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Phenomenological Study on Female Engineering Leaders in the New York Utility Industry

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Abstract

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MS, Long Island University, 2009

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Proposal Submitted in Fulfillment

of the Requirements for the Degree of

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Leadership and Organizational Change

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Abstract

This qualitative phenomenological study explored the development of women with an engineering background who became leaders. The purpose of this study was to explore the lived experiences of female engineering leaders in the New York utility sector. The research problem was why few women with engineering degrees obtain leadership positions. Women comprise half the total working population, yet few hold leadership positions, especially in the utility sector. In this study, 28 women in the New York utility sector shared experiences on their progression from engineer to leadership. The conceptual framework was the Moustakas phenomenological approach, investigating the humanistic properties of female leaders with backgrounds in engineering and Bandura's social cognitive theory on the role of self-efficacy for women. Through the phenomenological approach, in-depth interviews captured the challenges and successes each woman has faced and identified themes that emerged from those experiences. The modified van Kaam method of phenomenology was used for data analysis to capture the experiences and perceptions of female engineers in leadership positions. Key findings from this study indicated how working in teams helped build the self-efficacy of women during their undergraduate studies and fostered effective teamwork in their work environment. Work–life balance encouraged female engineering leaders to go further in their career because it allowed them stability and the ability to advance. Through this study, positive social change may occur for women seeking to pursue engineering degrees who are striving for leadership roles in traditionally male fields.

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Chapter 1: Introduction to the Study

Women in the 21st century have striven to become corporate leaders by acquiring skills and obtaining the necessary education to compete with their male counterparts (Budworth & Mann, 2010; Patel, 2015; Stemple, Rigotti, & Mohr, 2015). Despite various successes and achievements in the last few decades, women comprise less than 10% of top leaders in Fortune 500 companies (U.S. Bureau of Labor Statistics [BLS], 2015). An inconsistency exists between men and women in terms of pay in that women earned 83 cents to the dollar compared to men (BLS, 2015). As the number of women in the workforce (57% as of 2014) continues to grow, women continue to gain the same expertise, aptitudes, and competencies as men in their field, yet do not get paid the same (Budworth & Mann, 2010; BLS, 2015).

Women do not make the same weekly salary as men, even as they continue to account for more than half of the workforce. Although women's average weekly salary in 1979 was 62% of what men earned, and was 82% in 2013, lower wages persist (BLS, 2015). Based on age group and years of service, younger age groups of women make 90% of what men make; the percentage comparison decreases as women's and men's age progresses (BLS, 2014b). Although education levels play a major role in the earnings of men and women, men at each respective education level continue to make more than women (Buse, Bilimoria, & Perelli, 2013; Row, 2013).

Women seem to surpass men in industries such as education and healthcare, but in computer and engineering sectors, which are higher paying jobs; men continue to surpass women (BLS, 2014a). In management, women make an average of 74% of what men make and comprise 45% of the management field (BLS, 2014b). In engineering, an

average woman makes 81.5% of what men earn, but comprise less than 15% of engineering occupations (BLS, 2014a). Women can earn high salaries in energy-sector engineering positions in the United States, especially in the fields of petroleum, fire protection, offshore, and materials (Winters, 2014). These positions are lucrative for individuals, especially in the Pacific southwest and south central states.

Women in the engineering field consistently face barriers because of their gender (Buse el al., 2013; Craig, 2013; Kekelis, Larkin, & Gomes, 2014; Winters, 2014). For example, female and male engineers start at the same salary when graduating from an engineering school with the same credentials. However, after 5–10 years, a gap grows between men and women with the same credentials, amounting to an average of $7,000 per year (Winters, 2014). Women may feel discouraged when learning that their male peers are making more than they are for performing the same job (Buse et al., 2013; Craig, 2013; Kekelis et al., 2014; Winters, 2014). Women who are seeking a position in engineering perceive a barrier when learning a pay difference exists due their gender (Makarova & Herzog, 2015; Pearl-Martinez & Stephens, 2016). This gender discrepancy is vast in the field of engineering and continues to increase (Hatmaker, 2013; Lent et al., 2013; Merluzzi & Dobrev, 2015). Potential social implications include female engineers overcoming various challenges, inequalities, and adjustments in their pursuit to become leaders (Stemple et al., 2015).

Less than 10% of leaders in the field of engineering are women, perhaps due to attempts to achieve work–life balance, hesitancy to speak up for themselves, and lack of mentorship (Bhatia & Amati, 2010; Watts, 2009; Wirth, 2010). The work–life balance of women in engineering impacts the culture and profession of traditional roles, perhaps

explaining why men are unwilling to embrace the presence of women, especially in upper management (Watts, 2009). Some men perceive that women would inhibit male collectiveness and customs and could not endure long hours in the workplace (Watts, 2009). However, Wirth (2010) found that some women did not speak up as much as their male counterparts; communication is a cultivated skill that female engineers need to achieve leadership positions. Relaying information and communicating ideas aids in leadership abilities and enables leaders to obtain the followership of others (Wirth, 2010). Women who did not have a female role model to understand how to endure challenges they might face was another reason they are not in leadership positions (Bhatia & Amati, 2010; Shortland, 2014). Role models and mentors for female engineers are few; thus, women lack support from other women to aid in attracting future female engineers as leaders (Bhatia & Amati, 2010; Shortland, 2014).

As more women acquire similar stature as men in terms of experience, expertise, and education, the perception that women do not possess leadership qualities becomes inaccurate (Rhee & Sigler, 2014; Stemple et al., 2015). Women tend to stay in modest roles to be accepted by other women and most men (Unger, Sheese, & Main, 2010). Women want to be liked and may be punished for trying to achieve the same advancement as men; this societal challenge needs to be overcome (Stemple et al., 2015). Women can communicate, are charismatic, and understand others as well as their male counterparts, and should be considered for leadership roles (Vasavada, 2014; Wallace, Budden, Juban, & Budden, 2014). If women take a modest approach in the workplace, they hinder their chances of being considered an equal, due to not operating effectively (Longman, Dahlvig, Wikkerink, Cunningham, & O'Connor, 2011). Women more than

men seek to please everyone, and in turn fail to demonstrate their skills to lead (Rhee & Sigler, 2014; Unger et al., 2010).

Women who advanced higher on the hierarchical chart displayed more traits that are masculine when they discussed their experiences and obtained their higher role (Row, 2013). Women who were interviewed by Longman el al (2011) expressed how they addressed a male-dominated environment in which some were successful and some moved on, due to the hostile environment. Women averred they had to work harder than their male counterparts to be viewed as their equivalent. Women also had to be careful not to seem too much like a male leader; if they did, they would be called names (Longman et al., 2011; Row, 2013). Women had to gain the respect of their colleagues by being able to communicate and use evidence to back up their decisions; the result would be less recoil from colleagues. These women also had to be careful about raising their voices or becoming angry, to be respectful of their male counterparts (Longman et al., 2011; Rhee & Sigler, 2014).

Female leaders require the art of communication to relate to internal and external members of their organizations (Vasavada, 2014; Wallace et al., 2014). The image of the woman leader is important in organizations to maintain trust and consistent business practice with external and internal parties (Wallace et al., 2014). Female leaders also need to know the perceptions of the people around them to know how to handle situations and identify outcomes based on their decisions (Longman et al., 2011; Row, 2013). Being linked in social networks also enhances perceptions of female leaders and aided in the scope of studies (Vasavada, 2014). Building relationships (especially through technological advancements) with a followership on an external level will help the image

of the leader as well as the organization, promulgating a work environment where people would like to work and conduct business (Rhee & Sigler, 2014; Stemple et al., 2015). Coworkers perceive women leaders as more empathetic and understanding than their male counterparts, along with having the ability to logically analyze data (Wirth, 2010). Some women tend to allow emotions to impact choices and actions, which may lead many to prefer a male leader rather than a woman (Wirth, 2010). Despite many challenges and differences between genders in engineering, as technology improves and households increasingly comprise two income earners, and as more women enter the workforce, social change is occurring (Watts, 2009). Men are also seeking a better balance between work and life to enable them to share responsibilities of the household, as well as gain job satisfaction (Budworth & Mann, 2010; Rhee & Sigler, 2014).

As technology continues to advance, more individuals need to enter the field of engineering (Ismail, Zulkifli, & Hamzah, 2017). As women continue to register and be admitted into colleges, they have the chance to change perceptions of engineering by entering the field, mitigating the existing culture, and ending criticism that women are not as good as men (Beeson & Valerio, 2012). Some women who are not sure if they should become an engineer may not want to address the opposition and criticism others are willing to face (Ismail et al., 2017). Choosing a career is a hard task for men or women; however, knowing that a field is not accepting of women or that there are few women in a field (such as the utility sector) may deter others who want to fit and relate to their counterparts at work and in a male-dominated society (Howard, Saba, Gerrard, & Modi, 2014).

Careers in the utility sector for engineers are constantly growing, due to new technology in renewable energy (solar, wind, and hydro), which can aid female engineers seeking to grow with these careers (Ferrell & Lunsford, 2015; Gilbraith & Powers, 2013). Reliance of the utility sector on gas and oil is problematic for the future, as the rate of consumption will continue to rise and the amount of these fossil fuels continues to decrease (Jacobson et al., 2013). Alternative ways of providing energy are at the forefront of technology that many cities, including New York, are adopting to reduce their carbon footprint and provide efficient operations (Howard et al., 2014; New York State, 2016; Ramsden, Smardon, & Michel, 2014).

In the transportation system, hybrid vehicles are being adapted; in the power industry, wind and solar energy are being used to reduce reliance on fossil fuels (Howard et al., 2014; Jacobson et al., 2013; Ramsden et al., 2014). As a result of their use of alternative energy, New York City will assist in decreasing pulmonary illnesses as well as costs associated with diagnosing and providing medicine for these illnesses (Jacobson et al., 2013). Female engineers can be at the forefront for this renewable energy, challenging the existing fossil fuel market to aid in reductions of air pollution.

Understanding the perceived motives of female engineers who overcame challenges of the workplace can aid in women acquiring more leadership positions. The leadership landscape is changing as capabilities and competencies of female employees accelerate and the sustainability of corporations advances through technology (Beeson & Valerio, 2012). To discuss the changing landscape, major sections of this chapter include the background, problem statement, purpose of the study, theoretical framework, and the social implications of this study.

Background of the Problem

The concept of women in leadership positions in the United States has captured the attention of many researchers; however, few articles addressed the need to study women leaders in engineering. Mukherji and Jain (2009) and Francis, Parasuraman, and Man (2012) presented case studies that discussed the leadership potential of female engineers and strategies of development. Through various programs and initiatives, having more women obtain work in the discipline of engineering and leadership positions is a research topic that may change future approaches. By having these programs, more women may enter the engineering field, through support systems such as mentoring are needed to help female engineers (Bhatia & Amati, 2010; Ismail et al., 2017).

The current culture of engineering academics has negatively impacted the retention of women in continuing to pursue an engineering degree; women are switching academic majors and fields. A gap exists in the literature regarding female leaders with engineering degrees who are grouped in science, technology, engineering and mathematics (STEM) as one category. This study helps to close the gap by partitioning female engineers from the generic STEM category and focusing on their leadership in the New York utilities industry.

STEM careers are a rising topic in the United States. The number of jobs in these fields is dwindling in the United States and the lack of women in these careers is an ongoing topic (Belser, Prescod, Daire, Dagley, & Young, 2017). Some STEM careers are male dominated, and some women prefer not to pursue fields in which they are a minority (Watkins & Smith, 2014). These male-dominated societies also play a role in how women perceive certain STEM fields and are persuaded to enter these fields (Belser

et al., 2017; Bystydzienski, Eisenhart, & Bruning, 2015). For example, Saucerman and Vasquez (2014) referred to a controversy in 1992 when the toy company Mattel released a Barbie doll that stated that mathematics class is difficult. This was viewed as a psychological way to deter young women from studying mathematics and STEM-related fields at a young age. Certain STEM fields are predominately women oriented such as nursing and psychology; however, most STEM fields are still male dominated (Belser et al., 2017; Bystydzienski et al., 2015; Moakler & Kim, 2014; Morganson, Major, Streets, Litano, & Myers, 2015; Walker, 2015).

Saucerman and Vasquez (2014) approached the problem by discussing how students' and teachers' genders affect their beliefs in the classroom about STEM fields. Female teachers of mathematics and science comprise less than 10% (Belser et al., 2017; Bystydzienski et al., 2015). As students grow older, the presence of female teachers in mathematics and science compared to men dwindles, often affecting female students negatively (Carrigan, O'Leary, Riskin, Yen, & O'Donnell, 2017; Moakler & Kim, 2014). The stereotype that men are better than women in STEM fields starts at a young age (Bystydzienski et al., 2015; Moakler & Kim, 2014). The stereotype threatens young girls who are talented in these fields and want to succeed in these fields (Makarova & Herzog, 2015; Schlenker, 2015).

Men and women tend to choose careers that are congruent with their personalities and desires and tend not to cause tensions in their discipline (Sullivan & Kedrowicz, 2012). In academia, *hard* sciences such as engineering are considered masculine, whereas *soft* sciences such as psychology are seen as feminine (Sullivan & Kedrowicz, 2012). Women comprise less than 10% of faculty in science and mathematics departments in the

United States (National Science Foundation, 2007). Students in educational settings view engineering as an impersonal and competitive male field. Although students are gender conscious, self-efficacy also plays a role. Although engineering is viewed as suitable for individuals who excel in mathematics and science, it is also viewed as a field for men (Hatmaker, 2013; Sullivan & Kedrowicz, 2012). However, women have proven it is not a field solely for men.

Opening engineering opportunities for younger women may increase the percentages of women who go into various engineering fields. Peer influence in a negative or positive manner also influences the notion of younger women's development in STEM fields (Schlenker, 2015). As people continue to grow, they focus on their abilities and ask questions to understand who they are and how they can excel. Girls who tend do well in mathematics and science can have a chance to grow in STEM fields, and especially in engineering, if they are exposed to more opportunities. A persistent desire to challenge oneself may cause a person to conquer their fears (Saucerman & Vasquez, 2014).

Several programs provide initiatives for girls in STEM fields and engineering. For example, Kekelis et al. (2014) provided an exercise for young girls to take apart a hair dryer. This was a way for young women to learn about equipment they have seen in their house and perform reverse engineering. One benefit of opening this device is that it exposes young girls to different forms of engineering: electrical, chemical, mechanical, industrial, and environmental. Helping these young girls open the hair dryer helps to introduce career-exploration activities that can help young girls understand what engineers do and how they impact their society and organizations. Programs like this help

young girls gain interest in engineering degrees and can help foster greater interest in these careers; such encouragement starts in the classrooms (Kekelis et al., 2014). Larsen (2009) and Toglia (2013) discussed gender issues in classrooms and universities in STEM fields' courses. As public and research attention has increased regarding the lack of women entering STEM fields, these classrooms may provide opportunities for scholarships, grants, and tutorial programs to support women; however, gender discrepancies continue to hinder the fields.

The efficacy of women who strive for leadership positions continues to break boundaries and prove the capabilities of those women with engineering backgrounds. The need for this study of female engineers in leadership emerged because "women in token or minority positions at male dominated workplaces are marginalized based at least, in part, upon their gender" (Watkins & Smith, 2014, p. 207). Some women in engineering want to become leaders and do not want to be stopped due to their gender.

Problem Statement

In the United States, 21,000 (8.4%) women have leadership positions in the engineering field (National Science Foundation, 2013). A problem exists in the current workforce for female engineers with credentials equal to those of their peers in terms of obtaining higher ranking titles (Chavez, 2014; Craig, 2013). Despite the creation of various engineering programs that promote women in these fields, the growth in the number of female leaders is currently at low levels (Larsen, 2009; Stemple et al., 2015). Women are not developing into leaders due to the lack of female mentors to support and encourage them to undertake leadership positions (Bhatia & Amati, 2010; Shortland,

2014). The challenge has impacted female engineers who desire to be leaders in their organization or industry (Watts, 2009; Wirth, 2010).

Many women decide to leave engineering for various reasons, but retention of women for promotional opportunities requires additional inquiry (Toglia, 2013). The general problem is that "women working in male dominated organizations are less likely to occupy positions with authority" (Watkins & Smith, 2014, p. 208). In this study, I questioned why few female engineers work in leadership positions in the New York utility sector. The specific problem is that in the New York utility industry, female engineers who have the same qualifications as their male peers do not hold the same leadership titles in the workplace. This study explored the perceptions of women who acquired engineering degrees and obtained leadership positions in the New York utility sector.

The incentives for female engineers to pursue leadership positions are limited in the workforce for qualified engineering women (Bhatia & Amati, 2010; Buse et al., 2013; Chavez, 2014; Hatmaker, 2013; Larsen, 2009). Possible causes of women lacking the aspiration to become leaders in engineering fields include lack of career advancement, low salary, and negative stereotypes (Hoyt, 2005; Klenke, 2002; Martin, Wright, Beaven, & Matlay, 2015; Merluzzi & Dobrev, 2015; Mukherji & Jain, 2009; Row, 2013). To address the gap in current research literature about the dearth of female engineering leaders, this study investigated the perceptions of women who have successfully become leaders in the New York utility sector. A study that uses a phenomenological research approach can aid in learning about the perceptions of women and their accomplishments.

This study fills a gap in the literature by discussing challenges and barriers female engineering leaders have faced in the New York utility industry.

Purpose of Study

The purpose of this study was to explore the lived experiences of female engineering leaders in the New York utility sector. The research paradigm was the phenomenological approach described by Moustakas (1994), through interviews with 25 female engineering leaders. This study was conducted to help female engineers identify with the lived experiences of female engineering leaders and understand what they endured to obtain a higher title. The intent of this study was to show awareness of how women developed in the male-dominated field of engineering and succeeded by becoming leaders in the New York utility sector. Women comprise half the workforce and dominate 70% of the decisions that occur in homes, yet comprise barely 8% of leadership roles in engineering (Wirth, 2010).

This study focused solely on female engineers and the impact their leadership has in the New York utility sector. This study provides awareness of the lived experiences of female engineers in the New York utility industry when trying to advance their careers. As utilities change and women continue to enter the utility workforce, this study supports the potential influence women have on decisions to increase and impact industry success.

Conceptual Framework for the Study

The major theoretical propositions of this study stem from Bandura's (1977) social cognitive theory and the role of self-efficacy for women. Social cognitive theory helps explain how the environment dictates how individuals react when placed in challenging situations. Bandura's social cognitive theory relates to this study by helping

explain how women respond negatively or positively in their workplace environment and handle various circumstances. This theory connects to the research questions by addressing female engineers' lived experiences in leadership and their cognitive reactions to their workplace environment. This phenomenological study aids in understanding the characteristics, behaviors, and qualities of female engineering leaders. The concept that grounds this study is the lived experiences of female engineers who become leaders and develop their careers in a male-dominated environment.

The role of confidence in an individual comes from being persistent, having a high level of self-efficacy, and finding interest in one's field. Bandura (as cited in Buse et al., 2013) proved a combination of four mechanisms to improve self-efficacy: performance accomplishments, vicarious experience, verbal persuasion, and psychological states. The working environment can impact cognitive processes and plays a vital part in women's perceptions of their development (Purzer, 2011). The role of verbal persuasion negatively or positively impacts the communication skills of individuals (Rhee & Sigler, 2014). Female engineers may feel they do not have a voice because of underrepresentation, which is why using Bandura's (1977) theory is appropriate as a basis to answer the research questions of this study.

Research Question

This study aimed to examine the lived experiences of female engineers who became leaders. The objective was to find any commonalities linking women who could enter a male-dominated engineering field, aiming to understand their shared experiences as they progressed in their corporate careers. The general research question was, What are the lived experiences of female engineering leaders in the New York utility sector?

This general question coincides with Bandura's (1977) social cognitive theory. The research questions for this study follow:

RQ1: How has being a female engineer impacted professional careers as leaders in the New York utility industry?

RQ2: How do lived experiences of female engineers enable or impede advancement into leadership positions in the New York utility industry?

Nature of the Study

For this study, I used a qualitative methodology with a phenomenological design to understand the lived experiences of female engineering leaders. This method aided in the analysis of face-to-face interviews with 25 women. The rationale for choosing Moustakas' method is that it highlighted "the act of perceiving, feeling, thinking, remembering, or judging" (1994, p. 69). These attributes aided in the study of female engineering leaders' lived experiences in the New York utility industry. I chose the modified van Kaam method rather than the modified Stevick–Colaizzi–Keen method because of the specified sample criteria. With the modified Stevick–Colaizzi–Keen method, the researcher becomes one of the participants. To remain unbiased, I was not part of the study and therefore used the modified van Kaam method.

Researchers use the phenomenological approach to gather a combination of viewpoints using various methods, such as interviews and documentation, to gain insight regarding individuals' motivations. Moustakas stated that "the aim is to arrive at structural descriptions of an experience, the underlying and precipitating factors that account for what is being experienced; in other words, the 'how' that speaks to conditions that illuminate the 'what' of experience" (1994, p. 85). Moustakas (1994) provided the

structure to a phenomenological approach that I used to find the root of the analysis, focused on the main driver of female engineers who pursue leadership positions, explained in greater detail in Chapter 3.

The key concept investigated was the lived experiences of female engineers who hold leadership positions in the New York utility sector. The research design entailed collecting data from female engineers who hold leadership titles. Interviews with 25 female engineers included various questions relating to their lived experiences. Interview questions asked participants what motivated them to continue to strive toward success and any situations they faced because of their success. The approach aided in understanding female engineers who entered leadership positions and advanced in the utility industry. This study sought to examine the lived experiences of female engineering leaders and their accomplishments.

List of Definitions

This section defines terms used throughout this study.

Science, technology, engineering, and mathematics (STEM): The continuation and development of scientists, engineers, and innovators by increasing the participation and involvement of skilled individuals in these vital fields (U.S. Department of Education, 2014).

Self-efficacy: The belief that one has the power to complete a given task or activity related to that competency (Bandura, 1977)

Stereotypes: False or misleading generalizations about groups, held in a manner that renders them largely, though not entirely, immune to counterevidence (Blum, 2004).

Assumptions

Assumptions are "things that are somewhat out of your control, but if they disappear your study would become irrelevant" (Simon, 2011, p. 1). For this study, I assumed a person in a leadership position such as director, vice president, executive, or chief officer had a higher rank than manager and oversaw more than one manager. This assumption was necessary for the study to show the difference between a manager and a leadership position, which is above the manager position. I also assumed each woman would have an undergraduate degree in one of the various fields of engineering and not necessarily a master's degree or higher degree in the engineering discipline.

Another assumption was that all women who participated in this study would tell the truth and be honest. To aid in participants telling the truth, I explained the purpose of the study and assured each participant's confidentiality. It was essential that each participant tell the truth to ensure this study is accurate and for effective communication to occur. I also assumed that female engineers would want to share their lived experiences for this study regarding how they became leaders in the New York utility industry as well as issues and influences that affected their choices.

I assumed I would be granted access to meet with various women to conduct interviews in a controlled environment with minimal disruptions. This was necessary for the study to take place in an environment where questions and answers would be recorded as well as to enhance fluidity in communication between participants and me. This format was meaningful in providing a comprehensive view of the various areas of the utility sector in New York State and not one region. These assumptions were

necessary to conduct a meaningful study of female engineers who are leaders in the New York utility sector.

Scope and Delimitations

Scope is defined as "parameters under which the study will be operating" (Simon & Goes, 2013, p. 1). This study only focused on the lived experiences of female engineers in the State of New York currently working or retired from the New York utility sector. These female engineers are in leadership roles or were in leadership roles while in the industry. The research problem addresses why so few women who hold engineering degrees are leaders in the utility sector. I chose this specific focus to understand the gap regarding the number of women who became engineers but did or did not hold leadership titles. Women did not need to have affiliation with the Society of Women Engineers (SWE), the Association of Women in Energy, or any other engineering or energy-networking group. This study focused on female engineers of any age, ethnicity, and race.

Delimitations mean "those characteristics that arise from limitations in the scope of the study (defining the boundaries) and by the conscious exclusionary and inclusionary decisions made during the development of the study plan" (Simon & Goes, 2013, p. 1). One boundary of this study was that each woman interviewed in this study worked in the New York utility sector. Another boundary of this study was that each participant spoke English and understood all the interview questions. Participants were women who held a title above manager. I was conscientious throughout the data-collection period to maintain participants' confidentiality. The transferability of this research can be used to further understand how race and sexuality affect women in the New York utility industry.

Limitations

A limitation of this phenomenological study relates to Moustakas' (1994) approach, which it rests on the opinions of everyone being interviewed. One limitation to this study was the number of women interviewed to add more lived experiences to the study. Another limitation was that the women who were interviewed may not have answered the questions honestly, in an attempt to make themselves look good. A limitation was that this study did not use women who obtained their engineering degree at the master's level, rather than as an undergraduate. Another limitation was that I did not interview female engineering managers to determine the development and lived experiences of female engineers who made the choice not to move into a leadership position.

Bias could have accrued because I am a female engineer in the utility sector who has not yet reached a leadership position. To bracket my viewpoint, I wrote down and discussed my biases about female engineers. While interviews were taking place, I used a bracketing journal to address the interview questions in each interview to avoid summarizing in my own words, and instead used only participants' responses, trying not to assume participants' behaviors. During the data-collection and results phases, I used the bracketing journal to assure biases did not interfere with the results. Interviews were open to women of various ethnic groups; participants included women from several places of origin who worked in the New York utility industry.

Significance of the Study

The significance of this study is that it provides awareness of engineering leaders for young women and influences other women in engineering to pursue leadership titles

in the New York utility sector. This study may cause organizations or corporations to look further into their talent pool of women who have engineering degrees and use their skills in leadership positions. Female engineers have the potential to become leaders; through this study, a more comprehensive knowledge of what women have overcome could help other female engineers pursue advancement. This study may help influence upper level managers to decide who to advance, looking past gender, age, and ethnicity, and focus on the work ethics of women, promoting women who are dedicated to the workforce. Recognizing women who deserve to gain promotions and have contributed to engineering society will help elevate more women and may increase the positive impact on other women considering the field of engineering as a career.

This study contributes to social change in the engineering culture of the New York utility sector to help change the current landscape of leadership teams. The current landscape is that "the societal level status hierarchy is manifested in the familiar stereotypical gender roles, which position men at a higher status relative to women and prescribe that men hold powerful leadership roles while women hold less powerful care-giving roles" (Watkins & Smith, 2014, p. 209). The scope aligns with the purpose of the study and investigates female engineers to understand what they endured to attain leadership positions. The purpose of this study was to explore the lived experiences of female engineering leaders in the New York utility sector.

Summary

This chapter addressed a gap that exists between women who are engineers and those who have attained leadership positions. As women continue to aspire to leadership positions in the New York utility sector, their experiences and expertise will continue to

align with those of their male counterparts; however, to date, their positions of leadership do not align. Women experience challenges in engineering fields, and inequalities between women and their male peers continue to hinder their advancement and opportunities (Watts, 2009; Wirth, 2010).

This chapter highlighted the fact that as women continue to enter the field of engineering, few hold leadership positions. Learning more about the few female engineers who attain leadership positions can influence positive social change by bringing awareness to the lived experiences of female engineers trying to pursue leadership roles in the New York utility sector. The purpose of this study was to explore the lived experiences of female engineers who have become leaders in the New York utility sector. The purpose led to these research questions:

RQ1: How has being a female engineer impacted professional careers as leaders in the New York utility industry?

RQ2: How do lived experiences of female engineers enable or impede advancement into leadership positions in the New York utility industry?

Moustakas' (1994) phenomenological approach aided in understanding the drive of these women. Women continue to impact male-dominated society as they continue to grow in new job roles and affect decisions in organizations. The intent of this study was to show awareness of how women develop in the male-dominated field of engineering and succeed by becoming leaders in the New York utility sector.

Chapter 2 will include a review of Bandura's (1977) theory and other theories, will review the role of women in STEM careers, will address the presence of female engineers in the workforce, and will describe experiences of female leaders and their

advancement in the New York utility sector. In Chapter 2, I also review perceptions of women in male-dominated fields as well as stereotypes. This review aids in creating engineering social change by developing a structure to promote more female engineering leaders in the utility sector of New York.

Chapter 2: Literature Review

The specific goal was to determine why a small percentage of female engineers pursue leadership positions in the New York utility sector. The purpose of this study was to explore the lived experiences of female engineers who have become leaders in the New York utility sector. Gender stereotypes, engineering workplace culture, and the effect of women in leadership positions are a few of the current issues surrounding this problem (Bhatia & Amati, 2010; Budworth & Mann, 2010).

This literature review has six major sections. The first section focuses on the strategy of the literature search to help shape the literature review. The second section describes the theoretical foundation of this study, highlighting Bandura's (1977) social cognitive theory and mentioning other theories. The third section of the literature review focuses on women in STEM, stereotypes about them, and childhood characteristics, which leads into the fourth section, emphasizing female engineers' strengths and weaknesses, as reported in the literature. The fifth section addresses female leaders and their impact on organizations; the section also integrates conventional perceptions of women in leadership and engineering. The final section focuses on the New York utility sector, the impact leadership has there, and expectations needed for this sector.

Literature Search Strategy

I used Walden's library databases to locate articles throughout the research. Business and management databases such as Business Source Complete, ABI/Inform Complete, SAGE Premier, and Education Research Complete aided in the search. I also used multidisciplinary databases such as ProQuest Central and Academic Search Complete. Information systems and technology research databases such as ACM Digital

Library, Science-Direct, and Computer & Applied Sciences Complete were supplementary search engines.

Key search terms included *women*, *engineers*, *leadership*, *utility*, *women engineers*, *women leaders*, *women in utility*, *engineers in utility*, *women in male-dominated field*, *male-dominated fields*, *perceptions of women*, *perceptions of engineers*, *perceptions of women engineers*, *perceptions of women leaders*, *STEM*, *women in STEM*, *leaders in STEM*, *utility and STEM*, *New York utility*, *impact of women in STEM*, *childhood of women in STEM*, *women in the workforce*, *stereotypes of women*, *stereotypes of women engineers*, *stereotypes of women leaders*, *women entrepreneurs*, *gender stereotypes*, *gender issues in the workplace*, *cultural theories*, *feminist theory*, *cultural theories with women*, *feminist theory and engineers*, *Bandura's theory*, *social cognitive theory*, social cognitive career theory (*SCCT)*, *Moustakas*, and *self-efficacy*.

The Google search engine assisted in finding articles. Key search words included *women*, *women engineers*, *women leaders*, *women in utility*, *women in the workforce*, *women engineers*, *women in male dominated fields*, *women entrepreneurs*, *engineering societies*, *women's engineering societies*, *women's utility societies*, *women leader's societies, women leadership*, *entrepreneurs*, *gender stereotypes*, and *SCCT*. I used SAGE Research Methods Online database to search terms related to STEM, engineering, male-dominated fields, and stereotypes. The ProQuest Central database assisted in searching for self-efficacy and theories such as Bandura's (1977) social cognitive theory.

Conceptual Framework

Female engineers, influenced by their cognitive processes in the workforce who are successful in moving into leadership need self-efficacy. Bandura stated "perceived

self-efficacy influences choices of behavioral settings … the stronger the perceived self-efficacy, the more active the efforts" (pp. 193–194). It is up to an individual to follow through with their own actions and to attempt to reach goals and accomplishments. For this theoretical study, Bandura's (1977) theory of self-efficacy and social cognitive theory formed the basis for the conceptual framework. However, I also discuss social cognitive career theory (SCCT; Lent, Brown, & Hackett, 2000), Bourdieu's (1930–2002) social theory, and cultural and feminist theory, to form a foundation for the discussion of the impact on female engineers in leadership positions.

Self-efficacy has four sections: "performance accomplishments, vicarious experience, verbal persuasion, and physiological states" (Bandura, 1977, p. 195). Performance accomplishments build on individuals' success and failure experiences. Time and how things happen negatively or positively affect performance accomplishments in individuals, which creates a pattern of how to behave (Bandura, 1977). Based on these experiences, individuals become masters and determine if they should avoid a situation or follow through. Vicarious experiences stem from when an individual sees others achieving success and believes he or she will have a similar outcome (Bandura, 1977). Verbal persuasion is when a person believes in an outcome based on suggestions from an outside source and not from within (Bandura, 1977). Individuals tend to perform better when they are told they can achieve rather than merely given tools. Physiological states rest on a person's reactions to when a situation is stressful and how they cope with past experiences (Bandura, 1977). This notion ties with avoidance behavior and how motivation can positively or negatively impact an individual's behavior.

Although these four sections are in each individual, they also describe how an individual handles a situation and how the environment affects situations. Certain outcomes of situations impact one's self-efficacy regarding accomplishments, determining if a person actually has the capability without trying or having to keep trying to reach a goal (Bandura, 1982). Experiences and opportunities in the lives of women each played a part and contributed to their self-efficacy, which determined their approach when addressing life situations (Bandura, 1982). An individual's self-efficacy will change based on the successes and failures of their performance and observations of the successes and failures of others.

Bandura stated that "social cognitive theory explains psychosocial functioning in terms of triadic reciprocal causation" (1988, p. 275). Social cognitive theory rests on personal attributes, behavior, and environment, which influence an individual's functionality. Environment, which is part of the focus for this study, is partitioned into three types: "imposed environment, selected environment and constructed environment" (Bandura, 1999, p. 23). Imposed environment occurs outside an individual's desire and is forced on a person. The reaction of an individual in these situations rests on their experiences and personal reflections. In a selected environment, a person has a choice to partake in a situation and can react because they are aware of their choice. A constructed environment is an interaction between collective and organizational settings and aids as a basis among triadic settings in social cognitive theory (Bandura, 1999).

Bandura stated that "expectation of personal efficacy determines whether coping behaviors will be initiated, how much effort will be expended, and how long it will be sustained in the face of obstacles and aversive experience" (Bandura, 1977, p. 191). The

rationale for Bandura's (1977, 1982, 1986) social cognitive theory for this study was to assist in the framework by explaining how individuals react in a challenging environment and the persistence needed to overcome obstacles. This theory relates to the study by exploring the strength women need to overcome barriers and opposition; that strength stems from their self-efficacy and behavior. Bandura's (1977, 1982, 1986) social cognitive theory is the conceptual framework for this literature review and the cognitive mechanisms used by women to achieve their accomplishments.

From Bandura's theory, Lent et al. (2000) built SCCT, used to describe career circumstances (Lent et al., 2013). Yeagley, Subich, and Tokar (2010) used SCCT to link perceptions of young women to their goals for leadership. Self-efficacy is divided into tasks and the ability to complete them, based on one's expectations. Through a questionnaire for women who were studying engineering, results showed that women who had positive expectations and high efficacy were more inclined to have interest in leadership (Yeagley et al., 2010). Similarly, Lent et al. (2013) conducted research based on social cognitive predictors in engineering majors through SCCT. Women pursuing engineering degrees were more persistent than men (Lent et al., 2013). Taking a different approach with SCCT, Singh et al. (2013) analyzed female engineers and how self-efficacy played a role in women leaving engineering. Results showed that the organizational (work environment) influence played a crucial role in supporting women through training and developmental programs that encouraged women's self-efficacy (Singh et al., 2013). The present study continues to build on how self-efficacy impacts individuals, particularly women who are in challenging roles and organizations.

As careers are described through Bandura's (1977, 1982, 1986), self-efficacy, Bourdieu's (1930-2002) social theory builds on diversity in organizations. The field of engineering is male dominated and women who are interested in science and mathematics choose not to enter due to stereotypes and the existing culture in engineering, Hanappi-Egger (2012) conducted a study focused on Bourdieu's social theory, which attracts people to a career through diversity management. Through this theory, an organization can align leadership with gender competences, implementing consequences and changing the perceptions of members of an existing organization (Hanappi-Egger, 2012). Challenges in changing a culture stem from the existing organization and the opportunity for change it possesses: for example, a younger organization that is not as culturally affected by generations of male domination will adhere to this social theory more easily. This theory feeds into diversity management and imploring organizations to recruit women in STEM fields to change the organizational culture.

Torres (2012) focused research on the inequality between gender advancement in STEM fields using feminist theory. The focus on science relations pertains to the importance of women in STEM and the effects of women (Schlenker, 2015). Feminist theory highlights the general inequalities between genders; the goal of the theory is to equalize knowledge between genders (Torres, 2012). The lack of equity and male dominance in STEM fields adds to women's lack of experience, due to few opportunities for advancement. This lack acts as a bridge into cultural theory, dissuading women from working in certain fields. The use of a cultural theory to change the environment of male-dominated fields will help engage more women and men to have an open mindset that includes women. Cultural theory aids in the scope of the study as a supportive

environment for younger women pursuing STEM careers without adopting masculine tendencies to fit in (Torres, 2012). Women in STEM fields must address barriers; incorporating programs that aid in the advancement of women will create a network and assist other women (Jackson, Hillard, & Schneider, 2014). Although these theories relate to the leadership of women in general, the focus of this study was on women in engineering leadership.

Bandura's (1977) social cognitive theory on self-efficacy was the basis of the literature review on female engineers who obtained leadership positions. However, other theories also play a role for these women, including some that built on Bandura's theory such as SCCT (Buse et al., 2013; Purzer, 2011). In researching female engineers and leadership, SCCT, feminist, cultural, and Bourdieu's theories played roles in how women are affected as well as how they molded their careers. Feminist theory focuses on the gender aspect and its role in STEM fields (Torres, 2012). Cultural theory displays how the environment can affect the outcome of performance for women (Torres, 2012). Bourdieu's social theory discusses the constant change needed for women who will modify the existing norm by becoming leaders (Hanappi-Egger, 2012). SCCT examines female engineers and the impact of self-efficacy on their careers (Lent et al., 2013; Singh et al., 2013; Yeagley et al., 2010)

Review of Key Concepts

Women in engineering, leadership, and the utility sector have impacted the work environment, changed organizations, and slowly influenced organizational society through their accomplishments. As women continue to enter these fields, previous researchers have assimilated knowledge of women's strengths and weaknesses in these

key roles. The next few sections highlight literature focused on women, engineering, leadership, and the utility sector. The section begins with women in STEM, then flows into women solely in engineering (Chavez, 2014; Torpey, 2013). The middle section focuses on women in leadership and perceptions of women in leadership and male-dominated fields (Longman et al., 2011; Saucerman & Vasquez, 2014). The section ends with literature on the utility sector and the impact of leadership, as well as expectations for the New York environment (Hendrickson & Van den Berg, 2012;). These sections create a platform for this study and the influence of female engineers, leadership, and the New York utility sector.

Impact of Women in the Workforce and STEM

As baby boomers continue to age and leave the workforce, the projection for growth will slow considerably in the next few decades. The new workforce is not only more diverse by race, but contains more women, which strengthens the need for study (Toossi, 2012). Women are not only impacting the workforce by percentage, but as more women have entered the field, more family planning and changes in the fertility rate have also ensued. As women make various choices, the population has shifted (Toossi, 2012). By 2020, the projected workforce-participation rate is set to be impacted, as baby boomers of 55 and older will comprise only 25%. The rate of women in the workforce steadily increased in the last few decades (Toossi, 2012). For example, in the 1990s, women comprised 56.8 million members of the workforce; in the 2000s they compromised 71.9 million. Numbers are anticipated to increase to 77.2 million by 2020. As women continue to participate in the workforce, their continued presence will impact projects in the future.

Since the 1970s when the BLS started tracking women in the workforce, their participation has impacted the workforce in most fields. The number of women between the ages of 25 and 64 has tripled in obtaining higher educational degrees in the past 4 decades. In 1970, 11% of the women in the workforce obtained a college education, whereas 37% held degrees in 2011. In 1999, 60% of women participated in the workforce, a number that has slightly decreased since then (BLS, 2014b). The occupations of women in the workforce has also varied as women strive to obtain careers in certain industries. For example, in the field of accountants/auditors and teachers, women comprised 62% and 82%, respectively. In contrast, in the field of engineers/architects and physicians/surgeons, women comprised 14% and 34% in 2013, respectively (BLS, 2014b). The rationale for this concept is that women are still underrepresented in many fields in the United States (BLS, 2014b).

A bachelor's degree in engineering is projected to align with 570,000 job openings from 2010 to 2020 (Torpey, 2013). This is meaningful to the study because engineering jobs in the United States typically have successful rates of employment, higher wages than other fields, and on-the-job training. According to the National Center for Education Statistics, in 2009, unemployment rates for 2007 to 2008 graduates in engineering were 7%. This is almost half the unemployment of majors in humanities (13%) and social sciences (12.5%) and was lower than in psychology (11.5%), biological and physical sciences (9.5%), and business and management (8.5%) in 2009. The average starting salaries for engineering graduates of 2012 ranged from $74,000 to $130,280 (Torpey, 2013; BLS, 2014a). Entry-level engineering positions do not require prior work experience. However, a significant need exists for business, financial, and sales

occupations, projected to have 2 million job openings between 2010 and 2020 (Torpey, 2013). Graduating with an engineering degree does not guarantee a job or high wages, but the chance of obtaining them is higher than in other careers.

As U.S. society continues to change through technology, this digital age relies on STEM fields, which have grown three times faster than non-STEM fields (Chavez, 2014; Jackson et al., 2014). STEM jobs are projected to grow another 17% through 2018 and women should seek opportunities in these fields to help lead the next generation (Williams, Phillips, & Hall, 2016). Social pressures in these fields may deter women from pursuing work in these fields, based on stereotypes and U.S. societal views on women in STEM fields (Chavez, 2014). Engaging programs in society may help bring attention to women surrounded with how STEM fields help society, how STEM careers can help people, and how STEM can help future women (Moakler & Kim, 2014; Morganson et al., 2015; Walker, 2015).

Self-efficacy of girls toward STEM fields, created through their childhood and their development in that environment, affects their academic success (Belser et al., 2017; Schlenker, 2015). Stereotypes can impede confidence and self-efficacy in a girl's development in STEM fields and affect her performance (Makarova & Herzog, 2015; Saucerman & Vasquez, 2014). As the focus on STEM begins to increase in the United States, mothers in STEM fields may directly affect the persistence and aptitude of their daughters (Saucerman & Vasquez, 2014; Walker, 2015). The self-efficacy of these daughters was higher, and the capacity to build themselves on her own had a greater presence in girls with mothers' femininity and STEM fields than girls whose mothers wanted a more traditional role for their daughters.

The feminine-approach rationale aids in women reaching self-ignited higher goals from within to achieve a higher position (Patel, 2015). U.S. society plays a part in aiding women; however, to attain a certain stature and remain at a certain place, one should not be judged by this society. Becoming a mother, taking care of a house, and being a wife is still a preference for a woman in much of society. However, U. S. society does not view men in the same light as women, judging men on different achievements (Budworth & Mann, 2010; Schlenker, 2015). U.S. society views women as modest and more accepting of less achievement and recognition in the workplace than their male counterparts (Mascia, 2015). U.S. society sees the behavior of men as antagonistic, rather than whining and fussing (Budworth & Mann, 2010; Schlenker, 2015).

Female Engineers

Women's employment in the United States has increased dramatically in the last 50 years. However, as the presence of female professionals increases, the number of female engineers is still underrepresented (Hatmaker, 2013). The first women in the United States to obtain an engineering degree graduated in 1892 (Hatmaker, 2013). With STEM programs/initiatives as the approach for girls, an increase has occurred in the number of women entering these fields; however, a woman staying in these fields is at issue. Many women leave the engineering field within 15 years of obtaining their degree (Buse et al., 2013). The culture of organizations needs to change to keep women in these fields by providing mentoring, work–life balance, and advancement opportunities (Buse et al., 2013; Zula, 2014).

Women with strong self-efficacy stayed in engineering and adapted to their environment, handling various challenges presented to them at work (Buse et al., 2013).

The persistence of women who wanted to stay showed in their confidence and their willingness to challenge the existing culture (Ismail et al., 2017). Their engagement in their work showed not only at work, but also to others outside of work. These women were motivated by the challenges in the industry as well as opportunities to be at the forefront of technology. Women who wanted to be engineers and stayed in the field wanted to be challenged, were interested in engineering, and had life experience that made them want to be an engineer (Buse et al., 2013). A weakness in the Buse et al. (2013) study was in work–life balance for female engineers. Women who were persistent in the field had stay-at-home husbands. These women worked part-time while their children were young; then went back to full-time work or were less likely to have children (Buse et al., 2013).

Women who stayed in engineering learned to speak up, be aggressive, and prove they were willing and able to move upward in their career to be acknowledged for career progression (Hatmaker, 2013; Ismail et al., 2017). The male-dominated environment has given women who stayed an informal relationship with the industry to strive for higher positions and be part of the team. Women who stay in engineering remain for individual reasons: their self-efficacy, persistence, motivation, and self-drive to make a career work, despite multiple obstacles. This is meaningful to the present study because some enjoyed the challenge of the work and others enjoyed the opposition they faced that women were not part of the norm in engineering.

Many women who left the field had been encouraged to become engineers due to their excellence in mathematics and science, but had desires to pursue another field before they began engineering, had outside influences that pushed them into engineering,

and lacked the desire to be an engineer (Buse et al., 2013). Female engineers who left had children, wanted to stay home, and were more likely to get married. This concept aids in explaining that women leave engineering due to culture. Women prefer a culture that enhances work–life balance and adaptability to obtain fulfillment (Sullivan & Kedrowicz, 2012; Walsh, Fleming, & Enz, 2016). Culture adds to the intellect and ability of an individual toward their career (Zula, 2014). Instead of leaving the engineering profession to attain work–life balance, women should demand their employer provide them with the comfort of being able to stay in the engineering field and maintain a family as well.

Engineering is a male-dominated field that is declining in the United States due to a lack of interest in engineering; yet a growing interest exists in other countries. Recruitment and retention in these fields needs to spread not only to men, but also to women, as well to close the gap that is growing due to baby boomers retiring (Watkins & Smith, 2014). The existing culture in engineering drives the retention of women down and discourages girls from the potential to enter engineering, knowing that the culture is not as accepting of women as are other careers choices (Buse et al., 213). Culture also impacts the recruitment of women into the field, even as young women have a growing interest in mathematics and science in high schools (Ismail et al., 2017). Since the early 1990s, the percentages of women entering the engineering field are not growing, whereas the percentages of women entering medicine or business have been increasing. It is necessary to introduce girls at younger ages to engineering and create programs to help recruit and retain women in these fields (Bhatia & Amati, 2010). Having a women's networking group for engineering, such as the SWE, may also help in recruiting and retaining women in engineering.

The perceptions of women who consider engineering perceive the culture is a male-preferred environment and is not supportive of women (American Institute of Chemical Engineering [AIChE], 2014; Ismail et al., 2017). In a manufacturing organization, 51% of women surveyed cited that women eschew these fields because of their male culture (Watkins & Smith, 2014). Awards highlighting women in manufacturing fields have created awareness that more women should enter these fields. Science, Technology, Engineering, and Production is one program that seeks to not only honor women, but also to aid future generations in encouraging women to enter these workforces rather than shying away from male culture (Schlenker, 2015). However, for women who enter the field of engineering, challenges persist in advancing and in being viewed as equal to their male counterparts (AIChE, 2014).

The Societal Impact Operating Council focuses on retaining female engineers and promoting reentry into the field of engineering (AIChE, 2014). Workshops and other initiatives help promote women in the field of engineering and encourage choices that satisfy a balance between work and home (AIChE, 2014). Women who leave engineering decrease diversity in the field and do not promote change for women seeking to enter these fields in the future. Women continue to leave the field of engineering due to a lack of work flexibility, pay disparities between women and their male counterparts, lack of promotion, inability to provide effective child and elder care, and workplace culture (AIChE, 2014; Buse et al., 2013; Hatmaker, 2013). Several organizations and networking societies help women in engineering and promote their ability to help themselves. For example, the SWE, started in 1919, continues to assist women in the field of engineering (Craig, 2013).

Engineering is still considered a male career in the United States; however, that is not the same in other countries. Women's representation in the field of engineering varies from country to country; as a country with underrepresentation, the United States should learn from others that have a higher women presence in engineering (Craig, 2013). The United States, United Kingdom, Australia, Canada, and Ireland have less than 15% women in engineering. Statistics shows that in 2007, Latvia, Bulgaria, Cyprus, and Sweden had between 25 and 30% women's representations in engineering. China had 40%, and the former Soviet Union had more women than men in engineering, with 58% (Craig, 2013).

Gender Stereotypes for Leadership

The effect of stereotypes in U.S. society aids in the perceptions and influence of genders toward others (Rice & Barth, 2016). Budworth and Mann (2010) researched stereotypes toward genders and described how an individual *should* behave because of their chromosomes. For example, women *should* be thoughtful and sensitive and men *should* be assertive and dominant. The word *should* is italicized due to the perception of others in U.S. society and the workplace, according to Budworth and Mann. Individuals' assumptions are encouraged from a young age as are the perceptions of how men and women *should* behave, in individual minds. These perceptions also contribute to viewpoints when these behaviors switch genders and those switching characteristics are criticized (Budworth & Mann, 2010; Saucerman & Vasquez, 2014). When what individuals believe *should* happen is altered, others may display disapproval or acceptance; U.S. society tends to dislike altered behaviors of women and men in the workplace and in society in general (Budworth & Mann, 2010).

Women may be less desirable and labeled because they act like their male counterparts rather than like wives, mothers, or daughters (Monzani, Hernandez Bark, Van Dick, & Peiro, 2015; Saucerman & Vasquez, 2014). Many women have exhibited the strength to eschew stereotypes and to be viewed as equal to their male counterparts to obtain advancement (Rice & Barth, 2016; Sandler, 2014). However, women who are assertive and dominant are often disliked in the workplace because they do not demonstrate feminine characteristics (Budworth & Mann, 2010). Perceptions justify the rationale that men are better leaders than women, stemming from men taking the chance to prove themselves in more leadership roles than women (Seifart, Garcia, Leal, Pena, & Tellez, 2014; Vries, 2014).

Viewpoints in U.S. society also trigger perceptions of adolescents in gender roles (Laplonge, 2016; Monzani et al., 2015). In early childhood, parents should treat their children of both sexes the same, offering explanations and incorporating mathematics and science (Saucerman & Vasquez, 2014). Some parents are more likely to explain in-depth concepts to their male children than their women children. This concept provides a platform for children coming into school at different levels because of parental influences. Parental nurturing dictates the followership of children into mathematics and science fields (Saucerman & Vasquez, 2014).

A stereotype also exists that girls are better at reading and boys are better at mathematics, yielding greater representation of male mathematics teachers and female reading teachers (Saucerman & Vasquez, 2014). The same-sex role model starts in the classroom and affects the child's growth. Teachers may be unaware of the psychological influence and their involvement in internal development on students with their attitudes

toward certain subjects. This influence can also lead to internal influences on perceptions of leadership between genders (Laplonge, 2016).

Women need to promote themselves in the workplace to boost the confidence of upper management and to make known they are capable of leadership roles (Patel, 2015; Unger et al., 2010). Displaying their attributes for the organization and demonstrating their leadership characteristics may change the perceptions of upper management. To help mitigate the internal barriers women face, a training program can aid women in addressing societal impacts on their careers as well as self-promotion (Longman et al., 2011). Women need to find an even balance between competence and interpersonal skills required to be considered for promotional opportunities and advancement (Patel, 2015).

For women who overcome the stereotypes and the challenges and pursue leadership careers, retention tends to diminish in male-dominated fields (O'Brien & Rickne, 2016; Unger et al., 2010). This is a weakness in opportunities for promotions; advancement may dwindle and workplace behavior may impact a woman's cognitive behavior and attitude. Women need to have a competitive edge over their male counterparts to advance (Saucerman & Vasquez, 2014). Consistently demonstrating competence in a field and gaining positive perceptions from male workers is essential (Saucerman & Vasquez, 2014). Also, overcoming stereotypes by speaking up for themselves to ensure they are not overlooked when promotions are in order may help in a competitive organization with women's male counterparts (Unger et al., 2010).

Women Seeking to Lead

Nixdorff and Rosen (2010) examined the lack of women leaders in Fortune 500 companies compared to businesses thriving in women's start-up companies. As women

attain degrees and experience in U.S. corporations, many seem to be dissatisfied and are leaving jobs to start their own companies (Karsten, Brooke, & Marr, 2014; Unger et al., 2010). Many women leave corporations due to the "glass ceiling" that has hindered women for years (Sandgren, 2014; Sharma & Kaur, 2014). The differences between female entrepreneurs and males are their approaches and decision-making skills.

In the 1960s and prior, women were not in many job fields and it was very common that they stayed home to care for the family (Row, 2013; Tomal & Jones, 2015). In the 1970s and 1980s, women entered the workforce seeking to break the stereotype that they had no skill. Many no longer stayed home and began to work outside the home. The rationale in many fields was that women could conquer stereotypes, prove they could work with men, and were considered equivalent peers (Nixdorff & Rosen, 2010). Women continue to populate these fields and strive for careers in medicine, law, and business (Baker, 2014). However, the engineering-field stereotype that it is only for men has lingered (Ismail et al., 2017). Women are interested in the field of engineering and are capable of doing the same job as men. The field of engineering needs diversity and the integration of more women to help solve problems and overcome challenges that arise in the field of engineering (Schlenker, 2015). Many women enjoy using their hands and understand the use of technology, providing skills needed in engineering fields (Ismail et al., 2017; Schlenker, 2015).

U.S. women have continued to hold power in the home and make the majority of purchasing decisions (Row, 2013). However, outside the home, North American women do not excel in leadership. In the United States, women hold 21% of the senior positions, whereas in Turkey it is 30%, Russia 31%, and China 51% (Row, 2013). In addition to

women influencing their homes, organizations need women leaders to help guide businesses to understand and relate to women and to aid in family and community decisions (Row, 2013). As the United States continues to remain stagnant in enrolling engineers, other countries are prospering in the field of engineering; the effects of having insufficient numbers of engineers may be felt soon across the entire field (Belser et al., 2017). Women need to speak up, have courage, and have the knowledge to illustrate why they should be in leadership positions (Anca & Gabaldon, 2014; Schlenker , 2015). The stereotypical inoculation model aids members of an underrepresented group, as the dominant groups shields them from negative stereotypes, influencing them in different settings and statuses (Beckwith, Carter, & Peters, 2016; Schlenker , 2015). Men need to understand that women can do the same job as their male counterparts, and should not be overlooked because of their femininity (Anca & Gabaldon, 2014).

The behaviors of women, as well as the ownership and interactions between women entrepreneurs, may stem from their network, their education, and their experiences (Anca & Gabaldon, 2014; Longman et al., 2011). This is meaningful for many women entrepreneurs from corporate workplaces who chose an entrepreneurial path to elude the glass ceiling (Sandgren, 2014; Sharma & Kaur, 2014). Traditionally, men started their own businesses; however, women may play a role in enhancing the number of female mentors for women who aspire to entrepreneurship. Statistically, more men become entrepreneurs that women (Nixdorff & Rosen, 2010). When women seek to maintain a leadership style often attributed to men rather than following the stereotypical style of a women leader, some find it problematic (Anca & Gabaldon, 2014; Baker,

2014). Much turmoil and disagreement ensues in women's followership because they are not acting in accordance with the typical behavior of the woman-gendered role.

Women Leaders

Inconsistency exists between the notion that women have the skills, motive, and intelligence for leadership positions, yet lack women's presence in upper management compared to men (Baker, 2014). The discussion of the glass ceiling in organizations has been a distraction (Budworth & Mann, 2010; Sandgren, 2014) to the bigger challenge of a societal perspective. Women need to have the skill and the motive to become leaders, but most importantly, need the opportunity to hold a leadership position (Baker & Cangemi, 2016). Academia has alluded to the concept that leaders of each gender share similar talent; however, Budworth and Mann (2010) disagreed with this belief. They encouraged the notion that different methods exist to develop leadership between men and women and that different life experiences contribute to the way people lead.

Women tend to be transformational-style leaders (Brandt & Edinger, 2014; Rhee & Sigler, 2014). Many organizations prefer this style of leadership; however, they prefer transactional male leaders over women (Tomal & Jones, 2015; Unger et al., 2010). Little evidence suggests that certain experiences foretell the way a person will lead in the future. Rather, one must learn about behavior and explore individuals in leadership, thereby stimulating consistency between skills to help develop more women in leadership positions (Rhee & Sigler, 2014). Some women leaders use their gender as a tool to create positive images in the community and organizations to relate with those of both genders (Vasavada, 2014). Being able to choose the right person for a certain task will allow a company to react in a positive way in organizational society and internally.

Organizations favor men more in leadership roles because of a poor perception of women's decision-making abilities (Baker, 2014; Unger et al., 2010). However, some women have support from men who encouraged a competitive side that enabled a woman to reach higher levels. This is meaningful as an encouragement aid in organizations, giving women the experience of relationships with men and becoming good negotiators (Cheung, Lindsey, King, & Hebl, 2016). Individuals may allow perceptions of characteristics and experience to deteriorate when assessing the knowledge and skills of women leaders. In U.S. society, men and women tend to stereotype each other based on their experience, cultural aspects, gender-specific characteristics, and behaviors (Chin, 2016; Crites, Dickson, & Lorenz, 2015).

Women blamed for the inequalities between the genders also support male leadership over women leadership (Nixdorff & Rosen, 2010; Rhee & Sigler, 2014). Insufficient numbers of women are trained prior to becoming leaders and do not know how to handle the leadership role (Deaconu & Rasca, 2015). Mentorship from other women or a program to help women become capable of becoming leaders may help more women pursue leadership (Longman et al., 2011). Women leaders have the ability to handle situations through an integrated perspective: the ability to reason in a situation and the ability to put themselves on the other side of the situation to make decisions. Women were more influential when they portrayed a more feminine approach as a leader than when portraying a controlling approach (Chua & Murray, 2014; Nixdorff & Rosen, 2010). Women in male-dominated workplaces learned to adapt to their male counterparts to harmonize the workforce and avoid social consequences (Watkins & Smith, 2014). Women need power to address male dominance in the upper ranks of an organization and

can communicate effectively without giving up their female identity, leading many men to respect them (Cheung et al., 2016; Deaconu & Rasca, 2015). The balance women must attain to embrace leadership roles will aid in self-respect as well as in keeping the power of their role justifiable (Cheung et al., 2016).

Nixdorff and Rosen (2010) found multiple results for women's entrepreneurship that were similar to leadership. Women leaders exhibited a transformational style, encouraging team collaborations (Brandt & Edinger, 2014). Emotions played a part in their leadership style (Unger et al., 2010). Women leaders' interpersonal relationships included very few role models, the encouragement of networking, and fundamentals of interactions with their followership (Crites et al., 2015). They also experienced low self-efficacy in how they conveyed themselves.

Employers can advance a woman's career into leadership with a few suggestions (Beeson & Valerio, 2012; Tomal & Jones, 2015). First, gender biases that exist in senior management must be mitigated for women to attain leadership positions (Deaconu & Rasca, 2015). Career advancement should not be decided based on the candidate's gender (Cheung et al., 2016). The candidate's credentials and the work they have done should be presented to focus on the strengths of the individual and their chance to enter a leadership role. The next two suggestions are succession planning and developmental planning for all candidates. Developmental planning includes mentorship and being placed in positions that would require making decisions that may influence the business. The last few suggestions from Beeson and Valerio (2012) were constructive feedback and tailored career paths for women, based on their strengths and weaknesses, to help them attain upper management positions.

As women move gain higher positions in organizations, being able to give back to other women will enable the next generation to want to pursue higher positions (Beeson & Valerio, 2012; Vasavada, 2014). Joining a women's network can also help women explore ideas with other women and learn how to address challenges that may arise in organizations (Vasavada, 2014). Potential women leaders should also embrace feedback and want to continue to grow into future positions and consideration for opportunities that may arise (Beeson & Valerio, 2012; Walsh et al., 2016). As potential leaders, women must also be their own advocates, proving they are capable of performing multiple jobs (Deaconu & Rasca, 2015). Women need to display that they can make decisions, communicate with others, and have the knowledge and drive that upper management is seeking from a leader (Beeson & Valerio, 2012; Vasavada, 2014; Walsh et al., 2016). These perceptions and characteristics of some women play a part in how women view and effectuate their careers and advancement, specifically in leadership and engineering fields.

Perceptions of Women in Leadership and Engineering

The development of perception starts at a very young age and is a continuing process that can dictate a future career path for an individual. Individuals' perceptions form in childhood, especially when considering occupations for the future (Vervecken, Hannover, & Wolter, 2013; Zula, 2014). Exposure is an influencing factor. Stereotypes associated with job titles accrue from elementary school and male-dominated fields (Belser et al., 2017; Bystydzienski et al., 2015). Influences in early childhood for those aged 6 to 12 will affect the development of children's interests in a career (Vervecken et al., 2013; Zula, 2014). A child's interest initiates the child's perception for educational

and professional career choices that may last a long time; perceptions may last about gender-dominated fields. Vervecken et al. (2013) used Gottfredson's theory (1981) on career development to explain how children create a gender self-concept. The method eliminates consideration of a future career if it conflicts with interests.

When female professionals in a male-dominated field speak with young girls, they may disregard stereotypes about the career and may influence the girl child to consider a male-dominated field (Watkins & Smith, 2014). It is a child's perception of a career path that may dictate their association of a stereotype: whether a man should have a certain occupation rather than a woman, and vice versa (Bystydzienski et al., 2015). Girl children who see professionals in these male-dominated fields may view them as role models, thereby changing their perceptions (Holden & Raffo, 2014; Ismail et al., 2017). In areas, such as nursing and teaching, women are present, so girl children can identify with them and believe they should follow their path. Boys perceive engineering as a desirable career path; girls do not.

The perception of the tasks in an engineering job may be another stereotype that may deter a girl from entering this field. Some engineers do heavy manual work or lifting and work in very harsh and hazardous conditions (Belser et al., 2017; Ismail et al., 2017). Many individuals associate these tasks with engineering. Another perceived notion about engineering is that an engineer is at a desk all day working with numbers, or in a laboratory locked away from anyone. Older women who do not understand that engineering may provide some peer pressure; their attitudes toward engineering may reflect on younger women and girls (Ismail et al., 2017). Another perception of engineers is that they only fix things, like a mechanic or electrician; some people hold no

association that an engineer designs and calculates how mechanical devices work, electrical circuitry works, or how a building is constructed. Young girls should gain insight on what engineers help to innovate and technological advances throughout every industry, to change their perception of engineering (Bystydzienski et al., 2015).

With challenges and change occurring in many organizations, the talent pool of women is not being used and women are underrepresented in leadership, as they are in engineering. Women in management roles that can lead to leadership positions often comprise an underused resource (Beeson & Valerio, 2012; Pafford & Schaefer, 2017). Women are often placed in positions that do not have exposure to upper management, in contrast to their male counterparts (Beeson & Valerio, 2012). Insufficient succession planning includes women seeking to advance into leadership positions, compared to men (Mascia, 2015). Even if a woman has all the credentials for promotion into leadership positions, men are usually chosen because they seem to have a wider networking pool than their female peers (Beeson & Valerio, 2012; Pafford & Schaefer, 2017).

Perceptions of female and male leaders carry many stereotypes and much stigma (Chua & Murray, 2014; Merluzzi & Dobrev, 2015). When a woman takes on more of a masculine approach, it is not received well in an industry. However, when a man takes on a softer approach, it is praised and shows he is empathetic (Beeson & Valerio, 2012; Pafford & Schaefer, 2017). Women endure this double standard in male-dominated situations and must prove themselves more than their male counterparts, even if they have the same credentials (Kiser, 2015; Merluzzi & Dobrev, 2015). An important factor for women in leadership is their influential ability; they may attain a followership that does not consist solely of other women (Beeson & Valerio, 2012; Pafford & Schaefer,

2017). This challenge for women is met by balancing empathy with harsh decisions and proving they are worthy of leading men and women.

Another stereotype for young women who are potential candidates for leadership positions is that having children will deter them from returning to a demanding position (Belser et al., 2017; Mendez & Busenbark, 2015). The perception is that women will not be able to balance a personal life with a leadership position that may require long hours and travel (Merluzzi & Dobrev, 2015). The perception that every woman has a child or does not have a support system at home to help with the challenges of the job needs updating (Belser et al., 2017).

Perceptions of Women in Other Male-Dominated Fields

Some women in academia or who are entrepreneurs have different perceptions from those of women in corporate positions about advancing in male-dominated fields (Su, Johnson, & Bozeman, 2015). Academic and corporate women concur that women still do not gain equal pay for performing the same job function as a man (Carrigan et al., 2017). However, male and female entrepreneurs are similar in social skills. Researching these fields may help in understanding women's different perceptions.

Leadership in higher education aids in involving those of different genders, as more women seek higher education (Chin, 2016; Mascia, 2015). Wallace et al. (2014) questioned if women were represented in proportion to the degrees they attained in academic leadership roles. The authors examined representation, rate of success, and salary compared to men in higher education leadership positions as variables. Using statistics from the U.S. Department of Education and National Center for Education Statistics, Wallace et al. compared these three aspects in private and public universities.

In private and public universities, women are proportionately represented in the presidency as men (Carrigan et al., 2017). However, women receive lower salaries than men, often 10 times less. Women may be leaving male-dominated environments due to workplace culture and salary differentials (Rochetti, 2016; Wallace et al., 2014).

Women in leadership positions may demonstrate different behaviors, especially as entrepreneurs. Nixdorff and Rosen (2010) found evidence that gender role does exist and may trigger stronger self-efficacy. Women entrepreneurs attained this self-efficacy when an opportunity or need for a business presented itself and they took the risk to open a business (Carrigan et al., 2017). Men and women entrepreneurs share certain characteristics such as social motivation, development skills, management qualities, and interpersonal skills (Nixdorff & Rosen, 2010). Differences between men and women entrepreneurs are in experience, education, views of the corporate world, and emotional ties. Values between the genders of entrepreneurs also differ: men use a hierarchical approach whereas women focus on shared value and participation in decision making (Carrigan et al., 2017). Men tend to have more control over decisions in their businesses. Women tend to involve more employees for decisions to build a better relationship with employees and a better work environment (Deaconu & Rasca, 2015; Holden & Raffo, 2014).

Leadership in Utilities

Utility organizations provide customers with goods or services needed in society (Headrick, 2015). Leaders play key roles in determining what happens in these organizations to ensure public safety, reliability, production, and efficiency. Technology, the environment, politics, government, and constant change are some business effects that

play a role in the utility industry (Headrick, 2015). Leaders must incorporate different attributes and balance internal and external effects to provide capabilities of the organization (Headrick, 2015). As market and technological advancements continue, leaders will need to stay current with innovations and strategically align new technology with what is best for the company (Headrick, 2015). Leaders are only as effective as their followership in impacting events and projects in organizations.

Failing to procure the safety of certain utilities may impact society catastrophically. For example, nuclear-power generation provides electricity around the world and increases the risk of disaster. Whether a human-made disaster or a natural disaster, leaders and their followers must decide what will ensure public safety and reduce risk (Wohns, 2014). The 2011 earthquake in Fukushima showed how leaders and their followers came together to resolve issues occurring in the reactor (Wohns, 2014). Leaders of utilities must understand the risks associated with making decisions and the impact of their choices (Wohns, 2014).

Leaders in energy organizations should expect changes that could provide developmental opportunities or challenges in the current way they do business, especially if those changes impact the environment (Pearl-Martinez & Stephens, 2016; Prentis, 2015). Sustainability in homes, communities, and organizations is a currently appealing concept for energy consumption. Opportunities for private businesses to obtain grants or initiatives to create public awareness about energy sustainability and promote environmental consciousness in the community could diminish the impact of the utility industry (Ferrell & Lunsford, 2015; Pearl-Martinez & Stephens, 2016).

Federal-government encouragement to impact the future of energy consumption and sustainability is also a factor for various companies and utilities. “Going green” is an overused phrase in industries seeking to prove their environmentally sound policies aimed at reducing emissions or inefficiencies in businesses (Ferrell & Lunsford, 2015; Pearl-Martinez & Stephens, 2016). It is the task of the leader in an organization to position the business for future success, to learn from past mistakes, and to understand that change is inevitable.

Investing in the next generation of leadership in organizations is vital for the future, especially in the energy industry. For example, General Electric (GE) has a program to groom individuals for leadership positions to enhance the vision of the future company (Onatolu, 2013). Leaders must understand not only the business, but be able to form relationships between internal and external people (Ferrell & Lunsford, 2015). With competition increasing in all GE subsidiaries, new processes and visions were implemented to keep the company in the forefront of their divisions and create an adaptable leadership team. GE is an organization in the energy field that implemented succession planning for upcoming leaders. GE encourages upcoming leaders to strive to create a unique leadership style that engages others and the ability to adapt to change. The field of energy needs an innovative and transformational leader to ensure succession planning for the future (Onatolu, 2013).

Many organizations and companies introduce energy-management programs that benefit from cost savings as well as a more efficient avenue of producing energy (Headrick, 2015). Various organizations use the Leadership in Energy and Environmental Design (LEED) project to help with energy management (Ferrell & Lunsford, 2015;

Hopkins, 2016). Companies introduce these projects to help achieve a more effective way of producing electricity, especially during demand periods when consumption and cost are highest. Various opportunities in LEED organizations could help mitigate rising costs and implement additional savings. For example, a school system was able to reduce their energy consumption by 25% and in other cases by 66% (Hopkins, 2016). LEED is used for sustainability programs in housing, organizations, and communities (Ferrell & Lunsford, 2015).

Many risks align with electric utilities when associated with fuel, environmental impact, community involvement, and organizational structure, as well as the management team in charge of the utility (Graffy & Kihm, 2014; Headrick, 2015). Leaders must plan for risk to ensure the survival of the business (Wohns, 2014). In the utility sector, fuel is a major part of the business and the weakness associated with fuel is a factor on which leaders should focus to maintain production. As a leader, one should be able to mitigate the risks by knowing possible risks and having a plan in place, should danger occur (Graffy & Kihm, 2014). Many organizations have risk assessments in place to help identify and allocate resources to ensure they mitigate risks.

LEED projects assist communities with energy consumption and provide potential savings for customers (Hopkins, 2016; Ramsden et al., 2014). These projects are ideal for homes, schools, and commercial entities to help support building a more environmentally conscience community. LEED is a voluntary operation for the design and construction of homes and buildings that focuses on conservation of vital utilities such as water and energy. This program has restrictions and codes that need to be followed to qualify as a LEED facility and also must be affordable and thus available to everyone (Hopkins,

2016; Ramsden et al., 2014). The benefit of having lower income communities in LEED programs is the cost savings for governmental subsidy programs that provide funding for the majority of homes and government systems that provide living requirements.

Many utilities emerge from merely creating power and distributing it to focus on the financial aspect of their businesses (Ferrell & Lunsford, 2015; Frigo, Hilzinger, & Welch, 2012; Headrick, 2015). Focusing on finances helps keep businesses from failing or being taken over by other entities. When finances are aligned, a company can prosper and perform in a productive way. To improve companies, the leadership team must take charge of situations and do what is best for the company (Frigo et al., 2012). For example, CFO Hilzinger from Exelon Corporation had to modify the company's financial organization to build a more efficacious company. GE CEO Welch restructured the organization to gain a better financial outcome. These are two examples of energy-based companies that changed from the traditional utility mindset to build their organizations. To have an organization communicate with internal employees and the external community helps changes become effective; these advantages stem from leadership capability.

Sustainability is important for water utilities as well. The operations and leadership of water utilities have not conformed to change, retaining the traditional culture (Ekstrom, Bedsworth, & Fencl, 2017).). Adapting to the changes occurring in utilities will help an operation and allow sustainability to maintain low costs and efficiency in the water sector. Water is used for drinking and food as well as conservation, waste, transportation, energy, and other operations. Like energy utilities, water must be efficient to maintain a healthy community (Ekstrom et al., 2017). Water

that contains environmental impurities can harm the community. To maintain sustainability, the water sector must be adaptive, be able to integrate with other entities, communicate effectively, and collaborate with external organizations (Ekstrom et al., 2017). Leaders must impose these traits to maintain sustainability, which requires a change in the culture of the business (Jacobson et al., 2013).

New York Utility

Reducing greenhouse gas emissions in New York is an ongoing key concept of discussion (Howard et al., 2014; Jabareen, 2013; Ramsden et al., 2014). The utility sector plays a vital role in the lifeline of the city. The power needed to run the city, water needed for residents and the intricate transportation system keep New York functioning (Howard et al., 2014). In particular, the five boroughs of New York City have constant activity and continue to develop and grow. Proper planning for various risks is needed (Howard et al., 2014). Climate impacts the city: emissions are taking a toll on the city and aging utilities are impacting New York residents (Howard et al., 2014; Jabareen, 2013; Jacobson et al., 2013). The utility-industry approach is an important factor in New York and without proper planning, when catastrophic events occur—when lives may be at stake—the lack of utilities in this modern environment becomes a challenge.

The recent climate event of Hurricane Sandy shed light on the devastation that can occur in a city that was not built to handle such an event. The impact of the hurricane on the infrastructure of various utilities played a crucial role and the public had to do without them for several days, and months in some cases (Jabareen, 2013). New York City has complex problems in updating the capacity of pipelines and electric systems during various seasons. Seasons play a crucial role in the planning for the New York City

utility sector as well as other parts of New York State (Howard et al., 2014; Jacobson et al., 2013). The demand on the utility sector in New York is growing at a faster pace than can be addressed, and climate change is impacting loads in the seasons and increasing demand for maintenance. Hurricane Sandy showed the importance and reliance on the utility sector, illustrating why a discussion of New York utilities is relevant.

Each utility network needs assistance to improve its reliability and conditions for the public (Howard et al., 2014). Having a reliable utility sector in New York will not only assist in decreasing emissions, but will also reduce travel time, improve water quality, reduce energy consumption, and increase efficiency (Jabareen, 2013; Jacobson et al., 2013). The goal for updating these systems and investing in these sectors is not only a public and state political necessity, but also a necessity for the leadership and vision in each utility sector. Being able to handle a storm without losing pertinent utilities or reducing emissions on a daily basis is a goal each utility sector should aim to achieve (Prentis, 2015). New York City utilities must create strategic plans to improve the utility sector in New York and regulations should create programs to raise awareness and explain how to fix these issues (Howard et al., 2014; Jacobson et al., 2013). A leader in these utility sectors who seeks to improve the system will have a social impact on New York residents by prioritizing them and improving their daily activities.

As renewable energy plays a part in the New York utility society, regulations are being put in place to assist in decreasing greenhouse-gas emissions and pollution of existing and future energy sources (Ramsden et al., 2014; Welton, 2018). Federal and state commissions regulating New York utilities work to protect the public from hazards. The Clean Air Act and federal energy regulatory commissions are some institutions that

have placed regulations on New York utilities (Chen & Liu, 2013). The policies in place seek to reduce pollutants and emissions and impose standards and rates of return on utilities, requiring them to follow certain regulations. Tests and studies have not been able to prove the efficacy of alternative sources of energy, due to their short time of existence (Welton, 2018). For example, wind energy has increased over 1,000% in the last 15 years, but the impact on the global climate is still unknown (Heintzelman & Tuttle, 2012). The impact of alternative energy on climate, birds, and people (vision, sickness, etc.) are concerns for U.S. society (Heintzelman & Tuttle, 2012). However, renewable energy needs to start making a mark on the New York utility sector to decrease dependence on fossil fuels (Ramsden et al., 2014; Welton, 2018).

Governor Cuomo of New York is advocating the integration of more renewable and a more reliable substructure following Hurricane Sandy, when the aftermath showed the weakness of the electric utility sector and how strongly the reliance on fossil fuels affected New York (Howard et al., 2014). With the increase in renewable-energy options and the decrease in cost, the governor wanted to change the energy footprint and decided to create Reforming the Energy Vision (REV; New York State, 2016). Cuomo requested that the Public Service Commission and the New York Energy Research and Development Authority work with New York utilities to create a more efficient, clean, and inexpensive customer-choice system (New York State, 2016). As the climate continues to change and the existing infrastructure is incapable of keeping up with the growing demands of the industry, REV will help revolutionize New York's utility system. Through these initiatives, jobs and awareness increase, establishing resource diversity by not depending solely on fossil fuels (Howard et al., 2014). With each step,

the cost to the public and their health is at the forefront of each energy solution as well as the impact on the environment.

Gilbraith and Powers (2013), Howard et al. (2014), Jacobson et al. (2013) and Ramsden et al. (2014) suggested many methods to address greenhouse-gas emissions in New York, often centered on the important cost factor. From increasing taxes to obtaining grants from organizations/companies to seeking government help to fund energy-efficient programs through REV, New York is paving the way for a more diverse resource platform for energy solutions (Gilbraith & Powers, 2013; Howard et al., 2014; Jabareen, 2013; Jacobson et al., 2013, New York State, 2016; Ramsden et al., 2014). This approach is meaningful because updating and improving various utility sectors will help reallocate jobs of existing employees in these industries and create additional jobs to assist in improving the infrastructure and reduce pollution and greenhouse gases (Howard et al., 2014; Jacobson et al., 2013; Ramsden et al., 2014). The New York utility sector must be at the forefront of improvements and development of new energy technology and alternative means, setting examples for other cities that care about the environmental society, its health, and its structure (Howard et al., 2014; Jacobson et al., 2013).

Summary and Conclusions

The intent of this study was to show awareness of how women develop in the male-dominated field of engineering and succeed by becoming leaders in the New York utility sector. Throughout this chapter, I discussed current literature that pertains to this study. Bandura's (1977, 1982, 1986) social cognitive theory focuses on self-efficacy and the impact on women, especially in overcoming challenges and describing the motivation behind them (Purzer, 2011). Self-efficacy impacts women in STEM and initiatives to

engage more women interested in these fields (Walker, 2015). Incorporating STEM from childhood will impact women in the workforce in these fields to gain self-efficacy for the future (Saucerman & Vasquez, 2014). Stakeholders still do not know why women are underrepresented in these fields (Hatmaker, 2013). Women are underrepresented in leadership roles and struggle in male-dominated fields as women continue to enter the workforce (Watkins & Smith, 2014).

Well-known topics in this study are that women are leaving engineering and statistics show that the number of women entering the field is not increasing (BLS, 2014b). U.S. society has increased focus on STEM fields in recent years, trying to dissimilate that only men have a place in these fields (Buse et al., 2013; Craig, 2013). Also, known topics are inequalities by gender and pay in the field of engineering (Chavez, 2014; Singh et al., 2013). Women in leadership and the utility have changed organizations in a positive direction and literature shows the positive impact of women (Howard et al., 2014). Unknown is specifically how female engineers who go into leadership positions have impacted their fields. How to improve the stereotype of no longer viewing engineering as only a male field is also unknown (Schlenker, 2015; Vervecken et al., 2013). Another unknown factor is the perceptions of female engineering leaders and what influences they can have.

The present study fills the gap to discern understanding of the increasing numbers of women who are entering leadership roles in organizations and assisting in the growth of different sectors (Martin et al., 2015; Merluzzi & Dobrev, 2015; Row, 2013). In this study, I sought to close the gap by discerning the perceptions of women in engineering. Leadership influences organizations to eliminate stereotypes as well as change their

environmental culture (Vervecken et al., 2013). As the utility sector continues to change with new regulations in place, especially in New York, female engineers could make a difference as leaders who address the changing culture and environment (Ekstrom et al., 2017). As the New York energy sector continues to change by incorporating renewable energy to diversify the resource portfolio and receiving government backing through REV, many opportunities will arise for women to guide a positive impact. The next chapter highlights the methodology for the study to aid in obtaining the lived experiences of female engineers in leadership roles and to aid other female engineers seeking to obtain higher positions.

Chapter 3: Methodology & Design

The purpose of this study was to explore the lived experiences of female engineering leaders in the New York utility sector. Chapter 1 provided the conceptual foundation and importance of this study. Chapter 2 discussed previous literature surrounding the study and identified the gap in the literature. This chapter describes the qualitative approach using a phenomenological study and the Moustakas (1994) method to understand the behavior and traits of female engineers who become leaders. The literature lacks discussion of female engineering leaders. Addressing this gap in literature assists in understanding the perceptions of female engineers in leadership positions.

Participants in this study were women from all age groups who obtained their undergraduate degree in engineering and pursued a leadership position in the New York electric utility sector. I recorded 28 interviews with female engineers to obtain their perspectives. In Chapter 3, I describe the research design and the rationale, role of the researcher, proposed methodology, instrumentation, collection instruments, procedures for a pilot study, recruitment of participants, the data-analysis plan, trustworthiness, and ethical considerations.

Research Design & Rationale

This study addressed the following research questions:

RQ1: How has being a female engineer impacted professional careers as leaders in the New York utility industry?

RQ2: How do lived experiences of female engineers enable or impede advancement into leadership positions in the New York utility industry?

Engineering is a male-dominated field and obtaining experiences from female leaders, the minority in the workplace, assists in closing the literature gap on understanding the role of female engineers in leadership in the utility sector. I used the phenomenological research approach to examine the lived experiences of female engineers and their perceptions of their male-dominated work environment. The rationale for this approach was to develop a holistic understanding of the daily notions of individuals in complex situations and to observe the results.

Role of Researcher

My role in the study was to conduct the interviews. I am a woman in engineering in the utility sector who has not yet attained a leadership position in the field. I do not fit the criteria of individuals who will be interviewed, and my role in this study was as an observer. To mitigate bias, I maintained the phenomenological methodology and asked the same questions of each interviewee. Interviewees did not have a relationship with me prior to becoming an interview participant in this study. One ethical issue that may have arisen in conducting this study was the need to attain participation approval from these women and for their employers to release some information about their jobs. The plan to address this issue was to use interviewing questions rather than asking random questions to obtain information that could interfere with their workplace efficacy.

Methodology

The methodology was a qualitative phenomenological study. I selected this method because it focuses on social and human behavior that pertains to this study:

> Qualitative research is an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem. The

> researcher builds a complex, holistic picture, analyses words, reports detailed views of informants, and conducts the study in a natural setting. (Isaacs, 2014, p. 318)

I used this methodology to understand the societal impact of these women leaders and the male-dominated culture in which they work, as well as the positive and negative influences on the population.

The population for this study was female engineers who have attained leadership positions in the utility sector. The sampling strategy was to identify women in the New York area through various women societies and networks involving those who work or worked in the utility industry. These organizations and networks include the SWE, Women in Communications and Energy (WICE), Women's International Network of Utility Professionals, Women in Science and Engineering (WiSE), Women in Engineering Pro-active Network (WEPAN), Professional Women's Leadership Association, and Association of Women in Energy. Following an inquiry through e-mail, phone, or a networking event, I requested their participation in the study. One criterion for which participants I chose was that they were women who have an undergraduate degree in engineering and have managers as individuals directly reporting to them. I did not require participating women to have an active role in a leadership position; that is, they may have retired or moved to a new role. Female engineers comprise less than 10% of those in leadership roles.

For a study to have quality, researchers analyze the data and realize when data saturation has occurred (Marshall, Cardon, Poddar, & Fontenot, 2013). Saturation is achieved after repetitive responses from participants. The specific procedure for

participation was to contact several women's professional groups through membership affiliation, connect with members through websites, and speak with the board of directors. An e-mail (see Appendix A) explained the purpose of the research, as well as its importance to the members/directors, detailing criteria for members to participate. Participants who agreed to participate in the study received a separate e-mail, as well as additional information about the study and how the interviews were to be conducted. After each interview was conducted, I asked the participant if they knew another woman to be potentially interviewed, in hopes of creating a snowball effect to gain insights to additional participants (Waters, 2015).

Instrumentation

The interview protocol (see Appendix B) was the instrumentation used to collect data. Rowley (2012) discussed interviewing techniques, such as staying quiet and taking notes, to assist researchers in making informed decisions in qualitative data collection to yield high-quality data analysis. In phenomenological research, appropriate organization of questions and structure can yield reflections of participants' actual feelings (Tomkins & Eatough, 2013). In a qualitative phenomenological study, interviewing is a technique for data collection (Rowley, 2012). The primary sources of data collection for this study were phone or face-to-face interviews that I recorded. This type of interview, where the interviewee chooses a public location, provides an intimate environment where the participants establishes the level of comfort is established necessary for a phenomenological study (Tomkins & Eatough, 2013). The study consisted of the interviewing questions, guided by the Moustakas (1994) method for interviews, to establish themes for the interview. Obtaining sufficient data from participants in

phenomenological studies occurs through interviews. Researchers work to establish an interviewee-focused rapport by listening and considering the interviewee's experiences.

Researcher-Developed Instruments

Moustakas (1994) described the development of interviews through questions the researcher can develop to capture the experiences of participants through the phenomenology of the study. The interviews consisted of 10 questions (see Appendix B) to assist in answering the research questions by obtaining data from the experiences of participants. Interviews were audio recorded, composed of phone or face-to-face interactions. The recorded interviews were transcribed into a Microsoft Word document. The phenomenological interview notion stems from Moustakas and accounted for the developed list of questions to obtain data about women's experiences and feelings.

The qualitative research-instrument protocol for the phenomenological study sought to understand what occurred for each participant and to gather their experiences through the list of questions in the interview (as in Moustakas, 1994). The interview questions were appropriate to answer the research questions to obtain the various perceptions and experiences of these women. The women's career choices and the difficulties each experienced in the engineering field as an undergraduate student contributed to the interview responses, providing validity for the data-collection instrument. The gap in the literature on female engineers relates to their specific roles in the population of female leadership professionals in the utility sector.

Pilot Study

One pilot was conducted with two interviews to check the questions for their appropriateness for interviewees and to verify that the questions were relevant to the

research questions (Rowley, 2012). Prior to the start of the study, I conducted the pilot tests with two individuals who fit the criterion of a female engineering leader to assure the target audience would be questioned appropriately. It was important to discern if the wording of questions would block the importance of the questions and, therefore, I need to check with individuals prior to the beginning of the interviewing process (Tomkins & Eatough, 2013). The purpose of conducting a pilot study was to test for flaws and other issues that could impede the study (Rowley, 2012). The pilot study assisted in ensuring the interview questions were modified to fit the study appropriately. Reliance on a well-defined process followed Vagle's (2014) approach: strongly based on reflection, including reflection on the quality of my research skills (i.e., ability to conduct a quality interview).

Procedures for Recruitment, Participation, and Data Collection

Women who were interviewed came from various utilities through networking sites specific to female engineers: SWE, WICE, Women in Science and Engineering, Women in Engineering Pro-active Network, and Women's International Network of Utility Professionals. These networking sites have a base in the New York region and provide assistance in keeping women connected. The organizational sites assist in increasing the number of women members. If too few women were willing to participate, I would have contacted various human-resources departments (by e-mail, phone, and career fairs) in the utility sectors in the New York area to procure more individuals to participate.

Participation for this study was voluntary for every woman who agreed to participate in the study. If more than 25 women agreed to participate in the study, then

they would have been interviewed. Each participant was advised of the length of the interview prior to beginning the interview, to ensure participants could stay for the entire interview. When participants exited the interviews, she was advised that her identity would remain confidential and described the remaining dissertation process. If follow-up questions are needed, a similar set up would be utilized, going to the interviewee's location.

Data accrued from individuals who agreed to participate in the study at a location that was convenient and comfortable for the interviewee in a public space, such as a library or over the phone. Interviews lasted approximately an hour. Data accrued through an audio device. The data-collection process consisted of a member-check interview. This process is an interactive method such that as the interview is taking place, not only is it being recorded for transcription, but the researcher checks responses for "confirmation, modification and verification" from the interviewee (Birt, Scott, Cavers, Campbell, & Walter, 2016, p. 1805). If clarification is needed, a second interview will be scheduled with that participant. If an interview was interrupted or the interviewee needs to leave, the interview will be rescheduled.

Data-Analysis Plan

A transcendental phenomenological study focuses on a group of individuals who have a common encounter that has happened or is happening, using a humanistic approach (Jacobs, 2013). For this study, the modified van Kaam method of phenomenology is utilized, discussed by Moustakas (1994), for the data analysis, to capture the experiences and perceptions of the women. Using the modified van Kaam method assisted me in understanding the data from each interview and organizing

responses through the transcripts. The process consisted of manually analyzing the transcribed data following the interviews through the horizontalization process (equalizing each statement to have the same value) of Moustakas.

Through this process, the each woman expressed her perceptions to aid in answering the research questions of the study. Through manual manipulation, I extracted statements and collected quotations from the interviews that correlated with female engineers' leadership perceptions. Data was regrouped based on themes and commonalities between individuals. The purpose of the grouping was to develop a procedure to enable coding of the data to understand a woman's experiences through her words and statements (as in Moustakas, 1994). Through grouping, researchers put together meaning units into shared ideas from individuals' own words. Researchers conduct constant analysis and comparison of data to identify and refine commonality among the data from the transcripts. Through meaning units, a composite textual description derived from the women's experiences to assist in understanding the phenomenon (aligned with Moustakas, 1994).

Issues of Trustworthiness

Phenomenologists seek to understand the significance of humanistic encounters or impressions in a period or on a topic of study (Lin, 2013). Trustworthiness means "validity that spans paradigms and may be thought of as relevant across most research paradigm" (Morrow, 2005, p. 250). Understanding why humans act or perform or react in certain instances is a phenomenon (Moustakas, 1994). Being able to strategize how to obtain trustworthiness for this approach is found in credibility, transferability, dependability, and conformability. To address issues of trustworthiness, each interviewee

is spoken to prior to the interview to develop a relationship and build trust. I explained that threats to validity reliability could impact this field of study and the need to use the methodology consistently. Having inconsistent procedures or coding errors and incorporating researcher bias are some examples of possible threats to phenomenological research (F. Williams & Emerson, 2008). To maintain trustworthiness for this study's transcript reviews, recorded interviews, member checking, and computer software, consistent information-management system is utilized for this study.

Credibility

Validity of a qualitative study is the point at which the outcome is deemed trustworthy (Lin, 2013; Loh, 2013). For this study, thick descriptions captured participants' experiences, using audio recordings as the instrument to collect data (Vicars & McKenna, 2015). I explain and support the analysis in Chapters 4 and 5. Credibility must be confirmed by others, showing the findings are accurate and research bias is absent (Lin, 2013). Researchers use the bracketing method to mitigate preconception bias in a research study (Petty, Thomson, & Stew, 2012; Tufford & Newman, 2010). This method of analysis removes the judgment of the researcher, leaving an open-minded approach (Moustakas, 1994). For this study, I bracketed bias toward female engineers in leadership positions in a journal; thus, before conducting each interview, the journal entry reminded me of my bias to help ensure it was not included in the interview session. This method leads to dependability, allowing the research method to be repeated.

Transferability

The interview questions for the study pertained to the lived experiences of each interviewee to obtain thick descriptions that may aid in the transferability of this research

(as in Borrego, Douglas, & Amelink, 2009; Petty et al., 2012). Though this study will be conducted with a small population, similarities emerged with results of other studies (as suggested by Marshall et al., 2013). For female engineers in leadership positions, the interview questions were structured to elicit an open dialog to inquire about their experiences and collect comprehensive and significant information (Petty et al., 2012).

Dependability

Consistency between interviews aided in the organization of the research and assisted in the dependability of the study (Lin, 2013; Venkatesh, Brown, & Bala, 2013). For this study, female engineers took time to refrain from answering phones or e-mails, so as not to interrupt interviews. Throughout each interview conducted, an audio device is used and notes are written to capture motions and key words of each individual. Electronic documentation aids in establishing the dependability of the study. It is the role of the researcher to notice when information is repeated in the interviews and determine when saturation has occurred. The organization of collected data assisted in documenting all information accruing during the interviews, establishing the findings (Culver, Gilbert, & Sparkes, 2012).

Conformability

The reliability of phenomenological research comes from researcher analysis of the data in attempting to gain conformability. Throughout the study, I consistently rechecked information and engaged member checking to involve the interviewee (Loh, 2013). Member checking ensured that information exchanged was accurate and verified that each party agreed with the information imparted in the transcripts (F. Williams & Emerson, 2008). I contacted each woman who was interviewed and ensured no errors

emerged in the transcripts to aid in the accuracy of the study. These tools enhanced trustworthiness throughout the data analysis (Culver et al., 2012; Petty et al., 2012). Establishing reliability ensures greater integrity of the findings from the study.

Ethical Procedures

Prior to conducting this study, the Walden University Institutional Review Board (IRB) required the researcher to complete a Human Research Protection training certificate. All participants signed consent forms after the IRB granted approval to gain access to data. All participants involved in the study received notification, prior to beginning any questions and face-to-face contact with the researcher (Muskat, Blackman, & Muskat, 2012). Notification was in the form of a written agreement between the interviewee and me that the information discussed would be used for the study. In the event the interviewee would have liked to omit something said, the information would have been removed (Rowley, 2012). I treated each interviewee in a professional manner in a controlled environment so no outside interruptions would occur (Muskat et al., 2012). I recruited individuals through various methods such as contacting individuals by e-mail or phone through professional groups in the New York City area.

In the event potential interviewees did not want to participate or withdrew during the interview, they were free to leave the study (as in Marshall et al., 2013). I would have asked the individual why they wished to leave the study and incorporated their lack of participation in the findings (Muskat et al., 2012). If they withdrew during the interview, I would have explained that the interview was incomplete and the effect the failure of the interviewee to continue would have on the study (Rowley, 2012). The IRB requires the data integrity of the study to be confidential and participants to be notified that

information would have password protection, satisfying compliance with audits and proper disposal. All interviews were recorded audibly. As an IRB requirement, to minimize any negative outcomes, the treatments are reflected on human participants for risk level.

Participants' names are not mentioned unless they wished to be identified. All collected data remains on a USB drive archived at my residence. I used one USB drive per participant, kept in a safe that only I can access. Data will be destroyed, if requested by the interviewee, after a few years, aligned with the IRB minimum (Muskat et al., 2012; Rowley, 2012). If the interviewee wanted a copy of the data, a copy would be sent to the interviewee so they could access it.

No participants came from my immediate environment (as suggested by Muskat et al., 2012). Although some participants live or work in other regions of employment jurisdiction, their participation did not conflict with my employment. Proper routes of communication are utilized to gain access to sensitive information that may be shared with interviewees (Muskat et al., 2012). Information from participants who are outside my employment jurisdiction did not impact either party.

Summary

Chapter 3 described the Moustakas (1994) phenomenological approach, which aided in gaining the perceptions and characteristics of female engineers who are leaders. This chapter outlined the methodology used for the research study and the rationale for using the Moustakas method. The chapter included the role of the researcher, ensuring the structure was in place during the interviewing process, and how to mitigate bias. In the chapter, it is explained how the research was conducted and how participants were

recruited, to aid in repeatability of the study. The study involved an interviewing technique with 28 phone or face-to-face interviews, using technology, as much as possible, to record data. I conducted a pilot study to identify any flaws in the settings or questions and to address any unknown issues that may have arisen during the interviewing process.

The chapter also included explanation of the data-collection and the data-analysis plans, using the modified van Kaam method (Moustakas, 1994), to inform how the data was composed and evaluated. Issues of trustworthiness assisted in the credibility, transferability, dependability, and conformability of the research study. Ethical considerations, thoroughly discussed in this chapter, explained how individuals and data were treated, maintaining confidentiality for each participant. The chapter also included a discussion on the protection and storage of data to ensure no conflict of interest with any parties involved would arise. Although the interview environment varied, based on the location of participants, all other parts of the methodology remained consistent, to ensure repeatability. In Chapter 4, actual data collection, analysis, and results from the female engineers in leadership positions.

Chapter 4: Results

The purpose of this qualitative phenomenological study was to explore the lived experiences of female engineering leaders in the New York utility sector. The general research question was, What are the lived experiences of female engineering leaders in the New York utility sector?

RQ1: How has being a female engineer impacted professional careers as leaders in the New York utility industry?

RQ2: How do lived experiences of female engineers enable or impede advancement into leadership positions in the New York utility industry?

This chapter has sections on the pilot study, settings, demographics, data collection, data analysis, evidence of trustworthiness, results, and a summary. These sections lead to conclusions, described in Chapter 5.

Pilot Study

For this study, one pilot study was conducted with two female engineers, one in a café and one in a library, to validate the interview questions. Each participant was given the questions so if they needed to go back and reread each question to think about their response before they answered, they had the questions in front of them. Each participant understood that the interview would take an hour and allocated 60 minutes so they would not be rushed or lack time to think about how they wanted to answer each question. The microphone was used and notes were taken as the participant answered each question. After each pilot interview was completed, the interviewee was asked for feedback. The pilot studies followed the same transcript, codes, categories, and themes as the main study. Both interviews yielded the same results and responded to the research questions

in a similar manner. No difference arose between the pilot study and the main study and I changed nothing after the pilot study.

Setting

I conducted 22 interviews by phone to allow each participant to fit the interview into their work and home schedules. This format corresponds with the proposed data-collection method described in Chapter 3 of participants being in a convenient and comfortable environment. Most participants were in leadership positions for more than 10 years. Five participants had just started in their new role as a manager of managers and had less than 1 year of experience with a title that could influence interpretation of the study results. In their new roles, participants had new personnel and were adjusting and learning about them and their contributions to their new departments. Four participants had just moved from one geographical area and were adjusting to their new environment; four were working from home for an extended period, which are all factors impacting the setting. Participant 12 just started directing a new department in an organization that did not exist prior to her promotion, providing another organizational condition that may have influenced participants in the study.

Demographics

Each participant was a woman who obtained an undergraduate engineering degree. These undergraduate engineers' degrees included electrical, civil, mechanical, industrial, chemical, computer, computer science, structural, manufacturing, architectural, power, environmental, metallurgic, and material engineering. Each participant worked or currently works for a New York state utility company. The women who participated in the study ranged from their late 20s to late 60s. The years of experience ranged from less

than 1 year to more than 40 years. The ethnicities/races of the women were Asian, Black, Hispanic, Indian, and White.

Data Collection

For this study, 30 women who worked in a New York State utility company were interviewed: two for the pilot study and 28 for the full study. I queried various societies of women in the New York area to obtain participants. WICE was one organization that responded and highlighted this study on their website, posted the criteria for participation, and contacted me if anyone expressed interest. Many participants knew of other women who fit the criteria and referred me to additional participants. Each participant was a woman who obtained their engineering degree as an undergraduate, was currently a manager of managers, and worked in the New York utility sector.

Each interviewee was contacted by e-mail and then once either face to face or by phone. The duration of the data collection varied from 13-minute to 47-minute interviews. Each interview was recorded with an audio device. No variations occurred from the plan presented in Chapter 3 for the data. The only unusual circumstance that occurred during data collection was that the recorder stopped recording midway through one of the interviews. However, additional audio devices served as a backup and the interview continued with minimal interruptions.

Data Analysis

After the third interview, I began grouping key words to begin obtaining codes by abbreviating words that were frequently used. Oleinik, Popova, Kirdina, and Shatalova (2014) said the "assignment of the categories to the coded units (texts), by any coder, is governed by the distribution of the categories" (p. 2705). I transcribed the interviews

through Microsoft Word and Google Documents. The data-analysis process continued using Moustakas' (1994) modified van Kaam method of transcription by reviewing the data at least 10 times and identifying more categories and themes. Through the horizontalization process, the transcripts were grouped and reread to understand the data and its importance. Through manual manipulation, statements and quotations were collected from the interviews to answer each research question.

Member checking was key in the coding of the transcript; key words started to repeat as the interviews progressed. For example, many participants spoke about group work while in school and how it helped build teamwork as an engineer, once they entered the workforce. P3 stated "teams helped with solving problems with others and also built confidence which is needed when taking on new roles now." P11 stated, "from undergrad engineering classes, working in a team environment taught me how to work towards deliverables as a team for work." The researcher coded that concept in the notes as TEM for team, and then coded EXP for Experience. These codes helped establish categories and themes to emphasize the importance of how participants had similar journeys. Once coding was completed, based on the notes and transcripts to confirm what was heard during the interview, a frequency system was used to see how many different participants used the codes to answer each interview question. If interviewees used a code once in the interview, it was only used once for each question and thus did not indicate how many times that code emerged in response to a question. Line-by-line coding to narrow categories and themes through the number of times interviewees used words or phrases throughout the interviews (see Table 1).

Table 1

Initial Frequency Coding Structure

Career	CAR	Family	FAM
Challenge	CHA	Help	HLP
Change	CHG	Learn	LRN
Difference	DIF	Opportunity	OPP
Experience	EXP	Team	TEM

From the codes, categories arose from participants' responses and data obtained from the transcripts. These categories helped me create themes from the data and started to show the importance they had for this study and the women involved. Four categories emerged from the data: communication, influence, support, and environment. The women discussed the importance of communication in not just their careers, but in their lives. Influences from the past and present affected the women and impacted decisions they made in their lives. They described support from family, friends, and colleagues throughout the interviews. Environmental impacts from their homes and work were also contributing factors to women's behaviors and reactions.

Through coding and categorization, themes emerged to help discern the importance of the data to answer the research question. These themes are described in greater detail in this chapter. A discrepant case was analyzed during a few interviews when participants answered "no" to the same question without any other response. These answers factored as positive reinforcement about working in the utility industry as a form of data analysis and career choice. Themes that emerged were Change, Co-op and Internships, Family and Friends support, Male Dominated, Math and Science, Self-

Motivation and Self-Doubt, Sponsorship, A Variety of Jobs in Utility, Work–Life Balance, and Working in Teams.

Evidence of Trustworthiness

Implementing credibility in the study was conducted through bracketing journals to mitigate fixed ideas in the research study. Pompeii (2015) described credibility as the human experience that others who have gone through and would identify instantly, and external people can comprehend. Before conducting each interview, bracketing journal was reviewed to ensure the interview did not incorporate preconceived notions, thereby allowing me to remove those notions from the study. In addition, only the interviewing questions were asked and did not veer from the questions or need to follow up. There were no adjustments to credibility, described in Chapter 3. The audio device captured the entire interview so thick descriptions emerged during the data collection, which aided in transferability.

To implement transferability, thick descriptions to help in interpreting answers to each interview questions. As each interview question was asked, comments were written and key words and reiterated relationships in responses. Through thick descriptions, a detailed outline was developed of what occurred during each interview from notes taken during data collection. I asked 10 interview questions to answer the two-research questions: five for each question. The point of each question was to capture various aspects of the lived experiences of the female engineers, to answer the research questions, and to aid in encouraging participants to openly describe specific details and memories that aided them in their careers.

Each interviewee signed permission that detailed that each interview would be recorded, thereby implementing dependability for the study. Throughout the interviews, notes captured individuals' tone. Transcripts aided in discerning the findings by assisting in identifying reemerging themes. Much information repeated from interview to interview. Pompeii (2015) described dependability as being able to have repeatability of the study. During the interviews, I asked only the interview questions and I did not speak during their response, to ensure the study satisfied the tenet of dependability.

To implement conformability, each transcript was sent to the participant to review, to aid in accuracy. Each participant signed permission to conduct the interview and had the right to change or delete information with which she was no longer comfortable. I ensured each study was recorded and used thick descriptions to maintain consistent strategies through each of the interviews. Through this process, trustworthiness was highlighted throughout the data analysis to further strengthen the study.

Results

The intent of this study was to show awareness of how women develop in the male-dominated field of engineering and succeed by becoming leaders in the New York utility sector. The overall research question was, What are the lived experiences of female engineering leaders in the New York utility? This overarching question was partitioned into two research questions: *RQ1*: How has being a female engineer impacted professional careers as leaders in the New York utility industry? *RQ2*: How do lived experiences of female engineers enable or impede advancement into leadership positions in the New York utility industry? This section highlights the 10 themes that emerged from the two research questions, by interview question, half for *RQ1* and half for *RQ2*.

RQ1

All participants had engineering degrees from their undergraduate studies. The interview questions for *RQ1* were Questions 1 through 5, listed in Appendix B and asked about experiences during their studies, the effects of obtaining their degrees, the dominance of men in engineering, and their personal attributes that aided going into leadership. These questions aimed to understand the engineering part of women and its impact from being in school to graduating and the effect on their professional careers as they were entering the work field. From the responses, the codes that transpired were challenge, change, difference, learn and team. The categories were communication and environment. Themes emerged for each interview question, providing findings for *RQ1*. Themes for *RQ1* are (a) Change, (b) Co-op and Internships, (c) Male Dominated, (d) Math and Science, and (e) Working in Teams.

Change. For half of the participants, the discussion of change occurred especially when entering college from high school and then leaving college and going into the work field. Participants discussed the college experience as feeling overwhelmed, needing better time management, and preparing for the workplace as areas of change that occurred for half the women. Feelings of being overwhelmed came from not having sufficient sleep because they lacked good study habits prior to college. Participant 17 stated

> I wish I had better studying skills because high school I did not need to study and when I got to college, it was a big change because I did not know how to study or how to manage my time.

The lack of time management for half the women in this study came from realizing that, in college, they did not have enough hours in the day to attend class, do homework, write papers, and study for class, examinations, and laboratories.

Eight women spoke about coming from small high schools and entering big universities and the changes that occurred. Participant 4 said "I came from a small town where the graduating class was 62 kids and it was a big change going into college and being lost in a sea of people." They needed to adapt to finish their studies and become an engineer. One change that many of the women wished had occurred was taking more business courses, enabling them to better understand organizations and corporations before entering the field, providing them with more financial background to identify with upper management. Participant 22 stated "engineering curriculum need to change to incorporate hoe to communicate, negotiate projects and provide more business courses." Participant 4 stated, "I enjoy the energy field because it is changing so much and it is adapting to change which continues to help bring stability to the utility field." A few women were the first in their family to attend college, and being able to work in their field while going to school helped them continue.

Co-ops and Internships. Many participants discussed their appreciation of co-ops, internships, and work-study programs. They were buoyed by seeing different applications of the work experience, the application of what they learned in school, and how that knowledge related to what happened after college. Participant 16 said "classes helped with the co-op experience which helped with my job when I graduated." The application of work aided in women staying in classes to progress in their school and further in their careers. A few women spoke of their internship experiences, exposing

them not only to engineering work, but to the people who helped guide their career. Participant 8 stated, “my experience with co-op was I was able to see a project I was working on be implemented before I left,” which encouraged her to finish her degree.

By working in the workforce, women had the hands-on experiences they needed to continue throughout their studies. In a discrepant case, Participant 18 said “during my internship I realized I did not want to go into the technical aspect and knew I wanted to obtain the engineering degree but apply the degree in another aspect, such as business.” She wanted to solve problems and analyze scenarios, which helped place her in a leadership position. Eleven of the women preferred a co-op because it helped them be able to attend classes while working. Ten women stated co-ops helped them adjust to male dominance in the workplace.

Male Dominated. Various women said that the dominance of men did not affect their career choice when entering engineering. What helped a few women was the support of teachers and asking questions. Participant 14 said, “I started asking a lot of questions while in undergraduate to overcome some negative feedback from my male peers.” Asking questions helped her when she graduated and could ask pertinent questions in the workforce, which she believed helped her move up. Participant 7 stated, “being a minority in school prepared me for being a minority at work.” Many engineering majors and women in this study described the dominance of men. However, in a discrepant case, a woman who majored in chemical engineering described equal ratios of men and women, so male dominance was not a factor in her career choice. Participant 25 said, “male dominance was status qua and some men accepted women while others did not.”

Seven women in this study believed what helped them in male-dominated classes and the workplace was that they enjoyed competition and believed that if men could do it, so could they. Engineers compete, so these women believed they fit in. Nine women said that in male-dominated organizations, they experienced sexism not merely in the workplace, but also from teachers who denigrated women and did not understand their desire to become engineers. From working with few women in college, they could bond together and help each other, which is a form of networking that helped one woman through her undergraduate courses. Women experienced biases toward them, but did not let those biases deter them from entering the career. One reason many women entered the field was enjoyment of certain subjects in school.

Math and Science. Numerous participants stated they entered the engineering field because they were good in mathematics and science. These skills helped throughout their college years and having that strong background enabled them to continue their progression through classes and throughout their studies. Participant 22 said "I was motivated by achieving high grades in math and science which helped in my undergraduate studies." Engineering helped them reason through and solve problems. Participant 19 said, "because I liked math and science I was up to the challenge when it came to advancing with men who were also good in those subjects."

Fourteen women were unsure which path to choose and were told that because they were good in mathematics and science, they should go into engineering. Participant 11 stated, "I was good in math and science but my parents wanted me to become and engineer, but I wanted to become a math teacher." She decided to try engineering to appease her parents and does not regret that choice. Nine women said that while working

in teams in high school, their classmates in mathematics and science encouraged them to go into engineering because they were so good.

Working in Teams. Several women stated that during their college years they experienced much teamwork, which helped them prepare to work in teams when they entered the work force. Starting with study groups in college and group projects, being the only women in a group of men started in college. When the same ratio occurred in the workplace, these women were used to it and were prepared to work with men, whereas others had different experiences when working on a team of men. A handful of women said their undergraduate degree gave them a good baseline; however, they fully developed their engineering skills while learning on the job in teams. Participant 4 described her experience with teamwork as follows:

> During my undergraduate studies, I had to take at night because I worked full time during the day. Being in a program where everyone worked during the day and went to school at night aided in us working together to achieve group work goals.

Participant 24 spoke about "embracing work that no one wanted from a team, which put me in the alternative energy field that has allowed me to advance within leadership because no one wanted it initially." Participant 27 stated, "working in teams helped also to build communication skills and how to interact with others."

RQ2

All participants were managers of managers in the New York utility industry. The interview questions for *RQ2* were Questions 6 through 10, listed in Appendix B, asking participants about experiences that occurred while in these leadership positions, what

affected their career choice by going into the utility, influences, situations, issues, and how they felt about being a leader in their prospective job titles. These questions aimed to discern the effects of lived experiences of these women and what happened or continues to happen in their leadership roles. During the responses to the interview questions, the codes that transpired were career, experience, family, help, and opportunity. The categories were influence and support. Themes emerged that helped identify findings for *RQ2* are (a) Family and Friends Support, (b) Self-Motivation and Self-Doubt, (c) Sponsorship, (d) Variety of Jobs in Utility, and (e) Work–Life Balance.

Family & friends support. Several women proposed that family and friends helped them overcome issues and situations when advancing in their careers. A few women said they met their husbands in the industry and through spousal support, could move higher in their career. Positive feedback from family, friends, and teachers enabled many women to continue and focus on school to transverse many experiences of these participants. Participant 13 stated, "I learned my work ethic from watching my parents, who gave respect to everyone and my mom was my role model."

A discrepant case was Participant 19 who stated, "I did not have the support of family because they did not want me to go into a corporate role." Yet, she made the decision to continue and could attain leadership; she did not believe her title had significant meaning. Women believed they should take a role outside of their comfort zone to gain more support from others outside of family and friends. For example, Participant 23 said "I experienced harassment and wanted to quit." However, because family and friends supported her, she could communicate and speak up for herself; also, others joined her in her workplace and spoke up to settle issues appropriately.

Self-Motivation and Self-Doubt. Many women described themselves as motivated, with a great work ethic, and ready to advance; however, they also discussed how, if they were not 100% ready for a higher move, they would not apply for a job. Participant 3 said "I found my voice in a women's networking group and became self motivated to wing it and apply for a higher position even though I did not think I was ready and I got the job." A handful of women stated a man could have half the qualifications for a promotion and would get a job, whereas if women had all the qualifications except for one, they would still not apply. Women needed to satisfy all qualifications to apply to move up, pointing to their self-doubt. On self-doubt, Participant 14 stated, "I did not want to let anyone down*"* but learned that she could not please everyone. Twelve women said they enjoyed the challenge and empowering others to do their best, which, in turn, empowered them. Many women believed and also were told they received a job because they are women, making them feel they did not belong or were not accepted.

Participant 6 experienced "self-doubt when it was time for a promotion and I had just had a child and felt I was not ready." However, through sponsorship and others knowing she would do a great job, even though she did not apply, she was chosen to advance. Thirteen women felt self-motivation to advance quickly in their careers. They believed that because they did not have the years of experience that men did, they started to doubt their ability to handle situations. They needed support from someone higher to encourage them to believe they were chosen for a reason, and not because they were a woman. Participant 19 said "I lacked confidence, but others believing in me meant I could be promoted once I realized that, I worked harder."

Sponsorship. Many women spoke of someone above them who was supporting them and helped them become a leader in their department. A few women said that women who were already in leadership roles not only influenced them, but also helped get them promoted. A few women spoke about networking; building relationships helped them move into higher positions. Participant 18 said "sometimes it is who you know and if they know you." Networking had a major influence on these women's careers. Participant 23 said "advice received from someone higher is not to turn down a move even if it's a lateral move." That lateral move may teach a woman something she needs to know for the future. If someone believes a woman will be able to perform, advancing in her career may enhance her ability to show leadership.

Having a supportive management team is also an advantage in a woman's career. Having a mentor is another aspect that women described, providing someone to reflect and be proactive. In twelve cases, a mentor helped women deliberate on ideas or make a presentation. Mentors gave twelve women advice or listened to them. A handful of women discussed how difficult it is without a sponsor, mitigating the ability to break through to a leadership position, especially when senior leaders lack the credibility they once had. Leaders saw potential and gave assignments that were outside their job scope to see how well women performed, which helped them move up. Participant 9 stated, "having a male and female mentor is needed to have allies and listening to the male perspective."

Variety of Jobs in Utility. Many women have been working in a utility for years and discussed the various positions they held. For example, Participant 8 stated, "I held 14 difference positions and it exposed me to not only great people and great positions, but

great responsibilities that helped me move up into leadership." Five joined the utility industry because that was the only place hiring in the area for engineers at the time. Eight women wanted stable jobs and utilities were known as a stable work environment. Nine women said that, due to where they were raised, the energy field was appealing to them. For example, Participant 24 said "I grew up in California and was exposed to alternative energy, which helped me stay in the field as it expanded into different sectors and kept me interested in the utility industry."

A handful of women said they did not know about the variety in the utility sector until they attended their career fair and spoke to workers. They learned more about the utility and the opportunities that existed. Nine women who entered the utility sector were in a rotation program where they could hold different positions and see the variety in the utility industry, which piqued their interest to stay in utilities. Participant 10 stated, "when I was graduating only utility jobs were available so I didn't choose utility, utility chose me." Three discrepant cases in utility jobs were that once a person had experience in their career, they were compartmentalized into to the utility and could not move to another career. Six women joined the utility because they had a family member in the utility who showed them the positive aspects of working there while still being available for their family.

Work–Life Balance. Twenty five women discussed that work–life balance was one of their greatest challenges, especially in a household with two working people. Women do not want to miss important times with their families, but also do not want to miss important meetings in their workplace. Finding that balance was challenging for many of the women and ways to overcome the challenges were unique to particular

participants. Participant 12 stated, “I do not want to go further in my career and I have declined promotions because I don’t want to be away from my family more than I am now.” Participant 18 said “I believe I moved far up in my career because I never had a partner and realized that my trajectory would be different if I did.”

Nineteen women discussed sacrifice and knowing that, as they advanced in their career, they would be unable to attend all family events to maintain balance. Participant 9 said “I was present for milestones and sport events but working for a company that allows me to work from home, has sick leave and is flexible aids in being a woman in leadership you try to balance work and home.” Participant 19 said, “I had to leave a job because it was far from home and due to the long commutes, I switched jobs.” Participant 24 stated, “I work to live and not live to work.” Yet Participant 13 stated, “take a role that works for you to take care of the family.” Being able to do both was important and finding balance helped in the progression of women’s careers.

Summary

Participants viewed themselves in various manners that helped them attain leadership ranks and develop. Personal attributes and values that 21 women said they believed contributed to getting a leadership position were being honest and open; being a good communicator (18), being a hard worker (18), and helping others (19). Throughout the interviews, women said they loved to learn (22), made a difference (24), were not afraid to ask questions (27), enjoyed teaching people (17), and were team players (28). These attributes contributed to answering the research questions of this study.

The research questions addressed female engineers who hold or held leadership positions in the New York utility. The first research question inquired about the

experiences of these women as engineers and how having an engineering degree impacted leadership in their career. Having an engineering degree, women were able adapt to change, use their skills, and move ahead. Having a good basis in mathematics and science and by working largely with men allowed them to transition into co-ops and internships and work well on teams. The engineering degree impacted these women by providing a strong baseline to be able to overcome situations. Even though the women had different experiences, these themes emerged from the data and were repetitive throughout the data-collection process.

The second research question inquired about women's experiences that affected their leadership position in the utility. From the data obtained, family and friend support helped women continue with their careers as well as supported how the women felt about motivation and doubt. Having a sponsor as women experienced different job roles impacted their experiences. Many women spoke about work–life balance, which encouraged them to go further in their career because it allowed them stability and the ability to advance or stay where they were. These women's experiences stemmed from their views of themselves, other people's support, and becoming well rounded.

When situations arose, many women said it was important to keep moving forward and to pick one's battles. This finding aligns with the literature review on parental influence, remaining positive, and not backing down from one's life goals (Saucerman & Vasquez, 2014). Being able to absorb knowledge and focus on succession planning aided in their ability to be leaders in the utility industry. One point that every woman interviewed for this study stated was that the only person who could hold them back from where they are today was themselves. In Chapter 5, findings are analyzed and

interpreted. Also described are limitations and recommendations, based on the data and further research. The chapter ends with aspects of positive social change.

Chapter 5: Conclusion

The purpose of this study was to explore the lived experiences of female engineering leaders in the New York utility sector. This study used the phenomenological approach to bring attention to major factors underlying female engineers' pursuit of leadership positions. Key findings from the data collection were that many participants adapted to changes in their lives, did not let male domination affect their decisions, and worked well in teams. Most participants emphasized work–life balance, having support from others, and being able to move around in the utility sector. In Chapter 5, I discuss interpretations of the findings, limitations of the study, recommendations, and implications.

Interpretation of the Findings

Chapter 4 described data, trustworthiness, and results found in the study. The general research question was, What are the lived experiences of female engineering leaders in the New York utility sector? Experiences that repeated throughout the study showed similarities in school, work, and family experiences, as well as differences engineering women leaders have experienced at work. The themes that emerged from Chapter 4 were topics that impacted the women in this study; through these themes, not only did participants address the research questions, but also built on the literature review.

The overall research question was partitioned into two research questions.

RQ1: How has being a female engineer impacted professional careers as leaders in the New York utility industry?

The themes for *RQ1* are change, co-op and internships, male dominated, math and science, and working in teams.

> *RQ2*: How do lived experiences of female engineers enable or impede advancement into leadership positions in the New York utility industry?

Themes for *RQ2* are Family and Friend Support, Self-Motivation and Self-Doubt, Sponsorship, Variety of Jobs in Utility, and Work–Life Balance. This conclusion section will focus on the themes, literature, and research questions.

Self-Efficacy and Culture

Chavez (2014) discussed how stereotypes deter women from entering engineering fields; however, the present study identified some disconfirmation in that women who were interviewed stated that male dominance culture did not affect their career choice. This outcome helps answer *RQ1*, which discussed impacts on female engineers' professional careers. Participant 5 stated,

> When I first started working 35 years ago, I was the only woman, and a coworker refused to talk to me because their father told them that I was there to take their job. Things have changed so much that for the last 5 years, I have worked for a woman and more women are working along with me.

Participant 11 stated, "My mother was my role model because she pursued engineering decades earlier, in harder times than when I was pursuing my degree. I believed if my mother could get the degree, so could I." Participant 19 stated, "My mom influenced me as a single parent that I can do anything and if males can do engineering, so can females." These comments relate to *RQ1* in that having the influence of mothers impacted the self-efficacy of the professional careers of these women in the study, encouraging them to

become engineers. This kind of influence impacts growth and aspirations, especially when advancing to a leadership position in the New York utility sector. However, for one engineering major, male dominance culture was never a factor. Participant 17 stated, "As a chemical engineering major, classes were half male and half female so my career in school and out of school was always pretty mixed between the sexes."

Studies and Positions

Buse et al. (2013) said that women who were good in mathematics and science were encouraged to enter the field of engineering. This study confirmed that being good in mathematics and science led participants to engineering careers. Through studies, along with internships and co-ops, women were able to find out what careers they wanted to pursue. Participant 13 stated

> I was good at math and science, so I went into engineering. During my first college class, the professor asked me why I was in his class and told me I should study something else. I felt I had to prove to him and the class that I belonged. I ended up feeling bad because I did so well that the curve was based on my grades and many of my peers continued not to like me.

19 of the women in this study believed their mathematics and science studies helped guide them into engineering careers and the need to prove themselves in their classes, co-ops, and internships.

Participant 3 said,

> Math and science were my strongest subjects, so my teacher recommended that I go into engineering. During my second year in college, I was able to get an internship. The job helped show me what I wanted to do in my career and what I

> did not want to do. It also helped with the theory of what I was learning in class and applying it into practice.

O'Brien and Rickne (2016) discussed that women in their study overcame gender stereotypes by staying in male-dominated careers. This outcome relates to *RQ1* by having the opportunity as female engineers to have an internship and participate in co-ops, which helped introduce these women to their potential careers in leadership and helped guide their future paths in the New York utility.

Opportunity and Collaboration

Bandura's (1977) social cognitive theory showed that the lived experiences of women in this study were impacted by others in positive and negative ways. Working in teams for eight participants began in college when team assignments occurred regularly; thus, once they got to the workplace, teamwork did not affect their performance. Sixteen women described how college prepared them for their professional careers because their courses were male dominated and they had to learn how to work with men in teams. Participant 20 stated,

> Engineering classes helped me to prepare for my career because I learned how to work without a lot of free time, how to handle the pressure from a stressful environment, and how to work in teams with all men and do my part successfully.

Participant 9 said,

> Working with men in teams helped me build up my confidence to speak up and ask questions, which later helped with my career and being able to move up because I was not afraid to ask the hard questions everyone was thinking but not willing to ask.

Baker and Cangemi (2016) and Belser et al. (2017) said that women need opportunities or exposure to obtain leadership positions. Many women had a sponsor who helped provide them with the opportunity to advance into leadership, and nine women even stated that because they did not have a sponsor at this time, they did not see themselves moving higher until they did. For example, Participant 14 said, "support from a networking group and family helped me to build relationships which advanced my career because I had more exposure to different people which helped during interviews for higher positions." However, Participant 21 stated "I no longer have a sponsor, and I feel that my career is stagnant now and I have to constantly prove myself to the uppers that I belong in this position."

Support and Balance

Buse et al. (2013) said some women left their careers due to a lack of work–life balance; this study confirmed that having work–life balance was most important to women as working adults. Work–life balance was a major discussion among the women in the study that impacted their advancement into leadership roles. Participant 19 stated

> Having a job with work–life balance helped me in becoming a leader because I am able to work from home and balance out my home life and work life. I understand that I won't make it to every game for my children, but at least I get to make it to most.

Participant 25 spoke about a close family member getting sick and stated,

> Having a job that allowed me to work and still take care of family meant everything to me. I was taught that the choices you make in your career should line up with your values. Never take anything for granted as a woman.

Monzani et al. (2015) described gender roles and how parents treat children, based on their sex. The present research study disconfirmed that outcome, as a handful of participants were raised in households with many women, and their fathers encouraged them to aspire to nontraditional female roles based on where the father was working, and supported them throughout their studies and careers. Support from others seemed to enable women to advance into leadership positions to help answer *RQ2*. Participant 24 stated, "if I did not have support and people who believed in me, I would not have gone for higher positions or taken development classes to become a leader." Participant 18 stated, "I doubted my ability to lead until someone pointed out how I was leading my entire group effortlessly and then I started to believe in myself and go for leadership roles." Participant 28 said, "I came from a family of engineers, and even though they were males, they encouraged me, and it was expected of me to be successful."

Adapting and Energy

The lived experiences of female engineers have impacted their positions in the utility, helping to answer *RQ2*. Hatmaker (2013) averred that women who were in engineering spoke up and wanted to prove themselves. What enabled and impeded many of these women was how they viewed themselves, as well as having a company that provided a variety of jobs for these women to prove themselves. This study confirmed the Hatmaker study, affirming that self-perception dictated how women moved around in their careers. These findings related to the theoretical framework of Bandura's (1977) theory and how women handle themselves in various roles.

Having a variety of jobs in utility enabled and impeded eight women's advancement into leadership roles. Participant 18 stated, "when I first entered my job, I

was in a rotation which allowed me to see different roles and helped me to see where I wanted to be once I finished my rotation." Participant 24 stated, "being in the utility there are so many different roles and possibilities that I have been able to influence many people and learned how to deal with different conflicts and issues." However, Participant 15 stated,

> Having different roles in the utility enabled me to get where I am today, however, because I moved around so much I don't think I want to move any higher and move again. I would like to stay in my current role until I retire.

Participant 19 said, "moving around in the utility is great when you are young and looking to make an impact and advance, but after a while, you just want to stay still and enjoy helping others move up in their careers."

Leadership in utility sectors needs to be open to alternative ways of conducting business, especially in the field of energy (Pearl-Martinez & Stephens, 2016). Participant 8 stated "taking a role in alternative energy when none of my peers wanted it years ago, gave me the advantage of being in my current leadership position." This finding extends the literature, explaining the impact of a female engineer promoting alternative energy. This outcome also relates to the theoretical framework of Bandura's (1977) social cognitive theory and the self-efficacy of women who take on roles and prove themselves. Jabareen (2013) discussed the impact of Hurricane Sandy on New York City, its infrastructure, and the impact it had on the public. This research study confirmed that not only did it impact New York City, but also, four women were promoted because of their participation and the roles they played during Hurricane Sandy, thereby extending the literature on the impact of a *force majeure*.

Limitations of the Study

A limitation of the study could be the referral of other women to participate in the study. For example, the researcher contacted WICE and this organization agreed to post this study; if someone was interested, they could reach me directly. Women who reached out and knew of other women who also fit that criterion contacted them, suggesting they contact me. When a referral occurred, I was not sure what the two participants discussed that may have influenced the collected data. Another limitation of this study that arose during interviews is how long the women had been in a leadership position. Some women who just started in these leadership positions, with little experience in the role, could have influenced the data collection. The boundaries set did not distinguish the length each woman had to hold a leadership position; just that they had to be a leader. Interviews did not restrict the age, ethnicity/race, or social class of participants, but did restrict their gender, location, position, and work for the utility sector.

Recommendations

This study had strengths and limitations. Strengths of the research were the focal point of the study, concentrating on female engineers who were in leadership positions. The limitations that grounded the study were that participants were in New York City and worked for the utility sector. Recommended further research on female engineers is on women who get a master's degree in engineering in addition to their undergraduate degree, querying how going back to school for the technical graduate degree impacted their choices. Another recommendation for future study is to consider female engineers who were given the opportunity to move into a leadership position and declined to move up. What experience did these women have that made them not want to move up?

Outcomes from such a study could be used for training, discerning what organizations or engineering society has done to impact the choices of these women.

A recommendation for further study is to focus on female engineers who had a certain number of years as a leader (e.g., 10 or more) in the New York utility sector. Results could impact the training of women seeking to become leaders, or help women who recently joined the leadership ranks and want to learn how other women were successful. Another recommendation is to consider women executive leaders (vice presidents, presidents, senior vice presidents, CEOs) who also fit the criteria, but solely focusing on those women who have advanced higher into leadership and their lived experiences. These results could be used for conferences to help promote female engineers aspiring to progress in the ranks, explaining how reaching those levels differed from being a manager, then a manager of managers, and then joining these executive ranks.

Implications

The possible impact for positive social change is to develop a structure to promote female engineers to pursue leadership positions in an organizational societal level. For a family, the positive social change is to help in supporting, encouraging, and motivating women who go into engineering and pursue leadership. This study may impact positive social change by encouraging women to enter the field of engineering, the utility sector, and leadership. Organizational social change may be bringing awareness as to how some female engineers are treated in their workplaces, the engineering culture, and what support is offered in New York utilities. Reviewing this study, research may help organizations understand what these women have experienced. Specifically, these women

described finding work–life balance. An engineering organization might be impacted by these women working in a male-dominated environment.

Bandura's (1977) social cognitive theory formed the basis for focusing on the self-efficacy of women and the concept of environmental factors for these female engineering leaders in the New York utility. The implications of this theory showed, throughout the study, how each woman pushed herself and stated that the only person to stop her from moving ahead in her career was herself. Recommendations for practice include listening to women who have already reached leadership positions, as this study discussed and focused on ways to support these women in organizations. Important implications for progress are providing these women with opportunities to have work–life balance, giving them varied jobs that will help promote the opportunity to advance, and providing them with a sponsor to work with them and keep them motivated.

Conclusions

Throughout this study, the lived experiences of women helped capture the interpretations of other researchers; this study is now incorporated into the literature on how women's lived experiences impacted their careers as female engineers. The specific problem was that in the New York utility industry, female engineers who have the same qualifications as their male peers do not hold the same leadership titles in the workplace. This study, by answering the research questions, showed that the few women who do attain leadership positions have paved the way for others seeking to become leaders in the utility sector. This study closes the gap that existed in the literature focusing on female engineering leaders rather than grouped as a category in STEM fields, and how they have managed to move into higher positions in the New York utility.

Female engineering leaders in the New York utility have a positive impact on social change by altering the typical male-dominated leadership platform with their presence. Key findings from this study indicated how working in teams helped build the self-efficacy of women during their undergraduate studies and fostered effective teamwork in their work environment. Having support from family, friends, and sponsors in the lives of these women impacted their growth and stands out as a finding. Encouraging others to research more on female engineering leaders and their impact on the New York utility can help achieve social change. A key recommendation for women seeking to become engineers is not to be deterred by male dominance and, as did many of the participants, welcome male dominance as a form of competition, prodding themselves to strive for great heights and growth. A significant social change for organizations is the ability to provide work–life balance, which impacted many of the decisions of participants. This research recounted how female engineering leaders have been able to impact, uphold, and find stability in the ever-changing demands of the New York utility.

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Appendix A: Email to Participants

Good Day,

You are cordially invited to take part in a research study which could assist women into participating in engineering and moving into leadership positions. If you work(ed) in any of the New York utilities, such as gas, oil, water etc. and assumed a leadership role, you could participate in this study. The point of this e-mail is to explain the reason for this research. The purpose of this study is to explore the lived experiences of women engineering leaders in the New York utility sector. The intent of this study is to show awareness of how women develop in the male-dominated field of engineering and succeed by becoming leaders in the New York utility sector. This study focuses solely on women engineers and the impact their leadership has within the New York utility sector.

The criterion for those in leadership positions are women, who have an undergraduate degree in engineering (electrical, civil, mechanical, etc.) who have managers as direct individuals reporting to them. Participating women do not have to have an active role in the leadership position, i.e. retired, moved onto a new role, etc. Thank you for considering being part of this study. If you would like to participate, please email me Shelanda.Clarke@waldenu.edu

Please consider the importance your participation can lead to for other women engineers in the future.

Thank you again,

Shelanda

Appendix B: Draft Interview

Thank you for your willingness to participate in this study. I appreciate your time and patience today. The purpose of this study is to explore the lived experiences of women engineering leaders in the New York utility sector. This will aid in understanding the various perceived motives of current women engineers who have obtained leadership positions to aid in awareness for women engineers seeking to pursue becoming a leader.

Location of interview:

Date:

Time:

Name:

Draft Interview Questions

1. How would you describe your undergraduate experience within the field of engineering after you graduated college?
2. Do you feel that your experiences within undergraduate engineering classes prepared you for your career choices? If so or not so, what do you think help to prepare you?
3. Describe feelings that you experienced during undergraduate studies. Do you feel it effected how you felt towards obtaining your degree and advancing?
4. Did the dominance of males within engineering affect your career choice in any way? Do you feel it affected you from advancing above being just an engineer?
5. Describe your personal attributes and values that you feel contributed in going into leadership position. What did you want to gain by advancing?

6. Was there anything that happened that affected your career choice by going into the utility industry?
7. Can you explain any influence or events that may have affected you from advancing into a leadership role?
8. Can you describe events or situations that could have changed your decision from going into a leadership position?
9. Describe your feelings going into leadership and any conflict/issues you may have had
10. Explain how you feel about being in a leadership position right now. Was there anything or anyone holding you back from where you are today?