MAKING THE CHANGE:

A BASIC QUALITATIVE STUDY EXAMINING THE FACTORS INFLUENCING

WOMEN TO MAKE THE CHANGE FROM INFORMATION TECHNOLOGY

PRACTITIONER TO INFORMATION TECHNOLOGY EDUCATOR IN A

COMMUNITY OR TECHNICAL COLLEGE

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Authorization to Submit Dissertation

This dissertation of Linda R. Gould-Otto, submitted for the degree of Doctor of Philosophy with a major in Education and titled "Making The Change: A Basic Qualitative Study Examining The Factors Influencing Women To Make The Change From Information Technology Practitioner To Information Technology Educator In A Community Or Technical College" has been reviewed in final form. Permission, as indicated by the signatures and dates given below, is now granted to submit final copies to the College of Graduate Studies for approval.

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Abstract

This basic qualitative study presents an examination of the factors that influence a woman in a successful information technology career in industry to change to a career teaching information technology in a community or technical college. The purpose of this investigation was to gain an understanding of this change and create a basis for future development of theory to explain it. The research question used to guide this study was: What factors contribute to a woman leaving a successful career in the field of information technology for a position as an information technology instructor in a community or technical college?

The findings of the study indicate that multiple factors influence a woman when making this change from practitioners of information technology to educators in information technology. The personal interests of the participants were the most significant factor, but their stage-in-life and their feelings of receiving different treatment than men in industry also played a part.

Acknowledgements

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Dedication

This study is dedicated to my mother, Wilma Gould, who has supported and encouraged me throughout this long process and never let me give up.

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Chapter One: Introduction

This basic qualitative research study came about as a result of my personal search for understanding of who I am, how I came to be this person, and what purpose I might be fulfilling in helping other women who are similar to me. Growing up, I was called a tomboy, although I was never very good at sports. I was good at math and science, while the girls around me were more interested in art and music. I made some attempts at fitting in, but my parents encouraged me to be who I was.

When I went to college at the age of seventeen, I was determined to be a computer programmer, like my brother. I am not sure I really noticed at first that I was the only woman in my classes, but eventually I ended up changing my field. There were odd reasons for this; it was not because of poor grades. They centered mostly on the fact that the computer lab was open twenty-four hours a day, but as a woman, I was not welcomed in the middle of the night because it was not considered safe. A barrier was in place even though those in charge were not really trying to exclude me.

The field I entered, accounting, was also one dominated by men, but at least in this field I could do my work in my dormitory and did not require special considerations. My passion for computers never left me, and eventually I went to work for an accounting software firm and moved from there into positions in information technology.

While I loved working with computers, from the time I was in college to the present I have always had a desire to help others learn. I enjoyed tutoring and often took it on without pay. In my positions in information technology, I was one of the odd ones who actually liked to go to peoples' desks and teach them how to do the tasks they struggled with. I always believed that I was "weird". My desire to work in male

dominated fields conflicted with my desire to help others learn and be successful. This study is an opportunity for me to look at others who may have this same conflict and add to a body of knowledge that is lacking concerning women in information technology instructional positions.

Background of the Study

Historically, men have held a significant majority of the jobs in science, technology, engineering, and math (STEM) ("National Science Foundation [NSF]", 2012). For some fields, the difference between employed men and employed women is significant. For example, in the field of math, the percentage of women completing a degree and going on to employment in the field is 39% of what it is for men (Su, Rounds, & Armstrong, 2009). In other dimensions of STEM, the ratio is even greater. The ratio of women to men in the physical sciences is 28%, computer science is 26% and engineering is 12% ("National Science Foundation [NSF]," 2006; "National Science Foundation [NSF]", 2011). A report released by the National Women's Law Center in 2005 found that "female participation in vocational fields dominated by men has remained virtually unchanged since the late 1970s" (Cavanagh, 2005, p. 10).

While women are making progress in some fields previously dominated by men, information technology is one area in which their progress is slow and may even be regressing (Misa, 2010). In considering this exception, we can think through the gendered nature of jobs in general. Each job within an organization is designated a job description. While the job description is considered gender-neutral, a human being ultimately fills the position described in the job description, and that human is more than the list of tasks and skills a job description encompasses. Because the job description focuses solely on the

tasks and skills of the job, it can be considered a gendered concept because those tasks and skills described by the job description most closely resemble the historical male worker whose whole life revolved around his job while his wife or some other woman was responsible for his home and children (Acker, 1990). The components of the job description generally lack emphases on other responsibilities historically deemed female, such as homemaking and child rearing.

The origins of the field of information technology support this idea of gender-specific jobs. Even the title of a book detailing the history of information technology suggests this, "The Computer Boys Take Over: Computers, Programmers, and the Politics of Technical Expertise" by Nathan Ensmenger (2010). While this book is not examining the role of men or women in the field of information technology, it assumes that men dominate the information technology domain.

Statement of the Problem and Purpose of the Study

There is a lack of research on women who choose to move from the field of information technology into teaching information technology in a community or technical college. In both the field of information technology and in the field of instructing information technology, there is a majority of male professionals, instructors, and students. A woman who chooses to teach information technology in a community or technical college could have a variety of reasons for choosing this. This study attempts to examine the factors that influence a woman in making this choice to teach.

The purpose of this basic qualitative study is to gain an understanding of the factors involved for a woman in making the choice to leave the field of information technology as a practitioner and enter the field of information technology as an educator.

In examining this move from industry to higher education, we will be opening the door to further research and the potential development of theory to explain this phenomenon.

Significance of the Study

This study examines the factors that contribute to a woman leaving the field of information technology to become an educator in information technology, reducing the numbers of women in practice. Adding to our understanding of what causes women to leave the information technology profession and enter the field of information technology instruction allows us to determine practices that can potentially recruit and retain women both as practitioners and as instructors. This understanding is relevant to industries that provide information technology and are looking to diversify their talent pool as well as to academic institutions that strive to aid those industries.

Definition of Terms

- *Community or Technical College*. An institution that continues education beyond the high school/secondary level with an emphasis in technical education and/or an offering of general classes for transfer to a university. Includes both public and private institutions.

- *Gender*. As referred to in this study, indicates the socially constructed roles, behaviors, activities, and attributes applied to men and women.

- *Higher Education*. A sector that continues education beyond the high school/secondary level, such as a university, community college or technical college. Includes both public and private institutions.

- *Information Technology*. Includes general-purpose computational devices, associated peripherals, operating environments, applications software,

information, embedded computing devices, communications, and the science
underlying the technology (Lin, 2000).

- *Information Technology Practitioner*. As referred to in this study, a person who holds a position in any portion of industry and is actively involved in the field of information technology.

- *Information Technology Instructor/Professor*. As referred to in this study, a person who holds a position in a community or technical college in the field of instruction, actively teaching information technology subject matter.

- *IT*. Information Technology.

- *Sex*. As referred to in this study, indicates biological differences between men and women.

- *STEM*. Science, technology, engineering, and mathematics.

- *Successful Career*. As referred to in this study, a career in which an individual is continuously employed in a paid position and fully knowledgeable in the content areas of their work.

Research Questions

What factors contribute to a woman leaving a successful career in the field of information technology for a position as an information technology instructor in a community or technical college?

Sub-questions:

- In what ways might perceptions about their stage-in-life influence women IT practitioners to make the choice to leave information technology to become community or technical college IT instructors?

- In what ways might personal interests influence women IT practitioners to make the choice to leave information technology to become community or technical college IT instructors?

- In what ways might their perceptions about gender stereotypes influence women IT practitioners to make the choice to leave information technology to become community or technical college IT instructors?

- In what ways might their perceptions about cultural aspects of higher education influence women IT practitioners to make the choice to leave to become community or technical college IT instructors?

Limitations

1. Participation was limited to women currently employed as information technology instructors in community and technical colleges in the United States who were formerly employed in the information technology industry.

2. Participants did not all hold the same level of post-secondary education.

Delimitations

For the purposes of this study:

Participants were interviewed on a voluntary basis from community and technical colleges and therefore may not be representative of the overall female instructors of information technology.

Organization of the Study

The study is organized into five chapters. The first chapter introduces the research problem and the significance of the topic both to me personally and in general. Chapter Two provides a review of the literature pertaining to related research and theories.

Chapter Three provides a discussion of the research methodology, epistemology, and design, along with a description of the participants, coding procedures, and analytical procedures. Chapter Four presents the profiles of the participants, themes, and findings of the study that are determined from an examination of the data. Chapter Five is a discussion of the conclusions drawn from the study in relation to the literature review and offers recommendations for future research.

Chapter Two: Literature Review

The disparity between the numbers of men and women in information technology fields exists both in practice and in information technology education. Among higher education information technology faculty, men comprise 84% of the workforce with women holding only 16% ("National Science Foundation [NSF]," 2011). This disparity grows with rank with men holding 88% of information technology full professor positions and women holding 12% ("National Science Foundation [NSF]," 2011). Contrast this to the total number of males and females in higher education overall and we find 65% men and 35% women in all higher education, and in the highest ranks it is 78% men and 22% women in full professor positions ("National Science Foundation [NSF]," 2011). These data indicate there is a higher percentage of men in higher education in general, but it also shows that the difference is more significant in the information technology fields of higher education.

Information technology, both in education and in practice, follows the pattern of information technology in general, which attributes some skills/traits as associated with men and others with women. Traits and skills such as intellect, logic, scientific, and other skills referred to by Wilson as 'hard skills' are viewed as masculine, while intuition, emotion, social, and other skills referred to by Wilson as 'soft skills' are viewed as feminine (Wilson, 2004). The combination of both feminine and masculine traits is desirable in information technology instructors, allowing them to be different things to different people in any situation (McCarthy & Berger, 2008).

This literature review began with searches of online library resources. I began with a search of the Academic Search Premier (EBSCO) database using search terms that

included: "women and information technology", "information technology instructor", "women and career decision", "women and higher education", and others that led me to articles relevant to the research question. Using these articles allowed me to find relevant published books that I was then able to read and include in this review. Along with searches specific to women in information technology and education, I also searched using terms that included "gender differences", "occupational choice" and "social cognitive career theory". These searches led to a review of literature pertaining to the impact of gender differences on career choice and organizational theories that show the impact of gender roles in organizations.

This literature review is divided into four sections. These sections address issues that pertain to the research question asking why women choose to move from the field of information technology into teaching IT at the post-secondary level. The first section is a general discussion of several occupational choice theories and models and the factors that influence career choices with an emphasis, where applicable, on occupational choice theory as it applies to women.

The second section contains a review of organizational culture and the role of gender as it applies to information technology and higher education. The third section is an examination of the choices made by women entering STEM (science, technology, engineering and math) fields, and within these fields, the field of information technology. The final section contains a discussion of the choices made by women in entering the field of information technology.

The literature review concludes with a discussion of gaps in current scholarly understanding of women's decisions to move from information technology practitioners to information technology education.

Occupational Choice Theory

There are several theories that one might place into the overall category of occupational choice theory. These theories attempt to explain why people make the choices they do, and also what can be done by organizations and counselors to help insure those choices are appropriate both for the individual and for the organization hiring them (Luftig, 1974). The following sections will examine the contributions of John Holland and his theory of vocational personalities and work environments, Donald Super and his life-span, life-space theory, the life-career rainbow, and social cognitive career theory from the perspectives of Robert Lent, Steven Brown and Gail Hacket, Jacquelynn Eccles and Albert Bandura. An occupational choice theory to be addressed is that of Linda Gottfredson, whose theory of circumscription, compromise and self-creation specifically addresses career choices in relation to gender. The three-phase career development model proposed by Deborah O'Neil and Diana Bilimoria specifically addresses the needs of women in their career development. Finally, the kaleidoscope career model developed by Sherry Sullivan and Yehuda Baruch explains why women choose to make changes from successful careers, either to not working or to other fields.

Theory of Vocational Personalities and Work Environments

Holland first presented his theory of vocational choice in 1959. This theory has continued to evolve. This evolution of his theory began with a search for person-environment fit (Allison & Cossette, 2007) that continues today. Years after first positing

his theory, in the preface to his book, Making Vocational Choices (1997) he stated, "This book is my sixth attempt to create a more satisfying theory of careers. I never seem to get it quite right" (Holland, 1997, p. v).

Holland (1997) indicated that the aspects of character that are stable, prominent, and exhibited in most career, social, and personal contexts are the same aspects that define an individual's personality type. Using this basis he defines six personality types: realistic, investigative, artistic, social, enterprising, and conventional (often abbreviated as RIASEC) (Nauta, 2010).

Tokar and Swanson (1995) summarized these types as follows: "(1) Realistic: asocial, conforming, practical, uninsightful, inflexible; (2) Investigative: analytical, complex, independent, introspective, reserved, unpopular; (3) Artistic: emotional, expressive, impulsive, introspective, nonconforming, sensitive, open; (4) Social: cooperative, friendly, helpful, understanding, sociable, warm; (5) Enterprising: ambitious, domineering, energetic, extraverted, agreeable, self-confident, sociable; (6) Conventional: careful, conforming, conscientious, efficient, unimaginative, persistent, inhibited" (p. 91).

These same personality types then apply to work environments. An individual's personality type, according to Holland, leads them to seek an environment with the same, or close to the same, environment type, resulting in the exercise of inherent skills/abilities, expression of attitudes/values, and ultimately a satisfying work environment (Holland, 1997).

Personality types "originate in heredity, direct activities that yield interests and competencies, and culminate in a disposition or propensity to act in certain predictable

ways (repertoires)" (Spokane, 1996, p. 40). Holland's (1996) summary of his personality-

environment typology is broken down in Table 1 and Table 2 as follows:

Table 1

Personality Typology (Holland, 1996, p. 398)

	Realistic	Investigative	Artistic	Social	Enterprising	Conventional
Preferences for activeties and occupations	Manipulation of machines, tools & things	Exploration, understanding & prediction or control of natural & social phenomena	Literary, musical, or artistic activities	Helping, teaching, treating, counseling or serving others through personal interaction	Persuading, manipulating, or directing others	Establishing or maintaining orderly routines, application of standards
Values	Material rewards for tangible accomplishments	Development or acquisition of knowledge	Creative expressions of ideas, emotions or sentiments	Fostering the welfare of others, social service	Material accomplishment & social status	Material or financial accomplishment & power in social, business, or political arenas
Sees self as	Practical, conservative & having manual & mechanical skills – lacking social skills	Analytical, intelligent, skeptical, & having academic talent – lacking interpersonal skills	Open to experience innovative, intellectual – lacking clerical or office skills	Empathic, patient, and having interpersonal skills – lacking mechanical ability	Having sales & persuasive ability – lacking scientific ability	Having technical skills in business or production – lacking artistic competencies
Others see as	Normal, frank	Asocial, intellectual	Unconventional, disorderly, creative	Nurturing, agreeable, extroverted	Energetic, gregarious	Careful, conforming
Avoids	Interaction with people	Persuasion or sales activities	Routines & conformity to established rules	Mechanical & technical activity	Scientific, intellectual, or abstruse topics	Ambiguous or unstructured undertakings

Table 2

Environmental Typology (Holland, 1996, p. 399)

	Realistic	Investiga-tive	Artistic	Social	Enterprising	Conven-tional
Requires	Manual & mechanical competencies, interaction with machines, tools, & objects	Analytical, technical, scientific, & verbal competencies	Innovation or creative ability, emotionally expressive interaction with others	Interpersonal competencies, skill in mentoring, treating, healing, or teaching others	Skills in persuasion & manipulation of others	Clerical skills, skills in meeting precise standards for performance
Demands and rewards the display of	Conforming behavior, practical accomplishment	Skepticism & persistence in problem solving, documentation of new knowledge or understanding or solution of problems	Imagination in literary, artistic or musical accomplishment	Empathy, humanitarianism. sociability, friendliness	Initiative in pursuit of financial or material accomplishments, dominance, self-confidence	Organizational ability, conformity, dependability
Values or personal styles allowed expression	Practical, productive & concrete values; robust, risky, adventurous styles	Acquisition of knowledge through scholarship or investigation	Unconventional ideas or manners, aesthetic values	Concern for the welfare of others	Acquisitive or power-oriented styles, responsibility	Conventional outlook & concern for orderliness & routines
Occupations or other environments involve	Concrete, practical activity; use of machines, tools, materials	Analytical or intellectual activity aimed at trouble-shooting or creation & use of knowledge	Creative work in music, writing, performance, sculpture or unstructured intellectual endeavors	Working with others in a helpful or facilitative way	Selling, leading, manipulating others to attain personal or organizational goals	Working with things, numbers, or machines to meet predictable, organizational demands or specified standards
Sample occupations	Carpenter, truck operator	Psychologist, microbiologist	Musician, interior designer	Counselor, clergy member	Lawyer, retail store manager	Production editor, bookkeeper

The theory of vocational personalities and work environments shows how people may create a continuum of possibilities of vocational choice. Holland (1997) created four constructs to use in interpreting information about a person's personality and environmental types. The constructs are consistency, differentiation, identity, and congruence. They are as follows:

1. Consistency – defined by how the personality type and environmental type match each other. Holland's (1997) hexagonal model, shown in Figure 1, has those types with the most in common next to each other.

2. Differentiation – specifies how some individuals or environments may fall very closely into a single type, deemed highly differentiated while others may have components of all the types, making them undifferentiated.

3. Identity – separated into both personal and environmental identity. Personal identity is "the possession of a clear and stable picture of one's goals, interests, and talents…[Environmental identity is] when an environment or an organization has clear and integrated goals, tasks, and rewards that are stable over long time intervals" (Holland, 1997, p. 5).

4. Congruence – indicates how the personality types correspond to the environmental types. This has been called the "degree of fit" (Allison & Cossette, 2007). In Holland's model, the types that are next to each other are congruent while the types that are across from each other would be incongruent.

The use of these four constructs shows the relationships between the personality and environmental types, and from these we see the interactions between the RIASEC types and the constructs themselves. Holland (1997) stated that "the relationships within and between personality types or environments can be ordered according to the hexagonal model in which distances among the types or environments are inversely proportional to the theoretical relationships between them. This spatial arrangement provides explicit definitions of both consistency of a person or an environment (three

levels), and congruence of a person and environment (four levels). In this way, the internal relationships of the theory are defined and organized by a single geometrical model" (p. 5).
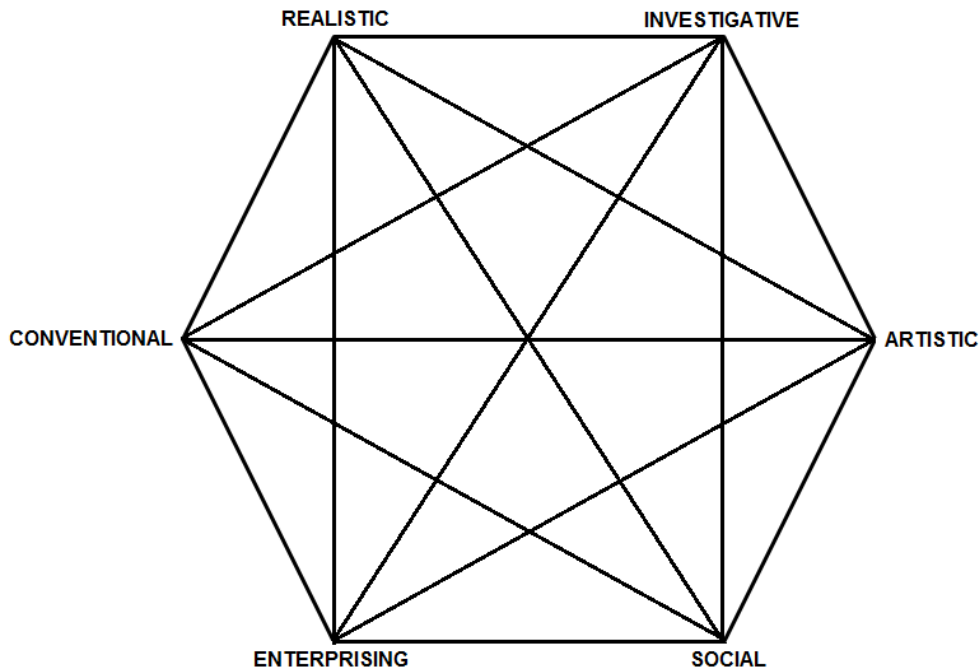
Figure 1. *Holland's Hexagonal Model (Holland, 1997, p. 6)*

Holland's theory has been used extensively in the development, validation, and application of many common assessments of vocational interests (Campbell & Borgen, 1999). Vocational counselors working with clients, giving guidance on career choices, use the results of such assessments.

Gender studies conducted to determine a relationship between Holland's occupation types and gender have been mixed (Allison & Cossette, 2007). Nevertheless, many researchers studying gender differences in career choice continue to use Holland's theory with the RIASEC personality and environmental characteristics. Reardon, Bullock and Meyer (2007) conducted a longitudinal study over 40 years in which they found that most men are employed in the Realistic area whereas most women were employed in

Enterprising or Conventional occupations. Their findings included a decrease in women in Realistic occupations, going from 33% to 15% despite efforts to bring women into nontraditional fields over the 40-year span of the study (Reardon et al., 2007).

A study of eighth grade students conducted by Ji, Lapan, and Tate (2004) indicated that students believe men are more likely to gain employment in Realistic type jobs and women are more likely to work in Social type positions. In this same study, male students indicated a higher interest in pursuing Realistic type careers and female students an interest in Social type careers (Ji et al., 2004). The perception that more women are employed in Social type positions is not based on data, as more women are actually employed in Conventional and Realistic type positions (Reardon, Vernick, & Reed, 2004). This could be a cultural stereotype. Another possible explanation for this discrepancy could be the fact that there are more positions in the Realistic type than there are in the Social type (Guindon & Richmond, 2005).

In a study of vocational interests conducted by Su, Rounds and Armstrong (2009), the RIASEC interests were broken down based on the gender of the individuals being examined. Figure 2, designed by Su et al. (2009) divides the sex differences in personal interests into two broad dimensions, Things-People and Data-Ideas. Su et al. (2009) then placed men (depicted by the clear circles) and women (depicted by the opaque circles) into the categories with the size of the circles denoting the percentage of sex difference for each personality type. As shown in Figure 2, there were substantial differences in the vocational interests of men and women with a definitive line between the People versus Things dimensions (Su et al., 2009). The study indicated that women are drawn more to people-oriented careers.
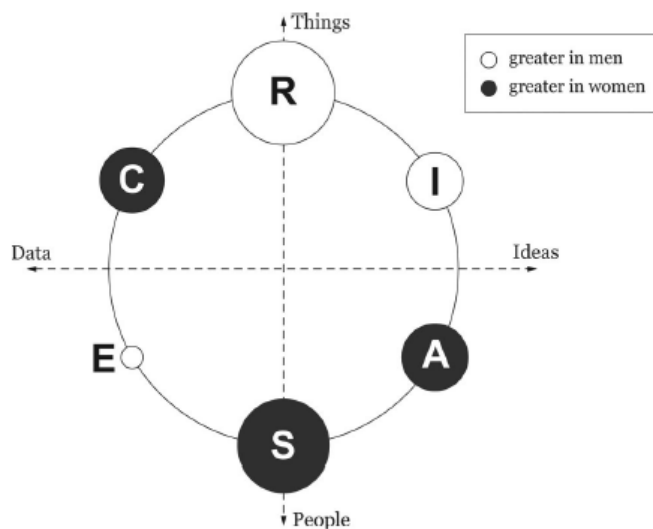
Figure 2. *Effect size of RIASEC interests. R = Realistic; I = Investigative; A = Artistic; S = Social; E = Enterprising; C = Conventional (Su et al., 2009, p. 871)*

While Holland's theory does not focus on gender specifically, he does recognize the influence of gender on vocational choice. In his examination of interventions used to help specific groups of people, such as blacks, women, criminal offenders, retirees, and physically handicapped persons, he determined that environmental changes are necessary to give these populations a better picture of the vocational possibilities available to them (Holland, 1997).

Life-Span, Life-Space Theory

Super (1980) defined a career as, "the combination and sequence of roles played by a person during the course of a lifetime" (p. 282). He came up with the life-career rainbow to demonstrate how a career progresses over the life span of an individual by moving her or him through nine different roles ranging from child to pensioner.

As seen in Figure 3, the two outer bands represent five life stages and the ages when they would be expected to occur. The inner bands are the roles an individual may have during a period of life and include child, student, leisurite (a term used by Super to

describe a point in a person's life where they are engaged in leisure, or idling), citizen, worker, spouse, homemaker, parent, and pensioner (Super, 1980). This model attempts to explain the overlapping roles a person holds as he or she advances through a life span, with the role of child being the only one held independent of all others.
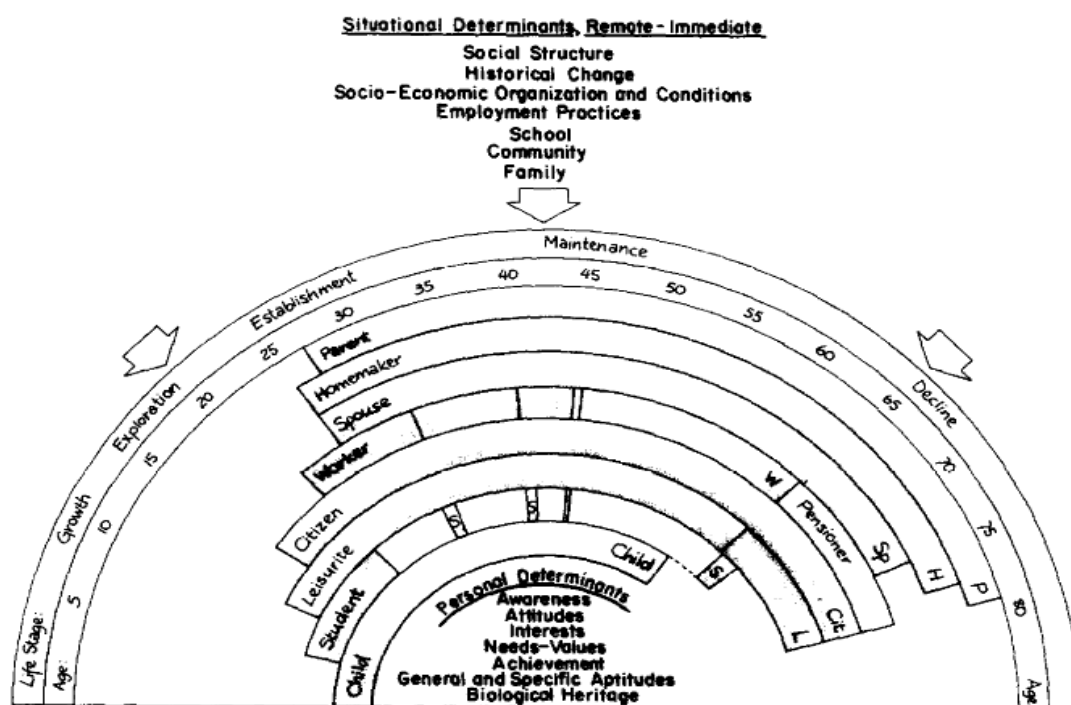
Figure 3. *The Life-Career Rainbow: Nine life roles in schematic life space (Super, 1980, p. 289).*

The life-span, life-space theory was developed in stages and that process ultimately led to its division into four distinct segments. The career maturity segment provides a model for adolescents to achieve career maturity, displaying a readiness to make both educational and career choices (Savickas, 1997). Savickas (1997) proposed that the career maturity segment be replaced with career adaptability. In making this proposal, he points out that maturity is considered an endpoint, which may not occur over the life span of an individual. Adaptability allows for unending change and the individual needs to continually respond to new circumstances and situations (Savickas, 1997).

The self-concept segment of the life-span, life-space theory is concerned with the role of an individual self-concept in career development. Super (1963), defined self-concept as "a picture of the self in some role, situation, or position, performing some set of functions, or in some web of relationships" (p. 18). In regard to the life-span, life-space theory, this definition is modified to be in line with the self-concept one has in a career, as a picture of those specific self attributes that are relevant to one's career (Super, Savickas, & Super, 1996). These include self-esteem and self-efficacy (Savickas, 1997).

Super et al. (1996) separated self-concept into dimensions such as personality traits, and meta-dimensions such as clarity and realism that are characteristics of a dimension. Of the dimensions and meta-dimensions used in life-span, life-space theory, self-esteem, clarity, consistency, realism, complexity, and self-efficacy are critical in attempting to understand how people interpret where they are in their life-cycle and what their roles are in general (Coetzee, 2006).

The life-space segment of the life-span, life-space model contains the roles that an individual will participate in during the course of his/her life (Coetzee, 2006). Super et al. (1996) suggested that work is important in its relationship to the other roles of an individual rather than being the central role of a life. This view allows the theory of life-span, life-space to respond to postmodern and feminist criticisms, which state that vocational psychology and career interventions do not take into account the multiple roles an individual may play in life. Richardson (1993) emphasized that in practice, career counseling should place an emphasis on the whole person in relation to the work in their life as work is "embedded in family and personal lives, as well as in paid employment" (p. 431). Using this focus would allow vocational and career counselors to help

individuals in the development of life themes that they could then use to construct careers

(Savickas, 2012).

Table 3

Super's Life Stages and Related Developmental Tasks (Coetzee, 2006, p. 27)

Stage	Approximate Ages	Career-related developmental tasks
Growth	4 – 13 years	• Becoming concerned about the future (career concern) • Increasing control over your life (career control). • Convincing yourself to achieve in school and at work (career conviction). • Acquiring competent work habits and attitudes (competency).
Exploration	14 – 24 years	• Crystallising a career choice. • Specifying an occupational choice. • Implementing a career choice.
Establishment	25 – 45 years	• Stabilising an occupational position. • Consolidating an occupational position. • Advancing an occupational position.
Maintenance	45 – 65 years	• Choosing to hold on to the position or to re-explore and re-establish a new career path. • Keeping up with new developments and skills in the field. • Innovating new ways of approaching tasks and challenges.
Disengagement	65 onwards	• Deceleration of responsibility and involvement. • Planning for retirement. • Retirement living.

The life-span segment of the life-span, life-space theory explains the stages of an

individual life and maps the career-related development tasks to each stage (Super et al.,

1996). Table 3 depicts each of Super's five life stages, the approximate age at which a

person goes through the stage, and the developmental tasks related to their career that

will potentially occur in the stage.

While all tasks within each stage may not occur for every individual, skipping a task in the normative sequence could potentially create problems in later stages (Allison & Cossette, 2007). The life-span segment of the life-span, life-segment theory allows us to see how individuals' perceptions of themselves, personality, needs, values, and interests, change throughout the course of their life (Ireh, 1999).

There have been various career-counseling instruments created based on the life-span, life-space theory. One that is particularly applicable to a study of gender in work is the Salience Inventory (Nevill & Super, 1986). Role salience is used to show the importance that an individual gives to the different roles they play in both the work and family domains of life (Cinamon, 2010). Cook (1994) explained that the differences seen in men's and women's careers exist due to the expectations of a society that creates differences between the sexes. The Salience Inventory is used to gather data about the pre-conceived ideas an individual has about the role they should play in society.

Although Super does not study gender specifically, his life-span, life-space theory supports the idea that differences between genders exist through its use of life roles. Further development of the theory has been limited, and one criticism of its development is the lack of sub-theories looking at career barriers, received messages, and other variables that can impact career behavior of under-represented groups such as women (Herr, 1997).

Social Cognitive Career Theory (SCCT)

The social cognitive career theory model was developed to provide a method for investigating the factors involved in career and academic choices (Lent, Brown, & Hackett, 1994). This model proposes that career choices are determined based on

individual interests and individual expectations of success. It also assumes there is some

effect on these choices derived from the self-efficacy of the individual (Oswald, 2008).

Self-efficacy refers to "people's judgments of their capabilities to organize and execute

courses of action required to attain designated types of performances" (Bandura, 1986

cited by Lent et al., 1994, p. 83).
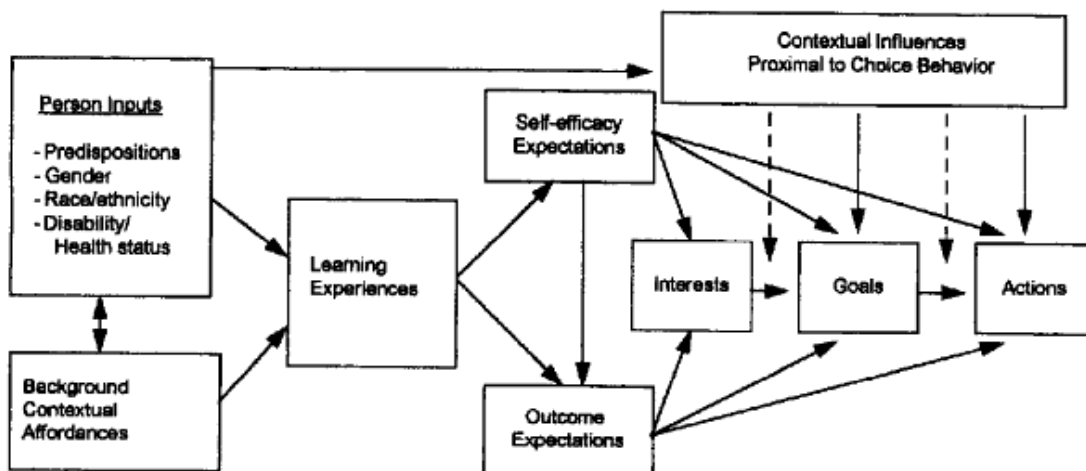
Figure 4. *Flowchart depicting Influence of Environmental Variables on Career Choices
(Lent, Brown, & Hackett, 2000, p. 37)*

The SCCT model focuses on how the cognitive-person variables of self-efficacy

and outcome expectations interact with aspects of the person and his or her environment

(Lent et al., 2000). As seen in Figure 4, the environmental variables that influence career

choices do not occur simultaneously, but across time. This model breaks the

environmental variables into two categories, distal and proximal. The distal factors are

depicted in the lower left and the proximal factors are the upper right. Distal factors are

those that influence the person in their development, such as the reactions they get to

success and failure in their academic pursuits or other activities. The proximal factors are

those that occur within the context of actually making educational and career choices. An

example would be one's experiences in a hostile or supportive work environment (Lent et al., 2000).

Social cognitive theory points to people being self-organizing, proactive, and self-regulating agents for their own psychosocial development (Bussey & Bandura, 1999). Bandura, Barbaranelli, Vittorio and Pastorelli (2001) indicated that individual, perceived self-efficacy is the key to this human agency. For women in particular, occupational preferences seem to be based more on the woman's perceived efficacy in the field rather than on any kind of draw to the benefits they might receive from an occupation (Bandura et al., 2001).

Eccles (1987, 1994) proposed a similar model, a model of achievement-related choices geared specifically toward the academic and occupational choices made by women. According to this model, if we are to understand these choices made by women, we must understand the variables that have an impact on a woman's expectations for success in a field. The model includes multiple factors that may influence a woman's expectations for success including: cultural stereotypes, socializing agents' beliefs and behaviors, differential aptitudes, and previous achievement-related experiences (Eccles, 1994).

Originally published in 1983, Eccles' model has undergone revision over the years (Eccles, 2011). According to Eccles (2011), the idea behind this current version of the model is to account not only for personal agency, but also for social/cultural structures, specifically subjective task value. Social influences play a role in all aspects of an individual's achievement-related choices and relate to the subjective value they

ultimately use in making career choices, engagement in a career, and persistence in that same career.

Two critical features of Eccles' model are cognitive mediation and choice. In cognitive mediation, it is assumed that if students do well in a subject, they will ultimately feel good about their skill in that area and persist in it for a future career. Research shows that this assumption is not necessarily true. Eccles et al. (1984) explained that girls may do well in math during their early development, but still not hold any expectation of doing well in math in their future. She goes on to explain that the difference is due to one's use of subjective meaning and interpretation of success and failure rather than the objective result (Eccles, 1987).

The model suggests that sex differences play a role in the choices of both men and women. Some factors that influence choice are socialization pressures, gender-role beliefs, and cultural norms (Eccles, 1987). Another important factor in choice is the knowledge one has of the options available. An option that is unknown will not be considered when choices are made. An option that is known, but without correct information, will not be considered. An option that does not fit an individual's own gender-role schema will also likely be eliminated from consideration. Because gender-role stereotypes are seen to be defined by the age of five (Montemayor, 1974), it is likely that gender roles have a significant impact on an individual's view of viable options for educational and career choice (Eccles, 1987).

Career counselors working with women in different settings use the social cognitive career theory for career counseling. Morris, Shoffner and Newsome (2009) conducted a study showing the theory's relevance to battered women leaving abusive

relationships along with strategies for using it effectively while working with these women while conducting career counseling with them. Coogan and Chen (2007) proposed the use of the social cognitive career theory for aspects of women's career counseling that includes exploring their life roles and enhancing self-concept.

Circumscription and Compromise Theory

Gottfredson (1981) presented a theory of the development of occupational aspirations from preschool through college years, the circumscription and compromise theory. This theory uses self-concept as the basis for the development of the career decision-making process. The theory is based on definitions by Gottfredson that may not have the same meaning in other theories. Self-concept includes the individual view of who one is and is not, as well as what one expects to be in the future (Gottfredson, 1981). Occupational image is defined in this theory as what other theories refer to as occupational stereotypes. It includes the generalizations that a person would have about an occupation and differentiates occupations into dimensions such as sex-type, level of work, and field of work (Gottfredson, 1981).

Occupational preferences are determined by finding the compatibility between the person's sense of self and their occupational images. "Those occupations that are highly compatible with one's sense of self will be highly valued; those that are highly incompatible will be strongly disliked" (Gottfredson, 1981, p. 548). Although a person may find occupational preferences that fit his/her self-concept, those preferences may not be accessible. "Accessibility refers to obstacles or opportunities in the social or economic environment that affect one's chances of getting into a particular occupation" (Gottfredson, 1981, p. 548).

These occupational preferences will ultimately lead to the determination of a range of acceptable occupational alternatives. Gottfredson refers to these as a perceived social space based on the idea that an individual determines preferences based on his/her own view of his/her position in society (1981). The occupational aspiration is an individual's perception of their best alternative at any point in time. It may change as the person's perceptions of his/her compatibility and of the occupation's accessibility change (Gottfredson, 1981). Figure 5 depicts a map from self-concept to the final occupational aspiration. It begins with self-concept and occupational images that a person uses when looking into the future at what he/she wants or expects to become. It moves forward to preferences and perceptions of accessibility of the occupations that fit into the person's self-concept and occupational images. From there it moves to the range of acceptable occupational alternatives and the stimulus to select one as a goal and concludes with the selection of an occupational aspiration.
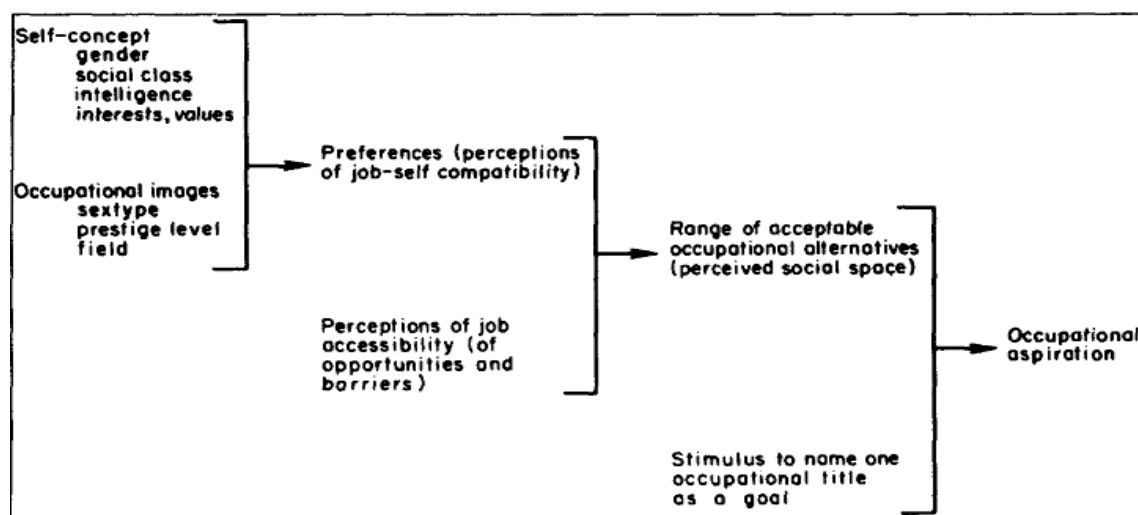
Figure 5. *Relations among theoretical constructs (Gottfredson, 1981, p. 547)*

The theory begins with circumscription. Circumscription is the process of creating social space by narrowing the choices from all possible alternatives to preferable

alternatives, and ultimately to choosing one occupational aspiration. This process occurs

in stages over time (Gottfredson, 1996). Table 4 offers a brief summary of these stages.

Table 4

Summary of Four Stages in the Development of Self-Concept and Occupational Preferences (Gottfredson, 1981, p. 555)

Characteristic	1. Orientation to size and power	2. Orientation to sex roles	3. Orientation to social valuation	4. Orientation to internal, unique self
Ages (years)	3–5	6–8	9–13	14 and over
Grades	Nursery school and kindergarten	1–3	4–8	9 and over
Thought processes	Intuitive	Concrete	Less concrete	Abstract
Ability to classify objects, people, occupations	Has not achieved object constancy	Simple groupings	Two-factor groupings	Complex groupings
New elements in perceptions of self and others	Little vs. big	Gender	Social class and intelligence	Personal interests, values, and competencies
New elements in occupational perceptions and preferences	Occupations as adult roles	Sextype	Prestige level	Field of work

Stage one is the orientation to size and power stage. Children in this stage begin to

classify people into the categories of big (or powerful) and little (or powerless). They also

begin to grasp adult occupations and stop saying they would like to be animals, fantasy

characters, or inanimate objects when they grow up. While children in this stage

recognize differences in gender and want to play with same-sex peers, their conceptions

of sex roles are still limited. The biggest achievement at this stage is the recognition of an

adult world and of the necessity of adults working at jobs (Gottfredson, 1996).

Stage two is the orientation to sex roles stage. Children in this stage are able to

differentiate the sexes based primarily on outward cues, such as clothing and activities.

They see occupations as distinctly related to a particular sex, and feel that they must not

cross boundaries to occupations held by the opposite sex. "Being particularly rigid and

moralistic, they often treat adherence to sex roles as a moral imperative" (Gottfredson, 1996, p. 192).

Stage three is the orientation to social valuation stage. By the time they reach this stage, children begin to see beyond sex roles to the values held by their peers and society in general. In this stage, they form opinions of high- versus low-status occupations, and eliminate many from consideration. They also begin to recognize their own levels of intelligence in relationship to their peers and see where they may, or may not, be able to compete in some occupations. "As youngsters incorporate considerations of social class and ability into their self-concepts, they reject occupational alternatives that seem inconsistent with those new elements of self" (Gottfredson, 1996, p. 193). This process of eliminating some occupations while leaving others open for consideration creates what Gottfredson refers to as "zones of acceptable alternatives" (1996).

Stage four is the orientation to the internal, unique self stage. Young people in this stage are now ready to explore their own unique capabilities. Previous stages focused on comparisons to others and what choices were or were not acceptable, and were mainly focused on rejecting unacceptable alternatives rather than choosing acceptable ones (Gottfredson, 1996). At this stage, people use the zone of acceptable alternatives determined in earlier stages to narrow down their occupational choices, giving thought to life considerations such as becoming good providers for families they may hope to have in the future.

The result of stage four is the need for compromise. In the four stages of circumscription, all known alternatives are explored and the least desirable are eliminated. That process eventually leads to a time when decisions need to be made to

move forward in a career. This is when reality steps in and the individual must make choices to eliminate some of his/her most preferred alternatives (Gottfredson, 1996).

Compromise can be broken into two categories, anticipatory and experiential (Gottfredson, 1996). Anticipatory compromise occurs when an individual begins to curb hopes that were built from personal assessment of compatibility with a field toward perception of being able to access that field. Experiential compromise happens when the individual meets a real barrier in his/her attempt to implement a preferred choice and must then turn to other, less preferred choices.
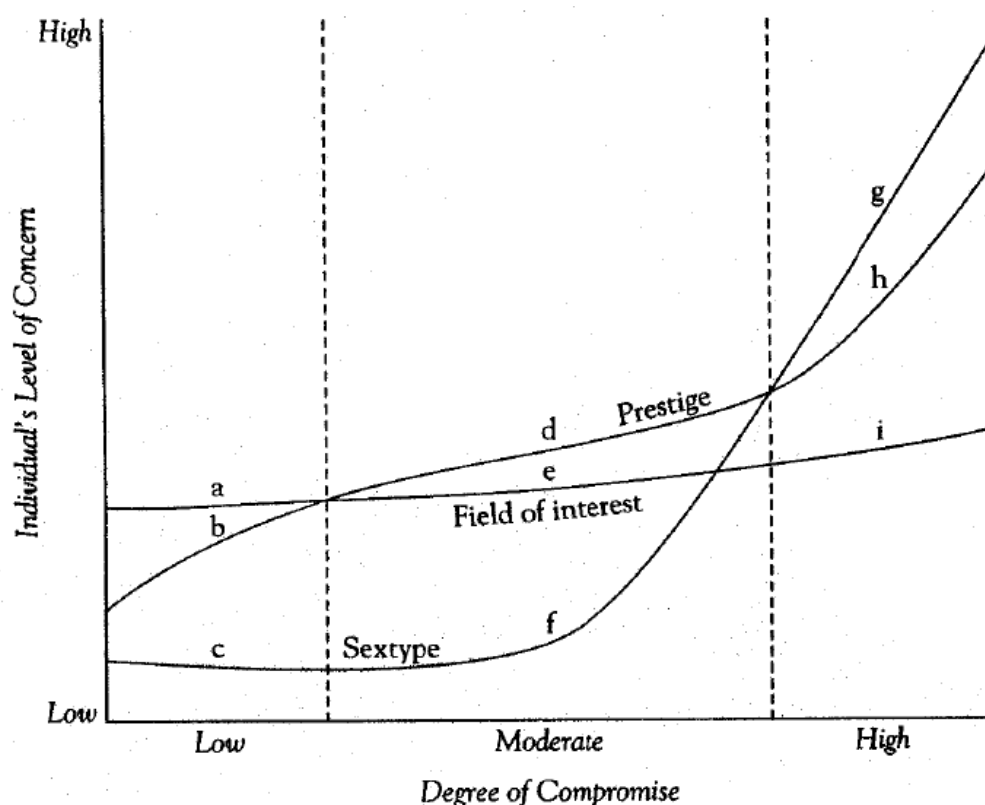
Figure 6. *Graph shows sensitivity to different degrees of compromise in sex type, prestige, and field of interests (Gottfredson, 1996, p. 199)*

Compromise also comprises different levels. A compromise made between acceptable alternatives is not as difficult as a compromise that requires an individual to move to what they have determined is an unacceptable alternative. Figure 6 shows how

prestige, field of interest, and sex type play a role in the level of concern of an individual as compromise is made. This figure shows how the individual's level of concern changes as the degree of compromise changes. While low to moderate degrees of compromise for sex type do not have a large impact on the level of concern (c and f), once compromise moves into the high range, sex type plays a greater role (g) in willingness to compromise than either field of interest or prestige (h and i) (Gottfredson, 1996).

Gottfredson's theory indicates that children as young as age six have already determined boundaries based on sex type in regard to appropriate occupations (1981). These boundaries, once established, are very difficult to change (Gottfredson, 1996). Gender-role orientation can significantly influence individuals' perception and behavior as they make career choices (Coogan & Chen, 2007), and ultimately gender can be the most critical factor in determining career direction (Gottfredson, 1996).

A study by Whitmarsh and Wentworth (2012) examined the career selection of young women. The data they collected suggest that careers traditionally dominated by men continue to be invisible and unavailable to young women. Using Gottfredson's theory, they suggest that career counselors implement strategies and interventions to aid young women during the process of compromise and circumscription, and encourage them to look at careers previously dominated by men (L. Whitmarsh & Wentworth, 2012).

A study by Cochran, Wang, Stevenson, Johnson, and Crews (2011) used the theory of circumscription and compromise to look at the influence of adolescent occupational aspirations and their impact on adult career success. This study looked at a sample of individuals from adolescence to mid-career, focusing on the prestige of the

occupational aspirations of the adolescents and its impact on mid-career success. The study concluded that the circumscription and compromise theory offers a good model for adolescent occupational aspirations, and the expanded model created through the study allows for evaluation of the role adolescent variables play in future career success (Cochran et al., 2011). This study did not confirm that gender plays a role in adolescent aspirations, but that it does still play a role in success later in life (Cochran et al., 2011).

Tsaousides and Jome (2008) used simulation to examine an individual's emotional reactions to career compromise. They found that even imagining life in a compromising career brought forth negative feelings, discontent, and dissatisfaction (Tsaousides & Jome, 2008). Their study extended Gottfredson's theory further by revealing that while participants reported less satisfaction as career compromise increased, they did not always report negative feelings. From this they suggest that individuals can be emotionally resilient to career compromise, but having a career that more closely matches what they want is a critical source of gratification and fulfillment (Tsaousides & Jome, 2008).

Three-Phase Model of Women's Career Development

O'Neil and Bilimoria (2005) proposed the three-phase model of women's career development for use in the study of how women make career choices over the course of their lives. This model differs from others, such as Super's life-stages, because it focuses specifically on women's career development. The need for study of women's career choices and behaviors was determined due to the ways that family responsibilities, relational perceptions, and underrepresentation in the upper echelons of business may impact a woman's career differently than a man's (Shenoy, 2008).

O'Neil and Bilimoria's model includes two types of career patterns. An ordered career pattern is considered stable, predictable, and hierarchical while an emergent career pattern includes proactive career moves, unexpected turns, and career stop-gaps (Harrington, 2006).

Career phase 1, idealistic achievement, is the early career, ages 24-35. In this phase, women tend to see themselves as in control of their futures, taking steps to move forward on the career path they have selected (O'Neil & Bilimoria, 2005).

Career phase 2, pragmatic endurance, is the mid-career, ages 36-45. In this phase, women are likely to feel they are not in control of their careers; they may feel little satisfaction in their jobs, and may be using their talents in areas outside their careers in order to fill their need for personal satisfaction (O'Neil & Bilimoria, 2005).

Career phase 3, reinventive contribution, is the advanced career, ages 46-60. In this phase, women come to recognize their ability to contribute both through their personal lives and their careers and to maintain their sense of self (O'Neil & Bilimoria, 2005).

The model by O'Neil and Bilimoria (2005) presented the phases of a woman's career as moving from positive in phase 1 to more negative in phase 2, then back to positive in phase 3. The career also moves from ordered in phase 1 to emergent in phase 2 and then back to ordered in phase 3. The change in phase 2 may be linked to accommodations needed to support family and non-work activities during the middle of a career (O'Neil & Bilimoria, 2005).

Using this model, O'Neil and Bilimoria (2005) offered suggestions for organizations for supporting women in different stages of their career. In phase 1, a

woman benefits from challenging assignments, helping them develop their skills. In phase 2, a woman benefits from flexible schedules and recognition of their accomplishments in their multiple roles in life. In phase 3, a woman benefits from opportunities to mentor and contribute to the success of others (O'Neil & Bilimoria, 2005).

A study of the use of women's networks to advance women's careers determined that the changing needs of a woman over these life-phases can be used to strategically advance a woman's career as well as contributing to the financial well-being of an organization (O'Neil, Hopkins, & Sullivan, 2011). Tschetter (2009) found that women's definition of success changed in the third phase of this model and his findings aligned with O'Neil and Bilimoria's (2005) structure where women see their ability to contribute to family, organizations and society when they reach this phase.

Kaleidoscope Career Model

The kaleidoscope career model was presented by Mainiero and Sullivan in 2005 in an attempt to explain why women are opting out of their careers rather than aspiring to higher positions (Mainiero & Sullivan, 2005). While this model does not apply specifically to women leaving information technology, it does offer some explanation of what women are looking for when leaving careers that are predominantly male. Mainiero and Sullivan (2005) analyzed media coverage for 2004 and provided the following list of reasons women are not maintaining or achieving positions in the higher echelons of male-dominated fields:

1. Highly educated women are leaving the workforce, thus reducing the number of female contenders for top positions,

2. Women aren't willing to work as hard as men for the top spots,

3. Women are too timid or too passive to claim their reward,

4. Women don't want power, or

5. Women find there are more psychological and social rewards for staying home (p. 106).

In light of these findings, Mainiero and Sullivan introduced the kaleidoscope career model. The Oxford Dictionary of English (Stevenson, 2010) defined a kaleidoscope as "a constantly changing pattern or sequence of elements" (p. 4348). The kaleidoscope career model describes the shifts in a woman's career patterns as relational, changing as the aspects of a woman's life changes (Mainiero & Sullivan, 2005). There are three specific items that influence a woman's career decisions: authenticity, balance, and challenge (Cabrera, 2007).

Authenticity is personal, a woman's ability to remain true to who she is; balance is a woman's ability to keep all the pieces (work and non-work) of her life together as a seamless whole; challenge is the experiences in a woman's career that stimulate and add to her self-esteem (Sullivan, 2009). According to Sullivan, these three parameters are always active in a woman's life, but as life changes occur, there is a shift in focus that changes priorities.

Cabrera (2007) conducted a study of women graduates from a top-ranked international business school and found evidence of these parameters and their influence on the career decisions made over a woman's career years. Sixty-two percent of the women in the study said the focus of their career had changed over time, and when asked

how it had changed, their answers fit into at least one of these parameters (Cabrera, 2007).

Of particular applicability to the study reported here of why women shift from information technology practitioners to information technology instructors is the evidence that at mid-career women often move from authenticity to balance (Cabrera, 2007). A study by Myers (2006) profiled eight business professionals who made the change from practitioner to educator within their field. Of the three women in the study, two of them cited the flexibility in teaching as a reason for making the change, which falls into the 'balance' parameter. The third woman was seeking the challenge of research, which falls into the "challenge" parameter (Myers, 2006).

A study by August (2011) reported that women in later stages of life are also making choices based on the three kaleidoscope career model parameters with a strong desire for challenge. One of the basic tenets of the kaleidoscope career model is that women are always negotiating within the three parameters, giving each of them different levels of importance as their lives and careers progress (August, 2011).

Organizational Culture in Higher Education and Information Technology

Schermerhorn, Hunt and Osborn (2001) defined organizational culture as "the system of shared actions, values, and beliefs that develops within an organization and guides the behavior of its members" (p. 264). An organization's culture may be a defense against unknown, outside influences and can give the organization a method of creating stability (Rutherford, 2001). The people of an organization are attached to their culture, which often means they resist any change. This allows us to see that a culture can be exclusive as well as inclusive (Rutherford, 2001).

Perceptions of organizational culture is a factor used, consciously or subconsciously, by individuals making career decisions. An individual's perceived fit into an organization influences his/her behavior, even though others' perceptions of their fit may not support the individual's beliefs of how they fit in (Young & Hurlic, 2007). The compatibility of the combined goals of the organization and the individual give the measure of organizational fit (Young & Hurlic, 2007). The significance of this fit is shown in its relationship to turnover rates, participation in teamwork, ethical behavior, stress, and general work performance (Westerman & Cyr, 2004).

According to a report in the ASHE Higher Education Report ("Examining Women's Status: Campus Climate and Gender Equity," 2011) women in higher education indicate they experience more stress than the men they work with in major components of their positions, teaching loads, publishing, research demands, and review and promotion processes. While policies addressing gender discrimination in higher education are in place, a study by Kjeldal, Rindflesh, and Sheridan (2005) suggested that focus on these structures has received emphasis while creating spaces for women to realize their potential has been overlooked. They conclude that the formal policies are the easy part of an attempt to create change, but that these policies will not create an inclusive environment (Kjeldal et al., 2005).

In the field of information technology, organizational culture is built around the idea that the hours at work will be long and irregular (Lamont, 2009). Along with the idea of keeping hours that are less than family-friendly comes the stereotype of the computer geek, working alone and lacking a physical social life (Lamont, 2009). The culture is described as dominated by white males, antisocial, competitive, and individualistic

(Tapia & Kvasny, 2004). The level of commitment and the number of hours typically

associated with information technology positions, tied to a common assumption that

women will carry the burden of more family responsibilities than men, could lead to a

conclusion that a woman will not contribute as fully as a man (Lamont, 2009).

Information technology culture holds expectations for workers that require

diminished involvement in non-technical lives and a constant push to prioritize their work

lives (Tapia & Kvasny, 2004). Ramsey and McCorduck report that this idea is seen by

some women as encompassing a status symbol. The longer you work, the odder the

hours, the higher you exist in the status of the organization (2005). In Western cultures

the predominant perception links the organizational culture of information technology

with power and masculinity (Wilson, 2004).

Women and STEM (Science, Technology, Engineering and Mathematics)

The U.S. Department of Commerce Economics and Statistics Administration

(2011) offers statistics that show the disparity between the number of women in the

workforce and the number of women working in STEM fields is significant. Figure 7

shows that while women hold nearly 50% of all jobs, of all jobs in STEM fields women

hold less than 25% (Beede et al., 2011).
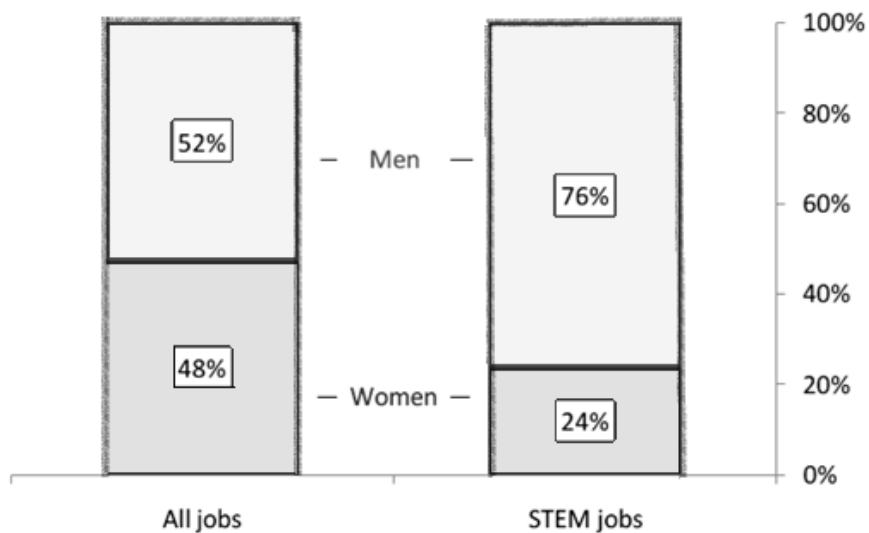
Source: ESA calculations from American Community Survey public-use microdata.
Note: Estimates are for employed persons age 16 and over.

Figure 7. *Percentage of jobs held by men compared to women in STEM fields and all jobs (Beede et al., 2011, p. 1)*

This disparity between the number of women in the workforce in general and the number of women in STEM fields has been described as a product of the 'leaky pipeline', a term used to describe the pathway from high school through college and ultimately to a job in STEM (Blickenstaff, 2005). While this pipeline exists for all students, where STEM fields are concerned, it is women who 'leak out' more than men do.

In a report written by Hall and Sandler (1982), the term "chilly climate" is used to describe how women receive different treatment from men in the classroom. This report indicates that the treatment is not always purposeful, but it simply exists. Overt examples of the chilly climate include: discouraging women's participation in class, preventing women from seeking help outside of class, making disparaging remarks about women, making comments about their intellect or physical appearance, referring to men as "men" and women as "girls", and making sexual overtures to women (Hall & Sandler, 1982). The STEM work environment itself is often characterized as being just such a chilly environment (Morganson, 2010).

Multiple theories have been applied to research involving the recruitment of women to and continuing maintenance in STEM fields. The social cognitive career theory previously discussed is one key theory, but gender theories are also used in examining why women are underrepresented in STEM. For example, Goodwin (2006) divided gender theories into three main categories: deficit theory, dominance theory and difference theory.

The deficit theory category suggests that women are perceived to just simply not have the same capabilities as their male counterparts (Goodwin, 2006). As an example, research on women and computer technology "has focused on female deficits: their lower experience levels, less positive attitudes, and failure to persist and perform well in educational programs, as compared with males" (Sanders, 2005, p. 23).

The dominance theory category focuses on the power struggle between men and women (Goodwin, 2006). An example that comes from the earlier days of research of the gender imbalance in STEM fields comes from Smith (2000), who tells of a woman who received a mathematics scholarship to attend college but had it withdrawn when those in charge of funding it discovered it was going to a woman.

The difference theory category suggests that men and women are psychologically different, having distinct natures (Goodwin, 2006). This category is commonly used in the study of recruiting women into STEM occupations and is where we see men portrayed as being more interested in abstract ideas and women as being more interested in relationships and people (Allison & Cossette, 2007).

Hyde and Linn (2006) proposed another category beyond Goodwin's with their gender similarities hypothesis. They contend that there is an overemphasis on the

differences between the genders, which leads to biases that may influence both males and females into making career choices they might otherwise not make. Hyde and Linn's explanation of data from the National Assessment of Educational Progress (NAEP) of science performance for three grade levels indicates that the data support differences in performance in math and science that are being interpreted by other researchers as significant, but which they interpret as small (Hyde & Linn, 2006). The interpretation that the differences are small suggests that more focus should be placed on the similarities of the genders rather than the differences.

The lack of women participants in STEM fields is visible to students by the time they enter the collegiate environment. The imbalance in participation by men and women can be a sign to a woman that she does not belong in one of these fields (Walton & Cohen, 2007). Situational cues such as this, with an imbalance in participation by men and women, have been shown to decrease both a woman's sense of belonging in an environment and her desire to participate (Murphy, Steele, & Gross, 2007). Even what may seem to be simple things, like the decorations in a classroom, can have an impact on a woman's sense of belonging and interest in a STEM field (Cheryan, Davies, Plaut, & Steele, 2009).

One model of gender theory that builds on the discussion of gender stereotyping is the stereotype inoculation model (Stout, Dasgupta, Hunsinger, & McManus, 2011). This model could be categorized both within the deficit and difference theory categories. This model focuses on the use of same-sex role models in an attempt to increase female participation in STEM fields. Figure 8 maps gender stereotypes to potential future career

decisions, indicating that the identification an individual has with an expert in a STEM field could potentially impact career decisions (Stout et al., 2011).
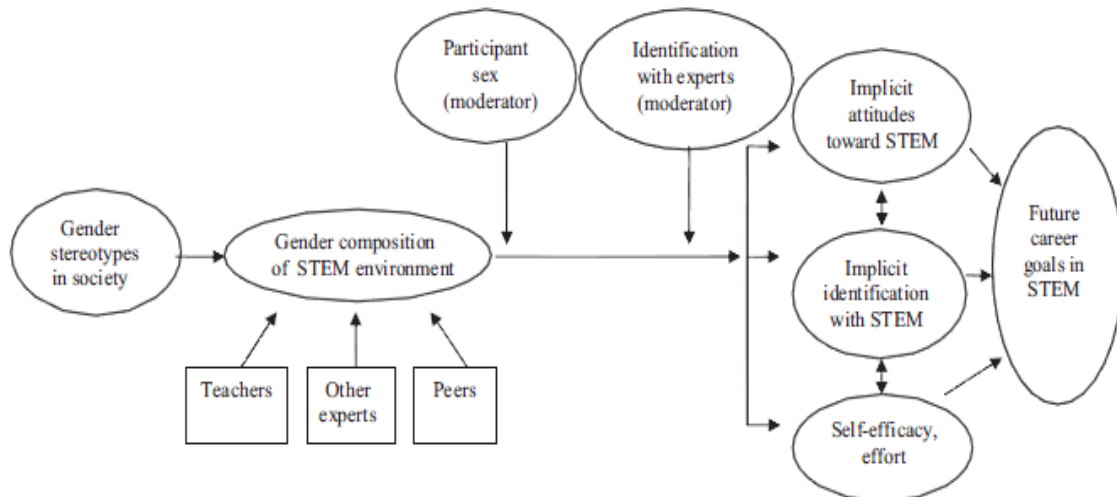
Figure 8. *A stereotype inoculation model identifying environmental conditions that promote the malleability of women's implicit self-concept in science, technology, engineering, and mathematics (STEM) (Stout et al., 2011, p. 2)*

Schmader, Johns and Forbes (2008) examined the impact of stereotypes using domain-relevant tests, at the same time looking at cognitive, emotional, and physiological reactions both before and during the tests. They concluded the effort of an individual to overcome the stereotype can have an impact on their performance in cognitive and social tasks (Schmader et al., 2008). This result can have an impact on the self-concept of an individual and therefore on their career decisions (Stout et al., 2011). Stout et al.'s (2011) model proposed that the use of same-sex role models can have a direct effect on changing the individual's self-concept.

When examining the participation of women in STEM it is important to look at their early experiences. While math is an independent study within STEM, it is also a component of each STEM field, science, technology, and engineering, and is therefore often the first subject researchers focus on in looking for differences in gender participation in all STEM fields. A study of kindergartener through middle-school math

achievement indicates that the gap between male and female math skills begins to develop by the time students reach the third grade (Robinson & Lubienski, 2011). A follow-up study indicated that the teachers themselves had an impact on this gap by consistently rating female student math skills lower than male students who were observationally the same (Robinson, Lubienski, & Copur, 2011). The final results of this study indicated that if teacher expectations were the same for female and male students, the females would have lost 40-75% less ground in math achievement for the periods examined (Robinson et al., 2011).

A study by Quimby and DeSantis (2006) looked at the impact of self-efficacy and role models on women's career choices using Holland's six career types. In looking at these six types, the Investigative and Realistic career types are the two most commonly tied to STEM fields, Realistic occupations involve manual, mechanical, agricultural, electrical, or technical skills while investigative includes scientists (Allison & Cossette, 2007). The study determined that self-efficacy accounted for 14% of the variance in career choice for the realistic career type and 26% of the variance in career choice for the investigative career type (Quimby, 2006). These findings indicate that self-efficacy has a direct influence on a woman's career choice.

In this study, the relationship of role models to career choice in STEM fields was not strong, only 2% variance for realistic and none at all for investigative (Quimby, 2006). Other studies of gender role models do show a direct correlation between role models and a woman's ability to overcome exposure to negative gender stereotypes and make career choices in STEM fields. Marx and Roman (2002) conducted three studies of the impact of positive female role models on female students' math test performance. The

results of these studies indicate that it might be possible to reduce the existing gender gap in standardized math tests with the use of positive gender role models (Marx, 2002). While these studies did indicate a positive result of having positive gender role models, Blickenstaff (2005) posited that "simply increasing the number of female scientists may not attract more young girls or women to science" (p. 377).

A study by Cole and Espinoza (2011) examined the factors that influence a woman toward a goal of a career in STEM and that influence a woman to pursue an advanced degree in STEM. The factors examined included those from social cognitive career theory. They found that even if the student had average high school grades, having high self-efficacy beliefs was significant for both reporting a goal of having a career in STEM or of seeking a graduate degree in STEM (Cole & Espinoza, 2011).

This same study also determined that outcome expectations of social cognitive career theory have a significant impact on a woman reporting a goal of working in STEM or seeking a graduate STEM degree (Cole & Espinoza, 2011). Research by Zeldin and Pajares (2000) on social and verbal influences on self-efficacy supports this idea that an outcomes expectation of receiving recognition for their accomplishments from peers has a positive effect on a woman's self-efficacy. This in turn supports the finding that receiving recognition from their peers may influence a woman to seek a STEM career or STEM higher education degree (Cole & Espinoza, 2011).

Women in Information Technology

Within the STEM fields, information technology is one area where growth continues to be great, and with that growth comes the need for qualified employees. A study by Zarrett and Malanchuk looked specifically at information technology and the

causes for the imbalance between the number of men and women pursuing careers in information technology (2005). This study differentiated between information technology "hard" computer jobs that include network/systems administration, information systems/technology, programmer/computer engineer, and "soft" computer jobs that include Internet journalism, research, telecommunications, help desk, resource guides, teaching, and statistics (Zarrett & Malanchuk, 2005). Their findings indicate that even women who aspire to higher education, beyond high school and vocational school, do not seek degrees in the hard computer fields (Zarrett & Malanchuk, 2005).

The idea that women do not fit in the information technology field is one that has continued since the field opened. The focus of the original designers, developers, and vendors was specifically on the technology itself rather than on its potential uses (Woodfield, 2002). There has long been a perception of an information technology professional as a "long-haired, bearded, bespectacled, smelly male programmer locked in his room, working day and night doing mysterious things on the computer. These geeks have poor communication and social skills and can only talk to fellow geeks about computing in a language not understood by the general population" (Crump, Logan, & McIlroy, 2007, p. 364).

As the field has grown, the organizations creating information technology products have found that to serve their clients they have to provide a more professional service that meets the demands of their users (Woodfield, 2002). This change required a new focus on the personnel hired, from those with strictly technical skills, to employees who also have good communication and interpersonal skills (Moore, Griffiths, Richardson, & Adam, 2008). This new need to recruit employees who have not only a

technical skillset, but also good social and interpersonal skills has brought about a new potential for women to enter the field of information technology.

The information technology industry is often classified as masculine, and in general, items classified as masculine are thought to have a higher status than those classified as feminine (Evans, 1994). The idea that a career or type of work falls into a gender category is sometimes called "gender typing". This was defined by Britton (2000) as "the process through which occupations come to be seen as appropriate for workers with masculine or feminine characteristics, that is, occupations could be said to be feminized, masculinized, or, more generically, gendered" (p. 424). There are shifts in occupations that allow an occupation classified as masculine to be feminized, and vice versa. When this happens, the value often changes as well, making a field previously feminine but now masculine to have a higher level of prestige, importance, value, and one that was previously masculine and is now feminine to have lower levels (Abrahamsson, 2003).

Hekman (1999) discussed two strategies that are used by women attempting to overcome these classifications. The first strategy is to simply deny that men and women are different and encourage women to play the "male game" in the same manner that men do (Hekman, 1999). The second strategy is to attempt to reverse the classifications, saying that women are actually superior due to the sensitivities and social skills they have, but which men are lacking (Hekman, 1999).

A third strategy introduced by Hekman (1999) challenges the classifications themselves and suggests that one does not have a higher status than the other and therefore differences are expected and are part of life itself. The information technology

industry is recognizing this and has moved toward the view that a major change is needed in the personnel profile used in the industry, from individuals who have high levels of technical skills, to those who also have social and communication skills (Woodfield, 2002).

A study conducted by Crump, Logan, and McIlroy (2007) looked at the reasons given by women in New Zealand for entering the information technology field. Nearly half of the participants indicated they were in the field as a chosen career, while the others came to the field either by a natural career progression or simply through serendipity. When discussing their decision to accept positions in information technology, regardless of the path they took to get there, most said that job interest was the most important reason for their decision (Crump et al., 2007). This supports career theories such as those of Holland, Super, and Gottfredson, which use interest as a key factor in determining career choice.

In a study conducted of both men and women entering the IT profession, McKinney, Wilson, Brooks, O'Leary-Kelly, and Hardgrave (2008) examined the motivations, socialization, and experiences used to make the decision to enter the information technology career. Table 5 indicates that in most motivational factors examined there is no difference in the weight of the items. Factors that had significant differences were: love of technology/computers, job security, ease of entry into the profession, and flexible working hours (McKinney et al., 2008).

Table 5

Motivation for entering the IT professions (McKinney et al., 2008, p. 82)

Item	Males	Females	Different
Opportunity for job autonomy	5.11 (1.34)	5.17 (1.42)	no
Opportunity for advancement	5.34 (1.36)	5.46 (1.16)	no
Opportunity for task variety	5.37 (1.32)	5.54 (1.26)	no
Prestige of the profession	4.08 (1.68)	4.05 (1.64)	no
Income	5.77 (1.51)	5.66 (1.17)	no
Using state-of-the-art technology	4.71 (1.55)	4.54 (1.56)	no
Opportunity for gratifying work	5.46 (1.24)	5.56 (1.33)	no
Love of technology/computers	5.40 (1.56)	4.86 (1.63)	yes (p<.001)
Job security	5.47 (1.38)	5.74 (1.25)	yes (p<.05)
Ease of entry into the profession	4.00 (1.71)	4.28 (1.54)	yes (p<.05)
Flexible working hours	4.43 (1.76)	4.96 (1.74)	yes (p<.001)

Notes:
• Seven-point Likert scales used, with 7=Important and 1=Unimportant;
• Cell value = mean (standard deviation)

The data indicate that men and women use some different criteria in making the choice to enter the information technology career field (McKinney et al., 2008). It shows that men are more likely to make the decision based on the contents of the job itself, whereas women may be looking at the factors around the job, such as flexible working hours (McKinney et al., 2008). These findings would suggest support of Holland's theory

of vocational choice and the need to find a person/environment fit, regardless of the sex of the individual.

Summary

There are theories that have been used to explain the disparities in the gender composition of the STEM fields and information technology specifically, such as deficit theory, dominance theory, and difference theory. While these are useful in studying why women may choose to enter a male dominated STEM field in general, they do not explain why they would make a move *within* one general STEM field, such as information technology, from practitioner to educator.

The occupational choice theories described in this literature review offer some possible explanations for why women make the choice to leave the field of information technology as practitioners and enter the field of information technology as educators. First, Holland's theory of vocational choice with its consideration of how careers are chosen based on a person's personality type aligning with a work environment is one theory that could be tied to a woman's choice to leave information technology practice for education.

Another theory that potentially explains this choice is Super's life-span, life-space theory in which we see the progression of a career over the life stages of an individual over time. When looking at these stages in relationship to why a woman chooses to leave the field of information technology practice for education, Super's theory might offer insight into the potential to skip tasks within a stage that might contribute to a woman making the choice to change the function of their job without leaving their chosen field.

Lent, Brown, and Hackett's social cognitive career theory, Eccles' model of achievement-related choices, and Gottfredson's circumscription and compromise theories all suggest that a person's interests, self-concept, and expectations for success could explain why they leave information technology practice for education. Of these theories, only Eccles' model focuses specifically on women. All three theories look at variables that impact their expectation for success within a field and could explain why a woman would choose to leave information technology practice for education.

O'Neil and Bilimoria's three-phase model is similar to Super's life-span, life-space theory. It focuses specifically on women's career choices based on different phases of life. This theory offers ideas why a woman might make a change in careers, or choose to stay where they are. It focuses on careers in general and does not specifically include studies of choices within specific career fields, such as information technology.

The Kaleidoscope Career Model is one that specifically addresses gender and a woman's choice to leave a successful career. This model focuses on women in male-dominated fields and offers possible explanations for what might make them choose to leave. It does not offer an explanation of why a woman might leave one male-dominated field such as information technology practice for another male-dominated field such as information technology higher education.

The organizational cultures in higher education and information technology offer a valuable contribution in the comparison of the culture of higher education and the culture of information technology. The two cultures appear very similar to each other, but also have some differences that may offer some explanation why a woman might make the change from information technology practitioner to higher education.

Overall, this review of the literature discovered no research specifically looking at why women choose information technology and then move from a career in information technology to teaching it. The object of this study is to begin the process of addressing this void.

Chapter Three: Research Methods

The purpose of this basic qualitative study is to gain an understanding of the factors involved in a woman making the choice to leave the field of information technology as a practitioner and entering the field of information technology as an educator. In examining this move from industry to higher education, we will be opening the door to further research and the potential development of theory to explain this phenomenon. To accomplish this, a basic qualitative study method was selected.

Research Questions

The research question asked for this study was: What factors contribute to a woman leaving a successful career in the field of information technology for a position as an information technology instructor in a community or technical college?

Sub questions:

- In what ways might perceptions about their stage-in-life influence women IT practitioners to make the choice to leave information technology to become community or technical college IT instructors?

- In what ways might personal interests influence women IT practitioners to make the choice to leave information technology to become community or technical college IT instructors?

- In what ways might their perceptions about gender stereotypes influence women IT practitioners to make the choice to leave information technology to become community or technical college IT instructors?

- In what ways might their perceptions about cultural aspects of higher education influence women IT practitioners to make the choice to leave to become community or technical college IT instructors?

Rationale for a qualitative design

As indicated in the literature review, there are quantitative studies showing the low percentage of women in both information technology practice and in higher education. There are also significant amounts of research concerning women practicing information technology in industry and women in STEM fields in general. However, there is a lack of research about women who choose make the change from the practice of information technology to higher education information technology educators.

The use of a qualitative design was selected because it is "descriptive and inductive, focusing on uncovering meaning from the perspective of the participants" (Merriam & Ntseane, 2008, p. 187). Creswell (2009), stated that "if a concept or phenomenon needs to be understood because little research has been done on it, then it merits a qualitative approach" (p. 18).

According to Creswell (2007), a reason to use qualitative research is to "empower individuals to share their stories, hear their voices, and minimize the power relationships that often exist between a researcher and the participants in a study" (p. 40). Merriam (2009) described its use by the researcher as demonstrating an interest in understanding how people interpret the experiences of their lives and the meaning they give those experiences.

Maxwell (2005) broke down five distinct intellectual goals that may be accomplished by using qualitative research: 1) understanding meaning, 2) understanding

the context from which a participant acts, 3) identifying unanticipated phenomena and influences, 4) understanding processes, and 5) developing causal explanations. In selecting a qualitative design for this study, my primary focus was on the first goal, understanding meaning, with secondary goals of understanding processes and potentially developing causal explanations.

Qualitative design allowed me to look at the individual experiences of women information technology professionals who have changed careers to information technology instructors, seeking the meaning behind this transition. Using these experiences will help find whether a pattern exists that is common between these women and potentially lead to future development of theory in this area (Creswell, 2009).

Research Design

A basic qualitative research design was chosen to discover and understand the factors involved in transferring from information technology practitioner to educator from the viewpoints of the women making this choice. Caelli, Ray, and Mill (2003) described the basic qualitative study as one that may encompass many of the characteristics of the more specific qualitative designs, focusing on the understanding of experiences or events.

Of interest in a basic qualitative study are "(1) how people interpret their experiences, (2) how they construct their worlds, and (3) what meaning they attribute to their experiences" (Merriam, 2002, p. 38). A basic qualitative design is appropriate for this study because it is seeking to understand why the participants made the decision to make the transition from information technology practitioner to educator.

The basic qualitative design allowed me to determine patterns and categories that I used to describe the phenomena of the transfer from information technology practice to education. The data are interpreted without building or developing a theory (Caelli et al., 2003), but with the purpose of drawing attention to the issue for future research and potential theory development.

Conducting qualitative research often requires the use of fieldwork. For basic qualitative studies, data are collected using interviews, observations, or document analysis. The primary data collection method used for this study was interviews, by telephone and video conference. The study was conducted in a natural setting that was sensitive to the subjects (Creswell, 2007).

This study is particularly interested in the personal experiences and perceptions of women information technology instructors from their distant past through their current employment setting. The interview is the preferred data collection method when seeking explanations of how people interpret their worlds and when looking for the influence of past experiences on current experiences (Merriam, 2009).

My personal interpretations of the participants' described perceptions of the path they took from information technology practitioner to educator are the basis for this study. As stated by Creswell (2009), "The goal of research is to relay as much as possible the participants' view of the situation being studied" (p. 8).

Interviews

Merriam (2009) described our modern world as one where people are being interviewed everywhere–on talk shows, the Internet, the news, and print media. The stories told in these venues rely on interviews to make a point or describe a situation. The

difference between these interviews and those of social science research lies in the

process used to conduct interviews. For social science research the interview process is a

systematic process that takes into account the relationship between the interviewee and

the interviewer (Merriam, 2009).

Although the relationship of the interviewer and the respondent may be a personal

one, the interview process itself does not necessarily reflect this. There are questions that

need to be asked, and although the respondent may at some points be allowed to take the

lead in the conversation, this is done at the interviewer's discretion, not the respondents'

(Rosenblum, 1987). Rosenblum (1987) went on to say:

> Thus, the social science interview is a temporally circumscribed, explicitly
>
> instrumental exchange between relative strangers; an impersonal,
>
> asymmetric, question-answer session. Yet insofar as it is occasioned by
>
> the desire to illuminate areas inaccessible by less obtrusive means, an
>
> interview is likely to address private and perhaps emotionally charged
>
> topics. At one and the same moment then, the social science interview
>
> stands as both an exceedingly personal and equally impersonal event (p.
>
> 389).

Marshall (2006) indicated that when looking for questions of "how" and "why",

the in-depth interview is the most efficient method for obtaining information. The

research questions for this study seek answers that necessitate facilitating the participants

in exploring and reflecting on the past and current events in their lives (Stringer, 2008).

The semi-structured interview format was used encompassing a mixture of more and less

structured questions (Merriam, 2009). The questions in the interviews were open-ended,

seeking the perceptions of the participants about the issues discussed, focusing the interview rather than controlling it. The use of these unstructured questions was flexible, allowing me to adapt to the responses of the interviewees.

Interviews were conducted by Internet video conferencing and by phone, based on the geographic location and preference of the participant. The use of telephone interviews has been debated by scholars for use in qualitative data collection. Trochim and Donnelly (2007) expressed concern that telephone interviews may lack interaction between the interviewer and the participant. A study of jail inmates conducted by Sturges and Hanrahan (2004) in which they compared the data from telephone and in-person interviews found that the method of interviewing did not influence the responses. For this study, telephone interviews were used only if other methods were not viable.

Criteria for selection of participants

The women for this study were selected based on their status as full time information technology instructors/professors in community or technical colleges in the United States, and previous status as full time information technology practitioners. Neither the participants' age nor time in their positions were considered in the selection. Initially, purposive, modal instance sampling (the typical case) was used in order to reach a specific, targeted sample, and because the proportionality of the sample was not a primary concern (Trochim & Donnelly, 2007). From the initial sample, snowball or chain purposive sampling was used to identify more participants within the same criteria range (Merriam, 2009).

Table 6

Description of participant sample

Participant	Woman Information Technology Instructor
Characteristics	Woman who has held a position as an information technology professional at some point in their adult career
	Woman who is currently employed as an information technology instructor in a community or technical college
	Woman who works in the United States

  Five participants were initially selected for the study with the anticipation that the total number would be 12 to 15 as more participants were selected based on the initial participants' recommendations. Although the anticipated number of participants was 12 to 15, the final number agreeing to participate was 10. This number allowed data collection to reach the point of saturation or redundancy, where adding to the participants was not adding new information to the data being collected (Merriam, 2009).

Participants

  The names of the initial participants were obtained by viewing the instructor directories found on the websites for community and technical colleges in the United States and from personal contact during the researcher's participation in information technology conferences over the past 10 years. Participants were contacted by e-mail messaging and by telephone to determine their willingness and availability to participate. In these initial contacts, the participants were asked general questions concerning their current employment to see if they met the criteria of being full time information technology instructors in a community or technical college. The participants were asked to agree to participate in a 60-90-minute interview, and if needed, a second interview later. Those who accepted were then scheduled for a meeting at the location of their

choice using video conferencing or by phone. No more than two participants were selected from a single institution to allow for a broad representation from diverse institutions.

Role of the Researcher

Qualitative research is interpretive research that involves a sustained and intensive interaction between the researcher and the participants (Creswell, 2009). As a female information technology instructor, one who made the move from the field as a practitioner to a position as an instructor, I hold a personal attachment to this subject. My reason for making this change was personal and somewhat ambiguous and I have long been interested in why other women have made the same choice. I am interested in hearing their reasons and seeing if there is any commonality between us.

With this known attachment to the subject, maintaining the integrity of the research was critical. My personal biases, prejudices, and orientations have certainly shaped my interpretations and approach to this study (Creswell, 2007). With this consideration, Creswell (2009) directs inquirers to "explicitly identify reflexively their biases, values and personal background, such as gender, history, culture, and socioeconomic status, that may shape their interpretations formed during the study" (p. 177). Based on this directive, I will attempt to acknowledge the personal history, traits, and biases that may have influenced my interpretation of the data collected in the course of this research project.

To begin, I was raised in a conservative, Christian home. My father was the leader and while my mother is a strong woman who gave her opinion, ultimately he made all critical life decisions. When I married, I went immediately into the same role that my

mother had held. I studied for a career in a male-dominated field and my first position out of college was in an organization that did not allow women to advance higher than a standard accountant. I felt restrained and ultimately rebelled against this structure. I joined the United States Army, and in making this decision, I joined the Military Police and ultimately was assigned as the first (and at the time only) woman in one of our honored combat Military Police Companies, and further than that, to one of that company's combat platoons.

After my time in the military, I ultimately took on the career of an information technology network administrator. In my 5 years working in this field, I often found myself the only woman in my department/area. While I enjoyed this field, I never felt fulfilled and was always seeking some of the human interaction that was missing in the positions I held.

My current position is that of an information technology instructor in a community college. I have held this position for 15 years. During this time, I have seen a 300% increase in women holding positions within my organization in the area of information technology instruction (from just one woman, myself, to four). Because of my professional relationship with them, these women, all former information technology professionals, are not included in this study and their reasons for making this change are unknown.

Knowing my own history and potential biases allowed me to be sensitive to the needs and perceptions expressed by the participants in this research. My experiences in multiple male-dominated fields gave me a unique perception of the women participants and allowed me to empathize and truly hear what they had to say with them. My own

ambiguity about why I made the change from practitioner to educator also allowed me to be open-minded, with no predetermined conclusions as to why other women made the same choice.

Protection of Information

This study was conducted in compliance with the requirements of the University of Idaho Human Assurances Review Board. The names and identities of the participants were held confidential by coding the data collected so that only the researcher knew the identity of the individuals participating in the study. Each participant was given a pseudonym to allow the researcher to determine their real identity. This information was stored in an encrypted, password-protected file on the researcher's personal computer. All physical copies were stored in a locked cabinet in the researcher's home office. The participants were asked to sign consent forms prior to the interview and given an explanation of how their identities would be protected.

Data Collection

Data collection was completed primarily in the fall of 2013. The method of collection was through interviews with the participants. Each interview lasted between one and two hours. With the permission of the participant, the interview was recorded using a digital audio recorder. Each audio recording was transcribed within 48 hours of the interview to allow for review and coding of the collected data. Interview notes were taken during the interviews, allowing for immediate thoughts about the participant responses to be documented for later consideration and to be used in the case of a recording failure. Journaling of ideas that surfaced during the data collection period was

used to capture my reflections, ideas, and questions for use in data analyses and follow-up interviews (Merriam, 2002).

To make the interview personal and to establish a relationship with the participant, I began each with a personal introduction and explanation of the study and my reasons for conducting it. I allowed no more than a few minutes for this, but feel it helped create rapport with the participants and avoid potential negative feelings where I might be viewed as trying to gather personal information from the participant while not sharing any about myself (Merriam, 2002). For those interviews in which the participant needed to talk by telephone, it was critical that I build a rapport with the participant. This was accomplished using the same process as the video face-to-face interviews, but with more detail in my introduction of the study about my personal interest in it. I also gave them a chance to ask any questions that they had about the study and the interview itself (Trier-Bieniek, 2012).

The interview guide contains one grand tour question and seven follow-up questions, some of which have potential further follow-up questions. The guide was piloted with two women currently teaching information technology in my organization but not asked to participate in the study. Based on this pilot the questions were revised for use in the study. After a brief personal introduction and description of the study, all study participants were asked the same set of questions as follows:

Grand Tour Question: What influenced you to leave the field of information technology as a practitioner and enter the field of information technology education?

Follow-ups:

   a. Describe what was going on in your life when you decided to make this change.

   b. Could you tell me about any personal interests that might have influenced you to make this change?

   c. Describe what was happening in your organization at that time that might have influenced you to make this change?

   d. Can you tell me anything about your field that might have influenced you to make this change?

   e. Can you tell me about any expectations you may have had about the field of teaching information technology that might have influenced you to make this change?

   f. Can you tell me about any expectations or other perceptions you may have had about the community or technical colleges you considered that might have influenced you to make this change?

   g. Is there anything you can add, expand on, or give examples of that had an influence on you making this change? What haven't we talked about regarding this that we should?

Follow-up questions were revised and added during the interview based on the participants' initial responses to the questions.

As the data were collected and reviewed, they were organized for easy retrieval. A log was created with a record of dates, places, specific activity, who was involved, and the topic of the activity (Marshall & Rossman, 2006). The data were then filed to match

this log to allow easy access and retrieval. Included in the log under 'specific activity' was a notation of whether the activity was recorded, written, or both.

Data Analysis

Initial data analyses were performed concurrently with data collection. Within 48 hours of conducting the interviews, I transcribed them and began the process of reviewing and writing memos, which led to the initial creation of categories (Creswell, 2009). Merriam (2002) stated that once the data are collected, they are "inductively analyzed to identify the recurring patterns or common themes that cut across the data" (pp. 6-7). Once all initial interviews and reviews were completed, I used the log created during data collection as a reference and began the next stage of analysis by listening to each recorded interview again and then reading the notes taken during the interview and the first review memos. During this process I used highlighting and further memos to capture thoughts, facilitate in-depth thinking, and stimulate analytic insight into the data (Maxwell, 2005).

Line-by-line coding was performed on the data, putting comments in the margins next to any data that seemed relevant to the research questions asked, performing open coding (Merriam, 2009). These initial codes were then put into groups that seemed related to each other, creating analytical codes that go beyond description to begin interpreting and reflecting on the meanings behind the data (Merriam, 2009). According to Merriam (2009), the "devising of categories is largely an intuitive process, but it is also systematic and informed by the study's purpose, the investigator's orientation and knowledge, and the meanings made explicit by the participants themselves" (pp. 183-184).

As part of the initial coding process, peer debriefing as described by Spall (1998) was used to maintain the quality and trustworthiness of the codes. After initial coding of the data from the first two interviews, the data were re-coded by a coworker familiar with the topic and coding process. The codes produced by the coworker were compared with my initial codes and differences were discussed. The purpose of this second review was not to produce the exact same codes, but to see if the data were labeled and sorted using the same logical paths (Graneheim & Lundman, 2004). This activity was repeated midway through the data coding process.

The process of coding the data in qualitative research involves breaking the data down so that individual items can be compared to each other within categories (Maxwell, 2005). Initially data were put into broad, organizational categories that were eventually broken down further into substantive categories. Maxwell (2005) described substantive categories as being "primarily descriptive, in a broad sense that includes description of participants concepts and beliefs; they stay close to the data categorized, and don't inherently imply a more abstract theory" (p. 97).

The analysis process was conducted using the constant comparative method described by Merriam (2002) as constantly comparing units of data with each other, similar to the way it is used in grounded theory research. This allowed me to compare and code the data and then describe further categories. Reading and re-reading permitted me to reduce the data and to establish connections between it and the research questions in this study (Creswell, 2007). The final stage of analysis was creating themes and finding connections between them to allow me to determine the potential reasons women have for leaving information technology practice to enter the field of information

technology higher education. Figure 9 illustrates the data analysis process followed in this study.

```
┌──────────────┐      ┌──────────────┐      ┌──────────────────┐
│  Interview   │  →   │  Transcribe  │  →   │ 1st Transcription │
│ Participants │      │  Interviews  │      │     Reading       │
│              │      │              │      │   (highlight)     │
└──────────────┘      └──────────────┘      └──────────────────┘
                                                      ↓
┌──────────────────┐  ┌──────────────────┐   ┌──────────────┐
│ 3rd Transcription│ ←│ 2nd Transcription│ ← │ 2nd Hearing of│
│  Reading (codes) │  │     Reading      │   │   Interviews  │
│                  │  │   (highlight)    │   │               │
└──────────────────┘  └──────────────────┘   └──────────────┘
        ↕
┌──────────────────┐  ┌──────────────────┐   ┌──────────────┐
│  Peer Debriefing │ →│    Construct     │ → │  Share with  │
│   (discussion)   │  │ Individual Profile│   │  Participant │
└──────────────────┘  └──────────────────┘   └──────────────┘
                                                     ↓
┌──────────────┐      ┌──────────────┐      ┌──────────────────┐
│              │      │   Identify   │      │   Aggregate All  │
│ Write Report │  ←   │   Emerging   │  ←   │ Participant Codes│
│              │      │    Themes    │      │                  │
└──────────────┘      └──────────────┘      └──────────────────┘
```
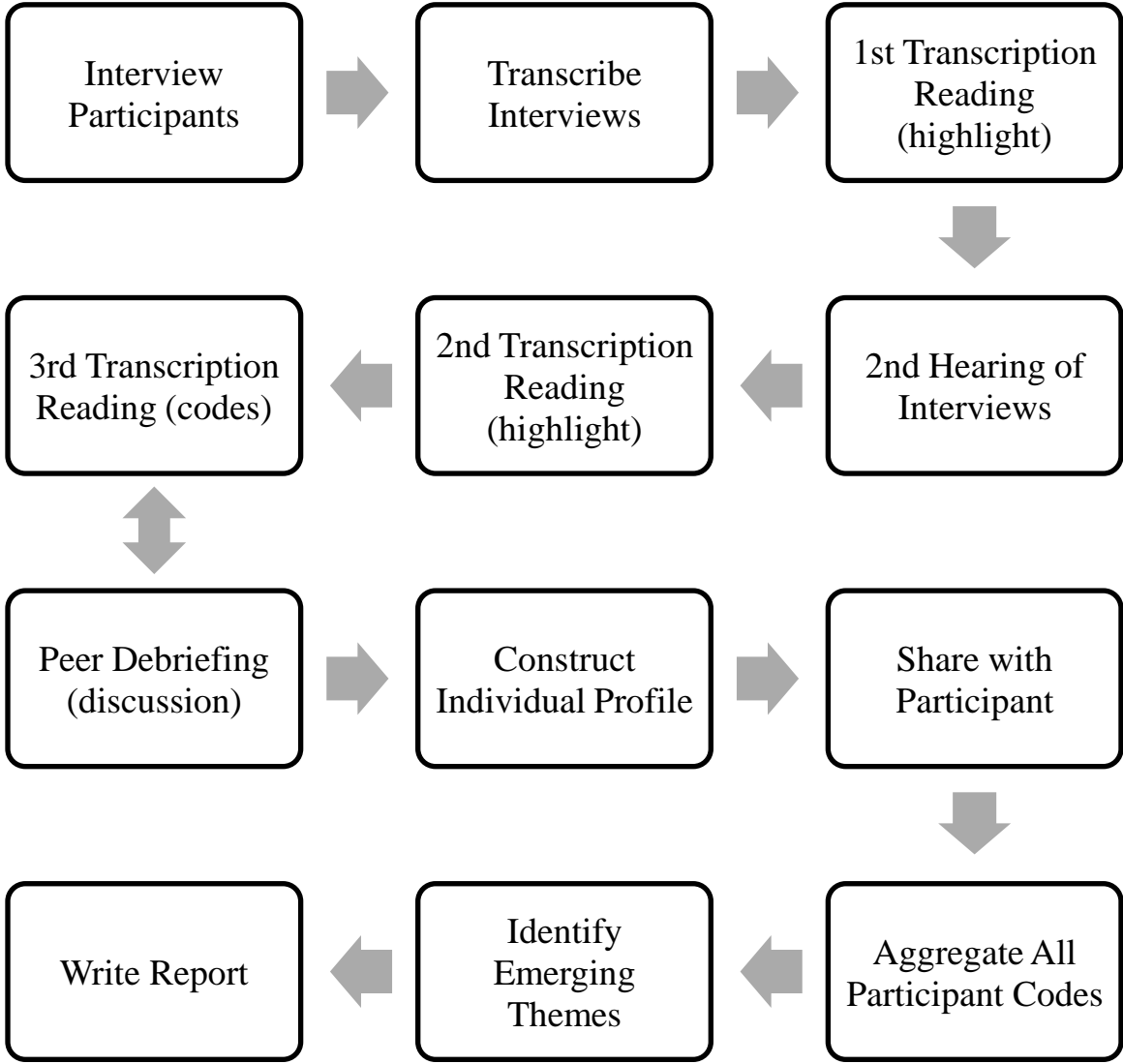
Figure 9. *Data Analysis Process*

Validity

"To have any effect on either the practice or the theory of a field, research studies must be rigorously conducted; they need to present insights and conclusions that ring true to readers, practitioners, and other researchers" (Merriam, 2009, p. 210). To reach this

goal, careful consideration was given to how the data were collected, analyzed, interpreted, and presented (Merriam, 2009).

During the study, three strategies were utilized to increase trustworthiness. The first strategy was the use of member checks. Member checks provide the participants the opportunity to express their views of the accuracy and credibility of my interpretations and analysis (Creswell, 2007). Maxwell, (2005) said that member checking is "the single most important way of ruling out the possibility of misinterpreting the meaning of what participants say and do and the perspective they have on what is going on, as well as being an important way of identifying your own biases and misunderstandings of what you observed" (p. 111).

After completing the interview and its subsequent transcription, the participant was given the opportunity to read the transcription and to provide feedback regarding any discrepancies or potential misunderstandings. Six randomly selected participants also completed a second member check. For this second check, the participants were given the write-up of the analysis of their interviews, allowing them the opportunity to provide feedback and further input concerning my interpretation and analysis.

The second strategy used was peer-review. The data collected, along with the analysis and findings, were reviewed by a colleague with no particular knowledge of the subject. This colleague was asked to comment on how the findings related to the data and their thoughts on the plausibility of the findings (Merriam, 2009).

The third strategy used was clarification of researcher bias. I have commented on my past experiences, biases, prejudices, and orientations that may impact my interpretation of the data and approach to this study (Creswell, 2007). I also was diligent

in doing self-reflection during the process of data analyses to be aware of my own bias that might have an impact on my interpretations.

The question of external validity or transferability asks whether the findings of this study are generalizable to other populations. The purposes of basic qualitative research do not include generalizations beyond the population studied. According to Maxwell (2005), it may be possible to give some plausibility to generalization from qualitative studies that use a non-random sample, but not with the "precise extrapolation of results to defined populations that probability sampling allows" (p. 116).

Summary

This study used a basic qualitative design in order to gain a deep understanding of why women choose to leave successful careers in information technology to become instructors of information technology in a community or technical college. This chapter provided the framework for the data collection, interviewing process, and data analysis. The participants of this study were purposively selected and included ten women who had previous experience as successful information technology professionals and were, at the time of the study, employed as information technology instructors in community and technical colleges who agreed to interviews.

Data collection occurred in one-on-one telephone and Internet video conference calls. Follow-ups and member checks using e-mail provided further clarification of participant responses. The transcriptions of the interviews and copies of the follow-ups were read multiple times and coded by hand to identify the codes and emerging themes. Chapter Four discusses the findings, provides analysis of the data, and includes detailed information of the study sample, and a summary of the findings.

Chapter Four: Findings

The purpose of this basic qualitative study was to gain an understanding of the factors involved in a woman making the choice to leave the field of information technology as a practitioner and enter the field of information technology as an educator. This chapter describes the participants' experiences in making this decision to move from the field of information technology to the field of teaching information technology in the community or technical college environment.

This chapter presents the stories of the participants gathered through interviews exploring the study's overall question of what factors contribute to a woman leaving a successful career in the field of information technology for a position as an information technology instructor in a community or technical college. The primary themes that emerged during the data analysis were developed from the various patterns and categories of data, and evolved from the inductive analysis described in Chapter Three. Themes were developed from the codes produced by the data and were then examined in relation to Holland's (1997) theory of vocational personalities and work environments, Super's (Super, 1980) life-span, life-space theory, Gottfredson's (1981) circumscription and compromise theory, and Mainiero and Sullivan's (2005) kaleidoscope career model.

Demographics

In order to include a representative group of instructors, the participants in the study were selected from the faculty directories of community and technical colleges in the United States. While the initial design of the study was to include from 12 to 15 participants, the final number of respondents was 10. This group was selected from a total of 32 individuals who were approached. Those not selected either declined to participate

or did not respond to requests. The initial interview included questions that solicited

general demographic information from each participant. The summary of this information

is included in Table 7. The age range was 30 years with the youngest participant being 36

and the oldest being 66. The mean age of the participants was 51.5 years. One participant

had obtained a Ph.D., the others all possessed master's degrees.

Table 7

General Demographic Information of Participants

Pseudonym	Age	Ethnicity	Highest Degree Earned	Years Experience in Information Technology	Years Experience in IT Education	Type of Educational Institution
Heather	49	NA	Ph.D.	22	4	CC
Wanda	53	C	MA	7	12	CC
Leslie	53	C	MS	5	23	CC
Sue	66	C	MS	15	30	CC
Rhonda	41	C	MS	2	13	CC
Debra	36	C	MS	10	3	CC
Betty	55	C	MS	28	5	TC
Laci	57	C	MS	16	20	CC
Tara	54	C	MS	11	14	CC
Janice	50	C	MA	7	25	CC

Note. C (Caucasian); NA (Native American); CC (Community College); TC (Technical College)

All participants had at least three years teaching information technology

experience in higher education with a range from two to 28 years working in the

information technology industry before teaching. The average number of years teaching

information technology for these instructors is 15 years. To allow the reader to become

familiar with the 10 participants, a profile is included for each of them. These profiles

were produced from the interviews conducted with the participants and through follow-

up questions obtained via e-mail messaging during the field research process. All names

used in this report are pseudonyms.

Participant Profiles

Heather

Heather has been teaching full time for four years after 22 years working in industry. Her decision to make this change from information technology in industry came at a time when she found herself in what she considered an intolerable position at her full time job. The manager in her organization was involved in illegal practices and she felt she needed not only to report the activity to the authorities, but also to find another position. As she started her job search, she came across a full time teaching position at a community college and made the decision to apply for it. She also continued to look for industry positions and ultimately had to make a decision between the two fields.

For Heather, the decision was not an easy one. She received offers from a company for an information technology position as well as from a community college to teach information technology courses. She spent time weighing the pros and cons of working in industry and teaching. The pay was one of the particularly difficult aspects of this choice as the employer in industry increased the offer multiple times in an attempt to get her to accept the position. She had also become accustomed to bonuses in industry positions that she knew would not be available at a community college. She also considered the hours expected of her in both positions. Ultimately, she made the choice to teach at the community college full time.

Wanda

Wanda has been teaching information technology for 12 years. Prior to teaching, she worked in several technology and engineering fields to include four years in the military. In each of the positions she held, she was a female minority. In these positions,

she had a couple of mentors who helped her and worked with her as an equal and they influenced her choice to leave information technology and go into teaching.

Although her original fields were not information technology, she found herself being called upon to help others with computer problems and ultimately went to work at a community college. While there, although not technically a support technician, she was often called to help when someone had a computer problem. When one of the information technology instructors resigned from their position, she was approached and asked to consider teaching full time. She stated that this seemed a "natural fit" and that she took the position.

Wanda did not consider going into teaching as a career choice and spent little time considering whether to make the change. The money she could make and the prestige in industry is considerably higher. She gave up the potential for advancement, raises and a lifestyle that the teaching profession does not support. She recognized this when she accepted the position, but says she has never regretted it.

Leslie

Leslie has been teaching information technology for 23 years. She began her career as a computer programmer and taught programming part-time before taking a full time position teaching programming and later teaching information technology. She enjoyed the part-time teaching and received an offer for a full time job teaching programming at a community college. The college that approached her required a master's degree and hired her with the agreement that she would go back to school and earn one.

At the time she began teaching she was a single parent and working many hours. In considering the offer to teach, she looked at the reduction in hours and considered the stability and security of higher education that she did not have in programming. She also had what she says she knew was unusual: an offer to teach that was an increase in pay rather than a cut. She recognized that future income would be higher in programming, but because of her positive experiences with part-time teaching, she went through with making the change. She stated, "There were just no negatives about it for me."

The change to teaching information technology came about because of the decline of students in programming and the high demand from industry for employees with information technology skills. She had little training in this area, so did self-study and took certification exams to prepare herself to teach it. Making this change was what brought her to teaching courses designed to train students for entry into the field with an associate degree, but not designed to transfer to a four-year institution.

While Leslie did not express any regret at making the change from industry to teaching, she did say this choice is one she makes each year. She states that she loves teaching and feels she makes a difference in the lives of her students. She also admits this choice requires a sacrifice in the income she makes and the lifestyle she maintains.

Sue

Sue has been teaching in information technology for 30 years. She started out working for a large company in the corporate environment as a programmer. The company had a pattern of hiring people when they had a specific need or project and then laying them off when that need diminished or the project concluded. In her time with the

organization, she experienced three layoffs. Her decision to begin teaching in higher education was not one that she considers a choice, but rather a necessity.

Sue had a desire to teach from an early age but never pursued a position in the teaching field. During the time she worked in industry, she was a single parent and had a need for a steady, consistent income. After the third layoff, she had the opportunity to teach and decided to take it. She began teaching part-time and asked for consideration for a full time position. She was told she needed to have a master's degree to get a full time position, so she began taking classes and completed a master's degree in professional technical education with an emphasis in computer science.

The master's degree allowed her to teach full time at the community college. She liked the classroom environment and has continued teaching, although she admits she misses the information technology field. At one point, she decided to return to industry, so took a leave of absence. She worked for about six months and then returned to her teaching position. Although she was enjoying working in the field, the same issues of stability that caused her to leave industry originally still existed and the company she worked for did not make it through a financial crisis and closed.

As a woman at a community college, she has been satisfied overall with her treatment, although she does mention that occasionally there have been signs of the discrimination she experienced in industry. She does occasionally have students who do not want to learn from a woman, but she has withstood this and been able to succeed with them as they see her skill in the tasks she is teaching them.

Sue states she is happy teaching, but also stated multiple times that she misses working in the information technology industry. She mentioned the discrepancy in pay

between industry and teaching, but seemed more concerned with the work itself. She has

concerns for the increasingly netative attitudes of the students coming into her programs

and states this does have an effect on her desire to continue teaching.

Rhonda

Rhonda has been teaching information technology in higher education for 13

years. The experiences that led her to teaching began when she graduated from college

the first time. She went to work in the information technology industry and worked for

about a year when her company had a large layoff. The people she worked with all had

considerably more experience in the field than she did, and she did not feel she could

compete with them in the information technology field in her area. She did find another

job with a small family business that she liked, but did not see a future with them.

Rhonda spent some time examining her options. She and her husband did not

have many responsibilities and decided this would be a good time to look for work

outside the field she had trained for. She had an instructor who mentored her in her the

community college she attended for her first degree, who had made a great impression on

her. She decided to use what she had learned from this instructor about teaching to move

to the teaching field. She had already gone back to school and obtained a master's degree.

She heard about a job fair for teachers and decided to see what they might have to offer.

One of the school principals there was impressed with her and hired her.

She spent the next several years teaching information technology at the high

school level, but never forgot what she had learned at the community college. She

continued watching for openings in the area community colleges and obtained a position

at the college of her choice in one of their off-site locations. She taught there for three

years and eventually obtained a position teaching information technology on campus.

Rhonda has never attempted, or had any desire to return to the information

technology industry. Although she did not hold aspirations for becoming a teacher at a

young age, her original experience at her community college gave her the desire. Even as

a student she asked her mentor how she could pursue teaching as a career and did not

doubt she would ultimately follow through and become a teacher.

Debra

Debra has been teaching information technology for three years. She knew when

she was a student at her community college that she might want to teach. She had a

mentor in college who talked to her about the information technology field she was

entering and about the high levels of burnout. He encouraged her to have a back-up plan,

and she chose teaching as her escape route should she need it. Even as she made sure she

had a backup plan, she was convinced she wanted to have a career in information

technology and was determined to pursue it. When she left the community college, she

continued her education and achieved a master of science degree in computer information

technology.

One aspect of her backup plan to enter teaching came from her mentor. He told

her she would need to prove herself in the field before she would be able to get a position

teaching. Keeping this in mind, she took a job in her community and began working. The

organization she worked for was a small company and she liked what she was doing.

After about seven years, she began to feel the burnout she had been warned about. She

was working on very high stress projects and was working long hours that would not

allow her to have any kind of life outside of work. Through an unrelated, casual communication with someone at the community college she had attended, she learned of an open position. She decided to apply and was offered a position teaching information technology.

Although she could have made more money by changing to another company and continuing in information technology, she decided to try teaching. She had many ideas for assignments to gain the attention of her students and create a fun learning environment. She was permitted to implement these ideas and make her classes popular and in demand.

Debra does not consider going back to industry as an option. She says that in the unlikely event of a layoff at the school, she would begin looking at other community colleges. As long as her current employer has a place for her, she believes she will continue to work for them.

Betty

Betty has been teaching information technology for five years. She grew up in a family in which both her parents and all four of her siblings worked in education. She resisted this and went to college to study electrical engineering. She worked in the United States and other countries as a field engineer for multiple organizations. She eventually settled down and started her own business as a computer consultant. This experience gave her the skills needed for a position as a systems administrator. She worked for several companies in this capacity for about 15 years before exiting the field for a position teaching information technology at her local community college.

When Betty made this decision, she had limited options. She lives in a rural area with very few companies that require her skillset. She had worked as a systems administrator and had her own business in the area. She stated there was not much beyond that for employment in information technology. She was involuntarily unemployed and needed work, so when she heard about the position for an information technology instructor at the community college, she applied. She was offered a position and accepted it, knowing she would make less money than she would if she had secured employment in industry.

In making the change to the community college, she felt that to teach students to be effective employees, she needed industry-standard equipment. She did not have this equipment, so spent time overcoming the deficiency so her students would still be prepared when they graduated. The equipment issue is one she finds troubling, but the students are still learning, and she stated she is starting to get more support.

Betty does not express any desire to return to industry. She states she has found the career that fits her. She did comment on the difference in salary, but likes what she is doing. The position she holds allows her to make a living without the need to relocate and it is a position she finds personally rewarding.

Laci

Laci has been teaching information technology for 20 years. In college, she studied programming and then went to work in the field as a programmer and as a network configuration expert. She has a real love of working with computers and the opportunity it offers her of continuous learning. The organizations she worked for had a high expectation that their employees be available 24/7. As Laci progressed in the field,

she did not fight this and enjoyed the challenges. However, when she decided to have a family, she began to reconsider what she wanted out of life for her and for her children.

While attending college, she had completed all the work needed for her state's secondary education teacher certification except the student teaching. She took a leave of absence from her work, did the student teaching, and obtained her certification. In this process, she realized she did not want to teach high school. She went back to her job and in discussions with one of her coworkers, learned of an adjunct position teaching a beginning information technology class at the local college. She decided to try it, but before the class started, she and her family moved.

Once settled in her new location, she looked into the local community college and took on work as an adjunct, teaching programming and networking. She found that she really loved it and decided to make teaching at this level a career. She did have some surprises in this transition. She expected, even as an adjunct, to get more support than she found. She tells of her first class, walking into the classroom at night when no administration or support personnel were available, and finding she had no access to the computer and no dry erase markers for the whiteboard. It was challenging, but she said it was worth it once she realized how much she loved teaching.

As a full time faculty member, she found she did get more support than she had as an adjunct. She also found she had more freedom in how she worked. She could teach the course using the methods of her choice, as long as she met the course objectives. In her most recent position, she went to a department that needed re-designed to include courses meeting current industry standards. Here she has received the needed support allowing her to complete this task.

Laci does not ever plan to return to the information technology industry. She earned nearly double what she earns teaching, but indicates that love for the work prevents her from leaving. Her initial choice had to do with wanting more time with her family. Now that they are grown, she continues teaching because she loves what she does and believes she is making a difference in the lives of her students.

Tara

Tara has been teaching information technology for 14 years. While attending graduate school, she worked for her university as an adjunct instructor. Upon graduation, she worked as a programmer for a short period and then took a position working as the information technology manager of the campus computer lab. She continued teaching adjunct, but found the university would not hire her full time without a doctoral degree.

At this time, Tara made the decision to relocate to an area with a school that offered the doctoral program she was interested in, and completed all of the coursework required without completing her dissertation. She heard of an opening at one of the local community colleges where her experience in information technology and her master's degree were required without a Ph.D. She discontinued her studies and went into full time teaching. She expressed that she does not regret this decision because the only reason she was in the doctoral program was to get a full time teaching position, which she achieved without the doctoral degree.

Information technology was not a first choice for Tara. While still in college, she was teaching math. She realized then she wanted to teach and went to her advisor to discuss it, suggesting that she would go to graduate school and get her master's degree in math. He advised her against this path because of what he stated was an overabundance

of math majors. He suggested she go into computer science for her graduate degree, which she then pursued. Along with her experience as an information technology manager, this degree ultimately allowed her to obtain her full time position as an information technology instructor at the community college.

Tara does not plan to leave teaching for industry. Because she wanted to teach since she first went to college, she says it was a natural progression. She stated that even while working as the information technology manager she was teaching the students who were working for her to be information technology professionals. Teaching full time allows her to continue in the information technology field and teach, which she loves.

Janice

Janice has been teaching information technology for 25 years. Before that, she worked as an information technology professional for about seven years. Her decision to leave the field of information technology for education was a practical one. She had a change in her life that left her a single parent. She found that the shiftwork required in industry left her little time with her child. She loved information technology and did not really want to give it up. In her examination of possible fields, she found teaching appealing due to a schedule that would coincide with her child's day and subject matter that would also allow her to continue working with information technology.

Janice already had a bachelor's degree in computer information technology and decided to go back to school and take the required courses to get her high school teacher certification. She taught in public high schools for 15 years. Her husband worked at a college in the area and encouraged her to apply. The college required a master's degree which she did not have, but hired her to teach with the agreement that she would continue

her education and obtain her master's degree. She has been teaching at the same community college since that time.

There were some requirements of teaching at the high school level that caused her to make the move to the college level. She found herself having to deal with parents more than she expected. She also found there was an attitude of entitlement in the students that was distressing. They did not engage or take responsibility for their own education. Her expectations of the community college environment included the hope that the students would have better attitudes and there would be less parental involvement. For the most part, she is pleased that these expectations have been met, but did comment that as time goes on those attitudes seem to be intruding into the college environment.

While Janice expresses a love for teaching, she demonstrates that her first love is information technology. Her position at the community college has changed from one in which she spent all her time preparing and teaching, to an information technology support role with a teaching requirement included. She manages one of the college's information technology systems, supporting both faculty and students. Her teaching requirements are set and she teaches a variety of computer classes, but does not focus specifically on one area of information technology.

Janice does not ever plan to leave the field of teaching. She loves working with the students and faculty. She expresses a strong desire to continue having an impact on the students' lives and seeing them succeed. She does feel that teaching offers the extra challenge of trying to stay current in the information technology field that she no longer works in full time. She appreciates being able to study and learn new skills to present to her students, and plans to continue.

Themes Emerging from the Qualitative Data

In the interview process, the researcher asked the participants to share their personal thoughts and feelings about their careers and the choices they made in leaving the field of information technology as practitioners to teach information technology in the community or technical college setting. During the fall and spring semesters of 2013 and 2014, the researcher collected, reviewed, analyzed and coded personal interview transcriptions and field notes taken during the interviews. As described in Chapter Three, the researcher used constant comparative analysis to determine codes and create categories of the data. From this analysis, the researcher identified four emerging themes: (a) Life events affect the decision to change from practice to teaching; (b) Personal interests affect the decision to change from practice to teaching; (c) Personal fulfillment is a significant factor in the choice to teach information technology; (d) Women felt they were treated differently than men in the practice of information technology in industry. Table 8 displays the codes and the themes resultant from them.

Table 8

Summary of Themes with Codes

Codes	Theme
having children, divorce, bad employer, job loss, financial hardship, physical exhaustion, shift work, spouse job loss	Life events affect the decision to change from practice to teaching
loves teaching, loves faculty, likes people, sharing excitement, like IT, love computers, love teamwork, staying current, love troubleshooting	Personal interests affect the decision to change from practice to teaching
making a difference, influence people, helping others, influence women, influence men	Personal fulfillment is a significant factor in the choice to teach information technology
men paid more, male/female balance, women work harder for same recognition, female stereotypes, male arrogance, women abnormal	Women felt they were treated differently than men in the practice of information technology in industry

Theme 1: Life Events Affect the Decision to Change from Practice to Teaching

Seven of the ten participants in this study indicated there was some significant event occurring in their lives when they made the decision to change from the practice of information technology to teaching it. There was no single event experienced by every participant, and they all expressed their life situation had a great deal of influence on their decision.

Four of these seven participants discussed how having children caused them to look at making a career change. In explaining why she left a good paying job in information technology to teach, Leslie states, "I had a young family and the hours in teaching were fantastic as compared to the hours in programming." She goes on to discuss her desire for the stability and security she felt she would gain in teaching that did not exist in the field, and the benefit these would provide to her family.

Laci also states that having children was a turning point. After she started her family, she continued to work in information technology. She describes her work there as 24/7, 365 days a year. She describes what happened when her children started school:

> This doesn't work having kids, it wasn't so bad when they were little, it was when I, I think what really happened was when I put them in school. When they started going to school it was like 'Oh my gosh, they get their summers off and they have to go to day care!' You now, it's not like my childhood where my mom was home or whatever. So, teaching was what I decided to do.

Janice had two significant life events that pushed her toward the field of information technology as a teacher. She had been working in information technology for seven years and shortly after the birth of her first child, she went through a divorce. She says, "In order to give her [the child] the attention I felt she needed as a single parent, I needed to have more control over my time, the time I spent at work, and being a teacher gave me that."

Leslie's opportunity to teach came while working as a full time programmer. She had the unusual circumstance of an offer of more money to teach than she was making as a programmer. She says, "I had a young family and the hours in teaching were fantastic as compared to the hours in programming." She jumped at the opportunity and says she never considered going back to the field.

Sue's situation was a little different. It involved her desire to have more time with her children along with an unexpected job loss. She was working full time and was part of a massive layoff in her organization. She was a single parent working three jobs to try to make ends meet and her children, along with a new marriage, led her to the decision to leave a field she loved in order to have more time with her family.

A job loss was also central in Betty's choice to leave the field and teach. When she lost her job, she did not seek a teaching position. She describes the transition as follows:

A friend of mine said that the local community college was in desperate straits, their IT teacher quit with a two weeks' notice. So, I walked in and picked up teaching computer repair classes and networking classes for a high school academy that they ran at the local community college.

It was her experience in this setting that ultimately led her to a full time teaching position in a technical college.

Heather also experienced an event that was significant in making her examine her career. While she did not lose her job due to layoffs, she found herself in a position of having to report her employer for illegal activity. She began searching for work and received an offer to teach information technology in an industry setting. At the same time, a community college approached her to teach information technology. She says,

I interviewed for the position and I totally forgot that I'd even applied for it, and then I got a job offer at the same time I had the offer to teach full time in the field. And, let me tell you the pay in teaching is tremendously less than the pay in the field. And the guy that was going to offer me the full time position in the field kept upping the ante and I'm like thinking, 'oh my gosh, what am I doing here?'

Although it was a difficult choice for her, she ultimately decided to take the position at the community college, and has continued in higher education since that time.

Rhonda also experienced a job change due to having what she called a bad employer. She worked in what she describes as an intolerable environment for two years and then decided to go back to school rather than continue. She mentions advice she received from her mother and her response to it:

This was back when I was really young, and my mom said 'you have to learn how to deal with these kind of people and you have to learn how to get along with them.' My response was, and I still remember it to this day, 'They're gonna have to pay me a lot more money than they were to put up with this kind of thing.'

The experience was significant enough that she was willing to quit the job and take one with lower pay. She went on to work part-time in the college she had graduated from and ultimately obtained a second master's degree in computer science in order to teach full time in the information technology department.

Theme 2: Personal Interests Affect the Decision to Change from Practice to Teaching

The 10 participants in this study all indicated strong interests in something, although not necessarily information technology, that led them both to information technology as practitioners and to their later choice to become information technology educators. While it would seem logical that all of them would indicate information technology as personally interesting to them, only five of them indicated this as the case.

Laci explained that her interest in computers and information technology were key in deciding to teach. She says, "Computers have been so good to me and so easy for me, I'm just a natural." Her enthusiasm for the field combined with her interest in teaching, which she discovered while still working in the field through teaching adjunct classes. She expressed this saying, "You know this is something that I really love and it's a way to share that love with all my students."

Heather also expressed that an interest in the information technology field played a part in her decision to teach it. She says, "You know they've [computers] always interested me and I think they're amazing! So, the field itself is a big reason why I'm teaching it." She also combines her interest in information technology with an interest in teaching, stating, "I like to share it with others and have them, like explore in it and find this information on their own. They just become amazed by it, it's great!"

Janice did not go to school seeking to become an information technology practitioner. She planned to go into dentistry. Her interest in information technology sparked during a high school internship at a dentist's office where she had the opportunity to watch their computers and see what they did. She liked working in information technology, enjoying the troubleshooting aspects and the logic trees used to work through the processes, and did eventually pursue a position in the field after college.

Tara talked about information technology from a slightly different perspective from the other participants. She started out teaching adjunct in the mathematics department of her university while in graduate school and discovered she had a true love of teaching. When she approached the department chair about a full time position, he encouraged her to study computer science instead. Through the process of getting a degree in information technology, she found a real interest in it and took a position as a programmer in industry. While she liked the work itself, she did not like the environment she worked in, saying it was too isolated from other people. Recognizing that she had never lost her interest in teaching, she took a position as manager of a community college computer lab and found this environment allowed her to combine her interest in information technology with her interest in teaching. She ultimately took a position that allowed her to teach information technology full time.

Leslie also combines her interest in information technology with her interest in teaching. She explains how these two interests combine as follows:

It's so much more fun [than just working in information technology], you get to continue to learn and it's full of challenges. You know, you've got the troubleshooting problems and you've always got puzzles to figure out. So it's a,

an ongoing learning experience. I've never stopped learning. There's always new stuff in IT to learn so that you can give your students a good foundation of what's out there, so I'm always learning. It's always a puzzle, always a challenge. Always interesting, never boring.

While an interest in information technology was not a key for all participants in their decision to leave the practice of information technology, all but one of them expressed an interest in teaching itself. Betty indicated that her interest in teaching started in childhood, fueled by the fact that both her parents and her four siblings were all educators. In what she describes as rebellion against what she saw as an expectation of her family, she rejected the field for 28 years. She describes her acceptance of teaching as her own personal interest:

After teaching for about two weeks, I came home and looked at my husband and I says, 'I finally found the career that I should have started at when I walked out of college.' It was really funny when I got this job after I lost my IT job. I called my mom and I says, 'Mom, I've got a job.' and she says, 'Oh, good, good, good.' Now my mother's about in her early 90s at this time. And she says, 'What are you doing?' I said, 'Well, I got a job as a teacher, teaching computers.' Dead silence on the other end of the phone. Then I hear this big sigh and she says, 'You finally became a teacher.' You know, she said I had it in my blood.

Wanda's personal interest goes beyond just an interest in teaching. She says that she is particularly interested in making information technology more women friendly. She is interested in teaching, says that it is fun, but her real interest is in changing the

perceptions she says many have about women in the information technology field and the perceptions women may have that prevent them from entering this field.

Debra became interested in teaching while a student. She had a mentor in her programming courses that recognized this interest and encouraged her to get the education she would need if she ever decided she did not want to continue in programming. She took his advice and obtained her master's degree in computer information technology. When she began to feel bored with what she was doing in industry, she started looking for a position teaching. She says she has always found education fun and her interest in teaching allowed her to see it from the professor's side instead of only the student side.

Rhonda's interest in teaching started as a student in college. In discussions with one of her professors, she understood she already had a degree that would allow her to teach technical classes. She found a position teaching in high school, but her real interest was in higher education, and she eventually obtained a position in the school she had attended. While she originally expected to teach business, she ended up teaching information technology based on school needs rather than on her own personal interest in the field.

Theme 3: Personal Fulfillment is a Factor in the Choice to Teach Information Technology

The 10 participants in this study all indicated some type of personal fulfillment as a factor in their decision to leave information technology practice for teaching it. Seven of the 10 women discussed a specific desire to make a difference in the lives of others.

Janice gives an example of an experience she had while still teaching in a high school:

> I had one student that I taught his senior year, the last year that I was teaching high school, who had the highest, or the best qualifying time in the 220 [track and field event] and he failed my class. And he didn't get to compete at the state meet. And that young man, to this day, 25 years later will come hug my neck every time he sees me.

She went on to explain how important it was to her that she had made a difference in his and many other students' lives over the years of teaching. She says, "It's those shining stars that come back and make it all worthwhile, that one compliment that you get out of a hundred students and you go, 'yeah, that's why I do this.'"

Debra stated it this way, "I think with teaching you can make more of an indelible mark in your community and you can actually reach out to people and help people and so that really appealed to me. Making a difference." She goes on to explain this desire based on her own experiences helping others before she started teaching:

> I had already experienced what it's like to help somebody who's lost and overwhelmed you know, learn programming and accomplish something that they don't think they can do. So I was hoping to recapture that feeling.

Rhonda also expressed her feelings about having students with changed lives. She says, "One day I would like to have students come back and say, 'Hey, I remember taking you, you were a really good instructor.' That would be a positive for me." Heather stated it a little differently. She says, "I picked teaching because I thought I could make more of an impact and help others get into the field."

Laci explains how she is making a difference. She says, "I feel like I'm making a difference. I mean I'm actually, my students are getting jobs." She goes on to say of a previous position, "We knew the community, all the surrounding community, people would call us and say, 'Hey look, we're looking for someone.' And I mean my students all got jobs, making good money."

Wanda discusses her thoughts on taking a teaching position when the opportunity first presented itself. She says "I thought I could influence people, get women in [to the information technology field]." She goes on to say about the students she works with, "They go on to great jobs. They go to quite a few different places and then they come back and they say, 'You changed my life.' So that's why I do it. Otherwise it's not worth it, not worth it at all."

Leslie expresses how she feels about her experience teaching: "I feel like I can make a difference and I get people in my classes that have no means of supporting themselves and they get out and, you know, they get good jobs and they're able to be productive members of society. That makes me feel good when that happens." She also talks about her area of the country and how little opportunity her students have to get an education. She says,

> We get people that couldn't, you know that may not have been able to go and go to a four-year college and you know, they're able to support their family well and improve their standard of life. And so, I have a lot of them come back and they tell me. That always makes me feel good and that's probably the biggest reason I stay [in information technology education].

Betty discusses the different types of students she serves. She has people in mid-life going through career changes, veterans and traditional students right out of high school. She expresses a love of teaching the mix of students and watching the dynamics of the classroom and the changes that occur, particularly in the younger, traditional students. She says, "You can see these young college students maturing and I just think that's great." It gives her a sense of fulfillment as she watches them go on to good jobs.

Theme 4: Women Felt they were Treated Differently than Men in the Practice of Information Technology in Industry

Five of the women in this study expressed that they saw or experienced different treatment from men in the information technology industry, in the educational setting, or in both. They indicated that the treatment was significant in industry and two of them stated that this treatment was in part responsible for their decision to leave the field as practitioners and go into education.

Sue explains a little bit about her experience in an organization where she was one of five women working at the same job with two hundred men:

> At one point, I had a manager who kept making passes at me. He kept making passes at me and I kept telling him no, and no, and he tried to get me fired. And I, fortunately, I had a second line manager who knew that this guy was notorious for that, but it was unbelievable. And we had a situation at the computer center that we had all male managers and one gal was very sharp. I mean we were all sharp but she wanted to be a manager and she had to consent not to have kids, in writing, if she was going to be a manager.

Leslie expressed her point of view on the treatment of men and women in information technology from a different perspective than the other participants. She is more concerned that her students will not get jobs because they learned from a woman. While she said she did not have any concrete evidence of this, she said she just had a feeling about it. She says, "I have good contacts with business partners. So we are able to hear about lots of job opportunities so we can let our students know about [them]. But I wonder if because I'm a woman that some of the male industry workers, you now, employers might think, 'oh well, she learned from a woman.'"

Wanda explains how her experiences with men in information technology led her to the decision to move into teaching.

A lot of the guys I worked with were somewhat irritating. A lot of the men I used to work with and still kind of do, are just jerks. So I figured that if I could have an influence on people, males coming in or going into IT that I could make a good influence that that would be something that I could show, that I could show that it's acceptable, that it's good to have women on their team, that it's more of a benefit than a negative.

In explaining this, she goes on with a description of her life in the military as one of two women working with two thousand men:

The hurdles that I had to go through to prove that I was capable was amazing. I had to be better than they were, hands-down, to be considered underneath them. So the majority of the men acted like that. There would be one or two that were great mentors and that helped me be who I am today because they looked at me as a co-worker, not a gender, and my skill set versus 'she's a female'.

Janice did not discuss harassment because of being a woman, but she does say this,

> There were some issues that I found unfair. Cause as I told you, I went back, went back to school. When I was working at the hospital there was a young man who had the degree, and he was hired in after I was hired in, for a bigger salary and couldn't do half of what I could do. That's kind of traditional with male dominated occupations.

She goes on to say that in this particular situation, she had to help this male co-worker complete many of his tasks, even when she was off work. She came to feel that she was at work 24 hours a day because of his many phone calls asking for her assistance.

Only one of the participants expressed that the differential treatment received was positive rather than negative. Betty explains,

> I was the only female out of 125 students that graduated that year. So when I walked in for interviews, people would say, 'Oh, a woman engineer'. Man, they rolled out the carpet and the whole nine yards. I didn't, never intentionally played the fact that I was a woman minority in my field.

She goes on to say she believed that some people gave her opportunities because it was good for them to have a female in one of their information technology positions. However, she feels that ultimately all they really cared about was whether she could get the job done. The only negative she mentions was a difference in salaries. She states, "People thought they could get you a little bit cheaper."

Summary of Findings

Table 9 summarizes the data used to create the four themes provided by the study

participants concerning their choice to exit the field of information technology as

practitioners and enter the field of information technology as educators.

Table 9

Summary of Findings and Themes

Leaving Information Technology as a Practitioner to become an Information Technology Educator

Life Events Affect the Decision to Change from Practice to Teaching
1. Having children
2. Divorce
3. Unexpected job loss
4. Problems in current job position

Personal Interests Affect the Decision to Change from Practice to Teaching
1. Interest in teaching
2. Interest in computers and information technology
3. Interest in encouraging women into information technology

Personal Fulfillment is a Factor in the Choice to Teach Information Technology
1. Making a difference in student lives
2. Making an impact in the community
3. Making a difference in the lives of women
4. Seeing the changes in student lives as they occur

Women Felt they were Treated Differently from Men in the Practice of Information Technology in Industry
1. Women in information technology treated differently from men in industry
2. Sexual harassment continues in the information technology industry
3. Concern exists that students trained by a woman will not get jobs
4. Women in the information technology industry have to work harder than men for recognition as equals
5. Men in the information technology industry paid more than women

Findings Related to the Literature

This section relates the findings above with the theories and presented models that

relate to occupational choice in Holland's (1997) theory of vocational personalities and

work environments, Super's (1980) life-span, life-space theory, Gottfredson's (1996)

circumscription and compromise theory, and Mainiero and Sullivan's (2005)

kaleidoscope career model, as well as a general overview of the findings in relation to organizational culture in higher education, women in STEM, and information technology.

Occupational Choice Theory

In his examination of how people fit into their chosen work environment, Holland (1997), identified six personality types: realistic, investigative, artistic, social, enterprising and conventional. These same types categorize work environments that an individual would find compatible. While the participants in this study did not take personality inventories, they had the opportunity to describe themselves in the interview process.

One participant, Betty, describes herself as a person with a passion for math and science. Her positions prior to teaching included various genres of engineering. These two factors, her love of math and science along with the choice of careers, would indicate that she falls into the realistic and conventional types (Tokar & Swanson, 1995). It was not until she found herself out of work and took a position in education that she realized she had never fit in her chosen career. She states, "I needed to be a teacher my entire life, but I was like no, no, no, no, I don't want to do that!" While her personality type *may* fall within the realistic and conventional types, she appears to be a strong social type as well.

Holland's hexagonal model (1997), Figure 1, is broken into four constructs for establishing relationships between the personality and environmental types: consistency, differentiation, identity and congruence. Differentiation and congruence are useful in interpreting Betty's personality and environmental types. We may view Betty's three personality types as undifferentiated, as she falls into three of the six types rather than

just one or two. This might indicate she would be a good match in many positions of employment as it broadens the jobs that fit at least one of her personality types.

Betty's realistic and conventional types are congruent, while the social type is incongruent with either of them. In her choice to teach information technology, Betty shows that although her three personality types from Holland's model may not all be congruent, they are all part of her personality and her current employment type, and they allow her to be successful in it. While not all the participants had the same personality types as Betty, most demonstrated some sort of incongruence within their own types that they were incorporating into what they consider successful careers as educators.

Super's (1980) life-span, life-space theory examines the roles a person holds over the course of a lifetime and the stages in which they occur. The five stages are growth, exploration, establishment, maintenance and decline. The nine roles are: child, student, leisurite, citizen, worker, spouse, homemaker, parent, pensioner (Super, 1980). As shown in Figure 3, the nine roles may overlap as a person advances through life. The study participants discussed the progress of life and the personal changes and roles they found themselves in that influenced their decision to change from information technology practitioner to educator.

The roles of homemaker and parent were important to several participants in making this choice. Laci was determined to create a home and spend time with her children, and saw teaching as the opportunity to do this. In the decision to go into education, she found herself also taking on the role of student for a time to reach this goal. Janice also states needing time with her child as a central reason in her decision to leave information technology as a practitioner to become an educator, and combined the

role of parent and homemaker with the role of worker. Laci and Janice were both required to adapt to their new roles. Savickas (1997) states that adaptation can give us a bridge across all segments of the life-span, life-space theory, allowing a career theorist to better understand what is at stake for an individual making a career change.

In the circumscription and compromise theory developed by Gottfredson (1996), individuals are said to view alternatives for potential careers before ultimately selecting one to pursue. Stage four of the circumscription and compromise theory is the time when an individual examines their capabilities and begins looking forward to what they wish to accomplish with their lives. This stage begins in adolescence and continues through life (Gottfredson & Lapan, 1997). Sue worked for many years in information technology and was content with the work. Her decision to leave the field as a practitioner and become an educator was an experiential compromise (Gottfredson, 1996). While she loved the work, she experienced multiple layoffs and ultimately took a position teaching information technology.

Sue demonstrates a conflict of her interests in her discussion of this change. She says, "I'll be honest with you, I miss the field." She goes on to say, "The reason I left, and went into teaching is not because I didn't like IT, I love IT. In fact, I wish I were back in it." She continues, "So, it's not a choice of leaving IT, it was, strictly had to do with the layoff situation." Her compromise in taking the position to teach information technology allowed her to continue with a field that she loves while offering her a stable position she also says she has come to love. This demonstrates Tsaousides and Jome's (2008) suggestion that an individual can be emotionally resilient through a career change brought about through compromise.

The kaleidoscope career model (Mainiero & Sullivan, 2005) says the pattern of a woman's career changes as she experiences changes in life. The changes influence different items, authenticity, balance and challenge, which are important in making a decision about a career. Authenticity is one of these items explained by Wanda in her decision to leave information technology as a practitioner for information technology education. She states of the women she worked with while still in the field, "They had certain qualities that I did not have and preferred not to have, so that's a stereotype that just keeps on getting encouraged." While she worked in the field, she felt strongly that the people she worked with should treat her as a professional in the field, not as a woman in the field. In choosing to leave the field, she indicates a desire for meaning in her life beyond just doing a job. She found she wanted to influence other women to break the stereotypes and have success in the field of information technology as she had.

Cabrera (2007) contributes a lack of flexibility given to employees to allow the successful combining of work and family as a potential reason for leaving positions in the workforce. Leslie made the choice to leave the field for education, seeking balance between her personal and professional lives. She had a young family and did not find flexibility in the hours required for success in the information technology field. She also considered authenticity in this change, asserting that her experience as an adjunct showed her she loved teaching and making a difference in the lives of students.

In a study using the kaleidoscope career model of women making career changes later in life, August (2011) states, "Participants reported that work, whether in the late career or bridge employment years, offered challenges in that it allowed them a way to maintain or strive for growth, demonstrate their competence, and provide intrinsic

interest and intellectual stimulation" (p. 225). Debra, who in mid-career, made the change from industry to education, was looking for challenge. She explains, "As a young person I was very determined to be a programmer, and after I'd proven myself and kind of, actually mastered a lot of the stuff that we were doing at work, I was feeling a little bit burned out, maybe bored, even." She had begun to feel the isolation of being a programmer and wanted the challenge of working with people again.

The occupational choice theories examined in the literature offer some explanation for the participants in this study making the change from information technology practice to education. Eccles (1994) presents evidence that gender differences are directly tied to occupational choice and in particular that personal interest plays a key role. The study participants all made a choice to enter the field of information technology as practitioners due to their interest in the field, breaking away from fields typically selected by women. They ultimately went on to careers in education, allowing them to continue with their stated interests in information technology, but also allowing them to focus on other personal interests.

Organizational Culture in Higher Education and Information Technology

Organizational culture in information technology played a role in the participants' decisions to move from the practice of information technology to information technology education. According to Tapia and Kvasny (2004), "The IT culture is described as largely white, male-dominated, anti-social, individualistic, competitive, all-encompassing and non-physical" (p. 87). Several of this study's participants expressed dissatisfaction with this environment. Heather mentions the requirement for working "extraordinarily long hours, just random weekends" as a key factor in her decision to leave practice for

teaching. Debra says, "It was a pressure cooker in that I was leaving there exhausted and tired and feeling like my work didn't have a lot of meaning." The need for life balance did not seem to fit into the culture of information technology in the organizations employing the participants, and most expressed this as a significant in their decision to leave.

Organizational culture in higher education may offer some of the same components that exist in information technology. Women in higher education indicate they are treated differently than men holding the same positions ("Examining Women's Status: Campus Climate and Gender Equity," 2011). None of the participants in this study expressed concern about this aspect of higher education's culture in their choice to change to positions teaching information technology.

Women in STEM and Information Technology

The problem of the lack of women in STEM fields, including information technology, is one that prompts research from many quarters. Gender theories are often the focus of this research. Goodwin (2006) gives us three categories of gender theory to apply to the study of women in STEM: deficit theory, dominance theory, and difference theory.

The three categories all focus on women being perceived as fundamentally different from men, lacking in capabilities, strength of will, and different psychologically (Goodwin, 2006). While it was not unanimous, participants in this study indicated they felt they were looked at differently from men while working in the information technology industry. Wanda says she always felt she had to prove herself and do more than any of the men for the same recognition. Sue mentioned working with men at one

job who she felt just looked at her as if she could not possibly have a brain. She states, "There's still an enigma associated with women being in the field. They couldn't be smart enough to do that."

The study participants expressed concern with the lack of women in STEM and information technology specifically. Walton (2007) proposes that the imbalance between men and women in these fields can communicate to women that they do not belong. Heather, although being offered a higher paying job in information technology, chose to teach so she could help others get into the field and play a part in reducing this imbalance. Laci expressed some frustration with the lack of women in her program, even with initiatives to draw them in. She says, "I don't understand why women aren't interested in how this [IT] works."

Many view information technology as a masculine field (Evans, 1994). While the study participants stated they worked almost exclusively with men while in the field, none of them presented this as a reason for leaving the field. Both in the field of information technology and in information technology education, they accepted this fact. They expressed a love of information technology that coincided with their love of making a difference in the lives of others that appeared to override any concerns of their own gender in their chosen environment.

Summary

The overall purpose of a basic qualitative study is to gain an understanding of how people make sense of their lives and experience (Merriam, 2009). The central research question for this study is: What factors contribute to a woman leaving a successful career in the field of information technology for a position as an information

technology instructor in a community or technical college? Using a basic qualitative

research design allowed the researcher to achieve a rich understanding of these factors

from the participants and their descriptions of their experiences. In the data analysis

process, themes emerged which were common between the participants and which were

examined in this chapter. The findings are related to Holland's (1997) theory of

vocational personalities and work environments, Super's life-span, life-space theory,

Gottfredson's circumscription and compromise theory, and Mainiero and Sullivan's

kaleidoscope career model. The study also included a general overview of the findings in

relation to literature on organizational cultures in higher education and information

technology, and the literature on women in STEM and information technology. Chapter

Five contains conclusions, recommendations and implications for future research.

Chapter Five: Summary, Conclusions and Recommendations

The purpose of this study was to gain an understanding of the factors involved in a woman making the choice to leave the field of information technology as a practitioner and enter the field of information technology as an educator. This chapter contains a summary of the study, the findings in relation to the research questions, conclusions resulting from the study, and recommendations for further research.

Summary of the Study

This study investigated the factors involved in a woman making the change from the field of information technology to the field of teaching information technology. Research continues to examine women's choices to enter fields dominated by men (Crump et al., 2007; McKinney et al., 2008), but no exploration exists pertaining to why they would change from the male-dominated field of information technology to another male-dominated field teaching information technology.

For the study, I used in-depth interviews to gather the participant stories from their personal perspective. I conducted the analysis process using the constant comparative method beginning with focused- and open-coding that led to the discovery of themes within the data. Member checks allowed participants to identify discrepancies or misunderstandings and provide further feedback and input. Peer review allowed corroboration of coding to strengthen the plausibility of the results.

Discussion of Findings in Relation to the Research Questions

The overarching research question for this study asks what factors contribute to a woman leaving a successful career in the field of information technology for a position as an information technology instructor in a community or technical college. In answering

this question, the sub-questions provide insight into areas of a woman's choice to make this change that contribute to these factors. The following discussion examines these sub-questions and the factors discovered with potential for answering them.

Research Sub-Question #1

In what ways might perceptions about their stage-in-life influence women IT practitioners to make the choice to leave information technology to become community or technical college IT instructors?

In my analysis of the data collected concerning the stage-in-life of the participants, a theme emerged indicating that life events affect the decision to change IT practitioners to IT educators. In my examination of the reflections offered by the participants concerning the life events of a stage-in-life, I found these events are factors in the decision to leave the field of information technology as a practitioner and become an information technology educator. Four of the participants (Janice, Laci, Leslie, and Sue) expressed very strong feelings about the stage-of-life with the introduction of children into their lives. They all expressed an overwhelming desire to be present for their children, and becoming a parent was a reason they gave for re-examining their careers. The choice of teaching information technology allowed them to adjust to their stage-in-life without the need to give up their chosen information technology field completely.

Another of the participants (Betty) entered a different stage-in-life in which she became the sole breadwinner for her family due to her husband's unexpected disability. This stage-in-life is one that women may face due to a need to care for elderly parents, or in Betty's case, a family disability. In making her decision to leave the practice of

information technology for education, she states that she had to look at her options. A key constraint was a requirement that she could not leave the area where they lived. Teaching was a viable choice and she took it. She did not express the same strong feelings about this as the participants who had to make decisions because of their children's needs. For her it seemed to be simple necessity.

My findings suggest the participants who made the choice to leave their chosen field due to their stage-in-life did it because they had strong feelings of responsibility. They could have stayed in the information technology field and hired others to care for their children. Betty could have insisted that her family relocate even if it meant a change in her husband's health care providers. Instead, they chose to accept the change as a natural progression in their lives.

Research Sub-Question #2

In what ways might personal interests influence women IT practitioners to make the choice to leave information technology to become community or technical college IT instructors?

All the participants in this study expressed personal interests that led them to their choice to leave information technology and become information technology educators. The participants were very expressive in their feelings about their personal interests and the analysis led to the development of two separate themes. The first theme explores personal interests in general as a factor in the choice to leave information technology practice for education. The second theme explores personal fulfillment as a factor in the choice to teach information technology.

In answering this sub-question, the personal interests that led to the development of both themes are considered. While six of the participants (Heather, Janice, Laci, Leslie, Rhonda, and Tara) did express an interest in information technology as one of the key factors in their choice, all but one (Janice) expressed an interest in the field of teaching. Another personal interest expressed by seven of the ten participants (Debra, Heather, Janice, Laci, Leslie, Rhonda, and Wanda) was an interest in making a difference in the lives of others. With the exception of Janice, they tied this interest to their love of teaching and expressed the two as being parts of that single interest.

For those who did not explicitly state that information technology was a personal interest, the fact that they pursued the field prior to making the choice to become educators seems to indicate they did hold some interest in the field, but it may not have been as strong as their desire to teach. I suggest that the combination of an interest in teaching with an interest in the particular field of information technology set in motion the choice to leave industry for teaching.

While the interests were not identical, the strong feelings communicated to me about these personal interests were significant. The fact that they all expressed personal interests that influenced them leads me to suggest these personal interests are a significant factor in the decision to leave information technology practice for teaching.

Research Sub-Question #3

In what ways might their perceptions about gender stereotypes influence women IT practitioners to make the choice to leave information technology to become community or technical college IT instructors?

The emerging theme from my analysis of the data pertaining to this sub-question states the belief persists that women receive different treatment from men in the information technology industry. Five of the ten participants (Betty, Janice, Leslie, Sue, and Wanda) indicated they received different treatment from the men they worked with while in industry. While this was only half the participants, I believe it is still significant. The experiences of these five women indicate stereotypes still exist concerning the role women are expected to play in the information technology field.

I found as the participants discussed this there was tension in their voices, similar to when you remember something unpleasant or distressing. This demonstrates the importance it held for them. Although only two of them (Janice and Wanda) declared this as one of their reasons for leaving the field, all five demonstrated strong feelings about it. Even when they were describing treatment that was not harassing, they expressed concern.

In answering the sub-question, I would put forth that although only two of these women were willing to state their treatment as women was influential in their decision to leave the information technology field, the strong feelings they expressed about this treatment suggest it may have had an influence on them. Considering this, I present the perception of different treatment between men and women as a potential factor in making the change from information technology practice to information technology education.

Research Sub-Question #4

In what ways might their perceptions about cultural aspects of higher education influence women IT practitioners to make the choice to leave to become community or technical college IT instructors?

The participants in this study expressed few expectations of what they would find in teaching information technology in higher education. Because of this, there was no general theme discovered to answer this question. During the interviews, I asked them to tell me about any expectations they had of community and technical colleges they considered when making the change from information technology industry to education. Their answers to this question focused almost exclusively on what they found when they took the position in education rather than what they expected.

In my discussions with the participants about the cultural aspects of higher education, the participants presented multiple items they expressed surprise at finding when they took the positions. These included a lack of updated equipment, a lack of motivated students, outdated class material and content, requirements for continuing education beyond what they had already obtained, and bureaucracy similar to industry. Only one participant (Rhonda) stated she used her expectations of what teaching in higher education would be like in her decision to change from IT practitioner to IT educator.

Implications for Theory

In considering the implications for existing theory from this study, we must keep in mind the limitations of qualitative investigations. The small sample size along with the non-random sampling limits its generalizability to other groups. However, in considering its contribution to theory, we can extend the results to theory that we can then hope to extend to other groups (Maxwell, 2005).

The findings of this study offer some implications for existing theory. Holland's theory of vocational personalities and work environments (1997) focuses on predicting

vocational choices, but does not consider gender and specifically how a woman's conflicting personal interests may impact her career choice. The current study shows that while these participants may have initially made their choice aligning with the construct of Holland's theory, they went on to a career change in part due to incongruence both within their personal interests and between their personal interests and their environments. They ultimately determined which of their interests were the most critical to their happiness and success, and made the choice to leave the work environment they initially selected. I would suggest this study might allow us to extend Holland's theory to include how gender with conflicting interests and work environments that may exist or develop over time impacts career choice later in life.

Another theory discussed in the current study is Gottfredson's theory of circumscription and compromise (1996). This theory focuses on the process used from childhood through young adulthood in the choice of a career. It is not specific to gender, but it does consider the role of sex-type in the examination of this process. One notable deficiency in this theory is the lack of explanation of why some individuals might not fit the pattern determined in the four stages of circumscription and ultimately in the compromises that may be made in career choice. The participants in the current study selected the field of information technology, even though according to stage two of Gottfredson's theory, they should have rejected it because it would be seen as distinctly related to the male sex (Gottfredson, 1996). This indicates they did not make the expected compromise in their career choice. This further suggests that stage two of circumscription may not have the impact on career choice stated in the theory and should be re-examined with a specific focus on women who make choices that do not fit this stage.

Another deficiency within the circumscription and compromise theory is a lack of information about career choices made later in life. Not only did the participants in this study not reject information technology as a field occupied by males, they later went on to make a choice to enter another field that is also predominantly occupied by men. In this choice, the participants did not seem to feel they were compromising. The current study goes beyond the initial career choices made by women in choosing male-dominated fields and examines the choice to change careers later in life. I suggest the circumscription and compromise theory should be expanded to include mid-career changes and how and why the choices to change are made.

O'Neil and Bilimoria's three-phase model of women's career development (2005) specifically addresses a woman's possible need for opportunities to mentor and contribute to the success of others at some point (phase) in their career progression. In the first phase women see themselves as in control and moving in a career path chosen by them, in the second phase women feel out of control in their careers and lack real satisfaction and personal fulfillment, in the third phase women see themselves back in control and contributing both through their personal lives and careers (O'Neil & Bilimoria, 2005).

One item within the current study with implications for O'Neil and Bilimoria's model is the implied assumption that all women progress through all three phases and that they do this at specific ages. While the participants in this study did progress through phase one, they appeared to move immediately to phase three rather than spending time in jobs in which they were felt they were not contributing in a meaningful way. Based on the results of the current study, I would suggest this model would benefit by indicating

more flexibility in the three phases rather than being so specific about the point in a career where they happen, and the age of the individual. In making this suggestion, I would also recognize the participants in the current study are not necessarily typical of women in their career progression and choices.

Other theories examined within the current study appear to be at least partially confirmed by the experiences explained by the participants. Super's life-span, life-space theory (1996) focuses on the roles that a person holds through life. The participants in the current study discussed how their changing roles in life played a part in their decision to move from one career to another.

Mainiero and Sullivan's kaleidoscope career model (2005) has the three career issues of authenticity, balance, and challenge impacting career decisions. The participants in the current study all demonstrated each of these issues as part of their career decision-making. They were seeking to be true to themselves, balancing their personal and work lives, and looking for new challenges that fit within their personal interests. These three issues within this model were confirmed as part of the career changes made by the participants.

Implications for Information Technology Organizations

In considering the implications of this study for human resource (HR) management practitioners, leaders, and managers in information technology organizations, the study participants were consistent in their concern for the pressures put on them while working in the field. Helen states, "Working in the field I could end up working extraordinarily long hours, um, just random weekends." Tara indicated dissatisfaction with the physical demands required of her while working in information

technology. She says, "I was expected to sit for hours, to stay in front of a computer, programming."

Another aspect that placed demands on the participants while working in the information technology industry was the lack of stability. The participants did not feel they could afford to be without jobs in the different stages in their lives and the constantly changing needs of their organizations led to layoffs and rehiring which they eventually found intolerable. Sue explained that while she loved what she was doing and was a qualified employee, she had lower seniority and therefore was first in a layoff and last to be hired back. There was no way for her to bridge this gap. Remaining available for call back was part of the expected demands of the job.

Leaders and HR practitioners in information technology organizations who are looking to retain women in the information technology field should consider methods for helping women employees to function in this demanding and somewhat unstable work environment. The examination of this problem should include looking at the effect of this environment on women who may be in different stages of life and how organizations might be adapted to meet their needs while still allowing them to be productive.

Another item organizational leadership should consider is whether the environment of their organization is humane, or whether it might be a hostile work environment, pushing women to leave who might otherwise have contributed to their organization positively. Participants of this study indicated that they felt gender stereotypes existed in the positions they held in information technology. The feeling that to receive minimal respect within an organization required them to be more qualified than their male peers resulted in some of these women taking employment outside of the

information technology industry. To improve this aspect of an organization's

environment, decision-makers may want to implement programs to raise awareness of

gender stereotyping for both their male and female employees.

The participants in this study discussed a need for personal fulfillment in their

work that they did not have while working in the information technology industry. They

had a personal interest in the work, however they expressed a need for relationships with

others that would allow them to connect and make a difference in their lives. This is

another aspect of the information technology industry that should be examined by those

seeking to retain women in this field. Determining and implementing job responsibilities

within an information technology position that provide opportunities for women to fulfill

this need would benefit the industry.

The information technology industry would benefit from further research focusing

specifically on the impact of the demands of the industry on women practitioners, their

perceptions of different treatment for men and women in this field and their need for

personal fulfillment. Focus of this research should be to determine what changes to make

in the information technology industry to help retain women practitioners.

Conclusions

The findings for each of the sub-questions examined in this study are applicable

in answering the overarching question of the study: What factors contribute to a woman

leaving a successful career in the field of information technology for a position as an

information technology instructor in a community or technical college? The factors

recognized in this study to contribute to the decision to leave the field of information

technology as practitioners to become information technology educators include the

participants' stage-in-life, their personal interests, and their feelings concerning their treatment as women in the field of information technology. In addition, although the participants did not state it explicitly, they may have been influenced by their expectations of what they would experience in educational positions in higher education.

In looking at women who have made the choice to enter the male-dominated field of information technology, we see statistics that show the percentage of women in this field declined from 30% in 2000 to 27% in 2009 (Beede et al., 2011). For those who want to see this trend reversed, information gained in this study may be useful. As part of their reasoning in making the choice to move from IT practice to IT education, the participants expressed their desire to make a difference in the lives of others. They expressed a desire to draw more women into the field as a component of making a difference in the lives of others. In considering this, those concerned with drawing more women into the field of information technology and in keeping them in the field may have an interest in this study.

The participants in this study initially made career decisions that placed them in the information technology field–a field they express an interest in even after leaving it. The participants then made decisions to leave information technology as practitioners and enter another field that allowed them to continue working with the components of information technology they enjoyed, while at the same time allowing them to remove themselves from those components they felt were unacceptable.

In examining the factors that led to their departure from information technology as practitioners, we see that specific aspects of the information technology field may make it untenable for women seeking to work in it. Women who wish to have families

may find the demands on their time do not allow them to be involved in their children's lives. Women who have a desire to help others and to be involved with others on a more personal level may also find information technology a challenge due to the limited importance placed on those qualities. Those who discover that they may be treated differently because they are women may reject the information technology field outright, even if they enjoy the work itself.

Others who may be interested in this study are those considering recruiting women information technology instructors in their effort to provide role models and draw women into the field of information technology. A study by Quimby and DeSantis (2006) indicates that role models may directly impact career choice. The current study provides information that could be used in the decision-making process for recruiting women from the field of information technology.

Further Discussion Developing from This Study

Participant Expectations of Higher Education

During the interview process, one of the questions asked of the participants was if there were aspects of higher education that influenced them in leaving the field of information technology as practitioners for the field of information technology as educators. The answers given did not reflect specific expectations held before making the change, but instead gave information about what they found after taking the positions teaching information technology.

In this discussion, the participants talked about a lack of engaged students, poor equipment, and the expectations for the faculty to obtain higher-level degrees rather than industry certifications. Betty expressed surprise at the lack of equipment. She says,

"Well, you think, IT, that you would want the students to have pretty recent, up-to-date hardware and software, you know, at least the industry standard type thing to work on. When I walked into the community college, I was working with computers that were almost seven years old, that had been torn apart and put together by the A+ class, the hardware repair class." She explains that this lack of equipment is an ongoing problem she has to work with. She also expressed surprise in the educational requirements for the community college. In industry, the certifications she had acquired were key to her employment. Because of this, she was unprepared for the requirement for a master's degree and had to return to school before she obtained a full-time position.

Betty also had some specific expectations for the students in the community college. She thought she would have students as excited to learn as she had been. She explains,

> I walked in and said, 'This is cool, I'm going to have a class full of really motivated and interesting students. They're going to want to learn because they understand this is going to be a good career change for them, it's going to give them good jobs, the whole nine yards, it's going to get them out of the area so they can go to like, you know, Washington D.C., or you know, Pittsburgh or someplace and get, you know, get a good job.'

Instead, she found students who were not motivated to learn and did not show interest in what she taught. She says this has changed with time. She is getting more adult students and veterans returning from service. These students do meet her original expectations.

Janice was surprised at the amount of learning required when teaching information technology as opposed to working in industry.

One of the benefits that I've found that I didn't realize I would have, is that I'm not stuck in a rut. That sounds weird, too, but when you work for an IT company and you're doing whatever processes you're doing for them, that's what you do every day, day in, day out. When you teach IT, especially at a community college, very seldom do you teach the same things over and over. You know, I'm always teaching something different. Which is kinda nice.

Laci expected the programs in the community college would be keeping current with industry standards. She describes what she found, "They were teaching some basic courses and they were just never changing anything." She goes on to say, "Now they want students to know how to do VOIP and they want them to know how to configure routers and switches and they want them to know how to do other stuff. And they had never done that here." She expressed her excitement in helping the college change to meet her expectation for the benefit of the students.

When Sue originally made the decision to move from information technology practice to teaching full time, she was surprised to discover she would have to return to school for a master's degree. She had started working for the college part-time and explains, "The dean told me that I would never get a full time job unless I had a degree and at that point I didn't have a degree, because you didn't need a degree [in industry], you needed the smarts."

Heather was surprised to discover the community college functions much like a large corporation. She says, "We have a lot of processes, procedures and committees and that's just amazing to me, some of the things that we have to do to get one thing done."

While she did expect there to be bureaucracy, she did not expect it to be so pronounced and she expressed some frustration at how long things take.

Rhonda had expectations of the community college based on her experience there as a student. When she attended the school, she worked as a student worker. She knew many of the people and was familiar with how things worked. In speaking of her experience at the community college as a student she says, "They [the instructors] just seemed a little bit more one-on-one, a little bit closer to you. And that's what influenced me [to work in the community college]." One thing that did come as a surprise was the requirement that she obtain more credits in information technology to keep her position. She did this and obtained a second master's degree. She loved attending as a student and that same appreciation of the community college environment has remained with her as a faculty member. Rhonda was the only participant to state it was her expectations of the community college that influenced her in choosing to work for one.

While I did not find an emerging theme concerning the participants' perceptions about cultural aspects of higher education, the fact that they were able to articulate surprise at what they found might indicate they did have some expectations. Further research would be required to determine whether these expectations played a part in their decision to change from information technology practitioner to information technology educator.

Reasons for Persisting as Information Technology Instructors in Higher Education

Although this study did not examine the reasons that a woman who chooses to leave the field of information technology as a practitioner for information technology

education stays in higher education, during the interviews the participants did provide some insight into this decision. Rhonda spoke of her love of teaching, but also discussed the lack of stability that she saw in the information technology industry as opposed to what she saw working at the community college. She says, "You have faculty members who've been here 20, 25, 30 years. So it ended up being another issue, not only did I love the school, not only did I love teaching, but it was a point for me because it was more stable than working in the IT industry."

Leslie expressed that the biggest reason she stays is the impact she has on her students' lives. She also talked about the experience she had teaching classes part time before she took on a full time teaching position. She says, "I enjoyed programming, too, but the teaching just, I don't know, I really enjoyed that." Her love of teaching along with the opportunity to make a difference in the lives of her students are key factors in continuing to teach in higher education.

Laci left the field of information technology when she became a parent. While she says she loved working in information technology, she needed to make a change in order to have more time with her family. In our discussion of this, she explained why she stayed in teaching after her children were grown. She says, "I mean, I love computers, I love working with IT and everything, so it's kind of like, I gotta like what I'm doing, so to me, when I started teaching it, it was kind alike, I love this, I'm keeping current with the field. Cause you know, it moves so fast. So it allows me to keep current, which I loved." She goes on to say, "So for me the teaching was a way to stay in the field," She was able to combine her two top personal interests, teaching and information technology and says she's getting the best of both worlds.

While not all the participants have been teaching in education for the same amount of time, seven of the ten have continued for more than ten years and four of those seven have stayed for 20 years or more. Further study might provide valuable information concerning why they persist in this field and have potential for guiding practice in recruiting and retaining women in information technology higher education positions.

Recommendations for Further Research

This study examined factors that influence a woman to move from the practice of information technology to become educators in information technology. These two fields, while tied together by information technology, are distinctly different in what is required. There is extensive research on why women do not enter the STEM fields in general, and some research concerning the field of information technology specifically. More study of why women leave the information technology field and of what might be done to draw and retain them would be useful.

Following are six areas recommended for further research:

1. What causes women to choose to work in the information technology field?

2. Are there effects on the field of information technology from the lack of qualified women practitioners?

3. What changes within the information technology industry might make it a more women-friendly environment?

4. What is the impact of having women as instructors in drawing women into information technology as practitioners?

5. What causes women who change from positions in information technology practice to information technology education to persist in positions in higher education?

6. What are specific actions that human resource practitioners can implement to recruit women into information technology practice and then retain them?

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Appendix A: Informed Consent Form

Informed Consent Form

Research Study: An Examination of the Factors Influencing Women to Make the Change from Information Technology Practitioner to Information Technology Educator in Higher Education

This study has been approved by the University of Idaho Institutional Review Board.

Investigator: Linda R. Otto
Telephone Number: 208-371-0208
Faculty Sponsor: Dr. Michael Kroth
Telephone Number: 208-364-4024

I.   **INTRODUCTION**
You are invited to take part in a research study. Before you decide to be part of this study, I want to thank you in advance for your willingness and generosity to assist me in this study and to explain the risk and benefits. This consent form provides information about my research study. I will be available to answer your questions and provide further explanations. If you agree to take part in the research study, you will be asked to sign this consent form. Your decision to take part in the study is voluntary.

II.   **PURPOSE**
As a doctoral student in the Graduate School of Education of the University of Idaho, I am carrying out a research study to understand why a woman leaves the field of information technology as a practitioner to teach information technology in higher education.

III.   **PROCEDURES**
The research will be conducted at a location of your choice. You will be asked to participate in a 60 to 90 minute interview. The interview will explore: 1) what you feel influenced you in your decision to leave information technology as a practitioner and become an information technology instructor; 2) how you feel about your fit in the organizations you worked in performing information technology duties and how you felt about your potential fit in the organizations of higher education before making the change.
The interviews will be audio-taped and transcribed. You will have the opportunity to review the transcripts and make corrections for accuracy of the transcription.
The dissertation may be published, as well as articles which relate to the findings. These may also be presented at conferences and other educational programs. At no time will you or your organization be identified. Data (verbal) will be reported anonymously (e.g., "one

instructor said…" "instructor number three related…") and each interviewee will be given a unique pseudonym.

IV.   POSSIBLE RISKS

The things you will be doing have no more risk of harm than you would experience in everyday life.

V.   POSSIBLE BENEFITS

You will not receive any tangible benefits from taking part in this study. As a result of participating, you may have an increased understanding of why you made the choice to leave information technology practice to become an information technology instructor and what contributed to this change.

VI.   COSTS

There are no costs to you for taking part in this study.

VII.   COMPENSATION

You will not receive compensation for participating in this study.

VIII.   RIGHT TO WITHDRAW FROM THE STUDY

Your participation in this research study is voluntary. You may decide not to begin or to stop this study at any time. You can choose not to answer any item you choose not to answer, to choose not be audio recorded or to have sections of the interview without audio recording. You can choose to do all this without any penalty.

IX.   CONFIDENTIALITY AND PRIVACY OF RESEARCH RECORDS

Your records will be private. No one except me will know that you are a part of this study. Only your first name will be used during the interview taping. The transcription will identify you by a number. Only I will be able to associate your full name with your number. Research records will be kept confidential unless the records are required to be released by law (i.e., court subpoena).

You will not be identified by name in any reports or publications of this study. Linkages to identify you will be destroyed, but the raw data and pseudonym transcriptions will be retained for future publication and will be stored in a locked file safe in my home to which only I will have access. All identifiable documents linked to your identity will be destroyed.

X.   SIGNATURES

By signing this consent form, you agree that you have read this informed consent form, you understand what is involved, and you agree to take part in this study. You do not give up any of your legal rights by signing this form. You will receive a copy of this consent form.

_____   _____Linda R. Otto_____
Participant (Print Name)   Researcher (Print Name)

_____   _____
Signature   Signature

_____   _____
Date   Date

Appendix B: Interview Guide

Objectives: Build rapport; describe study, review consent form, gain information about the participant's past and their context.

Grand Tour Question: What influenced you to leave the field of information technology as a practitioner and enter the field of information technology education?

Follow-ups:

a. Describe what was going on in your life when you decided to make this

change.

b. Could you tell me about any personal interests that might have influenced you

to make this change?

c. Describe what was happening in your organization at that time that might

have influenced you to make this change?

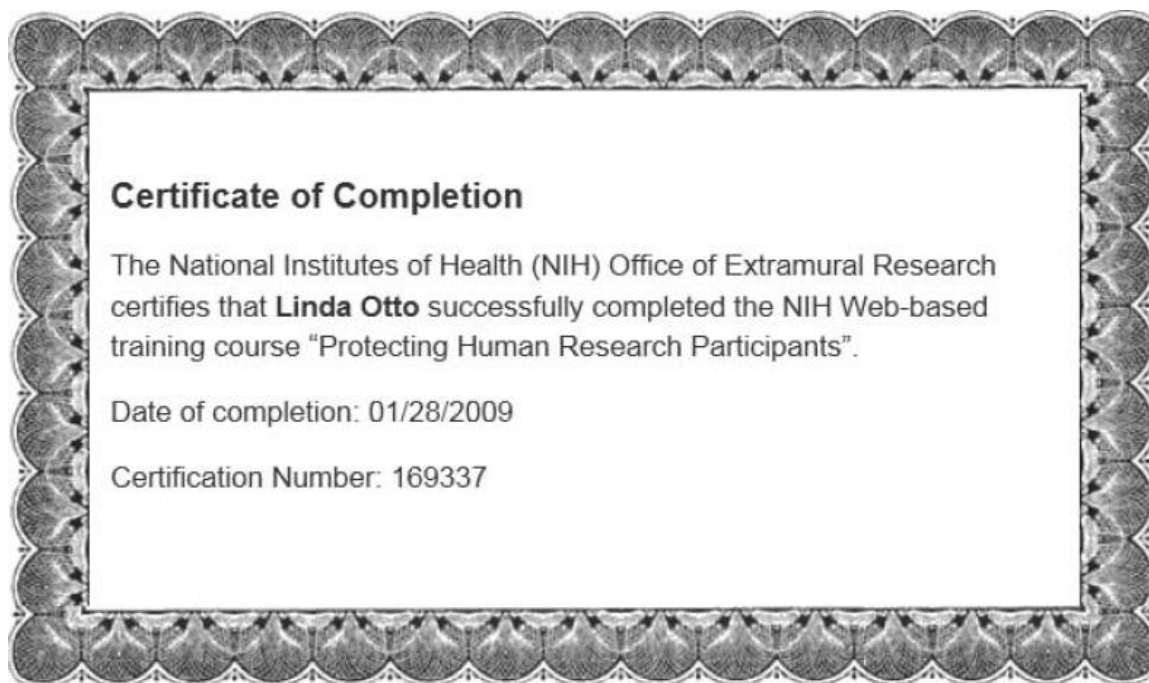d. Can you tell me anything about your field that might have influenced you to

make this change?

e. Can you tell me about any expectations you may have had about the field of teaching information technology that might have influenced you to make this change?

f. Can you tell me about any expectations or other perceptions you may have had about the community or technical colleges you considered that might have influenced you to make this change?

g. Is there anything that you can add, expand on or give examples of that had an influence on you making this change? What haven't we talked about regarding this that we should?

h. Demographics: Age, Ethnicity, Time in Industry, Time teaching, Highest degree obtained.

Appendix C: Human Assurance Completion Certificate

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Linda Otto** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 01/28/2009

Certification Number: 169337

Appendix D: Human Assurance Approval

University of Idaho

September 3, 2013

Office of Research Assurances
Institutional Review Board
875 Perimeter Drive, MS 3010
Moscow ID 83844-3010

Phone: 208-885-6162
Fax: 208-885-5752
irb@uidaho.edu

To: Michael Kroth
Cc: Linda Otto

From: Traci Craig, PhD
Chair, University of Idaho Institutional Review Board
University Research Office
Moscow, ID 83844-3010

Title: A Basic Qualitative Study Examining the Factors Influencing Women to Make the Change from Information Technology Practitioner to Information Technology Educator in Higher Education'
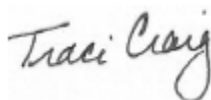
Project: 13-204

Approved: 08/30/13
Expires: 08/29/14

On behalf of the Institutional Review Board at the University of Idaho, I am pleased to inform you that the protocol for the above-named research project is approved as offering no significant risk to human subjects.

This approval is valid for one year from the date of this memo. Should there be significant changes in the protocol for this project, it will be necessary for you to resubmit the protocol for review by the Committee.

Traci Craig

Traci Craig

University of Idaho Institutional Review Board: IRB00000843, FWA00005639