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An examination of employer evaluations of student participants in a cooperative education program

Candice Grace Clendenin Stadler
candicestadler@gmail.com

AN EXAMINATION OF EMPLOYER EVALUATIONS OF STUDENT PARTICIPANTS IN A COOPERATIVE EDUCATION PROGRAM

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Candice Grace Clendenin Stadler
Approved by
Dr. Dennis M. Anderson, Chair
Dr. Louis Watts
Dr. Edna Meisel

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APPROVAL OF DISSERTATION

We, the faculty supervising the work of **Candice Stadler**, affirm that the dissertation, *AN EXAMINATION OF EMPLOYER EVALUATIONS OF STUDENT PARTICIPANTS IN A COOPERATIVE EDUCATION PROGRAM*, meets the high academic standards for original scholarship and creative work established by the EdD Program in **Leadership Studies** and the College of Education and Professional Development. This work also conforms to the editorial standards of our discipline and the Graduate College of Marshall University. With our signatures, we approve the manuscript for publication.

Dennis M. Anderson	Dennis M. Anderson	3/13/19
Dr. Dennis Anderson Leadership Studies	Committee Chairperson Major	Date
	Louis Watts	3/13/19
Dr. Louis Watts Leadership Studies	Committee Member Major	Date
Edna Meisel	Edna Meisel	3/13/19
Dr. Edna Meisel	Committee Member External	Date

DEDICATION

To my husband, Chris Stadler, for all of his unconditional love and encouragement throughout my doctoral journey and life. And to my Maine Coon writing partner, Miss Fancy Pants.

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ABSTRACT

This study examined employer evaluations of engineering student participants in a cooperative education program from research conducted on a small, rural, public university. Specifically, the data was derived from science, engineering, mathematics, and technology (STEM) programs. Historically, little research exists on employer perceptions of participants of cooperative education programs. Thus, a review of the literature examined the following areas: experiential education, cooperative education and work-based learning, implications of cooperative education and internships, history of cooperative education, implications for engineering majors, and employer perceptions of employability skills. More specifically, the research examined employer perceptions of cooperative education students in bachelor degree engineering programs using a statistical analysis of longitudinal data from employer evaluations. This study furthered the research in cooperative education by providing insight on employer perceptions of cooperative education students by work period, career attributes, and overall work performance. The data analyzed is public information.

CHAPTER 1

INTRODUCTION

Institutions of higher education and employers share the struggle to prepare college graduates for the workplace. Cooperative education at the time of its inception in the early 20th century was a highly innovative method to provide practical skills and career development simultaneously to engineering students. By combining academic and workplace experiences, students could develop interpersonal and teamwork skills while fully actualizing the educational components of engineering learned in the classroom.

In today's marketplace, families, students, employers, and universities are not only asking how young people can be better prepared for the world of work but questioning the value of higher education (Linn, Howard, & Miller, 2004). Thus, consumers of higher education are driven by academic programs that provide flexibility and a good return on investment. Traditional learning environments (i.e., classrooms, lecture halls, and laboratory settings) provide an essential component of the educational process; however, conventional learning environments cannot replicate real work experience. As a result, cooperative education's unique method of combining in-class learning and career development along with applied work experience can provide students with a strong foundation for long-term career success.

"The name, cooperative education, reflects the necessary cooperative relationship established between the institution and the agency providing the work situation" (Wilson, 1971, p. 3). While cooperative education is a relatively small component of experiential education in the United States, it is an important form of

experiential education that has roots in engineering education. Terms such as an internship, integrated learning, and contextualized learning have been used interchangeably with cooperative education experiences. Thus, it is difficult to narrow the broad field of experiential learning and more specifically cooperative education into a neat definition. Extensive research occurred in the 1970s and 1980s when participation in cooperative education programs was at its highest peak in the United States; however, the vast majority of recent research on cooperative education is outside of the United States. Therefore, a deficiency exists in the study of cooperative education programs and, in particular, programs located in small, public rural universities.

For college graduates to be competitive in the job market, specific skills beyond a college degree must be acquired. Interpersonal, communication, professionalism, and work ethic are all attributes of a successful career. Career development professionals have long touted the benefits of internships and cooperative education (co-op) experiences as a means to gainful employment; however, the quality and outcomes of internships and co-ops vary significantly by institution and placement site. Many studies have examined cooperative education from the perceptions of higher education administrators, faculty, employers, and students (Jiang, Lee, & Golab, 2015). This study will seek to fill a void in the literature by examining a small, rural engineering cohort of cooperative education employer evaluations. Rural students sometimes receive disheartening messages about the pursuit of higher education from family, peers, and other members of the community that might not have experience with systems of higher education (Crain, 2018).

BRIEF LITERATURE REVIEW

Educational scholars such as Dewey (1938) and Kolb (2014) have written extensively on the benefits and challenges of creating meaningful experiential learning practices in education. Dewey was the first to discuss the need to develop a theory of experiential education. He stated that "experience and education cannot be directly equated to each other" (1938, p. 8). Thus, structured experiences correlated to classroom learning is key to successful experiential learning programs. Kolb (2014) furthers this notion by reiterating that experiential learning is a type of learning and that experience itself is not enough to demonstrate that deep learning has occurred.

Kolb (2014) argues that while experiential learning is playing a more significant role in higher education and professional degree programs, some academics continue to view experiential and vocational learning techniques as more concerned with process than with substance. Quality experiential learning practices such as cooperative education create a system of proficiencies for labeling job duties to similar educational goals. Thus, cooperative education can emphasize the critical associations between the classroom and the world of work. Ultimately, the experiential learning model in cooperative education creates a structure for exploring and strengthening the essential connections between education, employment, and personal development (Kolb, 2014).

A cornerstone of student development theory is the concept of challenge and support. Chickering and Reisser (1993) discuss this component within the context and framework of activities that assist students in developing purpose by connecting academic coursework to meaningful work experiences. Specifically, experiences that enhance a student’s ability to assess interests, options, clarify goals, make plans, and

develop resilience are a key component of student development (p. 209). Experiential learning and more specifically, cooperative education experiences provide students with the opportunity to develop purpose. Similarly, Linn, Howard, and Miller assert that cooperative education offers a distinctive learning experience and that the process prepares students for the workplace beyond the capabilities of a university (2004).

In 1998, the National Association of Experiential Education developed eight principles for good practice in experiential learning. These principles define and shape the educational pedagogy that outlines experiential learning. The eight principles include (1) intention, (2) preparedness and planning, (3) authenticity, (4) reflection, (5) orientation and training, (6) monitoring and continuous improvement, (7) assessment and evaluation, and (8) acknowledgment. Through experiential education, students have an opportunity to build knowledge within a program of study and make connections between new concepts and existing ones. Thus, experiential education increases students' engagement within a field of study and future career. The role of experiential learning programs in higher education has been argued as educational experiences that can result in deep level learning.

The first cooperative education program in the United States was developed in 1906 at the University of Cincinnati under the direction of Dean Herman Schneider (Cates & Cedercreutz, 2008). The purpose of the cooperative education program at the University of Cincinnati was to expose students to practical educational experiences in the field of engineering. Students participated in both classroom and workplace-based experiences simultaneously. The employer was responsible for the selection and hiring of students while the university was responsible for preparing students adequately to

enter the workplace. The design was intentional to allow the employer and student to simulate a realistic hiring and work experience.

Since the inception of the first program, cooperative education has developed to become an umbrella term to encompass field experiences, internship programs, and practicum programs. Cooperative education is an off-campus experience closely related to the field of study of a student where the employment is regular and an essential element. Ideally, the experience is a requirement for the degree program, but this is not always the case. Additionally, cooperative education programs play a vital role in assisting university faculty in updating curriculum as well as the behavioral competencies and soft skills needed to succeed in the world of work. Weighart asserts "employers develop a good sense of what our students bring to the table and what they are lacking; the institution needs to reflect on that and decide whether changes should be made" (2009, p. 337). Thus, effective cooperative education programs devote time and resources to building and maintaining employer relationships (Weighart, 2009). Engaging employers as an educational partner requires the cooperative learning manager to discuss the integration of learning into the workplace.

Historically, the 1965 Federal Higher Education Act provided support specifically for cooperative education programs (Knowles & Associates, 1972). Congress continued funding for cooperative education programs through the early 1990s, but funding has since stopped. Over the nearly 30 year period of funding by the Federal Government, cooperative education programs received approximately $220 million (Cooperative Education and Internship Association, n.d.).

Cooperative education is a program with a focus on career readiness. In recent years, career readiness has been a central focus on the topic of higher education relevance and the employability of graduates. While academics, employers, and career development professionals all have varying definitions of career readiness, the National Association of Colleges and Employers (NACE) has defined career readiness as "…the attainment and demonstration of requisite competencies that broadly prepare college graduates for a successful transition into the workplace" (2015). This definition was developed by both university career development professionals as well as employers.

RESEARCH QUESTIONS

1. Is there a significant difference in overall performance rating as reported by employers due to engineering major?
2. Is there a significant difference in overall performance rating as reported by employers due to work period?
3. Is there a significant difference between engineering major and career readiness attribute performance ratings as reported by employers?
4. Is there a significant difference between work period and career readiness attribute performance ratings as reported by employers?

SIGNIFICANCE OF STUDY

The Cooperative Education and Internship Association (CEIA) asserts there are approximately 1,000 colleges and universities in 43 countries participating annually in cooperative education partnerships, thus, equating to roughly 76,000 employers and 310,000 students (Cooperative Education and Internship Association, n.d.). According to a review of the literature, a gap exists in research focused on employer perspectives

of cooperative education programs. Recent research regarding the study of cooperative education is concentrated in Canada, Australia, and Europe. In fact, in 2014 the CEIA Board of Directors voted to retire the *Journal of Cooperative Education and Internships*. The retirement of the *Journal of Cooperative Education and Internships* signals a lack of recent research and literature on cooperative education and internship programs in the United States.

This study fills a void in the existing literature by examining employer evaluations of participants in a cooperative education program at a small, rural public institution of higher education. Despite the significant literature regarding experiential learning, the majority of the research concentrates on learning outcomes for students rather than employer perspectives of student work performance. The results from this study can be used by universities, faculty, administrators of cooperative education programs, and employers to recruit and prepare students for cooperative education experiences. The outcomes of this study could also provide a foundation for future research in the perceptions of student work performance and workplace integration in cooperative education programs.

PURPOSE

Universities are under increased scrutiny to provide evidence of job placement and relevance for academic programs. Cooperative education provides a mechanism to assist students in the quest to develop relevant workplace skills. The benefits of cooperative education from the student perspective include the overall personal and professional development that occurs when a student engages in meaningful work. From the university perspective, the work experience provides an essential supplement

to the academic program and exposes the student to the role the profession plays in society. Thus, cooperative education provides students with opportunities to see the relevance of their academic work in a broader context.

From the employer perspective, there are numerous benefits of cooperative education programs. Foremost, cooperative education students provide a vital workforce need. Employers have critical hiring needs, and cooperative education students have the skills and knowledge for the positions. Students are often willing and available workers. Secondly, cooperative education is viewed as a recruitment tool that allows the employer to evaluate potential employees.

Consequently, this study examined employer evaluations of engineering cooperative education students to identify gaps in career attribute skill development. Additionally, the research will assist in identifying the best length for cooperative education experiences. Thus, this study will help engineering program faculty and career development professionals prepare prospective cooperative education students better.

CONTEXT AND SCOPE OF STUDY

Founded in 1895 as the Montgomery Preparatory School, West Virginia University Institute of Technology is a diverse baccalaureate institution and a divisional campus of the West Virginia University system (2018). With an enrollment of over 1,600 students, WVU Tech offers more than 40 baccalaureate programs and is most well-known for its focus on science, technology, engineering, and mathematics (STEM) programs. In 2017, WVU Tech ranked in the top 100 undergraduate engineering programs by *U.S. News and World Report* (West Virginia University Institute of

Technology, 2016). Students enrolled in engineering, science, and technology programs are eligible to participate in cooperative education and internship experiences.

METHODS

The method for this study is an analysis of extant data from the West Virginia University Institute of Technology cooperative education program. The research is an examination of employer evaluations of cooperative education students from 1990-2015. The evaluations of cooperative education students from chemical, civil, computer, electrical, and mechanical engineering were identified for analysis, and the data evaluated and interpreted using the statistical software, IBM Statistical Package for the Social Sciences (SPSS) version 25. Since the data is Likert scale and, therefore, ordinal, the researcher used the nonparametric Kruskal-Wallis statistical test.

The researcher will examine employer evaluations of cooperative education program participants based on their last reported work period. The analysis will focus specifically on the ten performance areas as determined by the employer evaluation of the individual cooperative education student. These areas include:

1. Attitude – application to work
2. Ability to learn
3. Dependability
4. Initiative
5. Quality of work
6. Relations with others
7. Maturity – poise
8. Quantity of work

9. Judgment
10. Overall performance

The study focuses specifically on 323 cooperative education student evaluations from the Leonard C. Nelson College of Engineering and Science at West Virginia University Institute of Technology. The university boasts nine Accreditation Board for Engineering and Technology (ABET) accredited programs which include: chemical, civil, computer, electrical, and mechanical engineering.

LIMITATIONS OF STUDY

Limitations of the study include the small population of evaluations from one university's cooperative education program. The study is limited to cooperative education participants in civil, chemical, computer, electrical and mechanical engineering programs at West Virginia University Institute of Technology. Therefore, students from majors outside of engineering will not be examined.

DEFINITION OF RELEVANT TERMS

For this study, the following definitions will be used.

Accreditation Board for Engineering and Technology (ABET): a non-governmental accrediting board for post-secondary education programs in applied science, computing, engineering, and engineering technology.

Career readiness: career readiness as defined by the National Association of Colleges and Employers (NACE) "…as the attainment and demonstration of requisite competencies that broadly prepare college graduates for a successful transition into the workplace" (NACE, 2015).

Career Services: an administrative office within a college that is responsible for assisting students with career development activities to include securing post-graduation employment. This department may be housed within academic or student affairs.

Cooperative education (co-op): an experiential learning experience in which students alternate periods of classroom study with work experience.

Employability: the transferable skills defined by employers as critical to long-term career success.

Experiential learning: an integrated experience in which knowledge and theory learned in a traditional educational setting is complemented with practical application and skills development in a professional context (National Association of Colleges and Employers, 2016).

Internship: an experiential learning experience that enhances student learning through observation, shadowing or work experience. Internships may be paid or unpaid, optional or a degree requirement, credit- or noncredit-bearing, and for a variety of lengths (Council for the Advancement of Standards in Higher Education, 2015).

STEM: science, technology, engineering, and mathematics.

Student: an individual pursuing a bachelor degree.

Work Period: experiential learning and full time work experience lasting approximately 12 to 16 weeks alternating with academic coursework. Cooperative education participants may engage in up to seven work periods.

SUMMARY

To summarize, cooperative education has been an enduring fixture in undergraduate engineering programs for over 100 years. It is critically important for higher education institutions to produce graduates that will not only find employment quickly after graduation but will also be career ready. Consequently, it is imperative that the provided evidence shows the effectiveness of cooperative education programs for the long-term career development of engineers. Thus, the learning and application of skills acquired through cooperative education experiences have the potential to provide engineering graduates with a strong foundation for career success. This study aims to provide insight into the benefits of cooperative education programs for undergraduate engineering students.

CHAPTER 2

LITERATURE REVIEW

This chapter presents the literature review as the foundation of this study. The body of literature on experiential education and cooperative education is extensive and encompasses nearly a hundred years of cooperative education programs in the United States. The literature review is in sections: experiential education, cooperative education, and work-based learning, implications of cooperative education and internships, history of cooperative education, implications for engineering majors, employer perceptions of employability skills, and conclusion.

Experiential education and learning opportunities such as internships and cooperative education can assist students in clarifying career aspirations and goals. Beyond clarifying career aspirations and goals, cooperative education and internship experiences contribute to realistic workplace learning that can support the development of employability skills. While experiential learning, cooperative education, and internships are available to all academic majors in higher education, this study focuses specifically on undergraduate engineering students.

EXPERIENTIAL EDUCATION

Experiential education began to gain traction in the early 20th century after educational scholar, John Dewey, wrote extensively on the topic. Dewey discussed the purpose of education in his 1938 work, *Experience and Education*, and defined education in relation to the meaning of purpose. Dewey was the first to discuss the need to develop a theory of experiential learning. He states that "experience and education cannot be directly equated to each other" (1938, p. 8). Dewey encouraged educators to

identify intellectual activity that resulted in learning that led to examining assumptions and exploring consequences related to those assumptions. Consequently, one method of exploring assumptions is by identifying structured experiences that are correlated with classroom learning and is key to successful experiential learning programs.

This concept was furthered by educational scholars such as Ambrose & Poklop (2015), Eyler (2009), and Kolb (2014). Kolb (2014) advanced this notion by reiterating that experiential learning is a type of learning and that experience itself is not enough to demonstrate that deep learning has occurred. Dewey and Kolb have written extensively on the benefits and challenges of creating meaningful experiential learning practices in education. Modern pedagogy of experiential learning emphasizes that learning is a process in which the learner engages in a structured process of inquiry and reflection. Kolb (2014) argues that while experiential learning is playing a more significant role in higher education and professional degree programs, some academics continue to view experiential and vocational learning techniques as more concerned with process than with substance. Quality experiential learning practices such as cooperative education create a system of proficiencies for labeling job duties to similar educational goals. Cooperative education can emphasize the critical association between the classroom and the world of work. Ultimately, the experiential learning model in cooperative education creates a structure for exploring and strengthening the essential connections between education, employment, and personal development (Kolb, 2014).

Eyler (2009) asserts that "Experiential education, which takes students into the community, helps students both to bridge the classroom study and life in the world and to transform inert knowledge into knowledge-in-use" (p. 24). This concept allows

students to develop purpose as well as life and employability skills. The challenge of education is to help students apply what they learn in multiple contexts. Programs such as cooperative education should seek to contribute to the whole development of the student. Likewise, Chickering and Reisser (1993) discuss that a critical component of student development is to develop purpose. The development of the whole individual includes a student's ability to assess interests, options, clarify goals, make plans, and build resilience (p. 209). Experiential learning opportunities such as internships and cooperative education can assist students in defining career aspirations and goals.

The Association of Experiential Education (AEE) defines experiential education as "…a philosophy that informs many methodologies in which educators purposefully engage with learners in direct experience and focused reflection in order to increase knowledge, develop skills, clarify values, and develop people's capacity to contribute to their communities" (n.d.). The area of experiential education encompasses many subfields including service-learning, adventure education, internships, and cooperative education. The AEE goes further to outline principles for experiential education which include:

- Experiential learning occurs when carefully chosen experiences are supplemented with reflection, critical analysis, and synthesis.
- Experiences are structured to require the learner to take the initiative, make decisions and be accountable for results.
- Throughout the experiential learning process, the learner is actively engaged in posing questions, investigating, experimenting, being curious, solving problems, assuming responsibility, being creative, and constructing meaning.

- Learners are engaged intellectually, emotionally, socially, soulfully or physically. This involvement produces a perception that the learning task is authentic.
- The results of the learning are personal and form the basis for future experience and acquisition of knowledge.
- Relationships are developed and nurtured: learner to self, learner to others and learner to the world at large.
- The educator and learner may experience success, failure, adventure, risk-taking, and uncertainty because the outcomes of experience cannot totally be predicted.
- Opportunities are nurtured for learners and educators to explore and examine their own values.
- The educator's primary roles include setting suitable experiences, posing problems, setting boundaries, supporting learners, ensuring physical and emotional safety, and facilitating the learning process.
- The educator recognizes and encourages spontaneous opportunities for learning.
- Educators strive to be aware of their biases, judgments and pre-conceptions, and how these influence the learner.
- The design of the learning experience includes the possibility to learn from natural consequences, mistakes, and successes (Association of Experiential Education, n.d.).

Thus, experiential education and more specifically, cooperative education provides students with the opportunity to develop purpose. Experiential learning can assist students' need to find a career or goal that is meaningful to themselves but may also serve the greater good. Similarly, Linn, Howard, and Miller (2004) assert that cooperative education provides a distinctive learning experience and that the process prepares students for the workplace beyond the capabilities of a university. Cooperative education provides students with authentic, real-world work experiences, and the feedback that employers offer to cooperative education participants aids in their future career development (Ambrose & Poklop, 2015).

Nearly 20 years ago, the National Association of Experiential Education developed eight principles for good practice in experiential learning. The principles defined and shaped the educational pedagogy that outlines experiential learning. The eight principles include (1) intention, (2) preparedness and planning, (3) authenticity, (4) reflection, (5) orientation and training, (6) monitoring and continuous improvement, (7) assessment and evaluation, and (8) acknowledgment. The principles outlined by the Association of Experiential Education and the National Association for Experiential Education both assert that experiential learning requires planning, should be intentional and must include a reflection component. The reflection component for many co-op programs consists of an evaluation of the student and the placement site.

"Education broadly conceived is the changing of behavior through experience—behavior being understood to include mental, physical, and emotional activity" (Wilson, 2001). One avenue that engineering students gain problem-solving, communication and employability skills is through experiential education. Experiential education

opportunities for engineering students include internships, cooperative education experiences, and engagement in design competitions. By engaging in practical work tasks, students can be challenged which can result in active learning. Thus, experiential learning involves activities and reflection with real consequences that can assist the learner in future studies or employment.

Weisz and Smith (2005) emphasize that "cooperative education has the potential to provide students with this opportunity of gaining experience in the workplace and of applying the theory learned in university to workplace practice and problem-solving" (p. 606). The role of experiential learning programs in higher education can result in deep level learning. Thus, the concept of deep level learning or deep meaning rooted in the constructivist tradition.

Psychologist and philosopher Jean Piaget first introduced constructivism in the early twentieth century. The theory of constructivism in education sought to explain how knowledge grows throughout ones' life (Smith, 2017). Nash and Murray (2010) further this notion by describing constructivism in higher education as “Educating for meaning, both inside and outside the conventional academic structures, will effectively teach all of us how to integrate site, selves, and subject matter into a complete learning experience” (p. 91). Therefore, deep level learning encourages self-examination and is both emotional and cognitive. Experiential learning is, consequently, the process of learning through experience by reflecting on the action.

COOPERATIVE EDUCATION AND WORK BASED LEARNING

A cornerstone of American education is the idea that when theory and hard work converge greatness can happen. Acceptance of cooperative education or work-based learning as a teaching and learning modality has steadily increased in higher education since its inception in the early 1900s. Authentic work experiences can help students clarify career goals and gain confidence in their ability to work (Zegwaard & Coll, 2011). The research suggests that cooperative education programs assist graduates in being more career ready when compared to their counterparts that do not participate in cooperative education programs (Barry, Ohland, Mumford, & Long, 2015; Weisz, 2000).

"The placement of post-secondary engineering students in cooperative education settings impacts the student seeking an education in the workplace, the employer offering it, and the academic institution in which the student is enrolled" (Hackett, Martin, & Rosselli, 1998, p. 455). One of the outcomes of cooperative education can be enhanced career development and self-actualization for students. Participants can include gaining practical experience in discipline related career capacities as well as increased employment opportunities and salaries (Linn, Ferguson, & Egart, 2004; Scholz, Steiner, & Hansmann, 2004; Zegwaard & Coll, 2011).

Educators should seek to assist students in connecting knowledge and theory acquired in the classroom to practice in the world of work. Moreover, educators and employers should work in tandem to engage students in analysis and action. Thus, the learning that takes place at work rather than in a formal educational setting such as a lecture hall can provide students with a context for traditional learning. The interactions that co-op engineering students have with colleagues and clients acquired knowledge of

workplace hierarchies and rules, and employee management is incredibly important to the overall professional development of the student (Costley, 2007). Cooperative education and workplace learning, however, has not gone without debate over the legitimacy of the validity of the critical learning that occurs for the student. The inherent conflict between the university academy and cooperative education is often a result of the shift in control and boundaries of the context and confines of the learning formulated by conceptual frameworks. Cooperative education presents knowledge in a different way that may or may not connect to the theoretical framework of their discipline (Costley, 2007).

Advocates for cooperative learning applaud it as a method of learning that has important learning implications for the future development of the individual learner (Hsiung, 2012). Previous studies have demonstrated that co-op engineering students have improved academic performance which may be the result of the student learning the benefits of spending more time on a single task (Smith, Sheppard, Johnson, & Johnson, 2005). Likewise, the benefits of skill development through cooperative education can be applied to any academic major and are critical to overall student achievement and success. Thus, cooperative education provides a natural learning environment that enhances interpersonal skills which is an essential skill in long-term career success and employability (Hsiung, 2012).

Consequently, one purpose and outcome of cooperative education programs is to support students in identifying and actualizing career goals. Cooperative education and work-based learning are critical career exploration activities that are often overlooked by educators, career development staff, and students (Linn, Ferguson, &

Egart, 2004). By broadening ideas of what activities are career exploration, more students may see the benefits of engaging in cooperative education experiences. Therefore, the short-term goal of obtaining professional experience related to an academic discipline will assist the student in long-term career planning and development. So, the fundamental purpose of cooperative education is to engage students in intentional educative experiences (Wilson, 2001). This deliberate action regardless of long-term career outcome for the student assists the student in learning about success as well as failure in the workplace. These experiences do require that cooperative education placements must be authentic, relevant, and meaningful (Zegwaard & Coll, 2011).

Most recent research from national career development associations has focused broadly on the definition of experiential education (National Association of Colleges and Employers, 2016; Cooperative Education and Internship Association, n.d.). More specifically, research from the national career development associations focuses on cooperative education programs that operate either as a parallel or alternating experience. In an alternating program, students enroll in alternating periods of full-time study and full-time paid employment. In a parallel program, students participate in cooperative education while engaging in part-time employment and taking classes concurrently. Thus, parallel programs are often referred to as internship programs. Both types of experiences can be constructive, valuable, and life-changing for participants.

IMPLICATIONS OF COOPERATIVE EDUCATION AND INTERNSHIPS

Increasingly universities are subject to providing information on the career outcomes of graduates. Thus, more and more academic programs seek ways of providing graduates with skill development opportunities outside of the traditional learning environment. There is a lack of research on comprehensive cooperative education and internship programs and its link to overall employability skill development in the United States.

Experiential learning plays an important role in the career development and outcomes of college graduates (Saltikoff, 2017). A Gallup-Purdue Index report found that students that engaged in internships during their college experience were able to apply learning that had occurred in class to their work but were also more engaged in their work (Seymour & Ray, 2014). The findings demonstrate that the opportunities and experiences that a student has in college are more important than many other factors to include the college that the student attends, race, or sex (Seymour & Ray, 2014). Based on the Gallup-Purdue research, graduates that participate in experiential learning are more likely to feel prepared for life, more likely to be employed full time, and more likely to be engaged at work (Seymour & Ray, 2014).

Stack and Fede (2017) assert that the five most valuable soft skills named by employers are the ability to: "…verbally communicate with persons inside and outside organizations; work in a team structure; make decisions and solve problems; plan, organize, and prioritize work; and obtain and process information" (p. 33). Prioritizing soft skill development throughout experiential learning activities such as cooperative education and internships requires the alignment of university curriculum and co-

curricular experiences with workforce and economic needs. Soft skill development connects to a key component of cooperative education, which is identifying work experiences that contribute to what the literature refers to as vocational self-concept (Drewery, Nevison, & Pretti, 2016; Weng & McElroy, 2010). Vocational self-concept is a positive outcome of experiential learning and one that can contribute to students' development of career-related interests, abilities, and attitudes about work.

Structured learning experiences that involve both self-exploration and environmental exploration are vital to meaningful cooperative education experiences. Cooperative education and internship experiences are an educational approach that requires many educational partners to collaborate to create innovative experiences that assist students in developing professional skills while utilizing their academic knowledge in a practical setting (Stack & Fede, 2017). Participating in work benefits students by contributing to self-concept as well as creating a commitment to a particular field or occupation (Drewery, Nevison & Pretti, 2016). Therefore, cooperative education and internship experiences are continuously increasing in importance as students require not only intellectual competency but also the soft skills that will allow for long-term career success.

The need to produce college graduates with workforce readiness skills is vital to the economic growth and stability of the United States. All occupations require individuals who need to exhibit workplace skills beyond technical training and competencies. Experiential educators have long embraced the concept that a college campus is not the only place that learning can occur. Cooperative education and internships provide students with the needed experiences that will allow for long-term

career success. More importantly, cooperative education provides students with the skills necessary to navigate a variety of job changes, diverse teams, and work situations (Hall, 1999).

Several researchers have discussed the value of cooperative education and internships and their ability to transform student learning experiences (Drewery, Nevison & Pretti, 2016; Saltikoff, 2017; Stack & Fede, 2017). Similarly, various hiring reports indicate that internships assisted students in developing career direction as well as securing full-time employment post-graduation (Knouse & Fontenot, 2008; Saltikoff, 2017). Students look at multiple factors when selecting a co-op or internship site including compensation, the experience offered, and potential for future employment (Hackett, Martin & Rosselli, 1998). Hackett, Martin, and Rosselli (1998) also indicate that students searching for co-op and internships seek an average of 10 hours of career counseling and preparation before beginning a co-op or internship experience. Consequently, students engaged in experiential education activities such as internships and co-ops are more likely to utilize career services offices and participate in career development events.

Overall, the implications for cooperative education and internship programs for student achievement and career development is significant. Students can attain employability skills that are critical for long-term career success while employers can develop young talent for the future of their organizations. A 2017 National Association of Colleges and Employers survey indicated that the key competencies that employers seek in internship/co-op hires include information processing, teamwork, planning/prioritizing, decision making/problem solving, and verbal communication.

These skills correspond to previous studies on employability skills (National Association of Colleges and Employers, 2015; Society for Human Resource Management, 2011). It is important to note, however, that most of the research from the career development associations such as the National Association of Colleges and Employers has focused on a comprehensive list of majors and not specifically on the employability skills of engineering students.

HISTORY OF COOPERATIVE EDUCATION

In 1861, Congress passed the Morrill Act which provided funds to establish universities that were devoted to agriculture and mechanical arts. The universities established under the Morrill Act have had a significant influence on educational and scientific advances since their inception (Cross, 1999). The Morrill Act was significant because it was a radical shift in the purpose of education. Under the Morrill Act, the purpose of education includes practicality and should be available to the general public (Loss, 2012). As higher education institutions and academic programs expanded, practical degree programs such as engineering developed. These skill-based degree programs required hands-on experience to complement academic coursework. Thus, when the Higher Education Act Title VIII of 1965 passed, it provided more impetus for the growth of co-op programs. Unfortunately, funding for cooperative education began to dwindle in the early 1990s. Under its current reauthorization, the Higher Education Act does not provide funding for co-op programs (Cooperative Education & Internship Association, n.d.).

In traditional cooperative education programs, students alternated between study and paid work experiences (Eyler, 2009). The first cooperative education program in the

United States was developed in 1906 at the University of Cincinnati under the direction of Dean Herman Schneider (Cates & Cedercreutz, 2008). The purpose of the program was to expose students to practical educational experiences in the field of engineering. Students participated in both classroom and workplace-based experiences simultaneously. The employer was responsible for the selection and hiring of the student while the university was responsible for preparing students adequately to enter the workplace. The design was intentional to allow the employer and student to simulate a realistic hiring and work experience. While the first cooperative education program developed for engineering, now nearly all disciplines can incorporate cooperative education learning activities (Buller & Stull, 1990).

Dr. Schneider had proposed the idea of cooperative education previously while he had served as a professor at Lehigh University; however, the concept was not well received (Cedercreutz & Cates, 2010). Upon arriving at the University of Cincinnati, Schneider began to develop the theoretical framework that would become cooperative education. He also began to make contacts with local employers in the Cincinnati area that were desperate to find qualified candidates for an increasingly complex industrial industry. Early employer partners hailed from a variety of industries ranging from mining to manufacturing.

After the success of the University of Cincinnati, other institutions began creating and operating cooperative education programs. Between 1909 and 1912, Northeastern University, University of Pittsburgh, University of Detroit, Georgia Institute of Technology, and Rochester Institute of Technology all announced programs. Within 20 years of Schneider's vision at the University of Cincinnati, more than 20 cooperative

education programs were in operation across the country (Cedercreutz & Cates, 2010). Cooperative education programs continued to grow throughout the early 20th century; however, the exponential growth occurred in the years following World War II.

Significant changes occurred to cooperative education in the 1960s which resulted in program expansion. Foremost, universities began developing parallel cooperative education programs. In these programs, students simultaneously worked part-time and attended college. Additionally, universities began to award academic credit for cooperative education experiences. Lastly, program expansion was influenced by the availability of federal funding for cooperative education programs in the 1960s.

Over the last 20 years, there has been a decline in the participation of traditional cooperative education programs. The decrease is due in part to the declined federal funding to support co-op programs. Additionally, with increased costs of higher education, the broader educational policy has emphasized completion of degrees rather than work-based learning programs. According to the Cooperative Education & Internship Association, "cooperative education and Internship programs today vary from individual experiences to multiple experiences with increased levels of responsibility working part-time or alternation semester of work and school" (Cooperative Education and Internship Association, n.d.). Recent research related to cooperative education in the United States has dwindled. The decline may be attributed to the decrease in funding and participation in cooperative education programs; however, it demonstrates the need to focus on research related to cooperative education and work-based learning.

The decline in cooperative education programs in the United States has resulted in the broadening of research on internships and cooperative education to include a variety of majors outside of traditional engineering. Recent research from the National Association of Colleges and Employers indicates that students participating in experiential learning are more likely to find employment than those students that have not participated (Saltikoff, 2017). Therefore, while many factors may contribute to the decline in research, experiential and work-based learning still plays a vital role in undergraduate education.

IMPLICATIONS FOR ENGINEERING MAJORS

Experiential education and learning activities can apply to any major; however, for this study, engineering majors will be examined. Therefore, it is important to discuss previous research concerning the effect of internships and cooperative education experiences in engineering programs. Engineering co-ops, like all experiential learning activities, are designed to provide students with a professional experience that is relevant to the academic experience.

The recent research regarding cooperative education and engineering students has focused on outcomes such as salary attainment and grade point average performance (Blair, Millea, & Hammer, 2004; Schuurman, Pangborn, & McClintic, 2008). For example, Blair, Millea, and Hammer (2004) found that participation in cooperative education had a positive correlation on salary and overall grade point averages for engineering majors. Engineering student participation in cooperative education programs has fluctuated throughout the years and may be the result of several contributing factors to include industry changes within the immediate region that

the higher education institution resides. Another factor as described in the 2015 study by Barry, Ohland, Mumford, and Long is that employers respond to wage instability as a result of shortages of engineers. For example, an employer may hire more co-ops as substitutes for hiring more expensive permanent engineers. Thus, the study found that participation in co-op programs is subject to market variability, meaning that students are less likely to participate in an engineering cooperative education experience during episodes when wage growth in their field is high (Barry, et al., 2015).

A nearly two-decade-old study by Hackett, Martin, and Rosselli (1998) examined the factors related to the performance of engineering students in cooperative education placements. This study indicated that there is often disconnect between the educational partners (i.e., faculty, co-op coordinators, and employers) in cooperative education experiences. The study found that cooperative education coordinators should spend more time preparing co-op advisees for the cooperative education experience. The preparation includes discussing: completion of additional engineering coursework prior to co-op experience can be beneficial in the workplace, more extended co-op placements tend to be more useful than short-term placements (i.e., internships vs. traditional co-op work-term placements), and lastly, engaging in prior non-engineering related work experiences can result in higher performance rates.

Over twenty years ago, Dr. Terri Friel conducted a study that analyzed employer benefits for engineering cooperative education. Prior studies to Dr. Friel's work had indicated that employers reported cooperative education programs were beneficial to corporations and in fact, very few problems occurred in cooperative education programs (1995). The study consisted of a survey of corporate cooperative education directors

that worked with engineering programs at Southern Methodist University, Texas A&M, and the University of Texas at Arlington. An analysis of the survey data concluded that co-op students receive a higher starting salary than students that did not participate in co-op; however, the results also found that new hires with co-op experience were not given better positions or promoted faster than new hires without co-op experience.

Interestingly, the most relevant portion of Dr. Friel's study for this research is the examination of problems reported in cooperative education programs. The 1995 study indicated that "cultural problems" was identified as the leading cause of concern and problems for co-op students. In the study, cultural problems were referred to as knowledge about workplace norms and culture. Thus, the major complaints were how to act in the workplace including appropriate dress and professionalism. These findings coupled with the research from Hackett, Martin, and Rosselli (1998) directly relate to the work examined in this study on employer perceptions of co-op students concerning employability skills.

EMPLOYER PERCEPTIONS OF EMPLOYABILITY SKILLS

Higher education is continuously challenged to prepare graduates for the workplace. Rapidly changing work environments caused by globalization make educators reevaluate the skills that college graduates need to succeed in the workplace. Transferable skills or soft skills are increasingly necessary for the long-term employability of college graduates (Stack & Fede, 2017). Experiential learning can assist in the development of soft skills in science, technology, engineering and mathematics (STEM) programs. Through experiential education, STEM students and more explicitly engineering students can apply the analytical, communication, and

professional skills needed to be competitive in our modern economy. Linn, Ferguson, and Egart assert that cooperative education experiences "…help the student self-assess, develop work skills, reflect on work experiences, integrate work experiences with classroom study, and identify career preferences, pathways, and goals" (2004, p. 431-432).

"The definitions of "employability" greatly vary although employers are increasingly defining employability around notions of "behavioral competence" and the capacity for graduates to demonstrate a range of performance and organizational abilities" (Jackling & Natoli, 2015, p. 760). Most research on employability focuses on skills that employers identify as key competencies that recent graduates must demonstrate for long-term career advancement and success. Thus, greater collaboration between employers and universities must improve to develop non-technical skill advancement for college graduates.

As mentioned previously, many employer surveys have been conducted to identify preferred skills and characteristics of recent college graduates (Casner-Lotto & Barrington, 2006; Hart Research Associates, 2015; National Association of Colleges and Employers, 2015). Authors Casner-Lotto and Barrington (2006) conducted a study of over 400 employers to identify preferred basic and applied skills of new hires. Basic skills included key academic subjects such as reading, writing, and mathematics. The applied skills identified by the study included: critical thinking/problem solving; oral communication; written communication; teamwork/collaboration; diversity; information technology application; leadership; creativity/innovation; lifelong learning/self-direction;

professional/work ethic; and ethics/social responsibility (Casner-Lotto & Barrington, 2006, p. 16).

In 2015, Hart Research Associates was commissioned by the Association of American Colleges and Universities (AACU) to conduct a survey related to skills desired by employers. These skills directly coincide with results from the 2015 study conducted by the National Association of Colleges and Employers (NACE). Both surveys focused on career competencies for recent college graduates and outlined the top skills and qualities valued by employers. The seven competencies included (1) Professionalism/Work Ethic, Critical Thinking/Problem Solving, Oral/Written Communications, Teamwork/Collaboration, Information Technology Application, Leadership, and Career Management (National Association of Colleges and Employers, 2015). The seven competencies outlined by the National Association of Colleges and Employers coincides with a survey from the Society for Human Resource Management (SHRM), *The Ongoing Impact of the Recession—Recruiting and Skill Gaps*, which includes: (a) critical thinking/problem solving, (b) professionalism/work ethic, and (c) written communication as the top skills and qualities desired by employers (Society for Human Resource Management, 2011).

Additionally, cooperative education programs play a vital role in assisting university faculty in updating curriculum as well as the behavioral competencies and soft skills needed to succeed in the world of work. Weighart asserts “employers develop a good sense of what our students bring to the table and what they are lacking; the institution needs to reflect on that and decide whether changes should be made” (2009, p. 337). Employer engagement with faculty and career services professionals assist in

creating structures and programs that provide experiences for students that allow for the development of employability skills as well as professionalism and personal growth. Thus, effective cooperative education programs devote time and resources to building and maintaining employer relationships (Weighart, 2009). Engaging employers as an educational partner requires the cooperative learning manager to discuss the integration of learning into the workplace.

For most professional occupations, higher education is a required entrance ticket to seek professional employment; however, as competition for jobs increases, soft skills development can set engineering candidates apart (Nilsson, 2010). In reality, the definition of employability skills can vary significantly based on the employer, position, and industry. Nilsson (2010) found that the employer or host organization generally does not assume the responsibility of creating and supporting educational activities for learning outside of the context of the technical skills of the job or task. By and large, the responsibility for developing and managing transferable skill development is regarded as the responsibility of the individual student. Therefore, experiential learning opportunities such as cooperative education and internship programs are critical tools in which a student can engage in career development outside the classroom.

CONCLUSION

While it is evident that educators have recognized the value of the cooperative education process, much of the recent research on cooperative education and work-based learning has focused on programs in Europe, Canada, and Australia while the research from the United States has dwindled over the last 20 years. In fact, in 2014 the Cooperative Education and Internship Association (CEIA) Board of Directors voted to

retire the Journal of Cooperative Education and Internships. The retirement of the CEIA journal signals that there is a lack of research and literature production on cooperative education and internship programs in the United States. Furthermore, despite the significant literature regarding experiential learning, the majority of the literature concentrates on learning outcomes for students rather than employer perspectives of student work performance and employability skills.

Cooperative education and internships can be an integral part of the overall higher education experience. A co-op or internship program that allows students to take on increasing levels of responsibility, use classroom learning, and gain employability skills while providing an opportunity to make meaningful contributions to the organizations in which they work will provide an undergraduate engineering student with the skills necessary to have a productive and successful career. The literature communicates the effect of experiential learning on a student's development; however, the literature is not as clear on the types of employability skills that are byproducts of the co-op or internship experience.

This study added to the contemporary body of literature on the benefits of cooperative education for undergraduate engineering students in the United States. Little research has been produced on cooperative education in the United States in the last 20 years. Thus, this study built upon and updated the work of prior research in cooperative education from researchers such as Dr. Friel and Hackett, Martin, and Rosselli. Additionally, cooperative education or work-based learning has grown to encompass students that engage in both the traditional rotation of work placements with an academic study as well as shorter-term experiences termed internships.

Consequently, this study assists cooperative education programs – both university and employer, in developing strategies to better prepare students for the cooperative education experience.

CHAPTER 3

METHODS AND PROCEDURES

One goal of experiential education is to instill lifelong learning in participants (Peck, 2017). Under the umbrella of experiential education, cooperative education is an educational modality to achieve a broad range of career development competencies as well as a broad range of academic learning outcomes (Hsiung, 2012). Thus, cooperative education is a process in which universities and employers work in tandem to successfully educate, train, and develop professionalism in students.

One of the purposes of higher education, cooperative education, and internship programs is to assist in the development of workplace skills related to an academic major. The research for this study examined employer perceptions of cooperative education students in bachelor degree engineering programs by analyzing existing data from employer evaluations of cooperative education students. While traditional cooperative education programs alternate between school and work experiences, this study will also include work experiences lasting as few as one work period (Eyler, 2009).

This chapter presents the research methods for this study. The chapter is divided into sections: research questions, data collection, population, procedure, data analysis, and summary. This study employed a quantitative approach by analysis of employer evaluations of cooperative education student forms. Thus, the research was able to examine trends related to cooperative education participant performance, major, and the number of work periods completed as well as the ability to gain insight into possible future trends of cooperative education.

RESEARCH QUESTIONS

1. Is there a significant difference in overall performance rating as reported by employers due to engineering major?
2. Is there a significant difference in overall performance rating as reported by employers due to work period?
3. Is there a significant difference between engineering major and career readiness attribute performance ratings as reported by employers?
4. Is there a significant difference between work period and career readiness attribute performance ratings as reported by employers?

DATA COLLECTION

The data for this study originates from the West Virginia University Institute of Technology Cooperative Education Program file and encompass 25 years of cooperative education participants. The researcher analyzed the employers' evaluation of cooperative education student forms using IBM Statistical Package for the Social Sciences (SPSS) software version 25. The form used to evaluate cooperative education students includes nine career readiness attribute areas: attitude of work, ability to learn, dependability, initiative, quality of work, relations with others, maturity-poise, quantity of work, and judgment. Additionally, overall performance is included in the evaluation. The independent variable for this study is student major which include chemical, civil, computer, electrical, or mechanical engineering as well as work period. The dependent variables include attitude – application to work, ability to learn, dependability, initiative, quality of work, relations with others, maturity – poise, quantity of work, judgment, and overall performance. For the analysis of the employer evaluation of cooperative

education students, the researcher assigned a numerical value to each attribute or performance level and conducted a statistical analysis of the data. Through an examination of the relationship of the employer evaluation of cooperative education student forms to career readiness competencies, the study adds to the body of literature as an example of cooperative education work performance.

POPULATION

The population of this research project contains engineering cooperative education program participants from West Virginia University Institute of Technology (WVU Tech). The population consists of 323 WVU Tech cooperative education students from 1990-2015. The majors of cooperative education students include chemical, civil, computer, electrical, and mechanical engineering. The cooperative education participants participated in one to seven work periods.

PROCEDURE

The procedure for this study includes the steps for the examination of the employer evaluation of cooperative education student form. The researcher was granted permission to use the data from the Dean of Students at WVU Tech with the stipulation that the research would share the outcomes of the analysis with the WVU Tech (see Appendix B). The Office of Career Services and Cooperative Education managed the cooperative education program at WVU Tech and was responsible for collecting the employer evaluation of cooperative education student form (see Appendix C).

The employer evaluation of cooperative education student forms was collected from cooperative education supervisors during each work period that a cooperative

education student completed. The form contains a section for nine career attributes for evaluation and overall performance evaluation. The attributes include attitude – application to work, ability to learn, dependability, initiative, quality of work, relations with others, maturity – poise, quantity of work, and judgment. The attributes and the work assessment can be found in Table 1. Additionally, attendance, punctuality, and overall performance were evaluated on the form. The areas of attendance and punctuality were not used for this study. Overall performance was used for this study.

The quality of the information provided on the employer evaluation of cooperative education student form is good for this study because it allows for an analysis of career attributes and overall work performance by supervisors of co-op participants. Initially, the researcher conducted a review of employer evaluation of cooperative education student form and assigned each performance attribute a numerical value. During this process, the researcher noted any discarded evaluation forms that are unusable. Once all forms were reviewed and coded for consistency and balance, the researcher created a cross-tabulation table. This table included the total number of subjects and engineering major of the subject (i.e., chemical, civil, computer, electrical, or mechanical engineering) and work period.

During the preliminary review of the data, two issues arose. First, the number of majors in each engineering discipline was not balanced for the statistical analysis. The solution was to combine computer and electrical engineering into one major grouping. Computer and electrical engineering are very similar academic programs and result in similar career opportunities, thus merging the two majors into one for the statistical analysis assists with balancing the data set for analysis. The second issue was the work

period category. Cooperative education participants can complete up to seven work periods while enrolled in an engineering program. Each work period runs between 12 and 16 weeks. Most cooperative education participants complete no more than four work periods. In order to balance the data for analysis, work periods five, six, and seven were combined into one dataset.

After the preliminary work was completed, the researcher conducted a statistical analysis of the data from the employer evaluation of cooperative education student form. Since the data is a Likert scale and, therefore, ordinal, the analysis was limited to the Kruskal-Wallis statistical test for ordinal data. For statistical analysis, the researcher determined to analyze the last evaluation received by the cooperative education participant. The rationale for evaluating the last evaluation was due to the number of evaluations per participant varied considerably in the data set, and the last evaluation would provide the most recent employer evaluation.

The researcher used the Kruskal-Wallis statistical test. After the data analysis was complete, the researcher analyzed the outcomes of the employer evaluation of cooperative education student form and reported any findings in narrative and table forms. Once the analysis is complete, the researcher will present the results in tables and interpret the results from the statistical tests in a narrative form. The researcher used the analysis to answer the research questions. Furthermore, the researcher made recommendations for future study on the topic of experiential learning and its relationship to employer perceptions.

DATA ANALYSIS

As stated in the procedures section of this chapter, the data analysis process for this research project included several steps. First, the raw data obtained from the employer evaluation of cooperative education student form was converted into information that will be useful for analysis. Each engineering major was assigned a numerical value: civil engineering (CE) – 1, chemical engineering (CHEME) – 2, electrical/computer engineering (EE/CPE) – 4, and mechanical engineering (ME) – 5. Work period was as indicated on the evaluation form: 1 work period, 2 work periods, 3 work periods, 4 work periods, or 5, 6, or 7 work periods. Overall performance was assigned the following numerical values: 5 – outstanding, 4 – very good, 3 – average, 2 – marginal, and 1 – unsatisfactory. Each work attribute category was assigned a rank value as indicated in Table 1.

Table 1

Work Attributes Assigned

Attribute	Rank 5	Rank 4	Rank 3	Rank 2	Rank 1
Attitude Application to Work	Outstanding in enthusiasm	Very interested and industrious	Average in diligence and interest	Somewhat indifferent	Definitely not interested
Ability to Learn	Learned work exceptionally well	Learned work readily	Average in understanding work	Rather slow in learning	Very slow to learn
Dependability	Completely dependable	Above average in dependability	Usually dependable	Sometimes neglectful or careless	Unreliable
Initiative	Proceeds well on his own	Goes ahead independently at times	Does all assigned work	Hesitates	Must be pushed frequently
Quality of Work	Excellent	Very good	Average	Below average	Very poor
Relations with Others	Exceptionally well accepted	Works well with others	Gets along satisfactorily	Has difficulty working with others	Works very poorly with others
Maturity – Poise	Quite poised and confident	Has good self-assurance	Average maturity and poise	Seldom asserts himself	Timid Brash
Quantity of Work	Unusually high output	More than average	Normal amount	Below average	Low output, slow
Judgment	Exceptionally mature in judgment	Above average in making decisions	Usually makes the right decision	Often uses poor judgment	Consistently uses bad judgment

Since a Likert scale was used for the data from both the employer evaluation of cooperative education student form and the employer survey, the applicable statistical test for this study is the nonparametric test, Kruskal-Wallis.

SUMMARY

In summary, cooperative education has been a feature of undergraduate engineering programs for over 100 years and, therefore, it is imperative that cooperative education programs be continuously evaluated for improvement. Evaluation of programs includes the review and analysis of individual programs that can contribute to the overall literature and research on experiential learning and cooperative education. This study aims to provide insight into the relationship between cooperative education programs and career readiness for undergraduate engineering students.

Limitations of this study are influences that are beyond the control of the researcher. Constraints can include conditions or deficiencies that place restrictions on the data analysis and therefore, conclusions. The limitations of this study include that the existing data are from a cooperative education program at one university and that the data consist of a population of students that participated in a co-op or internship from 1990-2015. Therefore, the population presents a shortcoming in the application to other cooperative education programs. Additionally, the researcher only evaluated the employer evaluation of cooperative education student forms from the following majors: chemical, civil, computer, electrical, and mechanical engineering. Therefore, this study may not apply to academic majors outside of engineering.

CHAPTER 4

RESULTS

Public universities must demonstrate value to students, society, and the economy, therefore, universities must incorporate strategies to increase student success and employment outcomes. Graduates must be prepared academically as well as professionally to achieve long-term career success (Association of Public and Land Grant Universities, n.d.). Many studies have shown that cooperative education and internships can provide a realistic work setting for students to enhance career readiness skills (Friel, 1995; Hsiung, 2012; Linn, Ferguson, & Egart, 2004; Saltikoff, 2017).

The primary purpose of this study was to examine a cohort of cooperative education employer evaluations of students. The evaluation included overall performance as well as individual rates for nine career readiness attributes. The study examined participants in civil, chemical, electrical/computer, and mechanical engineering programs. The purpose of this chapter is to describe the findings from the analysis of the data to answer the research questions. The specific research questions addressed were:

1. Is there a significant difference in overall performance rating as reported by employers due to engineering major?
2. Is there a significant difference in overall performance rating as reported by employers due to work period?
3. Is there a significant difference between engineering major and career readiness attribute performance ratings as reported by employers?

4. Is there a significant difference between work period and career readiness attribute performance ratings as reported by employers?

DATA COLLECTION

The data for this study consist of cooperative education program employer evaluations from 1990 – 2015 from West Virginia University Institute of Technology (WVU Tech). Permission to use the data for this study was granted from the Division of Student Life. The data were provided to the researcher in an Excel spreadsheet and contained no identifiable information for program participants. The data set includes overall performance and career readiness attribute performance evaluations of 323 cooperative education participants in the following engineering disciplines: civil, chemical, electrical/computer, and mechanical.

PARTICIPANTS

Study participants included 323 cooperative education program participants in the following engineering majors: civil, chemical, electrical/computer, and mechanical. Additionally, participants engaged in one to seven cooperative education work periods. On average cooperative education, work periods consist of between 12 and 16 weeks of full-time employment. Table 2 displays a demographic cross tabulation of study participants. The major breakdown included 40 civil, 92 chemical, 105 electrical/computer, and 86 mechanical participants. The last evaluation for each participant was analyzed. Therefore, each participant is categorized by the total number of overall work periods completed and major. A total of 75 participants completed one work period, 62 completed two work periods, 81 completed three work periods, 72 completed four work periods, and 33 completed five, six, or seven work periods.

Table 2

Demographic Cross Tabulation – Study Participants

Major Code * Work Period Cross Tabulation							
		Work Period					
		1 Work Period	2 Work Periods	3 Work Periods	4 Work Periods	5, 6 or 7 Work Periods	Total
Major Code	CE – Civil	10	6	9	11	4	40
	CHEME - Chemical	21	16	22	22	11	92
	EE&CPE - Electrical/Computer	19	27	20	26	13	105
	ME - Mechanical	25	13	30	13	5	86
Total		75	62	81	72	33	323

DATA FINDINGS

Research Question 1

The nonparametric Kruskal-Wallis test was performed to analyze Research Question 1 (Salkind, 2014). The statistical results resulted in a significant difference in some of the mean ranks for overall participant evaluation due to participant major. The findings are displayed in Table 3. A pair-wise comparison showed that mean ranks for CHEME are significantly lower than the mean ranks of CE (p=0.026) and EE/CPE (p=0.012). Thus, CHEME majors were ranked lower on overall performance compared to CE and EE/CPE majors. The findings of the pair-wise comparison are displayed in Table 4.

Table 3

Kruskal-Wallis Analysis of Major - Overall Evaluation

Major	Overall Evaluation Mean Rank	Kruskal-Wallis Statistic	Probability attained
CE – Civil	177.66	8.074	.045 *
CHEME – Chemical	142.66		
EE&CPE - Electrical/Computer	172.35		
ME – Mechanical	161.31		

* Significance attained at $p < 0.05$

Table 4

Post-Hoc Pair-wise for Major - Overall Evaluation

	Test Statistic	Std. Error	Std. Test Statistic	Significance	Adjusted Significance
Chemical Engineering – Mechanical	-19.051	12.62	-1.509	.131	.788
Engineering Chemical Engineering – Electrical/Computer Engineering	-30.092	11.985	-2.511	.012*	.072
Chemical Engineering – Civil Engineering	35.402	15.895	2.227	.026*	.156
Mechanical Engineering – Electrical/Computer Engineering	11.041	12.246	.902	.367	1.000
Mechanical Engineering – Civil Engineering	16.351	16.092	1.016	.310	1.000
Electrical/Computer Engineering – Civil Engineering	5.310	15.594	.341	.733	1.000

* Significance attained at $p < 0.05$

Research Question 2

The nonparametric Kruskal-Wallis test was performed to analyze Research Question 2. The analysis resulted in a significant difference in some of the mean ranks for overall participant evaluation due to the participant work period. The results are displayed in Table 5. A pair-wise comparison showed that mean ranks for 1 Work Period are significantly lower than the mean ranks of 3 Work Periods (p=.012), 4 Work

Periods (p=.000), and 5 or more Work Periods (p=.017). Therefore, subjects that completed 1 Work Period were ranked lower on overall performance compared to subjects that completed 3, 4, or 5 or more Work Periods. The pair-wise comparison also indicated that the mean ranks for 2 Work Periods were significantly lower than the mean rank of 4 Work Periods (p=.022). Additionally, subjects that completed 2 Work Periods were ranked lower on overall performance compared to subjects that completed 4 Work Periods. The findings of the pair-wise comparison are displayed in Table 6.

Table 5

Kruskal-Wallis Analysis of Work Period - Overall Evaluation

Work Period	Overall Evaluation Mean Rank	Kruskal-Wallis Statistic	Probability attained
1 Work Period	134.21	15.844	.003 *
2 Work Periods	151.31		
3 Work Periods	168.07		
4 Work Periods	184.74		
5, 6, or 7 Work Periods	176.03		

* Significance attained at $p < 0.05$

Table 6

Post-Hoc Pair-wise Work Period - Overall Evaluation

	Test Statistic	Std. Error	Std. Test Statistic	Significance	Adjusted Significance
1 Work Period – 2 Work Periods	-17.108	14.406	-1.188	.236	1.000
1 Work Period – 3 Work Periods	-33.868	13.489	-2.511	.012*	.120
1 Work Period – 5, 6, or 7 Work Periods	-41.824	17.532	-2.386	.017*	.171
1 Work Period – 4 Work Periods	-50.529	13.847	-3.649	.000*	.003
2 Work Periods – 3 Work Periods	-16.760	14.201	-1.180	.238	1.000
2 Work Periods – 5, 6, or 7 Work Periods	-24.716	18.085	-1.367	.172	1.000
2 Work Periods – 4 Work Periods	-33.422	14.541	-2.298	.022*	.215
3 Work Periods – 5, 6, or 7 Work Periods	-7.955	17.364	-.458	.647	1.000
3 Work Periods – 4 Work Periods	-16.661	13.634	-1.222	.222	1.000
5, 6, or 7 Work Periods – 4 Work Periods	8.706	17.643	.493	.622	1.000

* Significance attained at $p < 0.05$

Research Question 3

The nonparametric Kruskal-Wallis test was performed to analyze Research Question 3. The statistical results resulted in a significant difference in some of the mean ranks for participant career readiness attributes due to participant major. Significance was found on the following work attributes: quality of work, maturity – poise, and quantity of work. The data is displayed in Table 7.

Quality of Work

Quality of work refers to a rating provided by a cooperative education supervisor for a cooperative education student for performance related to the quality of task completion, contributions to team work, and achievement of goals. The ratings on the form included excellent, very good, average, below average, and very poor. A pair-wise comparison showed that mean ranks for CHEME participants was significantly lower than mean ranks for EE/CPE participants (p=.005) and CE participants (p=.000) for quality of work. Therefore, CHEME participants were ranked lower on quality of work compared to EE/CPE and CE participants. The pair-wise comparison also indicated that mean ranks for ME participants were significantly lower than mean ranks for CE participants (p=.005). Additionally, ME participants were ranked lower on quality of work compared to CE participants.

Maturity – Poise

Maturity – poise refers to a rating provided by a cooperative education supervisor for a cooperative education student for performance related to the ability to control emotions and behavior in the work place confidently. The ratings on the form included: quite poised and confident, has good self-assurance, average maturity, and poise,

seldom asserts himself, and timid or brash. A pair-wise comparison showed that mean ranks for CHEME participants were significantly lower than mean ranks for EE/CPE participants (p=.003) for maturity – poise. Thus, CHEME participants were ranked lower on maturity – poise compared to EE/CPE.

Quantity of Work

Quantity of work refers to a rating provided by a cooperative education supervisor for a cooperative education student for the amount of work output. The ratings on the form included: unusually high output, more than average, normal amount, below average, and low output, slow. A pair-wise comparison showed that mean ranks for CHEME participants was significantly lower than mean ranks for CE participants (p=.002) for quantity of work. Therefore, CHEME participants were ranked lower on quantity of work compared to CE participants. The pair-wise comparison also indicated that mean ranks for ME participants were significantly lower than mean ranks for CE participants (p=.005). Additionally, ME participants were ranked lower on quantity of work compared to CE participants.

Table 7

Kruskal-Wallis Analysis of Attributes - Major

Attributes	CE Mean Rank	CHEME Mean Rank	EE/CPE Mean Rank	ME Mean Rank	Kruskal-Wallis Statistic	Probability attained
Attitude – Application to Work	181.40	150.22	164.54	160.58	4.174	.243
Ability to Learn	172.82	148.77	164.83	165.84	3.329	.344
Dependability	173.19	148.28	163.68	165.76	3.563	.313
Initiative	169.89	152.64	168.05	159.05	2.095	.553
Quality of Work	200.12	138.71	172.00	155.02	17.441	.001 *
Relations with Others	174.60	161.09	165.13	151.29	2.529	.470
Maturity – Poise	182.18	141.79	177.88	152.86	11.874	.008 *
Quantity of Work	199.68	149.48	161.67	154.36	10.592	.014 *
Judgment	184.80	144.63	168.65	159.96	7.337	.062

* Significance attained at $p < 0.05$

Research Question 4

The nonparametric Kruskal-Wallis test was performed to analyze Research Question 4. The statistical results resulted in a significant difference in some of the mean ranks for career readiness attributes due to the participant work period. Significance was found on six of the nine career attributes. The attributes where significance was found included dependability, initiative, quality of work, maturity – poise, quantity of work, and judgment. The results of the statistical analysis are displayed in Table 8.

Dependability

Dependability refers to a rating provided by a cooperative education supervisor for a cooperative education student for performance related regular attendance and the

ability to be relied upon at work. The ratings on the form included: completely dependable, above average in dependability, usually dependable, sometimes neglectful or careless, and unreliable. A pair-wise comparison showed that mean ranks for 1 Work Period participants were significantly lower than mean ranks for 3 Work Periods (p=.001) and 4 Work Periods (p=.000) for dependability. Therefore, 1 Work Period participants were ranked lower on dependability compared to the 3 Work Period and 4 Work Period participants.

Initiative

Initiative refers to a rating provided by a cooperative education supervisor for a cooperative education student for performance related to the ability to evaluate and initiate work independently. The ratings on the form included: proceeds well on his own, goes ahead independently at times, does all assigned work, hesitates, and must be pushed frequently. A pair-wise comparison showed that mean ranks for 1 Work Period participants were significantly lower than mean ranks for 3 Work Periods (p=.003) and 4 Work Periods (p=.000) for initiative. Therefore, 1 Work Period participants were ranked lower on initiative compared to the 3 Work Period and 4 Work Period participants.

Quality of Work

Quality of work refers to a rating provided by a cooperative education supervisor for a cooperative education student for performance related to the quality of task completion, collaborations, and goals. The ratings on the form included excellent, very good, average, below average, and very poor. A pair-wise comparison showed that mean ranks for 1 Work Period participants were significantly lower than mean ranks for

4 Work Periods (p=.001) for quality of work. Therefore, 1 Work Period participants were ranked lower on quality of work compared to 4 Work Period participants.

Maturity – Poise

Maturity – poise refers to a rating provided by a cooperative education supervisor for a cooperative education student for performance related to the ability to control emotions and behavior in the work place confidently. The ratings on the form included: quite poised and confident, has good self-assurance, average maturity, and poise, seldom asserts himself, and timid or brash. A pair-wise comparison showed that mean ranks for 1 Work Period participants were significantly lower than mean ranks for 3 Work Periods (p=.000) and 4 Work Periods (p=.000) for maturity – poise. Thus, 1 Work Period participants were ranked lower on maturity – poise compared to 3 Work Period and 4 Work Period participants.

Quantity of Work

Quantity of work refers to a rating provided by a cooperative education supervisor for a cooperative education student for the amount of work output. The ratings on the form included: unusually high output, more than average, normal amount, below average, and low output, slow. A pair-wise comparison showed that mean ranks for 1 Work Period participants were significantly lower than mean ranks for 4 Work Periods (p=.001) for quantity of work. Thus, 1 Work Period participants were ranked lower on quantity of work compared to 4 Work Period participants.

Judgment

Judgment refers to a rating provided by a cooperative education supervisor for a cooperative education student related to the ability to evaluate options, come to

conclusions, and make decisions. The ratings on the form included: exceptionally mature in judgment, above average in making decisions, usually makes the right decision, often uses poor judgment, and consistently uses bad judgment. A pair-wise comparison showed that mean ranks for 1 Work Period participants were significantly lower than mean ranks for 3 Work Periods (p=.002) and 4 Work Periods (p=.000) for judgment. Therefore, 1 Work Period participants were ranked lower on judgment compared to 3 Work Period and 4 Work Period participants.

Table 8

Kruskal-Wallis Analysis of Attribute - Work Period

Attributes	1 Work Period Mean Rank	2 Work Periods Mean Rank	3 Work Periods Mean Rank	4 Work Periods Mean Rank	5, 6, or 7 Work Periods Mean Rank	Kruskal-Wallis Statistic	Probability attained
Attitude – Application to Work	144.52	153.80	165.65	178.47	167.47	7.095	.131
Ability to Learn	141.12	156.22	170.90	166.60	183.83	8.504	.075
Dependability	132.04	149.62	177.27	182.51	162.33	18.977	.001 *
Initiative	129.25	157.17	169.66	191.62	157.42	20.921	.000 *
Quality of Work	134.35	156.68	168.70	181.26	171.68	13.142	.011 *
Relations with Others	145.85	159.97	163.93	171.14	173.03	4.439	.350
Maturity – Poise	129.43	148.05	181.57	180.51	169.53	20.223	.000 *
Quantity of Work	133.73	151.49	171.49	180.80	172.79	14.341	.006 *
Judgment	132.65	152.71	175.57	182.25	164.18	15.685	.003 *

* Significance attained at $p < 0.05$

SUMMARY

Students that engage in experiential learning activities such as cooperative education can gain valuable career development preparation that cannot be achieved in a traditional classroom setting (Brahimi, Dweiri, Al-Syouf, & Khan, 2012; Linn, Ferguson, & Egart, 2004). Cooperative education provides benefits for students, universities, and corporations. This chapter discussed the findings of the study which may provide insight into improving cooperative education programs. Findings from the statistical data analysis of the employer evaluation of cooperative education student forms were presented to answer the four research questions. Demographic data were presented in Table 2 Demographic Cross Tabulation – Study Participants.

Research questions one and two concerned overall performance rating as related to engineering major and the number of work periods completed. The statistical results for research question one resulted in a significant difference in overall performance rating as reported by employers due to engineering major. As indicated in Table 3, chemical engineering majors were ranked lower on overall performance as compared to civil and electrical/computer engineering majors. There was no significant difference between any of the analyzed majors and mechanical engineering.

The statistical results for research question two indicated a significant difference in some of the mean ranks for overall participant evaluation due to participant work period. Cooperative education participants that completed two work periods were significantly lower than participants that completed four work periods. Additionally, participants that completed one work period were found significantly lower than participants that completed two, three, four, and five, six, or seven work periods as

indicated in Table 4. Therefore, the more work periods completed by a cooperative education participant, the employer overall performance rating improves.

Research questions three and four examined the nine career readiness attributes on the employer evaluation form as related to major and work period. The analysis of research question three resulted in finding a significant difference for three of the nine mean ranks for participant career readiness attributes due to major as indicated in Table 5. Significance was not found for any of the majors due to attitude – application to work, ability to learn, dependability, initiative, relations with others, and judgment.

Significance was found for quality of work, maturity – poise, and quantity of work for some majors. Chemical engineering majors were found to have been ranked significantly lower than electrical/computer and civil engineering majors for quality of work. Mechanical engineering majors were ranked significantly lower than civil engineering majors for quality of work. Chemical engineering majors were ranked significantly lower than electrical/computer engineering majors for maturity – poise. Chemical engineering majors were ranked significantly lower than civil engineering majors for quantity of work. Mechanical engineering majors were ranked significantly lower than civil engineering majors for quantity of work.

The statistical analysis for research question four resulted in a statistical difference in the mean ranks for six of the nine career readiness attributes due to participant work period as indicated in Table 6. Significance was not found for any of the work periods due to attitude – application to work, ability to learn, and relations with others.

Significance was found for dependability, initiative, quality of work, maturity – poise, quantity of work, and judgment for some work periods. One work period participants were ranked significantly lower than three and four work period participants on dependability, initiative, maturity – poise, and judgment. Additionally, one work period participants were ranked significantly lower than four work period participants on quality of work and quantity of work.

CHAPTER 5

FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Cooperative education has been utilized as both a human capital strategy for employers and an educational tool by universities since its inception in 1906. Through cooperative education, employers fill employment gaps in critical need areas as well as providing an opportunity to mentor and to vet potential full-time employees. For students, cooperative education gives them a chance to use skills learned in the classroom and to broaden that knowledge through related work experience.

Additionally, the paid work experience of cooperative education provides the student with a competitive edge in the job market upon graduation. This study seeks to contribute to the limited research that has been published concerning the employer evaluation of career readiness attributes of engineering students. Specifically, this chapter includes a summary of the study, implications for cooperative education, and recommendations for future research.

STUDY SUMMARY

Despite the significant literature regarding experiential learning, the majority of the research concentrates on learning outcomes for students rather than employer perspectives of student work performance and career readiness attributes. Thus, the primary purpose of the study is to examine a cohort of employer evaluations of cooperative education students in relationship to engineering disciplines and work period to fill a void in the existing literature. The results of this study can be used by universities, faculty, administrators of cooperative education programs, and employers to recruit and prepare students for cooperative education experiences.

Furthermore, the scope and importance of this study can provide insight into faculty, career services administrators, and employers on the benefits of cooperative education for engineering students. Also, the study is an update to the literature regarding employer perceptions of career readiness attributes and overall performance. Results of this study can enhance the quality of student development of soft skills as well as promote student and employer participation in cooperative education.

The population of the study included cooperative education participants from West Virginia University Institute of Technology from 1990 to 2015. Thus, the research encompasses 25 years of cooperative education program participants at a small, public STEM institution. Additionally, the variables of student major (chemical, civil, computer/electrical, and mechanical engineering) and the number of work periods completed were examined to determine if any significant difference exists between these variables and employer overall performance rating and career readiness attribute performance ratings as reported by employers. A total of 323 employer's evaluation of cooperative education student evaluations were statistically analyzed to answer the research questions using IBM Statistical Package for the Social Sciences (SPSS) software version 25. The research questions addressed were:

1. Is there a significant difference in overall performance rating as reported by employers due to engineering major?
2. Is there a significant difference in overall performance rating as reported by employers due to work period?
3. Is there a significant difference between engineering major and career readiness attribute performance ratings as reported by employers?

4. Is there a significant difference between work period and career readiness attribute performance ratings as reported by employers?

CONCLUSION AND DISCUSSION

A basic demographic cross-tabulation of study participants was conducted of study participants for major and work period. The study comprised a total of 323 participants. The analysis of majors concluded that a total of 40 civil, 92 chemical, 105 electrical/computer, and 86 mechanical participants were included in the study. Additionally, participants were divided into groups based on the last work period completed. The breakdown of completed work periods included a total of 75 participants who completed one work period, 62 who completed two work periods, 81 who completed three work periods, 72 who completed four work periods, and 33 who completed five, six, or seven work periods.

The nonparametric Kruskal-Wallis statistical test was performed to answer each of the four research questions for this study. Research questions one and two examined the employer overall performance rating of cooperative education participants relative to engineering major and work period completed. Research questions three and four concerned the employer ratings for the nine career readiness attributes as related to engineering major and work period. A statistical significance was found in the analysis of the data for each research question.

Findings: Research Question 1

Statistical analysis was completed using data from the employer evaluation of cooperative education student form to determine if there was a significant difference in the overall performance rating of cooperative education participants as reported by

employers due to engineering major. The statistical test outcomes resulted in a significant difference in some of the participants' overall evaluation due to major. Specifically, chemical (mean rank 142.66) engineering majors were found to be rated lower than civil (mean rank 177.66) and computer/electrical (mean rank 172.35) engineering majors by employers. No significant difference (significance attained at $p < 0.05$) was found for mechanical engineering majors (mean rank 161.31).

Findings: Research Question 2

Statistical analysis was completed using data from the 323 evaluations to determine if there was a significant difference in the overall performance rating of cooperative education participants as reported by employers due to the number of work periods completed. The statistical outcomes resulted in a significant difference in some of the participants' overall evaluation due to participant work period. The overall performance rating for participants that completed 1 work period (mean rank 134.21) was significantly lower than participants that completed 3 work periods (mean rank 168.07), 4 work periods (mean rank 184.74), and 5 or more work periods (mean rank 176.03). Additionally, participants that completed 2 work periods (mean rank 151.31) were ranked lower on overall performance than participants that completed 4 work periods (mean rank 184.74). Thus, the statistical analysis indicates that employers ranked cooperative education participants with three or more work periods higher for overall work performance compared to participants that completed one or two work periods.

Findings: Research Question 3

Statistical analysis was completed using data from the employer evaluation of cooperative education student form to determine if there was a significant difference in career attribute ratings of cooperative education participants as reported by employers due to engineering major. The employer evaluation of cooperative education student form included nine career readiness attribute categories. The career readiness attribute categories included: attitude – application to work, ability to learn, dependability, initiative, quality of work, relations with others, maturity – poise, quantity of work and judgment. Significance was found for some of the majors for three of the career attribute categories: quality of work, maturity – poise, and quantity of work.

Chemical engineering (mean rank 138.71) cooperative education participants were ranked significantly lower for quality of work than computer/electrical (mean rank 172.00) and civil (mean rank 200.12) engineering participants. Mechanical engineering (mean rank 155.02) cooperative education participants were ranked significantly lower for quality of work than civil engineering participants. Thus, chemical and mechanical engineering majors received a lower ranking for quality of work as compared to computer/electrical and civil engineering majors. Additionally, chemical engineering (mean rank 141.79) cooperative education participants ranked significantly lower for maturity – poise compared to computer/electrical engineering (mean rank 177.88) majors.

Lastly, a pair-wise comparison showed chemical engineering (mean rank 149.48) participants were ranked significantly lower than civil engineering (mean rank 199.68) participants for quantity of work. The analysis also indicated that mechanical

engineering (rank mean 154.36) majors ranked significantly lower for quantity of work as compared to civil engineering (rank mean 199.68) majors. The analysis indicates that civil engineering majors ranked higher for quantity of work by employers when compared to chemical and mechanical engineering majors.

Findings: Research Question 4

Statistical analysis was completed using data from the employer evaluation of cooperative education student form to determine if there was a significant difference in career attribute ratings of cooperative education participants as reported by employers due to the number of work periods completed by the cooperative education participants. The analysis indicates that cooperative education participants that completed three or four work periods were ranked higher on the majority of career readiness attributes as compared to participants that completed one work period.

Cooperative education participants that completed one work period were found to be ranked significantly lower for the career readiness attributes of dependability, initiative, maturity – poise, and judgment as compared to participants that completed three or four work periods. More specifically, cooperative education participants that completed one work period (mean rank 132.04) ranked significantly lower than participants that completed three (mean rank 177.27) and four (mean rank 182.51) work periods for dependability. For the career readiness attribute, initiative, participants that completed one work period (mean rank 129.25) ranked significantly lower than participants that completed three (mean rank 169.66) and four (mean rank 191.62) work periods. Participants that completed one work period (mean rank 129.43) ranked significantly lower than participants that completed three (mean rank 181.57) and four

(mean rank 180.51) work periods for maturity – poise. Lastly, participants that completed one work period (mean rank 132.65) ranked significantly lower than participants that completed three (mean rank 175.57) and four (mean rank 182.25) work periods for judgment.

Additionally, cooperative education participants that completed one work period were found to be ranked significantly lower for the career readiness attributes of quality of work and quantity of work as compared to participants that completed four work periods. Specifically, cooperative education participants that completed one work period (mean rank 134.35) ranked significantly lower than participants that completed four (mean rank 181.26) work periods for quality of work. Participants that completed one work period (mean rank 133.73) ranked significantly lower than participants that completed four (mean rank 180.80) work periods for quantity of work.

IMPLICATIONS

The findings from the analysis respond to the study's research questions and help to achieve the goals of this study. An extensive body of literature describes the benefits of cooperative education for student development and learning; however, recent research is limited to the perceptions of cooperative education from employers. Experiential education allows students to develop an understanding of a particular field of study or career into practical experience (Eyler, 2009). More precisely, cooperative education provides a distinctive learning opportunity that prepares students for the workplace beyond the abilities of a university classroom (Linn, Howard, & Miller, 2004).

Decades of research has long supported the value of cooperative education experiences for students (Eyler, 2009; Linn, Howard, & Miller, 2004). This study adds to

the research in demonstrating employer perceptions of overall performance and career readiness attribute performance for engineering majors. One of the key takeaways from this study is that employers rate co-op participants that participate in multiple work periods at a higher rate than those that engage in only one work period. Most internship experiences last two to three months making the finding significant. Likewise, a cooperative education work period is similar in length to an internship; however, a co-op participant may complete multiple work periods resulting in a much longer experience.

This research indicates that major and number of work periods completed by a cooperative education participant directly affects employer perceptions of overall performance and career readiness attributes. As for major, civil and computer/electrical engineering majors were ranked higher by employers for overall performance over chemical engineering majors. The evaluation of career readiness attributes indicated that civil and electrical/computer engineering was ranked higher on three of the nine career readiness attributes compared to chemical and mechanical engineering.

This study found that the total number of work periods completed by a cooperative education participant is the most critical factor that impacts employer perception of career readiness. Of the nine career readiness attributes evaluated by employers, six were found to be significant due to the number of work periods completed. More specifically, participants that complete four work periods were found to be ranked the highest by employers for career readiness and overall performance.

While major reflects one dimension of cooperative education participant characteristics, the overall number of work periods completed by a cooperative education participant provides more detail for employer perception of overall work

performance and career readiness attributes. This study specifically addressed research questions focused on employer perceptions of engineering cooperative education participants and thus, the study has implications for students, employers, university administrators/career services professionals, and faculty.

At the individual level, the results of this study may inform students, employers, university administrators/career services professionals, and faculty regarding employer perceptions of cooperative education participants. Students can gain insight into the employer perceptions of career readiness attributes and overall performance. Therefore, administrators can use this knowledge to encourage students to seek out resources from the university and faculty to prepare for a cooperative education experience. University administrators/career services professionals and faculty can use this study to better prepare cooperative education participants for the work experience. Employers may use the results of the study to inform cooperative education managers and supervisors of the preparedness of cooperative education participants. Moreover, career services professionals, faculty, and employers can work together to create intentional partnerships that can connect classroom learning to developmental career competences (Peck, 2017).

At the organizational level, the results from this study may have implications for universities to improve the preparation of cooperative education participants before beginning a cooperative education experience. Organizations may use this study to develop strategies to enhance cooperative education recruitment and participation. Universities can also use this study to examine existing structures for the delivery of career development activities. In *Engagement & Employability*, Peck (2017) asserts that

“Career preparation does not have to exist on separate turf; it can be done through academic departments, including in course instruction and assignments, and incorporated in existing advising procedures” (p. 102).

Additionally, employers and universities can utilize this study to improve the cooperative education experience for participants through increasing career readiness attribute awareness of faculty and co-op supervisors. Improving the cooperative education can be achieved by employers, faculty, and career services professionals working collaboratively to educate future co-op supervisors, faculty liaisons, and career counselors on the career readiness skills desired by previous co-op supervisors. Universities should serve to fill the gap between employers and regional economic needs by coordinating and collaborating on identifying and developing strategies to close the skills gap (Association of Public and Land-Grant Universities, n.d.).

RECOMMENDATIONS FOR FUTURE STUDY

“While a college degree remains important, what a college represents must, as it always has, continue to evolve to meet the multiple and complex needs of our society” (APLU, n.d.). Likewise, cooperative education programs must evolve to meet the needs of students, academic programs, and employers. Research by American universities in the area of cooperative education has dwindled over the last 20 years. Consequently, the subject of cooperative education and employer perceptions of participants is open for research regarding current trends and the longevity of cooperative education programs in the United States. Student participants in this study encompassed a time frame of 25 years, and while generational and societal changes have occurred, many of

the takeaways of this research can be applied to identifying future recommendations for research.

This study examined employer perceptions of cooperative education participants using a performance evaluation form and examined the difference in performance as related to participant engineering major and the number of work periods for each participant. The study did not consider other demographical factors or characteristics that may affect employer perceptions such as non-engineering academic majors, academic preparedness, prior work experience, co-op setting industry, gender identity, race, or socio-economic background. An analysis of employer perceptions of cooperative education participants with those factors or characteristics would be an approach to expand on the research in this study. Additionally, the data for this study originated from a single university's engineering program and therefore, comparing the findings from this study to engineering programs at other small, public, rural engineering programs would add to the body of literature.

Selingo (2018) asserts in a recent publication in *The Chronicle of Higher Education* that university career services centers must promote engagement in career development activities early in a student's college experience and the experiences must be integrated into broader student success programs and efforts. Thus, university career services professionals should develop programs to engage potential cooperative education participants early on in the college experience to inform students of the career readiness attributes desired by employers. The programs should be held in collaboration with student success and academic departments to ensure engagement with future cooperative education participants.

Additionally, the career readiness attributes, which were evaluated by employers in this study, could be taught within the context of a realistic workplace by engaging cooperative education program alumni for class presentations, mock interviewing, and other career development activities. Prospective cooperative education participants could also benefit from site visits to various cooperative education employer partners. Thus, a wraparound approach to engaging students in the career development process may assist in providing students with more preparation and opportunities to learn about career readiness before participating in cooperative education experiences.

Lastly, findings from this study should be shared with faculty and program advisory boards. Academic programs can assist with cooperative education participant development by identifying methods to infuse career readiness skills into the curriculum. Faculty and career services staff should work in tandem to identify career readiness attributes for projects and other learning activities for students.

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APPENDIX A

IRB EXEMPTION LETTER

MARSHALL UNIVERSITY.
www.marshall.edu

Office of Research Integrity

November 5, 2018

Candice Stadler
158 Manor Drive
Beckley, WV 25801

Dear Ms. Stadler:

This letter is in response to the submitted dissertation abstract entitled *"An Examination of Employer Evaluations of Student Participants in a Cooperative Education Program."* After assessing the abstract it has been deemed not to be human subject research and therefore exempt from oversight of the Marshall University Institutional Review Board (IRB). The Code of Federal Regulations (45CFR46) has set forth the criteria utilized in making this determination. Since the study does not involve human subjects as defined in DHHS regulation 45 CFR §46.102(f) it is not considered human subject research. If there are any changes to the abstract you provided then you would need to resubmit that information to the Office of Research Integrity for review and determination.

I appreciate your willingness to submit the abstract for determination. Please feel free to contact the Office of Research Integrity if you have any questions regarding future protocols that may require IRB review.

Sincerely,

Bruce F. Day, ThD, CIP
Director

APPENDIX B

DATA APPROVAL LETTER

September 16, 2018

Candice Stadler, Doctoral Student
Marshall University
clendenin31@live.marshall.edu

Dear Candice,

I have reviewed your request to conduct a research for your dissertation at Marshall University. I feel this research project will be beneficial to West Virginia University Institute of Technology (WVU Tech). It is my understanding that your study is a longitudinal examination of cooperative education program participants and that the WVU Tech employer evaluation of cooperative education student form will be analyzed. You have my permission to use the cooperative education employer evaluation of cooperative education student form data for this project.

The following stipulations should be observed: the data you will receive contains no identifiable information of students or employers. The results of the project must be shared with WVU Tech's Division of Student Life.

If you have any questions regarding this letter of approval, please give me a call at 304-929-1232.

Sincerely,

Richard Carpinelli
Dean of Students

APPENDIX C

EMPLOYER'S EVALUATION OF COOPERATIVE EDUCATION STUDENT FORM

West Virginia University Institute of Technology
COOPERATIVE EDUCATION PROGRAM
Box 31, Old Main
Montgomery, WV 25136
EMPLOYER'S EVALUATION OF COOPERATIVE EDUCATION STUDENT

Name_____**Major**_____**Work Period**_____

Employer_____**Location**_____

INSTRUCTIONS: The immediate supervisor should evaluate the student objectively, comparing him with other students of comparable academic level, with other personnel assigned the same or similarly classified jobs, or with individual standards. *Remarks are particularly helpful.*

ATTITUDE-APPLICATION TO WORK	ABILITY TO LEARN	DEPENDABILITY
Outstanding in enthusiasm	Learned work exceptionally well	Completely dependable
Very interested and industrious	Learned work readily	Above average in dependability
Average in diligence and interest	Average in understanding work	Usually dependable
Somewhat indifferent	Rather slow in learning	Sometimes neglectful or careless
Definitely not interested	Very slow to learn	Unreliable

INITIATIVE	QUALITY OF WORK	RELATIONS WITH OTHERS
Proceeds well on his own	Excellent	Exceptionally well accepted
Goes ahead independently at times	Very good	Works well with others
Does all assigned work	Average	Gets along satisfactorily
Hesitates	Below average	Has difficulty working with others
Must be pushed frequently	Very poor	Works very poorly with others

MATURITY-POISE	QUANTITY OF WORK	JUDGMENT
Quite poised and confident	Unusually high output	Exceptionally mature in judgment
Has good self-assurance	More than average	Above average in making decisions
Average maturity and poise	Normal amount	Usually makes the right decision
Seldom asserts himself	Below average	Often uses poor judgment
Timid Brash	Low out-put, slow	Consistently uses bad judgment

ATTENDANCE: Regular Irregular	**PUNCTUALITY:** Regular Irregular			
OVERALL PERFORMANCE: Outstanding	Very Good	+ Average -	Marginal	Unsatisfactory

The student's outstanding personal qualities are:

The personal qualities which the student should strive most to improve are:

For additional remarks, please use reverse side.

This report has been discussed with the student: Yes No

(Signed)_____ (Date)_____
(Immediate Supervisor)

PLEASE COMPLETE ASSESSMENT QUESTIONS ON REVERSE SIDE

SUPERVISOR'S EVALUATION OF STUDENT'S ACADEMIC PREPARATION

In an effort to assess the student's academic preparation for this cooperative education assignment, we are requesting your assistance in providing comments on the following:

WHAT IS YOUR ASSESSMENT OF THE STUDENT'S ACADEMIC PREPARATION FOR THIS POSITION? (Overall academic preparation, not training for specific equipment or software).

_____ Exceptionally well prepared
_____ Very well prepared
_____ Satisfactorily prepared
_____ Some deficiencies in preparation
_____ Very poorly prepared

COMMENTS:

DOES IT APPEAR THAT THE STUDENT'S ACADEMIC PROGRAM IS ORIENTED TO THE PARTICULAR NEEDS OF YOUR ORGANIZATION?

_____ Yes
_____ No

COMMENTS:

WHAT CHANGES WOULD YOU LIKE TO SEE IMPLEMENTED IN THE CURRICULUM TO BETTER PREPARE FUTURE STUDENTS FOR YOUR ORGANIZATION?

THANK YOU FOR YOUR ASSISTANCE.

APPENDIX D

LIST OF ABBREVIATIONS

CE	Civil Engineering
CHEME	Chemical Engineering
CPE	Computer Engineering
EE	Electrical Engineering
ME	Mechanical Engineering

APPENDIX E

CURRICULUM VITA

Candice Clendenin Stadler

Phone: 304.975.0129 • Email: candicestadler@gmail.com

EDUCATION

Marshall University, Huntington, WV

Doctor of Education (ABD), Educational Leadership: Higher Education, Expected May 2019
Dissertation: An Examination of Employer Evaluations of Student Participants in a Cooperative Education Program

University of Charleston, Charleston, WV

Master of Science, Human Resource Management, May 2005

Bachelor of Arts, History, August 2003
Minor: Leadership

ADMINISTRATIVE EXPERIENCE

West Virginia University Institute of Technology—Beckley, WV

Associate Dean for Student Development 4/2017 – Present

- Serve as a senior staff member of the Division of Student Life
- Responsible for administrative oversight, management, and daily operations of student activities and organizations, fraternity and sorority life, career services, cooperative education, service and learning, and new student orientation programs
- Participate in on call emergency rotation

Director of Career Services and Cooperative Education 11/2015—4/2017

- Responsible for all aspects of career services and cooperative education department
- Cultivate relationships with national, regional and local employers to develop employment opportunities for WVU Tech students and alumni

New River Community and Technical College—Beaver, WV

Director of Career Services 6/2012—11/2015

- Responsible for all aspects of career services department for four campuses and an advanced technology center
- Responsible for creating an intensive peer support initiative for students in technology programs to increase student retention and job placement rates after the College received a 1.3 million dollar U.S. Department of Labor, Trade Adjustment Assistance Community College and Career Training (TAACCCT) Grant Program

West Virginia Northern Community College—Wheeling, WV

Career Services Counselor 10/2011—6/2012

- Responsible for all tri-campus career services programming

Wheeling Campus Counselor 9/2009—10/2011

- Primary counselor to students on admissions, financial aid, and academic advising for Wheeling Campus; Assist with coordination of dual credit course offerings along with Vice President of Academic Affairs in local high schools

Western State College of Colorado—Gunnison, CO

Career Services Program Coordinator 8/2006—7/2008

- Responsible for all campus Career Service Programming including Career Fairs, Etiquette Dinner, Career Development Workshops, etc.

- Served as employer relations liaison on campus

Student Services Center Program Assistant 9/2005—8/2006
- Coordinated student retention efforts for the Division of Student Affairs including outreach to students with poor mid-term grades, students that had not registered for following term, etc.

University of Charleston—Charleston, WV
Freshman & Peer Educator Program Advisor 7/2003—5/2005
- Supervised and trained Peer Educator Team of twenty students and two interns
- Organized and facilitated Orientation Programs and coordinated retention outreach efforts for first year students

TEACHING/CURRICULM DEVELOPMENT EXPERIENCE
Marshall University—South Charleston, WV
Teaching Assistant, Leadership Studies

New River Community and Technical College—Beaver, WV
Adjunct Instructor, General Business

Western State College of Colorado—Gunnison, CO
Adjunct Lecturer, Business Administration

SELECTED PRESENTATIONS
Stadler, C. and Lucas, L. "How to Develop and Strengthen Your Campus's Service Program," West Virginia Association of Student Personnel Administrators (WVASPA), Canaan Valley, WV, November 2018.

Stadler, C.G.C., Carpinelli, R., and Stadler, C.M. "Reimagining Student Success," West Virginia Association of Student Personnel Administrators (WVASPA), Canaan Valley, WV, November 2018.

Stadler, C., Sands, E. and Robertson, S. "The WVU Tech Story: Implications for a Student Affairs Division throughout a Campus Move," West Virginia Association of Student Personnel Administrators (WVASPA), Charleston, WV, November 2017.

Nicholson, B., Ingraham, C.S., Meadows, P., Saunders, A., and Stadler, C. "The Bubble – Wrapped Student: Are Trigger Warnings Necessary in Higher Education." Southern Regional Council on Educational Administration (SRCEA), Atlanta, GA, November 2015.

Withers, A., Epling, P. and Stadler, C. "Developing a Comprehensive Assessment of Student Services on Your Campus: A Two-year College Example," West Virginia Association of Student Personnel Administrators (WVASPA), Huntington, WV, June 2013.

Stadler, C. and Sullivan, C., "Using Advising and Orientation Programs to Promote Student Success," West Virginia Community College Association and the West Virginia Association for Developmental Education Joint Conference (WVCCA/WVADE), Glade Springs, WV October 2011

Clendenin, C. and Buchanan, C., "Using Emotional Intelligence to Create and Maximize "Teachable Moments," National Association of Student Personnel Administrators Region IV-W (NASPA), Breckenridge, CO, November 2006

Duffy, J. and Clendenin, C., "Emotional Intelligence and Retention of First-Year Students," National Association of Student Personnel Administrators (NASPA), Tampa Bay, FL, March 2005