked in the HVAC trade since 2000. Among his credentials, Eric holds a bachelor’s degree, a master mechanical license, and several industry training certifications. Since his entry to the HVAC field, Eric has worked for several HVAC companies. This experience led him to take the initiative to found his own HVAC business.
Frank. Frank has been a human resource manager of an HVAC company for more than two years and has 10 years of experience in the human resource industry. Frank has been employed in several different types of businesses, which include the automotive industry, electrical industry, and now an HVAC business. Frank holds a bachelor’s degree and a master’s degree.

Gary. Gary is the co-owner of a medium-size HVAC company with his father, who founded the company in 1990. Gary holds an associate degree in residential HVAC service technician from a community college. He has been working in the industry since he was 15 years old and has almost 20 years of HVAC experience. Gary holds many certificates that are related to the HVAC industry.

Holly. Holly is the co-owner of a medium-size HVAC company with her husband, and they have worked together in the HVAC industry since 1990. Holly holds a bachelor’s degree and her husband holds a master mechanical license for their HVAC business. Her responsibilities as the co-owner include serving as vice president of the company, secretary, and bookkeeper, and addressing day-to-day operations.

Data Collection and Analysis

After I collected all the data, I started transcribing each of the participants’ information, and as a result, segments of the data began to emerge into clusters. From these clusters, it was possible to identify various themes. Similar answers were reduced and clustered together in order that the employers’ perceptions of the HVAC graduates could be ascertained.

Survey

The initial data collection method began with the use of a survey presented to Group 1, which consisted of seven HVAC advisory board members from a community college. The
survey feedback provided the initial data regarding the employers’ perceptions regarding HVAC graduates. The survey contained close-ended questions, which means that the responses could be calculated quantitatively (e.g., raw totals and percentage).

Survey question one was: To what degree are the Midwest Community College (MCC) HVAC graduates career ready? Group 1 participants reported that overall, the MCC HVAC graduates were ready to enter the work force and were career ready. Of the participants, 14\% (N = 1) thought the graduates were very ready to enter their career field, and 86\% (N = 6) responded that they were ready.

Survey question two was: How well are the MCC HVAC graduates prepared to enter the HVAC field in comparison to HVAC graduates from other technical schools? Of the advisory board members 72\% (N = 5) believed that the graduates from the community college, in comparison to graduates of other schools, were very ready to enter the HVAC field and 28\% (N = 2) believed the graduates were ready. The overall training acquired by the graduates is relatively similar across the state due to the fact that KBOR recently aligned the HVAC curriculum in the state of Kansas.

Survey question three was: How well does the MCC HVAC program prepare students in technical skills? The perception of the advisory board members was that faculty at the community college prepare graduates with technical skills that are in demand by the HVAC employers. The responses were as follows: 28\% (N=2) of the Group 1 members rated the graduates as very ready and 72\% (N=5) of the Group 1 members rated graduates as ready.

Survey question four was: How well does the MCC HVAC program prepare students in soft skills? Of the advisory board members, 14\% (N = 1) believed that graduates were very ready in the preparation of the soft skills, while 58\% (N = 4) of the board members believed that
graduates were *ready*, and 28% \( N = 2 \) of the board members believed that graduates were *somewhat ready*.

Survey question five was: The Kansas Board of Regents (KBOR) has advanced the idea that a group of identical, introductory HVAC courses are to be taught at all HVAC higher educational institutions. Which MCC HVAC course should be included in the baseline courses and serve as a model for introductory courses at MCC and other higher educational institutions? The employers listed, in numerical order, the courses they perceived to be most beneficial for the HVAC graduates as related to the sequence of classes. In Table 3, a numerical value is placed beside each, which was ranked from 1–10 (1 being most important and 10 being least important, see Table 3).

Group 1, which consisted of the seven HVAC advisory board members, emphasized that the HVAC Fundamentals class was the most critical course of which the students should have a thorough understanding and that the students should be able to apply the theories associated with the classroom activities to their hands-on learning. A close second in terms of rated importance was the Electrical Fundamentals because it emphasizes the analytical aspect of learning: (a) electrical circuits, (b) ladder diagrams, (c) electrical schematics, and (d) the pathways of electricity. The Heating Systems Fundamentals and Cooling Systems Fundamentals classes were ranked third and fourth in the results. Although both systems are independent of one another, they are combined in most applications. The EPA 608 Refrigerant Management was ranked fifth. In regard to the latter half of the ranked classes, Sheet Metal Fabrication and Layout ranked sixth. The Safety Orientation/Occupational Safety and Health Administration (OSHA) 30 course followed closely behind. The courses that ranked near the bottom were Installation and Start-Up Procedures, Load Calculations, and lastly, Work Place Skills.
Table 3

Numerical Value of Course Listing from Most Beneficial to Least Beneficial

<table>
<thead>
<tr>
<th>Course Names</th>
<th>Average Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVAC FUNDAMENTALS</td>
<td>1.2</td>
</tr>
<tr>
<td>ELECTRICAL FUNDAMENTALS</td>
<td>1.7</td>
</tr>
<tr>
<td>HEATING SYSTEMS FUNDAMENTALS</td>
<td>4.0</td>
</tr>
<tr>
<td>COOLING SYSTEMS FUNDAMENTALS</td>
<td>4.7</td>
</tr>
<tr>
<td>EPA 608 REFRIGERANT MANAGEMENT</td>
<td>5.0</td>
</tr>
<tr>
<td>SHEET METAL FABRICATION</td>
<td>6.4</td>
</tr>
<tr>
<td>OSHA ORIENTATION/OSHA 30</td>
<td>7.1</td>
</tr>
<tr>
<td>INSTALLATION AND START-UP PROCEDURES</td>
<td>7.2</td>
</tr>
<tr>
<td>LOAD CALCULATIONS</td>
<td>8.5</td>
</tr>
<tr>
<td>WORKPLACE SKILLS</td>
<td>8.8</td>
</tr>
</tbody>
</table>

Focus Group

The focus group meeting was the second method of data collection utilized in this study. The focus group members were referred to as Group 2. As associate members of ACCA, these members had a direct working relationship with the HVAC industry by their involvement in the manufacturing, distribution, and sales of HVAC products and equipment. The input provided by the ACCA associate members during the focus group was valuable because the members directly share their knowledge concerning the employers’ perceptions of the HVAC graduates.

The first question asked during the focus group was: What soft skills are necessary for entry-level employment and ought to be taught at MCC? Each member identified and listed the soft skills that an HVAC graduate should possess. By the end of the discussion, soft skills were identified as: (a) communication, (b) creative thinking, (c) analytical thinking, (d) conflict resolution, (e) problem solving, (f) team building, (g) customer service, (h) ethics, and (i) time management. Each of these person-oriented skills can be transferred to any occupation.
The second question asked during the focus group was: What technical skills are necessary for HVAC entry-level employment and ought to be taught at MCC? The focus group members noted that the technical skills that are needed by an HVAC graduate are wide ranging. The graduates should have skills and knowledge concerning the fundamentals of: (a) an HVAC system, (b) the tools of the trade, (c) safety, (d) order of operation, (e) the refrigeration cycle, (f) venting, (g) sheet metal, (h) brazing, (i) refrigerant charging, and (j) electrical circuits. The technical skills are arguably the easiest tasks to teach at the community college HVAC program. The standard operating procedures can be identified as learning the order of operation sequence. Teaching the order of operation entails memorizing the order in rote memory with the use of ladder diagrams and flow charts.

The third question asked during the focus group was: To what degree are the community colleges and technical school programs preparing students to obtain the appropriate HVAC soft and technical skills? The focus group identified the Basic Fundamentals class, the Electrical Fundamentals class and, the Internship class as important classes for the graduates to have taken in order to have a foundation in the technical skills. The importance of the Internship class provides real world work experience and through the student’s performance on the class, potential employers can estimate the level of real-world skills possessed by the graduate. The employers also noted that each class offered in the curriculum would benefit from having some component of soft skills training. The focus group members addressed the need for the development of a well-rounded graduate who has both technical skills and general education requirements. Members of the focus group suggested that completing the work place skills class would broaden the overall experiences of the graduates and would have a direct impact on them seeking and maintaining employment.
The fourth question asked during the focus group was: To what degree do the current HVAC programs offered at community colleges and technical schools prepare graduates for a successful HVAC career? I gave the focus group members a list of courses offered at MCC, specifically, those classes that are a part of the HVAC certificate and the associate degree programs. The purpose of this question was to: (a) gain an understanding of the introductory topics, (b) establish a generalized awareness of the equipment used in the HVAC trade, and (c) provide an overall understanding of the concepts and theories that are possessed by a quality HVAC graduate. The focus group members noted that it appeared the training becomes more intense during the second year with the introduction of several advanced classes in the second year. As a result, the associate degree program, which incorporated these classes, was believed to be more comprehensive than the one-year certificate program.

The fifth question asked during the focus group was: Since the Kansas Board of Regents (KBOR) has advanced the idea that identical, introductory HVAC courses should be taught at all HVAC higher educational institutions, which introductory HVAC courses or topics should serve as the baseline and be offered at these institutions? Why? The focus group discussion points were focused on the first semester of the HVAC certificate. The focus group members agreed that the introductory classes of the first semester are the most critical and imperative for the graduates to master because they provide the foundation for the subsequent classes in the program. However, members of the focus group noted the electrical class can cross many areas of instruction, and the graduates should have a strong understanding of the electrical principles. Additionally, the focus group members suggested that the safety class should be incorporated into the first semester because safety has been and always will be a critical aspect of the HVAC business.
The members of Group 2 thought that the technical and soft skill sets were practical and important for every HVAC graduate to possess. The impressions that HVAC technicians make on others reflect upon the company, business, or employer they represent. Increasingly, employers seek candidates who not only have broad technical skills sets, but also have desirable personal traits related to soft skills, such as: (a) enthusiasm, (b) professionalism (e.g., punctuality, manners, appearance), (c) self-confidence, (d) positive attitude, (e) a strong work ethic, (f) attention to detail, (g) teamwork with fellow employees, (h) leadership qualities, (i) problem-solving techniques, (j) the ability to accept constructive criticism, (k) the ability to work under pressure, and (k) genuine curiosity.

**Interviews**

The individual face-to-face interviews constituted the final method utilized to collect data and to triangulate the findings from this study. Employers who were ACCA contractors comprised Group 3. The data from the interviews provided a vast amount of rich and thick descriptions about the employers’ perceptions of HVAC graduates. The interviews were designed as an informal and interactive conversation. The interview questions that were asked of the employers were open ended, general, and focused on gaining a stronger understanding the phenomenon of the study.

Each employer was asked the same set of questions and in the same order. The first interview prompt was: Provide a description of an ideal employee. The employers all had firm beliefs about the qualities inherent in an ideal employee. Carl suggested that the employee needs to “be clean cut, presentable, have an upbeat attitude, and be personable.” Frank maintained that a new employee should keep an open mind, learn from others, and be willing to provide the highest possible customer service. Holly said, “The ideal employee would have the technical
skills and the soft skills to perform the job.” Bill, Donald, Gary, and Eric held a similar opinion, which was that employees need to: (a) start on time, (b) complete the assigned tasks, and (c) ask for help when needed. At HVAC companies, it is important that employees be willing to ask questions, as there will always be someone who knows the answer and who is willing to help. In addition, Anthony noted that employees should maintain a positive attitude.

The second question asked during each interview was: How you would describe a person who is HVAC career ready? The responses ranged from basic to elaborate. Most employers indicated that they wanted HVAC graduates who had basic understanding of: (a) the refrigeration cycle, (b) electrical circuits, (c) how to diagnose basic service items, (d) how to be a team player, (e) customer service, and (f) how to help the company and their fellow coworkers to get the job done. Carl said that a person “who is HVAC career ready should know the refrigeration cycle, have a good comprehension of electrical circuits, and basic troubleshooting aspects of the trade.” Frank noted that learning is a constant in this trade, so the candidate should have strong study skills and be willing to find out information on his own. Donald and Eric noted that, essentially, the most valuable experience was hands-on experience. They elaborated that only time in the field increases a person’s experience, and there is no substitute for experience.

Gary held the position that a new employee should be able to perform the basic functions of complete preventive maintenance checks on HVAC systems. Both Anthony and Holly suggested that a new employee should have a comprehensive background in HVAC and be willing to learn from others. Furthermore, although new employees do not have to be extremely knowledgeable, they do need to have an overall understanding of the components so that if they need help in the field, someone can provide assistance over the telephone and be able to solve
problems. The specific description of new employees, who are career ready was based upon several scenarios. The employers who participated in the research noted that career readiness depends on: (a) the background of an individual, (b) education, (c) willingness to learn the trade, (d) knowledge, (e) attitude and impressions, (f) willingness to be a team player, (g) technical skills, as well as (h) soft skills training and communication skills.

The skills required for an HVAC graduate differed based upon the employer’s needs. Overall, results indicated that there was not one particular skill set that was essential in the HVAC industry. Each participant agreed that knowledge comes with experience in working in the HVAC field. Several employers noted during the interview that they have working HVAC systems available at their businesses for training purposes. This supplemental training allows the employees at these organizations to gain additional skills on how to: (a) install various HVAC items, (b) service HVAC equipment, and (c) correctly diagnose HVAC equipment with real world faults built into the HVAC systems.

Three employers commented that during the first few weeks of being on the job, they allowed new employees an opportunity to work with a seasoned technician. This learning opportunity created a relaxed introduction to the company and allowed the new graduates to gain confidence and to make and learn from mistakes early on, as opposed to when they are on their own. This process also instills in them that they are part of a team and that working together to meet the goals of the company are important.

The third question asked during the interviews was: What skills should an HVAC graduate possess in order to be considered a good candidate for employment? The overall impression of the employers was that the most desired skills were the technical skills of the graduate, which are based upon their jobs and on employment. Carl and Frank emphasized the
technical skills, but also alluded to the intangibles of the characteristics and drive of the person. Frank went on to say, “The technical skills are something that can be learned, but the intangible skills are something that each employee has to bring with them.” Gary emphasized, “A good candidate needs to have great communication skills in order to speak with the customers who they meet on a daily basis.” Holly noted that an employee should have some life skills in addition to the technical skills of an HVAC employee. Anthony said, “It comes down to the integrity of the new employee.”

A common factor among the employers’ responses regarding the hiring of HVAC graduates was the employee’s character and background. A person’s true character will show through in many instances. Candidates may mask negative character traits during the interview and application process, or even after being hired, but over time, a person’s true character emerges. Just the same, an educational background can provide the employer with a general idea of the knowledge graduates possess in regard to tasks common in the HVAC trade.

Three employers noted that the cost associated with hiring graduates has increased dramatically. To compensate for this concern, employers are starting to require prospective employees to take introductory examinations when they complete an employment application. The examination requires the applicants to answer basic HVAC questions that any entry-level technician should be able to answer. Based upon the results of the application, the employment examination, and a background check, a decision is made to invite the applicant back for an interview. Most of the background checks include: (a) contacting the insurance provider to check on the driving record of the applicant, (b) requiring an applicant to pass a drug or pre-employment test, (c) checking the applicant’s credit report, and lastly, (d) checking social media venues such as Facebook, Google, and Twitter. As a result of implementing this two-stage
process, second interviews are becoming increasingly necessary for HVAC employers to conduct.

Background checks are becoming more critical due to high insurance rates to cover the risks that companies take when they allow technicians to enter customers’ homes. If there are any problems associated with an applicant’s background check, it is pragmatic for the employer to consider another applicant. The employers who participated in this study reported that they had taken chances on applicants in the past and it worked out well, yet other employers noted they hired seemingly ideal candidates who passed everything, but turned out not to be a good employees.

The fourth question asked during each interview was: How would you characterize the technical skills of an HVAC graduate who you have met, interviewed, or hired? All of the employers reported that they evaluated new employees on their competencies and technical skills. Holly suggested:

The technical skills of an HVAC graduate could be more than just the overall technical aspects of learning the HVAC systems. They could be classified as having confidence, the right attitude, basic knowledge of an HVAC system, willingness to improve on their own skill level, willingness to share and be helpful with others, being sincere, trustworthy, and hardworking.

Carl noted that many of the employees who he had hired were able to catch on to what they needed in a relatively short amount of time. He thought this was because the graduates already had a sound foundational background of the HVAC theory and applications. Frank stated, “The educational background the graduates have provides an air of confidence to their mannerism and they pick up the information in the field quicker than someone without the HVAC training.”
Bill said that the graduates should have an ability to start almost immediately on an installation and maintenance team. He went on to say it “usually takes everyone some time to pick up on the service aspect of this field, but graduates have an easier time of it due to their educational background and training that they received from the community college.” Donald agreed with Bill and added that the graduate’s technical skills are important in obtaining a position of employment with any company. Eric echoed Bill’s thoughts and included that “the troubleshooting skills are a set of skills that comes with experience and time working in the field.” Gary suggested that many of the field-taught employees lack the technical knowledge, and they lack the knowledge of the science of how a system functions. Based upon their education, the HVAC graduates have a notable advantage in comparison to other entry-level employees because they are able to apply the information and knowledge that they received at the community college to many different forms of the industry. Anthony added, “The graduate’s technical skills are important tools that they need to use on an installation, maintenance, or on a service call.”

The technical skills required to enter the HVAC field include basic working knowledge of: (a) HVAC systems, (b) the refrigeration cycle, (c) brazing and soldering, (d) troubleshooting, (e) superheat and sub-cooling, (f) electrical training, (g) installation and service, and (h) salesmanship. However, the technical skills are only one aspect of the HVAC field; a well-rounded and desirable graduate must be able to incorporate many skills. Each of the employers noted that whereas technical skills may get a graduate hired, lack of soft skills will almost certainly get an employee fired.

The fifth question asked during the interviews was: How many HVAC graduates, if any, has your company hired in the past five years? The assortment of answers from the employers
who had hired HVAC graduates in the last five years ranged from one to 40. Overwhelmingly, the responses to the question of how likely they would be to hire an HVAC graduate from a community college was “very likely.” The employers indicated that they would hire an HVAC graduate from a community or technical college when they search for their next employee. All of the employers thought the community college’s staff did a good job in the preparation of graduates for the HVAC field. Gary complimented faculty at the schools on being proactive with the students by creating an environment conducive to learning. The objectives and skills taught at the community and technical colleges are parallel to qualities for which the employers look when they hire. Most of the HVAC employers noted that they had hired several new employees from the community and technical colleges and would continue to do in the future. Anthony said he “feels confident when hiring graduates from the community college because of their educational and technical background.” Holly added that her “company only hires community college graduates because of the time that is required to train someone to know the basic HVAC skills that is taught at the community colleges.”

The sixth question asked during each interview was: In your opinion, how well do the community colleges or technical schools currently prepare HVAC graduates to be good candidates for employment? A majority of the employers noted that the HVAC program of MCC had an excellent reputation, and that quality graduates came from the program. Further, many employers observed that the faculty had close associations with the local HVAC employers, thus making graduates of the program well prepared for the field of HVAC. The employers reported the graduates were eager to succeed in the field. Frank said, “Each person has to be willing to put in 100% effort.” Eric and Anthony added that it is difficult to simulate many of the items that happen in the real world on real service calls, so some students may not
be familiar with the full range of tasks to which they will be exposed when they leave school. Holly suggested that, “Additional electrical training should be introduced to the students in the HVAC program.”

Sub-prompt A of question six was: What do you perceive to be the strengths of the education the graduates received? All of the employers reported that the overall strength of the program lies with the education in the basic fundamentals class, the electrical class, and the other introductory classes. They indicated the graduates have a strong foundation of fundamental entry-level skill sets with the hands-on learning that takes place in the classroom and in the laboratory. Both Carl and Eric observed that the graduates have a basic knowledge of how things are supposed to work and a good understanding of residential systems. Frank maintained that “the classes build structure in a student’s life and a dedication to the HVAC field and industry.” Additionally, the employers noted that for the most part, the community and technical college faculty has developed a strong, comprehensive hands-on curriculum that enables placement of the students in as many real-life situations as possible to enhance awareness of the situations graduates are prone to experience in the field. It was Anthony’s opinion that:

Not only the full-time faculty, but adjunct faculty members provide the graduates with an atmosphere that challenges them to learn and understand what the expectations are out in the field and what are the responsibilities of being an HVAC service or installation technician.

Each instructor has his or her own strengths, but the combined faculty was believed to provide the graduates with the best instruction based upon the instructors’ experience and knowledge.

Sub-prompt B of question six was: What do you perceive to be the weaknesses of the education the graduates received? A majority of the employers indicated that the weakest area of
preparations seems to be the lack of advanced electrical skills. The electrical courses are complex, and typically, either the students understand the information and excel or they struggle to learn the skills. Holly noted “that a majority of the graduates that they have hired have some trouble in working with, identifying, and troubleshooting electrical circuits.” She explained that before new employees go out on their own, she and her husband need to ensure the employee is competent and ready for situations the employee may encounter. She added that in-house training is critical and rewarding, not only from an employer’s perspective, but also from an employee’s point of view. Eric added that besides the electrical requirements, graduates may be unprepared in several areas: (a) reading electrical wiring diagrams, (b) reading ladder diagrams, and (c) electrical troubleshooting. Many service calls in the HVAC industry are electrical in nature. Thus, having a strong background and a solid understanding and knowledge concerning electrical requirements and safety are mandatory.

Anthony said, “The graduates need to have a strong work ethic in order to get the job done and to make the customer happy.” Gary stated, “Out in the field, there are surprises that pop up, and sometimes a graduate gets overwhelmed by the complexity of the tasks.” Donald, Carl, and Frank agreed that one of the most important qualities in a graduate is in the area of the soft skills. They observed that the younger graduates do not seem to understand how to: (a) talk to customers, (b) shake hands, (c) look customers in the eye, and (d) handle themselves in front of women. Also, Carl added, “The graduates sometimes struggle when trying to make sheet metal adaptions.” Building a sheet metal transition can be difficult, because it entails taking a single-dimension piece of sheet metal and trying to produce a three-dimensional product.

The seventh question asked during the interviews was: If you were in charge of a student’s education, what subjects or topics would you consider essential in order for that person
to be successful in the HVAC field? A majority of the employers repeated the same topics as
previously reported, namely, that electrical skills are critical to develop in graduates for a strong
foundation and advanced skills. Bill, Eric, and Carl emphasized that “the electrical competencies
could range from low voltage circuits, to high voltage, series circuits and parallel circuits,
motors, and many items between.” Donald and Gary brought up the fact that faculty should
exert more time and effort in effective teaching as they introduce the concepts of sheet metal to
the students and focus more on troubleshooting with pieces of HVAC equipment.

One concept that Frank raised, which had not been previously discussed was financial
management. Frank’s position was that many new graduates entering the workforce may not
have all of the financial tools and knowledge to meet all of their personal obligations. He
suggested that the community and technical colleges develop a class to aid the graduates’
knowledge of their financial management skills. Anthony introduced another concept not
directly related to the HVAC field when he suggested that “the graduates should have more
classes on writing and communication classes.” He went on to say, “In order to be a well-
balanced person you have to have more than the technical skills; you got to have a positive
attitude and the soft skills by interacting with people.”

Most of the employers noted that the students had a good foundation in regard to the
technical skills required in the HVAC field. They maintained that teaching the introductory
classes was important because it laid the foundation of the curriculum and the technical side of
working in the HVAC field. The employers thought that the curriculum was sufficient because it
allowed the students to obtain a general understanding of the HVAC field and a knowledge base
of how to diagnose, service, and repair furnaces, air conditioners, and heat pumps. They
approved of the program because the faculty provided many general concepts that the graduates
need when they enter the workforce. These needs include knowledge of the following tasks: (a) calculate the fuel consumption, (b) calculate the air flow, (c) clock a gas meter, (d) check for carbon monoxide, (e) charge air conditioning units by either superheat or sub-cooling, (f) calculate the vent size for a furnace, (g) develop sheet metal skills, (h) size gas lines, (i) acquire a strong electrical background, and (j) develop customer relation skills. Because the conceptual training was introduced at the community and technical college level, employers were able to add new training skills for the fresh employees.

The last question asked during the interviews was: What recommendations could you make to improve the skills of future HVAC graduates? The most common answers were: (a) to continue teaching the basic skills, (b) to increase awareness of the soft skills, (c) to build the curriculum in a manner that is beneficial not only for the graduate, but also for the employer, (d) to develop more hands-on activities, and (e) to continue with the concepts of electrical circuits. Anthony said, “The HVAC field is constantly moving towards more of a high-tech industry and therefore, the training for the advanced classes should start to introduce some of these advancements.” Frank suggested that “the schools push the internship classes, because this type of learning takes place out in the field and the students get to see exactly what it is like to work for an HVAC contractor.” He went on to suggest that the schools’ staff should place more focus on hands-on learning in the curriculum.

Holly, Bill, and Anthony suggested that the schools should continue to improve on the soft skills of the graduates by exposing them to scenarios to allow students to practice addressing many situations that they might experience in the field. Gary recommended that students should use the instructors as a resource because instructors likely have experience in areas related to the HVAC industry to which the students may not have been exposed. Gary additionally stated,
“The instructors should plant a seed into the graduates that the education they are receiving is only the beginning.” Therefore, it is necessary for faculty at community and technical colleges, as well as the staff of the CTE programs, to enhance the training and provide the necessary skills for the graduates. Faculty at community and technical colleges should focus on preparing HVAC graduates to be career ready by providing them with strong foundational knowledge, technical skills, and soft skills that employers require.

Results

The purpose of this study was to understand employers’ perceptions of recent HVAC graduates. A total of 21 employers participated and all of the employers lived and worked in the large metropolitan area in which this study took place. Results came out of an in-depth analysis of the data collected from a survey, a focus group meeting, and the individual interviews.

The three overarching themes that emerged regarding the recommendations of employers who are hiring HVAC graduates are as follows: (a) emphasize the basic fundamental classes; (b) focus on technical skills and hands-on learning; and (c) incorporate soft skills training within each class, as appropriate. These overarching themes constitute the basis of what HVAC employers seek when hiring HVAC graduates. The results of coding and reduction of data are displayed in Table 4. The themes and clusters in Table 4 are presented in no particular order.
Analysis of Raw Data from Focus Group and Individual Interviews

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<tr>
<th>Cluster of Themes</th>
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<th>Horizontalization of the Focus Group and the Interviews</th>
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Overarching Theme 1: Emphasize the Basic Fundamental Classes

The first overarching theme that emerged from the data collected from the HVAC employers was that faculty at community colleges should continue to teach and emphasize the basic fundamental skills of HVAC. The participants believed that a strong foundation in the basic fundamentals class and the electrical class is vital for an HVAC graduate to possess. The skills learned in the fundamental classes constitute the foundation for which everything else is learned and applied. The fundamental classes also provide a foundation upon which subsequent courses are structured. The fundamental classes provide the students with theoretical knowledge and the introductory concepts of application. These classes start with the concepts of the refrigeration cycle; brazing and soldering; charging methods of superheat and subcooling; refrigerant handling techniques associated with reclaim, recycle, and recovery; the introductory
theories of gas laws; and electrical theory and application of how to use ladder diagrams, wiring schematics, and pictorial drawings.

**Overarching Theme 2: Focus on Technical Skills and Hands-On Learning**

The second overarching theme that emerged from the data obtained from HVAC employers was that faculty at community colleges should continue to teach the technical skills that are required in the HVAC trade, but should include more hands-on training. The technical skills can be classified as the service and installation practices of: (a) furnaces, (b) air conditioners, (c) heat pumps, and (d) accessories that are used in the HVAC trade. CTE programs at community and technical colleges should be linked to the preparation for employment in specific occupations or careers. As a result of the use of a hands-on curriculum, students gain technical skills and learn accepted standards, abilities, and knowledge necessary to carry out the employees’ responsibilities in the workplace. Formal educational programs are designed to convey the skills and knowledge required in a career readiness field.

There are two components in vocational education theory and application. The theoretical knowledge can help lead to a deeper understanding of the concepts. The application and practical side of CTE is the hands-on approach to learning. This type of instruction is essential so that students can work with actual equipment and attain an understanding of HVAC systems.

**Overarching Theme 3: Incorporate Soft Skills Training within Each Class, as Appropriate**

The third overarching theme that emerged from the data obtained from the HVAC employers was the importance of community colleges and technical schools focusing on the HVAC graduates’ soft skills. The ACCA associate members identified some of the soft skills as: (a) communication, (b) creative thinking, (c) analytical thinking, (d) conflict resolution, (e)
problem solving, (f) team building, (g) customer service, (h) ethics, and (i) time management. Most soft skills are transferrable to other occupations and can be defined as person-oriented skills. During the interviews for this study, the employers reported that they seek candidates who not only have broad technical skills sets, but also have desirable traits related to soft skills such as: (a) enthusiasm, (b) professionalism (e.g., punctuality, appearance, manners), (c) self-confidence, (d) positive attitude, (e) a strong work ethic, (f) attention to detail, (g) capacity to participate in teamwork and collaboration with fellow employees, (h) leadership qualities, (i) ability to solve complex problems, (j) willingness to accept constructive criticism, (k) ability to work well under pressure, and (l) genuine curiosity. Students’ acquisition of soft skills is progressive and their successful mastery of these skills may not be apparent until after the graduates enter the workforce.

Summary

In this chapter, I presented the data collected from the study. The purpose of this study was to understand and describe employers’ perceptions of career readiness of graduates from a community college HVAC program in Kansas. A transcendental phenomenology research design was used to study employers’ perceptions and to arrive at common themes in the employers’ lived experiences. Three methods of data collection including a survey, a focus group, and individual interviews, were utilized to triangulate the results regarding the experiences and perceptions of the HVAC employers. The lived experiences of the 21 HVAC employers who participated in this study were described in this chapter. From a thorough analysis of the data, three themes emerged. The three themes were: (a) emphasize the basic fundamental classes, (b) focus on technical skills and hands-on learning, and (c) incorporate soft skills training within each class, as appropriate.
Each of the research questions was reviewed and answered in detail from the perspective gained by each of the three methods. Employers’ quotes supporting the answers to the research questions served as evidence substantiating the claims. The themes were designed to describe the employers’ perceptions of HVAC graduates and qualities and skills they sought when hiring the graduates. This study revealed that HVAC employers seek employees who have a strong foundation in the basic fundamental skills, technical skills with hands-on learning, and the softs skills. In the next chapter, these results are discussed in the context of the existing literature and recommendations for the students and graduates, faculty members and colleges, and employers are presented.
CHAPTER FIVE: DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Overview

In this chapter a summary of the results, a discussion of the findings in light of relevant literature, implications, and recommendations for future research are presented. The purpose of this transcendental phenomenological study was to understand and describe employers’ perceptions of career readiness of graduates from a community college HVAC program in Kansas. Moustakas (1994) noted that “transcendental phenomenology is a scientific study of the appearance of things, just as we see them, and as they appear” (p. 49). I examined and described the lived experiences of 21 HVAC employers and their perceptions of HVAC graduates as they related to the graduates’ preparation for career readiness and workforce development. Transcendental phenomenology was the appropriate method for this study because it allowed the researcher to gain an understanding of the participating employers’ perceptions of HVAC graduates.

Summary of Findings

Data was collected through three methods (survey, focus group, and individual interviews) and then analyzed. The questions presented in all three methods were developed based upon an in-depth review of the literature. Following Moustakas’ (1994) recommendations for conducting a transcendental phenomenological study, the first stage of inquiry involved the use of a survey to elicit information from advisory board members of an HVAC program (see Appendix E). The second stage of inquiry involved a focus group comprised of ACCA associate members (see Appendix F). Finally, the third stage of inquiry utilized individual face-to-face interviews with ACCA contractor members (see Appendix G). Closed-ended questions were used in the survey, while open-ended questions were utilized during the focus group meeting and
the interviews. The open-ended questions were used to provide a means in order to explore with more freedom and flexibility the employers’ perceptions regarding the HVAC graduates. The goal for this phenomenological study was to examine employers’ perceptions of HVAC graduates. I collected data from 21 HVAC employers using three different methods of inquiry.

Three research questions were developed to guide this study. The answers to the research questions provided a description of the composite textural, structural, and essence of the employers’ perceptions. The research questions were as follows:

Research Question 1: How do HVAC employers describe the career readiness of HVAC graduates of MCC as they enter the HVAC field?

Research Question 2: How do HVAC employers describe the training the participants received from MCC?

Research Question 3: What recommendations, if any, do employers believe are specifically necessary to improve the content of curricula utilized in the HVAC program at MCC?

From the participants’ words, three overarching themes emerged. They were: (a) emphasize the basic fundamental classes, (b) focus on technical skills and hands-on learning, and (c) incorporate soft skills training within each class, as appropriate. These three overarching themes constitute what HVAC employers seek when hiring HVAC graduates.

**Research Question One Findings**

In addition to revealing the overarching themes, the data was used to answer each research question. The first research question was: How do HVAC employers describe the career readiness of HVAC graduates at MCC as they enter the HVAC field? The career readiness of HVAC graduates is based upon whether applicants have the qualities employers
seek in their own employees. The consensus among the employers was that the career readiness of an HVAC graduate should encompass several areas. These areas of knowledge are founded in a solid understanding in the basic skills of HVAC, which include but are not limited to: (a) the refrigeration cycle, (b) superheat and sub-cooling charging methods, (c) reclaim, recovery, recycle, and evacuation, (d) an in-depth knowledge of electrical circuits, (e) the technical or hard skills, (f) basic troubleshooting and service skills, (g) the EPA 608 refrigeration management certification, (h) some hands-on experience, (i) the soft skills that are requisite for interaction with the public, (j) sheet metal skills, (k) soldering and brazing, (l) HVAC safety concerns, (m) knowledge of the tools of the trade, and (n) a willingness to help and assist others.

**Research Question Two Findings**

The second research question was: How do HVAC employers describe the training the participants received from MCC? The training that an HVAC graduate receives at the community college is designed as an entry-level employment skill sets. Overall, the quality of this training was rated as *Very Good* based on the responses from the employers in this study. The objectives taught at community and technical colleges parallel those that the HVAC employers sought. The employers’ rationale for the benefit of the training is that the graduates have a strong foundation as they enter the workforce and they can build upon that foundation as they continue to learn the trade.

Many of the HVAC employers noted that they had hired several new employees in the past from the community colleges and would continue to do so in the future. Anthony, an owner of a large HVAC company, said he “feels confident when hiring graduates from the community college because of their educational and technical background.” Holly, a business co-owner, added that her “company only hires community and technical college graduates because of the
time that is required to train someone with the basic HVAC skills.”

There were some areas where the employers believed that the colleges excelled, and there were other areas needing improvement. The employers’ desired skill sets for the graduates like their businesses, were wide and diverse. The purpose of the training at the community and technical colleges is to teach the students the basic skill sets required in that employment. The graduates should be aware of the requirements for continuing their education after entering the field by: (a) taking continuing education classes, (b) participating in up-graded training from manufacturers and distributorships, (c) participating in in-house training, and (d) attending trade shows or conventions.

**Research Question Three Findings**

The third research question was: What recommendations, if any, do employers believe are specifically necessary to improve the content of curricula utilized in the HVAC program at MCC? The employers noted that the community and technical colleges offer a strong, comprehensive hands-on curriculum that is focused on placing the students in as many real-world and active learning situations as possible. The focus has been and needs to continue to be learning in a hands-on environment. Learning in a hands-on environment supports the theoretical concepts taught in the classroom and allows students to apply theory by allowing the subject to come to life in a laboratory setting.

During the interviews, the employers suggested that instead of trying to teach every skill required in the field, the faculty at the community and technical colleges should focus on the most important issues, especially those most needed in future employment and most desired by employers. Several employers noted that the electrical skills are critical for the graduates to possess. The electrical courses are complex, and typically either the students understand the
information and excel, or they struggle with mastering the information. During the interviews, several employers stated that electrical knowledge ranges from being able to read the various schematics and understanding electrical voltage, series and parallel circuits, motors, and troubleshooting. The HVAC graduates need to master those electrical skills in order to be classified as a good technician.

The HVAC employers identified areas of improvement that were directly related to their type of business. However, the employers overwhelmingly recommended that the faculty of the community and technical colleges continue to teach the most critical aspects of the HVAC trade. Specifically, they noted the importance of: (a) hands on training, (b) basic skills, (c) the analytical aspect of learning the electrical circuits, ladder diagrams, electrical schematics, and the pathways of electricity, and (d) soft skills such as, communication, creative thinking, analytical thinking, conflict resolution, problem solving, team building, customer service, ethics, and time management.

This transcendental phenomenological study fills a gap in the research by delving into employers’ perceptions of HVAC graduates. Previous researchers had not concentrated on employers’ perceptions of career readiness of HVAC graduates. Previous researchers in the HVAC trade had examined many conceptual positions regarding technical data of HVAC equipment, but there was a paucity of research devoted to the specific qualities desired in potential employees. There were two research studies that provided a foundation for the current study. Feutz (2010) focused on graduates of the Bachelor of Science in HVAC at Ferris State University. Green (2006) sought to understand the methods by which HVAC service technicians learn from troubleshooting electrical components in HVAC equipment. By investigating employers’ perception of HVAC graduates in the current study, the focus was the content being
taught, the manner in which it is being taught, and the methodology that is being used to ensure that the material being taught is appropriate for the graduates to successfully enter the workforce. Allowing HVAC employers to share their voice about their process of decision-making in hiring recent graduates will inform faculty and instructors who are responsible for instilling in students the skills and knowledge that are necessary to job placement in the HVAC field.

**Discussion**

The purpose of this transcendental phenomenological study was to understand and describe employers’ perceptions of career readiness of graduates from a community college HVAC program in Kansas. I used Savickas’s CCT (Brown & Brooks, 1996; Glavin & Berger, 2012; Packard et al., 2012; Patton & McMahon, 1999; Sampson et al., 2013; Savickas, 2005; Savickas, 2012; Savickas & Lent, 1994; Savickas et al., 2009; Swanson & Fouad, 1999) and the constructivist theory (Bay et al., 2012; Dewey, 1938; Grier-Reed et al., 2009; Piaget, 1952; Powell & Kalina, 2009; Ultanir, 2012; Yilmaz, 2008) as the theoretical frameworks that guided this study. The data revealed several themes.

**Themes**

From the analysis of the data gathered from the 21 HVAC employers, three overarching themes emerged: (a) emphasize the basic fundamental classes, (b) focus on technical skills and hands-on learning, and (c) incorporate soft skills training within each class, as appropriate. The first theme that emerged from the data was for faculty at the community and technical colleges to place an emphasis upon the basic fundamental classes. Scott and Sarkees-Wircenski (2001) noted that HVAC employees should have the functional skills, the theoretical principles related to the HVAC occupation, and the skills and abilities to perform the necessary jobs related to the HVAC industry. The participants spoke about needing HVAC graduates to have a strong
foundational knowledge in the fundamental classes because the concepts that are taught in these classes are used throughout the HVAC industry and are the building blocks for all of the other HVAC classes.

Within the theory of CCT, Savickas (2005) identified a formula for vocational behavior and the way in which individuals build careers by imposing meaning on their vocational behavior. There are four elements of CCT: (a) identity, (b) life themes, (c) vocational personality, and (d) career adaptability. CCT can be used as a method to understand the developmental process of HVAC graduates. Basing the study upon the theories of CCT and constructivism allowed me to gather information that may increase the likelihood that future graduates learn the skills necessary for employment in the skilled trades and enhance accurate identification of career readiness of the graduates as they enter the workforce. CCT was ideally suited to form the foundation of this study, as it is related to career choice and vocational behavior, which is based upon the motivation and learning development of the graduate.

The second theme that emerged from the data was for faculty at the community and technical colleges to focus on technical skills and hands-on learning. The technical skills and hands-on learning that are incorporated in HVAC programs are essential in workforce development and in the career readiness of HVAC graduates. When HVAC students are engaged in the learning process with a hands-on curriculum, they are able to gain the technical skills and learn the mechanical codes and standards established in the HVAC industry. By combining the hands-on learning with the technical skills, a graduate can be successful in obtaining employment. HVAC employers’ comments align with the research of Powell and Kalina (2009) who noted that constructivism, which is a model of obtaining knowledge in which a person learns by interacting with their environment, is one of the best methods of teaching and
learning. Grier-Reed et al. (2009) suggested that constructivism allows students to build
knowledge through practice and assimilation. The employers in the HVAC industry view hands-
on learning as an integral method of teaching and learning. Justice et al. (2009) noted that
faculty who teach using the constructivist method of learning focus on problem solving
techniques and the application of using a hands-on learning to further the graduates’ learning
experience.

The third theme that emerged from the data was for the community and technical colleges
to incorporate soft skills training within each class. The employers noted that soft skills training
are indispensable and should be integrated within every class. The participants of this study
classified soft skills as desirable traits including: (a) professionalism, (b) enthusiasm, (c) work
ethics, (d) communications, (e) problem solving, and (f) customer service among others. Soft
skills are essential for all employees to possess in every service-based industry. Simon et al.
(2013) suggested that one aspect of constructivism is service learning. Service learning is
associated with new skills that are necessary for the graduates to possess when entering the
workforce. The BLS (2014) identified several critical soft skills including customer service
skills, attention to detail, and time-management skills. The theory of constructivism implicates
that customer service knowledge and understanding is built through actual experiences and hand-
on learning objectives and competencies.

**Relationship to the Literature**

The purpose of this section is to discuss the findings of this study in relation to the
empirical and theoretical literature reviewed in Chapter Two. The literature review included
information on HVAC programs, career and workforce development, and alignment with
government regulations which included KBOR and the TEA along with business and industry.
The literature review encompassed both CTE programs and collegiate level technical programs. This study focused was based on two prominent theories: constructivism and CCT.

Roessger (2012) noted that the philosophy of constructivism is heavily influenced by theory and practice. In any educational setting, a primary goal is to instill in students a sound skill foundation for life-long learning. Different approaches must be taken into consideration when teaching, and alternative methods may be used to convey the knowledge and the theories. The learning outcomes of an HVAC program should consist of not only academic achievement, but employable skill sets that are required to be used in the trade (Yilmaz, 2008).

**Composite Textural, Structural, and Essence Descriptions**

**Textural description.** The last aspect of the data analysis was examining the findings through the composite textural, structural, and essence descriptions of the employers as described in this study. Creswell (2013) noted that the textural description is expressed in the experiences of the participants in the study. The employers’ perceptions can be summarized through the attributes they sought when hiring HVAC graduates for employment. The textural description focused on the actual experiences of the HVAC employers. The textural descriptions revealed certain themes relevant to identifying skills and knowledge needed by the graduates in order to be ready for the rigors of the HVAC field. Moustakas (1994) suggested that each individual textural description and experience should be reflected upon in order to construct a structural description that exemplifies the participants’ perceptions of the HVAC graduates and allows for interpretation of the participants’ stories. In writing the textural description, I noticed many of the employers’ perceptions overlapped into clusters of themes.

During the interviews and the focus group meeting, the employers expressed their own ideas of qualities that constituted a successful candidate for employment. The majority of the
ideas were similar yet unique based upon the employers’ own requirements and needs. Comparing the data from the focus group and the data from the interviews yielded the overall result that a majority of the employers concurred that the basic foundational training was the most integral part of the HVAC graduates’ success.

**Structural description.** In contrast to the textural description, the structural description conveys how the experiences affected the participants. The structural descriptions focused on the employers’ perceptions of the HVAC graduates. Each element of the employers’ input led to the formation of the structural description. This description emerged from an understanding of the structural themes related to this experience. Moustakas (1994) noted that the “structural descriptions provide a vivid account of the underlying dynamics of the experience” (p. 135).

As a result, the structural descriptions helped determine the meanings of the themes, by the “varying of frames of reference, employing polarities and reversals, and approaching the phenomena from divergent perspectives, different positions, roles and functions” (Moustakas, 1994, p. 98). Thus, the goal of the structural description was to “arrive at the experience, the underlying and precipitating factors that accounted for what was being experienced; in other words, the ‘how’ that speaks to the condition of the ‘what’ of the experience” (Moustakas, 1994). In general terms, HVAC employers seek employees who can complete the job that they have been hired to do in an efficient manner.

**Essence description.** Lastly, the essence of the employers’ perception of HVAC graduates complements the textural and structural descriptions. The essence of the experience represents the culmination of a phenomenological study. This last step synthesizes the textural and structural description and produces a final statement that captures and expresses the essences of the employers’ perceptions of HVAC graduates. Between the two descriptions, common
threads were woven into one final description that captured and expressed the spirit of the employers’ experiences.

The essence blends the details from each employer within the study and captures the distinctiveness of each of the employers. During the research, the challenge was to understand the ways that the employers viewed the graduates, qualities they sought when hiring graduates, and qualities they thought were vital. In this way, this phenomenological study was used to answer the research questions.

**Theoretical Framework**

I incorporated the constructivist theory into the frameworks for the study. Dewey (1938) introduced constructivism and suggested that the idea of experience prepares the younger generations for future responsibilities. Grier-Reed et al. (2009) highlighted the fact that college students should be empowered to construct their own career paths. Savickas (2012) further advanced the idea that career choice is enhanced by: (a) modeling, (b) mentoring, (c) networking, and (d) relationships. The data from the HVAC employers in the current study suggested that the constructivist method of teaching was beneficial to the students who were in the HVAC program, as employers lauded the methods of hands-on teaching, which empowers the students to learn by doing. The constructivist method of teaching enhances the capacity for the real world application of knowledge taught in the classroom and in the laboratory setting. The real world application provides the students opportunities to construct understanding from working with HVAC equipment and from interacting with other students on a social and cognitive level (Bay et al., 2012).

Scott and Sarkees-Wircenski (2001) noted that CTE programs are starting to place a greater emphasis on critical thinking skills along with the social and leadership skills needed to
better prepare students for the modern workplace. Relevant to constructivist learning theory, several employers noted the benefits of teaching within their own businesses because it allows their employees to interact with the HVAC equipment and obtain the first-hand knowledge that customers expect and demand from the employees. Merriam et al. (2007) suggested that constructivism is the process of how some students construct meaning of what has been described or taught.

I also incorporated CCT into the framework for this study. CCT was developed to provide a method to describe how individuals arrive at choosing a profession. CCT is related to how students learn the skills necessary for a skilled trade and in identifying an individual’s career readiness. Del Corso et al. (2011) proposed that CCT is a career model that emphasizes a lifelong and adaptive approach to vocational behavior. Packard et al. (2012) suggested that little is known about CTE graduates, even though they are an integral part of the workforce. According to Del Corso et al. (2011), CCT is related to a career choice, and vocational behavior is based upon motivation. Data revealed that employers are seeking new hires who are career ready and motivated to learn the HVAC trade.

Grier-Reed and Conkel-Ziebell (2009) noted that CCT can be used to reveal one’s traits and abilities. Within CCT, individuals build careers by attaching meaning to vocational behavior. Several employers who participated in the interviews suggested that learning the HVAC trade is a process. This process begins by working and learning the trade from the bottom up. Thus, each step of advancement is an integral part of the HVAC graduates’ learning development.

Del Corso et al. (2011), Packard et al. (2012), and Savickas (2005, 2012) noted that there are four distinct segments that influence CCT: (a) identity, (b) life themes, (c) vocational
personality, and (d) career adaptability. Identity involves how people think of themselves and their employment roles. Life themes provide a purpose and meaning to the work and guide the expression of vocational personality. Vocational personality refers to an individual’s career-related abilities, needs, values, and interests. Career adaptability refers to how an individual adapts to the changes within an industry or vocation. CCT can be used to understand the developmental process of the progression of an employee working for an HVAC business from an entry-level employee to a more productive employee with greater responsibilities. According to the employers in this study, a consistent feature of being employed in the HVAC industry is that the learning is continuous, life long, and constantly changing.

**Implications**

The purpose of this section is to discuss the empirical implications of this study’s findings as well as the practical implications for the employers of HVAC graduates. The findings from this study could prove beneficial to other community and technical colleges in regards to how faculty conduct their classes, instruct their students, and work with current HVAC employers. By examining the employers’ perceptions regarding HVAC graduates, the results of this study contribute to the existing literature related to the HVAC employers, career readiness, and HVAC programs. The employers in this study shared their experiences on the factors contributing to HVAC graduates’ success at the community and technical colleges and in the workforce.

The theoretical framework used in this study was Savickas’s (2005, 2012) CCT and Dewey’s (1938) constructivist theory. CCT was a natural fit for this study because of how it directly related to the building of a career for the students and later the HVAC graduates. CCT provides a way of thinking about how individuals choose and prepare for a working career.
(Savickas, 2005, 2012). The theory depicts a comprehensive model of vocational behavior throughout the life cycle. Furthermore, constructivism directly relates to CCT because they both have relevance to the development of the graduates. Overall, CCT holds that the individual learners construct knowledge out of their personal experiences. Constructivism promotes active and hands-on learning. Each of the employers who participated in this study owned or was employed in the HVAC industry. Their own personal descriptions were studied, and the themes that were derived as the essence of this study both supported the theories used in the framework of the study as well as extended their application to both CTEs and collegiate-level programs.

**Empirical Implications of the Study**

Virtually no studies have been published regarding employers’ perception of HVAC graduates. The results of this study add to the body of literature based upon the experiences of the employers in this study regarding the career readiness of the HVAC graduates as they enter the workforce. Previous research of Green (2006) and Feutz (2010) suggested that successful HVAC graduates need to be prepared for the rigors of the real world by having sound fundamental skills and soft skills and experiencing hands-on learning. Green (2006) identified that the electrical skills needed in the HVAC industry are highly regarded and necessary for an HVAC service technician to possess in order to professionally develop. Feutz (2010) supported Green by examining not only the electrical skills of the HVAC technician, but the overall perceptions of the HVAC graduates, after they left college and entered the HVAC field. Feutz investigated the aspects graduates believed were critical in the HVAC trade.

The results of this study corroborate previous research of Green (2006) and Feutz (2010) concerning HVAC graduates. The employers who participated in this research were owners of HVAC businesses or were employed in the HVAC trade. Their perspectives were in lock-step
with previous and current research concerning the HVAC industry. Other studies from Al Awneheh (2009), Coughlin (2012), Davis (2013), Lassiter (2012), Siegrist (2012), Strain (2000), Tilman (2005), and Younger (2011) are consistent with the position that developing employment skills, training the workforce, hiring HVAC graduates, and teaching them the integral aspects of the HVAC industry takes time and additional schooling. This is due to the ever changing nature of the HVAC industry as it adapts to the newest technologies that are being developed. As a result, the consensus in the field is that HVAC technicians will need to continue their education.

**Practical Implications of the Study for Stakeholders**

The findings in the study can be used to develop recommendations for HVAC graduates who are entering the workforce. The employers’ specific references of the qualities an HVAC graduate should possess are directly related to the needs of the employers’ business model. In this section, the recommendations for students and graduates of community and technical colleges are first. The recommendations for the faculty members and for the community and technical colleges are then detailed, followed by the recommendations to HVAC employers. The direct quotes from the employers’ based upon their experiences provided support for these recommendations.

**Recommendations for students and graduates.** The employers spoke about the baseline skills needed for the graduates who are seeking entry-level employment in the HVAC industry to gain employment. The employers noted that successful graduates from HVAC programs should have a strong understanding of the basic fundamental skills, the technical skills that are obtained through hands-on learning, and the soft skills required for job success. Several of the employers suggested that the graduates should have a strong foundational knowledge in the fundamentals of the HVAC trade. Carl noted in the interview that he wanted “to hire HVAC
technicians who were clean cut, presentable, and personable with a positive attitude.” Anthony suggested that “new hires should continue to learn from older technicians and maintain a good attitude and positive disposition.”

The employers also offered specific advice and recommendations for the HVAC students and graduates to get involved and apply the education, training, and hands-on experience. The employers further suggested that training is more than reading textbooks; it involves reading information outside of traditional curricula and asking questions of the instructors. When potential employers come to the campus, students should ask questions, introduce themselves, join HVAC industry-recognized organizations, and earn third party testing certificates, such as NATE, HVAC Excellence, or ICE. The education that students are receiving at the community or technical college is only the beginning, and there are always other opportunities to learn and grow within the HVAC industry. Donald and Eric noted that “learning takes on many forms, but there is no substitution for hands-on experience.”

These recommendations provided by the employers offer a general concept of the skills that are needed by the students and graduates of an HVAC program in order to be considered career ready. A program of study should instill confidence in students that is the material being taught will lead to employment and a career. In conclusion, HVAC employers are searching to hire graduates with the right attitude, strong technical skills, and mastery of soft skills.

**Recommendations for faculty members and colleges.** Overall, a majority of the employers approved of the teaching methods employed by the faculty members and the community and technical colleges. At MCC, the instructors follow a course outline for each class with set competencies and objectives that have been established by the curriculum director, adopted by the HVAC department, and approved by the educational affairs committee that
represents the college. The competencies and objectives that are taught at the community and technical colleges mirror the characteristics for which a vast majority of the HVAC employers look when they hire graduates. The recommendations from the employers concerning the students focused mainly on the curriculum. Faculty at the schools should provide a basic foundation to develop the skills needed by graduates of an HVAC program to be considered career ready. A program of study should instill confidence in students regarding the concepts that are being taught. Anthony suggested that he feels “confident when hiring a recent graduate because of their educational and technical background.”

The focus group members and the employers who were interviewed provided specific recommendations for the community and technical colleges to increase the success rates of HVAC graduates. Staff members in CTE programs need to be responsive to the needs of the students and the community. Holly noted that “the career programs should be willing to examine themselves, work with employers who hire the graduates, and allow the employers to have an active voice in the career technology curriculum.” Specific recommendations for the faculty members were to continue teaching the basic fundamental skills along with the technical skills needed by the HVAC graduates for entry-level employment.

Faculty members should also continue to promote and focus on the electrical skills related to the HVAC industry. Electrical knowledge can be transferred to many other fields and is one of the most fundamental skills needed by an HVAC technician. Promoting the instruction of electrical skills was considered vital because the vast majority of the HVAC residential and commercial service calls are electrical in nature. Holly expressed that “the electrical skills taught should be emphasized to a higher level and mastery should be the end result.” She also noted that electrical skills are one of the most desirable skills needed within the HVAC industry.
Lastly, the employers who were involved in this study noted that the faculty community and technical colleges need to continue to emphasize and apply hands-on learning to the curriculum. Carl and Eric noted that “Graduates who use their hands when engaged in the application of the HVAC theory and application have a greater understanding of the complex equipment and the learning is more adaptive to a real world learning exercise.” Hands-on learning takes the concepts presented in class to the laboratory setting in order to develop the skills employers are seeking in the graduates. In essence, hands-on learning connects for students the theory being instructed to the practical application of the trade.

**Recommendations for employers.** One of the common perceptions that was noted by 13 of the 21 HVAC employers during this study was that they enjoyed being a part of the HVAC program. They especially enjoyed being involved with the advisory board, coming to the schools and speaking to students, mentoring students, and connecting students with the employers. The employers who participated in this research study suggested that there should be more involvement between the HVAC industry and the community and technical colleges. Anthony said “it is important for the employers to get involved with the community and technical colleges because it is those graduates who we will be employing in the near future.” The involvement between business and industry and the community and technical colleges would be a win–win relationship that would benefit both parties.

Being involved with an HVAC program from an HVAC employer’s perspective requires a genuine commitment. Some employers have equipment not available at the community or technical colleges, and are willing to make the equipment available for the student’s hands-on learning. Having the HVAC equipment available is a necessity not only for the community and technical colleges, but for the students to be able to work on, repair, and install the equipment, as
well as for the employers who hire the graduates. The wide variety of equipment is critical to achieving success in the student’s interest and training. The results of the curriculum and the hands-on learning approach create a comprehensive program of study that is not only beneficial to the students, but also to the community colleges, employers, and to business and industry.

**Limitations**

Limitations are inevitable aspect of all research and can be viewed as a study’s restrictions over which the researcher has no control (Creswell, 2013). Merriam (2002) noted that using a small purposeful sample provides an in-depth understanding of the subject. The limitations that may have impacted this study were: (a) the researcher’s skills, (b) an accurate description of the phenomenon, (c) interview deficiencies, (d) focus group deficiencies, (e) any potential biases of the researcher, and (f) the location at which this study took place. I did not take into account rural or urban employers unless they already worked in those areas. Additionally, I did not incorporate or seek input from employers in other areas of the region, other states, or other geographical areas.

The selection of the employers was gathered from an HVAC advisory board for the survey, among ACCA contractor members for the interviews, and among ACCA associate members for the focus group. Of the 21 HVAC employers who participated in this study, 19 were men and two were women. The employers represented various types and sizes of HVAC businesses. Many of these limitations present in this study were addressed through the measures taken to increase trustworthiness, discussed in Chapter Three.

**Recommendations for Future Research**

There has been virtually no research concerning employers’ perceptions of HVAC graduates. The opportunities for future research on CTE programs are limitless; further research
regarding employers’ perceptions of the individual CTE programs should be completed in order to gain a full understanding of the businesses at which their graduates are employed. Future researchers could focus on the needs of the individual employers and preparations that community and technical college staff can make to ensure that their graduates are prepared for the rigors of the specific programs. Another study could examine the reasons why millennia’s are not entering the HVAC field. These recommendations for future research could be undertaken in other large metropolitan areas or rural areas in the state of Kansas or other states in order to identify any commonalities or discrepancies from the current findings that may exist in other settings.

In this study, I did not assess the academic performance of the HVAC graduates during their collegiate experience. Future researchers could undergo qualitative or quantitative studies to assess the academic performance of the HVAC graduates as it relates to acquiring a position within the HVAC industry. Additionally, a comparative study could be conducted in order to compare the job success or the limitations associated between students graduating with an associate degree and college students only receiving an HVAC certificate from a community or technical college.

Future research could be conducted to study the HVAC students’ perception of the training they received from the community or technical colleges. Feutz (2010) examined the students’ completion of a bachelor’s degree program at Ferris State University, and Green (2006) studied students’ preparedness for working in the HVAC field. A researcher could conduct either a case study or a comparative analysis in order to identify the most effective measures of preparing the students for the workforce, the instructional methods, and classes that are most effective in maximizing students’ success.
Summary

In this qualitative transcendental phenomenological study, I sought to examine and describe employers’ perceptions of HVAC graduates from a community college in Kansas. I examined the perceptions of members of the HVAC industry about HVAC graduates. The goal of this study was to add to the existing literature on the career readiness of HVAC graduates so as to increase understanding about how HVAC graduates can secure employment in their chosen field based upon the specific qualities HVAC employers are seeking when hiring HVAC graduates. In this study, 21 HVAC employers participated in three methods of inquiry in order to answer the three research questions. The employers provided first-hand accounts of their lived experiences and expectations concerning HVAC graduates. As a result, three overarching themes emerged relevant to the expectations and recommendations of employers. Specifically, graduates of HVAC programs need to have a strong foundation in the basic fundamental classes, technical knowledge with hands-on learning, and soft skills to be better prepared to enter the workforce and achieve success.

There has been virtually no research focused on HVAC employers’ perceptions of HVAC graduates. This study was designed to address this gap in the literature by allowing HVAC employers to have a voice concerning HVAC graduates and the knowledge and skills employers believed were essential for graduates to possess when seeking entry-level employment. By analyzing the employers’ perceptions of HVAC graduates, this research provides concrete recommendations for faculty at community colleges and for HVAC graduates seeking employment.
REFERENCES


