

Micromessaging: A Qualitative Study on Female Enrollment, Persistence, and Attainment in Gender Nontraditional Postsecondary Career and Technical Education Programs

by
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Abstract

Despite federal legislation on gender equity in any program receiving federal funds, there still exists a disproportionately low number of females in Career and Technical Education (CTE) community college programs leading to high demand and high wage careers. The study focused on Iowa community colleges. Individual interviews were conducted to identify the lived experiences of females in gender nontraditional community college CTE programs. An examination of the transcripts identified themes from the received messaging that may have influenced the decisions of participants to enroll, persist, and attain. The results identified the themes of persistence influenced by learning environment, instructor, and enrollment in a gender nontraditional community college CTE program with the hope of future job security. The different experiences in classrooms suggested a need for professional learning regarding classroom environments, teaching strategies, and collaboration with local high school CTE programs.

Acknowledgments

“In the midst of winter, I found there was, within me, an invincible summer.
And that makes me happy. For it says that no matter how hard the world pushes against me,
within me, there’s something stronger – something better, pushing right back.”

Albert Camus

In my 9th grade English class, I remember reading this quote on the wall throughout the school year, thinking about what it meant and what it meant to me. As I have pursued my goals, I have not always believed in myself and through finding my invincible summer and having others around me warm my soul, I am honored to be at this point-writing my acknowledgement.

This was not easy, trying to put words to my passion in advocacy, but thank you to Dr. Haltinner for being Urs-your guidance, acceptance, and kind encouragement helped me to give voice to my passion.

My appreciation to Dr. Tiala and Dr. Wentz for the support during my prelims and for agreeing to continue.

To my children, Riley and Jack, may each of you continue to create your own paths. Each of you have been inspirations and my champions.

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Chapter I: Introduction

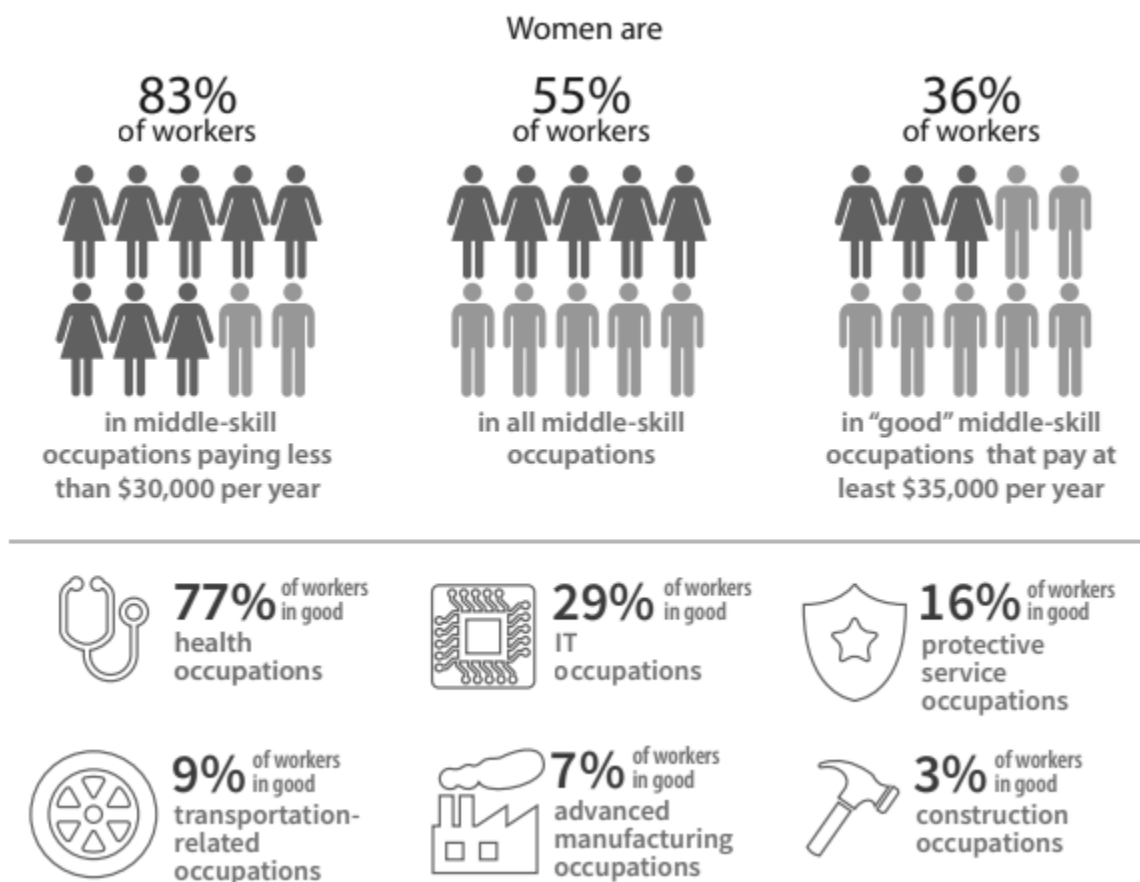
More than forty years ago, Title IX legislation was passed to address gender discrimination in American education. This legislation dictated that “[n]o person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any educational program or activity receiving Federal financial assistance” (Stromquist, 2013; Patsy Mink Equal Opportunity Education Act, 1972). Despite the law’s passage, gender disparities in enrollment persist in nontraditional career and technical education (CTE) programs. The National Career Clusters Framework lists 16 CTE career clusters and more than 79 CTE career pathways (Advance CTE, 2018). Gender nontraditional CTE programs are those that provide training for occupations in which one gender represents 25% or less of the workforce (United States Office of Career, Technical, and Adult Education, n.d.).

In 2016, women made up more than half of all workers in financial activities, education and health services, and leisure and hospitality; however, they were underrepresented in mining, transportation, utilities, and construction (United States Bureau of Labor Statistics, 2017). Females continue to enroll in traditionally female postsecondary programs, such as childcare, cosmetology, and health services, and males remain less likely to participate in education and health services (Advance CTE, 2018; Association for Career and Technical Education, 2018; National Alliance for Partnerships in Equity, 2015; National Women's Law Center, 2014; St. Rose & Hill, 2013; Zula, 2014). Figure 1 provides a visual of the numbers for women in middle-skill occupations, that is, occupations that require less than a bachelor’s degree but more than a high school diploma and that are in high demand and often high-paying. Gender nontraditional middle-skill occupations of transportation, information technology, manufacturing, and

construction include a disproportionately low number of females. The career categories identified in Figure 1 include community college programming that require two years or less to attain a diploma, certificate, or associate degree (Hegewisch et al., 2016; Shanholtz, 2019).

Figure 1

Women in Middle-Skill Occupations.



Note. From *Pathways to equity: Narrowing the wage gap by improving women's access to good middle-skill jobs*, by M. Hegewisch et al., 2016, Institute for Women's Policy Research.

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In 2017, the median hourly wage was \$26.01 for electricians, \$16.08 for construction/laborers, and \$25.39 for computer support specialists. In contrast, the median hourly wages for childcare workers, cosmetologists, and nurse assistants were \$13.94, \$11.97, and

\$13.23, respectively (U. S. Bureau of Labor Statistics, 2018). Gender stratification and the unequal distribution of wealth and power shift the focus from equal representation in the workforce to equal compensation, leadership, and opportunities (Danaj, 2016; Schaefer, 1993). This narrative shift can assist the United States in building a larger qualified workforce to stay competitive in a global market (Advance CTE, 2018; Association for Career and Technical Education, 2018; Leonard, 2016; National Alliance for Partnerships in Equity, 2015; National Women's Law Center, 2014; Schaefer, 1993; St. Rose & Hill, 2013; Zula, 2014).

Diversity in the workplace strengthens the United States economy, and women in nontraditional careers can contribute to the development of new ideas, provide recommendations, and offer insight that is lacking. Chartier (2017) identified gender balance in computer science as “enabling a large, key group of people to better participate in the problem-solving and societal improvement that technology brings” (para. 2). In contrast, gender imbalance—which is not found only in computer science or science, technology, engineering, and mathematics (STEM)—restricts vision and creativity. Educational inequity reaches beyond the walls of educational institutions with many women and minorities having marginal economic participation due to gender and ethnic biases.

Understanding why a female enrolls and persists in a gender nontraditional CTE program may assist employers in developing recruitment and retention strategies in fields, such as transportation, engineering, and construction. Eliminating discriminatory practices and taking proactive steps to expand participation of students in fields where one gender is underrepresented can increase overall participation and success in high-growth fields (U.S. Department of Education, 2015). According to the National Coalition for Women and Girls in Education (2012), gender equity in CTE increases access to and success in high-demand fields, boosts U.S.

economic competitiveness, generates greater wage-earning potential, and leads to more men working in nontraditional careers (p. 28).

Statement of the Problem

Females are underrepresented in secondary CTE pathways and postsecondary CTE programming leading to high-wage and high-demand careers. Identifying and understanding why females enroll in gender nontraditional programming has the potential to strengthen enrollment initiatives. One possible deterrent for females may be micromessaging, which communicates biases through messages that can affect a person's belief in their capacity to succeed (Williams & Pollock, 2015). Micromessaging may be verbal and/or nonverbal and can either affirm with positive messages or, as a micro-inequity, promote negativity. Micromessages in CTE marketing materials, course descriptions, or school counselor discussions with students can either provide affirmation or continue to perpetuate inequities (Lester et al., 2017; Williams, 2019; Williams & Pollock, 2015).

Gender imbalance is evident in secondary CTE programs, as females are more likely to enroll in human service programs, such as education, whereas males tend to enroll in industrial technology programs, such as construction, engineering, and automotive specialties (Advance CTE, 2021; Association for Career and Technical Education, 2018; National Coalition for Women and Girls in Education, 2012; Domenico & Jones, 2006; National Alliance for Partnerships in Equity, 2015; National Women's Law Center, 2014; and Williams & Pollock, 2015). Public education in the twentieth century was intended to prepare some students for college and other students for work, but that is no longer the case (Visher & Stern, 2015). Terms of *college and career readiness*, *career-connected learning*, and *future-ready* reflect a shift in focus from college for all to career readiness, ensuring high school graduates develop skills to

navigate career pathways, postsecondary training and education, and advocate for themselves (Meeder, 2017; Visher & Stern, 2015). Often beginning in middle school, exploratory courses introduce career pathways. High school students are able to select their elective courses with CTE classes being one of the options. Experiences of students in the same CTE class can differ:

From an observer's standpoint, the situations of a boy and a girl in a math classroom or of a Black student and a White student in any classroom are essentially the same. The teacher is the same; the textbooks are the same; and in better classrooms, these students are treated the same. Is it possible, then, that they could still experience the classroom differently, so differently in fact as to significantly affect their performance and achievement there? (Steele, 1997, p. 613)

Steele's (1997) question emphasizes the possibility that students experience education differently. Developing an understanding of unique experiences of students by gender may provide insight into factors guiding career interests and the associated postsecondary education and training.

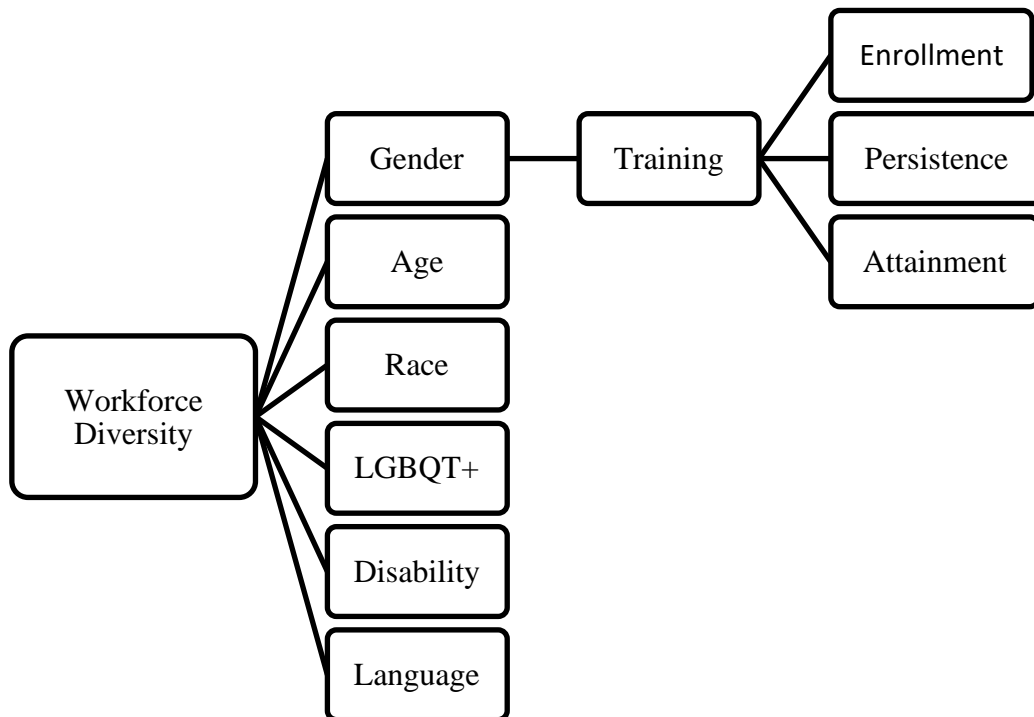
Females may continue to experience negative micromessaging in the workplace, as gender diversity does not guarantee an inclusive culture. About 80% of women who are "onlys" in their workplace report receiving microaggressions, whether intentional or unintentional, that communicate hostile, negative, or derogatory slights (Schooley, 2019). The cost of gender imbalance in the workforce is not only financial. It reduces the diversity of ideas and makes it more difficult for other underrepresented populations to envision themselves in a career. "The pervasive lack of gender equity limits not only income for women but also limits the inherent wealth in the nation's human capital" (Gioiosa, 2014, p. 1).

Purpose of the Study

The purpose of the study is to identify and understand micromessages influencing enrollment, persistence, and attainment that are received by female students in gender nontraditional postsecondary CTE programs. It will provide insight into their lived experiences. The setting of the study is gender nontraditional CTE programs at Iowa's community colleges. Findings will be shared with decision-makers including students, parents, peers, educators, and program marketing developers while providing a voice for the students. Figure 2 is not a comprehensive listing of what is considered a diverse workforce but provided as an example to highlight the focus of the study on enrollment, persistence, and attainment in gender nontraditional training programs.

Figure 2

Workforce Diversity Focus on Gender in Post-Secondary Training



Research Questions

The following research questions guide this study:

1. What are the perceived persuasive messages described by females who entered and persist(ed) in their selected gender nontraditional CTE programs of study?
2. What are the perceived persuasive messages described by females who chose to transfer out of their gender nontraditional CTE programs of study?

Significance of the Study

Understanding the lived experiences of postsecondary female students provides the opportunity for administrators and faculty at postsecondary gender nontraditional CTE programs to develop an awareness of the micromessages those students receive, evaluate current practices, and make changes based on the institution's new knowledge. Cadaret et al. (2017) emphasized the need for research on the factors contributing to such underrepresentation is important because of the increased need for STEM professionals, increased STEM employment opportunities, and issues of gender equity. Research results may also be applicable to secondary CTE programs and career academies and may offer insight into the influence of micromessages on enrollment and persistence in CTE programs for other underrepresented populations and/or males in gender nontraditional CTE programs.

Assumptions of the Study

There has been little research on the experiences of postsecondary female students in nontraditional CTE programming. Data on participation and retention rates of female students in postsecondary nontraditional CTE-related programming is available through the institutions themselves. For this study, the following assumptions were made:

1. Postsecondary nontraditional CTE female students differ from postsecondary male CTE students and should be studied as a specific group.
2. Postsecondary nontraditional CTE female students will describe their experiences honestly to offer their insight.
3. Postsecondary nontraditional CTE female students have unique experiences that influence nontraditional program persistence.
4. Micromessages exist and influence nontraditional postsecondary CTE program enrollment and persistence.

Limitations of the Study

Participants may have prior experience in a gender nontraditional CTE program in a secondary setting. The researcher is a member of the community served by one of the community colleges where the study was conducted. Population and sample size are small due to the limited number of female students pursuing nontraditional CTE programming. Additional limitations include the researcher's assumptions about the topic (Cresswell & Poth, 2018; Webb, 2016) as well as the focus on women with the researcher being female. However, this study may provide a foundation for continued research leading to the generalizability of results.

Definition of Terms

These definitions are provided to ensure a common understanding of the terms used in this study.

Associate Degree

A two-year college degree, typically requiring half the amount of study as a bachelor's degree. Programming is generally characterized as technical or general education.

Attainment

Achieving a desired goal. For the purpose of this study, “attainment” will refer to earning a certificate or credential in a nontraditional CTE program.

Career and Technical Education (CTE).

Preparing multi-age students with academic and technical skills, knowledge, and training to succeed in future careers in a secondary and/or postsecondary setting (Advance CTE, 2018).

Carl Perkins Vocational Education Act of 2006

The act is a main source of federal funding to states and discretionary grantees for the improvement of secondary and postsecondary CTE. The purpose of the funding is to holistically develop the academic, career, and technical skills of students enrolled in secondary and postsecondary CTE programs (U. S. Office of Career, Technical and Adult Education, 2018a).

Community College

A public two-year college. In Iowa, for example, community colleges offer adult education, career programs, and college parallel programs (Iowa Department of Education, 2021).

Gender Stratification

Unequal distribution of finances, power, and privilege between two genders (Danaj, 2016).

Implicit Bias

An unconscious stereotype or bias held by an individual that may influence their beliefs about or actions toward another individual.

Lived Experiences

The experiences of an individual in the context of a particular time and space in their life.

Micromessaging

Messages, either positive (micro-affirmations) or negative (micro-inequities) that are sent and received (National Alliance for Partnerships in Equity, 2015).

Middle-Skill Jobs

High-demand careers that require more than a high school diploma but less than a bachelor's degree (Shanholtz, 2019).

Nontraditional

Gender nontraditional occupations are those in which one gender represents 25% or fewer of the total number of individuals employed (U. S. Office of Career, Technical, and Adult Education, n.d.). For this study, “nontraditional” will focus on nontraditional programs for females.

Persistence

Refers to continued striving towards a desired goal. For the purpose of the study, “persistence” refers to continuation of the training program.

Perkins V (H.R. 2353): The Strengthening Career and Technical Education for the 21st Century Act

On July 31, 2018, President Donald Trump signed H.R. 2353, known as Perkins V. Its provisions became effective July 1, 2019 (Association for Career and Technical Education, 2018).

Phenomenology

A philosophy and method that seeks to describe and create meaning from lived experiences (Savin-Baden & Howell Major, 2013).

Postsecondary

Education after secondary school. This may be a training program or two- or four-year institution. For the purpose of this study, “postsecondary” will refer to a two-year training program at a community college.

Retention Rate

Refers to the number of students returning to the institution the following semester to continue their studies.

Secondary

A school between elementary school and college, offering general, technical, or college-preparatory classes.

Sector

A group of broadly similar businesses. Industries are classed within various sectors. For example, the financial sector comprises industries, such as banking, insurance, and real estate.

Self-Efficacy

An individual’s belief in his or her ability to achieve a task (Bandura, 1997).

Title IX

A federal law that prohibits discrimination in any federally funded education program or activity on the basis of sex (Patsy Mink Equal Opportunity in Education Act, 1972).

Underrepresented Populations

“Underrepresented,” as defined by the Carl Perkins Vocational Act of 2006, refers to race, ethnicity, and gender in nontraditional programs and special populations (individuals with disabilities; individuals from economically disadvantaged families, including foster children; individuals preparing for nontraditional fields; single parents, including single pregnant women;

displaced homemakers; and individuals with limited English proficiency (U.S. Office of Career, Technical, and Adult Education, n.d.).

Chapter II: Literature Review

The purpose of the study was to identify and understand messages influencing enrollment and persistence received by female students in gender nontraditional community college CTE programs and provide insight into their persistence and lived experiences. Gender disparity in careers reduces income potential, diversity of ideas, and students' opportunities to explore careers aligned with their interests and skills. The traditionally female programs offered through a two-year college are more likely to be lower-wage and lower-skill fields, whereas males are more likely to earn certificates in the higher-wage and higher-demand fields (St. Rose & Hill, 2013).

This research draws upon published studies, books, organizational research, and online information examining programs, projects, and initiatives that encourage the participation of females in gender nontraditional programming in secondary and postsecondary education (Erkkila, 2019; Schaefer, 1993; St. Rose & Hill, 2013; Wagner, 2019; Williams & Pollock, 2015). This chapter examines using a constructivism framework to examine the perceived verbal and nonverbal messages received by female students in nontraditional postsecondary CTE programs. Few of these studies examine the micromessaging received by females in such programs. The following questions guided the study:

1. What are the perceived persuasive messages described by females who entered and persist(ed) in their selected gender nontraditional CTE programs of study?
2. What are the perceived persuasive messages described by females who chose to transfer out of their gender nontraditional CTE programs of study?

Existing research examines efforts, initiatives, and practices to recruit and retain females in postsecondary STEM programs and STEM careers. Additional research exists about females

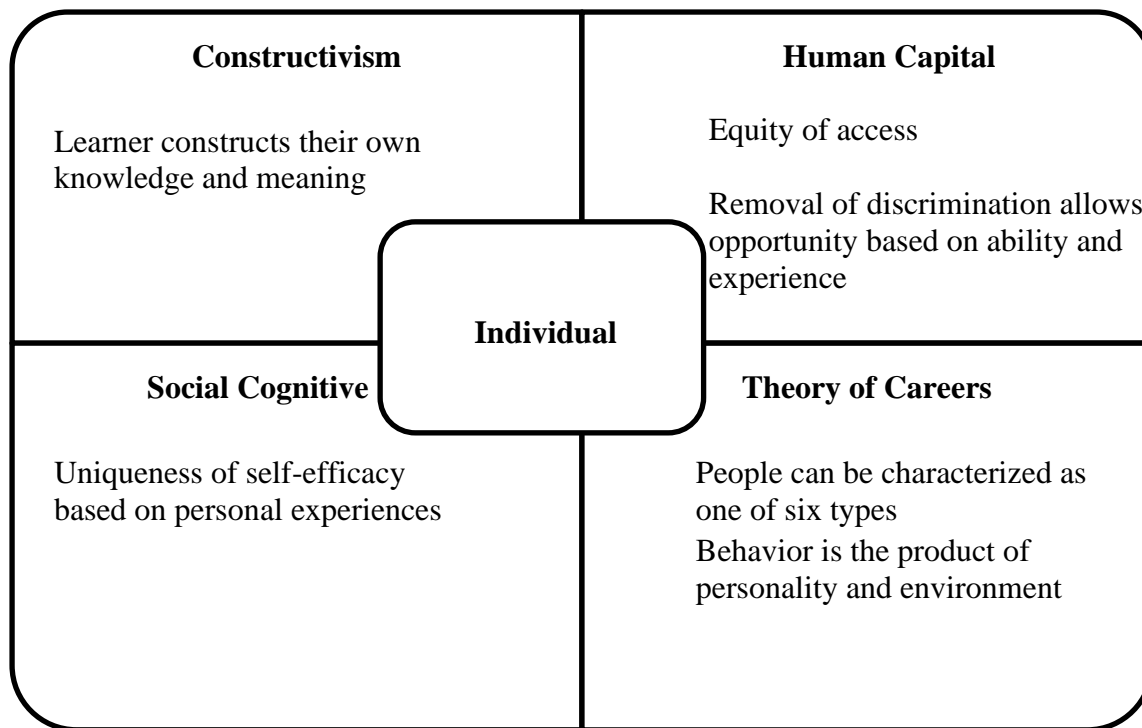
in other gender nontraditional careers, such as the skilled trades. The literature, as a whole, includes information on gender identity, career decision-making, self-efficacy, and the influence of mathematical self-efficacy on career choices. However, there is limited published research specific to understanding how micromessaging impacts gender in enrollment, persistence, and attainment of postsecondary awards. Identifying and understanding the lived experience of female students may provide a missing piece of the story behind the numbers.

Theoretical Framework

The theoretical framework developed for this study (see Figure 3) provided a lens to study the lived experiences of females in gender nontraditional CTE community college programming. It draws from constructivism to explore female experiences but includes a broader framework of theories. I drew on Piaget, Dewey, Hegel, Kant, and Vico's theory of constructivism to explore female experience but also incorporated a broader framework of theories, including Becker's human capital theory, Bandura's social cognitive theory, and Holland's theory of careers (Bandura, 1977; Becker, 1964; Davidson, 2016; Doolittle & Camp, 1999; Holland, 1973; Inzlicht & Schmader, 2012; Leung & Springer, 2008; Raskin, 2002; Savin-Baden & Howell Major, 2013; Ultanir, 2012). Using the framework required recognizing not only how the theory could be applied to gain insight but also its possible limitations (Anfara & Mertz, 2015).

Figure 3

Theoretical Framework Developed to Examine the Perceived Messages of Study Participants



The sources identified in this literature review were examined using a constructivism framework to identify and analyze the perceived messages received by female students in nontraditional postsecondary CTE programs. The roots of constructivism lie in Piaget, Dewey, Hegel, Kant, and Vico. Constructivism asserts that learners construct their own knowledge and meaning (Doolittle & Camp, 1999; Raskin, 2002; Savin-Baden & Howell Major, 2013). In constructivism, reality is a product of one's perspective, and truth is the meaning that one has assigned to experiences and ideas through understanding based on previous knowledge and experiences and researchers seek to investigate how this understanding is created (Raskin, 2002; Savin-Baden & Howell Major, 2013; Ultanir, 2012).

During the mid-1990s, researchers drawing on the work of Piaget worked to unpack individual experiences to explain how individuals construct knowledge and how meaning is

created (Savin-Baden & Howell Major, 2013). How does the female student make meaning of her experiences in and out of the nontraditional postsecondary classroom? Knowing how a specific phenomenon (i.e., micromessaging in this study) was experienced by female students and used to construct meaning will provide insight into the experience of others.

Social Cognitive Theory and Self-Efficacy

Social cognitive theory—and social learning theory, from which it grew—recognizes the ongoing interactions between personal/cognitive behavior and environment (Davidson, 2016; Leung, 2008.). Bandura (1977) views human behavior as a “continuous reciprocal interaction between cognitive, behavioral, and environmental determinants” (p. vii). He emphasizes that social learning takes place through casual and directed observation as well as symbolic modeling through visual media.

Bandura (1977) argues that there are three types of learning from the environment: informative learning, motivational learning, and reinforcement of learning. In informative learning, individuals develop their perception of situationally appropriate responses through observing the outcomes of their responses. In motivational learning, they develop expectations based on prior experience. Finally, learned behaviors are regulated by reinforcement. Most human behavior is learned through observation, modeling, and using what was observed as a guide for the behavior (Bandura, 1977).

Elements of observational behavior include the processes of attention, retention, motor reproduction, and motivation. Attentional processes identify what is selectively observed and what the individual takes from that observation. Retention processes involve remembered knowledge and experiences, often coded through either imagery or verbal symbolism. Motor reproduction processes involve doing and adjusting what has been learned. Motivational

processes are based on the realization that one is more likely to adopt modeled behavior if the results are personally valued. Perceived self-efficacy is the belief in one's ability to achieve a set goal (Bandura 1977, Leung, 2008).

Self-efficacy perceptions are based on four sources of information: performance accomplishments, vicarious experiences, verbal persuasion, and physical and emotional state (Bandura, 1977). Performance accomplishments are based on personal mastery experiences with successes increasing expectations and failure lowering expectations. Individuals with consistent success are more likely to continue performing the task when compared to those who are not successful. Vicarious experiences allow individuals to observe classmates and form an opinion based on their success or failures. If someone else can complete the task and be successful, then that success may also be possible for the observer. Verbal or social persuasion influences the individual to think they have the ability to accomplish the task. Finally, an individual's physical and emotional state can influence self-efficacy based on their anxiety levels and how a stressful situation is perceived (Bandura, 1977; Betz, 2004; Erkkila, 2019; Williams, 2019).

Betz and Hackett (1981) studied 134 female and 101 male undergraduate students to determine the applicability of Bandura's self-efficacy theory to the process of career decision-making, specifically in traditionally male and traditionally female occupations. They found that self-efficacy was greatest among women in traditionally female occupations, such as social worker, dental hygienist, and secretary, and among men in traditionally male careers, such as accountant, mathematician, and engineer (Betz & Hackett, 1981).

Human Capital Theory

Human capital theory identifies an individual's acquired knowledge and skills as a form of human capital and important for economic growth (Schultz, 1961). Building on Schultz's

earlier studies on employment advancements due to an individual's investment in their education to identify the components of productivity as ability (and the amount of ability invested on and off the job), motivation, and intensity of work, Becker (1964) clarified equality of opportunity implies identical supply curves (p. 123). When public and private discrimination and nepotism are eliminated, the opportunity curve changes and earnings differ because of differences in abilities, not because of other factors.

Investments in human capital include schooling, on-the-job training, medical care, migration, and searching for information about prices and incomes (Becker, 1964; Blaug, 1976; Santos Silva & Klasen, 2021; and Schultz, 1961). These investments improve skills, knowledge, or health. Becker recognizes that almost all studies have found a tendency for age-earning profiles to be steeper among more skilled and educated persons. He also acknowledges that his research barely scratches the surface of the effects of education, gender, and other factors on human capital.

Theory of Careers

Career guidance in middle and high school often involves formal conversations with students regarding post-high school plans. Holland (1973) notes that everyone has vocational decisions and problems that are not limited by age. Vocational decisions and subsequent questioning of those decisions are facts of life, whether they are experienced by youths pondering their futures or adults facing a career change. Holland also recognizes that everyone, in some capacity, serves as a vocational coach, and it is difficult to know how to help others make the best choice. Theory of careers includes the assumption that people and environments can be characterized into one of six types: realistic, investigative, artistic, social, enterprising, or conventional (Holland, 1973; Leung, 2008). These personality types have been used to assist

individuals in finding their career fit. People want to find environments in which to use their skills that are aligned with their attitudes and values (Holland, 1973).

Holland's codes are prevalent in school counseling and postsecondary career advising, as individuals seek to find a pathway or career that fits their personality as characterized by one or more of the six types. As a database of over 1,000 occupations, the Occupational Information Network (O*NET) is the nation's primary resource specific descriptions, labor market information, and career fit. Developed through a grant and in collaboration with the U.S. Department of Labor/Employment and Training Administration, O*NET offers an interest profiler to assist users in identifying potential careers based on the results, using Holland's codes, and level of education or training (National Center for O*NET Development, n.d.-a; National Center for O*NET Development, n.d.-b; Rounds et al., 1999).

Micromessaging

Mary Rowe (1990) identified micro-inequities as small, hard-to-prove events experienced by people who are different from the majority in an environment, such as a workplace or postsecondary campus. Micro-inequities, particularly in business, may include patterns of being overlooked, devalued, or underrepresented because of sex, race, religion, age, country of origin, or handicap. Examples include mispronouncing names, interrupting while another person is speaking, confusing ethnicities, taking more questions from people of one gender, or making jokes about a minority group (Brogaard, 2013; Young, 2007).

Sue (2010) identified three categories of microaggressions: relating to race, gender, or sexual identity. Often unconscious and unintentional, these microaggressions affect the quality of life and standard of living of the receiver. Williams and Pollock (2015) described

microaggressions as biases communicated through unconscious, but still powerful, words or actions that can affect an individual's self-efficacy.

The National Alliance for Partnerships in Equity (NAPE) divides micromessages into micro-affirmations and micro-inequities. In the *Explore Nontraditional Careers* (Williams & Pollock, 2015) tool kit, NAPE identified micro-affirmations as intentional ways of creating opportunities for students to feel valued, included, encouraged, and positive, and micro-inequities as often unintentional messages that result in a student feeling excluded, devalued, and discouraged. Relayed through verbal and nonverbal communication, classroom and school cues, and written feedback, micromessages are manifestations of implicit bias that gain force as they accumulate within the recipient (Williams & Pollock, 2015).

Rowe (1990) discussed glass ceilings and glass walls. Glass walls create occupational segregation in places of work. Described as “subtle discrimination,” they constitute a form of bias against anyone different from the decision-maker. While glass ceilings typically refer to bars against upward movement, glass walls can prevent other forms of internal movement. For example, a female with certification as an administrative assistant may have developed the necessary skills, through years of work, to move into a computer support position, but may not be considered for this lateral move that has greater wage potential.

Career and Technical Education Legislation

Federal involvement in career and technical education programs reaches back more than 150 years. In 1862, the Morrill Act established land-grant colleges whose purpose was to prepare individuals for careers in mechanical and agricultural service areas. In 1917, the Smith–Hughes National Vocational Education Act was signed into law, beginning federal investment in CTE. The act provided funding for vocational programs in agriculture, trades, industry, and

homemaking (Novak, 1949). The Smith–Hughes Act also established the State Boards of Vocational Education. The National Defense Act of 1958, which was passed during the Cold War following the launch of Sputnik by the Soviet Union, emphasized the importance of science, mathematics, foreign language, and technical skills. Included among the many provisions of the National Defense Act were funds for higher education. The Vocational Education Act of 1963 provided funds to help secondary schools offer vocational education opportunities for “all people in all communities, in all occupations which require less than a baccalaureate degree for job entry” (Dugger, 1965).

The Vocational Education Amendments of 1968 replaced all previous federal legislation regarding vocational education except for the Smith–Hughes Act. The purpose of the amendments was to provide all citizens with access to vocational education, allocating funds and emphasizing postsecondary vocational education, including for postsecondary students. The Carl D. Perkins Vocational Act of 1984 amended the Vocational Act of 1963 and replaced the 1968 and 1973 amendments. The 1984 act had both economic and social goals; it was designed to improve skills and adult job preparation in addition to providing equal opportunities. Furthermore, it emphasized the need for gender equity in vocational funds to support the elimination of sex bias and stereotyping and the importance of addressing sex equity in programs to promote participation in gender nontraditional programming. The Carl D. Perkins Vocational and Applied Technology Act of 1990 emphasized academic and vocational skills; development of accountability through performance measures; and placement, retention, and completion of postsecondary programs (Gordon, 2014).

The Strengthening Career and Technical Education for the 21st Century Act, passed in June 2018, is known as Perkins V and constitutes the most recent reauthorization of the Carl D.

Perkins Vocational and Applied Technology Act. Perkins V not only provides continued funding for CTE programs but also increases accountability and funding for comprehensive local needs assessments. It promotes equity initiatives to increase the number of students completing a program of study in secondary programs while they earn a certification or degree in a CTE program (U. S. Office of Career, Technical, and Adult Education, 2018b).

Educational Equity Legislation

Legislation has been used to decrease educational inequity and support funding for CTE. The Vocational Education Act of 1963 provided funds and guidance to secondary schools to develop high quality vocational training programs (Dugger, 1965). Title IX of the Educational Amendments of 1972 prohibits sex discrimination in education. It is often applied to sports and has effectively reduced sex discrimination in school athletics. Its provisions also apply to CTE courses—Title IX made it illegal for schools to restrict enrollment based on student gender (National Coalition for Women and Girls in Education, 2012)—but Title IX has not been as successful in increasing equity in CTE career pathways as it has in athletics (Toglia, 2013).

Besides Title IX, three major complementary pieces of legislation have been passed: the Women’s Education Equity Act (WEEA) of 1974, Title IV of the Civil Rights Act of 1964, and the Carl D. Perkins Vocational Education Act of 1984 (Stromquist, 2013, pp. 6-7). The 1976 amendments to the Vocational Education Act (VEA) and the Carl D. Perkins Vocational Act of 1984 mandated each state have a full-time sex equity coordinator with set aside funds from each state’s basic grant for use in developing and delivering sex equity programs and support services. Sex equity coordinators were tasked with ten functions around building awareness of vocational education, reducing sex bias and sex stereotyping, collect and disseminate enrollment data, and

assist local education agencies with improving opportunities for women in vocational education (National Alliance for Partnerships in Equity, n.d.).

Additionally, Every Student Succeeds Act (ESSA), a revision of the No Child Left Behind (NCLB) Act of 2002, was signed by former President Obama on December 10, 2015. This action included the reauthorization of the fifty-year-old Elementary and Secondary Education Act (ESEA). According to the United States Department of Education (2015), ESSA will advance equity, maintain accountability, and effect positive change through consolidated state plans. Each state educational agency (SEA) must include in its plan “meeting long-term goals for English Language proficiency ... and ... how youth will receive assistance from counselors to advise and prepare for college under the McKinney-Vento Education for Homeless Children and Youth program” (U.S. Department of Education, 2015).

Williams and Pollock (2015) have noted that the last two Perkins reauthorizations have included accountability for core indicators of student enrollment in, and completion of, CTE programs leading to nontraditional careers, but that increasing participation and completion has been difficult despite legislation, such as Title IX, the Carl D. Perkins Act, and ESSA that seeks to advance equity and provide metrics to support equitable access for students. While strategies have been implemented to increase student participation in nontraditional secondary and postsecondary programming, Williams and Pollock identified the need to examine five areas of influence: education, career information, family characteristics and perception, internal and individual factors, and societal issues. Due to individual and institutional biases, significant adults and peers may discourage underrepresented students from entering specific programs through their actions and words (Williams & Pollock, 2015).

Gender Equity of Occupational Access

To maintain the strength of the American economy—an objective that is confounded by the graying of the workforce—equity of occupational access must be addressed with urgency. In 2017, the median age of the total employed population was 42.2 years (U. S. Bureau of Labor Statistics, 2018). A diverse workforce provides the opportunity for the diverse ideas necessary for the nation to maintain its world leadership and economic power in innovation, invention, and automation and artificial intelligence services and products. Rees (2013), contrasting market-focused political and economic policies, indicates that liberal market economies (LME) may be in a better position to transition their labor force into the future of work. They assert that LMEs are nimbler in contrast to the social infrastructure, which is present to minimize the human resource occupational insecurity supported by the coordinated market economy (Rees, 2013).

Workplace Equity Legislation

Since World War II, women have become more involved in the workforce, shifting from traditionally female-oriented fields to more nontraditional careers. In 1961, President John F. Kennedy established the President’s Commission on the Status of Women as an advisory committee to investigate inequity in education, the workplace, and under the law, and provide recommendations to eliminate inequity (Woolley and Peters, n.d.). Executive Order 10980 proclaimed that it was in the “national interest to promote the economy, security, and national defense through the most efficient and effective utilization of the skills of all persons” and acknowledged that after WWII, previously employed women had become a “marginal group” with underutilized skills (Woolley & Peters, n.d.). Legislation, such as the Equal Pay Act in 1963, Title IX of the Educational Amendments in 1972, and the Lilly Ledbetter Fair Pay Act of 2009 serve as a legal foundation for females and underrepresented populations to pursue equity

in education, economic opportunity, and civil rights. The Lilly Ledbetter Fair Pay Act of 2009 addressed wage discrimination on the “basis of sex, race, national origin, age, religion and disability” and established that there could be accrual of pay from the time of the discriminatory pay decision or practice occurs (National Women’s Law Center, 2014). Legislation addressing wage gaps for job-alike individuals is a start, but the wage gap of full-time employed females and males persists due to the pay discrepancies between traditionally female and traditionally male occupations. Almost all of the employees at beauty salons and childcare centers (94%) are female, whereas only 9.1% of workers in the higher-paying field of construction are female (U. S. Bureau of Labor Statistics, 2018).

Community Colleges

To support continued United States’ economic growth in the early 20th century, state and national leaders recognized the need for a higher skilled workforce. At the same time, high school graduates were hesitant to attend distant colleges and public high schools were seeking innovative ways to serve their communities. Some of these innovative ways were developing teacher institutes and vocational education programs (American Association of Community Colleges, n.d.). Community colleges prepare students for technical training, additional skill development, or transfer to a four-year institution. Technical training may be short-term (six months or less) or involve a diploma program or an associate’s degree. Technical training programs are guided by labor market needs; examination of enrollment suggests the number of potential future employees. As essential components of state and national workforce strategies, communities work with business, industry, and the government to create specialized training programs to meet economic needs (The White House, 2016).

Table 1 identifies Iowa's two-year college degree completion by gender and cluster for the 2017-2018 school year (Iowa Department of Education, 2019). Numbers represent the total awards given by Iowa's community colleges. Career clusters with the highest female awards are those leading to traditionally female careers. Fewer females earning awards in nontraditional clusters, such as transportation, distribution and logistics, architecture, and construction means fewer applicants for jobs in those fields. This perpetuates gender wage gaps, as the male-dominated career clusters often have higher entry-level wages and greater opportunity for earnings growth.

Table 1*Iowa Two-Year College Awards by Gender for the Academic Year 2017-2018*

Cluster	Male	Female	% Female
Agriculture, food, and natural resources	428	235	35
Architecture and construction	812	47	.05
Art, A.V. technology, and communication	200	170	46
Business, management, and administration	138	407	75
Education and Training	20	146	88
Finance	96	227	70
Government and public administration	-	-	-
Health Science	560	3,705	80
Hospitality and tourism	110	158	59
Human services	42	354	89
Information technology	577	96	14
Law, public safety, and security	221	108	33
Manufacturing	1,183	90	.07
Marketing	51	81	61
Science, technology, engineering, and mathematics	79	10	11
Transportation, distribution, and logistics	811	47	.05
College transfer (parallel)	2,364	3,187	57

Note. Adapted from the *annual condition of Iowa's community colleges: AY 2017-2018 tables*,

issued by the Iowa Department of Education, 2019, p. Tables, Section 3|3.

(<https://educateiowa.gov/documents/condition-community-colleges/2019/01/data-tables-2018-condition-iowas-community-colleges>). Copyright 2019 by Iowa Department of Education.

Summary

Much of the existing research on environmental factors on enrollment and persistence, females working in gender nontraditional careers, and initiatives to increase female enrollment in STEM careers lacks the rich lived experience of females. Previous and current legislation specifically calls out special populations and nontraditional students in vocational education programs, both with supportive funding and accountability measures, but gender disparity exists in training programs, manifesting itself in employment demographics. Lacking from the research

and legislation is the voice of the female student enrolling in a gender nontraditional program.

What are their lived experiences and what are the perceived micromessages influencing female students to enroll, persist, and attain?

Chapter III: Method and Procedures

The primary purpose of the study was to identify the perceived messages that encourage or discourage female enrollment and persistence in gender nontraditional postsecondary CTE programs. These micromessages may be positive (e.g., affirmations) or negative (e.g., aggressions). The development of the data collection process was guided by the research questions:

1. What are the perceived persuasive messages described by females who entered and persist(ed) in their selected gender nontraditional CTE programs of study?
2. What are the perceived persuasive messages described by females who chose to transfer out of their gender nontraditional CTE programs of study?

Research Methodology

A qualitative inquiry method was used in this study to provide an understanding of the lived experiences of postsecondary female students in nontraditional programs of study. Cresswell and Poth (2018) recommended phenomenological research for examining lived experiences for those whose research focuses on understanding the “essence of the experience” and describing “the essence of a lived phenomenon” (p. 67). Studies employing phenomenology generally focus on individuals who have experienced the same phenomenon. This study’s phenomenon is the reception of perceived persuasive messages (i.e., micromessages) in a gender nontraditional program. Although the specific programs may be different, the experience of being female and being enrolled in a male-dominated program are the shared surface characteristics. Through interviews, the experiences of the participants were recorded and transcribed. Interviews were kept in transcription records. Data is typically stored in digital files or as transcription records with verbal interviews (Cresswell & Poth, 2018; Jacob & Furgerson,

2012). Challenges included logistics of interviewing multiple individuals and preventing the researcher's personal experiences from biasing the interviews. "In phenomenological studies, the researcher needs to decide how and in what ways his or her personal understandings will be introduced into the study" (Cresswell & Poth, 2018, p. 81).

Demographic data of enrollment, persistence, and attainment by gender, ethnicity, and age range exists in yearly reports but quantitative data does not share the voice of the student. Open-ended interviews were conducted with students currently and previously enrolled in gender nontraditional postsecondary CTE programs at Iowa community colleges.

This study seeks to provide a holistic view of female nontraditional career education participation—socially, politically, and economically—through a phenomenological approach. Developed by Husserl in the early 1900s, phenomenology was perceived as the philosophical discipline to look at life as an experience. Phenomenological researchers seek to understand an individual's awareness of an experience. Questions of experience support phenomenology as the methodology of this study. It is consistent with the theoretical framework of social learning theory, human capital theory, and the theory of careers. Social learning theory describes learning by reinforcement (Bandura, 1977); identifying students' lived experiences provides the opportunity to learn what they perceived as reinforcement while identifying possible stereotypes influencing choices (Inzlicht & Schmader, 2012). An examination of the key elements of a female's experience in nontraditional programming will provide insight into the way that a given individual experienced and reflected on specific moments (see Table 2).

Table 2*Commonly Used Qualitative Research Designs*

Design	Purpose/focus	Researcher goals and rationale for not using
Ethnography	Understand behaviors and culture of a group with a common culture	Seeks to find common experiences of a specific group based on shared gender and program of enrollment
Narrative research	Tell lived stories of one to two individuals	Seeks to learn the lived experiences of multiple individuals
Historical research	Describe setting or past events to gain understanding of a specific setting or event	Seeks to discover experiences in multiple settings over multiple time periods
Grounded theory research	Derive a theory from collected data in a process of human actions/interactions	Seeks a singular approach to learn the lived experiences of participants
Case study research	Understand one person or setting	Seeks to understand multiple individuals and different educational settings

Note. Adapted from Mertler, 2016, p. 77-91; Savin-Baden & Howell Major, 2013, p. 22-23;

Webb, 2016, p. 92. Copyrights by C. A. Mertler, M. Savin-Baden & C. Major, and A. L. Webb.

Participant Selection and Description

Iowa community colleges were selected based on the proximity to the researcher and statewide collaboration. In Iowa, the community colleges are building a talent pipeline to achieve the Future Ready Iowa initiative's goal that 70% of Iowans in the workforce will have training or education beyond high school by 2025 (Iowa Department of Education, 2020). To support the Future Ready Iowa goals, the Last Dollar Scholar initiative covers the gap between the tuition and fees and the awarded grants and scholarships for students enrolled in one of the 30+ eligible programs based on job demand (Iowa College Aid, n.d.).

Iowa's community colleges have a job-alike group called the Iowa Association of Community College Presidents (IACCP). The IACCP meets to enable resource sharing,

collective endeavors, and statewide planning for initiatives, such as sector partnerships, career pathways, and high school partnerships (Iowa Department of Education, 2020). They have comparable offerings in advanced manufacturing, construction, information technology, and transportation (see Appendix A). The researcher contacted the community colleges through the recommended point of contact within the Iowa Department of Education's Administrator for Division of Community Colleges and Workforce Preparation (see Appendix B).

Participants in this study were students with enrollment dates of Fall 2017 or Fall 2018 in a gender nontraditional postsecondary CTE program at one of Iowa's 15 community colleges. Students in the advanced manufacturing, architecture and construction, information technology, and transportation, distribution, and logistics programs were invited to participate; the programs were chosen based on gender enrollment rates (Iowa Department of Education, 2019). This purposeful sampling was designed to encourage participation while identifying possible themes across programs and different institutions. Convenience sampling was then used to obtain the participants. Participants received consent forms that provided the opportunity to opt out of the study.

An email was sent to the recommended contacts identifying the study's purpose, method, anonymity, and intended sharing of results (see Appendix C). This communication asked for institutions interested in participating in the study to respond to the sent email. Appendix D and E provide responses from two community colleges with one agreeing to participate. The institution representative who confirmed participation was asked to send emails to students who had not opted out of outside contacts, inviting them to participate in an online reflection of their experiences and background, and providing examples of micromessaging (see Appendix F). Students received information about informed consent (see Appendix G) and were invited to

participate in a survey (see Appendix H). Students choosing to participate in the interview received the interview protocol (see Appendix I).

Upon their review of the informed consent and interview protocol, students who met the gender, enrollment dates, and program enrollment requirements received an invitation to participate in the study. An affirmative reply in the online survey was taken as implied consent; the study did not require a signature of consent.

Instrumentation

This study was conducted in two phases. Phase 1 included the email invitation from a community college employee, an instructor or other staff member, to participate in a research study with an email link to review informed consent before the demographic survey. Participants meeting the demographics of a self-identified female enrolled in a gender nontraditional CTE program at one of Iowa's community colleges received a follow up email invitation to schedule an interview. Phase 2 was an hour-long, semi-structured, in-depth interview process with open-ended questions and follow up questions based on responses of the participants. Interviews were completed through phone calls due to closure of schools and workplaces due to the pandemic. Interviewees received a copy of the informed consent and interview questions before the scheduled interview. Within one week after the interview, each interviewee received a summary of their interview for review and clarification.

Participants were asked to answer open-ended questions about their background, educational experience, reason for enrolling in the program, and micro-messages they perceived to have influenced their decision to enroll, persist, and attain certification. Additional research-focused questions provided the opportunity for participants to describe their interests, life experiences, past and present feelings, and micromessages (see Appendix I).

To ensure the validity of the questions, questions were developed based on the literature review and assessed by the dissertation, Iowa CTE leaders, and community college instructors. Iowa CTE leaders include Perkins coordinators, work-based learning coordinators, and Department of Education representatives. These individuals also vetted the interview instruments, and the researcher emailed the participants to inform them of the purpose of the study, interview protocol, and informed consent. A peer reviewer provided feedback on the instrument design during a phone conversation. The reviewer was able to ask for clarification and provide guidance for improving the instrument and questions.

Data Collection Procedures

Before data collection, participants received an email link to the consent form and an explanation of the research objectives (see Appendix D). The form provided the opportunity for participants to accept or decline participation in the study. The informed consent form indicated clearly that the risks included possible feelings of discomfort when revisiting uncomfortable or unpleasant experiences. Identity and institutional affiliation of the individuals who elected to participate are kept confidential through coding. Confidentiality can improve the honesty of the responses. Participants received the open-ended questions via an email link that remained accessible until the conclusion of data collection. An identified incentive was the opportunity to support other female students in pursuing a nontraditional career program, share the lived experiences of current and former students, and provide a better understanding of perceived persuasive messages. After the data collection, an email was sent to thank the participants.

To better understand the lived experience of participants, the researcher also examined images on the gender nontraditional program websites. Special digital strategies for community colleges are recommended due to unique programs, diverse learners, and recruitment of current

students as future students (Fancher, 2021). Providing some of the first impressions for prospective students, program websites may unintentionally have a gendered design based on elements considered to be more neutral, masculine, or feminine (Stonewall, 2016). For the purpose of this study, images including people were the focus, not design elements, such as color, font, or shapes.

Data Analysis

Qualitative data collected during an open-ended interview and follow-up questions were analyzed through a thematic identification process. Data were reviewed to identify lived experiences and themes of real and/or perceived persuasive messages. Van Manen (2016) identified approaches to thematic analysis of descriptions of lived experiences (LEDs) as holistic, selective, and detailed. The holistic approach considers the entire text, whereas the selective approach examines a paragraph or story, using a detailed reading to analyze each line, identifying themes in sentences, phrases, or single words. A selective approach was used to examine and identify themes.

Phenomenological analysis and representation have a general template for data analysis, including a recommendation that the researcher describe their personal experiences with the phenomenon under study through a comprehensive description in an attempt to identify bias and allow focus on the participants (Cresswell & Poth, 2018). Table 3 provides a researcher developed template for data analysis.

Table 3*Data Analysis and Representation*

Data analysis and representation	Phenomenology	Study
Manage and organize data	Create and organize data files List significant statements	Organize participant responses
Read and note emergent ideas	Group significant statements	Form initial codes from text
Describe and classify codes into themes	Describe personal experiences withholding judgement Describe the essence of the phenomenon	Review participant responses without judgment
Develop and assess interpretations	Develop significant statements Group statements into meaning units Develop a textural description— “what happened”	Describe participant experience with capta reduction
Represent and visualize the data	Develop a structural description— “how the phenomenon was experienced” Develop the “essence” using a composite description	Summary of situation and experience

Note. Adapted from *Qualitative inquiry & research design* (4th ed.) by J. Cresswell and C. N.

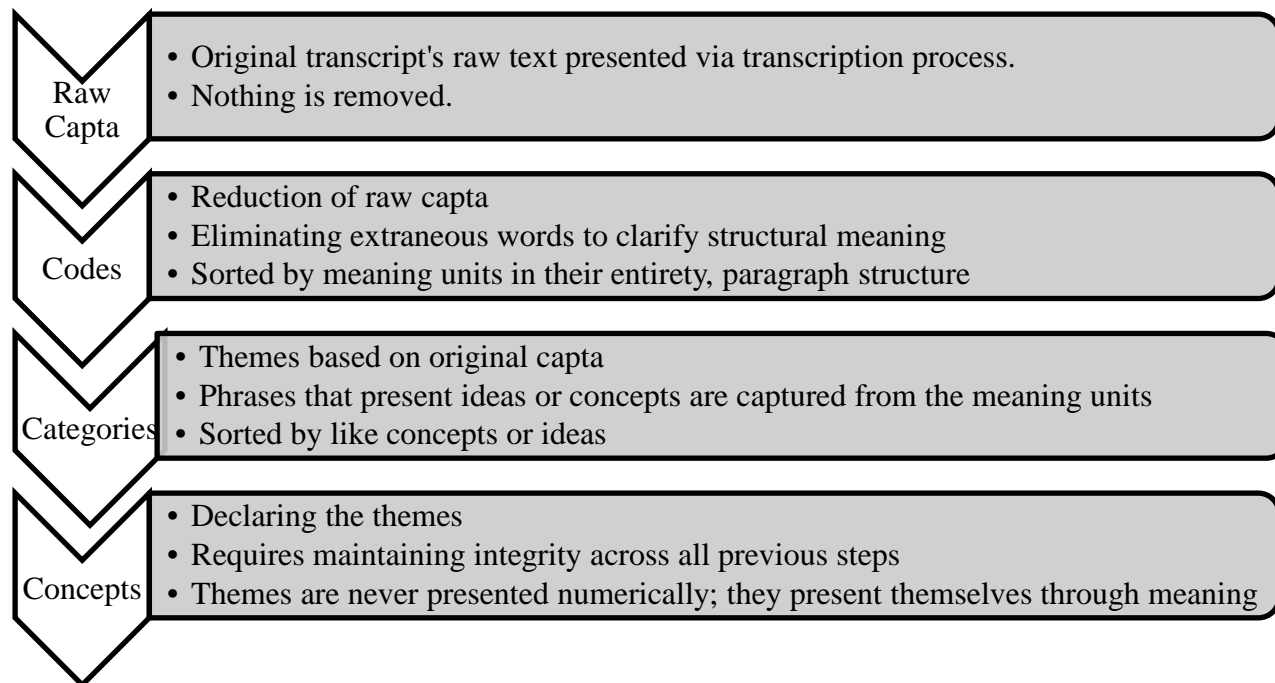
Poth, 2018, Sage, p. 199. Copyright 2018 by J. Cresswell and C. N. Poth.

A four-step process was used to identify the capta in a reduction table (see Figure 4) and an excerpt from the interview is included in Appendix J. Adapted by Haltinner, this process is based on the work of Giorgi (1987), van Manen (1997), and Lanigan (2013). The interviewer uses the verbatim transcription, represented in the first column, to move through a reduction process to discover themes. The raw data serves as a reference throughout the reduction process. The second column contains the first reduction; extra language has been removed to begin finding meaning. Themes begin to emerge in the third column. They are identified using the

participant's words or paraphrases made by the researcher. The fourth column contains the themes that have been identified, expressed in the researcher's own words, and reviewed for accuracy against the raw capta.

Figure 4

Data Reduction Table Outlines the Four Steps for Developing Themes



Limitations

Limitations of this study included the availability of participants and their willingness to participate. Also, participants' memories may not have always been accurate when they recounted their experiences. The number of participants was limited by the lack of female representation in gender nontraditional postsecondary programs. Characteristics of age, race, prior work experience, prior postsecondary or certification experience, and parent/guardian work/education experience were not considered in participant recruitment, although enrollment dates and identified gender provided parameters for the initial invitations to potential participants. Institutional limitations included differences in curricula, recruiting efforts,

marketing materials, instructor demographics, and career academy offerings in local high schools that could have affected the numbers and types of students who enrolled. Timing of the interviews was also a limitation due to the world-wide shutdown due to a pandemic. Outreach began before community colleges moved to online learning, but the actual interviews took place during a time when individuals were quarantined to their homes unless in a state-identified essential worker position.

Researcher bias is another limitation. The researcher is a female in a gender traditional career as an educator who is responsible for CTE programming at the second largest school district in Iowa. The researcher leads district initiatives in recruitment and retention of underrepresented students in secondary CTE programs including examination of enrollment by reportable demographics and grade attainment. As an active member on local sector boards, whose goals are building a pipeline of future employees into high demand careers, monthly meetings discuss and plan outreach initiatives at elementary, middle, and high school in addition to postsecondary programs, the researcher frequently examines labor market information and program development. Beyond the researcher's current employment, the researcher is a parent with a daughter and son. The researcher's daughter has entered a gender nontraditional CTE program at an Iowa community college. Specific experiences and messages identified by participants, in different programming, may be similar to her daughter's experiences who has received positive and negative micromessages.

Summary

This study utilized the qualitative inquiry approach of phenomenology to identify and describe the lived experiences of females in gender nontraditional programs at Iowa community colleges. It used open-ended questions and a follow-up communication that contained the

informed consent, which provided the opportunity to opt out of participation to those initially agreeing to participate. Institutional and participant anonymity were maintained by removing identifiable factors; every community college in Iowa offers a construction-related program, so this was not itself a potential identifier. Coding of themes followed the four-step process adapted by Haltinner (personal communication, 2018).

Chapter IV: Presentation of the Findings

This study examined the lived experiences and personal stories of females enrolled in gender nontraditional career and technical education (CTE) programs at Iowa community colleges. A majority of the existing research on female enrollment in gender nontraditional programming has been in the STEM fields of science and engineering at four-year institutions and on the experiences of women who enter gender nontraditional fields. There is limited research on the factors influencing females' decisions to enroll and persist in male-dominated CTE programs at the community college level. Using a qualitative approach to capture the participants' own words, this study collected data using phenomenological techniques. Development of the data collection process was guided by research questions on perceived persuasive messages that influence enrollment, persistence, and attainment in gender nontraditional programs of study at community colleges.

Two participants completed the study, both enrolled in gender nontraditional CTE programs at Iowa community colleges. This chapter presents individual profiles. Each profile is based on a one-on-one, semi-structured interview conducted by the researcher. It includes a description of the participant's previous educational experiences, the persuasive messages she perceived, and her current educational experiences. Using a third-party transcription service, Rev.com, to transcribe each interview, the researcher read the transcribed content multiple times and shared summaries with the participants to verify its accuracy. Once the accuracy was confirmed, the researcher completed capta reduction as identified in Chapter 3 (see Table 4). Although there were similarities between the participants, each female had developed a personal meaning for her experiences. One female persisted in her program of study while another did not persist in their selected gender nontraditional program of study.

Demographic Findings

After communicating with the state’s Division of Community Colleges and Workforce Preparation Administrator, the researcher received recommendations of community colleges to connect with. With approval from the colleges’ institutional review boards, the researcher connected with department heads and instructors in the programs identified to support the programs of architecture and construction, information technology, manufacturing, and transportation and logistics. The request was for the department heads and instructors to invite self-identified female students via email to participate in an initial survey. Five females between the ages of 20–35 completed the online survey with two agreeing to interviews. Table 4 contains the results of the initial survey.

Table 4

Initial Survey Results by Respondents

Respondent	Self-identify as female	Age range	Enrolled program	Enrollment status	Postsecondary enrollment type
1	Yes	20-25	Information Technology	Enrolled	First-time attendee (graduated high school in 2017 or earlier)
2*	Yes	31-35	Information Technology	Enrolled	Returning student, skill development for career change
3	Yes	26-30	Information Technology	Enrolled	Returning student in a different program
4*	Yes	26-30	Architecture and Construction	Dropped program	Returning student in a different program, skill development for career change
5	Yes	20-25	Architecture and Construction	Enrolled	Returning student in a different program

Note. *indicates an interview participant

Interviewee Context

This study's purpose was dedicated to understanding the lived experiences of females in gender nontraditional CTE programs. The interview questions asked for messages, images, people, and experiences that influenced the participant's decisions around enrollment and persistence. The following participant profiles provide context for the reader and insight into the experiences.

Robin identified her favorite classes as those involving the arts, literature, and philosophy; her hobbies included PC games, painting, baking, stress cleaning, and being somewhat involved in politics. She expressed a dislike for rush hour traffic and dealing with the public after 15 years in customer service. Her early education was spent in the Philippines, where she described attending a private school with a more advanced curriculum compared to the classes she has taken in the US, where she says it is easy to earn straight A's without studying. Robin did not recall any middle school career conversations from teachers and reported not having any emotional support from her parents. Robin identified her priority in middle school as getting better at making friends.

Robin attended a tech high school with courses on mills and lathes, hand drafting, and computer-aided drafting. Robin described her high school as more interesting. She liked all her classes and teachers because the teachers were very supportive. She was still interested in being popular until her senior year when she recognized that self-worth did not come from everyone liking you. Although there was more encouragement for college and careers at the high school, Robin did not care about those things, as she knew her parents did not have the money to send her to a good school. Instead, she knew that she would have to make it through a community college on her own, using student loans. Due to her family's finances, Robin did not visit any

colleges; she chose the affordable community college option, which made sense to her because of the cost.

Robin described not caring about the opinions of others and never asking for them when she was selecting a major or college. Although she had many creative interests, she knew that “those subjects wouldn’t net me a high-dollar career, so I went the practical route and explored STEM majors.” Following high school, Robin “changed majors a bunch of times,” completed a medical transcription diploma and an associate’s degree in science, and has declared majors in chemical engineering, computer-aided drafting/mechanical engineering technology (CAD/MET), and architectural technology.

Robin's plans to change from CAD/MET to architectural technology occurred because “I am absolutely terrible at math and I don’t have to put up with male toxicity.” Robin spoke of her CAD/MET class as beginning with three girls in a class of 25. After the two other females dropped the program, Robin was the only one left and “ended up bailing after the first year and getting the diploma instead of the two-year degree.” She provides the reason that she only completed the first year as male toxicity during group work. She describes her frustration at working with males, who did not care about her ideas but expected her to complete the work for them. Robin reflected, “It was so disheartening that at one point I stopped coming to school, but decided to go back because I wanted to get at least the diploma out of this suffering.”

She described her experiences in math as either “drowning in higher-level math classes or I was following along on software tutorials from the teacher.” Robin voiced her frustration with the instructor’s knowledge of math, as it appeared that the instructor was learning the content at the same time it was being taught and appeared to be providing problems copied and pasted from an online site that also featured the answers to the problems. Robin asked, “If my teacher is

cheating on their lesson plan and all the students are cheating on their math homework, is anyone actually learning anything?"

Robin's decision to switch programs was also based on the response she received when reporting the male toxicity incidents to her teacher, who was also head of the department. The response from the teacher was "They don't even know they're doing it." Robin said that her teacher's response was "such a cop-out answer that I can't respect so I left the program knowing not even the teachers could help me." Robin's response indicated an assumption that the female teacher would be nurturing and seek to change the environment, which serves as a stereotype of a female teacher. When not working in groups, Robin enjoyed the classes. She also pointed out that not all male classmates were toxic, but said that there were enough of them to make her want to change to a "more fulfilling major." Robin planned to begin the architectural technology program in Fall 2020.

Beth began her introduction by describing herself as being a parent, a bit out of high school, "a huge psych buff," and an extrovert. She described 15 years of experience in sales, with her most recent work experience as a mobile supervisor for a mobile provider housed in a big-box store. She laughed as she described how she liked helping people, troubleshooting software, and helping people use social media. Beth also described her enjoyment of literature courses and communication. When she learned that she would be laid off, she immediately went to the community college and "was like, hello, I want to be not expendable because [in] sales and retail...you can be fired at the drop of a hat or you can be laid off at the drop of a hat." Her initial thoughts were to earn a degree as a computer support specialist because it was similar to what she had been doing, and because she had been rejected from such positions due to her lack of a degree.

Beth described her initial conversation with an advisor to share her plans to earn a degree as a computer support specialist. Her advisor recommended web development, and Beth was concerned about how she would balance her family life with the pace of the program. She described switching from computer support specialist to software development is occurring because an instructor said to her, “you’re trying to get a degree in something you already know how to do, why, why would you do that” and also tried to get her into web development, which she said she had left off because she had never been artistic. This same person was also her instructor in a programming course and continued the conversation, asking about her plans and concerns. Due to the conversation with the instructor, Beth decided to switch her major to software development and has “loved it ever since.”

Describing her courses, Beth identified females in many of the courses as being significantly outnumbered, with ratios of five females to 18 males at the start of a semester and two females remaining at the end of the semester. Beth also identified her instructor as a champion for females who told the classes that females are usually those who do best in the class because they try so much harder because “they feel like they have something to prove” and that “they’re going to be the ones lapping you.”

Beth shared that it has been redeeming to be one of the top students in her classes after the responses she received when telling others that she was entering software development. A software developer told her not to pursue the degree because she was too outgoing. Others shared with her that she would be bored, should go for something else, or should design things. Beth reflected, “just because I’m going to be better at it than you are does not mean you should tell me not to do it.” As a self-described extrovert, Beth believes that extroversion has been a strength because she is used to working on teams, getting people to talk who normally do not, using her

sales experience, and getting people to come out of their shells. She described “kind of a niche in talking to people that don’t normally talk to people.” Beth also shared that the instructors had told the female students not to state their proficiency in Word, Excel, PowerPoint, or other similar skills on their résumé to avoid being turned into secretaries. Although she had not “gotten to what I want to be when I grow up entirely,” Beth wanted to do something to benefit people and help with “anything that can help more girls interested in this field...I feel like we would be able to benefit as a society more.”

Despite the similarities of Robin and Beth as females in gender nontraditional programs of study, former big-box store employees, returning adult learners, and searching for job security, their experiences in the programs of study were different with different outcomes. Robin finished the school year with the intent to change programs due to her experiences and Beth spoke with enthusiasm and confidence regarding her program and finding related employment opportunities.

Findings

Through thematic reduction of the interview transcripts three main themes emerged. Themes that presented themselves through the interviews include the following:

- Persistence in a gender nontraditional CTE program of study is influenced by the learning environment.
- Persistence in a gender nontraditional CTE program of study is influenced by instructors.
- Participants enrolled in a gender nontraditional CTE program with the hope of future job security summarizes the goals of the participants to find job security.

Each participant shared her experience as one of few females in a male-dominated course and as one of even fewer remaining in the course at the end of a semester. The perceived

persuasive messages received by participants that influenced their persistence in gender nontraditional CTE programs were both verbal and nonverbal.

Research Question 1

Research Question 1 asked: “What are the perceived persuasive messages described by females who entered and persist(ed) in their selected gender nontraditional CTE programs of study?” Based on this question, the following prompt started the conversation with Beth, Interviewee 2: “How did you select your current program of study?” When Beth learned she was being laid off, she described the conversations with an advisor and, later, an instructor about her program of study. Through those conversations, she changed her focus from earning a degree in what she already knew to Software Development. The conversations included someone listening to her concerns about the pace of the course, being able to still have time for her son, job security and placement, and available support. Despite the verbal messages from other acquaintances saying she would not like software development, and it was not the right fit, Beth focused on the encouraging messages and found motivation in them. Beth identified the instructor as a great supporter and as not seeing gender in “that way” because he challenged Beth to switch programs to something that would benefit her and celebrated her success in computer science courses. Beth reflected positively on her conversations with an advisor before deciding on a program and her ongoing conversations with the instructor who asked about her interests, plans, and concerns. Through these conversations, the instructor addressed Beth’s fears and helped her consider the software development program. Beth described how she decided to enroll in the program, “after speaking with him [software development teacher] and the other girl in my class who was software development I switched majors to software development, and I have loved it ever since”.

The conversation continued with Beth as the second prompt was asked: “What is/was a typical day in class like for you?” Beth described a friendship with the other female in a computer science course after the three other females dropped, stating that she and her female classmate had “this weird need to be in the head of the class because we’re so outnumbered.” Beth’s learning environment at the community college featured an instructor who was vocal about the potential of females in the software development program.

Beth’s micromessages from her instructors were affirmations and appeared to provide her confidence in her ability as the instructor specifically called out females as typically being the best students. With the expectation set high, Beth describes herself and some of her other female classmates, as being at the top of the class. Beth identified one of the micromessages from her classmates as often being the one requested to take notes because of her perceived nice handwriting. Beth laughed when speaking about handwriting as she identified her fiancé as having nicer handwriting than she did.

Research Question 2

Research Question 2 asked, “What are the perceived persuasive messages described by females who chose to transfer out of their gender nontraditional CTE programs of study?” Based on this question, the following prompt started the conversation with Robin, Interviewee 1: “How did you select your current program of study?” Robin’s description of how she selected the CAD/MET program focused on earning potential and her experiences in high school. In addition, Robin already had other degrees and coursework in STEM fields. Robin’s interests were in creative fields, such as writing, crafts, and art. CAD/MET, Robin hoped, would provide an outlet for creativity and design. To enter the CAD/MET program, Robin had to complete a program orientation that outlined the courses, expectations, and program of study.

Conversation continued with Robin with the second prompt of, “What was a typical day in class like for you?” Robin described her CAD/MET courses as male-dominated, with both older and younger males. The older males were more likely to expect women to fit stereotypical female roles, such as being good at taking notes, while the younger males did not comment on (but also did not refute) the older males’ female stereotypes. Robin said that the males, depending on their age, would present in aggressor or observer roles. While not all males in the courses fit the aggressor or observer type, Robin identified aggressors as the most prevalent with fewer as observers.

Robin described her experience when voicing her concerns to the instructor about the classroom environment. The instructor, described by Robin, was female and Robin anticipated more support when she identified the toxic environment. The instructor’s response was described by Robin as a “cop out” and a contributing factor in her decision to transfer out of the program after earning the one-year diploma. Robin identified her CTE classes at a tech high school as introducing her to mills and lathes, drafting, and computer-aided drafting. She considered the classes more interesting than those at a traditional high school. She remembered her high school teachers as being supportive, encouraging students to attend college and consider careers. Robin’s description of her postsecondary experiences in the CAD/MET program are self-identified as the reason she changed programs. Robin described the nonverbal micromessaging of being expected to take notes, being asked by male classmates what they [the class] should be working on, and responses from the male classmates to her questions and ideas as being disappointing. When Robin voiced her concerns to the female instructor, the verbal response was to ignore it because the males did not know what they were doing. Robin’s expectation was that a female instructor would affirm her concerns and work to change the classroom environment.

Robin's expectation was based on her own stereotype of a female instructor likely to be more nurturing when the environment has been created and sustained by the instructor.

Micromessaging from the instructor's unwillingness to address a student concern was that Robin's experiences did not matter. Robin stopped attending classes until she determined she wanted to get something from her experience. Her initial plans were to complete the two-year program but changed to the one-year diploma program and transferred programs for the following fall term.

While learning environments influenced persistence for Beth and Robin, environments were described differently and individual responses were opposite. Beth continued her program and Robin switched programs at the end of the school year.

While theme one of persistence influenced by the learning environment was evident through the responses of Beth and Robin, another theme emerged. Participants knowingly entered gender nontraditional CTE programs of study during a time of career transition with a shared theme of job security. For one participant, job security represented an earning opportunity with a "high-dollar career." The other identified job security as "avenues of opportunity" and not being "expendable." Within the overall theme of job security was the underlying theme of affordability of education, which motivated the participants to select programming at a community college. One participant described selecting a community college because it was the only option due to her finances, and the other described her decision as returning to the community college.

Both the CAD/MET and software development programs are part of a state initiative to support students in community college programs leading to high-demand and high-dollar careers. The initiative provides funding for the difference between grants and scholarships and the cost of

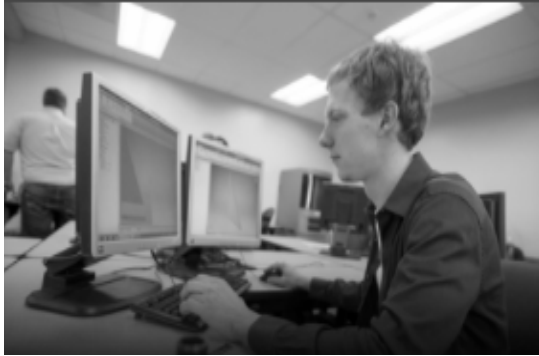
tuition (Iowa College Aid, n.d.). Beth specifically identified the initiative as the reason she was able to attend the program.

Visual Data

First steps to entering either Beth or Robin's program is to complete a program conference. Program conferences are a one-hour introduction to entry requirements, courses, costs, and employment opportunities. Information about program conferences and general program information is available on the program websites. Program websites often serve as an introduction to programs and provide an opportunity to see images of lab spaces, classrooms, staff, and students. Emerging from the visual data of website images was a common depiction of females in postsecondary programs more often as the teacher, smiling, nurturing, observing, or taking notes. Visual data was inclusive of web images and recruitment videos as well as classroom images associated with place and space of the programs that housed the programs that Beth and Robin were affiliated with that represent the added stories in support of their experiences. Table 1 identified degree completion by gender and career cluster. Beth and Robin's programs were two of the top three with lowest female award rates, Architecture and Construction and Information Technology, with 0.05% and 0.07%, respectively (Iowa Department of Education, 2019). Beyond the initial examination of the Architecture and Construction and Information Technology programs, the researcher examined the other postsecondary programs sites to determine if the representation of females was consistent. Samples from the website images, with identifying information cropped out, demonstrate the visual text providing the micromessaging of the role of a female in a postsecondary program. Industrial Technology and Information Technology were selected based on enrollment of Robin and Beth.

Architecture and Construction, including the CAD/MET program, is part of the Industrial Tech department. Robin's community college of attendance's Industrial Tech website features a landing page with a large image and then smaller images for the specific programs. The Industrial Tech recruitment video features high energy music and action scenes of welding sparks, firefighting, and wind turbines with the closing image of a team of multiple males in safety equipment walking through a field with the high energy music. The classroom for the CAD/MET programs lacks anything on the walls besides general building safety information and is set up with dual screen work stations, allowing for individual and groupwork.

Industrial Technology's main site features a male in safety equipment as the page loads. Scrolling through the page, there are 14 programs identified. Each of those programs has an accompanying image. Two of the 14 images include females: one with Advanced Manufacturing and Robotics and the other with Automotive Technology. The two female images feature females alone in the images, not working as part of a team and smiling while a majority of the images with males show them either part of a team, working, or with serious expressions. The messaging shows females smiling while they work, alone while the males that are working are serious, concentrating, and the work requires their focus. Images (see Figures 5 and 6) from the Industrial Technology's main site provide insight to Robin's experience when researching programs in the Industrial Technology department. To maintain confidentiality of the participants, the retrieval information for the images is not provided.

Figure 5*CAD/MET Program Image*

Note. Copyright 2021 by study site (not named to protect the anonymity of the student).

Figure 6*Automotive Technology Program Image*

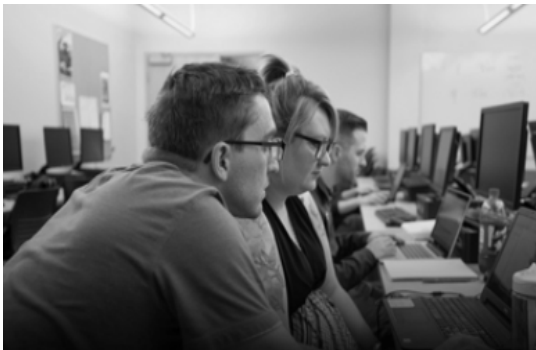
Note. Copyright 2021 by study site (not named to protect the anonymity of the student).

Software Development is an Information Technology program within the Business and Technology Department. On the website for Beth's community college, the Business and Technology page features an image of two females sitting at a table. One of the females is smiling at the camera with the second seemingly focusing on writing. Two additional images appear, one with two females for Business programs and one with a male for the Technology program. Within the Business and Technology Department, five Information Technology programs are identified. Of the five program images, women are featured on two of them. One

has a female appearing to be assisted by a male with the second image featuring a female smiling at the camera as she is surrounded by computer monitors. The recruitment video features three Caucasian males: career advisor, graduate, and teacher. Classroom images show writing on the whiteboards and safety posters. Images (see Figures 7 and 8) from Business and Technology's main site provide insight to Beth's experience when researching programs in the Business and Technology department. To maintain confidentiality of the participants, the retrieval information for the images is not provided.

Figure 7

Software Development Program Image



Note. Copyright 2021 by study site (not named to protect the anonymity of the student).

Figure 8

Engineering/Liberal Arts Program Image



Note. Copyright 2021 by study site (not named to protect the anonymity of the student).

Other postsecondary programs offer similar depictions of gender imbalance, depending on the department and specific program. For the Agriculture program, Figure 9 highlights a female smiling at a piglet while holding it in the air like an infant served as the landing page image with Figure 10 depicting males working on. These images send a message of the nurturing female working with cute animals while the males are fixing equipment or using specialized tools. To maintain confidentiality of the participants, the retrieval information for the images is not provided.

Figure 9

Ag, Land, and Animals Program Image



Note. Copyright 2021 by study site (not named to protect the anonymity of the student).

Figure 10

Diesel Ag Technology Program Image



Note. Copyright 2021 by study site (not named to protect the anonymity of the student).

For the STEM department, one image included a female using a microscope and another female operating a 3-D printer while a male observed the process. Other STEM program images included females watching males with their hands resting under their chin or taking notes. No images of males were included in the Early Childhood Education or Education program links.

Summary

Two participants shared their experiences as females in different gender nontraditional CTE programs of study at community colleges in Iowa. Participants shared the micromessaging from classmates and faculty that either encouraged or discouraged their persistence in their selected program of study. Using phenomenological techniques to learn their experiences and reduce the data to identify themes, the emergent themes from the individual interviews were explored. Participant perspectives were summarized and supported by direct quotes. Responses to the research questions were reviewed to discover the main themes. Visual texts were examined and provided a common depiction of females in a supporter, nurturer, or observer role in most of the gender nontraditional programs.

Participants differed in their responses to the micromessaging. Robin shortened her program of study from a degree to a diploma due to factors including the learning environment and influence of the instructor. Beth experienced the messaging in her courses as supportive resulting in her commitment to degree completion.

Chapter V: Discussion, Conclusion, and Recommendations

The purpose of this qualitative study was to examine the lived experiences of females in gender nontraditional CTE programs at Iowa's community colleges. This study aimed to discover and describe the micromessages that influence enrollment, persistence, and attainment. This chapter includes major findings related to other studies on enrollment, persistence, and attainment in STEM or CTE programs of study in addition to the implications for education programs, employers, and females planning to pursue STEM or CTE careers. It answers the research questions of this study: *What are the perceived persuasive messages described by females who entered and persist(ed) in their selected gender nontraditional CTE programs of study?* and *What are the perceived persuasive messages described by females who chose to transfer out of their gender nontraditional CTE programs of study?* Through the discovery and examination of the lived experiences, shared themes can contribute to existing and future research to support recruitment and retention initiatives. In addition, findings provide insight on classroom environments and professional learning topics for postsecondary faculty and staff. Understanding experiences of females in gender nontraditional programming helps in understanding the consumer of the programming and developing strategies to encourage enrollment, persistence, and attainment of certifications or degrees.

Discussion

With the purpose to discover and describe the micromessages that influence female enrollment, persistence, and attainment in Iowa community colleges' gender nontraditional CTE program of study, this study identified the shared themes to offer develop recommendations for recruitment, classroom environment, and professional learning. Developing a diverse and highly skilled workforce is critical to economic success. Community college programs are challenged to

meet the needs of industry and accountability measures of Perkins V including placement, earning recognized credential, and nontraditional program concentration (American Association of Community Colleges, n.d.; Perkins Collaborative Resource Network, n.d.; The White House, 2016). Understanding the experiences of females in gender nontraditional programming is one component of understanding the consumer of the programming and developing strategies to encourage enrollment, persistence, and attainment of certification or degree.

Themes that influence females to enroll and persist in gender nontraditional programs of study are *learning environment*, *hopes of job security*, and *influence of instructors*. Learning environment includes classmates, previous learning experiences, classrooms, program websites, and conversations before and during enrollment in the program of study. Job security includes rate of pay and job availability. Influence of instructors of enrollment and persistence focuses on instructors in the postsecondary programs of study. Some aspects of these themes relate to the individual, whereas others involve the classroom culture. Both participants reported spending fifteen years in a sales-related career before enrolling in their current educational programs. The two participants shared the fact that both were females in male-dominated CTE programs; however, they were enrolled in different programs and identified different micromessages.

Findings from this study agree with the research published by Erkkila (2019), which found that women's decision-making processes were influenced, both positively and negatively, by family and learning experiences. Social cognitive theory emphasizes that people and environments interact continually, and this process factors into self-efficacy. An individual's levels of self-efficacy within social cognitive theory influence their motivation and ability to persist despite challenges (Bandura, 1977; Betz & Hackett, 1981; Erkkila, 2019; Liao, Edlin, & Ferdenzi, 2014; Leung S. & Springer, D, 2008; Wagner, 2019; Williams & Pollock, 2015).

Robin voiced her frustration regarding the learning environment, including her perception that the courses she had taken were either too hard or too easy. Robin said that she transferred out of her program because the environment was toxic and she perceived that nothing would change.

Beth's description of her interactions with her instructor and the classroom environment felt lighter than Robin's. She described her experiences with laughter and expressed the ability to shut down the "haters." Beth's self-efficacy improved after her instructor informed the class that females tended to be his best students and after she became comfortable speaking with classmates. After initially being concerned about her potential for success she became confident that her chosen course was the right fit for her. Lester (2017) identified the community college classroom as being more gender-equitable, not in the number of females in a specific program, but in how female students generally reported feeling about the classes. Robin and Beth were enrolled in different programs, both programs were more information technology based in software developer and CAD/MET.

While Beth was positive about her classroom environment, instructor and advisor messaging, Robin did not describe the same experience. The micromessages the participants received varied depending on their classmates and instructors. Robin identified microaggressions from male classmates who did not value her opinions and from an instructor who informed her that the males in the course were not aware of what they were doing. With the instructor feedback, Robin knew the unfriendly environment was not going to change so the decision was with her to either remain in the program or find a more inclusive environment (Lester et al, 2017).

Neither participant focused on what was the right fit for them based on their personality. Beth identified direct messaging from numerous individuals that her personality was not a good fit for a career in software development and she should consider something else. Robin's focus was on a career in STEM that provided job security through salary. The study did not find alignment with other studies of how individuals find a career matching their personality or career counseling assisting with decision making (Holland, 1973; Leonard, 2016).

Examination of the program websites reinforced females as helpers, caregivers, and cheerful. For the male-dominated programs, females were included as either smiling at the camera or smiling when working when a majority of the males were engaged in repair, equipment usage, and surrounded by others who were observing or taking notes. Websites often serve as an introduction to a program, helping an individual "see" themselves in the program and career.

Conclusions

This study highlighted the experiences of females in gender nontraditional postsecondary CTE programs at Iowa community colleges. Persistence and attainment were influenced by the learning environment, instructor, and an individual's self-efficacy. STEM and CTE programs were selected by the participants due to job security of high pay and guaranteed employment. The participant who persisted in her selected program of study, Beth, identified an instructor as a champion for females through supportive words, declarations to the class of the focus and determination of female students, and identification of females as often top of the class. Robin, who did not persist in her selected program of study, identified a hostile environment and changing her anticipated level of instructor support as futile because she did not expect anything to change.

Research on gender equity in postsecondary programming often focuses on STEM programming at four-year universities, effectiveness of recruitment efforts, and determining a relationship between math ability and self-efficacy in STEM programs (Betz & Hackett, 1981; Schaefer, 1993). This study focused on community college programs. There are similarities between its findings on persistence, attrition, self-efficacy, and stereotypical gender roles and those reported in the literature. In the years since Title IX was passed, there is still much to learn about the female experience in STEM and CTE training programs and careers. Persistence and attainment in STEM and CTE programs by special populations creates a more diverse workforce while increasing earning potential.

Recommendations

This research study provides a background and suggestions for enrollment and retention of females in gender nontraditional CTE programs of study at a community college. Based on the research study and findings, it is recommended to train community college and high school CTE instructors, examine promotional materials and social media to ensure representation of diverse learners, and completion of a lab space audit. Training of high school and postsecondary teachers, school counselors, and career advisors would establish common understanding, consistent messaging, and alignment of outreach efforts through clearly defined career pathways.

High school CTE programs are required by federal legislation to have programs of study that articulate to community college programs. High school and postsecondary CTE teachers often participate in shared advisory committees using the same labor market information and local employers. These findings suggest the need for annual training in implicit bias, micromessaging, and cultural responsiveness. This training would be most effective if the high school staff and postsecondary staff received the same training and invited industry partners to

be part of the training. Training needs to be more than a single day session but an ongoing commitment from the institution to improve the overall culture in addition to planned onboarding of new staff to ensure consistency. This training should include self-reflection, possibly through a culture awareness inventory, to support staff in learning not only about their students but also about themselves. Through shared training, better relationships are likely to develop and more purposeful collaboration between educators to engage students in the secondary programs as preparation for postsecondary programming.

The shared training should also incorporate an examination of marketing materials and a classroom equipment audit. For the marketing materials, how is diversity depicted in the classroom? What roles are genders assuming in images and are individuals of different ethnicity or ability represented? A classroom equipment audit includes examining sizes of welding equipment, aprons, and accessibility of the lab space for all abilities.

Areas for Further Study

In addition to recommendations for training, examination of promotional materials and social media, and a classroom audit, the following research is recommended:

- replicate the study in a non-pandemic setting for in person meetings and classroom observation,
- perform a qualitative study to discover the experiences of females at skilled trade apprenticeship training centers,
- complete a study of the experiences of male or female high school students in gender nontraditional CTE courses or career academies,

- complete a study of career pathways of females currently employed in gender nontraditional, and careers to identify themes in their decision making, persistence, and micromessages on the worksite, and
- perform a mixed methods study on secondary students completing two or more CTE courses in the same pathway using the special populations identifiers.

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Appendix A

Program Offerings at Iowa's Community Colleges

Community college	Advanced manufacturing	Architecture and construction	Information technology	Transportation, distribution and logistics
Des Moines Area	X	X	X	X
Eastern Iowa	X	X	X	X
Hawkeye	X	X	X	X
Indian Hills	X	X	X	X
Iowa Central	X	X	X	X
Iowa Lakes	X	X	X	X
Iowa Valley	X	X	X	X
Iowa Western	X	X	X	X
Kirkwood	X	X	X	X
Northeast Iowa	X	X	X	X
North Iowa	X	X	X	X
Northwest Iowa	X	X	X	X
Southeastern	X	X	X	X
Southwestern	X	X	X	X
Western Iowa Tech	X	X	X	X

Note. Adapted from *The annual condition of Iowa's community colleges*, by Iowa Department of Education, 2020, Division of Community Colleges and Workforce Preparation.

<https://educateiowa.gov/sites/files/ed/documents/2020%20Annual%20Condition%20of%20Iowa%27s%20Community%20Colleges%20-%20Web%20Version.pdf>). Copyright 2020 by Iowa Department of Education.

Appendix B

Division Administrator Letter

Dear Division Administrator, Division of Community Colleges:

The purpose of this email is to request your assistance. As we have spoken in the past, you may remember that I am pursuing my EdD in Career and Technical Education through the University of Wisconsin-Stout.

My research seeks to identify and understand micromessages influencing enrollment and persistence of females in gender nontraditional postsecondary CTE programming, specifically in Advanced Manufacturing, Architecture and Construction, Information Technology, and Transportation, Distribution, and Logistics. To answer my research questions, I would like to invite participation of female students in the identified programs to participate in a qualitative research study to identify and understand messages that may have encouraged or discouraged enrollment, persistence, and degree/certificate attainment.

If appropriate, I am asking for the contact information from the community colleges to make my request as well as identification of the process and timeline.

1. Invitation to community college contacts
 - a. Identify the purpose of the research
 - b. Request for enrollment, persistence, and attainment information with demographics
2. Willingness to send students an email identifying study
3. Students contacted
 - a. Email
 - b. Survey link

- c. Informed Consent form
4. Interview protocol
- a. Open-ended questions
 - b. Follow up questions with summary of previous responses
 - c. Confidentiality of responses for all

It is my belief that this information will benefit not just community colleges, but provide transferability to secondary programs and, possibly, insight for other underrepresented populations. Please contact me with any questions as I look forward to hearing from you.

Sincerely,

Tara Troester

Appendix C

Email to Community College Contacts Identified by Division Administrator

The purpose of this email is to request your assistance. Jeremy Varner, Division Administrator, is cc: d on this email as I began my request with him. Currently I serve as the Career and Technical Education (CTE) Facilitator for the Cedar Rapids Community School District. To better serve my district and state, I began an EdD program in CTE at the University of Wisconsin-Stout. My research seeks to identify and understand micromessages influencing enrollment and persistence of females in gender nontraditional postsecondary CTE programming, specifically in Advanced Manufacturing, Architecture and Construction, Information Technology, and Transportation, Distribution, and Logistics.

To answer my research questions, I would like to invite the participation of female students in the identified programs to participate in a qualitative research study to identify and understand messages that may have encouraged or discouraged enrollment, persistence, and degree/certificate attainment.

My requests of you, if interested in participating

1. Provide enrollment, persistence, and attainment information with demographics for the identified programs for Fall 2017 and Fall 2018.
2. Willingness to send students an email identifying study
3. Student Experience/Data Collection
 - a. Receive an email invite
 - b. Demographic survey
 - c. Informed consent form
 - d. Interview protocol

- e. Open-ended questions
- f. Follow up questions
- g. Thank you email

4. Findings

- a. Ensure confidentiality of participating community colleges
- b. Ensure confidentiality of participating students
- c. Shared with participating community colleges
- d. Shared with Division Administrator
- e. Presented at local, state, and national conferences

It is my belief that this information will benefit not just community colleges, but provide transferability to secondary programs and, possibly, insight for other underrepresented populations.

If you are interested in participating, please respond to this email and provide the requests identified above. Please contact me with any questions as I look forward to hearing from you.

Sincerely,

Tara Troester

Appendix D

Community College Response (Approval)

RE: IRB Research Proposal

[REDACTED]
Fri 1/31/2020 1:42 PM

To: Troester, Tara <troestert6189@my.uwstout.edu>

Hi Tara,

I'm sorry it has taken me a bit longer than expected to get your proposal reviewed. Attached is a letter and corresponding documents indicating that [REDACTED] IRB also found your research exempt.

Your research sound very interesting, with important implications for our CTE programs. I am very interested in hearing about your findings.

Let me know what your next step is. At [REDACTED], email addresses are not considered directory information under FERPA. I am willing to work with you by identifying your target population and sending an email out to them on your behalf.

Thanks,

[REDACTED]

Appendix E

Community College Response (Denial)

Re: IRB Research Proposal

Tue 6/2/2020 9:36 AM

To: Troester, Tara <troestert6189@my.uwstout.edu>

Greetings Tara,

Due to the current student overwhelm of surveys related to transitions that have occurred as a result of COVID19, the request to participate has been denied.

I wish you the best of luck going forward.

On Mon, Jun 1, 2020 at 8:46 AM [REDACTED] wrote:

Hi Tara,

Please send me a copy of the email that you would be sending to our students.

As I stated in my previous email, I may be able to request approval for cooperating with you on this project. If cooperation is granted the college may charge for the time required to generate the desired student contact information and send out the email.

Would you have the resources to cover such a fee?

Thank you.

On Sat, May 30, 2020 at 9:12 AM Troester, Tara <troestert6189@my.uwstout.edu> wrote:

The purpose of this email is to follow up on January email conversations. With the availability of students at all institutions vastly different, I was interested to find out if there would be a possibility of staff of specific programs sharing my email with students.

The programs would include Advanced Manufacturing; Auto Tech, Mechanics, and Transportation; Construction; and Information Technology.

Thank you for additional consideration.

Sincerely,
Tara Troester

From: Troester, Tara <troestert6189@my.uwstout.edu>

Sent: Monday, January 13, 2020 9:18 AM

Subject: Re: IRB Research Proposal

Thank you for your quick response. Attached is my UW Stout IRB approval as well as the submitted application.

Completely understandable with the student information. I would not need access to it if the college was willing to send an email that we agree upon to students, or if there is an online board that information is posted towards. How students learn about the research opportunity can vary to meet the practices of the college.

Thank you, again.

Tara Troester

troestert6189@my.uwstout.edu

Sent: Monday, January 13, 2020 7:45 AM

To: Troester, Tara <troestert6189@my.uwstout.edu>

Subject: Re: IRB Research Proposal

Greetings Tara,

We do not have a fully functioning IRB at the college and as a result, we are only able to work with those whose research is reviewed and approved by an external IRB. If you are able to do your research under a UW Stout IRB and provide me with the IRB approval and consent form used for participants, I may be able to request approval for cooperating with you on this project. If cooperation is granted the college may charge for the time required to generate the desired student contact information.

So, lots of unknowns. Hopefully you will have easier routes through other institutions. Best of luck to you!

Respectfully,

Appendix F

Participant Email

Dear Potential Participant:

This email is to invite you to participate in a qualitative research study as a female student in a gender nontraditional postsecondary Career and Technical Education program of study. Currently I serve as the Career and Technical Education Facilitator for the Cedar Rapids Community School District. To better serve my district and state, I began an EdD program in CTE at the University of Wisconsin-Stout. I want to identify the messages (verbal and nonverbal) that may have influenced you to enroll, persist, change, and/or attain certification in a program that typically has 75% or more of those enrolled that are male.

Purpose

The purpose of this study is to understand your experiences. What did you see and/or hear? How did you feel? What was your experience, in your words? Are there shared experiences/themes of females in nontraditional postsecondary CTE programs? This study seeks to identify those themes and use them to inform and guide future practices.

Your involvement

As a participant, you will be asked to participate in a two-part online response to open-ended questions. The first part will have demographic information. The second part will be an hour-long open-ended interview with questions that you are asked to answer honestly and completely. Finally, a summary of the open-ended interview responses will be emailed to you to ensure accuracy.

Next steps

Review the informed consent form([link](#)) and determine your interest in participating.

I believe your participation will help other females choose to enroll and persist in a nontraditional CTE program of study. Your time and consideration of participation is greatly appreciated.

Sincerely,

Tara Troester

troestert6189@my.uwstout.edu

Appendix G

Informed Consent

UW-Stout Signed Consent Form for Research Involving Human Subjects Consent to Participate in UW-Stout Approved Research

Title: Micromessaging: A qualitative study on female enrollment, persistence and attainment in gender nontraditional postsecondary Career and Technical Education Programs

Research Sponsor: Dr. Urs Haltinner

Investigator:

Tara Troester
319-310-6577
troestert6189@my.uwstout.edu

Description:

The purpose of this research is to identify and understand the lived experience of female students in nontraditional post-secondary Career and Technical Education programs of study. This study is intended to examine micromessages that may influence enrollment, persistence, and degree/certification attainment of students enrolling in Fall 2016 and Fall 2017 at participating Iowa community colleges.

The following research questions will guide this study:

1. What are perceived persuasive messages described by females that entered and persist(ed) in their selected gender nontraditional CTE programs of study?
2. What are perceived persuasive messages described by females who chose to transfer out of their gender nontraditional CTE programs of study?

This study will use a phenomenological approach. This approach will provide the opportunity for the researcher to identify themes in the lived experiences of the participants.

Risks and Benefits:

The perceived risks with this study include possible feelings of discomfort when responding to questions about experiences, especially if there were negative experiences. Concern about identifiable experiences may also be a perceived risk. The risk will be decreased by confidentiality of data and the option to opt out of the study at any time without any consequence.

The perceived benefits associated with the study is that the results may assist future female students when shared with community colleges. In addition, the understanding gained from this study may improve the messaging for other underrepresented populations in nontraditional programming and males in nontraditional male programs.

Time Commitment and Payment:

Participation in the online interview questions will take approximately one hour. Follow up questions, either online or over the phone, will take approximately one hour. There is no payment for participating in the research.

Confidentiality:

Your name will not be included on any documents. We do not believe that you can be identified from any of this information. This informed consent will not be kept with any of the other legal documents completed with this project.

Right to Withdraw:

Your participation in this study is entirely voluntary. You may choose not to participate without any adverse consequences to you. Should you choose to participate and later wish to withdraw from the study, you may discontinue your participation at this time without incurring adverse consequences.

IRB Approval:

This study has been reviewed and approved by The University of Wisconsin-Stout's Institutional Review Board (IRB). The IRB has determined that this study meets the ethical obligations required by federal law and University policies. If you have questions or concerns, or reports regarding your rights as a research subject, please contact the IRB Administrator.

Investigator:

Tara Troester
319-310-6577
troestert6189@my.uwstout.edu

IRB Administrator

Elizabeth Buchanan
Office of Research and Sponsored Programs
152 Vocational Rehabilitation Bldg.
UW-Stout
Menomonie, WI 54751
715-232-2477
buchanane@uwstout.edu

Advisor:

Dr. Urs Haltinner
715.232.1493
HaltinnerU@uwstout.edu

Statement of Consent:

By signing this consent form you agree to participate in the project entitled, *Micromessaging: A qualitative study on female enrollment, persistence and attainment in gender nontraditional postsecondary Career and Technical Education Programs.*

Signature

Date

Signature of parent or guardian
(If minors are involved)

Date

Appendix H

Initial Survey

On July 1, 2020, all submitted interest surveys will be compiled and participants will be selected based on program of study, school of attendance, and availability to make certain there is representation across programs and the state. Those selected for further participation will receive an email with additional information. Email addresses are not being collected; you are asked to self-report your email.

Your time and willingness to provide information is appreciated.

By completing the following survey, you agree that you are 18 or older and to participate in the project, Micromessaging: A qualitative study on female enrollment, persistence and attainment in gender nontraditional postsecondary Career and Technical Education Programs.

- A. I consent to contribute my information for consideration in a study about my experiences as a female in a gender nontraditional program. (Gender nontraditional means 25% or less of student enrollment is a single gender. For example, in a class of 10 students, 3 or less are female. In a class of 20, 5 or less are male.
- B. I do not consent to this study. If you do not consent to this study, you can click submit without providing additional information.
1. Please provide your first name and the initial of your last name.
 2. Please provide your email address.
 3. Do you self-identify as female?
 - a. Yes
 - b. No

4. Demographic Information (Age)
 - a. 19 and under
 - b. 20-25
 - c. 26-30
 - d. 31-35
 - e. 36-40
 - f. 41-45
 - g. 46-50
 - h. 51 and over
5. What is/was your post-secondary school of attendance? Please fill in the blank and you may provide more than one.
6. Identify your program(s) of enrollment.
 - a. Advanced Manufacturing
 - b. Architecture and Construction
 - c. Information Technology
 - d. Transportation and Logistics
 - e. Other
7. Are you still enrolled in the program identified above?
 - a. Yes
 - b. No, I graduated.
 - c. No, I enrolled in a different program.
 - d. No, longer attending program.

8. Please identify your postsecondary enrollment.
 - a. First time attendee (high school graduate in 2017 or 2018)
 - b. First time attendee (high school graduate before 2017)
 - c. Returning student in a different program
 - d. Skill development for current career
 - e. Skill development for career change

Appendix I

Interview Protocol

Name of Study: Micromessaging: A qualitative study on female enrollment, persistence, and attainment in gender nontraditional postsecondary Career and Technical Education programs

Researcher: Tara Troester

Introduction: My name is Tara Troester and I am part of an Educational Doctorate program in Career and Technical Education through the University of Wisconsin-Stout. I currently support Career and Technical Education teachers and programs for the Cedar Rapids Community School District in Cedar Rapids, Iowa. As part of my dissertation research, I would like to interview female students enrolled in postsecondary programs that are gender nontraditional to learn what encouraged enrollment, persistence, attainment or what discouraged those identifiers. The interview is estimated to take up to 60 minutes via face-to-face, telephone, or Zoom/GoToMeeting. Do you have any questions about the study, procedures, or the consent document?

Interview Questions

1. Tell me about yourself. (Tell me more about your favorite classes, hobbies, interests?)
2. Describe what you remember from middle school, classes, career exploration.
(Describe the classroom settings, posters, responses about your career interests ...
Tell me about any career conversations you remember from 6th/7th grade or other years, what were you interested in-tell me more about that, about role models, favorite classes, and why.)
3. Describe high school, classes, career exploration (What classes did you take? Tell me about any guest speaker you may remember-what do you remember? Tell me about

- any career conversations you remember from high school, what were you interested in-tell me more about that, about role models, favorite classes/teachers and why.)
4. Did you tour any post-secondary colleges, training programs, or businesses? Which ones stand out the most and tell me more about those.
 5. How did you select your current program of study? (Describe any visits, program orientations, responses from family/friends, other programs you considered.)
 6. What is/was a typical day in class like for you? (Describe the classroom and lab space, equipment, uniforms, instructors, any guest speakers?)
 7. What would you want to tell future students interested in this program?
(Remembering your visit, what do you wish you would have known? Tell me more about that.)
 8. As you think over our conversation, is there anything else you would like to add?

Appendix J

Interview Capta Reduction Excerpt Figure

Raw Capta	Reduction stage 1 (Essential Meaning Units)	Reduction Stage 2 (Rough Themes)	Final Themes (Enduring themes across interviewees for the question asked)
Interviewer Asked Question 4 How did you select your current program of study? (Describe any visits, program orientations, responses from family/friends, other programs you considered)			
<p>Well honestly, um, that, as far as that goes, it, it just, it gave me the ability to talk many different types of people. Especially working at a place like Best Buy, um, I would find myself talking to um, people in this industry, um, engineers and software developers. And people that weren't necessarily extroverted, so I found kind of a, a niche in, in talking to people that don't normally talk to other people. So. (laughing)</p> <p>Well um, from people around me, um, like for instance, so when I found out I was going to be laid off, um, I immediately went back to Kirkwood and I was like hello, I want to be not expendable because sales and retail is, like you can be fired at the drop of a hat or... you can be laid off at the drop of a hat. And so I was going to initially go back for computer support specialist</p>	<p>Gave me the ability to talk to many different types of people Talking to people that normally don't talk to people Want to be not expendable Initial plans for computer support specialist Had been rejected from positions because she did not have the degree Another instructor "...you're trying to get a degree in something you already know how to do, why, why, would you do that?" Advisor for software development asked "...why are you not doing software development"</p>	<p>Previous work experience provided the ability to talk to many different types of people Talk to people that don't normally talk to other people Looked for a non-expendable career Was going to earn a degree in what she had been doing because of being turned down for positions due to lack of degree Advisory encouraged web development but X was concerned about the pace. Instructor encouraged X to change programs and listened to X about concerns.</p>	<p>Participants enrolled in a gender nontraditional CTE program with the hope of future job security.</p> <p>Persistence in a gender nontraditional CTE program of study is influenced by instructors.</p> <p>Persistence in a gender nontraditional CTE program of study is influenced by learning environment.</p>

<p>because uh, that's what I've been doing. So like- ... I was going to get a degree in that, and then like, it would open up more a- avenues of opportunity because I had been rejected from positions purely because I didn't have uh, a degree in something. And so when I went back to school, I initially spoke with um, an advisor who was super helpful. She was, she was actually trying to get me into the web development area. And I was concerned about the pace and, and that kind of thing with you know, all of the extracurriculars I have with a boy and all of that.</p> <p>So it wasn't actually until I, so I started, I started software development, I did switch to software development from the, because another instructor got ahold of me and was just like, you're trying to get a degree in something you already know how to do, why, why would you do that?</p> <p>Why wouldn't you just get something, you know, a step up. So he tried to me into web development but I'm not a designer, by any means.</p> <p>Um, art has never been my strong suit. (laughs) At all. So I was kind of, like one of the classes that I have, was intro to programming, so it was Python class. And my advisor for software development was my teacher for that, and he ... got ahold of me and he</p>	<p>Switched majors after speaking with him and "...loved it ever since"</p> <p>One of the guys that was a software developer and he was like, don't do it. "...you're too outgoing"</p> <p>"...boring and you wouldn't be able to do..." "...I think very logically. And, they're like, no you don't."</p> <p>"it's been really kind of redeeming going from all of these guys telling me that because of my personality, I would not be good at this."</p> <p>One of the top in my class...incredibly redeeming...</p> <p>"...they're all haters."</p> <p>"just because I'm going to be better at it than you are does not mean that you should tell me not to do it."</p> <p>No, your personality and you don't think like that and there's no, like you shouldn't... No, no, no, no. That's silly, why would you do that? You should go for something else</p>	<p>Switched majors and the current major fits other software developers told "her" to not do it because of personality Making assumptions based on a personality type that someone would not like something Motivation and redemption at accomplishing something someone said you would not be able to .</p> <p>Top of class Career interest based on perceived personality Someone believed in X Pride of advisor Supporter-used gender as a motivator advisor as an advocate-set a high expectation, verbalized expectation to class</p>	
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<p>was like, why are you not doing software development? he's just like, you should watch out for the, the girls in the class 'cause they're going to be the ones that are lapping you. Like they, they're going to be the ones that are trying harder, they're going to be the ones are, you know, e-excelling in these classes.</p>	<p>“... current advisor is the one who really made me believe I could do it.” advisor was super proud Advisor a great supporter and does not see gender that way. ...two of the best people in his class have been Female. “...you’ll find that the people who do the best in this class are usually females because they feel like they have something to prove. And, it’s not wrong. Like we all, we feel like we have something we need to prove because we are so outnumbered in these classes.” ...they’re (females) going to be the ones that are trying harder, they’re going to be the ones are, you know, excelling in these classes</p>		
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