Exploring the Retention and Career Persistence Factors of African American Women in Information Technology: A Multiple Case Study

DISSERTATION

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By

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Abstract

The purpose of this qualitative study was to explore the occupational experiences of African American women in Information Technology (IT) and the factors that led to their persistence and ultimate retention in the field. Social Cognitive Career Theory (SCCT) provided the framework for exploring both internal and external contextual factors such as self-efficacy, personal goals, and outcome expectations on career development for the women in this qualitative investigation. Using a multiple case study methodology to capture the lived experiences of eleven African American women, the study identified the barriers to career development the women face and the ensuing strategies of persistence they employ to enter and remain in the profession. Data was collected using open-ended, semi-structured questions. Interview transcripts were then analyzed within and across cases to identify related themes.

The findings in this study reinforce the similarities that African American women share with their colleagues. For example, IT employees including African American women seek career growth and development, challenging work opportunities, team environment, management they can trust, recognition, autonomy, fair pay and benefits. However, the findings also revealed differences. In order to persist in IT despite the barriers these women demonstrate higher levels of self-efficacy, need to maintain professional development career goals, overcome outcome expectations of gender and racial bias, and proactively seek out early career support through role models and
mentors. The findings also indicate that ongoing gender and racial biases continue to act as a catalyst for the low availability of role models. Moreover, isolation from informal networks and concerns over equitable pay and career advancement opportunities are prominent themes. While contextual barriers have some influence on the career interest, goals and actions of the women in this study the greatest influence on their career persistence came from internal influences not explained within the SCCT theory. The emerging themes add depth to the understanding of the construct of persistence within the SCCT theory.
Dedicated to My Mom
Terry T. Hines
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Chapter 1: Introduction

As an African American woman I understand all too well the challenges and difficulties there are in working in a male dominated field. I’ve spent twenty years working in Information Technology (IT). Early experiences with computers in high school sparked my interest that later translated into a college degree. Although not my parents first choice I compromised and doubled majored in order to have what they considered the safe backup degree in accounting. However, after college I immediately joined a consulting firm working in the systems consulting group. While I may have changed organizations a few times in my career I remain a technology professional. The technical positions I’ve held during that time include: software development, network/infrastructure design, systems analyst, database developer, database administrator, web development, technical project manager, application systems manager, and currently a senior technology manager. In my present position I am responsible for a staff of technical project managers, systems analysts, software developers, and application systems architects across multiple states and in two countries.

Looking back on my career I am very proud of my accomplishments and confident that I could continue to gain even greater leadership responsibility in the organization. I know this because during my tenure with my current employer I passed up promotion opportunities in order to further my education. I guess that’s why I failed to pay much attention before. I thought I was doing all the right things including reaching back and helping others. It didn’t hit me until I sat in the annual strategy and
leadership meeting among 200 managers of the over 11,000 plus technology organization
staff members which is part of the 50,000 plus total employees of the company. I was
struck as I looked around the room to see so few persons of color besides myself this
includes the one other African American women. That was four years ago and since then
we were only able to grow that number to five, not for the lack of trying. With more than
400 managers in IT this number seems abysmal at best.

I continue to struggle with the low representation. As a hiring manager I have
personally hired several women and minorities. However, I still see so many young
African American women - including the many I started my own career with - leaving
technology. I continue to stay engaged and try to be a role model for others which
includes chairing the United Negro College Fund scholarship program and walkathon for
more than four years and co-chairing the Diversity and Inclusion Committee organization
at my current company. Yet, it seems even with all the effort to find and recruit women
and minorities we still lose them not long after they arrive. Among my own group of
technical friends I watched many of them chose alternative occupations as well. For
example, Leandra returned to school for nursing and later went to work at a hospital.
Shawntel moved over to business operations eventually leaving for a position in
government. Yolanda went back to school for her teaching certification to teach to K-12.
The other Yolanda went back to school for speech pathology and soon stopped doing
technical work all together. Rosa moved over to business operations as well and then on
to customer care. I can remember how I quickly found myself with few friends in which
to call for technical advice.
This realization has forced me to acknowledge that the issue of representation doesn’t seem to be improving. Efforts to attract young women to the field do nothing if more effort isn’t placed on ensuring these women can transition into and thrive in the workplace. If we don’t do more to understand the needs of women and minorities, especially minority women and assist them in building careers, we will find that the pipeline is a revolving door with as many going out as are coming in. As result I chose to explore the issue of African American women and their persistence in the IT profession and how understanding the factors that contribute to this persistence results in their retention.

**Background of the Problem**

Although women are slowly beginning to make up a larger overall percentage of the science, technology, engineering, and mathematics (STEM) workforce, some occupations are still experiencing a wide gender gap. Technology for example, has actually seen a decrease in female representation. Overall employment of IT related occupations is projected to increase by 20% to 30% from 2008 to 2018, much faster than all other jobs in the professional sector (U.S. Bureau of Labor Statistics, 2012). As a result, growth in IT employment remains a significant source of added jobs, accounting for more than 42% of all STEM employment (Commission on Professionals in Science and Technology [CPST], 2007). However, in 2013, only 26% of computing and information technology professionals were women, down from 35% in 1990, according to a study from the American Association of University Women. Meanwhile, the U.S. Bureau of Labor Statistics predicts that information technology (IT) will add nearly 1.4 million jobs to the U.S. economy by 2020 (Vollman, 2015). As the pool of applicants
dwindles and the concern over available resources to meet labor demand rises, it becomes increasingly important for organizations to retain well-trained employees, lower general turnover costs, and to maintain a highly productive and creative workforce.

Women, as well as African Americans, Hispanic Americans, and Native Americans are represented in the IT workforce in percentages that are far lower than their percentages in the population as a whole (Tapia & Kvasny, 2004). Currently in the U.S., women, minorities, and persons with disabilities remain underrepresented in science, technology, engineering, and mathematics careers, while constituting more than two-thirds of the overall workforce (Commission on the Advancement of Women and Minorities in Science Engineering and Technology Development [CAWMSET], 2000; Information Technology Association of America [ITAA], 2003). Women currently hold more than half of all professional occupations in the U.S. (National Center for Women & Information Technology [NCWIT], 2010). Minority women represent 33% of the workforce (Burns & Barton, 2012). However, women overall make up only a quarter of the technical industry workforce, African American women account for 3%, Asian women 5%, and Hispanic women only 2% (Gillipin, 2014).

While minority female representation is low, African American women are among the least represented racial group, relative to their representation in the workforce. According to Burton and Barton (2012), African American women represent 2% of STEM related occupations, but 7% of the workforce. The lack of African American women in STEM related occupations is proximately caused by attrition and diversion. According to the Science and Engineering Indicators (2014), 35% of African-American students intend to major in STEM (compared with 45% of Asians and 30% of Whites).
However, data indicate that far fewer actually receive a STEM degree. Moreover, a high proportion of those who do persist through bachelor programs divert from a STEM related occupation upon graduation (Carnevale, et al., 2011).

As the U.S. demographics of higher education rapidly shift towards becoming majority minority and majority female, minorities and women, and especially women of color, are widely considered to be untapped sources of domestic talent that could fill the country’s current and future scientific and technology workforce needs. To sustain America’s technology preeminence, drastic steps must be taken to change the way we engage and develop our workforce as the culture of the U.S. becomes more diverse (CAWMSET, 2000). Insufficient entrants and/or attrition of the existing IT workforce by women and minorities can only contribute to the widening IT talent “gap”.

Several theorists explained the underrepresentation of women in IT as a problem of retention citing the following as reasons for departure from the profession: (a) pressure to balance work and home responsibilities, (b) pay inequity, (c) exclusion from networking with male counterparts, (d) the lack of mentoring opportunities, and (e) retirement (Davis & Kuhn, 2003; Griffiths, Moore, & Richardson, 2007; Morton, 2005; Shropshire & Kadlec, 2012; Tapia, 2006). Work-life balance is a challenge for IT workers and more so for women because women still perform most of the care giving of children and aging parents, as well as carry more of the domestic responsibilities in the household (Diekman & Goodfriend, 2006; Quesenberry, Trauth, & Morgan, 2006; Yavas, Babakus, & Karatepe, 2008). Researchers have also found that women and minorities tend to exit the IT profession in greater numbers than their male counterparts (Hom et. al., 2008).
Thus research efforts are needed to determine how to transition African American women STEM graduates into related occupations, upon graduation, specifically those in technology, which is predicted to have the greatest demand. If not, the U.S. economy has the potential to be adversely impacted and may not remain globally competitive due to the significant demand of Information Technology (IT) related occupations in an increasingly diversified workforce.

Problem Statement

The underrepresentation of women and minorities in the STEM workforce has long been of concern to policy, academic, and industry leaders alike. Although women are able to gain the necessary skills to enter the IT workforce, they are more likely than their male counterparts to leave the IT industry (Hom et al., 2008; Riemenschneider, Armstrong, Allen, & Reid, 2006; Tapia & Kvasny, 2004). Research by Hom, Roberson, and Ellis, (2008) also revealed that minority women leave their jobs at much higher rates than white men, minority men, and white women.

A variety of activities have been utilized in an effort to increase the recruitment and retention of minorities and women in STEM degree programs including summer bridge programs, scholarship programs, peer mentoring programs, and innovative teaching strategies. Despite these efforts, according to a report by the Center for Work-Life Policy over time more than half of women who begin science, engineering, and technology (SET) careers leave these careers and never return to such positions (Hewlett, et al., 2008) and African American women experience higher quit rates than their counterparts (Hom, Roberson, & Ellis, 2008).
A study conducted with 2,823 male and female IT professionals found that women are nearly two and a half times more likely than men to leave the IT workforce (Wardell et al., 2005; 2006). According to the authors this lack of retention could be due to organizational factors (e.g. organization size, climate and environment) or societal factors (e.g. children and domestic responsibilities). The study supports the argument that social pressures on women to be responsible for domestic duties raises difficulties in career advancement and retention (Cockburn, 1991). Particularly relevant to IT, Schiebinger (1999) and Kam (2005) stress that the pipeline model assumes women should assimilate to the current practices of science, but does not provide insight on how to change the field so as to be a more inclusive environment for recruitment and retention of underrepresented groups. The under representation of women in the IT workforce continues to grow and appears to be compounded by poor retention statistics.

With talented women exiting the technology profession (Agarwal & Beath, 2007; Chabrow, 2007; Morton, 2005) and few students entering the technology workforce (Frieze et al., 2006; Zarrett et al., 2006), authors predict a global shortage of skilled technology workers. Ahuja (2002) posited, “Gender differences in information technology careers appear to be affecting the competitiveness of companies globally” (p. 20). According to Tapia and Kvasny (2004) while recruiting efforts are crucial for increasing the participation of women and minorities, it is equally important that we retain those already in the IT workforce. “It is clear that nothing is gained by bringing women and minorities into the workforce to simply have them drop out or be weeded out” (Tapia & Kvasny, 2004, p.85). Kvasny et al. (2005) and Tapia et al. (2004) add that
there is an insufficient understanding of gender and organizations that is vital for informing policies and strategies to retain women in the IT workforce.

Aspray and Freeman (1999), posited if women, Hispanics, African Americans and Native Americans “were represented in the IT workforce in proportion to their representation in the U.S. population, this country would have more than an adequate supply of workers to fill even the most dire estimates of a IT workforce shortage” (p.12). Otherwise, the United States may face severe shortages in information technology workers unless the science and technology labor market becomes more representative of the diverse U.S. workforce.

Purpose of the Study

The purpose of this qualitative study is to explore the related themes that influence the career persistence of African American women in information technology using the Social Cognitive Career Theory (SCCT; Lent, Brown, & Hackett, 1994, 2000) as a framework. The SCCT describes three major components of career development: selection of career options, formation of career interests, and the focus of this study, occupational or educational persistence. For this study, persistence was defined as 5 or more years of experience in the IT field, with intention to remain in the profession.

Currently, the literature available that addresses African American women persistence once in the occupation is limited. There is little qualitative literature that discusses why and how African American women persist in IT. Much of the literature available focuses on African American students and the majority of past research efforts focus on why IT majors are not pursued and the failure of students to persist in computer science degree programs. However, modest research efforts have focused on individuals
who have successfully matriculated through an IT undergraduate curriculum and persisted into an IT related occupation. For this reason, the proposed research study attempted to define and explain factors that contribute to both occupational choice and persistence of African American women who are employed in the field of information technology.

The role that gender and race plays in influencing the work experiences and career outcomes of IT personnel has been neglected in the literature to date, despite the significant demographic changes in the workforce. Using a multiple case-study approach, this study sought to capture the lived experiences of African American women in IT in an effort to understand why these women chose careers in IT and how they were able to successfully navigate the barriers identified in previous research literature. The investigation seeks to extend the previous findings by understanding issues associated with the retention of African American women and their decision to remain in the IT profession. Potentially, this study adds new dimensions to the widely used SCCT theory. In addition, the emerging themes add depth to the understanding of the construct of persistence within the SCCT theory.

Identifying and understanding the dynamics of persistence among African American women could provide political, academic, and organizational leaders with the knowledge they need to develop programs, instructional techniques, and services that will benefit not only African American women but members of other minority groups as well. An in-depth knowledge of what these women face and what they need to succeed could well lead to a new, more in-depth and more realistic perspective in shaping those services designed specifically for diverse populations.
Significance of the Study

African American women, as a group, are both “women” and “minority,” when it comes to discussion regarding equity and opportunity. It is often assumed that “women” and/or “minorities” share similar experiences and meanings no matter race/ethnic backgrounds. “Attempting to address problems of attraction and retention of minority IT professionals using policies that target a single identity factor will not always help. Emphasizing the single characteristic of gender while ignoring the effects of race, ethnicity, sexuality, and social class on the self-identity of women consequently, gives rise to interventions that fail to deal with the diverse and fragmented nature of women’s experiences and needs (Tapia & Kvasny, 2004).

Attracting more diverse racial groups, such as African Americans, to IT careers creates more diversity among the IT workforce, and thus organizations will be better able to develop solutions to meet the needs of a broader range of customers (Barker & Aspray, 2006). According to Hom et. al (2008) successful firms will need to identify and retain talented employees from a variety of gender and ethnic backgrounds. Hom et. al (2008) says "If you're losing minorities at such high rates, that's not going to look good for diversity and it will continue to create pipeline issues”.

It is difficult to find data that examines the perspectives of African American women in IT regarding the factors that led to their persistence to enter and remain in the field. The lack of data regarding the persistence factors leaves an empirical gap in the literature. The examination of the unique perspectives of the persistence of this underrepresented group is significant in the future development of programs and opportunities. The absence of research on this topic has denied African American women
IT professionals a voice in the development of programs and policies that would impact future generations of IT professionals, beneficial toward increasing the percentage of African American women in IT. Embedded within their personal journeys are insights into their experiences, motivations, and coping strategies.

In particular, this study contributes knowledge to the scholarly research related to identifying and isolating factors applicable to the persistence and retention of African American women in IT. With a more thorough understanding of the influences that contributed to these women persisting in information technology careers, educators, organizations and policy makers will be better informed in their creation of programs and policies to increase the number of women and minorities in the field of information technology.

**Research Questions**

The purpose of the qualitative study was to determine what factors influenced the persistence and retention of African American women in information technology. In order to understand why these women chose careers in IT and how they were able to successfully navigate barriers to avoid taking alternative career paths. The following research questions guided this study:

1. What factors were identified by African American women currently in IT that influenced their decisions to pursue a career in IT?
2. What do African American women currently in IT identify as the most important retention factors influencing their decision to remain in information technology?
3. What perceived barriers, if any, did African American women overcome to sustain their IT careers?

It is important for the purposes of this study to distinguish between retention and persistence. Both terms relate to employees remaining in their profession, but the terms reflect different perspectives. Retention is evaluated from the point of view of the organization, which primarily views employees as a group, and thus focuses on general problems that most employees share, rather than on the struggles of individuals. Persistence, on the other hand, is understood from the point of view of the employee.

A list of interview questions was developed based on the main research questions. All interview questions were designed to elicit in-depth information regarding the participants’ experiences in their profession and to explore significant incidences or themes that influence their persistence. The findings could assist educators, human resources managers, and policymakers to develop new directions for retention strategies and mitigate turnover.

**Theoretical Framework**

A review of previous research suggests that one emerging theory, Social Cognitive Career Theory (SCCT), provides a relevant framework for understanding the career decision-making of African American women (Hackett & Byars, 1996). SCCT is a useful framework for deconstructing and understanding how people make career decisions, develop interests, and deal with the barriers that arise in their educational and career pathways. Because SCCT takes into consideration the interactional role of the person (including sex and race/ethnicity) and the environment (e.g., structural barriers and supports) in shaping career relevant behavior, the model allows for a more complex
examination of career development than other theories. Thus, SCCT could be an ideal framework for more comprehensively examining the career development process of racial/ethnic minorities.

SCCT also provides a conceptual framework for understanding how people develop career-related interests, make (and remake) occupational choices and achieve career success and stability (Lent & Brown, 1996; Niles & Harris-Bowlsbey, 2009). The conceptual framework (Figure 1) describes how person inputs (e.g., predisposition, gender, and race) interact with background contextual factors (e.g., culture, family, gender role socialization) and learning experiences to influence our self-efficacy beliefs and outcome expectations. Self-efficacy beliefs and outcome expectations in turn shape our interests, goals, actions, and eventually, our performance attainments. However, our interests, goals, and actions are also influenced by contextual factors (e.g., job opportunities, access to training opportunities, financial resources) (Niles & Harris-Bowlsbey, 2009).

Figure 1. Social Cognitive Career Theory (Lent, Brown & Hackett, 1994, 2000, 2002)

The lens of social cognitive career theory lends itself to this study as it recognizes that career choice and development are influenced by multiple factors. These factors
include vocational interests, self-perception and world-view, resources, socialization, and life experiences (Kerka, 2003). In addition to highlighting cognitive-person variables, such as self-efficacy, SCCT emphasizes the role of other personal, contextual, and learning variables (e.g., gender, race or ethnicity, ability, social support, external barriers) that can help shape career trajectories, including the means to remediate disadvantages from being under-represented in particular occupations (Blustein, McWhirter, & Perry, 2005). In sum, SCCT permitted an examination of how the intersections of particular influences signified precursors of self-efficacy, outcome expectations, and personal goals, i.e., variables which may have influenced career choices and behaviors.

**Assumptions and Limitations**

As part of this study there were certain assumptions and limitations considered. The first assumption was that all participants would participate voluntarily and would respond to interview questions completely, openly, and honestly. Honest responses contribute to the accuracy and completeness of research data. It is possible that all factors of retention or experiences of persistence were not shared by each participant. Different people interpret events and situations differently; therefore, what is a difficulty or a challenge for one may not be for another. Although other minorities are underrepresented in the IT industry, this study focused exclusively on the perceptions of African American women in IT.

Other study assumptions include: (a) IT would remain a continual and evolving professional discipline, (b) ongoing changes in organization practices and economic impacts would continue, potentially impacting traditional IT career paths and requirements for career development, and (c) the total population and labor markets will
continue to diversify. The usefulness of the data will be time sensitive, given the rapidity of change in the IT industry and the influence of global business strategies such as outsourcing and technological advances.

The sample group was limited due to size and access to the population of interest and normal difficulties locating people to participate in the research study. It was also assumed that the characteristics of the purposeful sample of 11 African American professional participants are similar to other African American professionals in the study population. However, the sample size may not produce findings that reflect the perception of African American women in IT nationwide as a result cannot be generalized to all African American professionals.

A final limitation is the potential bias from the interviewer’s personal experience (i.e. African American IT professional) that could have affected the drafting of interview questions and possibly guided or limited the study participants’ responses. Personal experiences could have affected the interpretation of the research data, potentially inhibiting an accurate and unbiased analysis of the results. Efforts were made to remain attentive to the crafting of the interview questions and potential misinterpretation of interview content that could have led to erroneous conclusions.

Other steps taken to mitigate potential bias included exploiting uniformity in the data collection process, remaining impartial in addressing study participants’ questions and concerns, and precluding influence concerning study participants’ responses. However, one cannot rule out the possibility that some bias may have unwittingly crept into the study. All responses were recorded, coded, analyzed, and summarized, using qualitative data management processes.
Summary

Little research has investigated the issues of career persistence after entering the IT workforce as well as and the characteristics of African American women that have chosen to enter and maintain careers in the field of information technology. As such, this chapter described how the purpose of this qualitative study was to determine what factors influenced the career persistence of African American women in information technology. Exploring the retention issues that exist among women and minorities is crucial for increasing the capacity and diversity of the IT profession (Pantelli, Stack, Atkinson & Ramsay, 1999).

For more than 30 years, researchers and educators have struggled to understand the underrepresentation of women in STEM fields (Blickenstaff, 2005; Clewell & Campbell, 2002). An unprecedented amount of studies can be found related to recruiting and retaining potential STEM candidates. However, this body of research has often failed to acknowledge or account for racial/ethnic group differences among women’s experiences in these fields (Hanson, 2004). According to Tapia and Kvasny (2004):

Although IT organizations express strong concern with diversity in the workplace, little scholarship is available to guide these efforts. For example, research that examines the intersection of race and gender in IT organizations is largely non-existent. While gender research is more plentiful, within the women-in-management literature there is an underlying assumption of “womanhood” or shared experiences. The universalizing tendency of this perspective is political in its reductionism for it typically emphasizes a single characteristic of gender while ignoring the effects of race, ethnicity, sexuality, and social class on the self-identity of women (p. 87).

In this chapter an argument was made for considering racial/ethnic group differences among women in STEM, rather than viewing all women as a monolithic group without regard to the influence of race and ethnicity. Considering race and
ethnicity highlights important differences of women’s participation in STEM fields, doing so enhances “our understanding of the unique talents, interests, and experiences of subgroups of women” (Hanson, 2004, p. 96).

In addition to Chapter 1, four more chapters are included in this study. Chapter 2 presents a review of the literature to establish the research context for the study. Chapter 3 describes the qualitative research methodology selected as well as specific procedures that were employed in this study. Chapter 4 presents the analysis of the data collected, using the methodology and instrumentation described in Chapter 3. In Chapter 5 there is a discussion of the conclusions, recommendations and study limitations. In addition, recommendations for future studies will be offered.
Chapter 2: Literature Review

Introduction

Although women are able to gain the necessary skills to enter the IT workforce, they are more likely than their male counterparts to leave the IT industry (Hom et. al, 2008; Riemenschneider, Armstrong, Allen, & Reid, 2006; Tapia & Kvasny, 2004). Research by Hom, Roberson, and Ellis, (2008) revealed that minority women did in fact leave their jobs at much higher rates than white men, minority men, and white women.

This chapter offers a comprehensive review of the literature related to this study in three content areas: (a) Turnover in Information Technology (IT), (b) Social Cognitive Career Theory as a Framework for Investigating IT Career Paths, and (c) Gaps in Social Cognitive Career Theory. Research studies were also analyzed, where appropriate, to present past findings and linkages to the current study or gaps in the studies that present opportunities for future research.

Turnover in Information Technology

Pipeline Challenges

Despite changes in economic conditions, the demand for qualified IT professionals continues to grow. The fastest-growing occupation in the economy is expected to be in network systems and data communications analysts (U.S. Bureau of Labor Statistics, 2010). Occupations within IT represent some of the largest growing occupations within STEM presented in Figure 2. Alter (2005) attributes this growth to rapid advances in technology, the continuing development of computer applications, and
the growing significance of networks and information security as shown in the chart below.

![Projected Percent Change, Major STEM Occupations 2008-2018](chart.png)

Figure 2. Source: *Women in IT: The Facts*, (NCWIT, 2010)

The expanding use of internet technologies has driven the increased projections for computer applications software engineers (i.e. Internet, intranet, and web application development) as well. This occupation is projected to be among the top three fastest growing occupations (U.S. Bureau of Labor Statistics, 2016). According to the U.S. Bureau of Labor Statistics (2016) employment of computer and information technology occupations is projected to grow 12% from 2014 to 2024, faster than the average for all occupations. These occupations are expected to add about 488,500 new jobs, from about 3.9 million jobs to about 4.4 million jobs from 2014 to 2024 (U.S. Bureau of Labor and Statistics, 2016). With so much growth there is an ongoing concern regarding IT labor shortage. Factors such as: (a) the underrepresentation of women and minorities, (b) fewer computer science graduates, (c) the retirement of baby boomers (55 and older), and (d) higher turnover rates contribute.
According to a survey of 1,400 chief information officers in the United States conducted by Robert Half Technology, 52% of the respondents reported a shortage of qualified IT professionals (“Survey: Finding Skilled Tech,” 2008). Commonly referred to as the “gap” in IT workers the U.S. Bureau of Labor Statistics (BLS) indicates that as new technology continues to emerge, one out of every four new jobs will relate to IT. However, it’s expected there will be ongoing IT talent challenges 2012 and beyond (Luftman & Kempaiah, 2007). If current trends continue, by 2018 the industry will only be able to fill half of its available jobs.

A highly-skilled technical workforce is crucial to the U.S. IT industry and to maintaining the competitive edge in a knowledge-based economy. The U.S. ability to retain its standing as a leading knowledge-based, entrepreneurial and technologically-prepared country depends upon its ability to attract, train, and retain skilled IT workers. Information technology is a field with high demands for qualified employees. Yet, companies struggle to recruit and retain sufficient numbers of qualified IT employees with the right skills, representing a serious challenge for the industry.

While many industries struggle with employee recruitment, retention and training, the IT industry has the additional challenge of rapid change. IT technological advancements occur almost daily. This fast pace contributes to exciting opportunities for growth, as well as some significant challenges. The pipeline of prospective IT workers is affected, as current skill sets are often outdated by the time IT students graduate from college and enter the job market. Rapid changes also make it difficult for those within the industry to predict the skills and knowledge an employee or student might need in three to five years. To remain competitive, IT companies and workers
must keep up with the innovations and advancements that drive their industry. Training and retraining staff is costly and time-consuming, especially for small business owners who need to respond quickly to the ever-changing needs of their clients in order to survive and to remain competitive.

The labor market remains tenuous for U.S. IT employees as companies continue to look for opportunities to reduce costs. Despite computer and technology related positions paying higher than average salaries those currently working in IT are still seeking alternative careers due to other factors such as outsourcing, layoffs leading to contract work, and cost savings leading to increased workloads. Exiting IT professionals, compounded by poor university enrollment, has resulted in increased outsourcing offshore. Organizations must promote IT career opportunities to counter the perceptions of layoffs and outsourcing that may discourage IT professionals from entering or remaining in the field.

Furthermore, the global economy is increasingly competitive; as a result, the American IT workforce is now competing against highly skilled workers around the globe. Some professionals accept reductions in pay for full-time positions. Others attempt self-employment through IT consultancy. The remainder resort to temporary or permanent part-time work. However, the demand for IT professionals remains strong due to the need to respond to rapidly changing technological and environmental circumstances. The lack of qualified IT professionals leads to understaffed IT organizations, thus reducing a company’s ability to leverage IT to gain competitive advantage, increase sales, drive revenue, or grow its businesses.
Increasing evidence indicates a skills shortage, with the underrepresentation of women and minorities in the IT workforce as an important contributor to the problem (BLS, 2009). Claims have been made that the skills shortage would be ameliorated or eliminated if women and minorities were included in the IT workforce at rates closer to their general population representation (Gallivan, Adya, Ahuja, Hoonakker, & Woszczynski, 2006; Trauth, 2012).

**Turnover in Information Technology**

Information Technology employees, in high demand, represent a group of employees with elevated turnover potential. Annual turnover rates for Information Technology staff have traditionally exceeded other job classifications by 10% to 20% during both boom and recession cycles. Organizational consequences associated with high employee turnover include operational disruption and lost productivity along with the administration, replacement, and training costs associated with personnel lost (Mansell, Brough, & Cole, 2006; Morrow & McElroy, 2007; Tracy & Hinkin, 2008; Wright & Bonett, 2007).

This problem is not new, because turnover has been a major problem in the IT career field for many years and continues as a challenge for managers today (Niederman & Sumner, 2003). It has been reported that IT employees have higher tendencies than employees in other fields to quit an organization in favor of another (Niederman & Sumner, 2003). Studies of turnover in the IT workforce include several factors including job satisfaction and organization committee that considered a multitude of variables given the unique nature of IT-related positions. Job satisfaction elements for IT
professionals included: work flexibility, stress, fit with quality of life goals, job performance, and career development (Riemenschneider et al., 2006).

While job satisfaction is considered a key component in IT voluntary employee turnover additional research is needed to explain the greater than 20% variance in turnover among IT professionals (Taylor & Chin, 2004). Prior research has focused on the general population of employees’ intent to quit and some on IT employee turnover. However, based on literature searches, there is limited research that presents findings from studies that focus on minority women.

For example, Joseph et al. (2005) conducted research on turnover and retention that identified five categories of factors that significantly influenced employee intentions to leave the IT workforce: work attitudes, personal attributes, job content factors, organizational factors and environmental factors. Griffeth et al. (2000) also conducted research on IT turnover and found six categories of factors that significantly influence employee intentions to leave: personal characteristics, satisfaction with job facets, work experiences, environmental factors, behavioral predictors, and cognitions and behaviors. Finally, Gaylard et al. (2005) found job satisfaction, financial reward, employability and personal growth, the job itself, the employee, relationship with boss, and organizational culture and environment were repeatedly key factors in the retention of IT employees.

Turnover and retention of skilled IT personnel are major issues for employers and recruiters of the IT workforce: the departure of a company’s IT employees not only means the loss of personnel, knowledge and skills, but also the loss of business opportunities (Moore & Burke, 2002). As Longenecker and Scazzero reported, “Turnover can have a damaging effect on project completions, system upgrades, morale,
teamwork, workloads, group stress levels, and a host of intangibles” (Longenecker & Scazzerro, 2003, p. 59). Turnover becomes significant to managers when it disrupts production scheduling, because the lead time to find new employees and train them to become effective in their new roles can be long and most certainly costly. These disruptions can be costly to the organization and can lead to projects and product development being delayed, thus negatively affecting an organization’s competitive advantage.

More fundamentally, high employee turnover results in the loss of intellectual capital, time, productivity, efficiency, and potential customer base. Even employees who do not deal directly with customers can bolster the bottom line. In 2002, turnover rates in IT ranged between 25% and 35% (Moore & Burke, 2002). Consistent with these prior research studies, Scroggins (2008) indicates that approximately 76% of those currently employed are either somewhat likely or very likely to begin a job search as they perceive an improvement in the economy and job market. Wardell et al. (2005; 2006) found in their study of male and female IT professionals that women are nearly two and a half times more likely than men to leave the IT workforce. According to Allen, Armstrong, Riemenschneider, and Reid (2006) voluntary turnover decisions for IT women are typically influenced by work schedule flexibility, family responsibilities, stress, job qualities, and inconsistency in workplace policies.

Other reasons may drive an individual to change careers though the person was otherwise satisfied with the occupation. Shropshire and Kadlec (2012) found that stress, burnout, and job insecurity were cited by IT professionals as reasons to change careers. This research was the first to look at the departure from the IT profession rather than
voluntary turnover. Joseph and Koh (2012) tested two segments of work-life conflict: (a) time-based conflict and (b) strain-based conflict in relation to voluntary turnover and career change. The authors found no relationship to time-based conflict to turnover or career change (Joseph & Koh, 2012). Conversely, they found a direct relationship of strain-based conflict to voluntary turnover or career change (Joseph & Koh, 2012). Joseph and Koh (2012) believed the reasons for the results are IT professionals expect long hours but are not prepared for the constant pressures of the job. Other studies confirm the concept that burnout is an antecedent to voluntary turnover (Kanwar, Singh, & Kodwani, 2009; Priyadarsini & Maran, 2009; Wentling & Thomas, 2009) and career change by the IT professional (Joseph & Koh, 2012; Shropshire & Kadlec, 2012).

Joseph, Ang, and Slaughter (2006) found that IT professionals with more than 10 years of experience had reduced the probability of turnover. Turnover is more likely to occur in IT professionals with less than five years of experience (Joseph et al., 2006). In some empirical studies on voluntary turnover, intent to turnover replaced actual turnover (Thatcher, Stepina, & Boyle, 2002; van Dick et al., 2004).

In a slightly different approach, several researchers have conducted meta-analyses of career satisfaction and turnover intention research of IT professionals. Joseph et al. (2005) and Griffeth et al. (2000) conducted a meta-analysis of IT retention and turnover literature. The researchers concluded that factors that significantly influence employee intentions to leave the IT workforce were: work attitudes, personal attributes, job content factors, organizational factors, work experiences, behavioral predictors, environmental factors, and cognitions and behaviors.
Cable and Judge (1996) research suggested that employees are attracted to jobs and work environments that are compatible with their work-related values and preferences for job attributes. McMurtrey et al. (2002) argue that factors shown to influence career satisfaction and turnover intention include the organizational climate and values that an individual perceives as important to their career. The authors call for additional research that examines the fit between dominant career anchors and organizational attributes as a way of increasing career satisfaction.

On the other hand, Igbaria and Chidambaram (1995) reported gender differences in career satisfaction and turnover intention. They found that women in their study were in lower positions, were paid less than their male counterparts, and had fewer opportunities to interact with others outside their departmental boundaries. Likewise, Thatcher et al. (2003) found that gender was highly correlated with turnover intention. More specifically they found that women in their study were more likely than men in their study to leave the IT workforce.

**Turnover of Women and Minorities in IT**

Lemons and Parzinger (2007) theorized that women may find the inherently male culture of IT unappealing. Some studies reported possible reasons for departure as pay inequity, work-life challenges, and the constant pressure to perform (Davis & Kuhn, 2003; Griffiths et al., 2007; Morton, 2005; Tapia, 2006). Davis and Kuhn (2003) reported that American women were leaving the IT profession faster than men were, and faster than the rate at which both sexes were entering (Info Tech Employment, 2008), creating a deficit of skilled female IT workers.
Figure 3 provides an overview of the average turnover intention in IT measured on a scale from 1 (not at all likely to actively look for a new job in the next year) to 7 (extremely likely to actively look for a new job in the next year). Underrepresented minorities have significantly higher turnover intention than white men and white women (Hoonakker, Korunka, & Carayon, 2008).

![Bar graph showing turnover intention by race/ethnicity](image)


We need to look more closely at the causes and effects of retention and intention to turnover in order to better understand the reasons for the underrepresentation of women and minorities in the IT workforce. Auster (2001) observes:

Firms around the globe are struggling with the issue of how to retain their best and brightest women. Unlike many assumed for decades, the majority of women are not leaving corporations to spend time at home, they are leaving because they are dissatisfied with their job growth and advancement, lack of flexibility, sex bias and discrimination, and they often go to competitors or start their own businesses. (p. 747)
In their 2008 article, Hom, Roberson, and Ellis explored the prevailing assumptions about minorities and women as it relates to voluntary turnover. They sampled 20 corporations and acquired statistics on more than 400,000 professionals and managers. Specifically, the authors found that women quit more than men, and that minorities (e.g., African, Hispanic, Asian, and Native Americans) quit more than their white counterparts. Other studies found gender to be highly correlated with turnover intention, more specifically that women were likely than men to leave the IT workforce (Thatcher et al., 2003).

The following thoughts have been indicated as possible underlying causes for this phenomena, (a) women experience higher levels of discomfort in environments dominated by men, (b) women are negatively stereotyped in the workplace (Brett & Stroh, 1999), and (c) women experience greater work life balance challenges (Chen, 2003). In general women are also perceived as being more committed to their families than to their work (Stroh, Brett, & Reilly, 1996). This perception can lead employers to make decisions to distribute work related benefits (e.g., pay increases, promotions, assignment to special projects etc…) to employees which are perceived as being more committed to the organization (Stroh, Brett, & Reilly, 1996).

The rationale for corporate flight among women of color rests on the “double jeopardy” hypothesis, which holds that “individuals who occupy the lowest position on two or more social categories will experience the most disadvantage of any group” (Browne & Misra, 2003, p. 493). Minority women face more negative work outcomes than do their male counterparts and Whites of both sexes. Studies have shown that African and Hispanic American women, compared with other groups, earn the lowest
wages (Browne, 1999) and occupy the lower service related positions. Berdahl and Moore (2006) reported that women of color, relative to men of color and White American women, encounter the most gender and ethnic harassment at work. Finally, Bell and Nkomo (2001) observed that African American female professionals perceive greater barriers to advancement, tokenism, and perceive less work group acceptance than do White American female professionals.

Figure 4 illustrates the results of the Hom et al (2008) study. The graphic presentation directly compares African American men and women to their white counterparts. In particular, the graph illustrates the greater rates of African American women to quit early in their career than any other group. Indicating longer tenure improves retention results.

![Turnover in Corporate America](image)

Additional analyses revealed that minorities and women were disproportionately represented in high risk, short-tenure jobs with historically high turnover rates (Griffeth, Hom, & Gaertner et al., 2000 as cited in Hom et al, 2008).

**Social Cognitive Career Theory as a Framework for Investigating IT Career Paths**

Lent, Brown and Hackett (1994) produced their comprehensive social cognitive career theory (SCCT) as an extension of two previous career development theories: Bandura’s social cognitive theory (Bandura, 1986) and Hackett and Betz’s (1981) career self-efficacy theory (Gysbers, Heppner, & Johnston, 2003). The SCCT describes three major components of career development: selection of career options, formation of career interests, and the focus of this study, occupational or educational persistence.

Choosing a career path is a multidimensional process with many inputs providing feedback to an individual that impacts decision-making throughout one’s life (Lent, 2005; Lent et al., 1994). The career choice model Figure 5 recognizes the potential influence that individual person inputs, like race and gender identity markers which impact the learning opportunities that are provided to an individual, background contextual affordances, like cultural and gender role socialization and role models which impact career decision making processes, and proximal contextual influences, like discrimination, emotional and financial support in pursuing a career field which take place during an individual’s career decision making processes, have on a person’s learning experiences (Lent, 2005; Lent et al., 2000). These three factors have a continual impact on the messages that people take away from their learning experiences in life and may translate into the development of self-efficacy and outcome expectations. These
factors influence the academic and career goals that individuals set for themselves (Lent et al., 2000).

Figure 5. Social Cognitive Career Theory (Lent, Brown& Hackett, 1994, 2000, 2002)

Figure 5, illustrates that individual differences, contextual influences and affordances, which are the messages one receives by nature of his or her identity, influence learning experiences, the opportunities an individual has to gain skills, knowledge and resources (Lent et al., 1994). The learning experiences may, in turn, influence self-efficacy, defined as confidence in one’s ability to complete a task, and outcome expectations. These characteristics influence interests, goals, choice actions, and performance expectations (Lent et al., 1994). The SCCT theory is unique in that it studies multiple pathways in which a person may come to choose and stay within a career.

Information Technology as a Career Choice

According to the U.S. Bureau of Labor Statistics (2009a) there is no universal definition of the IT workforce. Information Technology (IT), as defined by the Information Technology Association of America (ITAA) is "the study, design, development, implementation, support or management of computer-based information
systems, particularly software applications and computer hardware. IT deals with the use of electronic computers and computer software to convert, store, protect, process, transmit and retrieve information, securely.

The “IT Professional” term refers to a diverse group of workers with IT skills and knowledge base continually acquired from a variety of formal and informal educational sources in several specialties (Kaarst-Brown & Guzman, 2005). IT professionals are found throughout the economy, in nearly all areas of the country and in nearly all types of organizations including computer services firms, manufacturing, financial services, retail and wholesale sectors, education, and government agencies (Bartels, 2004).

In addition, the IT industry offers a wide array of occupational classifications, with numerous career paths. The U.S. Bureau of Labor Statistics uses 10 computer-related Standard Occupational Classifications (SOC) to identify computer and information technology workers. Table 1 identifies the 10 SOC information technology occupations and their functional descriptions.

Table 1

*Standard Occupational Classification (SOC) Computer and Information Technology*

<table>
<thead>
<tr>
<th>Occupation Functional Description</th>
<th>Computer and Information Technology Occupations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer and Information Research Scientists</td>
<td>Computer and information research scientists invent and design new approaches to computing technology and find innovative uses for existing technology. They study and solve complex problems in computing for business, medicine, science, and other fields.</td>
</tr>
<tr>
<td>Computer Network Architects</td>
<td>Computer network architects design and build data communication networks, including local area networks (LANs), wide area networks (WANs), and intranets. These networks range from small connections between two offices to next-generation networking capabilities such as a cloud infrastructure that serves multiple customers.</td>
</tr>
</tbody>
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Table 1 continued

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<thead>
<tr>
<th>Computer and Information Technology Occupations</th>
<th>Occupation Functional Description</th>
</tr>
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<tbody>
<tr>
<td>Computer Programmers</td>
<td>Computer programmers write and test code that allows computer applications and software programs to function properly. They turn the program designs created by software developers and engineers into instructions that a computer can follow.</td>
</tr>
<tr>
<td>Computer Support Specialists</td>
<td>Computer support specialists provide help and advice to people and organizations using computer software or equipment. Some, called computer network support specialists, support information technology (IT) employees within their organization. Others, called computer user support specialists, assist non-IT users who are having computer problems.</td>
</tr>
<tr>
<td>Computer Systems Analysts</td>
<td>Computer systems analysts study an organization’s current computer systems and procedures and design information systems solutions to help the organization operate more efficiently and effectively. They bring business and information technology (IT) together by understanding the needs and limitations of both.</td>
</tr>
<tr>
<td>Database Administrators</td>
<td>Database administrators (DBAs) use specialized software to store and organize data, such as financial information and customer shipping records. They make sure that data are available to users and are secure from unauthorized access.</td>
</tr>
<tr>
<td>Information Security Analysts</td>
<td>Information security analysts plan and carry out security measures to protect an organization’s computer networks and systems. Their responsibilities are continually expanding as the number of cyberattacks increases.</td>
</tr>
<tr>
<td>Network and Computer Systems Administrators</td>
<td>Computer networks are critical parts of almost every organization. Network and computer systems administrators are responsible for the day-to-day operation of these networks.</td>
</tr>
<tr>
<td>Software Developers</td>
<td>Software developers are the creative minds behind computer programs. Some develop the applications that allow people to do specific tasks on a computer or another device. Others develop the underlying systems that run the devices or that control networks.</td>
</tr>
<tr>
<td>Web Developers</td>
<td>Web developers design and create websites. They are responsible for the look of the site. They are also responsible for the site’s technical aspects, such as its performance and capacity, which are measures of a website’s speed and how much traffic the site can handle. In addition, web developers may create content for the site.</td>
</tr>
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The occupational culture of IT workers is characterized, for example, by the use of technical jargon, work practices that often include long hours, late nights, after-hour meetings, on-call duty, and a continual state of urgency. It’s a profession that
experiences rapid technological change, with new technical skills appearing and others becoming obsolete in short timeframes. The result is a constant need for up-skilling, so traditional curriculums may not be germane to preparing a resource to enter, re-enter and remain in the IT labor market.

The minimum qualifications/skills include some degree of training ranging from few months of certification to years of formal education, but usually including a bachelor’s degree in computer science or a technical-school degree. Other paths to a career in IT are completing an Associate’s degree, vocational technical schools, military training, and non-traditional paths, e.g. self-study, or online programs (Joseph et al., 2012). Joseph et al. (2012) found an additional IT sub-career path, late entry IT careers. These individuals joined the IT profession from non-IT-related professions in mid or late career and remained in the IT profession to the end of career (Joseph et al., 2012).

**Representation of Women and Minorities in Information Technology**

SCCT provides a framework through which to understand the impact that gender, along with racial and ethnic identity, may have as barriers to and facilitators of career behaviors and development (Gysbers et al., 2003; Perrone, Sedlacek & Alexander, 2001), and as a result, is an ideal theory for this study on the occupational experiences of African American women. Understanding the representation of role models and gender role socialization expectations within IT contributes to our understanding of IT as a career choice and the persistence in the field.

A diverse IT workforce supports increased corporate social responsibility, social access, and social inclusion (Trauth, et al., 2008). Trauth, et al. (2008) sought to determine the effect of a diverse environment on the global IT workforce, and found that
a diverse workforce was more innovative, knowledgeable, and skilled. Trauth, Huang, et al. found that diversity led to the generation of IT products and services designed to meet the technology requirements of diverse end-users.

There have been estimates that if women and minorities were represented in the IT workforce in proportion with their representation in the general population, the shortage of IT workers in this country could be largely resolved (CAWMSET, 2000; Aspray & Freeman, 1999). Currently in the U.S., women, minorities, and persons with disabilities remain underrepresented in STEM careers, while constituting more than two-thirds of the overall workforce (ITAA, 2003). As a result the existing pool of workers lacks diversity. With fewer women, IT is deprived of a workforce component that can contribute alternate perspectives on systems design, development, and utilization. Given that IT pervades our work, education, health, entertainment, and safety, it is essential that women participate in innovating and advancing the IT field (NCWIT, 2010). Enlisting a broad range of minds and backgrounds in the design of IT yields products and services that benefit society as a whole (NCWIT, 2010).

Gender disparity is an ongoing workforce issue in the IT industry, as women continue to lag behind men in IT jobs. According to statistics from the Bureau of Labor Statistics (2016), women represent 47% of the total workforce, but only 26% of the computer and information technology workforce. In terms of attracting women to the IT workforce, this problem should have improved in recent years, but has actually worsened. In the past decade, more women have received college degrees than men, however, these have largely been in fields other than science, engineering, and IT-related subjects (National Center for Education Statistics [NCES], 2005). The proportion of women
holding IT related jobs continues to decline and the problem of insufficient minority candidates remains unchanged (Gallivan, Adya, Ahuja, Hoonakker, & Woszczynski, 2006). Although there are theories as to why women are under-represented in IT, there are no definitive answers to the problem (Balcita, Carver & Soffa, 2002).

Women are not only under-represented in the IT workforce, but they are also a declining part of it. As we see from Figure 6, women make up half the professional and related occupational workforce but on average only 30% of the IT related occupations. Women are also over-represented in operations and systems analyst positions, often not considered heavily technical, and under-represented in the computer systems engineering positions. Research reveals that the society views science and technology in general as a masculine pursuit. Men are seen as designers, developers, and largely controllers of technology. Leonard (2003) explicates in her book, *Women, Technology, and the Myth of Progress*

Since minorities are systematically steered away from technology, it has become a major instrument of elite male domination in terms of education, role models, and job opportunities. Women on the other hand, are socially conditioned to avoid technology (p. 19).

Women tend to be represented in higher percentages in analyst positions while represented in lower percentages in more technical positions such as computer engineers and programmers. Women are also more likely than their male counterparts to leave technology positions. For example, reports and technical news bulletins presented by organizations such as the National Center for Women & Information Technology (NCWIT) highlight that few female and minority college students are choosing science, technology, engineering, and math (STEM) fields of study or careers. For those who choose STEM fields, attrition both during education and in the workplace is pervasive.
According to examination of government labor data by *CIO Insight* the author DeGiglio (2006) reported that in 2000, the Department of Labor’s Bureau of Labor Statistics found that approximately 984,000 women held one of eight IT positions: managers, computer scientists, systems analysts, system developers, software designers, support experts, database managers, network/computer systems administrators, or network systems/data communications analysts. That year, women made up 28.9% of the nearly 3.41 million employed IT workers. Notably, in 2006, overall IT employment hit a record of nearly 3.47 million. However, in that same year there were 76,000 fewer women working in IT than in the year 2000. The 908,000 women working in the profession that year represented 26.2% of employed IT professionals, which was a drop from 2000. In 2003, when the economy rebounded from the dotcom bust, women employment in IT rose by 35,000 from 2002, but then dropped by 43,000 in 2004. Overall, DeGiglio found fewer women seemed interested in making IT their career.

With the forecasted growth and demand of IT jobs, one would anticipate greater participation of women in the field, considering women represent half of the workforce. However, women represent a small fraction of information technology professionals. In professional computing occupations, approximately 26% of positions are held by women. These percentages have been declining since 1991, when women represented 36% of IT professionals. The lack of female representation in IT is due to a series of discernible challenges. Women’s representation in IT also varies by race and ethnicity. In 2013, 5% of Asian women held computing occupations, 3% for African-American women and 2% for Hispanic women (Gillipin, 2014). Minority women in general are underrepresented
in STEM related occupations as illustrated in Figure 6 using data from the 2009 household population survey.

Figure 6. Data adapted from the Current Population Survey (CPS) conducted by the Bureau of Census for the Bureau of Labor Statistics. A comprehensive body of data on the labor force, employment, unemployment, persons not in the labor force, hours of work, earnings, and other demographic and labor force characteristics.

Minorities, who represent nearly one-third of the U.S. workforce, make up only 3% of technology professionals (CAWMSET, 2000). African Americans and Hispanics hold only 5% of IT jobs, yet make up respectively 12% and 14% of the U.S. population. In fact, the percentage of African Americans in the U.S. IT workforce fell from 9.1 percent to 8.3 percent between 1996 and 2004. American Indians and Alaskan natives are 0.6% of IT workers and 0.9% of all workers. On the other hand, Asian Americans are three times more prevalent in the IT workforce than in the workforce overall.

*African American Women in Information Technology*

Although African American women have gained entry into the IT field, they have found it difficult to advance professionally and managerially within their organizations.
(Wilson, 2004). Perhaps, as the management literature suggests, this is because minorities may experience considerable discrimination on their jobs, which lowers their performance and ultimately impedes their career advancement. For example, we find that African Americans are significantly less likely to remain in IT vs. moving to a different occupation. According to authors Stephan and Levin (2005) while other women such as White women leave the workforce during child birth years African American women are less likely to leave the workforce but instead leave IT occupations for other occupations. Simply put African Americans leave IT for another occupation; they do not leave IT to leave the labor force or because they are unemployed (Stephan & Levin, 2005).

Although IT organizations express strong concern with diversity in the workplace, little scholarship is available to guide these efforts. For example, research that examines the intersection of race and gender in IT organizations is largely non-existent. Considering race and ethnicity highlights important differences of women’s participation in STEM fields, doing so enhances “our understanding of the unique talents, interests, and experiences of subgroups of women” (Hanson, 2004, p. 96). While gender research is more plentiful, there is an underlying assumption of “womanhood” or shared experiences in the literature.

Acker (1999) posited that other racial and/or ethnic groups have different histories and socialization patterns, which shape different class/gender experiences. Unfortunately, African American women have not been sufficiently regarded as a group that needs to be heard on its own, for its own sake. In addition, African American women compose a critical proportion of the potential STEM workforce of the future, yet are disproportionately represented and remain an untapped source of talent. Researchers tend
to adopt the conventional practice of merging Asians, African Americans, Native Americans, and Hispanics into single categories such as nonwhite or other. It is an act that ignores and trivializes the uniqueness of men and women of various racial and ethnic backgrounds (Kvasny, 2003). Amott and Matthaei (1996) posited that accounting for racial/ethnic group differences recognizes that “there is no generic gender oppression which is experienced by all women regardless of their race-ethnicity” (as cited in Johnson, 2007, p.4).

While underrepresented minorities enroll in science and engineering majors at rates similar to those of White students, there is a definite gap when considering the overall pipeline outcomes (Camp & Gurer, 2002). In 2003, computer and information sciences degree studies ranked 12th out of 36 degree attainment choices for African American females (National Center for Education Statistics [NCES], 2005).

Current data indicates that more young females of color are entering the education pipeline, but that not enough of them are reaching the highest career levels. In the 1990s, the number of African-Americans enrolling in and graduating from graduate and undergraduate IT programs rose significantly; however, general enrollments in computer science have declined by almost 30%. In recent years however, the trend reverse with fewer African Americans entering IT programs. African American women accounted for over one-third (35.4%) of all African American STEM workers. According to the National Association for the Advancement of Colored People (NAACP) a major concern is nearly half of all minorities leave technology jobs to enter other occupations (as cited in Worthington, 2009). Meanwhile, the percentage of jobs held by women in almost all other sciences has increased significantly.
According to the U.S. Equal Employment Opportunity Commission Employer Information Report EEO-1, used by employers to provide a count of their employees by job category, ethnicity, race, and gender; African American women represent 7.67% of all EEO-1 employment (U.S. Equal Employment Opportunity Commission's [EEOC], 2009). During 2009 African American women represented 6.69% of the total professional, scientific, and technical services (NAICS Code 54199) employment population (EEOC, 2009). However, the majority of these positions were in office and clerical positions as illustrated in Figure 7. African Americans continue to be underrepresented in skilled and managerial sectors and overrepresented in service positions.

Figure 7. U.S. Equal Employment Opportunity Commission, 2009

Chubin, Lanius, & Tapia, (2000) posited that there exists interdependencies between “representation” and “leadership”. Lack of opportunity for career growth into the management ranks and research could be a factor for the lower percentage of African
American females in IT management occupations. The opportunity for growth after entry into the information technology field can improve retention of African American females.

While African American representation in broad STEM related occupations (e.g. science technician) closely match their population rates at (e.g. 10.6% in 2004), their smallest share was among computer, science and engineering managers at 4.1% (CPST, 2007). This echoes a study of attrition from the US IT workforce, which argued that research and interventions must be responsive to the variations between women and within IT workplaces (Trauth et. al., 2009).

Williams (1997) argues that embracing diversity provides firms with a source of competitive advantages in six ways: (a) by reducing costs associated with excessive turnover and absenteeism, (b) by making it easier to recruit scarce labor, (c) by increasing sales to members of minority culture groups, (d) by promoting team creativity and innovations, (e) by improving problem solving, and (f) by enhancing organizational flexibility. Attracting more diverse racial groups, such as African Americans, to IT careers creates more diversity among the IT workforce (Barker & Aspray, 2006).

According to a recent quote by Catherine Ashcraft, senior research scientist at the National Center for Women & Information Technology:

It isn’t just about equity and fairness, though that’s important, too. But it’s also about the harm it does to innovation to have one relatively similar group of people designing the new technologies that are being consumed by a diverse range of people. To the extent that the talent pool becomes more similar, that creative innovation is at risk (Collet, 2010, p.3).

The more diverse the IT workplace and the larger the pool of talent from which to draw, the more likely IT solutions will address a broad range of issues, and thus will be
better able to develop solutions to meet the needs of a broader range of customers (Florida & Gates, 2002).

**Contextual Support Influences of Retention in Information Technology**

Retaining IT professionals is important for organizations, given the challenges in sourcing for IT talent (Ang & Slaughter, 2004). Regardless of organizational size, retention of employees is an ongoing issue in organizations today as retention has both a direct and indirect impact on an organization. However, the literature points to a wide variety of often conflicting factors that may influence retention of IT employees (Igbaria & Baroudi, 1995; Moore & Burke, 2002; Joseph et al. 2005). A common error regarding the recruiting, retention and management of IT professionals is assuming that they have a similar set of career goals, personal values and motivation as non-IT professionals.

A review of the literature found several studies resulting in a range of different variables influencing retention. A survey conducted with retailers found the top-five methods to retain key IT employees: (1) challenging work environments; (2) employee capabilities enhancements (training and education); (3) adequate compensation; (4) availability of state-of-the-art technology and applications; and (5) work/life balance accommodations (Age, 1999). Later additional research would support these findings. Arthur et. al. (2005) found that providing challenging work and commensurate compensation and benefits; providing learning and development or retraining opportunities, as well as opportunities for advancement; and having flexible working situations that enable employees and their families to deal with life issues contributes to retention intentions. A survey by the Society for Information Management (SIM) found the top vehicles for retaining IT staff to be: (1) open and honest communication; (2)
Good worker-supervisor relationships; (3) Increased relative importance of “trust” may reflecting the growing usage of virtual teams; and (4) Opportunities for advancement and balance between work life and outside life remain important (SIM, 2006).

According to Luftman and Kempaiah (2007) IT professionals want to provide input and influence IT-related decisions. IT staff also want respect and recognition from their supervisors, as well as appreciation for being a valued member of the organization. The top priority should be to create a challenging work environment while opening the communication lines so that they can have positive interactions with their supervisors (Luftman & Kempaiah, 2007). The authors also suggested companies should pay more attention to factors affecting the work-life balance of IT professionals and offer a rewarding environment that ensures an appropriate equilibrium. The indicate that IT professionals should be given flexibility in their work schedules, the ability to work from home, desirable amenities, greater benefits, and generous vacation and holiday packages (Luftman & Kempaiah, 2007).

A primary component for retaining IT staff is the need for ongoing and consistent training. IT professionals need to constantly update their skills in order to maintain or even position themselves for opportunities to advance within their careers, as well as ensure they are able to effectively apply emerging and changing technologies to organization products and services. IT professionals are avid consumers of training internally and externally available. As a result training opportunities can be used as a mechanism for recruiting and retaining IT employees.
The Retention of Women and Minorities in IT

Previous studies leave gaps in our understanding of the phenomenon of turnover intentions of women and minorities in IT. Few IT studies have attempted to tackle the issue of minority employee retention directly. Many studies tend to focus on the disparity of women in IT and often group minorities and women together. Women are often grouped together despite differences among race/ethnicity. However, it’s acknowledged that it is necessary to look more closely at the causes and effects of retention and intention to turnover in order to better understand the reasons for underrepresentation of women and minorities in IT (Carayon et al., 2006).

What consistently appears in literature regarding the retention of women in the IT field are the factors: work–life balance, organizational climate, and mentoring. According to the findings in The Athena Factor: Reversing the Brain Drain in Science, Engineering and Technology women hit a ‘breaking point’ in their mid- to late 30s which has resulted in 52% of highly qualified SET women quitting their jobs. The report’s finding shows that the sources of this retention crisis come from issues related to work–life balance, organizational climate (expressed as hostile macho cultures, reward systems and extreme work pressures) and mentoring (expressed as severe isolation and mysterious career paths) (Hewlett et al., 2008).

Although existing research has identified a number of factors that are closely related to employee retention and its correlates, this research has not determined which broad set of characteristics: individual, organizational, or economic, has the most effect on African American women’s decisions to remain on the job. This could be caused by
companies that have insufficient understanding of work place practices valued by African American and other minority employees.

Opara, et al. (2005) conducted a study designed to measure the job satisfaction levels of African American workers in the field of information technology and to identify the factors that might explain those levels. The independent variables used in this study were opportunity for advancement, satisfaction with the compensation, gender, satisfaction with training, stress management level, and occupational challenges. Opara et. al. (2005) found that most African American IT workers were satisfied with their jobs and compensation, with a subset of the male respondents stating that while they were satisfied with their jobs, they weren’t completely satisfied with their salaries but their needs are most likely satisfied by opportunities to advance in the workplace. These results indicate satisfaction with the job is not directly correlated with satisfaction to their salary, but improving upon other factors of job satisfaction like opportunities for advancement, training, and employee growth could temper employees' desire for better compensation.

**Contextual Barriers to the Retention of Women and Minorities**

Despite the growing importance of qualified IT employees, women and minority employees continue to face barriers to their acceptance and advancement within the corporate environment. Many of the reasons that discourage women from IT careers also apply to minorities (Aspray, & Freeman, 1999). For example, in their 2003 article, Heilman and Chen highlight the following challenges commonly faced by women and minorities (a) work-life balance, (b) job placement, (c) negative stereotypes, (d) lower performance evaluations and (e) fewer opportunities for advancement. According to
Riemenschneider et al. (2006), some of the barriers faced by women entering the IT profession are:

…the lack of role models and networking opportunities; the information gap about the academic requirements needed by high school students to enter the field; the IT work environment does not appear attractive; the lack of strong corporate commitment; and gender-related stereotypes that may impede women’s hiring and advancement opportunities. (p. 60)

*The Athena Factor: Reversing the Brain Drain in Science, Engineering and Technology* identified in its report that the reasons identified for the exodus of women include perceptions of a hostile and macho work environment, feelings of isolation, work cultures that encourage risk taking, and time-intensive job pressures that compromise work-life balance. The study, further reported that 45% of the women with SET degrees lacked mentors, 63% experienced sexual harassment, and 40% felt stalled or stuck in their careers (Hewlett et al., 2008). The report also noted that white women seem to be making some strides in the field at times considered chilly towards women, however the same is not true for African and Hispanic American women (Hewlett et al., 2008).

The inequities experienced by African-American women manifest themselves in a number of different ways in the workplace (Bell & Nkomo, 2004; Catalyst, 2004). One Catalyst study (2004) detailed a number of different barriers African-American women encounter in the workplace, including negative stereotypes (e.g., being confrontational), greater visibility and scrutiny of their actions, questioning of their authority and qualifications, and a perceived lack of credibility.

Other studies show that the key barriers to the entrance and retention of women and underrepresented minorities in IT are lack of role models and mentors, exclusion from informal networks, stereotyping, discrimination, unequal pay scales, and inadequate
work/family balance (CAWMSET, 2000; ITAA, 2003). The literature also identified cultural fit, expectation gaps, mentors, role models, career satisfaction, organizational commitment, role ambiguity, and role conflict as pertinent factors that affect the retention of women in the IT workforce (Riemenschneider, Armstrong, Allen, & Reid, 2006; Tapia & Kvasny, 2004).

The National Center of Women in Information Technology (NCWIT, 2010) found that unconscious bias contributed to a number of key barriers to women’s participation and advancement in technology. These include a lack of role models, mentors, and sponsors; problems with supervisory relationships; inequities in performance and promotion procedures; and inflexible work policies that make it difficult to manage competing responsibilities (e.g., family, elder care). Unconscious bias (also called implicit or hidden bias) plays a role in these barriers and in creating other institutional barriers for technical women. Unconscious bias influences your decisions in a way you don’t notice and can’t control.

Unconscious biases results when our pre-existing beliefs and attitudes about particular groups of people subtly influence behaviors and decisions. Unconscious bias poses problems for all workplaces, but it typically poses even bigger problems in workplaces or industries dominated by a single gender or group. In these workplaces, practices, cultures, and systems naturally emerge to reflect and meet the needs of this population. These systems inadvertently disadvantage employees from underrepresented groups who later enter the field with different needs. Figure 8 below illustrates how this bias can result in a number of subtle dynamics and more overt barriers.
The NCWIT (2010) alludes that when they become more systemic or subtly encoded in company policies or practices, they result in institutional barriers. “It is important to remember that these barriers naturally arise in any majority-minority situation and are not necessarily the result of any ill intentions’ (NCWIT, 2010, p.25). If these policies or systems do not change with the times, however, they can inhibit the success of new members.

These unconscious beliefs or implicit biases may be more powerful than explicitly held beliefs and values simply because we are not aware of them. Even if overt gender bias is waning, as some argue, research shows that less-conscious beliefs underlying negative stereotypes continue to influence assumptions about people and behavior (NCWIT, 2010).

Research by Catalyst (2003) *Women in Technology* indicates that problems associated with unconscious bias and fairness may be exacerbated in technical companies and departments. The Catalyst report indicates that technical women were less satisfied
with their companies’ approaches to fairness and voice than all other employees: women in non-technical roles, men in technical roles, and men in non-technical roles (as cited in NCWIT, 2010). Employees are more likely to leave when they feel that their ideas and opinions are not taken into account or when they feel like they have little say in performance evaluations. Unconscious bias and problems with fairness negatively affect employee engagement, turnover, and, ultimately, the company’s bottom line. Subtle instances of unconscious bias are extremely important because they are much more difficult to detect but often build upon each other, creating environments that force underrepresented employees out the door.

For example, stereotype threat - the fear or anxiety that our actions will confirm negative stereotypes about our “group” or about ourselves as members of a group. These fears and anxieties reduce feelings of competence and trust, and can negatively affect performance, confidence, and risk-taking behavior. Recognizing stereotype threat is important; otherwise employers, supervisors, or coworkers might incorrectly assume that these behaviors or lack of confidence are the result of personal characteristics of the employees themselves. This will leave the conditions that create stereotype threat unaddressed, ensuring that these employees are not able to live up to their full potential and most likely will leave the company.

A gender- or color-blind stance might be appropriate if the larger society also was gender- and color-blind. Since this is not the case, holding such a stance at this point in time ignores important realities. Women and people of color often have experiences that shape their lives differently, (e.g., women more often than men have to think about or are asked to explain how they balance work and family responsibilities). These individuals
also face different prejudice and inequities. “Treating everyone the same” ignores these realities and the fact that existing workplace conditions do not meet these employees’ needs.

On the other hand, tokenism often occurs when only a few employees belong to a particular identity group (e.g., gender, race, age). Members from diverse groups are often expected by others to “speak for” or “represent” the group as a whole. These behaviors ignore the reality that a wide range of variation exists within any identity group and that it is unreasonable to expect one person to represent this within-group variation (for example, rarely do we expect a white person to speak for all whites or a man to speak for all men). These issues may be particularly acute for women of color as they represent a double minority and the dual disparities they may experience are often overlooked or not considered.

Baroudi, and Igbaria (1995) studied the role gender plays in career success within IT occupations. The authors found that, even when demographic variables (i.e. education, knowledge and skills) were controlled for, women in IT hold lower level positions than men, receive lower salaries and have fewer opportunities to interact with peers. For example according to the American Association of University Women 2012 report women made 88% of what men did in “engineering and engineering technology”, but only 77% of what men did in “computer and information technology” (American Association of University Women [AAUW], 2012). By the authors 2016 report the pay gap is worse for women of color. African American women for example make only 63% of what white men earn (AAUW, 2016).
There were no significant differences between men and women in satisfaction and commitment, but there was a significant difference in terms of intention to stay. Igbaria and Greenhaus (1992) found that women and minorities in IT are generally younger, less educated, lower paid, in lower level positions, and receive less exposure outside their departmental boundaries compared to white men.

Additionally, a study by Igbaria and Baroudi (1995) is an example of literature that exhibits evidence of women being treated unfavorably when dealing with fewer rewards, fewer resources, and fewer opportunities. Without access to power, Kanter (1977) believes women are often restricted to lower-level assignments and excluded from informal social networks (as cited in Igbaria and Baroudi, 1995). Further, a study produced by the United States Department of Labor’s Federal Glass Ceiling Commission (1995) concluded that equally qualified women are being denied advancement to top levels in organizations on the basis of gender. Contrary to predictions, women were more likely to estimate longer continuing employment.

Northouse (2004) indicated that the slow progression of women into leadership could also be attributed to organizational, interpersonal, and personal barriers. Organizational barriers were identified as (a) women being held to higher standards of performance, (b) women lacking developmental opportunities, and (c) women in a hostile culture/environment. Interpersonal barriers included: (a) women being stereotyped, (b) women lacking or being excluded from mentoring and networking, and (c) women lacking emotional support. Personal barriers included (a) women striving for work/life balance, (b) women’s non-work obligations, and (c) women lacking political savvy (Northouse, 2004).
The ITAA (2003) Blue Ribbon Panel on IT Diversity notes that the issue of underrepresentation cannot be linked to a single factor or barrier that prevents women and underrepresented groups from entering the IT workforce. Sumner and Werner (2001) found that women in their study reported low levels of career satisfaction based on lack of challenging work and the inability to progress pass a glass ceiling in the workplace. Ahuja (2002) argues that social and structural factors shape women as the primary domestic caregivers. She suggests that work-life balance issues are linked with female career satisfaction and turnover intention. Researchers have concluded that women face a number of challenges in the workplace that can negatively impact their career satisfaction and increase their turnover intention (Ahuja, 2002; Hsu et al., 2003; Igbaria & Chidambaram, 1995; Igbaria & Greenhaus, 1992; Sumner & Werner, 2001).

Definitions of SCCT Constructs

In order to understand the support and barrier influences on retention and persistence among African American women and their career choices the Social Cognitive Career Theory (SCCT) was used as a theoretical framework for this study. The SCCT aligns closely with Bandura’s triadic reciprocal model, where the interaction between the individual, his/her environment, and his/her personal attributes and specific behaviors work in concert to influence one another in a continuous and dynamic manner. SCCT emphasized three social cognitive constructs relevant to career development: self-efficacy beliefs, outcome expectations, and personal goals (Lent, Brown & Hackett, 1996). As an extension of bandura’s Social Cognitive Theory this model emphasizes the process through which individuals develop interests, how people make choices about pursuing a given career, and how and why people perform and persist in given
occupations and educational settings (Gysbers, Heppner, & Johnston, 2003). In addition to analyses of factors impacting their occupational choices, SCCT research also provided a framework in which to examine coping mechanisms, or the strategies individuals employed to overcome perceived barriers or obstacles (Hackett & Byars, 1996).

In order to understand how the proposed study adds to the literature, one must understand key SCCT variables. The following section defines and clarifies differences among the SCCT variables. The three main constructs of self-efficacy, outcome expectations, and goals are explained. SCCT asserts that each of these variables mutually influence career behavior, and along with other social cognitive variables, have been found to be good predictors of a person’s interests, choices, performance and persistence towards success in disciplines. Following the main discussion of the constructs, important supporting variables within SCCT are discussed, including interests, contextual barriers and supports, and learning experiences.

**Self-Efficacy**

The application of self-efficacy to career development was initially used to explain the underrepresentation of women in traditionally male-dominated careers. The concept of self-efficacy has been proposed as a promising conceptual link between practice-oriented learning processes, learning outcomes, and persistence (Chemers, Hu, & Garcia, 2001; Kahn & Nauta, 2001; Eames, 2004). Self-efficacy is defined as an individual’s perceived level of competence or the degree to which she or he feels capable of completing a task. It is a dynamic proximal trait that changes over time and can be influenced by experience. It refers to one’s judgments about one’s ability to organize thought, feelings, and actions to produce a desired outcome (Bandura, 1986). Self-
efficacy expectations are considered the primary cognitive determinant of whether or not an individual will attempt a given behavior. Self-efficacy beliefs further influence the degree of effort expended toward goal attainment, the persistence exhibited, and the thought patterns and emotional reactions experienced when met with obstacles. The level of self-efficacy, or the degree of difficulty of tasks one feels capable of attempting, influences the kinds of behaviors attempted and avoided. The degree of self-efficacy strength, or an individual’s confidence in his or her capability, influences persistence of behavior when disconfirming or dissuading experiences are confronted.

Bandura (1986) identified four sources of information that shape self-efficacy: performance accomplishments, vicarious experience, verbal persuasion, and physiological and affective states. Performance accomplishments refer to one’s positive or negative appraisals of learning experiences. Some examples include participant modeling, performance desensitization and exposure, and self-instructed performance. Vicarious learning/modeling has been described as one’s observation of a valued model’s performance and the positive or negative feedback they receive. Verbal persuasion includes messages of encouragement or discouragement. Encouragement serves to increase self-efficacy, and lack of encouragement or discouragement usually serves to weaken one's self-efficacy beliefs. The fourth source of efficacy information is affective states, also described as emotional arousal. The level of one’s anxiety or arousal may facilitate or hinder one’s performance or self-efficacy (Bandura, 1977).

Outcome Expectations

Outcome expectations pertain to beliefs about the consequences of certain actions and behaviors (Bandura, 1986). Lent and Brown (1996) further assert that outcome
expectations are gleaned from “a variety of direct and vicarious learning experiences, such as perceptions of the outcomes one has personally received in relevant past endeavors and the second-hand information one acquires in different fields” (p. 312).

From a social cognitive perspective, personal goals are defined as one’s intent to engage in certain activities for certain outcomes (Bandura, 1986). This variable, along with the others, affords a level of personal agency or control whereby individuals marshal, steer, and support their own educational and career development efforts (Lent & Brown, 1996). While self-efficacy and outcome expectations intermix to influence the development of interests, interests affect the distinguishing of and planning for career choice, and goals (Lent et al., 1994).

Through learning experiences, outcome expectations may take three diverse forms of behavior: social effects, physical effects, and self-evaluation (Bandura 1986; 1997). Social effects may include imagined power, recognition, or admiration from others (Bandura, 1986). Physical effects may include financial gain or sensory pleasure. Self-evaluation is continuously shaped through individual learning experiences. Outcome expectations strongly influence how an individual proceeds in decision-making on a chosen career path.

Within the SCCT framework, it is proposed that interest in a particular career-related activity relies, partly, on the outcomes that are anticipated as a result of participation in that activity, and the value placed on those outcomes by the individual. Interest development also depends on efficacy beliefs. Within the experience of interest formation, outcome expectations are partly determined by efficacy precepts. In other
words, individuals tend to presume that desired outcomes are more obtainable when they view themselves to be capable.

According to the SCCT model then, efficacy beliefs influence outcome expectations with efficacy and outcome beliefs both, affecting interests. Thus highly valued outcomes, anticipated for a particular course of action, will not likely be pursued if a person doubts their capability. Strong capability beliefs regarding a particular course of action, however, are likely to be derailed when negative outcomes are anticipated. For example, high efficacy for nontraditional occupations for women, with the anticipation of negative outcomes such as discriminatory hiring and/or promotion practices, or lack of support and approval from important others, may deter interest development and choice actions (Lent et. al., 1994). Thus, according to SCCT, outcome expectations play a role in influencing career interest development.

**Choice Goals and Actions**

A goal may be defined as an individual’s desired outcome (Bandura, 1986). A goal may serve as a type of internal motivation to help an individual arrange and regulate specific behaviors. Goals may take the form of short-term choices or long-term aspirations (Lent et al., 1994). For example, a student choosing a college major. By establishing goals, individuals increase the chance that they will obtain desired future outcomes. There is a distinct difference between choice goals and choice actions in regard to guiding career decisions. Choice goals represent the “intention to engage in a particular action” and are proximal antecedents to an individual’s behavior (Cunningham et al., 2007; Lent et al., 1994, p. 94). Choice actions represent how an individual begins “entry” behaviors into a particular career choice (Lent, Brown, & Hackett, 1994).
Career choice involves active selection. Choice is not a state; it may be changed by outcomes that take place after a decision is made (Lent et al., 1996). In some instances, career choice is not simply dictated by the individual, but rather by outside influences such as discrimination, economic demands, or family expectations (Lent & Brown, 1996.) The collective influences of goals, barriers, self-efficacy, and outcome expectations create career choice, differentiating it as a phenomenon with more than a single influence.

The establishment of choice goals then prompts choice actions. Choice actions are behaviors that are aimed at accomplishing the career goals (e.g., taking courses that fulfill the degree requirements for a declared college major). SCCT posits that self-efficacy and outcome expectations also exert a direct effect on choice goals and choice actions. According to SCCT, individuals are more likely to set goals and follow a course of action for obtaining those goals if they feel they are capable of doing so and if they expect favorable outcomes. The third aspect of career development is performance which includes achievements (e.g., GPA, promotion) and persistence (e.g., stability of academic major, career persistence) (Lent et al., 1994). Performance directly results from choice actions and self-efficacy.

**Person Inputs**

Person inputs refer to background characteristics that may influence career development. Within SCCT, person variables include predispositions, gender, and race/ethnicity. Predispositions refer primarily to inherited attributes that have an influence on vocational interests. SCCT maintains that inherited characteristics are
mediated, in part, through intervening learning experiences that shape career-relevant skills, such as comfort level with math skills.

Gender and race/ethnicity, within the SCCT framework, are considered to be “socially constructed aspects of experience” (Lent et al., 1994 p.105). Both gender and race/ethnicity can shape the development of career interests, choices and performances. Gender role socialization, for example, may limit or promote girls and boys access to sources of information needed for the development of strong efficacy beliefs. Thus learning opportunities may be biased in such a way as to expose girls only to culturally sanctioned learning experiences. Similarly, for females, the nature of anticipated outcomes for performing certain activities may also be gender-biased. Positive outcome expectations may be forsaken in the service of gender-typical interests. For example, girls are expected to be caregivers so gender role socialization biases nurses as female. The development of a strong skill set, through relevant learning experiences, fosters a robust sense of efficacy which can give rise to positive outcome expectations and to interests according to SCCT (Lent et al., 1994). Lent et al., (1994) maintain that race and gender have relevance to career development not because they exist but rather because of the typical reactions they may elicit from the social/cultural environment. However, the effects of gender and race/ethnicity can be mediated through learning experiences. For example, disparities in educational access can affect the quality and types of learning experiences an individual receives.

**Background Contextual Affordances and Influences**

According to the social cognitive career theory, background and proximal contextual affordances and barriers impact learning experiences (Lent, 2005). Because
these affordances and barriers operate in relationship to one’s identity, they are likely to play a particular role in the career experiences of African American women. According to Lent et al. (2000) contextual affordances and barriers are variables that “enhance or constrain personal agency” (p. 36), meaning these variables sustain or deter individuals in their goal of following a specific career path. Examples of affordances are positive messages from role models and the opportunity to gain experiences in career fields. Examples of barriers are messages and socialization processes that discourage one from pursuing a specific career or do not allow one the financial ability to pay for education to pursue a specific career. Swanson and Woitke (1997) defined barriers as “events or conditions either within the person or in his environment, that make career progress difficult” (p. 434). These barriers may include economic needs, educational limitations, lack of familial support, lack of role models or mentors, and gender or ethnic discrimination and have been identified as environmental factors which may have negatively affected an individual’s career self-efficacy. They may also inhibit the pursuit of primary interests or preferred career goals. Lent et al. (1994) argue that there are at least two points at which contextual barriers and affordances impact career paths: distally and proximally.

Distally means prior to making a career decision, one’s certain experience operates in the background of decision making, but is nonetheless a foundation to self-efficacy. Proximal affordances and barriers are present during the active points of career choice and educational attainment, when decisions are being made. Examples of distal supports and barriers are cultural and gender role socialization, support or discouragement for pursuing different fields and the presence or absence of role models
at a young age. Even though these distal messages are received long before an active career decision is made, these messages have been shown to impact academic and career choices later in life (Lent et al., 2000).

Examples of proximal supports and barriers are discrimination, and emotional and financial support in pursuing a career field during active points in the career choice process. Proximal influences are those that occur closer in time to career decision-making junctures including child-care needs, discriminatory hiring practices, and economic trends in a particular occupational field. According to social cognitive career theory, background and proximal contextual affordances and barriers each have different roles and both are impacted by another critical SCCT construct, person inputs (Lent, 2005; Lent et al., 2000). The meaning people attribute to experiencing various affordances and barriers is highly dependent upon and interactive with their person inputs (Lent et al., 1994). For example, for African American women, race and gender impact the messages they receive from a very early age about the opportunities that are and are not accessible to them.

These variables, distal and proximal, contribute to the development of research on perceived barriers to career development and the use of coping mechanisms as strategies for overcoming barriers. Women and African American women as evidenced in the literature, experience various types of discrimination throughout their careers. SCCT addresses how perceived barriers affect their careers and studies how women and other minority groups cope with these factors throughout their career paths.
Learning Experiences

Learning experiences are the skill building opportunities individuals receive that produce an individual’s self-efficacy and outcome expectations. These experiences influence the competency to perform skills associated with interests, goals, and actions. Learning experiences within an individual’s environment play a key role in determining whether or not an individual views specific career goals as attainable. Learning experiences shape self-efficacy, outcome expectations, and career goals.

Interest

Another aspect for the study of career development within the SCCT framework is interest development. Lent et al. (1994) define vocational interests as “patterns of likes, dislikes, and indifferences regarding career-relevant activities and occupations” (p.88). SCCT contends that individuals are not only exposed in direct and vicarious ways to diverse activities, but also are differentially reinforced for pursuing certain activities and performing certain activities satisfactorily. Perceptions of self-efficacy and outcome expectations impact the formation of interests. SCCT proposes that emergent interests lead to intentions or goals for more activity participation which increases the likelihood of subsequent task selection and practice. Activity practice produces performance attainments involving successes or failures, resulting in the revisions of self-efficacy and outcome perceptions. Positively revised self-efficacy beliefs and outcome expectations can serve to crystallize interests. The interplay of self-efficacy, outcome beliefs, and interests, therefore, produces goals.

A primary vocational choice goal leads to actions (e.g., enrollment in a job training program) that will implement the goal. Subsequent performance
accomplishments will influence self-efficacy beliefs thereby creating a feedback loop which can ultimately affect future career actions (Lent et al., 1994). In other words, positive performance accomplishments, including goal attainment and enhanced skill development, can serve to further strengthen self-efficacy beliefs and, as a consequence, intensify interest in career goal fulfillment. Ultimately, this intensification of interest can impact goal persistence (Lent et al., 1994).

Interests influence subsequent career choice and outcome processes, but the interest may or may not lead to actual career behavior. An individual is most likely to emphasize interest in a particular area if those interests are a) believed to have a positive outcome (outcome expectations); and b) able to be performed effectively (self-efficacy) (Lent et al., 1996). For example, an African American woman may be interested in male dominated field but due to perceived barriers does not take actions to accomplish it.

Performance Domain and Attainments

Finally, performance accomplishments and attainment refer to whether an individual has made a significant performance or achieved an important milestone leading to a given career and attainment is the indicator that an individual has successfully entered a given career. Performance in a chosen profession may be influenced by parallel variables such as self-efficacy and goals.

Within the domain of career-related performance, SCCT focuses on two “primary” aspects: level of attainment and degree of persistence and/or resiliency. Persistence refers to the ability to sustain the career choice over time and is a key component of performance in a chosen career. Level of attainment, or degree of mastery, is affected both directly and indirectly by actual ability, and indirectly by self-efficacy
and outcome expectation. Actual ability, or skill level, directly translates to how well a task can be completed and indirectly exerts its influence via its impact on self-efficacy and outcome expectation. Self-efficacy and outcome expectation are positively correlated with ability and influence the setting of performance goals, which within this domain refers to the level of attainment to which one aspires. According to SCCT model, there exists a feedback loop between level of attainment, ability, and self-efficacy and outcome expectations in which accomplishments promote abilities and, in turn, self-efficacy and outcome expectations. In terms of the current study, having positive (e.g. mastery) experiences within a domain will lead to an increase in both actual ability and beliefs about one’s own ability, and potential positive outcomes within that domain.

**Gaps within the SCCT Literature**

Lent et al. (1994) stated that SCCT may be a particularly good framework for studying the career development of racial/ethnic minority groups, given that factors potentially important to racial/ethnic minorities’ career development, such as the experience of racism and discrimination, can be accounted for in the model. Further, because SCCT takes into consideration the interactional role of the person (including sex and race/ethnicity) and the environment (e.g., structural barriers and supports) in shaping career relevant behavior, the model allows for a more complex examination of career development than other theories. Thus, SCCT could be an ideal framework for more comprehensively examining the career development process of racial/ethnic minorities.

The primary strength of Social Cognitive Career Theory (SCCT) is that it enables researchers to examine external, contextual factors that affect the career development process (Gysbers, Heppner, & Johnston, 2003). However, due to its roots in Bandura’s
Social Cognitive Theory, SCCT possesses a similar weakness in that it fails to acknowledge social class identity, or the power of simply feeling connected to a given social class. That sense of group identity and affiliation with a certain class may be an important predictor of career choice for some. Identity development may provide a useful compliment to the Social Cognitive tradition in the future examination of career development of African American women.

Many of the studies too numerous to cite here using SCCT have focused on secondary and post-secondary career choices and development. There are few studies that address adult populations and career development throughout their lifespan. The following sections discuss the gaps associated with SCCT:

**Gap 1:** Previous research has focused primarily on the three SCCT constructs of self-efficacy, outcome expectations, and career goals. The less known contextual variables have continued to be understudied. Few studies have emphasized career persistence in a chosen career once an individual has made the choice to enter it. Most SCCT research is based on areas that lead an individual to a chosen career. Despite years of research on variables related to cognitive structures involved in choosing a career, very little research has focused on persistence within career performance. More specifically, SCCT research does not include the contextual influences that contribute to sustaining or persisting in a chosen area.

Lent (2005) suggested that self-efficacy mediates persistence within a career. An individual’s belief that she can succeed in a career influences the amount of persistence she has in obtaining her career goal. In addition, goals were found to mediate the
connection between self-efficacy/interests and persistence (Lent, 2005; Lent, et. al, 2003).

In addition, Bandura (1986) argued that over long periods of time, persistence is determined by specific and steadfast goals. These career goals are strengthened by expected positive outcomes, which help an individual to initiate and persist within the chosen career (Lent & Brown, 1996). Further studies of persistence have suggested that the higher congruence or “fit” between a person and his or her environment predicts long-term persistence within that career (Donohue, 2006, p. 513; Lent, Brown, & Hackett, 2000, p.44). Overall, research has suggested types of variables involved in persistence, but has not delineated specific circumstances related to an individual’s persistence.

**Gap 2:** Previous research on persistence focused on quantitative methodologies that link variables. Previous research regarding career persistence using the SCCT model has involved a variety of empirically driven methodologies. SCCT research has used structural equation modeling (SEM) to draw connections between the variables (Donohue, 2006; Ferry, Fouad, & Smith, 2000; Fouad, Smith, & Zao, 2002; Gushue & Whitson, 2006; Lent et al., 2003; Pinquart, Juang, & Silbereisen, 2003). What’s notable is the lack of qualitative methodologies that attempt to explore the lived experiences of participants in an effort to gather rich data on the topic.

The phenomenological approach provides depth and meaning to the SCCT constructs from individual stories of each participant. Whiston and Bouwkamp (2003) asserted that in order to have a more holistic view of women in career decision-making, more qualitative data are needed. Qualitative depth can add substance and offer reasons as to why and which women maintain persistence within certain careers. Furthermore, in-
depth phenomenological research is needed to understand the underlying meanings within SCCT constructs such as environmental supports and barriers (Ali, McWhirter & Chronister, 2005; Blustein et al., 2005; Brown et al., 2003). In addition, qualitative studies may illuminate the complexities of other variables, such as outcome expectations and self-efficacy (Cunningham et al., 2007). As suggested by Lent et al. (2000), contextual measures should be developed by researching components which 1) reflect the influence of the environment; 2) link to theory; and 3) remain domain specific.

**Gap 3:** Much of the previous research utilized adolescents typically in university settings. The primary goal was to understand career choice goals and the persistence to matriculate through degree programs. Few studies addressed persistence once in the workforce and of those early career behaviors were investigated rather career choice and decision-making throughout the lifespan.

This multiple case study was designed to investigate the experience of contextual strengths, barriers, coping, and self-efficacy in relation to career persistence of African American women in IT, using the SCCT as a sensitizing concept (Lent et al., 1994, 2000). This study is important for three reasons: 1) The central construct of persistence within SCCT theory is under-studied; 2) the study increases the literature related to career persistence among female adults; and 3) a qualitative study allows exploration of variables in the context of an individual’s worldview. These variables may include outcome expectations, family influences, levels of self-efficacy, and coping mechanisms. An understanding of meaning may lead to more effective career intervention strategies. In addition, the study may help other researchers to understand the complexities of
potential patterns and awareness of themes that exist in the career decision-making of African American women in technology related fields.

Summary

There are few available studies that investigate the career persistence of African American women in Information Technology (IT). African American women tend to have attrition rates greater than other ethnic women, white women, or men in IT as opposed to other STEM fields. It was the goal of this research to explore retention factors that lead to the career persistence of African American women already in the IT. As stated before it does no good for the IT pipeline if these women attain careers in the field only to drop out soon after entry.

In order to better understand this phenomenon literature on the turnover and retention issues in IT was reviewed. Also reviewed were the perceived barriers to retention for women and minorities as they relate to IT profession. Social Cognitive Career Theory (SCCT) provided the framework for this study and as such an overview of the model was presented along with current gaps in the literature that were addressed as part of this research.

In sum, Lent et al. (1994) described the need for SCCT research to expand beyond processes that occur prior to, during, and just after career entry in order to attend to processes that occur later during career development. More specifically, the authors called for the inclusion of research on work adjustment themes, thus making SCCT relevant across the career lifespan. The present study responds to this call by examining the relations of proximal contextual variables, namely organizational retention strategies,
perceptions of workplace sexism, racism, and diversity practices, to career choices and attainment for African American women in the IT career field.
Chapter 3: Methodology

Introduction

The purpose of the qualitative study was to determine what factors contributed the persistence and retention of African American women in information technology (IT). The existing literature provides insight into the reasons why some women have not chosen to enter the field of information technology. However, the lack of research in persistence factors of those women is a rationale for the present study. The following sections are incorporated in chapter 3: (a) research design and method appropriateness, (b) population and sampling procedures, (c) informed consent and confidentiality, (d) data collection, (e) data analysis, (f) role of the researcher, and (g) reliability and validity.

Research Design and Method Appropriateness

Quantitative vs. Qualitative

There exist two distinct types of research, quantitative and qualitative (Creswell, 2005). Quantitative research methods are more useful for describing or examining research questions with a narrow focus. When conducting quantitative research, the initial step would be determining a hypothesis based on an extensive literature review and professional experience. A methodology for data collection would be developed that would ensure the reliability and validity of the results. The study would be conducted with concerns of researcher bias, random sampling, sample size, and any other factors to avoid corruption of the data. The collected data is then submitted to statistical analysis to determine if the results were statistically significant. Assuming that the results are
statistically significant, the hypothesis would be supported and generalized beyond the sample group to the broader population. If the research was experimental in nature, then the results may indicate a causal relationship between variables (Golafshani, 2003).

Unlike quantitative research where variables are identified and studied, qualitative research is applied when variables are unknown, complex, and require exploration (Creswell, 2005). A qualitative approach is best for study questions in which the researcher is not aware of the variables (Creswell, 2005). The goal is not to develop an experimental model for data collection. Instead, the intent is to gather a rich, detailed understanding of a subject’s experiences or of a phenomenon. While quantitative analysis may find consistency across the subject population (Labuschagne, 2003). Qualitative methods typically produce a wealth of detailed data about a much smaller number of people and cases through direct quotation and careful description of situations, events, interactions, and observed behaviors (Labuschagne, 2003, p. 100). Researchers conducting qualitative studies do not approach research with hypothesis to test; instead they are more concerned with understanding meaning of experiences and behaviors from the participant’s own frame of reference.

A qualitative method was deemed most appropriate for the study because qualitative processes provide for the investigation and comprehension of the meaningful experiences of people in real-world phenomena (Leedy & Ormrod, 2005). The purpose of qualitative research is to understand an individual’s experiences, and the goal is to provide in-depth details about how the participant perceives his or her experiences. It can lead to a better understanding of any phenomenon about which little is known (Strauss and Corbin, 1990). Further, the qualitative approach can be appropriate in situations
where the researcher has determined that quantitative measures cannot adequately
describe or interpret a phenomenon. The data provided by this study enriches the
understanding of career persistence among African American women in IT. Therefore,
qualitative research was well suited to the purpose of this study.

*Qualitative Research and Social Cognitive Career Theory*

Much of the previous research related to the Social Cognitive Career Theory (SCCT) has been extensively quantitative in nature too numerous to cite. However, several studies have incorporated qualitative data to offer depth of understanding and to better explain how and why people make particular choices. One common method has been to administer traditional quantitative surveys followed by qualitative explorations of the results. As mentioned previously, Trenor et al. (2008) utilized SCCT in a mixed methods study, interviewing women engineering students to explain quantitative survey results in depth (Trenor, et al., 2008). Similarly, a survey of college students that were prospective sports coaches revealed significant perceived barriers but positive expected outcomes among minorities (Cunningham & Singer, 2010). Researchers then followed up with focus groups to further explore this finding, determining that minority participants expected barriers in all careers.

Several studies have also used SCCT in purely qualitative ways. This approach offers the benefits of greater depth than quantitative methods. Through interviews, for example, female associate professor’s decisions to actively pursue full professorship were found to be moderated by self-efficacy, outcome expectations, and environmental factors (Pruitt, Johnson, Catlin, & Knox, 2010). Another study drew from interviews grounded in SCCT to recommend career counseling techniques for battered women (C. Brown,
These women’s contextual influences of a history of violence led to lower self-efficacy and poor outcome expectations, which in turn resulted in low career goals and actions. A study of international doctoral students that had secured academic positions used written narratives, open-ended questionnaires, and focus groups to provide a retrospective look at their job search process (Wang, Lo, Xu, Wang, & Porfeli, 2007). These studies show that SCCT can be a highly informative framework in a qualitative exploratory or explanatory setting, yielding deep and rich findings that would not be answered by quantitative work alone. For example, Trenor et al.’s initial survey found no difference among racial groups, but interviews exposed nuanced differences in the experiences of women engineering students linked to ethnicity (Trenor, et al., 2008).

**Case Study Design**

Case study methods, as described by Yin (2003), are ideal for research addressing questions of how or why, instances where the researcher has little control over the setting or events, and when the research is investigating a contemporary phenomenon, as opposed to a historical setting for which there is no access to living participants (Yin, 2003). As all three of these criteria apply to this research study, case study methods are appropriate. First, I am seeking to explain both how and why African American Women in IT act on their goals by exploring influential factors. Second, the study was not designed as an intervention or experiment so the participants’ actions were not controlled by the study in any way. Participants answered interview questions based on their own experiences in work, school, and life contexts. Finally, I investigated contemporary
experiences of the participants in that the study focused on IT professionals with 5 or more years of career persistence.

A qualitative multiple case study design was used to examine the experiences of African American women information technology (IT) professionals, their prevailing beliefs that affect their decision to remain in the occupation as well as what obstacles, if any, did these women overcome to remain in their position are also included. According to Yin (2009) the purpose of case study research is “to understand a real-life phenomenon in depth” (p. 18) and “contribute to our knowledge of individual, group organizational, social, political, and related phenomena” (p. 4). More specifically multiple case study research seeks to “gain greater insight into a research topic by concurrently studying multiple cases in one overall research study” (Johnson & Christensen, 2004, p. 378). With the abundance of barriers impacting the entry of women into the industry, why do certain women persevere? Using a multiple case study approach, this study sought to capture the experiences of African American women in IT in an effort to understand why and how they were able to successfully navigate the barriers identified in previous research literature.

A major underlying assumption of this study was that there are identifiable traits and strategies that contribute to the success of African American women sustaining careers in IT. Multiple case study methods allow for generalization across cases. Johnson and Christensen (2004) explain that multiple case study research can be conducted to compare similarities and differences in cases which may be used to more effectively generalize results “therefore compared to single case study, the researcher would have greater confidence that a similar result would happen in a new case” (p. 373).
It is important to note that this case study strategy did not search for broad generalizations across a defined population or sample, but rather to understand particular situations as encountered by the respondents themselves. With this approach the researcher is then allowed to place the data in a wider context of explicit and implicit influences surrounding the phenomena under investigation. These abilities further support the appropriateness of the case study approach.

This research strategy was selected due to the lack of studies that focus on such women. An attempt to engage in a research design that would try to establish causality or develop theory would be premature. At this point it seems more appropriate to begin preliminary research by developing a better appreciation for the lived experiences and perceptions of African American women in IT that have persisted in this male-dominated field. Yin (2003) advocated the multiple case study design in order to make the evidence influential and more convincing. The design "ensures convergent lines of inquiry" (Yin, p. 36) since the intention is to find a pattern. The depth and breadth of knowledge gained from multiple cases was related to the views and experiences of study participants.

**Population and Sampling Procedures**

*Sampling Method*

As two levels of sampling are usually necessary in qualitative case study design, the first level focused on the selection of the case to be studied, or that about which the researcher had a general question (Merriam, 2009). The second level of sampling focused on the selection of sub cases, or the numerous participants who could have been interviewed (Merriam, 2009). For the purposes of the present study, the unit of analysis (or case) is African American women in IT, and the subunits (or sub cases embedded
within the case) are African American women in IT with a minimum of five years of experience. Yin (2003) recommended a two-stage screening process of candidates for the study when the study has more than 30 possible candidates. The first stage of the screening identified potential participants, consisting of African American women IT professionals in various information technology organizations. The second stage of screening identifies operational criteria to determine qualified cases or participants (Yin, 2003).

Because this study was designed to investigate the experiences of African American women specifically, purposeful sampling was utilized in order to select a sample from which the most can be learned (Merriam, 2009). Purposeful sampling, also known as purposive or judgmental sampling, is a process requiring the selection of appropriate respondents based on a set of criteria (Creswell, 2003). Purposeful or purposive sampling allows for a researcher to “select people or sites who can best help us understand our phenomenon to develop a detailed understanding that might provide ‘useful’ information,’ that might help people ‘learn’ about the phenomenon, [or] that might give voice to ‘silenced’ people” (Creswell, 2002, p. 193). Creswell (2002) conveyed the need to select purposefully participants for qualitative studies based on the need “to develop an in-depth exploration of a central phenomenon” (p. 193) rather than seeking to generalize to a population. Another reason for its use is to obtain expansive or “information-rich” responses from sample subjects who have lived experiences that are significant in connection to the topic (Suri, 2011).
Population

African American women from various organizations including, healthcare, financial services, education, business consulting, and technology organizations throughout the U.S. who are currently employed at various levels in the IT profession were selected. The use of information technology inundates every sector of the US economy. As such, IT positions are not restricted to what would normally be considered “high tech” companies. Not only can IT positions be found in technology-laden industries such as banking and health care, but also in other economic sectors such as law, manufacturing, and education. The IT workers’ job titles that were considered for the study were in the following areas: Software Architecture, Software Development, Database Administration, Database Support Administration, Desktop Support Group, Help Desk, Networking, Systems Administration, and Computer Operations.

As stated, subjects must have worked in an IT position for a minimum of five years. Less experienced women in IT may have had fewer experiences and not be information rich (Creswell, 2002). An overarching purpose of this study is not only to understand why certain women have chosen to enter into the field, but why or how they have been able to persist. An intended outcome of this research is to develop better strategies for encouraging young women to consider careers in IT. If this is the case, then the characteristics and perceptions of women recently entering information technology professions may be different from those with sustained careers. Those just entering may not have shown their ability to handle, adjust, cope, or prevail over the challenges of working in a male-dominated industry.
The sample size of 11 African American women IT professionals was deemed appropriate based on Creswell (2005) who suggested that the sample size of 10 is suitable to conduct qualitative interviews and sufficient to reach saturation. Utilizing typical sampling, each participant selected represented the average participant, situation, and phenomenon being studied (Merriam, 2009).

A snowballing technique was also implemented. Snowballing is a non-probability sampling method used when there are a small number of subjects that have narrowly defined characteristics. Snowballing asks subjects for references of other potential subjects that share the characteristics required for inclusion in the study. Although used primarily for exploratory purposes, this sampling technique helps when the participants are potentially difficult to locate.

Initially, recruiting participants for this study began by contacting professional organizations that had an identified group of African American IT professionals. Potential participants were also identified through the researcher’s personal connections to locate African American women IT professionals for the study. When contacting different professional organizations, a written script was used to explain the purpose of the research in order to obtain a list of potential participants for the study. The various organizations contacted include:

- African American Women in Technology (AAWIT)
- National Black Data Processing Associates (BDPA)
- National Center for Women & information Technology (NCWIT)
- Association for Women in Computing (AWC)

After obtaining a list of potential participants through personal connections and contact with different professional organizations, an invitation letter via email was sent out to all potential participants to see if anyone would like to learn more about the study.
For those participants who responded with interest in participating in the study a confirmation email was sent with a request for contact information. After selection, each respondent was contacted by phone during which the researcher began to develop rapport with the respondent (Creswell, 1998); explain the purpose of the study; and set a time, date, and location for the interview.

**Sampling Challenges**

Identifying participants for this study was especially challenging, as a result many of the final eleven participants joined the study due to snowballing (references from other participants). Also difficult was identifying participants with 5 or more years of career persistence. While initial responses were significant during the recruiting process, as more information was shared about the study, potential participants chose to drop from consideration during recruiting.

Many of the potential participants mentioned being asked to participate in past studies only to find that their responses were not accurately reflected in the findings. As a result potential participants were not confident that the final research results would reflect the experience of the minority women, but rather once again group them among women in general. They also indicated that many other studies only offered survey collection methods that were too limiting in their data collection and again failed to accurately reflect African American women’s experiences. Overall there seemed to be a desire for research in this field and many who communicated their reasons for not participating in the study were enthused by the intention of the study and encouraged the researcher to continue to pursue this direction. But, ultimately the skepticism regarding the outcomes kept them from agreeing to participate in the study.
The snowballing technique then became critical in identifying potential participants. Respondents who were referred by a reliable source were more likely to participate in the study because someone they knew had previously gone through the same process. Obtaining new respondents through the recommendation of someone who has already experienced the research process may serve as a sign to the prospective respondent that the researcher is trustworthy or responsible (Sadler, Lee, Lim, & Fullerton, 2010). Trust seemed to be a factor when considering participation for the population of women considered. It was also crucial as the information provided is considered sensitive information.

However, there are also some disadvantages in using snowball sampling similar to the disadvantages of purposeful sampling. Among these is the fact that it may introduce biases, especially since initial respondents are more likely to recruit individuals who may bear very similar characteristics as them (Sadler, Lee, Lim, & Fullerton, 2010). This may create a dataset that is skewed by human perception or one that provides a limited viewpoint. Aside from that, the data obtained from snowball sampling may also not be generalizable to the total population (Noy, 2008).

In this study the women were spread across multiple states in different industries and were not completely familiar with one another. While the snowball method was used to identify potential participants with the exception of two of the women many did not know each other and their first interaction was due to the receiving notification of this study. Often women recommended other women based on having a friend who knows someone. However, this also resulted in a higher average age group of 30’s, 40’s, and 50’s. There were no women in their 20’s identified in the study. This also could be the
result of the limitation of 5 years minimum in the field which would have limited the number of younger women available for the study overall. Ultimately, I felt confident that there was good variation amongst the group given the differing locations, positions, and characteristics of the women.

**Informed Consent and Confidentiality**

*Informed Consent*

Before any interviews began, the entire research protocol was submitted to The Ohio State University’s Institutional Review Board (IRB). The purpose of the IRB was to ensure that the research design conformed to state and national laws regarding the ethical treatment of human subjects. At initial contact, the potential participants were informed about how the study would be conducted under the approval of The Ohio State University IRB, and how their confidentiality and rights would be protected through guidelines set forth in the IRB policy. One of the requirements of this process was the development of an Informed Consent (see Appendix A) release. In the Informed Consent, the general purpose and procedures of the study were presented.

In addition an information document was provided to each participant that included: (a) name and contact information of the researcher and faculty chair if any questions were related to the study; and (b) the name and contact of an appropriate person to contact (The Ohio State University IRB Committee) with questions related to one’s rights as a research participant. Prior to any interview starting subjects were informed that they could choose not to participate and terminate the session without any penalties. Participants agreed to allow the researcher to capture data from the interviews utilizing a digital recording device as well as pen and paper. Once verbal agreement was received,
the digital audio recorder was turned on to capture the interview. Participants were assured that upon informed consent, names would be held confidential and would not be available to anyone other than the person conducting the study.

Confidentiality

Due to the amount of information that was shared in this qualitative study, strategies for protecting confidentiality were carefully considered before data collection began. The participants receive confidentiality and anonymity, as identifying names do not appear in the publication of this study. Reference to individual participants occurs by using assigned participant numbers. The same assigned participant number was used to identify the participant during the interview process. As described by Creswell (2008), the disassociation of participant names and firms assisted to protect the anonymity of the study participants. Before the digital-recording was initiated, the participants were reminded that all information will be held for three years in a secure location at the researcher’s residence in a locked filing cabinet, and then destroyed. Three years after completion of the study, data will be destroyed by appropriate methods such as paper shredding and destruction of digital interview recordings of participant responses.

Data Collection

In a multiple case study research design, there needed to be a level of consistency across subjects in order to ensure that the interviews stayed focused on the research questions. In the current research study, data collection consisted of interviews conducted using a semi-structured interview guide with open-ended questions. In qualitative designs, the use of open-ended questions strengthens opportunities for a participant to expound on personal experiences without the insertion of limits (Creswell, 2005).
Interview Protocol and Procedures

For the multiple case study design, an interview protocol was essential to enhance reliability of the design and to guide the interviewer throughout the data collection process (Yin, 2009). The interviews were guided by a protocol based on the central research questions and the theoretical principals (Social Cognitive Career Theory) through which data would be analyzed. This protocol acted as a guide to assure sufficient and applicable data were collected. However, as I interacted with participants, additional probing questions flowed from a genuine desire to understand participant perspectives on a deeper level and as a natural response to unexpected information. As data were gathered, there was a continual process of assimilating new information into the knowledge previously attained through the study of theories as well as through my own personal experiences. Yin (2009) describes this process as a “continuous interaction between the theoretical issues being studied and the data being collected” (p. 59). The protocol helped in "standardizing agenda for the investigator's line of inquiry" (Yin, 2003, p. 68) to promote consistency and sequence of the interview process.

At the beginning of each interview, the researcher restated the purpose of the interview and how it would be used as a part of the current study. The beginning of the interview included information about using the digital-recorder, the transcription of data, and the necessity of reviewing the textual data for validation purposes. Participants were invited to ask questions and express any concerns that may have been present. At the close of each interview, the researcher again invited each participant to ask questions or express any concerns regarding the interview and/or study. The researcher also discussed with the participants the possibility of a follow-up interview to clarify any instances in
the initial interview that were unclear. Participants also agreed to allow the researcher to capture data from the interviews utilizing a digital recording device as well as pen and paper. The digital recording device ensured that all narratives were captured; they were later transcribed in their entirety into Microsoft Office Word® and further translated into Microsoft Excel®. The transcripts were sent to the participants via email for member checking. Member checking allowed the participants to ensure the accuracy of the data (Creswell, 2003).

Each interview took place at the time and place of the participant’s convenience. The expected length or duration of the interview was one hour and included a brief period of member checking at the close of the interview. Creswell (1994) explained that member checks involved “taking the final report of specific descriptions or themes back to participants and determining whether these participants feel that they are accurate” (p. 196). It also provided the researcher the opportunity to review notes and clarify any unclear comments.

All interview questions were designed to elicit in-depth information regarding the participants’ experiences in their profession and to explore significant incidences or themes that influence their career persistence. Although the participants were given as much time as they needed to talk about their own perceptions and experiences, the guide was still useful to remind the researcher of the points she wanted covered. However, the number of questions asked varied between subjects based on the flow of the interview. The interview guide, therefore, was important because it guided and focused the direction of the in-depth discussion with the participants to ensure that the respondents did not
deviate too much from the subject matter. When new questions emanated from the interview, an adjustment of process and procedure was made.

The process of the interview also included taking notes that were used later to complement the verbatim recorded from each participant. Taking notes served two purposes: 1) the notes taken during the interview assisted in formulating new questions as the interview progressed and verified comments that were conveyed early in the interview; and 2) taking notes while recording facilitated data analysis; including locating a quotation from the recording itself.

Immediately after each interview, I reviewed my notes and recorded any interpretations and additional thoughts for each question. This is referred to as analytic notation and involves activities such as identifying problems, developing new interview questions, and discerning patterns and themes in the data. This also represents an opportunity to jot down feelings, ideas, impressions, and speculations about what is going on.

*Interview Design*

Prior to each interview, the purpose of the study was reiterated and confidentiality procedures explained. The participants were informed that they had the right to end the interview at any time without penalty. The interview guide consisted of approximately 19 semi-structured interview questions that explore the subject’s perceptions of how they have been able to persist with their chosen career, and the influences on their persistence. Brief probes were used to elicit more detailed information from the participants throughout the interviewing process. Probes such as “Tell me more about that,” or “Could you explain?” were used when I was unclear as to the meaning of the response or
when responses to questions appeared to be ambiguous. Field notes were written and reviewed within 48 hours following the interviews.

According to Yin (2009), the interview is one of the vital sources of evidence for case study research and can take several forms. Most interviews are of an open-ended nature which means that the researcher can ask about facts, opinions, or insights from the respondent. Another type of interview is the focused interview which uses a focused set of questions derived from the case study protocol. A third type of interview uses structured questions along the lines of a survey. Yin focused on the need for interviews to be conversational questions conducted in a non-biased manner within the bounds of the case study protocol (1994, p. 90). Open-ended questions and a friendly environment are vital to respondent answers. According to Yin, “As a result most commonly case study interviews are open-ended nature, in which you can ask key respondents facts of a matter as well as their opinions about events” (1994, p. 90). Therefore, this study used open-ended interview questions using a conversational approach.

The interview questions were based upon the primary research questions, Social Cognitive Career Theory (SCCT) construct variables, and the literature review of turnover and retention in information technology. This researcher focused the open-ended and sub questions on the theoretical constructs of this study and based questions upon the precepts of the literature review. As described by Neuman (2005) the recollection of common lived-experiences from participants during interviews might help to identify specific themes of valuable information. The semi-structured interview also gives the investigator the latitude to explore unanticipated topics through follow-up, re-directs, and probing questions (Yin, 2003). Categories and themes were expected to evolve in
accordance with the exploration approach used throughout the interview (Hancock & Algozzine, 2006). Participant responses with similar characteristics were grouped in categories, whereas themes were sought from the responses to describe the phenomenon under study.

Hancock and Algozzine (2006) viewed semi-structured interviews as most appropriate for case study design. The flexibility in the wording of the questions, although predetermined, allowed the participants the freedom to express opinions and share experiences explicitly and unreservedly, and persuaded further inquiry when needed (Hancock & Algozzine, 2006). A well-defined context helped to enhance meaningful and purposeful disclosure of information (Crabtree & Miller, 1999). The information gleaned from individual understanding of the phenomenon helped to generate significant themes and narratives.

Qualitative data from semi-structured interviews provide rich, deep descriptions of African American women in IT experiences and beliefs, potentially identify causal links, and allow for exploration beyond the researchers’ original conceptions (Miles & Huberman, 1994; Patton, 2002). Interviews allowed participants to express themselves in their own words, rather than being bounded by the preconceptions of the researcher.

Primary Research Questions

The attrition of women and minorities in IT is a concern to educators, organizations, and policy makers as the information technology pipeline issues grow. This study explored the factors that contributed to the career persistence of African American women in information technology. The following primary research question guided the study:
1. What factors were identified by African American women currently in IT that influenced their decisions to pursue a career in IT?

2. What do African American women currently in IT identify as the most important retention factors influencing their decision to remain in information technology?

3. What perceived barriers, if any, did African American women overcome to sustain their IT careers?

These questions assisted in exploring the characteristics common to African American women in IT that explain their persistence and success in IT fields. Understanding conditions under which African American women adapt to, and negotiate challenges and change in IT settings, we can better explain how they maintain career persistence. With a more thorough understanding of the influences that contributed to these women persisting in information technology careers, educators, organizations, and policy makers will be better informed in their creation of programs and policies to increase the number of women and minorities in the field of information technology.

**Secondary Research Questions**

According to Yin (1994), “The heart of a protocol is a set of substantive questions reflecting your actual line of inquiry,” (p. 20). Understanding case study research requires a focus on the questions. Research question should have both substance and form.

“Substance includes what the study is about, and form includes ‘who’, ‘what’, ‘where’, ‘why’ or ‘how’” (Yin, 1994, p. 21). According to Yin, reviewing the literature is a way to make questions sharper and more insightful (1994, p. 21). “As a result most commonly case study interviews are open-ended nature, in which you can ask key respondents facts
of a matter as well as their opinions about events” (1994, p. 90). Therefore, this study used open-ended interview questions using a conversational approach (Appendix B). These questions assisted in exploring the characteristics common to African American women in IT that explain their persistence and success in IT fields.

**Data Analysis**

The data analysis for the study commences once the interview and data collection process are completed. Creswell (2002) referred to the process of data analysis as inductive as the process entails going from data, which is particular and detailed, to more general data involving coding and the creation of themes. Stake (2006) outlines five steps of analysis. These are as follows: 1) within-case analysis; 2) across-case analysis; 3) comparison with the literature; 4) writing the case report; and 5) checking for credibility and validity. In the initial phase of the research design, each individual was treated as a separate case study. The intent was to respect the individuality of the subjects and capture the essence of their experiences and perspectives (Stake, 2006).

**Within-Case Analysis**

The interview transcripts were read and reviewed multiple times to gain an understanding of the participants’ voices (Creswell, 2008). After reviewing the transcripts, open coding was used to identify concepts and patterns. Initial attempts were to identify the broad concepts and patterns within the dialogue of the transcripts. Transcripts were then analyzed at paragraph and sentence levels. A Microsoft Excel spreadsheet was used and each worksheet in the workbook represented a main interview question, totaling 19 worksheets. Upon reading and highlighting all responses, significant statements were placed in bold, for each question. After all significant statements were
bolded; those statements were then placed into groups, clusters and meaning units, for the development of broad themes.

The purpose of this coding was to capture the individual concepts and patterns conveyed in the raw transcripts (McCann & Clark, 2003). At this stage, the analyses of the concepts and patterns were done independently of each other. Highlighting significant statements, sentences or quotes that provide an understanding of how the participants experienced the phenomenon. As the open coding process proceeded, care was taken to recall the perspectives and voices of the subjects in order to preserve the true meaning of the words used as the statements were divided into their most basic elements and recombined to move towards a holistic meaning. Simply identifying the concepts and patterns expressed in the transcripts was the goal.

Axial coding (Strauss & Corbin, 1998) permitted the primary investigator to identify links between the independent concepts captured during open coding. Similar concept and pattern codes were organized into categories. Links were then created between categories and subcategories (McCann & Clark, 2003). These initial coding levels were focused on accurately documenting the observations gathered through the data collection process.

Selective coding (Strauss & Corbin, 1998) guided the interpretation of the outcomes of the first two levels of coding. At this stage, relationships between categories were analyzed to determine themes that illuminate the research questions (McCann & Clark, 2003). During this phase, the overarching categories or themes were compared with previous literature. The purposes of literature at this stage included: a secondary data
source; prompt unexplored questions relating to the data; and provide a means of validation (Strauss & Corbin, 1998).

Each of the individual case studies followed this method of coding and thematic analysis. In this process, additional attention was given to determining the presence of Social Cognitive Career Theory (SCCT) variables among the subjects. Once the individual analysis of the first round of interviews was completed, the process moved into the across-case analysis phase.

**Across-Case Analysis**

The purpose of the across-case analysis is to identify the recurring themes across the individual case studies that provide insight into the phenomenon being studied. Stake (2006) provided a systematic approach to organizing and analyzing the individual case study observations that worked towards the central research questions.

The methods described were based on Stake’s model of cross-case analysis. Stake provided a series of seven worksheets that cover the entire multiple case study process. For this study not all worksheets were used in the data analysis and some worksheets were modified to best fit the needs of the data collected. Stake acknowledged that his model was a series of recommendations and that the researcher must determine which components are appropriate for use in his or her unique study.

The purpose of the cross-case analysis is to identify the recurring themes (similarities and differences) across the individual case studies that provide insight into the phenomenon being studied. The researcher compared each incident in the data with other incidents appearing to belong to the same category while exploring their similarities and differences. This process reduces and groups data into meaningful categories (Strauss
& Corbin, 1998). This included a comparison of identified patterns, assertions, and interpretation of each case in comparison with the others.

Across-case analysis was an important part of the overall research process as it dictated the conclusions that might be derived from the overall study. Creswell (2003) reported the necessity of reducing the number of themes to five to seven as “it is best to write a qualitative report providing detailed information about a few themes rather than general information about many themes” (p. 267). The key emerging themes might facilitate the capture of opinions, concerns, and attitudinal behaviors, which relate to the research purposes and research questions of the study.

Once multiple cases were interpreted, the researcher employed cross-case analysis, which identified groups, recurring themes, and relational patterns cross all cases. Cross-case analysis improved external validity and provides a dynamic interpretation of data (Merriam, 2009; Yin 2003). Upon completion of the cross-case analysis, the researcher provided narratives giving meaning to the data analyzed and reported the findings of the information (Creswell, 2003; Yin, 2003).

Comparison with Literature

During this phase, the overarching categories or themes were compared with previous literature. As stated earlier the purposes of literature at this stage included: a secondary data source; discussion of unexplored questions relating to the data; and provide a means of validation (Strauss & Corbin, 1998). Performing a comprehensive review of the literature for this study necessitated using the Internet, online databases, articles, and published books.
Internet searches primarily generated resources from government organizations that documented population statistics and labor projections. Professional technology organizations that provided information on the IT profession and the IT shortage were also generated through the Internet searches. The researcher primarily used EBSCOhost, InfoTrac, and ProQuest databases to search periodicals, scholarly journals, newswires, and dissertations for relevant literature. Books published on the topics of retaining employees provided additional information for the literature review. At this stage previous literature was revisited and a brief new search of literature was engaged to understand any new themes that may have emerged as a result of the information gathered as part of this research. The objective was to determine whether the variables/patterns/themes may be validated as meaningful underlying factors.

Writing the Case Report

Upon completion of the cross-case analysis, the researcher provided narratives giving meaning to the data analyzed and reported the findings of the information (Creswell, 2003; Yin, 2003). Writing the case report is an ongoing and integral part of multiple case study research (Stake, 2006). In this case the case report is summarized within Chapter 4.

Role of Researcher

Creswell, (2003) Merriam (2009) and Yin (2003) identified competencies and positions the researcher must employ when conducting research, as they are the primary mechanism to gather information. Researchers must possess skills and characteristics, which allows them to build rapport with the participants and ask suitable questions while listening with impartiality. Although it is important that researchers have an
understanding of the issues being studied, it is their responsibility to identify any possible biases or preconceived ideas of the study’s outcome (Creswell, 2003; Yin, 2003). Identifying potential biases is especially important when researchers complete their study in a familiar environment.

Creswell (2003) explained how personal values, biases, and assumptions of the researcher can affect the mechanics of the study including how data is collected, analyzed, and interpreted. These conditions are not necessarily detrimental to a qualitative study. In fact these circumstances may enhance the researcher’s awareness of the context and conditions of the study, and provide a greater insight on findings and patterns that may emerge from the data (Creswell, 2003; Hatch, 2002). The researcher must act to devise a method of separating personal feelings, impressions, and interpretations from the descriptions and perspectives provided by the participants as data are collected (Hatch, 2002).

As the researcher I am also an African American woman with experience in information technology. As result I took steps to ensure that personal bias did not influence the study negatively, but did consider my own experiences when reviewing the literature and developing questions I believed could add additional insight into the research study. Coding of information and a research journal assisted me in systematically reflecting on new information as it can then be more effectively distinguished from personal biases and views (Creswell, 2003).

Additionally, the researcher is familiar with a few of the participants, having prior professional relationships with them. This prior familiarity evoked a feeling of rapport, comfort, and trust, which is necessary when conducting case study research, and allowed
the researcher to adapt and be flexible with the interview questions based on the responses of the participants. The researcher employed numerous strategies in validating the data, which are discussed later in this chapter.

**Researcher Bias**

Validity threats in qualitative research as described by Maxwell (2005) often revolve around two main issues, researcher bias and reactivity. Clarifying research bias from the outset of the study is important so the reader understands the researcher’s position and any biases or assumptions that impact the inquiry (Merriam, 2009). Through this process the researcher comments on past experiences, biases, prejudices, and orientation that have likely shaped the interpretation and approach to the study.

As an African American woman working in Information technology, pursuing a study where I have a vested interest in the data that I collect creates reasonable concerns of which I must be aware. Glesne (2006) and Maxwell (2005) discuss the ramifications of having preconceptions prior to data collection. I have been explicit with the fact that my background certainly was an impetus to many of the questions I have. It was important, however, not to impose my interpretation of what is going on into the career of the female participants. As Maxwell (2005) argues, I needed to be aware of how my “values and expectations influence the conduct and conclusions of the study (which may be either positive or negative) and avoiding the negative consequences” (p. 108). This was addressed through careful use of my interview protocol and the use of questions that target the goals of the study. As Maxwell (2005) suggests, I needed to gather evidence through the interview method in such a way that my background is not creating a validity threat. It was important to probe the participants to gather as much meaning to their
answers as possible while trying to avoid any tangential follow-up queries based on experiences I may have had. I needed to write rich descriptions on the participants themselves and their behavior as the interviews proceeded to allow for as much transparency in what the participants were thinking rather than forcing the reader to have to interpret my interpretations of the participants’ thoughts.

The sharing of my data interpretation with the participants, member-checking, was one-way to ensure more accurate interpretation of the interview and as a way to reduce misunderstanding as much as possible. This respondent validation allowed for additional evidence that responses given in interviews were not affected by my biases.

**Reliability and Validity**

Reliability and validity issues may have been factors in this research. Open-ended questions constructed specifically for the purpose of this study were used rather than a standardized instrument. Also, researcher bias may have occurred in the interpretation of the results, especially since the research topic is familiar and of particular interest to me.

Those critical of case study research often say that the investigator fails to develop a sufficiently operational set of measures and that “subjective” judgments are used to collect data. In case study research, the researcher is the instrument; hence, validity hinges on skill, competence, rigor, and the quality of the relationship formed between the participant and the researcher. Conscious attempts were made to be as fair and accurate in data collection, analysis, and reporting as possible. For data reliability and validation, member checking and clarifying research bias are the two validation strategies that were used for this study.
**Validity**

In qualitative research, validity reflects authenticity (Neuman, 2005). Authenticity in this regard indicates truthfulness, accountability of findings, and credibility of the conclusions evolving from data analysis. With the use of multiple case study design, capturing real-life experiences of participants ensures the validity of the data. Yin (2003) concurred that honesty and truthfulness in transcribing data are salient features of validity in the case study design.

According to Creswell (2003) the validity and strength of qualitative research is based on “determining whether the findings are accurate from the viewpoint of the researcher, the participants, or the readers of an account. Researchers must be aware of potential threats to the validity of phenomenological research, such as inadequate interviewing procedures, unsuitable population, transcription and coding errors, incorrect descriptions, and researcher bias (Cooper & Schindler, 2003; Creswell, 2003, 2008); and should include countermeasures to address accuracy, validity, and reliability of the study findings.

**Internal Validity**

For the multiple case study design, internal validity was achieved by employing checking techniques. One of the means to ensure internal validity was that after transcribing the interviews, the textual data were reviewed again to ensure that all information was transcribed. In this manner, statements were checked for correctness and inclusion. The internal validity of this study is high because it is participant driven. The interviews were conducted in a natural setting or via telephone conferencing, thereby allowing sufficient time to refine assertions and recheck the conclusions of the
participants’ responses. Moreover, the interviews allowed the use of language and symbols that are familiar to the participants, thereby providing opportunity for the participants and researcher to clarify meanings. Participants also had the opportunity to validate their responses after they were transcribed from digital-recordings (member checking). All interview transcriptions were sent to each participant to confirm and verify all responses were accurately recorded.

The credibility of the data interpretations was verified through member checking. Cresswell (2008) explained that member checking is a form validating the accuracy of qualitative interviews information back to the participants. To further illuminate the findings, the researcher included rich text descriptions of the participant’s lived experiences through their voices to convey the findings in Chapter 4 (Creswell, 2008). These rich descriptions provide the reader with an opportunity to experience the connections through the exact words that were spoken by the participants. By using multiple strategies as outlined by Creswell (2008) and by the researcher personally transcribing the interviews, the researcher checked for accuracy of the data and of the results in this study.

External Validity

External validity of a research study focuses on generalizability of findings, outcomes, and conclusion as well as applicability to other situations (Dereshiwsky, 1999). Reliance of the multiple case study design on real-life experiences that give contextual relevance to the phenomenon under study has increased the external validity aspect of the research study. Taking people as they are, "in all their often-messy complexity" (Dereshiwsky, p. 2), increases the chance for generalizability of findings.
Johnson and Christensen (2004) explain that multiple case study research can be conducted to compare similarities and differences in cases which may be used to more effectively generalize results “therefore compared to single case study, the researcher would have greater confidence that a similar result would happen in a new case” (p. 373). Thus, capturing real experiences does not assure the generalizability aspect of the multiple case study design; rather the experiences reflect the circumstances garnering the phenomenon under study. Approaches that ensured applicability of findings and went beyond the limitations of the research study included cross-method investigation and the intense use of literature review (Cooper & Schindler, 2006). Cross-case synthesis is advocated when analyzing data to improve external validity and consider the research more vigorous (Merriam, 2009; Yin 2003).

Reliability

Reliability answers questions related to consistent measurement, stability or predictability of findings (Dereshiwsky, 1999). In qualitative, exploratory studies, the standards for reliability are different from those for quantitative studies. Miles and Huberman (1994) posited “in qualitative research, issues of instrument validity and reliability ride largely on the skills of the researcher” (p. 38). They suggested that the researcher should be familiar with the phenomenon being studied and should possess “good ‘investigative skills,’ including doggedness, the ability to draw people out, and the ability to ward off premature closure” (p. 38).

Owing to the reliance of case study design on the life experiences of key informants, the individual variation of those experiences, and the contextual orientation of the design, replication of the research study yielded different findings (Creswell,
In the research study, reliability was achieved by applying the interview protocol, in which a systematic and consistent approach to data collection was prompted (Dereshiwsky, 1998).

Field notes (Creswell, 2003; Johnson & Christensen, 2004) were used before, during and after interviews with the participants. Field notes included descriptions of actions, contexts, and conversations written with as much detail as possible and written immediately after interaction with the participants in order to try to preserve impressions and preliminary interpretations. These initial interpretations provided valuable insight related to the research questions as data collection continued throughout the study. Bracketing was used in these field notes to separate potential bias information such as impressions and feelings of the researcher from information obtained from the participants.

**Summary**

In this chapter, the methodologies for this study were presented. This included sections to describe the methodology, research design, and appropriateness of the design. A detailed discussion regarding sampling, informed consent, and confidentiality is also included. Contained within chapter 3 is a discussion of the data collection, data analysis, and concerns regarding reliability and validity of the current study.

Based on the information obtained through an interview process, an interpretation of the results allows for an understanding of the findings within a larger, more abstract meaning directed towards the prospective audience of educators, human resources managers, and policymakers (Creswell, 2002). Chapter 4 includes the findings and results
of the study seeking to understand the nature or meaning of the experiences of African American women in IT.
Chapter 4: Presentation of Findings

The purpose of the qualitative multiple-case study design was to explore lived experiences of 11 African American women in Information Technology (IT) for factors that contribute to their retention and career persistence in the field. With a more thorough understanding of the influences that contributed to these women persisting in information technology careers, educators, organizations and policy makers will be better informed in their creation of programs and policies to increase the number of women and minorities in the field of information technology.

The research findings and data analysis discussion are organized in the following sections of the chapter: (a) overview of individual cases, (b) data analysis and presentation of findings, and (c) summary of the themes discovered through the research process. The research design and methodology were discussed in chapter 3.

The qualitative multiple case study approach provided the means to explore the phenomenon of career persistence of African American women working in IT for 5 or years. The following research questions guided this study:

1. What factors were identified by African American women currently in IT that influenced their decisions to pursue a career in IT?
2. What do African American women currently in IT identify as the most important retention factors influencing their decision to persist in information technology?
3. What perceived barriers, if any, did African American women overcome to sustain their IT careers?

The predefined interview questions (Appendix B) yielded insights into career motivations, experiences in the workplace as female participants, workplace support, challenges, and rewards. Other topics such as effectiveness and perceptions of mentoring, societal pressures on work-life balance, and coping mechanisms emerged through deeper discussions with participants.

The data collected through the face-to-face and telephone interviews was analyzed using multiple techniques. These techniques included the digital recording of the conversation, field notes taken during and at completion of the interview, and transcription of the interview recordings. The interview transcripts were also sent to the participants asking them to verify the findings, allowing them to make corrections and/or additions for additional member checking. However, not all participants returned feedback. Of those who responded none of the participants made any changes to the interview transcripts. Any information absent from the transcripts was later obtained by contacting the appropriate participant via e-mail or phone. However, secondary follow-up discussions initiated by participants occurred and were noted in the researcher’s field notes and added to written transcripts. Once all of the interviews were completed and transcribed with any updates or corrections, preliminary analysis began.

**Overview of Individual Cases**

Twelve African American women were interviewed as part of the study. However, the results presented here only include feedback from eleven women as one woman dropped from the study during member checking. The participant expressed
concerns with organization information shared as part of the interview and asked that her responses be completed removed. All information related to her interview was later deleted or destroyed including the digital recording, transcribed documents and field notes.

In order to maintain anonymity each participant was assigned a participant number. However, general demographic data is included. This data was later used during the analysis process to search for associations among categories, subcategories, and specific demographic attributes. Table 2 below list these attributes for each participant.

Table 2

<table>
<thead>
<tr>
<th>Participant #</th>
<th>Position</th>
<th>Education</th>
<th>Major</th>
<th>Age</th>
<th>Married</th>
<th>Child</th>
<th>Years in IT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001</td>
<td>Application Systems Manager</td>
<td>B.S.</td>
<td>Computer Science</td>
<td>48</td>
<td>Yes</td>
<td>Yes</td>
<td>20</td>
</tr>
<tr>
<td>1002</td>
<td>Technology Manager</td>
<td>B.S.B.A./MBA</td>
<td>Marketing</td>
<td>57</td>
<td>Yes</td>
<td>Yes</td>
<td>20</td>
</tr>
<tr>
<td>1003</td>
<td>Software Engineer</td>
<td>B.S.B.A.</td>
<td>Information Systems</td>
<td>36</td>
<td>No</td>
<td>No</td>
<td>10</td>
</tr>
<tr>
<td>1004</td>
<td>Infrastructure Technology Manager</td>
<td>B.S.</td>
<td>Electronics Engineering Technology</td>
<td>51</td>
<td>Yes</td>
<td>Yes</td>
<td>26+</td>
</tr>
<tr>
<td>1005</td>
<td>Technology Relationship Manager</td>
<td>B.A.</td>
<td>Accounting</td>
<td>50</td>
<td>Divorced</td>
<td>Yes</td>
<td>14</td>
</tr>
<tr>
<td>1006</td>
<td>Senior Change Mgmt Consultant</td>
<td>B.S.B.A.</td>
<td>Business Admin and Technology</td>
<td>50</td>
<td>No</td>
<td>No</td>
<td>15</td>
</tr>
<tr>
<td>1007</td>
<td>Systems Analyst and Project Coordinator</td>
<td>Some college no degree</td>
<td>Business Administration</td>
<td>51</td>
<td>Yes</td>
<td>Yes</td>
<td>20+</td>
</tr>
<tr>
<td>1008</td>
<td>Technology Project Manager</td>
<td>B.A.</td>
<td>Business Administration</td>
<td>39</td>
<td>Yes</td>
<td>Yes</td>
<td>11</td>
</tr>
<tr>
<td>1009</td>
<td>Business Systems Analyst Lead</td>
<td>B.S. and M.S.</td>
<td>Computer Science</td>
<td>45</td>
<td>No</td>
<td>Yes</td>
<td>20</td>
</tr>
<tr>
<td>1010</td>
<td>Control Oversight Officer</td>
<td>B.S.</td>
<td>Computer Science</td>
<td>47</td>
<td>Yes</td>
<td>Yes</td>
<td>18</td>
</tr>
<tr>
<td>1011</td>
<td>Database Analyst</td>
<td>B.S.</td>
<td>Computer Tech</td>
<td>50</td>
<td>No</td>
<td>Yes</td>
<td>25</td>
</tr>
</tbody>
</table>
Due to the sensitive nature of the information provided and the promise of anonymity individual narratives of each case is not included. Several of the women expressed concerns regarding the sharing of information especially company information as it may violate company confidentiality policies. As result I am only presenting the overall information of the entire study population. However, detailed responses from the participants are included in the findings where the concern over confidential information is not an issue.

The women in the study work in a range of organizations ranging from medium to large sizes. While some women indicated previous employment in small businesses none of the women in this study work for organizations smaller than several thousand employees. This is noted because company resources may impact availability of program and retention strategies important to the participants in this study. One of the women had indicated that she had recently left a smaller organization to return to a previous employer because the smaller organization could not offer her development opportunities. The organizations and industries the participants are currently employed with range from government offices, financial institutions, manufacturing, and consulting firms.

Of the eleven women in the study, eight have strictly technical roles requiring they use key technical skills as part of their daily responsibilities. The other three women hold management positions and admit that they are no longer required to complete technical tasks daily. However, they are expected to maintain technical awareness in order to appropriately lead staff. Most of the women indicated that they were able to transition through multiple technical (software development, networking, database, and infrastructure) positions in their career and attributed that to organization size. All of the
women indicated that they were either the only women or person of color within their designated department/group.

Of the eleven women, ten have children of varying ages and indicated that having children impacted their career development and choices. What was most evident in the information was that less than half of the women in the study have computer science or related (i.e. information systems) degrees. Several stated that the lack of a degree in computer science did not hinder their entry into the field nor their persistence. However, several of the women also indicated that increasingly a degree is preferred for entry into the field today. Many of the women were self-taught in technical skills and see this as a key to maintaining their careers. The average age among the women is above forty, but only one woman expressed a concern regarding aging in the workplace.

Data Analysis and Presentation of Findings

The first phase of analysis involved coding, categorizing, and searching for themes within the individual cases. Participant transcripts were reviewed and relevant statements to the study were abstracted. Each statement was considered to have equal value and contribution to the understanding of the experience. Microsoft Excel was used and each worksheet in the workbook represented a main interview question, totaling 19 worksheets. Upon reading and highlighting all responses, significant statements were placed in bold, for each question. After all significant statements were bolded; those statements were then placed into groups, clusters and meaning units, for the development of broad themes. A revised listing and preliminary grouping table was used to cluster the emerging themes. Initially, the data was organized by the structured questions and additional probing questions asked in each interview. This technique worked, but more
important to the study were the repeating topics that surfaced. These surfacing topics were the themes used to present the interview data found in Table 3.

Table 3

*Within Case Codes*

<table>
<thead>
<tr>
<th>Interview Questions and Initial Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interview Questions</strong></td>
</tr>
<tr>
<td>1. Based on your experiences, why did you pursue a technology career and what impacts your decision to remain in the profession?</td>
</tr>
<tr>
<td>2. Based on your experiences, what are the contributing factors for sustaining your position? How long do you plan to sustain this position?</td>
</tr>
<tr>
<td>a. What strategy do you use to stay competitive?</td>
</tr>
<tr>
<td>b. What characteristics do you believe you have that allow or enhance your capabilities to sustain your position?</td>
</tr>
<tr>
<td>c. What strategies do you feel contribute to your success?</td>
</tr>
<tr>
<td>3. Based on your experiences, can you explain to me what reasons you have to continue to work for your present organization and why these things are important? What would affect your decision to leave or stay with the organization?</td>
</tr>
<tr>
<td>4. Based on your experiences, what sacrifices, if any, have you made to remain in your position?</td>
</tr>
</tbody>
</table>

Continued
Table 3 continued

<table>
<thead>
<tr>
<th>Interview Questions</th>
<th>Initial Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Based on your experiences, what is it about your job that creates ‘feelings of satisfaction’?</td>
<td>Being Innovative, Delivering Quality Service, Inclusive Culture, Adds Value, Coaching/Mentoring, Technical Expertise, New Learning Opportunities, Respect, Flexibility, Compensation, Autonomy</td>
</tr>
<tr>
<td>7. Based on your experiences, what are the most important benefits an employer can offer an employee and what makes you desire these benefits?</td>
<td>Comprehensive Benefits, Flexibility (Schedule), Rewards and Recognition, Professional Development</td>
</tr>
<tr>
<td>8. Based on your experiences, what are the incentives offered at your present place of employment that entice you to stay?</td>
<td>Tuition Assistance (informal/formal), Flexibility (Schedule), Monetary Rewards, Work From Home, Increased Compensation</td>
</tr>
<tr>
<td>9. Based on your experiences, can you describe what you would change in your present position that would be an incentive to stay?</td>
<td>Increased Diversity, Clear Career Paths, Continuing Education, Employee Engagement, Reduced Workload</td>
</tr>
<tr>
<td>10. Based on your experiences, if certification bonuses or flexible scheduling were offered by your organization as added benefits would they be important to you? Why or why not?</td>
<td>Continuous Education, Work/Life Balance</td>
</tr>
</tbody>
</table>

Continued
Table 3 continued

<table>
<thead>
<tr>
<th>Interview Questions</th>
<th>Initial Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Based on your experiences, can you describe what obstacles you had to overcome in your career?</td>
<td>Equity In Career Advancement Credibility Gender and Racial Bias Work/Life Balance Lack of Advocacy Isolation</td>
</tr>
<tr>
<td>12. Based on your experiences, can you describe what, if any, are current obstacles in your career? How might your organization help you to overcome them?</td>
<td>Lack of Role models/Mentors Trust in Management Gender and Racial Bias Lack of Continuous Education Lack of Support Lack of Work/life Balance</td>
</tr>
<tr>
<td>13. Based on your experiences, what has kept you moving forward in this field? Were you made aware of advancement opportunities?</td>
<td>Curiosity of Technology Self Confidence Constant Change High Salaries Technical Expertise Provide Mentoring Being Innovative Continuous Education Spirituality Visibility Respect</td>
</tr>
<tr>
<td>14. Based on your experience, what, if any, effects have the “glass ceiling” had on your career progression?</td>
<td>Stalled No Role Models No Advocates No Diversity Lack of Opportunities Credibility</td>
</tr>
<tr>
<td>15. Based on your experience, how would you describe your relationship with your peers, subordinates, and superiors?</td>
<td>Good Working Relationship Positive Working Relationship Family Lack Trust Non Value Add</td>
</tr>
<tr>
<td>16. Based on your experiences, can you describe what leadership style you prefer your unit manager/director to have and why this is important to you?</td>
<td>Supportive Engaged Hands off Allows Autonomy Open Door Provides Coaching Advocate Clear Direction</td>
</tr>
</tbody>
</table>

Continued
Table 3 continued

<table>
<thead>
<tr>
<th>Interview Questions</th>
<th>Initial Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>17. Based on your experiences, can you describe if you have the support you need from your manager/director to do your job? How does this impact your decision to stay or leave your organization?</td>
<td>No, Lack Recognition  No, Advocate  Yes, Value and Respect</td>
</tr>
<tr>
<td>18. Based on your experience, what are your experiences with mentors? a. How do you feel about mentoring other women?</td>
<td>Early Career Roles Models/Mentors  Manager/Supervisor as Mentor  Different Sex  Different Race  Difficult to Find</td>
</tr>
<tr>
<td>19. Based on your experience, what changes do you think need to be made in order to increase the number of women in information technology?</td>
<td>Commitment to Diversity and Inclusion  Target Recruitment and Retention  Advocate  Less Talk More Action  Secondary and Post-secondary engagement  Equitable Pay  Role Models (formal program)  Increased Awareness</td>
</tr>
</tbody>
</table>

Across-Case Findings

The second phase of the analysis involved themes consolidated across all cases. The number of participants using relevant key words and phrases identified through the open coding of the interview data was noted. Further consolidation of similar themes was also completed. Again the themes were grouped by the interview questions. Participants were then tabulated to determine the percentage of participants that contributed to the identified theme found in Table 4.

In this case, commonalities were of greater interest than differences as the study’s intent was to identify the most common influences on the population African American women rather than individual experiences. This phase included additional member checking with two participants to ensure that the themes identified accurately represented
the essence of their perspective. A comparison of information from cross-case analysis allowed the researcher to summarize the results which are depicted in Table 4 as a cross-case summary. A cross case data display of the data in a “uniform framework” can help researchers determine the importance of themes and ideas (Yin, 2009, p. 156).

Cross-case analysis of the data helped to collapse categories, refine themes, and determine relative categories. Findings are presented in tables and support the formation of a data display depicting refined categories from which conclusions are supported. These strategies were consistent with the “replication approach to multiple-case study” (Yin, 2009, p. 87) analysis and help to assure accuracy of the data.

The results of the study are not a retelling of the individual case analyses, but a presentation of the findings associated with the overarching research questions and how the individual cases support those findings. Once confirmed through member checking the secondary questions were then sorted as to their relevance to each of the primary research questions (Appendix C). This chapter will present the findings from the analysis process. Each of the three research questions is presented with a table outlining the participants’ responses in the form of clusters (themes), with accompanying discussion and supportive examples derived from the interviews and literature.
Table 4

*Emergent Trends from Cross-Case Analysis*

<table>
<thead>
<tr>
<th>Interview Questions</th>
<th>Open Codes</th>
<th>The number of participants using relevant key words and phrases</th>
<th>Percentage of participants using relevant key words and phrases</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Based on your experiences, why did you pursue a technology career and what impacts your decision to remain in the profession?</strong></td>
<td>Constant Change</td>
<td>11</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Variety</td>
<td>10</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>Logical Thinking</td>
<td>9</td>
<td>82%</td>
</tr>
<tr>
<td></td>
<td>Curiosity of Technology</td>
<td>8</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>Problem Solving</td>
<td>8</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>Understand How things Work</td>
<td>7</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>High Salaries</td>
<td>6</td>
<td>55%</td>
</tr>
<tr>
<td></td>
<td>Math Skills</td>
<td>4</td>
<td>36%</td>
</tr>
<tr>
<td><strong>2. Based on your experiences, what are the contributing factors for sustaining your position? How long do you plan to sustain this position?</strong></td>
<td>Continuous Learning</td>
<td>11</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Learn New Things</td>
<td>9</td>
<td>82%</td>
</tr>
<tr>
<td></td>
<td>Accept Change</td>
<td>9</td>
<td>82%</td>
</tr>
<tr>
<td></td>
<td>Being Innovative</td>
<td>8</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>Build Multiple Tech Skills</td>
<td>7</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>Awareness of Current Events</td>
<td>2</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>Take Risks</td>
<td>1</td>
<td>9%</td>
</tr>
</tbody>
</table>

Continued
<table>
<thead>
<tr>
<th>Interview Questions</th>
<th>Open Codes</th>
<th>The number of participants using relevant key words and phrases</th>
<th>Percentage of participants using relevant key words and phrases</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Based on your experiences, can you explain to me what reasons you have to continue to work for your present organization and why these things are important? What would affect your decision to leave or stay with the organization?</td>
<td>Availability of Training</td>
<td>11</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Variety</td>
<td>10</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>Flexibility (Schedule)</td>
<td>9</td>
<td>82%</td>
</tr>
<tr>
<td></td>
<td>Inclusive Culture</td>
<td>8</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>Comprehensive Benefits</td>
<td>8</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>High Salary</td>
<td>5</td>
<td>45%</td>
</tr>
<tr>
<td></td>
<td>Adds Value</td>
<td>3</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>Comfortable</td>
<td>2</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>Fear of Change</td>
<td>2</td>
<td>18%</td>
</tr>
<tr>
<td>4. Based on your experiences, what sacrifices, if any, have you made to remain in your position?</td>
<td>Work/Life balance</td>
<td>10</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>Assimilation (Lost Identity)</td>
<td>7</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>Equitable Pay</td>
<td>4</td>
<td>36%</td>
</tr>
<tr>
<td></td>
<td>Being Innovative</td>
<td>2</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>Geographic Restrictions</td>
<td>1</td>
<td>9%</td>
</tr>
<tr>
<td>5. Based on your experiences, what is it about your job that creates “feelings of satisfaction”?</td>
<td>New Learning Opportunities</td>
<td>11</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Autonomy</td>
<td>10</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>Flexibility</td>
<td>9</td>
<td>82%</td>
</tr>
<tr>
<td></td>
<td>Inclusive Culture</td>
<td>8</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>Being Innovative</td>
<td>7</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>Delivering Quality Service</td>
<td>7</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>Adds Value</td>
<td>7</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>Technical Expertise</td>
<td>7</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>Respect</td>
<td>7</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>Compensation</td>
<td>7</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>Coaching/Mentoring</td>
<td>2</td>
<td>18%</td>
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</table>

Continued
### Table 4 continued

<table>
<thead>
<tr>
<th>Interview Questions</th>
<th>Open Codes</th>
<th>The number of participants using relevant key words and phrases</th>
<th>Percentage of participants using relevant key words and phrases</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Based on your experiences, what is it about your job that creates ‘feelings of dissatisfaction’?</td>
<td>Lack of Work/life Balance</td>
<td>11</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Lack of Inclusive Culture</td>
<td>10</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>Lack of Recognition</td>
<td>8</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>Lack of Equitable Pay</td>
<td>7</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>Lack of Diversity</td>
<td>6</td>
<td>55%</td>
</tr>
<tr>
<td></td>
<td>Isolation</td>
<td>6</td>
<td>55%</td>
</tr>
<tr>
<td></td>
<td>Lack of Compensation</td>
<td>4</td>
<td>36%</td>
</tr>
<tr>
<td></td>
<td>Lack of Customer Engagement</td>
<td>1</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>Limited Autonomy</td>
<td>1</td>
<td>9%</td>
</tr>
<tr>
<td>7. Based on your experiences, what are the most important benefits an employer can offer an employee and what makes you desire these benefits?</td>
<td>Professional Development</td>
<td>11</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Flexibility (Schedule)</td>
<td>10</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>Rewards and Recognition</td>
<td>9</td>
<td>82%</td>
</tr>
<tr>
<td></td>
<td>Comprehensive Benefits</td>
<td>7</td>
<td>64%</td>
</tr>
<tr>
<td>8. Based on your experiences, what are the incentives offered at your present place of employment that entice you to stay?</td>
<td>Flexibility (Schedule)</td>
<td>10</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>Increased Compensation</td>
<td>4</td>
<td>36%</td>
</tr>
<tr>
<td></td>
<td>Monetary Rewards</td>
<td>3</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>Work From Home</td>
<td>3</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>Tuition Assistance</td>
<td>2</td>
<td>18%</td>
</tr>
<tr>
<td>9. Based on your experiences, can you describe what you would change in your present position that would be an incentive to stay?</td>
<td>Continuing Education</td>
<td>10</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>Increased Diversity</td>
<td>8</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>Reduced Workload</td>
<td>8</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>Clear Career Paths</td>
<td>7</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>Employee Engagement</td>
<td>7</td>
<td>64%</td>
</tr>
</tbody>
</table>

Continued
### Table 4 continued

<table>
<thead>
<tr>
<th>Interview Questions</th>
<th>Open Codes</th>
<th>The number of participants using relevant key words and phrases</th>
<th>Percentage of participants using relevant key words and phrases</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Based on your experiences, if certification bonuses or flexible scheduling were offered by your organization as added benefits would they be important to you? Why or why not?</td>
<td>Work/Life Balance</td>
<td>9</td>
<td>82%</td>
</tr>
<tr>
<td></td>
<td>Continuous Education</td>
<td>3</td>
<td>27%</td>
</tr>
<tr>
<td>11. Based on your experiences, can you describe what past obstacles you have had to overcome in your career?</td>
<td>Credibility</td>
<td>10</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>Gender and Racial Bias</td>
<td>10</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>Equity In Career</td>
<td>9</td>
<td>82%</td>
</tr>
<tr>
<td></td>
<td>Advancement</td>
<td>9</td>
<td>82%</td>
</tr>
<tr>
<td></td>
<td>Work/Life Balance</td>
<td>8</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>Lack of Advocacy</td>
<td>7</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>Isolation</td>
<td>7</td>
<td>64%</td>
</tr>
<tr>
<td>12. Based on your experiences, can you describe what, if any, are current obstacles in your career? How might your organization help you to overcome them?</td>
<td>Gender and Racial Bias</td>
<td>11</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Lack Role Models/Mentors</td>
<td>10</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>Lack of Work/life Balance</td>
<td>10</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>Lack of Continuous Education</td>
<td>4</td>
<td>36%</td>
</tr>
<tr>
<td></td>
<td>Lack of Support</td>
<td>3</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>Trust in Management</td>
<td>2</td>
<td>18%</td>
</tr>
</tbody>
</table>
## Table 4 continued

<table>
<thead>
<tr>
<th>Interview Questions</th>
<th>Open Codes</th>
<th>The number of participants using relevant key words and phrases</th>
<th>Percentage of participants using relevant key words and phrases</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. Based on your experiences, what has kept you moving forward in this field? Were you made aware of advancement opportunities?</td>
<td>Constant Change 11</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Continuous Education 10</td>
<td>90%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High Salaries 7</td>
<td>64%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Curiosity of Technology 6</td>
<td>55%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Technical Expertise 6</td>
<td>55%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Being Innovative 6</td>
<td>55%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Self Confidence 5</td>
<td>45%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provide Mentoring 3</td>
<td>27%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Respect 2</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spirituality 1</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Visibility 1</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>14. Based on your experience, what, if any, effects have the “glass ceiling” had on your career progression?</td>
<td>Credibility 10</td>
<td>90%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No Role Models 9</td>
<td>82%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stalled 8</td>
<td>73%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No Diversity 8</td>
<td>73%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No Advocates 7</td>
<td>64%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lack of Opportunities 3</td>
<td>27%</td>
<td></td>
</tr>
<tr>
<td>15. Based on your experience, how would you describe your relationship with your peers, subordinates, and superiors?</td>
<td>Good Working Relationship 9</td>
<td>82%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Family 2</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non Value Add 2</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lack Trust 1</td>
<td>9%</td>
<td></td>
</tr>
</tbody>
</table>

Continued
Table 4 continued

<table>
<thead>
<tr>
<th>Interview Questions</th>
<th>Open Codes</th>
<th>The number of participants using relevant key words and phrases</th>
<th>Percentage of participants using relevant key words and phrases</th>
</tr>
</thead>
<tbody>
<tr>
<td>16. Based on your experiences, can you describe what leadership style you prefer your unit manager/director to have and why this is important to you?</td>
<td>Hands off</td>
<td>11</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Allows Autonomy</td>
<td>10</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>Supportive</td>
<td>8</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>Engaged</td>
<td>7</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>Open Door</td>
<td>4</td>
<td>36%</td>
</tr>
<tr>
<td></td>
<td>Provides Coaching</td>
<td>3</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>Advocate</td>
<td>2</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>Clear Direction</td>
<td>1</td>
<td>9%</td>
</tr>
<tr>
<td>17. Based on your experiences, can you describe if you have the support you need from your manager/director to do your job? How does this impact your decision to stay or leave your organization?</td>
<td>Yes, Value and Respect</td>
<td>5</td>
<td>45%</td>
</tr>
<tr>
<td></td>
<td>No, Advocate</td>
<td>4</td>
<td>36%</td>
</tr>
<tr>
<td></td>
<td>No, Lack Recognition</td>
<td>2</td>
<td>18%</td>
</tr>
<tr>
<td>18. Based on your experience, what are your experiences with mentors?</td>
<td>Early Career Roles</td>
<td>8</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>Models/Mentors</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Different Sex</td>
<td>8</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>Different Race</td>
<td>8</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>Difficult to Find</td>
<td>6</td>
<td>55%</td>
</tr>
<tr>
<td></td>
<td>Manager/Supervisor as Mentor</td>
<td>4</td>
<td>36%</td>
</tr>
<tr>
<td>a. How do you feel about mentoring other women?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Based on your experience, what changes do you think need to be made in order to increase the number of women in information technology?</td>
<td>Increased Awareness</td>
<td>10</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>Embrace Diversity</td>
<td>9</td>
<td>82%</td>
</tr>
<tr>
<td></td>
<td>Role Models (formal)</td>
<td>8</td>
<td>73%</td>
</tr>
<tr>
<td></td>
<td>Targeted Recruitment and Retention</td>
<td>7</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>Advocate</td>
<td>7</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>Early Youth Engagement</td>
<td>6</td>
<td>55%</td>
</tr>
<tr>
<td></td>
<td>Equitable Pay</td>
<td>6</td>
<td>55%</td>
</tr>
<tr>
<td></td>
<td>Less Talk More Action</td>
<td>4</td>
<td>36%</td>
</tr>
</tbody>
</table>
Primary Research Question One Findings

The findings of the study are presented in the context of its relationship to each of the three research questions (See Appendix C for interview questions grouping).

**Research Question One:** What factors were identified by African American women currently in IT that influenced their decisions to pursue a career in IT?

The findings from the interviews revealed several themes shared by women who sustained careers in information technology. The circumstances around their transition into the information technology field were found to be a factor that contributed to their persistence in information technology. Several of the subjects transitioned into technology positions after having established themselves in non-technical positions in their organization. Entering the field of information technology was either a second or delayed career choice. The findings also suggested that there are certain personal traits shared by the subjects.

In order to better understand the retention factors most effective for African American women in IT it’s important to first acknowledge what factors brought them to the field and if these factors were still relevant as they progressed in their career. The first research question sought to understand the factors that contributed to the decision to pursue information technology or technology in general as a career choice. According to the women in this study Table 5 represents the primary themes that influenced their decision to pursue a ‘technology’ career: a) challenging opportunities and multiple career paths, b) use of analytical and technical skills, c) innovative and constantly changing field, and d) higher salaries.
Table 5

*Information Technology as a Career Choice*

<table>
<thead>
<tr>
<th>Identified Themes</th>
<th>Number of participants to offer this statement</th>
<th>Percentage of participants to offer this statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenging Opportunities and Multiple Career Paths</td>
<td>10</td>
<td>91%</td>
</tr>
<tr>
<td>Use of Analytical and Technical Skills</td>
<td>9</td>
<td>82%</td>
</tr>
<tr>
<td>Innovative and Constantly Changing Field</td>
<td>11</td>
<td>100%</td>
</tr>
<tr>
<td>Higher Expected Salaries</td>
<td>6</td>
<td>55%</td>
</tr>
</tbody>
</table>

Each of the participants had varying reasons and entries to the information technology profession. Some knew at very early stages that technology was a profession they intended to pursue while others happened upon technology as circumstances in their careers changed.

**Challenging Opportunities and Multiple Career Paths**

Many of the women in the study consider themselves ‘technology professionals’ (Participant 1001, 1002, 1003, 1004, 1005, 1009, 1010, 1011) and there exist a wide variety of career paths within technology they can maneuver. As such Information Technology (IT) is a professional discipline in which computer-based technology is used to accomplish organizational requirements in functional areas such as application development, computer operations, system administration, data security, networking, testing, business analysis, and project management (Haag, Cummings, & McCubbrey, 2005; Shao & David, 2007).
The vast number of different types of positions in the field allows for many different types of career paths based on field of expertise within technology itself. For example, one participant found that she was able to move around to many different types of organizations, industries, and positions within technology.

“Technology is ever changing and there is always something new to learn. There are so many different aspects of this field. There is hardware, software, infrastructure. When you get tired of one area can always try another area and keep doing that until you find a niche for yourself” (Participant 1003).

According to the participants (Participant 1002, 1003, 1004, 1008, 1009) depending on your interest and willingness to learn changing positions can be relatively easy as long as you have the technical foundation to build from. Because technology changes so rapidly new opportunities present themselves often. It’s also easy to find oneself as an industry specialist. The rewards can be very lucrative depending on the scarcity of available resources with specialized skills. However, a specialization can be short lived once new technology replaces old.

Use of Analytical and Technical Skills

Unlike other fields within STEM higher education did not play a key factor in the decision to pursue a technology position for many of the women. Rather the use of analytical and technical skills drove their career success. Several of the women did not earn degrees in computer science and instead were mostly self-taught (Participant 1002, 1005, 1006, 1007, 1008). Many of the women in the study indicated that it was the logical thought process required in technology that initially brought them to the field and that continues to be what keeps them interested. One participant stated:

“Computer science was especially appealing to me because it requires logical thinking and problem solving” (Participant 1001).
Another:

“I always wanted to know how things work and at times like to break things. So the trial and error aspect of IT never lets me get bored” (Participant 1003).

A number of the participants in the study did not agree that participation in the IT field required a four-year degree (Participant 1002, 1005, 1006, 1007). The literature review identified many entry points into the IT profession and while a degree is recommended, many IT professionals without one have acquired the necessary skills through specialized training. This was especially true for participants with long tenures (15 to 20 plus years) in the field. However, many of the initial undergraduate educations were in math and science related academic pursuits. So the transition to technology was not completely unfamiliar.

In some cases (Participant 1004, 1009) technology related education was pursued later in their careers as they sought career advancement opportunities. Most of the participants expressed their propensity or fondness towards problem solving and liked the ideal of working in a field which could utilize such analytical skill sets (Participant 1001, 1002, 1003, 1004, 1005, 1007, 1009, 1011). Along with resolving problems participants enjoyed the use of technology as a tool and it afforded the opportunity to develop products and services that could help others.

For participant 1005 the move to technology was as she put it ‘accidental’ because while working in an accounting department a new software reporting tools was needed. Her attempts to improve department productivity later resulted in administering the tool to developing additional products and ultimately moving from accounting to application development. As a result she found herself increasingly enjoying the
technical skills she was developing and made the decision to pursue a career path that allowed her to continue to build on the skills she had gain. She eventually chose to apply for a position in the technology department in her organization. She never pursued any formal education. Instead she spends much of her off work hours learning on her own. However, she would reach out to colleagues she knew in IT to help with advice and direction.

Overall many of the women exhibited an aptitude for technology in that they had the ability and capacity for learning technology and their ongoing inquisitiveness is prevalent in their career persistence. Many of the women especially enjoy learning new technology in their quest to understand ‘how things work’.

_Innovative and Constantly Changing Field_

The rapid change associated with technology is a factor that seems to contribute to the persistence of many of the women in the study. Admittedly while many consider the tasks of maintaining technical skills daunting the opportunity to be a part of the creative process developing new products and services is especially appealing. New technology represents new problems to solve. Many of the women responded that they were always curious and wanted to know and learn more. In fact the constant need for updating skills in order to keep up with the ever changing technology met a need of some to always keep learning and contributing (Participant 1001, 1002, 1003, 1004, 1007, 1009, 1010, 1011). Many of the women stated having the opportunity to be innovative is what make’s technology ‘fun’. Participant 1003 went on to state that “technology evens the playing field in that you don’t need physical strength to build something so many would use”. In fact some of the women (Participant 1002, 1003, 1004, 1005, 1011)
prefer to expand their technical knowledge and expertise rather than grow into positions of increased responsibility.

**Higher Expected Salaries**

A final emerging theme influencing the African American women in this study is the expectation of higher salaries offered in the technology field. This theme is especially important because salaries are also found as a contributing factor to career persistence for the women as well. In some cases salary acts as a negative contributing factor given that some participants feel it limits their ability to transition to occupations due to their established dependence on higher salaries as they continue to progress in their careers. Computer and information technology professionals experience higher salaries than in other occupations. The higher salaries limit occupation movement. To borrow from Participant 1011 this is defined as the ‘salary trap’.

“I feel like computer science is a trap. It is a good field in that it’s well paid. But you can burn out after a while so you feel trapped not knowing what else you can do. But what keeps you is that it’s the comfort of being well paid for something you are comfortable doing.”

**Primary Research Question Two Findings**

**Research Question Two:** What do African American women currently in IT identify as the most important retention factors influencing their decision to remain in information technology?

Seven themes evolved from the data analysis as factors contributing to retention. According to the African American women in this study the primary retention factors for them include: 1) organizational culture and work environment that promotes respect; 2) work/Life Balance policies that allows flexibility; 3) opportunities for ongoing development and continuous education; 4) overall job satisfaction with working in IT; 5)
strong employer benefits and competitive salaries; 6) equitable career advancement opportunities; and 7) leadership that promotes autonomy and recognition. Table 6 provides a summary of the factors indicated by the participants.

The themes identified in this study correlated with much of the literature review that retention involves providing challenging work and commensurate compensation and benefits; providing learning and development or retraining opportunities, as well as opportunities for advancement; and having flexible working situations that enable employees and their families to deal with personal issues when necessary.

Table 6

Influencing Retention and Persistence

<table>
<thead>
<tr>
<th>Identified Themes</th>
<th>Number of participants to offer this statement</th>
<th>Percentage of participants to offer this statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inclusive Culture and Work Environment</td>
<td>8</td>
<td>73%</td>
</tr>
<tr>
<td>Work/Life Balance (Flexibility)</td>
<td>10</td>
<td>91%</td>
</tr>
<tr>
<td>Continuous Education</td>
<td>11</td>
<td>100%</td>
</tr>
<tr>
<td>Overall Job Satisfaction</td>
<td>8</td>
<td>73%</td>
</tr>
<tr>
<td>Employer Benefits and Salary</td>
<td>7</td>
<td>64%</td>
</tr>
<tr>
<td>Equity in Career Advancement Opportunities</td>
<td>9</td>
<td>82%</td>
</tr>
<tr>
<td>Autonomy and Recognition</td>
<td>10</td>
<td>91%</td>
</tr>
</tbody>
</table>

In addition, other factors that were frequently mentioned as important to their career advancement and success in the IT field included: being flexible/adaptable to
change; interpersonal/people skills, focused on success/delivery of results; and depth and breadth of knowledge about IT/business. Demonstrating competency on the job, producing high quality work, getting results, being accountable, knowing job/field, willing to take risk, and being consistently outstanding were mentioned by the participants as prerequisites for a successful IT career.

Inclusive Culture and Work Environment

The term “work environment” encompasses many different aspects such as: physical work environment, management’s attitude toward employees, relationship with colleagues, and working conditions. Organizational factors in the IT workplace constitute one set of determinants of women’s under representation in the IT field. Indeed, Ahuja’s (2002) review of the research literature posits that organizational factors will negatively influence women’s choice of and persistence in IT careers if they perceive the workplace to be an unwelcoming, male-dominated, hostile environment. Her model of determinants of women’s careers in IT includes both social (e.g. cultural biases) and structural factors (e.g. lack of role models and mentors, and the proportion of women in top management). Successful retention is the ability to create an environment where people stay and it meets their needs.

All of the women in this study indicated that work environment was a major factor in their retention with an organization and career persistence. Two of the women (Participant 1003, 1010) even indicated that they had left IT for a period of time (i.e. both for two years) due to conflicts within the culture and work environment of their organization. They have since returned to working IT and have remained now for several years. The women found that their reasons for choosing IT were still valid and other
occupational opportunities did not provide them with the same level of job satisfaction as working in technology does. However, both women also indicate that the original issues still remain just their ability to cope with them has improved.

Participant 1001 commented that if not for ‘liking the company I work for and the people I work with I may have considered leaving a long time ago’. Employers who demonstrate values that care for its employees wellness, support work that employees are passionate about, customizes retention remedies to the individual, establishes a work environment that is nurturing demonstrating respect and trust have positive influences on employee retention (Gaylard, Sutherland, & Viedge, 2005). Recent research has highlighted the hypothesis that an employee’s work environment can have a dramatic effect on his/her performance and attitude toward work. An environment that supports an employee’s sense of belonging to the organization is the ideal. The ability of IT team members to work together affects both retention and productivity. Building relationships helps to increase motivation, optimism, and loyalty to the company and the work.

When asked about their relationships most of the participants indicated that they have positive working relationships with their peers and subordinates. Many of the women alluded to that if not for working with ‘good’ people and having a team in which to share the stresses of job responsibilities with, they would likely consider alternative career options. Having a team that can share your burdens helps in this increased workload and diminishing work/life balance environment as Participant 1002 put it. While every one of the women indicated they had positive working relationships. I wasn’t quite sure how to take these statements when they also seem to come with a ‘but’.
I found some of the statements to be conflicting or not within my definition of positive and good working relationships. One of the women commented:

“My relationship with my peers and subordinates is friendly, trusting, and respect for expertise and experience, but I also know for a fact that they would throw me under the bus. But I feel like it’s more related to the culture since the company tends to foster a CYA environment” (Participant 1001)

Another one of the women stated:

I have a very good rapport with my colleagues – managers, staff, and peers. But I also keep my distance not to close not too far” (Participant 1004).

Participant 1010 stated:

“My relationships are fabulous. Management one level up is excellent, but I don’t really get the exposure to them to know what they think of me”.

Some of the statements regarding their work culture from the women seems to conflict when you look at the question about relationships. Consistently in the interviews the women would indicate how they liked their culture and work environment but would state such comments as the ones above when asked specifically about their relationships.

When considering the question of emotional support as defined within SCCT as a contextual influence on career development would these women truly consider their relationships at work contributing to their support needs for persistence.

Work/Life Balance (Flexibility)

There used to be a negative perception that working in the IT field requires long hours and an irregular work schedule. Women who enter technology find their commitment questioned when they do not spend as many hours in the office as their male colleagues, yet women are often more responsible for family and household and feel a greater need to be involved in family commitments than their male counterparts, resulting
in greater stress and decreased opportunities for advancement (Tapia et al., 2004). The participants in this study no longer see that as a barrier. This researcher posits that the emergence of flexible work schedules and the growing popularity of telecommuting have played a role in reversing this perception.

In particular many of the women in the study frequently spoke of having the ‘flexibility’ now to help manage family needs. Participant 1009 stated: “I’ve got a good current mix of benefits, but work/life balance most important having flexibility in scheduling helps that”. Several of the women (Participant 1001, 1002, 1004, 1006, 1007, 1008, 1010, 1011) consider flexibility to be a benefit and feel that it should be included as part of the overall comprehensive benefits package. All the women with children in the study indicated that without such benefits of flexible scheduling, telecommuting, and arranged work timeframes their ongoing participation in IT may have been reevaluated. One woman (Participant 1005) stated that “without flexible scheduling I may have left the IT workforce until my children were older and considered a more regularly scheduled position”. For this woman part of her job responsibilities require that she works weekends and odd shifts. Telecommuting allowed her to stay in close contact with her children.

Almost every one of the women in the study took advantage of flexible work benefits at their organization. These benefits included flexible schedules such as floating start times or incidental flexibility where staff may begin their shift early or leave early to meet personal needs like personal and children’s doctor appointment without having to use available days off. Most of the women with the exception of the government worker had at home access and could work from home when desired. Participant 1004 indicated
that telecommuting was not allowed for her current team. Although her organization
does offer it to some employees she is unable to use this option due to her level of
security. To reduce risk, access is restricted to on site only. For another participant
( Participant 1007) telecommuting is a significant component of the benefits package.
She feels as though her organization with the use of flexible scheduling and telecommuting offers just the right ‘mix’ of benefits to meet her needs.

Firms that avoid issues of high turnover consider their employees’ work/life
preference and create these “menu of benefits” and extras, which seem to keep turnover
rates low (Nash, 2000). Many employers have found they can increase productivity,
revenue, or both by 20% by implementing a work/life balance program for employees.
Experts say it is possible to reduce turnover as much as 50% by introducing any of the
following: dependent-care leave, child-care subsidies, elder-care programs, counseling
and referral, and flexible working hours (Withers, 2001).

Continuous Education

One challenge African American women face in developing their careers is that
no comprehensive or adequate career development model exists for them to follow that
addresses their unique work experiences (Hackett & Byars, 1996). Cook et al. (2002)
noted that current career counseling practices are based on certain assumptions about
clients and their career development, and these assumptions implicitly reflect male,
Western European experiences and worldviews. These assumptions may not reflect the
general life priorities and specific role commitments of many women of color and White
women, (p. 291)
Continuous education was the third theme that emerged from the data analysis. Education may be defined as the individual’s investment in continuing to develop skills and seek change and growth. Skill development was a crucial aspect within education for all of the participants. They expressed the idea that one’s learning never ceases. Once one is established within a profession, ongoing training is critical in terms of development. Whether the training includes ongoing formal coursework or informal suggestions from colleagues, many of the women stated that the willingness to continue actively learning technology was essential to career persistence.

Beyond the recognized importance of formal training, the importance of pursuing informal learning opportunities throughout one’s career also emerged from the interviews. Incorporating an array of skills over time allows one to be flexible and allows for increased opportunity to play in a variety of technical roles. The experience of diversifying one’s skill set through continued training helps IT professional to persist in their career.

The majority of the women in the study indicate that they consistently engage in continuous education. Some desire to be recognized for their technical expertise (Participant 1005, 1009, 1010). Others believe that continuous learning is a requirement for maintaining their position as technology changes so frequently. None of the women made a distinction between professional, career, or training and development. Career development, training and development were considered one in the same as the opportunity for career advancement was associated with the availability and support of ongoing training opportunities provided/available to employees.
What was surprising during the interviews was while many of these women expressed concerns about receiving the necessary career and professional development for career advancement, only a few (Participant 1001, 1002, 1008) expressed an interest in taking on more leadership responsibilities in their organization. Many of the women were looking to extend their current technical knowledge. IT professionals are typically confronted with a dual career-ladder that usually consists of one of two career options, management versus technical tracks (Joseph, Ang, & Slaughter, 2005). Professional development typically provides the skills and abilities necessary for the growth and maturation necessary for leadership positions.

According to Lee (2002) a wrong career move can result in skill attrition and often turnover, particularly in the present economic state. While many organizational models assume most employees seek natural progressions upward, technology professionals may prefer to seek more challenging technical areas rather than progression to management (Elmuti, 2001; Lee, 2002). The participants in this study were also split in their career aspirations. While some were looking for greater responsibility leading to leadership and management roles, others prefer to focus on increased technical skills with challenging projects.

What many of the women in the study would welcome is more attention paid to training and development at their organization. However, they also expressed a desire to have organizations understand the need for committing the time necessary for ongoing training. Rather than expecting employees to find time on their own which often requires taking away from family and other life activities creating an imbalance of work/life quality.
Given the rapid obsolescence of IT specific skills there is a continual need to provide opportunities for employees to update their technical skill sets. Realizing that advances in technology and knowledge are rendering many traditional employee skills obsolete, while simultaneously developing needs for new ones it is this continuous threat of knowledge obsolescence that makes training and retraining necessary.

**Overall Job Satisfaction**

In considering the concept of employee retention, one is immediately drawn to the question of whether job satisfaction impacts an employee’s choice to stay with an employer. According to Spector (1997), “Job satisfaction is simply how people feel about their jobs and different aspects of their jobs. It is the extent to which people like (satisfaction) or dislike (dissatisfaction) their jobs” (p. 2). Having said that, some researchers have proven that job satisfaction, or the lack thereof, can negatively impact an employee’s decision to stay with an organization.

The women in this study had varying definitions of job satisfaction. But all agreed that job satisfaction was a requirement for remaining in IT. Participant 1003 for example, stated:

“That if not for my team, challenging projects, the chance to do what I love most, that’s code, I’m not sure I could stick around for all the hours of commitment. What makes me happy is seeing the finished product when its gets delivered to the customer.”

Participant 1011 identified the need for better recognition and rewards systems. For her it’s all about the work but “after a while you want to be recognized and compensated for it” (Participant 1011). None of the women indicated compensation as a primary factor for job satisfaction. While compensation for the long hours and hard work
should be there it is not what drives them to persist in the field. Many of the women experienced job satisfaction through successful completion of projects and creating innovative solutions.

Research on IT voluntary employee turnover has produced findings that indicate work flexibility, stress, fit with quality of life goals, job performance, and career development are key elements of job satisfaction for IT professionals (Allen et al., 2006; Joshi, Kuhn, & Niederman, 2007; Riemenschneider et al., 2006).

Employer Benefits and Salary

Due to escalating costs, family needs, retirement, flexibility and a myriad of other personal desires, an employees’ benefits package has become an important part of their job, as well as their level of commitment to and satisfaction with the organization they work for. Employees in today’s economy expect more than just access to reasonable employer provided medical insurance. Other benefit considerations may include: dental insurance, eye care, accidental death, short-term and long-term disability insurance, generous vacation, holidays, sick/personal days, pension plans, dependent care, flextime, and various other possibilities. The key for management is to be able to provide as many of these benefits as possible to ensure an adequate level of employee satisfaction, while at the same time being able to maintain organizational profitability.

Most of the women in this study also had children so they expressed the importance of working with organizations that had strong benefits to meet the needs of their family. Participant 1008 indicated that the overall compensation has more importance than salary for her. At one point she was a single mother and she needed
programs like child-care and flexible working schedules to allow her to care for her children.

However, an interesting theme has emerged during the data analysis on the topic of salary. While the combination of offered employee benefits still ranks as significantly important, salary has resulted in both a positive and negative influence on persistence for several of the women. Several participants defined it as a ‘trap’ (Participant 1001, 1003, 1005, 1008, 1010). Were it not for the higher salary achieved in their career they may have considered differing career options. The realization is that other career opportunities are unlikely to provide them with similar salary ranges. On the other hand other participants felt strongly (Participant 1002, 1004, 1011) that while their salary is higher given other occupations it was still not in line with what they believed their male or even white female counterparts were receiving.

Griffiths et al. (2007) found a contributing factor to women leaving the IT workforce was the perception of pay discrimination. Women in IT received compensation that lost pace with that of their male counterparts (Collett, 2006; Lemons & Parzinger, 2007). According to National Women’s Law Center (2012), working women earn 77% of the income of their male counterparts and the annual median income for working women was $38,052. The median income for an IT professional with one-year experience was $41,996 and $95,399 with greater than 15 years (Dice, 2011).

Equity in Career Advancement Opportunities

Career progression is also an important factor in retention of employees. The participants expressed a need for opportunities within the organization and room for them to grow and develop into other positions. If they do not see a clear career path in their
current employment, they are more inclined to look for jobs outside the organization that offer growth opportunities. Limited career opportunities could lead to job dissatisfaction.

Throughout the discussion on employee retention, a recurring theme emerged related to the need for employees to feel that they have not only challenging work but also overall opportunities for growth and advancement in their career (Boxall et al., 2003; Branham, 2005; Trank, Rynes, & Bretz, 2002). Studies show that many women of color have been, and continue to be, stuck at junior-level positions, not advancing to leadership positions at the same pace as their male and white female counterparts. The mid-career level seems to be a breaking-point moment when attrition spikes (NCWIT, 2010). And 46% of women in technology companies leave their organizations at the mid-level point (10-20 years) in their careers. This is more than double the quit rate for men. It is also higher than the quit rate for women in science and engineering (NCWIT, 2010).

While many women quit due to what they perceive as lacking career advancement opportunities the women in this study had an opposite opinion. Nine of the eleven women felt the reason for their ongoing career persistence was because of the many options regarding technical positions within an organization. Because technical positions vary in skill sets for example a software developer who works with computer applications has a very different responsibility than a network designer who utilizes hardware and infrastructure components. However, two women (Participant 1002, 1010) indicated this was dependent on the organization size. Smaller organizations may outsource some technical services like networking to outside vendors. Several of the women navigated multiple technology positions such as application developers, database administrators, network architects and infrastructure. None of the women remain in the same technology
position they started their careers in. As Participant 1001 stated you can just keep moving around until you find your niche.

Others however, did express some concern about career opportunities but these women are also the same individuals seeking greater leadership in their respective organizations. Not being able to advance in one’s career within a reasonable time and with higher levels of performance was expressed as a frustration especially for those participants (Participant 1002, 1005, 1008) already in mid-level management positions seeking to advance to executive positions in their organization.

Autonomy and Recognition

Individual autonomy refers to the degree of choice one has about tasks and when and how to perform them. A key element in providing effective supervision is allowing workers to maintain autonomy and authority over the work that they do. In order to feel competent, it is essential that there is a sense of autonomy that the workers feel that they can use individual discretion and critical thinking skills in carrying out important tasks. Almost all of the participants expressed that they preferred managers who allowed them autonomy over their work (Participant 1001, 1002, 1003, 1005, 1006, 1007, 1008, 1009, 1010, 1011). Most of the women had the same sentiment as Participant 1011:

“I prefer to be trusted with a laid back hands off approach with someone who doesn’t micro manage me. Allows me to learn for myself, work at my own pace and set my own direction on how to accomplish the task”

Only Participant 1004 preferred more supervision from her management. She felt that it increased her understanding of their expectations for each project. Instead she prefers a manager who provides regular and clear direction.
Another aspect important to the study participants was the need for more rewards (e.g. bonuses) and recognition of work. Often times the women felt that their male counterparts were singled out for successfully completing project work that in turn increased their visibility. Higher visibility within the organization could lead to additional career advancement opportunities. This recognition would often come in the form of formal communications by executives to staff in appreciation of good work. At times performance bonuses would accompany such recognition. When it comes to recognition the women in the study did not offer any specific examples, but to state they felt overlooked at times when it came to recognizing their accomplishments as though their contributions were less significant than their male counterparts.

The lack of recognition through advancement and promotion may contribute to women’s job dissatisfaction and result in their leaving the workforce early in their career (Evetts, 1996). Best said by Wheatley (2006) about our basic human dynamic is “our need to trust one another, our need for meaningful work, our desire to contribute and be thanked for that contribution, our need to participate in changes that affect us” (p. 164).

According to Poulin and Walter (1992), workers who have experienced greater work autonomy and have greater control over their jobs have higher levels of job satisfaction. Overall, it is important for supervisors to realize that high-tech IT professionals want autonomy. They are achievement-oriented and have a high need for recognition. Recognition and non-monetary reward plans are motivators for IT professionals and supervisors play a key role in this process. IT professionals want the opportunity to earn respect, contribute to the organization, work in innovative ways, and be recognized for the value they bring to the organization.
Because of the nature of IT work with long hours, demanding deadlines, and stressful deliveries the women in the study feel as though management could do more to reward and recognize their efforts and contributions. Often recognition is based on the advocacy of others within informal networks in the organization. Because these women are not always engaged in these informal networks they lack the advocacy to recognize their achievements in the same manner of some of their male peers. However, given the high performance of the many of the women they already feel as though their organization recognizes their expertise and values their contribution through good performance reviews but not always through public recognition. Another issue the research has helped to clarify is that the recognition need not be in the form of monetary payment.

**Primary Research Question Three Findings**

**Research Question Three:** What perceived barriers, if any, did African American women overcome to sustain their IT careers?

Studies show that the key barriers to the entrance and retention of women and underrepresented minorities in IT are lack of role models and mentors, exclusion from informal networks, stereotyping, discrimination, unequal pay scales, and inadequate work/family balance (CAWMSET, 2000; ITAA, 2003). The literature also identified cultural fit, expectation gaps, mentors, role models, career satisfaction, organizational commitment, role ambiguity, and role conflict as pertinent factors that affect the retention of women in the IT workforce (Riemenschneider, Armstrong, Allen, & Reid, 2006; Tapia & Kvasny, 2004).

For the women in this study it is important to note that any one of these barriers could have been a deterrent from persisting in the IT field. However, it is their ability to
overcome the combination of these barriers that have made them successful. Many of the women prided themselves on ‘not letting it get them down’. When faced with a challenge many of the women had the self-confidence to develop their own informal networks or address the organization leadership about improving diversity practices in recruiting and mentoring programs. One case in particular when one woman (Participant 1006) felt she could no longer overcome the issue she left the organization and began her own consulting firm rather than leave technology all together.

Five themes emerged from the data analysis regarding what barriers each of the women overcame in order to remain in the profession. While many of the participants pointed out that they have experienced each of the barriers their experience was in differing degrees. Table 7 outlines the participant’s results.

Table 7

*Barriers to Advancement and Persistence*

<table>
<thead>
<tr>
<th>Identified Themes</th>
<th>Number of participants to offer this statement</th>
<th>Percentage of participants to offer this statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of Role Models and Mentors</td>
<td>10</td>
<td>91%</td>
</tr>
<tr>
<td>Lack of Network (Isolation)</td>
<td>8</td>
<td>73%</td>
</tr>
<tr>
<td>Gender and Racial Bias</td>
<td>11</td>
<td>100%</td>
</tr>
<tr>
<td>Lack of Work/Life Balance</td>
<td>10</td>
<td>91%</td>
</tr>
<tr>
<td>Perception of Glass Ceiling</td>
<td>7</td>
<td>64%</td>
</tr>
</tbody>
</table>
In this study the women did not deny that they have all experienced the barriers outlined. What is most important to take from this study is the overall attitude against being defeated by them. As proudly stated by Participant 1001 “you can’t make me quit”.

*Availability of Role Models and Mentors*

According to Higgins and Kram (2001) role models and mentors are primary resources in aiding women’s understanding of how to cope effectively and advance in male dominated organizations and career fields, as well as, serve important functions of providing information about negotiating the demands associated with having a career and a family, professional sponsorship, and help them gain access to networks through interactive relationships.

Only three of the participants currently have role models. Although all indicated that that at one time they did have role models and mentors. However, it was at an earlier time in their career and they eventually outgrew those relationships. All of the women indicated they would like a role model again especially a mentor but expressed that it was often difficult to find one. The participants also did not feel that it was critical to have a mentor or role model currently in their career since they feel more established and aware of career needs now that they have matured more in their positions. Only two of the eleven would prefer a woman, the others felt as long as the person they were working with had a genuine interest in them having a role model of the same sex wasn’t critical. If fact two participants (Participant 1005, 1008) expressed having issues with female role models/mentors in the past. However, if given the option would rather have another woman and one of color who could really appreciate their issue.
Lack of Network (Isolation)

Networking with others contributes to persistence. This commitment to ongoing networks contributes to an individual’s willingness and motivation to persist in her career. Informal networks further improve professional development by providing support and encouragement from those who understand the difficulties and successes of the career, as well as constant feedback in one’s own learning.

As part of the initial recruiting efforts of this study I attempted to identify participants from several IT related organizations like African American Woman in IT (AAWIT). Because many of these women were initially recruited either through those within these organizations or personal reference the participants had already established a set of informal networks in which to gain support and professional development. Many of the women acknowledged that you have to be proactive about seeking out networking opportunities.

What each of the women still indicated as a barrier in which they have learned to live with is their lack of informal or formal engagement with networks within their organization. Many of the women feel isolated because they are often the only women or person of color within the group. Team rapport is fine it just isn’t the same comradery like they get from their external networks. Participant 1002 indicated that she always has to ‘watch myself’. After being accused of being too assertive she is afraid of coming off as the ‘angry black woman’. She believes this contributes to fewer offers of engagement with informal activities inside and outside of the office such, as bowling leagues and golf teams. As a result her isolation continues especially since joining the ranks of management where there are fewer women and minorities.
Gender and Racial Bias

Typical stereotypes of the African American culture include (a) they are more violent than other groups, (b) they are less intelligent than others, (c) they are lazy, and (d) they are troublemakers. Two stereotypes of a more detrimental nature are that African American women do not take criticism well and they are unable to control their emotions. As a result of these stereotypes senior leaders who believe this are less likely to mentor an African American woman. They may also refrain from providing constructive criticism if they believe employees of color will not be receptive.

Due to gender and racial bias barriers, African American women have not easily gained access to the organizational knowledge needed to do their jobs. This, in turn, has affected their ability to develop the requisite skill sets to compete in the organizational environment. Nobel (2007) observed that in order to be successful in the field of information technology, one has to prove his or her “professional fortitude” (p. 35).

A repeating issue with all of the women has been about credibility. As Participant 1011 stated:

“Every time I join a new project team or get a new boss I have to prove that I can do the job. It is always assumed that someone was doing me a favor to get me where I am. While I take great satisfaction in proving people wrong it gets old sometimes.”

What is most telling in the interviews is that for each of these women it is important to try to maintain their sense of identity as a woman especially African American woman. They all admit to adjusting their behavior at times to assimilate more into the group, but want to guard against going too far.
Lack of Work/Life Balance

Leiter and Maslach (2009) found “burnout was indeed predictive of turnover intention” (p. 337). Increased workload and longer hours may lead to burnout of the IT workers resulting in turnover. All of the women expressed work/life balance to be an issue. What was consistent in all of their organizations was an increased workload and higher demand regarding project deliveries. With new technologies and technology adoptions growing so rapidly organizations are finding it difficult to keep up with the demand for new products and services. As a result many of the women feel increased pressure to deliver which means increased hours worked and less time for family and self. While benefits such as telecommuting and flexible work schedules help, work/life balance issues remain due to the increased number of hours IT professionals now need to spend at their computers in order to deliver greater amounts of project work.

Often times the women feel pressured to work weekends along with the full work week in order to deliver technology. Because businesses prefer technology implementations to happen during off business hours IT resources are often asked to work late nights and weekends to implement new technology or make technology changes. The women in this study understand the need to avoid impacting business activities however the frequency of working late nights and weekends has significantly increased and it has now become an expectation. Fortunately, the ability to work from home helps as Participant 1008 explains, “but that doesn’t mean you have time to spend with family when you are closed off in your home office completing work”. This also means you can’t attend outside of the home family activities. “Working from home
doesn’t mean you get more time with your family it just means you are more likely to be working more hours” (Participant 1002).

Perception of Glass Ceiling

Several of the women mentioned the barrier of the glass ceiling in particular. Ask how it differs from gender and racial bias one participant explained that there is gender and racial bias you can receive from your peers, clients/customers, and management. But the glass ceiling is a sense that there is an unwillingness to have others not in the majority in positions of leadership. As Participant 1008, currently a technology manager with goals of advancing to an executive position puts it:

“Reality TV is killing us. My colleagues seem to think all black women throw drinks, yell and scream to get their point across. I feel like every time I start to express a differing opinion everyone’s watching me to see if I lose it or something”.

There is also the stereotype African American women are not as intelligent or technically component as their male counterparts. Many of the women found this especially to be true in information technology. Already women in general are not expected to be as ‘tech savvy’ as men given the ‘computer geek’ stereotype already in the field. Participant 1011, who is by far the most technically accomplished of all the women finds that she is often questioned about her education when working on new projects. This is not the case with her male peers. It’s as if she must pass a test to see if she really has the skills before being accepted.

In sum, the women in this study were able to maintain an awareness of these factors and overcome them through different management and coping strategies. By facing each challenge individually the barriers were not able to compound resulting in
feelings of dissatisfaction and increased willingness to leave the profession. They also understand that being minority and being a woman increases their visibility so they are more conscious of their actions. If a mistake is made, it will be difficult to conceal or may be perceived as damaging opportunities for other women in the workplace (Tapia et al., 2004).

**Conclusions from Findings**

There are several conclusions I was able to make regarding the persistence of the women in the study. After reviewing the findings of the data I was able to identify several assertions that can be made regarding the African American women in this study. While these assertions cannot be generalized to the entire population they can help to generate questions for future research. Using a multiple case study assertions worksheet (Appendix D) four key assertions emerged. Not finding any significance in education levels and work experience each of the women in the study exhibited the following characteristics as it relates to their ability to persist in IT:

**Assertion #1: Many of the retention factors for African American women are consistent with retention factors of other women and men in IT. However, African American women feel that retention practices often fail to acknowledge their unique needs.**

The study reinforces the similarities of the IT work profile between African American women, men, and other women. IT employees seek career growth and development, challenging work opportunities, team environment, management they can trust, recognition, autonomy, fair pay and benefits. However, the African American women in this study feel that many organizations fail to recognize the need to develop retention remedies that address both their gender and cultural needs. Many of the women in the study moved positions or organizations that failed to take their perceptions into
consideration. Several of the study participants (1004, 1007, 1008, 1010) feel that an organizations commitment to addressing the diversity of retention needs demonstrates respect for the individual and as a result it improved their commitment to the organization.

Assertion #2: Persisting African American women engage in regular self-reflection and professional development activities.

The nature of constant change in information technology necessitates that employees who rely on technical skills maintain a self-directed development plan that allows them to remain technically relevant. Deficiencies in career development can create implications for workers wishing to enter, re-enter, or remain in the field. Successful career management and transition, especially for professionals in mid-career, depend on an individual’s ability to remain competitively skilled.

Ongoing development was crucial, as each woman has to constantly re-evaluate her current skills to continuously seek to improve herself. Whether through formal lessons, working with colleagues, consulting professionals in needed areas of growth, or learning a new technology, the women emphasized the importance of development as an ongoing process. In addition, education encompasses the psychological mindset of commitment to continuing to make one more competent. The internal drive to develop and enhance one’s learning contributes greatly to the women’s experience of persistence. Professional development enhances an individual’s identity and contributes to positive mental health (e.g., increased self-efficacy). It coincides with the developmental framework and processes and links professional development with self-efficacy and the conviction that someone believes that she can accomplish realistic tasks and reach her goals by working hard.
The findings in this study determined that many of the women were never content in their career development often seeking out new development opportunities, reflecting on and adjusting career goals. The women in the study are persistent and passionate about technology. Many of whom learned to adapt and adjust to both the culture of the technology industry and organization culture they found themselves in.

Based on the literature review, African American women tend to employ four general types of success strategies. First, successful African American women remain knowledgeable of self, others, and the organizational culture in which they worked. Secondly, persisting African American women exert extra effort to attain credibility and the respect of their peers, superiors, and subordinates. Third, they continue to maintain and develop the technical expertise and knowledge required of their professions. Finally, successful African American women in the literature used their networks, mentor relationships, and support systems as resources to further inform their knowledge and to enable their abilities (Catalyst, 2004). This is in line with the strategies employed by many of the women in this study as well. They also developed other indirect competencies such as communication, leadership, intercultural interactions, and career planning.

Alfred (2001) studied highly achieving African American women and found that self-knowledge, organizational knowledge, self-awareness, a support network, and bicultural competence were vital as success strategies. Coleman (as cited in Nichols & Tanksley, 2004) found that hard work, a positive self-concept and attitude, the ability to take risks and accept challenges, a good support system, high motivation, self-discipline
and self-determination, persistence, and commitment all were success strategies among the African American women in her study.

Assertion #3: Persisting African American women have the ability and capacity to overcome a combination of barriers.

Women may not leave a male dominated industry for just one issue but rather for a combination of issues. This has been coined by Yates as “lack of awareness syndrome” (Yates, 2001, p. 42), Meaning most issues could individually be resolved. However due to a repetitive pattern or more than one issue occurring simultaneously, these issues become more difficult to address and lead to dissatisfaction. The concern reflected in this literature is that when a woman reaches a threshold of exposure to negative factors she is more likely to leave that particular workplace or the IT field altogether.

However, amongst the women in this study there is a strong similarity. Perhaps the most notable commonality in their personality is not that they are all of an identical personality type, but rather that they all share a strong sense of self-confidence. A qualitative study of successful women in leadership positions reported many shared qualities and experiences. These women describe themselves as having high activity and energy levels; appetites for challenge, problem solving, and risk taking; obstacles and personal setbacks to accept and overcome; intellectual competence and underpinnings of strong academic backgrounds; personal awareness and confidence, continuously honed by wide exposure to life experiences; and support for their commitment from family and friends or role models and mentors (Astin & Leland, 1999).
Assertion #4: Support was a key factor in influencing early career persistence in Information Technology (i.e. mentoring and informal network development).

The participants in this study identified early on the need for mentors and support systems. When those individuals and systems did not exist in their own organization each woman was able to look elsewhere for the informal networks necessary to receive coaching and feedback that would assist with her technical career goals. These informal network and mentoring relationships would cross both gender and racial boundaries. Bell and Nkomo’s (2001) analysis revealed that, although performance was significant, informal networks formed an equally important link to career advancement. Their findings also supported Thomas’ (2001) study that reinforced the efficacy of interracial mentoring relationships. Bell and Nkomo found that, when African American women connected with white men as mentors or in social networks, the experiences were perceived to offer African American women better opportunities for career advancement. For example,

“Best mentor ever had (phenomenal). A man - had trust, support, advice and provide direction to move to next level. Started off as a previous manager, but then became mentor” (Participant 1005).

This continues to be the case. Not only was this critical for their early success, but many of the women identify the need to act as role models, mentors and support systems for existing and newly entering young women. Some of the women believe that their active participation in programs and networks will help increase the participation of women and minorities in the field and improve the opportunities for advancement as more women join the ranks of this male dominated field. Mentoring programs help put minorities and women on the fast track, and fast-tracking quickens the pace for creating women and minority role models in organizations where few or none exist (Pfleger &
Mertz, 1995). However, organizational support is critical to the success of mentoring programs in the company.

**Summary**

The women in this study were diverse in their ages, technology experience, marital status and family characteristics, job positions, and employer size. A variety of factors were found to influence the career choice making process and the career development of participants. Similarly, these women identified an array of coping strategies used to overcome barriers faced in IT.

I found that the initial factors in selecting IT as a career choice remain key persistence factors for the women in this study. As evidenced by two of the participants who left IT only to return based on their original interest despite the barriers. It is still important to the women in the study to use logical thinking skills in an ever evolving and innovative field that offers multiple challenges/opportunities and compensates accordingly.

I also found that the women in this study are influenced by many of the same contextual influences and supports as others within IT and that is:

- Inclusive culture and work environment
- Flexible schedules
- Ongoing training and development
- Overall Job Satisfaction
- Strong compensation packages
- Career advancement opportunities (not necessarily managerial)
- Autonomy and recognition

Finally, I found that gender and racial biases act as catalysts to several of the other barriers the women in this study encounter. Because of biases regarding being minority and a woman there are fewer women and minorities in the occupation as a result fewer
role models are available. Biases also lead to exclusion from informal networks leaving the women feeling isolated. Because these women lack advocates through networked relationships they perceive the existence of a glass ceiling due to credibility concerns. While the increased workloads in technology organizations leading to concerns regarding burnout are not related to gender and racial biases, however, in order to be seen as pulling their ‘weight’ these women are often unwilling to push back on unrealistic work demands that increasingly infringe on work/life balance commitments.
Chapter 5: Discussion

Overview

Using a multiple case study approach, this study sought to capture the lived experiences of African American women in an effort to understand why these women chose careers in IT and what factors contributed to their retention and career persistence in information technology. The document also investigated how the women were able to successfully navigate and overcome barriers identified in previous research literature. Thus, this study sought to extend the previous findings by understanding issues associated with the retention of African American women and their decision to remain in the IT profession. By focusing on telling the stories of these women it also describes retention strategies that can impact IT employees overall.

The guiding theoretical concept was the Social Cognitive Career Theory (SCCT). The SCCT proposes multiple pathways affecting career choice and persistence. This study was conducted to address four key gaps in the SCCT literature. First, a qualitative sample was used to explore the lived experience of African American women in IT. Secondly, it addressed the gap in available research of career persistence in general, as this concept has historically been overlooked in the SCCT literature. Prior research related to persistence has cited factors such as underrepresentation of women, individual and institutional discriminatory practices, overt and covert sexism, inflexible working structures, and an unhelpful environment for the reconciliation of work and family commitments as barriers to the career development of women (Dainty et al., 2004). Other
studies have identified personality traits and the role of self-efficacy as a means of addressing and overcoming such barriers (Astin & Leland, 1999; Dunahoo et al., 1996). The findings of this study supported this prior research, elaborating and identifying additional challenges women face in IT and their strategies of persistence.

The third focus of the study was to provide qualitative data to complement the quantitative data that has been the primary source of SCCT research. Finally, the focus on working adults rather than college populations enhances the understanding of ongoing career persistence and professional development within information technology careers.

The Social Cognitive Career Theory

For this study, the SCCT provided an initial structure to explain career goals and actions, so there was some understanding before analyzing the data. Using this framework case study methods answer why and how questions (Yin, 2009) because the theory addresses why and how career choices are made. The SCCT model itself and the general applicability of the model to this research was discussed in detail in Chapter 2. Importantly, SCCT has been used, and shown to be valid, in a variety of settings similar to my research with early STEM career graduates (Brunhaver, et al., 2010; Fouad, Fitzpatrick, & Liu, 2011; Lent, et al., 2005; Trenor, et al., 2008). Because frameworks offer theories about relationships among data, it is both necessary and important to discuss how the data and findings match or fail to match the model. The model from Figure 1 is shown again below as Figure 9.
Overall, my analysis shows that the model fits most of the data from the study. Person inputs include individual predispositions, sex or gender, race or ethnicity, and disability or health status from the case study interviews. Background Contextual Affordances are prior opportunities, experiences with role models, or cultural socialization that occurred in the person’s past. The participants focused on the importance of early relationships with role models and mentors for their persistence. However, several of the participants also indicated that they do not currently utilize role models in a similar manner as they did earlier in their career.

In this research, participants did not discuss self-efficacy as playing an important role in past goals and actions, but several participants did discuss a direct relationship of self-efficacy to future actions, a pathway supported by the model. This is likely due to the nature of the interview questions. Specifically, participants were asked about their confidence in achieving future plans but not how their confidence played into their past goal setting and actions. However, the model did not account for the high confidence of the participants who overcame multiple barriers. It was evident from the participant
interviews many of the women shared similar characteristics that resulted in internal influences for coping with discrimination issues not easily addressed as part of the model.

Support of SCCT

The SCCT posits that there are three paths of influence in career decision making: environmental (e.g., family, colleague, friends), contextual (e.g., learning opportunities), and core social cognitions (e.g., the belief that one can succeed in a chosen vocation) (Lent et al., 2001). SCCT supports the notion that race and gender are important in how an African American woman might make career choices. Race and gender are influential in determining the exposure to and interpretation of contextual affordances and barriers.

The following sections will address how data findings support these main tenets of the SCCT theory as well as address specific gaps within the literature. Through this study, the main supports focused on specific contextual supports and barriers that directly contribute to career persistence. Due to the nature of qualitative research and lack of formal hypotheses, data may serve only to inform future practice by deepening understanding of lesser known constructs and not serve as a general rule for all African American women in this career.

Career persistence may be construed as an outcome of environmental supports. Specifically, environmental supports within the work unit appeared to increase self-efficacy, which leads to persistence. These environmental supports are included in the data findings. Many participants alluded to having one person early on in their career to provide role and mentoring guidance. Also having a manager who supports a career decision enhances one’s ability to persist, which is consistent with SCCT. According to Lent et al., environmental supports can help an individual’s effort to reach a career goal.
(2001), which proved significant to several participants. Of note is the idea that environmental aspects also served as a barrier for some participants. One woman noted that her family was not always supportive of her career decision due to lack of understanding of the field and time commitment required. This environmental barrier affected her career decision making in a negative way, as she often doubted her career choice and considered returning to school to pursue a different occupation. These findings of environmental influences affecting career decision making support the SCCT theory.

The Social Cognitive Career Theory did not include many contextual influences that foster persistence in a chosen career. This research added a depth of understanding of the unique perceptions that the participants held in regards to supports and barriers related to learning opportunities. Several of the women spoke about formal and informal learning opportunities. Most of the informal learning opportunities were self-directed by the participants. Their individual development activities ranged from computer based training, journal reviews, books, and network organization participation. Formal learning opportunities range from internal company training programs to external education institutions. No data were collected on negative learning experiences. Participant 1002 indicated that with ongoing success from new learning opportunities she was encouraged to continue working in technology. Participant 1006 expressed that with the support of an aunt who works for a software development company the knowledge sharing between the two encourages her to stay current with technology and as such persist in IT.

Findings did not support previous literature that African American women did not expect positive outcomes due to low expectations of performance (Fouad et al., 2002). In
fact, participants discussed the idea that increased self-awareness combined with high self-efficacy heightened expectations and success.

Anderson and Betz (2001) suggested that the greatest influence on self-efficacy was performance accomplishments. The research findings only minimally supported this research in that there were no specific direct links to increasing career promotion and leadership achievements. Performance accomplishments were enhanced primarily by environmental supports, and only alluded to. Rather self-efficacy is maintained through continuous education and skill maintenance. However, self-efficacy was shown to be strongly influenced by vicarious learning, as suggested by Lent et al. (1994). Participants consistently discussed being influenced by mentors, colleagues, specialists, and their own learning as a form of self-efficacy. Many of the women in the study were not seeking greater responsibilities at work. They were primarily focused on extending their current technical knowledge and contributing to their organization through quality products and services. However, they did seek recognition for achieving such performance.

**Specific Gaps in SCCT literature**

As referenced in the literature, data findings addressed specific gaps within the SCCT literature in addition to supporting career decision-making research. The first gap related to career research with African American women in general. Second, persistence within SCCT was addressed. The third gap addressed persistence by African American women. Finally, the qualitative study contributed other data related to SCCT.

A minimal amount of research has focused on determining strengths and barriers with adult females in technology. The present findings filled a gap in SCCT literature specifically addressing persistence among adult women in STEM related fields.
However, current data does add to the depth of understanding related to the experience of career persistence among women over long periods of time. Due to the convenience samples frequently used in the career development literature, much of the research focus has been on young adults (Lent et al., 2005; Nauta & Epperson, 2003; Sax & Bryant, 2006; Williams & Subich, 2005) or high school age (Gushue & Whiston, 2006; Meinster & Rose, 2001; Nauta & Epperson, 2003). This qualitative approach to career decision making enhances the understanding of career persistence in a population not frequently studied. Many of the participants alluded to their lifelong journeys and various career paths that led to persistence.

As would be expected, a set of similar variables have been shown to influence career development as those which affect one’s career choice making process. Based upon prior research, factors such as personality and degree of self-efficacy were explored as having some bearing on career development. Many other considerations were discovered and are identified in the discussion to follow.

While the factors of career choice were fairly straight-forward and similar to those identified in prior research, factors of career development identified within this study varied and were more complex in nature. Once in IT, barriers to career development fell into two main areas: conflict of personal and professional goals (i.e., balance of family and work) and institutionalized discrimination (i.e., glass ceiling). These findings are incredibly consistent with the literature. Catalysts (2006) identify both these barriers as common to male dominated fields. In the same way, the women often spoke of a double standard as one participant remarked, “We have to work harder…to gain that respect.”
Finding the balance between often competing personal and professional goals was identified as the single most significant barrier to career development for these women. Those that had children expressed a great deal of concern about balancing the demands of their positions within their organizations and their responsibilities to their families. Even those without children or spouses spoke of the challenge of finding enough time to enjoy their lives outside of work and meet the expectations their positions hold. Only a few stated that their personal lives and goals were aligned with their professional roles so that there was little to no conflict between the two. The increased use of technology in organizations has resulted in high demand environments where IT professionals are expected to work extended hour work weeks and take on workloads beyond a typical full-time resource.

Many of the women expressed concerns regarding burnout and work/life balance. This experience was expressed by almost all of the women married with children, and anticipated by others without children. It became an either/or decision for many of them, leading them to choose between a higher-status and better paying career path or a more supportive position (e.g., less responsibility, less prestige, less pay), but one which allows more flexibility of schedule and less travel. Repeatedly, these women spoke of the stress added to their lives by trying to juggle the needs of their families and their work. The general perception was that the work/life balance sought was exacerbated by the male culture of the industry. The women in the study commented that at times when family commitments required time away from work their contribution to project work was considered less significant. Although these women would regularly make up for time away working later hours. However, when recognition of project achievements was
communicated they were often left off the list because they were not seen as contributing at the same level as their male peers. The women then expressed concerns regarding being as visible as men in the same role.

Prior research has shown that a strong sense of self-efficacy is a central component to career development, especially for women in non-traditional occupations (Betz & Schifano, 2000; Mathieu et al., 1993). The findings within this study support this claim, with participants referring to an internal sense of confidence as the primary source of strength in overcoming challenges. For many, this confidence is something deep within them, an internal sense of self, an attitude. For others, this confidence is something that they have sought out or developed through time (e.g., preparation, additional education, experience) or someone in their lives who provides reassurance and encouragement when needed. From this research it seems that self-efficacy can be drawn from many different sources, often intertwined or changing throughout one’s career.

Role models and mentors were most often reported to be individuals the participant could learn from (i.e., vicarious experience) and were there for emotional support and verbal encouragement. For those participants fortunate enough to have them, mentors, defined as senior employees in an organization or within a career field who help navigate career-related issues, were identified as the most valuable resource in their career development and progression. Unfortunately, few of these women had an active mentor and, as consistent with prior research, all of those that did had male mentors. These mentors were helpful in understanding organization political dynamics, but were less helpful in identifying coping strategies for being minority women. Also these mentors were not always advocates but instead provided guidance and advice.
In light of these challenges, these women are employing a variety of coping and persistence strategies. Consistent with prior research (Astin & Leland, 1999; Dunahoo et al., 1996; Gaskill, 1991), these women spoke primarily of their own abilities and ambitions and the role of self-efficacy traits as means of persistence. Other considerations influencing career development included factors such as flexibility of schedule, level of comfort with company and co-workers, availability of development resources, and type of work (i.e., technical projects).

Expansion of Guiding Theories

The key links between the experience of those interviewed and the SCCT theory centered on contextual supports and overall feelings of self-efficacy. The central phenomenon of the study could not be clearly explained by a single theory. Multiple theories may be helpful in describing the experience of African American women including the SCCT theory as well as Holland’s theory of personality characteristics (1985).

Although SCCT was the initial guiding concept, the interview questions did not lead the participants to focus exclusively on SCCT constructs. As a qualitative researcher, it was imperative that I had no preconceived notions of which theories supported data findings. In the analysis, the driving concept of identity emerged through data collection, although it could not be solely explained by the SCCT theory. Specifically, Super's (1980) theory of career identity provides a framework of understanding related to the theme of identity within career persistence. Super posited that an individual's life roles and identity constitute unique career patterns within lifespan development. Congruent with data, identity and life roles remained a determining factor of career persistence.
Several examples of the interaction of life roles were identified by the women. For example, one participant identified herself as a role model with her family as the first to complete college and the first to have a profession that was beyond hourly labor. Specifically, having an identity as a mother determined the types of positions and hours a woman worked in her technical career. Her identity as both a technology professional and a mother directly influenced her perceptions of how her career may contribute to her family obligations and directly affected career behaviors.

Finally, the data related to personality characteristics as a primary determinant of career persistence is supported by Holland (1985). This theory posits that the more congruent a person is to her vocational environment, the more likely she is to persist in that environment. Personality distinctiveness was identified as key factors in determining career perseverance. Findings suggest that identity is a key factor of persistence. For example, one's ability to identify as extroverted or flexible in nature determined the extent of her persistence. Another example, one participant indicated that she’s a “techy”. Her preference is to do work that involves understanding and developing technology and the constant change in the field keeps her from getting bored. This knowledge of oneself allowed her to make meaning out of her chosen career. This knowledge of a correct "fit" enhances her ability to stay in her chosen career. The combination of theories supports findings to suggest that not only do self-efficacy and context determine career persistence, but also identity, constructivism, and personality.

In sum, these findings primarily support three paths of influence originally stated in SCCT. The participants specifically mentioned social support as an environmental influence in decision-making. These supports include encouragement from family,
friends, colleagues, and management. In addition, contextual factors (ongoing education) and core social cognitions (feelings of self-efficacy) further contributed to these paths of influence. What was not as clear in support of SCCT was specifically how interests and goals lead to persistence. Questions did not specifically address these aspects of career persistence. However, understanding the experience of the participants may continue to inform practice. In addition, the findings support the main gaps in the SCCT literature. Namely those gaps include: women in careers, persistence (among woman and technology), as well as increased need for qualitative data.

**Implications for Practice**

The final line of questioning for the participants in the study was related to their perceptions regarding the future of women and minorities in information technology and any recommendations they would make to academia and industry for the successful recruitment and retention of minority women. Some anticipated growth in numbers of women, others did not, but all believed there is a place in the profession for women.

There are many studies regarding turnover and retention in the IT workforce. There are equally as many studies on the barriers to entry and career advancement of women and minorities. However, few studies focus on the desired retention factors for African American women and how their initial entrance and ongoing persistence strategies have allowed some to maintain technology careers. Many of these recommendations come directly from the female participants in the study. The researcher added more recommendations based upon prior research, experience and an overview of this study’s findings. The following are some suggested implications for the education,
human resource and government audience regarding the retention African American women:

**Recommendation 1:** Develop formal mentoring programs for new employees (especially minority) within technology organizations. One way in which women can improve the opportunities for other women in information technology is to serve as mentors or role models for newly hired women in information technology and for girls/young women considering a career in information technology. Establishing formal programs within the organization that makes the designation of mentors and models a priority at entry for young minorities by managers an important part of personnel management. Encourage senior members of the company to mentor junior members (e.g., new graduates) upon their entry to the organization to help them navigate company policies and expectations.

Women need to be exposed to how to resolve difficult situations related to gender differences as well as specific hurdles associated with being a female in a male dominated field. Without a trusted female mentor who can relate to female-specific issues such as discrimination and harassment, the situation may become overwhelming (Yates, 2001). Fewer women may leave IT careers if they felt they were not alone and had methods for handling specific situations as they arose. The literature provided research indicating that the lack of role model discourages young women from entering the field of information technology (Bush, et. al., 2002; Catalyst, 2003; ITAA, 2003;). Because of the lack of female role models, females may feel that there is no opportunity for growth when there are only men at the top of technology organizational chart.

The conclusion is further supported by the research which indicated that having a role model or mentor is a major contributor to women’s success in information
technology (Catalyst, 2003; Nobel, 2007). This was especially the case for early career entry. The findings support the conclusion that women with sustained careers in information technology felt a need to remove the barriers for future women in the field. In turn, this need serves as a motivator for career persistence. Those with experience volunteering, however, made mention of the sometimes conflicting demands of their work hours and the time needed to actively recruit individuals into industry. The study participants recommended organization commitment to time away from the office to allow them to engage with high school and post-secondary programs.

**Recommendation 2**: Develop and encourage participation in internal and external support networks. For example a few national networking organizations include:

- African American Women in Technology (AAWIT)
- National Black Data Processing Associates (BDPA)
- National Center for Women & information Technology (NCWIT)
- Association for Women in Computing (AWC)

These organizations provide networks which are designed to provide a support system for women in the computing and information technology field, as well as, provide a means of career networking (a.k.a. career development). Support networks such as these are invaluable in showing that women are doing well in industry and help to offset the challenges faced (or at least provide a forum for discussion).

**Recommendation 3**: Invest in training and development programs that consider the long-term professional development needs, as well as, meet the time commitment for ongoing training without creating work/life balance concerns. Training of employees is very often seen as an investment in the employee as well as being a way to build self-efficacy and encourage initiative (Kouzes & Posner, 2002). According to Lam and White (1998)
organizations that focus on “increasing the workforce’s competence … increase workers’ self-efficacy, because workers feel that they can perform well enough to make significant contributions to the organization…. Thus, the level of employee commitment may also be enhanced through training and development” (p. 354). Training can take many forms such as coaching, mentoring, job shadowing, as well as providing stretch opportunities for new assignments, and to take on new challenges (Kouzes & Posner, 2002, 2006).

**Recommendation 4:** Add work/life balance benefits that increase flexibility. Industry needs to become more conducive to having a family (e.g., hours friendly, job sharing, flexible schedules). This may include modifying positions so employees can work part-time when their children are very young, or modify positions so employees are not needed to work 50+ hours a week. Be flexible to include working from home on tasks that are applicable. The utilization of these benefits should also not penalize the employee. The counterargument against job sharing or part-time work is that it results in lower pay and opportunity for women because it leads to a practitioner role instead of a managerial path. The goal is to allow women opportunity to fulfill family responsibilities while maintaining their professional skills and career identity. As this study showed, this is a critical determinant to the promotion and career development of African American women.

**Recommendation 5:** Another recommendation from the findings of this study would be to include diversity training. While organizations increasingly invest in diversity activities based on the feedback from the participant’s organization have yet to embrace diversity within the organization. The participants feel that organizations often speak
diversity but don’t live it in everyday activities. For example, activities that celebrate differing cultures represented in the organization. Invest in diversity programs that account for gender and cultural differences among the workforce. Encouraging and building an inclusive organizational culture improves the recruitment and retention of an exceptionally skilled, trained, and educated workforce (Kossek & Pichler, 2006).

Creating an organizational culture inclusive of diversity of thought, style, and behavior may increase employee participation in the decision-making process (Kaliprasad, 2006). According to the women in this study many of their current organizations diversity efforts and programs leave much to be desired.

Individuals are attracted to work environments and positions where they feel comfortable working and believe the organization focuses on retention of its employees. This is equally true for African American females. Companies with information technology career positions should demonstrate consistent and proactive approaches to attracting, retaining, and promoting qualified women and minority candidates in IT (ITAA, 2003). Lack of corporate commitment and leadership to recruit and retain African American females in IT career positions may cause minority candidates to choose other occupational fields. Companies must show commitment to increasing the availability of IT job opportunities for African American females by (a) demonstrating executive commitment to meeting diversity goals in the IT career fields, (b) supporting and partnering with IT professional forums such as Black Data Processing Associates (BDPA), Women in Technology (WIT), the National Association of Female Executives (NAFE), and the Society for Hispanics; and (c) fostering stronger partnerships with colleges and universities (ITAA, 2003).
**Recommendation 6:** A final recommendation in creating a culture of recognition.

Recognition for contributions is something that should be built into the fabric of the organization for it to be perceived as genuine and authentic, and it needs to be modeled by the leaders of the organization (Kouzes & Posner, 2006). The more that people feel this authenticity within their teams, the more they will recognize it in the organization as a whole. Employee recognition increases employee retention which impacts an organization’s performance. As noted, to achieve optimal performance and employee retention, employees are willing to work hard, however, want to be recognized for that contribution. No single approach will meet the needs of all companies or all IT professionals. Organizations must anticipate the needs of diverse IT professionals and proactively address them with tactics that match their IT workforce goals.

**Recommendations for Future Research**

As the design of the research was exploratory in nature, many more questions emerged from the data collection than were answered. There are four major research directions that may expand the depth and breadth of knowledge of persistence using the SCCT theory. The following examples of future research would extend the lines of inquiry begun in this study:

1. This study should be replicated with other underrepresented ethnic groups. The sample should be expanded to consider both minority men and women. Are their similarities and/or differences among variables of career choice and persistence? The scope of this study was limited to African American women. A larger and more diverse sample may give insight to unique challenges faced by underrepresented groups. A comparison between men and women using the same
Methodology could contribute to gender differences within career persistence. A focus on women may limit findings in that minority men may experience a distinctly unique set of supports and barriers that contribute to career persistence.

2. Explore further the phenomenon of persistence. Study a similar set of variables (i.e., background, individual, and environmental) of those women who have left IT careers and pursued alternative occupational career paths. Access similarities and difference of women who stay and those who divert.

3. A mixed method (quantitative and qualitative) version of this study could be completed with a larger sample of participants to add statistical significance to the qualitative data of this study. A larger statistical sample could allow the results to be generalized to the entire population of African American women entering and persisting in IT. Because of the uniqueness of being not only female, but also African American in the United States and the barriers encountered (both in and out of the workplace) (Bell & Nkomo, 2001; Catalyst, 2004), there needs to be plans that take all aspects of African American women's experiences into consideration.

4. Complete a longitudinal study of the population in this study. The interviews took place in a single point in time and the reflections of the participants were historical in nature. The historical recollections may not have accurately represented each woman’s career journey. A key strength of the SCCT model is the feedback loop occurring over time, as one experience influences the next (Lent, et al., 1994). Longitudinal research allows for the exploration of this feedback loop, yet few studies have explored these changes over time. This
approach could provide a depth of insight as to the ongoing journeys of African American women across their career span. More specifically, researchers may gain a deeper understanding of how identity and life role plays into one’s career path at different ages. Differences in career supports and influences may change as the person develops.

Limitations of the Study

Due to the nature of multiple case study research, which is focused on the depth of understanding rather than breadth of populations, there are inherent limitations in the findings. In addition, the present research did not address career barriers as a stop to career persistence by nature of the sample. All women interviewed have persisted in their career, so further understanding of strong career barriers (effecting self-efficacy) may inform future research as suggested by Lent and Brown (1996).

One of the limitations of this study is the lack of a random selection process for the sample population. The study was conducted on a selected sample of African American women from IT with a minimum of five years of experience. The limitations were as follows: The purposive sampling procedure, which was nonrandom, decreased the generalizability of findings. In addition, the study used a qualitative research method, which means the findings could be subject to other interpretations. The study included an in-depth interview process. Case study research has often been stereotyped as a weak approach among social science methods because it does not involve hypothesis testing aimed at providing quantifiable “objective” proof about participants’ experiences. Because not enough is known about African American women retention needs, I
concluded that an exploratory, qualitative research design was needed in order to capture in-depth, contextual information.

Participants were scattered throughout the United States making individual telephone interviews the most practical interview technique because both a focus group interview and a one-on-one interview would be difficult to coordinate logistically and cost prohibitive. As with any data collection instrument, there are limitations. In a telephone interview, the researcher cannot see the informal communication provided through body language or facial expressions. Another drawback to a telephone interview was that the participants needed to be comfortable and willing to speak and share their ideas in order to collect the most honest data, and the telephone format presents difficulty in building rapport (Creswell, 2007; Gay et al., 2006). Therefore attention to protocol and involvement in the interview was important (Gay et al., 2006). The other significant constraint was time. The number of questions asked was limited to keep the interview to no more than one hour.

Finally, personal biases may influence qualitative research in different ways. Personal knowledge of computing and information technology may have allowed me as the researcher to assume certain aspects of the data collection. I may have overlooked other themes or subcategories that could have contributed to the depth of knowledge.

In spite of these limitations, qualitative methods, using extended interviews, are needed and appropriate for exploring meaning in relation to career persistence, particularly in non-traditional samples. One further limitation is that the study is retrospective, therefore threatening validity due to historical attrition of the subjects’ memories. It was critical that I avoided making statements regarding causal relationship,
since such statements threaten internal validity (Gall, Gall, & Borg, 2003). Due to the subjective nature of the research, it was important that the statements made by each participant be construed solely as representing the individual’s experience.

**Conclusion**

The use of information technology is pervasive throughout society. As a result there is a high demand for professionals with the knowledge, skills, and abilities needed to design, implement, and maintain the complex technology that drives our economy. Despite this opportunity, there are few women and minorities IT professionals entering into and remaining in the field. This is especially significant for minority women. The prevailing areas of research have focused on the circumstances that decrease the likelihood of women entering the field of information technology.

Despite the years of research and programs to correct the underrepresentation of women and minorities in IT, the number of women pursuing technology degrees and careers has continued to decrease. Yet, there exist women that have chosen to pursue technology as a career and have maintained those careers for a significant number of years. It was the goal of this study to approach the issue from a different perspective. Instead of focusing on the conditions that dissuade women from choosing to pursue IT careers, this study explored the factors that influenced those women in particular African American women to maintain careers in information technology. The experiences of these women should reveal factors or proven strategies one could employ to decrease diversion rates and increase STEM employment rates among women and minorities, specifically in IT. In addition, the outcome of this research could be used to further
develop programs to reconcile the ethnic gender disparities in STEM fields by identifying those factors that influence the persistence of minority women.

This study will contribute to workplace literature concerning African American women. It will help other African American women understand the challenges they face and overcoming barriers they may experience while pursuing career advancement. It will help managers build stronger, higher performing teams with improved job satisfaction through diversity factors such as diversity in thought, ethnicity, gender, learning styles, and so forth. And, it will assist organizational professionals in building diversity plans to assist in developing African American women to leadership positions in the workplace.

With a more thorough understanding of the influences that contributed to these women retained and persisting in IT, policy makers will be better able to define intervention strategies to improve the recruitment and retention of women and minorities in IT. This study could also contribute to how 1) companies can better manage the transition process for new technology entrants, 2) computing science programs can provide students with better approximations of IT practice, and 3) computer science and information technology students could better investigate potential employers.
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Appendix A: Verbal Script for Obtaining Informed Consent

Hello, my name is Angela Smith. I am a graduate student at The Ohio State University in the Workforce Development and Education, and I am in Columbus, Ohio undertaking research that will be used in my dissertation. I am studying retention factors that influence the career persistence of African American women in Information Technology (IT). I would like to ask you a series of questions about your career experiences in IT. I am seeking to gain a more thorough understanding of contributing factors for retention of minority women in technology.

In particular this study will contribute knowledge to the scholarly research related to identifying and isolating factors applicable to the retention of African American women in IT. With a more thorough understanding of the influences that contribute to women persisting in information technology careers, educators, organizations and policy makers will be better informed in their creation of programs and policies to increase the number of women and minorities in the field of information technology.

This interview will take about 45 to 60 minutes of your time. Additional time may be required in the validation of statements made through transcribed transcripts of the interview. Statements will be provided to you via email for your review and validation.

There is minimal risk of a breach of confidentiality. I will not link your name to anything you say, either in the transcript of this interview or in the text of my dissertation or any other publications. All personal contact information will be kept and secured separately from the transcript or notes of this interview.

There are no other expected risks of participation given personal information will not be shared.

Participation is voluntary. If you decide not to participate, there will be no penalty or loss of benefits to which you are otherwise entitled. You can, of course, decline to discuss any issue or answer any question, as well as to stop participating at any time, without any penalty or loss of benefits to which you are otherwise entitled.

If you have any additional questions concerning this research or your participation in it, please feel free to contact me, my dissertation supervisor or our university research office at any time. I have forwarded you all the relevant contact information.

I would like to make a tape recording of our discussion, so that I can have an accurate record of the information that you provide to me. I will transcribe that recording by hand, and will keep the transcripts confidential and securely in my possession. I will erase the tape after I transcribe it.
Do you have any questions about this research? Do you agree to participate and may I record our discussion?
If so, let’s begin…
Appendix B: Interview Questions

This study’s protocol included the design of questions to allow the participants to answer the research questions in their own words without parameters. I started by asking simple questions about what about IT interested you, and why did you choose it as a career. The goal is that the nature of the conversation is much more natural and fluid continuing to build on a rapport between the researcher and the participant. Developing a good rapport can be beneficial to the collection of quality data. The original demographic and open-ended interview questions for the study are as follows:

Demographic Questions

1. What is your age?

2. What is your work status? a) Full-time b) Part-time c) Contingent

3. What is your current position? (responsibilities).


5. Do you have any children? If so, how many?

6. Do you have a college degree(s)? If so, what was your major? Was your college major in a computer-related field (like computer science, information technology, management information systems)?

7. How many years have you been working in IT?

The demographic data was used during the analysis process to search for associations among categories, subcategories, and specific demographic attributes.
Open-ended Questions

20. Based on your experiences, why did you pursue a technology career and what impacts your decision to remain in the profession?

21. Based on your experiences, what are the contributing factors for sustaining your position? How long do you plan to sustain this position?
   
   d. What strategy do you use to stay competitive?
   
   e. What characteristics do you believe you have that allow or enhance your capabilities to sustain your position?
   
   f. What strategies do you feel contribute to your success?

22. Based on your experiences, can you explain to me what reasons you have to continue to work for your present organization and why these things are important? What would affect your decision to leave or stay with the organization?

23. Based on your experiences, what sacrifices, if any, have you made to remain in your position?

24. Based on your experiences, what is it about your job that creates ‘feelings of satisfaction’?

25. Based on your experiences, what is it about your job that creates ‘feelings of dissatisfaction’?

26. Based on your experiences, what are the most important benefits an employer can offer an employee and what makes you desire these benefits?

27. Based on your experiences, what are the incentives offered at your present place of employment that entice you to stay?
28. Based on your experiences, can you describe what you would change in your present position that would be an incentive to stay?

29. Based on your experiences, if certification bonuses or flexible scheduling were offered by your organization as added benefits would they be important to you? Why or why not?

30. Based on your experiences, can you describe what past obstacles you have had to overcome in your career?

31. Based on your experiences, can you describe what, if any, are current obstacles in your career? How might your organization help you to overcome them?

32. Based on your experiences, what has kept you moving forward in this field? Were you made aware of advancement opportunities?

33. Based on your experience, what, if any, effects have the “glass ceiling” had on your career progression?

34. Based on your experience, how would you describe your relationship with your peers, subordinates, and superiors?

35. Based on your experiences, can you describe what leadership style you prefer your unit manager/director to have and why this is important to you?

36. Based on your experiences, can you describe if you have the support you need from your manager/director to do your job? How does this impact your decision to stay or leave your organization?

37. Based on your experience, what are your experiences with mentors?
   b. How do you feel about mentoring other women?
38. Based on your experience, what changes do you think need to be made in order to increase the number of women in information technology?
## Appendix C: Mapping of Interview Questions to Primary Research Questions

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Interview Question</th>
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<tbody>
<tr>
<td>1. What factors were identified by African American women currently in IT that</td>
<td>1. Based on your experiences, why did you pursue a technology career and what impacts your decision to</td>
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<td>influenced their decisions to pursue a career in the IT field?</td>
<td>remain in the profession?</td>
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<tr>
<td>2. What do African American women currently in IT identify as the most important</td>
<td>1. Based on your experiences, what are the contributing factors for sustaining your position? How</td>
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<td>retention factors influencing their decision to remain in information technology?</td>
<td>long do you plan to sustain this position?</td>
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<tr>
<td></td>
<td>a. What strategy do you use to stay competitive?</td>
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<td></td>
<td>b. What characteristics do you believe you have that allow or enhance your capabilities to sustain</td>
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<td></td>
<td>your position?</td>
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<td></td>
<td>c. What strategies do you feel contribute to your success?</td>
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<td></td>
<td>2. Based on your experiences, can you explain to me what reasons you have to continue to work for</td>
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<td></td>
<td>your present organization and why these things are important? What would affect your decision to</td>
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<td>leave or stay with the organization?</td>
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<td></td>
<td>3. Based on your experiences, what is it about your job that creates ‘feelings of satisfaction’?</td>
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<td>4. Based on your experiences, what are the most important benefits an employer can offer an employee</td>
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<td></td>
<td>and what makes you desire these benefits?</td>
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<td>5. Based on your experiences, what are the incentives offered at your present place of employment</td>
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<td></td>
<td>that entice you to stay?</td>
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<td></td>
<td>6. Based on your experiences, can you describe what you would change in your present position that</td>
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<td></td>
<td>would be an incentive to stay?</td>
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<td></td>
<td>7. Based on your experiences, if certification bonuses or flexible scheduling were offered by your</td>
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<td></td>
<td>organization as added benefits would they be important to you? Why or why not?</td>
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<td></td>
<td>8. Based on your experiences, what has kept you moving forward in this field? Were you made aware of</td>
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<td>advancement opportunities?</td>
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<td>9. Based on your experience, how would you describe your relationship with your peers,</td>
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<td>subordinates, and superiors?</td>
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<td></td>
<td>10. Based on your experiences, can you describe what leadership style you prefer your unit manager/</td>
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<td>director to have and why this is important to you?</td>
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<td></td>
<td>11. Based on your experiences, can you describe if you have the support you need from your manager/</td>
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<td></td>
<td>director to do your job? How does this impact your decision to stay or leave your organization?</td>
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Continued
### Research Question | Interview Question
--- | ---
3. What perceived barriers, if any, did African American women overcome to sustain their IT careers? | 12. Based on your experiences, what sacrifices, if any, have you made to remain in your position?  
13. Based on your experiences, what is it about your job that creates ‘feelings of dissatisfaction’?  
14. Based on your experiences, can you describe what past obstacles you have had to overcome in your career?  
15. Based on your experiences, can you describe what, if any, are current obstacles in your career? How might your organization help you to overcome them?  
16. Based on your experience, what, if any, effects have the “glass ceiling” had on your career progression?  
17. Based on your experience, what are your experiences with mentors?  
   a. How do you feel about mentoring other women?  
18. Based on your experience, what changes do you think need to be made in order to increase the number of women in information technology?
### Appendix D: Multiple Case Assertions Worksheet

<table>
<thead>
<tr>
<th>#</th>
<th>Assertion</th>
<th>Related to Which Themes or Factors?</th>
<th>Evidence, Persuasion, Reference in Which Case?</th>
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<tbody>
<tr>
<td>1</td>
<td>Many of the retention factors for African American women are consistent with retention factors of men and other women in IT. However, African American women feel that retention practices often fail to acknowledge their unique needs.</td>
<td>1) Organizational culture and work environment that promotes respect; 2) Work/Life Balance policies that allows flexibility; 3) Opportunities for ongoing professional development; 4) Overall job satisfaction with working in IT; 5) Strong employer benefits and competitive salaries; 6) Equitable career advancement opportunities; and 7) Leadership that promotes autonomy and recognition.</td>
<td>Participant 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1009, 1010</td>
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<tr>
<td>2</td>
<td>Persisting African American women in IT engage in regular self-reflection and professional development activities.</td>
<td>1) Opportunities for ongoing professional development;</td>
<td>Participant 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011</td>
</tr>
<tr>
<td>3</td>
<td>Persisting African American women have the self-efficacy to overcome the totality of barriers for advancement and development.</td>
<td>1) Organizational culture and work environment that promotes respect; 2) Management and Leadership Style; 3) Gender and Race Bias</td>
<td>Participant 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011</td>
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<tr>
<td>4</td>
<td>Support was a key factor in influencing early career persistence in information technology.</td>
<td>1) Available Role Models and Mentors; 2) Lack of Network</td>
<td>Participant 1002, 1003, 1004, 1005, 1006, 1007, 1011</td>
</tr>
</tbody>
</table>

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