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**ADDRESSING THE GENDER GAP IN FEDERAL LAW ENFORCEMENT PROFESSIONS:  
THE MOTIVATIONAL ATTRACTION OF WOMEN IN COMPUTING**

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Thesis submitted in Partial Fulfillment of the Requirements for the Degree of

**Master of Science in Networking, Security, and Systems Administration**

Rochester Institute of Technology

B. Thomas Golisano College of

Computing and Information Sciences

Department of Networking, Security, and Systems Administration

**February 22, 2011**

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THE MOTIVATIONAL ATTRACTION OF WOMEN IN COMPUTING**

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## **ABSTRACT**

Nationwide, federal law enforcement agencies seek candidates with specialized skill sets and more advanced educational knowledge for employment. In view of this, it is proven, after much open source research into federal agencies' qualification requirements, that those who possess a background in select areas, specifically computer science, have a better opportunity for employment with federal law enforcement agencies, particularly in the computing sector; although, in many cases, work experience can be substituted for a college degree [7]. For this reason, many women are not involved in, nor apply for, computing professions within federal law enforcement agencies. A significant step in encouraging women to pursue computing careers is to examine the reasons women, currently employed in federal law enforcement, have chosen a computer-related career path. Research that provides an analysis of the motivations that exist for women in becoming interested in computing professions, within federal law enforcement agencies, will help address the issue of equal representation for the underrepresented population of women in computing fields.

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# **1. INTRODUCTION**

## **1.1. RESEARCH TOPIC**

For this project, the research topic addresses the gender gap that exists in computing positions within federal law enforcement, as well as the motivational attraction of women to these positions. A series of interviews were conducted with women within a federal agency to report on the challenges women encounter in the computing and federal law enforcement profession.

## **1.2. THE CHALLENGE**

Upon entering the 21<sup>st</sup> century, society also entered the Information Era. The Information Era is the primer to how the future is being shaped by computing technologies. Technological breakthroughs have revolutionized individuals' professional outlooks and careers paths, specifically those within federal law enforcement agencies. On August 8, 1969, President Richard Nixon signed Executive Order 11478, "Equal employment opportunity in the Federal Government [17]." This provided equal opportunity in federal employment for all persons; prohibited discrimination in employment because of race, color, religion, sex, national origin, handicap, or age; and, promoted the full realization of equal employment opportunity through a continuing affirmative program in each executive department and agency [17]. WIFLE [17] noted that this order opened up the GS-1811 positions and other job series for women from which they had previously been barred based on their gender; now, women could occupy positions that held authority. As a result, the first women were hired in 1971 and 1972 by the Immigration and Naturalization Service, the United States Secret Service, the United States Postal Inspection Service, the Federal Bureau of Investigation, and the Bureau of Alcohol, Tobacco and Firearms [17].

Since such executive history, federal law enforcement employers are now in search of candidates that have the necessary and required knowledge to fulfill their positions, whether an applicant for a Special Agent or an applicant in the area of Professional Support [7]. Applicants, male or female, are prioritized in the hiring process based upon certain critical skills for which the agency is recruiting. With the continuous growth and intensity of technological advancements, a demanding critical skill set lies in the area of Computer Science and Information Technology. There is a growing need in federal law enforcement agencies for individuals that can offer an expertise in these areas [7]. For instance, as cyber security becomes an increasingly important aspect of National defense, rapid growth will occur among information technology specialists, such as computer and information research scientists, who will be needed to devise defense methods, monitor computer networks, and execute security protocol [7].

According to the Federal Jobs Network [7], continued education is significant in federal law enforcement computing careers, especially for women since the profession tends to be predominately male. In support of this, the Department of Education: Institute of Education Sciences, the statistics given by the National Center for Education show that the number and proportion of degrees awarded to women increased at all levels between the years of 2006 – 2007. Women were proven to have earned the majority of associate’s, bachelors, and master’s degrees, in addition to 50% of doctor’s and first-professional degrees. According to Bailey and Hussar [2], it is projected that between the years of 2018 – 2019, continued increases are expected in the number of degrees awarded to women (Section 4. Degrees Conferred, para. Degrees, by Level of Degree and Sex of Recipient). If women are highly educated, why is there a vast gender gap in the number of women employed as computing professionals with federal law enforcement agencies? The American Association of University Women (AAUW) Educational Foundation issued a report, *Women at Work*, which addresses part of this issue by recognizing that the education of today’s females has great implications for women’s future success in the work force. The report shows that the computer and technology literacy gap for school-aged females is mirrored in the adult world of work [1]. With that said, the celebration of the fact that women’s education and work participation levels are higher than ever is well deserved; however, the critical questions and clear warning signs presented cannot be ignored [1].

Since the 1880’s, AAUW’s focus has been on pushing educational opportunities for women [1]. *Women at Work* [1] describes how education for today’s women overall is similar to that of men today; therefore, with growing numbers of service-related jobs, women have a greater likelihood of employment than men do. In 2001, it was noted that the fastest-growing occupations, according to the Department of Labor, were computer engineers, computer support specialists, and systems analysts [14]. However, according to the United States Department of Labor: Women’s Bureau [15], in 2008, the top most prevalent occupations for employed women were secretaries and administrative assistants (Statistics & Data section, stat. 7(1)). In addition, according to the United States Office of Personnel Management [16], in 2006, only 25% were in the Technical Occupational Category White-Collar women. In 2008, the United States Department of Labor: Women’s Bureau [15], declared that out of the ten occupations with the highest median weekly earnings among women who were full-time wage and salary workers were: 4) Computer Software Engineers, at \$1,351; 5) Computer and Information Systems Managers at \$1,260; and 10) Computer Scientists and Systems Analysts at \$1,082 (Statistics & Data section, stat. 10). It is clear that very few women do decide to pursue a higher education and further pursue a career in the areas of Science, Technology, Engineering, and Mathematics (STEM); an increase in interest needs to occur for a positive change to occur in these areas [5].

The decrease of women in computing professions within federal law enforcement organizations is a complex and many-sided issue. It is important to understand that there is no single resolution to this problem. Little by little, initiatives are being implemented nationwide to encourage women to pursue computing careers within federal law enforcement agencies. In 1999, the Women in Federal Law Enforcement (WIFLE) Foundation [19] was formed and

provided a vision statement of achieving gender equality in federal law enforcement. In addition, in 2000, The National Center for Women and Policing [10] released their latest publication, The Self-Assessment Guide for Law Enforcement. This assessment was designed to serve as a recruiting and retaining methodology to assist local, state, and federal law enforcement agencies in examining their policies and procedures in order to identify and remove obstacles to sworn and civilian women employees. These are a select pair of many organizations developed to provide women with the support they need to pursue computing, both educationally and professionally.

Therefore, it is crucial to investigate the issue of so few women in federal law enforcement computing positions through further reviewing research and literature conducted in this area. This thesis will focus on an imperative preliminary step to determine and examine the reasons and motivations why women choose a computing career path in federal law enforcement. As a result, the analysis of women's experiences that led them to this profession will facilitate the approaches that can be taken by other women and assist them in their career choices in the future.

## **2. LITERATURE REVIEW**

### **2.1. PROBLEM**

### **2.2. PROBLEM STATEMENT**

The purpose of this investigative study is to determine what research is currently being performed in the area of women employed by federal law enforcement agencies engaged in computing occupations. This project will identify research currently or previously being conducted with regard to women employed with federal law enforcement organizations, with a strict concentration in the computing sector. There are many proceedings and publications referenced with regard to women in computing careers separately from women in law enforcement; no projects were discovered with further observation to women in the federal law enforcement segment of computing in specific.

The most relevant information can be found in some open source research reports – a significant piece of open source research, with regard to women in federal law enforcement, is the WIFLE Organization, Women in Federal Law Enforcement, Inc. WIFLE is a professional association formed to promote and support women in federal law enforcement occupations. The WIFLE Organization [19] was established in 1999 as an organization of individuals working together to foster awareness of the value that women bring to law enforcement. In 2006, the WIFLE Foundation, Inc. was later incorporated to educate the agencies in federal government and the general public about the issues facing women in federal law enforcement and recommend solutions. WIFLE [18] maintains five strategic goals to accomplish as an organization, between January 1, 2008 – December 31, 2012, to include: 1) Expansion of Services; 2) Conduct Relevant and Credible Research; 3) Extend Both Membership and Value Membership; 4) Share Information and Knowledge; and 5) Create a Strong and Sustainable Organization. In support of this research, according to WIFLE [18], strategic goal 2) Conduct Relevant and Credible Research will allow the Foundation to be “recognized as a premier research organization and knowledge management center regarding issues facing women in law enforcement,” perhaps specifically the issue of few women involved federally in computing. WIFLE stated the following will be completed by 2013 [18]: 1) WIFLE , Inc. and the WIFLE Foundation will provide more effective, efficient, and unique services to the organization, the membership, and the public; 2) The WIFLE Foundation will be recognized as a premier research organization and knowledge management center regarding issues facing women in law enforcement; 3) WIFLE, Inc. will increase (and sustain) membership by 5% each year for an optimum membership of 1000; 4) WIFE, Inc. and the WIFLE Foundation, will be recognized (through communication, collaboration and credibility) as a leader in research and center for knowledge management on law enforcement issues, particularly those facing women; and lastly, 5) WIFLE will create a strong and sustainable management team and revenue stream for the future; by 2013, WIFLE (WIFLE, Inc., WIFLE Scholarship and WIFLE Foundation) will obtain average annual funding increases of 5%, an overall increase of 25%.

Another piece of significant research was conducted by the University of Ohio [3] who recently researched why women choose Information Technology careers, focusing on educational, social, and familial influences. The study conducted allowed for the influences and motivations that led women to further pursue the various career paths in this area of study to be illustrated. Bernt, Pecora, & Turner [3] focused on the influences that successful women in Information Technology (IT) cite as being the dominate forces that led them to their career choice. To initially address this query, the qualitative methodology was applied through a survey designed with a series of short-answer, as well as open-ended questions. Bernt, Pecora, & Turner [3] approached this survey with the notion that, because IT encompasses a wide scope of job functions, a survey of women in IT careers should not be tied to one company or one job title; nor should the survey be tied to one geographic location; they chose an informal organization for technical women in computing, called Systems. The implementation of this survey differs from this project's approach of qualitative interviews, the factors of procedure, population validity, and data analysis all remain constant.

According to Creswell [6], qualitative research is applied through emerging questions and procedures, collecting data in the participants' setting, analyzing the data inductively, building from particulars to general themes, and making interpretations of the meaning of the data. Therefore, the general inductive approach for analyzing data provides a convenient and efficient way to receive straightforward results; it supports a focus on individual meaning, and the importance of rendering the complexity of a situation. Thus, in furtherance of receiving results, Bernt, Pecora, & Turner [3] posted a message to the organization's listserv explaining the project and requesting Systems members complete the online survey. The organization has about 2,500 members, only 275 members responded to the survey; the survey results cannot be seen as representative of the whole Systems membership. As a result, responses to the survey were electronically saved; the short-answer questions were coded and transferred for analysis and the open-ended questions were analyzed qualitatively by looking for the emerging themes and coding each response based on those themes [3].

As might be expected, women make their career choices at different stages in their lives; nonetheless, many women provide reasons why they chose to enter computing, whether it is a result of events or influences and attributes of the women themselves, or of computing careers [12]. Many of the same topics and trends were focused on in this study, because the qualitative research was centralized, specifically the various influences that prescribe women's career choices. Additional results were centralized around women's first computer usage, parents' occupations, significant people in their lives, academic paths, and internal and external influences [3].

The women who responded to the Bernt, Pecora, & Turner's [3] survey were between the ages of 22 and 64, and retained a broad range of IT positions: Software Engineer, Network Administrator, Programmer, Systems Analyst, Web Developer, IT Manager, Database Administrator, Technical Writer, Application Developer, Quality Assurance Engineer, Director of Student Computing, Professor, Multimedia Consultant, and CEO. All of the 275 women preserve occupations in the IT field, practically half of the women majored in non-technical subject matters throughout their college career. Nonetheless, according to Bernt, Pecora, & Turner [3], half of the women involved in the study reported that their first introduction to computing was in school. A significant number of women have had some sort of influential experience which led them to pursuing a computing career, nonetheless, with a federal law enforcement agency. Whether it is a familial or friend influence, societal influence, or an internal motivation – the majority of women claim a positive influence in their lives contributed to their decision of choosing computing as a career.

Within the number of women studied in the Systems survey, the vast majority of them identified a specific person, or persons, as having the most influence in steering them toward a career in IT [3]. According to Teague [12], friends and family members must be educated about the benefits of computing careers for women in order to assist with the problems of stereotyping and misperceptions. These women claimed a person or persons as an external influence, one woman spoke of, "non-existent support," while another said she received "no encouragement in school. NONE in college" [3]. Hence, the need for women's technical abilities is in demand, as they are clearly the minority in the field; they should not be discouraged through the minimal support levels being provided.

Society has a reflective impact on the decisions women make in the computing field, both academically and professionally. According to Camp & Güner [4], most of the images of computer science are negative..." The individual, personal influences women experience are key to how they view various careers in the IT field. In the study of Systems, respondents cited a range of experiences that were influential in leading them to a career in IT – both in the classroom and on the job [3]. Many women experienced an influential occurrence through a specific course in high school or college, while other women experienced an influential occurrence through an on-the-job opportunity.

The specific motivating factors often varied based on the individual and their experiences. In the Systems study, for several of the women, the financial aspects of IT careers were important motivating factors, with many of them mentioning earning potential, job security, and the desire for a marketable skill as their reason for pursuing an IT career [3]. Bernt, Pecora, & Turner [3] concluded that there were less practical motivations that existed as well, such as finding computers to be "exciting and glamorous." For quite a few of these women, computers represent a way to do what they are good at; many women find computing as a motivating and inspiring interest, but require a bit more acknowledgement, guidance, and support in order to pursue their long-term goal.

Regardless of the research that has been performed on women in the computing and technological fields, there is a deficient amount of research that specifically addresses women in computing fields within the area of federal law enforcement. Although the study performed by Bernt, Pecora, & Turner [3] provided extremely positive results on determining why women choose Information Technology Careers with regard to educational, social, and familial influences, the lack of women involved in computing within federal law enforcement requires immediate attention.

In correlation, according to Teague [12], women in computing enjoy solving a problem and developing a solution – at all levels, change, challenge, and diversity, the career opportunities, money, and travel, the interaction with their immediate colleagues and with others within and outside the organization, their working environment and flexibility of hours and work location, and the respect they earn from doing their job well. These career characteristics are different from those perceived by the majority of women; these exact characteristics need to be expressed in an efficient manner to obtain the attention of various, skill-oriented women. The United States Department of Justice, Bureau of Statistics [14], reported in 2004 that women accounted for as little as 16% of the 105,000 federal law enforcement officers that were surveyed. According to this statistic, and the findings of this research, influential shaping is essential in expanding women's career choices and encouraging and motivating more women to pursue computing professions in federal law enforcement.

### **3. SCOPE OF THE RESEARCH PROJECT**

The purpose of this research project is to evaluate various topics and trends surrounding the reasons why women chose computing careers within federal law enforcement. The objective is to explore the motives behind why the women chose career paths in the area of computing, the number of experiences they sustained in the field, and the motivations that supported their decisions in becoming involved in the area of computing.

This project provides an in-depth analysis of various motivations that exist, such as visualizations, education, interpersonal skills and interests, social influences, familial influences, support systems, and tenacity. More importantly, this research will investigate federal programs or agency policies that are currently in place to address the issue of so few women in the computing career path.

#### **3.1. SIGNIFICANCE OF PROBLEM**

Currently, women in computing professions are underrepresented in federal law enforcement, and attracting them to this career field is a challenge. According to the Thom, Pickering, and Thompson study, the Margolis and Fisher study, and the ECAR study, acceptance of femininity by colleagues, self-confidence in female candidates, and the availability of social support are significant factors in recruiting women to computing professions [8].

It is the purpose of this study to take women currently in the profession, and the events and obstacles they encountered throughout their lives and careers, and further recognize and address this for other women interested in the field. Recognition will further demonstrate perseverance to the idea of encouraging and supporting women in computing.

#### **3.2. PROJECT GOALS**

The main goal of this research project is to determine what motivates women to become involved in the computing aspect of federal law enforcement as a professional career. Research in the area of representation of women within federal law enforcement careers, specifically computing professions, is a dual concept. Initially, understanding the gender gap that exists within federal law enforcement careers, specifically in the area of computing, is crucial. The computing gender gap is the mechanism that attracts attention to the need for women to be educated in and aware of the area of computing and the opportunities for women within federal law enforcement agencies, despite the stereotypical descriptions that exist. Second, determining and understanding the motivations that subsist for women behind the interest in computing is also essential. There are many avenues for women to pursue within the area of computing; however, federal law enforcement is a deceiving direction for women of all ages and cultures to follow. Attentiveness into what motivates women to move toward computing careers in federal law enforcement will be the focus. The final outcome of this project will establish a clearer explanation for these concepts.



### **3.3. PROJECT OBJECTIVES**

1. Identify current research efforts addressing the gender gap in computing fields within federal law enforcement agencies
2. Identify women employed by a federal law enforcement agency to conduct interviews for data collection; base selection on specific characteristics to include:
  - a. Age
  - b. Current job title
  - c. Number of years in computing position
  - d. Countries they've grown up in; area (city/suburb)
  - e. College educated (Associate's Bachelor's, Master's, Doctorial)
3. Determine the presence of various motivations behind becoming involved in computing professions with federal law enforcement organizations; some areas to include:
  - a. Determine what initially attracted and currently attracts women to computers
  - b. Examine how gender socialization in the home sets in motivation toward computers
  - c. Examine their experiences in college and how it relates to the career path they chose and will lead them to choose in the future
4. Address significant factors through data collection process in order to help inform women interested in the field within a federal agency
5. Attempt to identify federal programs or agency policies that are currently in place to address the issue of so few women in the computing career path

### **3.4. METHODOLOGY**

In an effort to pursue this study, data will be gathered through a qualitative method from women in various computing professions of federal law enforcement in order to assess the motivations that exist behind the involvement of this occupation. A series of professional interviews were conducted with women nationwide. The qualitative interviews were completed through various communications styles, to include: 1) face-to-face; 2) telephone; and 3) electronic, e.g. e-mail. The interviews generally involved open-ended questions to identify the principal motivations that have led women to this profession, and what can be done to increase the number of computing women in federal law enforcement organizations in the future. During the face-to-face interviews, qualitative observations were also concluded and documented, such as behavior and activities of the women when asked questions and discussed topics.

As Creswell [6] stated, those who engage in the form of qualitative research support a way of looking at research that honors an inductive style. The purposes for using an inductive approach are to: 1) condense extensive and varied raw text data into a brief, summary format; 2) establish clear links between the research objectives and the summary findings derived from the raw data; and 3) develop model or theory about the underlying structure of experiences or processes which are evident in the raw data [13]. The inductive approach is similar to the

qualitative approach utilized in this study because a clear link was established between the research objectives of the study, and the summary findings derived from the data.

A total of 23 women within the country of the United States were selected from one specific federal law enforcement agency, and interviewed as a part of this study. The women varied in federal computing positions, to include, Special Agent, Regional Information Technology Specialist Program Manager, Staff Operations Specialist, Field Photographer, Information Technology Specialist, Technical Information Specialist/Administrative Assistant, Forensic Examiner, Intelligence Analyst, and Office Services Supervisor. Personal understanding of computing and technological concepts, observations of women in computing professions within federal law enforcement, and the experiences of being a woman in the area of computing, both academically and professionally, will supplement the design of the interview questions.

The women participants received a list of questions, typically ice-breaker questions at the beginning, which would develop into sub questions throughout the qualitative research study. The questions were established in a structured and organized manner. Common ice-breaker questions were initially focused upon, such as age, type of upbringing, education, and current job title and past experience. However, the questions became more involved as the basic information was collected from the women, focusing on their interests, both in federal law enforcement and computing, skills, influences, etc. The formulation of these questions presented an opportunity to learn about, and further observe the women in their computing profession environment. Methods and practices of how to capture their true emotions about the federal gender gap in computing positions were examined. In depth interaction with these professional women in a positive and proactive manner, in addition to personal experience as a woman in computing, will provide an extreme resource to this thesis project.

### 3.4.1. TIMELINE

Below is a proposed timeline for the completion of the Master's thesis.

Years: 2010 - 2011	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
Literature Search Completed	←→									
Thesis Committee Selected & Secured	←→									
Draft Proposal Completed	←→									
Final Accepted Proposal		←→								
Individual Interviews and Data Collection			←→							
Report Results and Analysis			←→							
Thesis Defense										←→

## 4. APPROACH

### 4.1. PLAN OF WORK

This research project consists of the following tasks:

1. Literature Search and Review
  - a. Objective – Determine what research is currently being done in the area of the women employment rate for federal law enforcement agencies in the computing sector.
  - b. Approach – Investigate current research in the position of women in computing through the federal law enforcement sector by searching the Internet, the library, and reputable conference proceedings and publications. Identify open source information and network with women contacts from computing conferences and federal law enforcement agencies that can serve as a catalyst for this issue as well.
2. Thesis Committee Selection
  - a. Objective – Determine the appropriate individuals to serve on the thesis committee, provided their area of interest(s) and career field(s). Three individuals will be selected upon; one Rochester Institute of Technology faculty member as the chairperson and two additional members, provided they have their Master’s Degree, to serve as reviewers.
    - i. Chairperson – Sharon Mason
    - ii. Reviewer – Bill Stackpole
    - iii. Reviewer – Susan Lupiani
  - b. Approach – Provide the chairperson as well as the reviewers with a proposal draft, outlining the purpose and intention of the project.
    - i. Provide each committee member with a copy of the Thesis Proposal Approval Form in order for each individual to indicate their approval by signing off on the proposal. Finally, submit both printed and electronic copies of it to the Graduate Coordinator.
3. Draft and Final Proposal
  - a. Objective – Persuade my prospective committee that my thesis will be interesting and worthwhile through clarifying my thoughts, arguments, and approach to this crucial topic.
  - b. Approach – Deliver a clear outline of why I want to determine the reason behind why the number of women employed by federal law enforcement agencies is slim with regard to the computing area.
4. Individual Interviews and Data Collection
  - a. Objective – To research and collaborate with women in computing fields in a federal law enforcement agency. I will determine and understand their motivations for becoming involved in the computing area with federal law enforcement and further examine what can be done so that valuable contributions and perspectives of federal law enforcement women in computing can be respected.

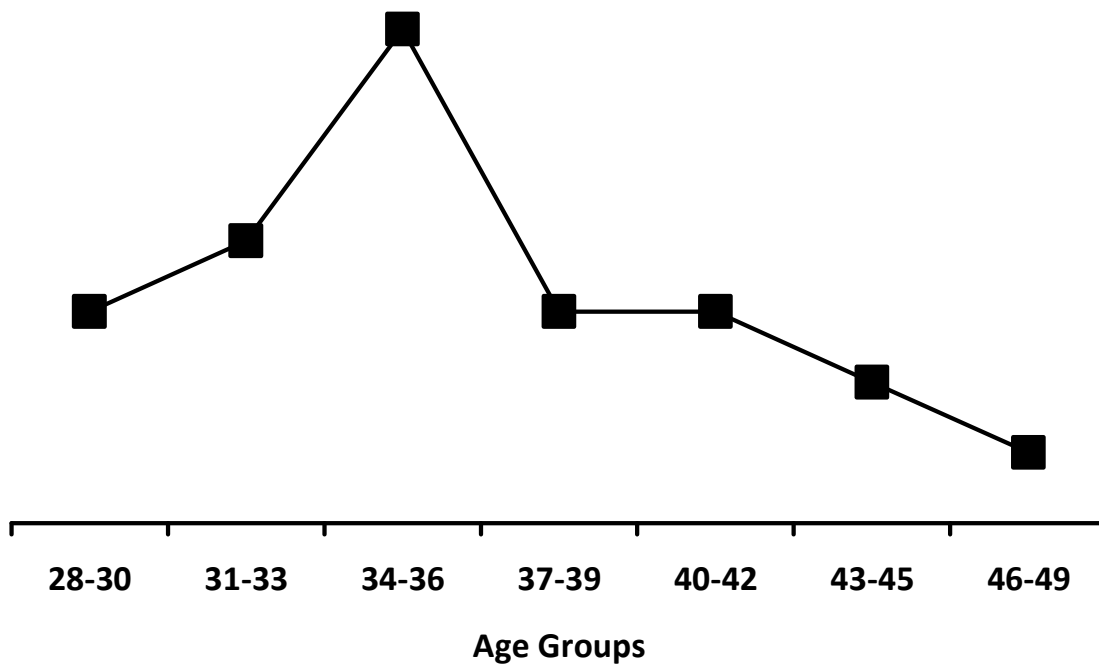
- b. Approach – The subjects will be selected for participation by choosing women currently involved in computing professions within a federal law enforcement agency. The women will be approximately between the ages of 28-49 years old and hold positions such as Special Agent, Regional Information Technology Specialist Program Manager, Staff Operations Specialist, Field Photographer, Information Technology Specialist, Technical Information Specialist/Administrative Assistant, Forensic Examiner, Intelligence Analyst, and Office Services Supervisor.
5. Report Results and Analysis
- a. Objective – Document the work performed as well as pertinent findings in the study of federal law enforcement women in computing professions.
  - b. Approach – Electronic notes will be maintained throughout the project to preserve a record of each individual interview. A final report with the detailed results of this research will become available.

## 5. RESULTS

### 5.1. CHARACTERISTICS OF RESPONDENTS

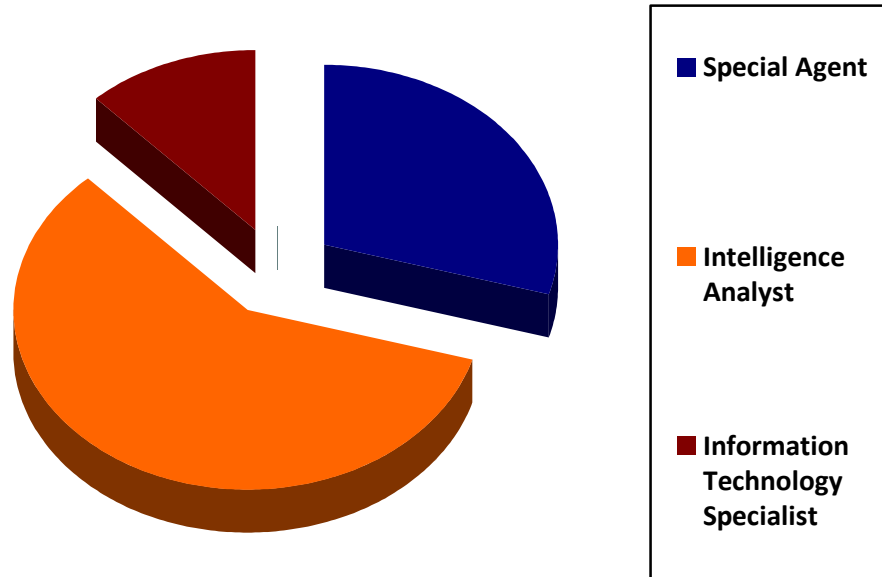
The 23 women that responded to the interview questions ranged in age from 28 – 49 with a mean age of 36. As shown in Figure 1, out of the 23 women, 30% were between the ages of 34 – 36.

Figure 1. Ages of Participants.



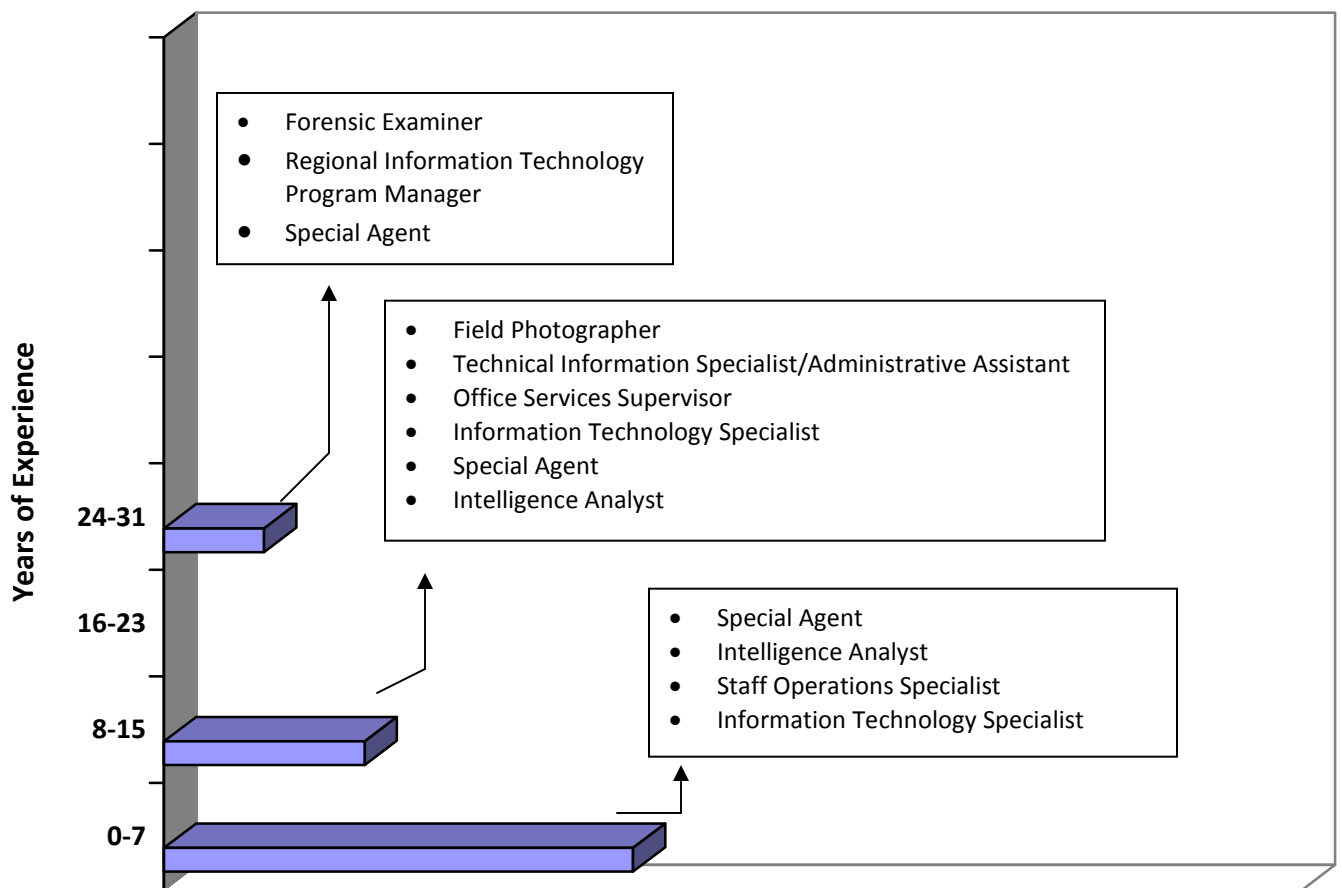
All of the women's current job titles covered a range of positions in federal law enforcement, to include: Special Agent, Regional Information Technology Specialist Program Manager, Staff Operations Specialist, Field Photographer, Information Technology Specialist, Technical Information Specialist/Administrative Assistant, Forensic Examiner, Intelligence Analyst, and Office Services Supervisor. Although the various women that responded to the study held a variety of computer-related positions within federal law enforcement, the majority, at 44%, were Intelligence Analysts. Next, at 22%, women held the Special Agent position assigned to the cyber-related matters within their organization. Following that was an astonishingly low percentage of 9% of the women as Information Technology Specialists (See Figure 2). Thus, with that said, the very technical positions did not hold many women, whereas the analytical aspect of computing had a high number of women employed.

Figure 2. Position Titles of Women.



The numbers of years the women have been employed in a computing career with a federal law enforcement agency ranged from 6 months to 31 years, with a mean of 9 years. It was common for most women, at 57%, to have 1 – 6 years of employment history with their organization in a computing position. On the other hand, 39% of the women reported having more than 6 years of experience in a computing position within their agency (See Figure 3). All of the women interviewed were born in and grew up in the United States, to include one woman from an unincorporated dependent territory of the United States. The majority (87%) grew up in a suburban area as a child; whereas 13% grew up in the city as a child.

Figure 3. Years of Professional Computing Experience in Federal Law Enforcement.





The vast majority of the women reported being college educated; 44% reported having a Master's Degree, 48% reported having a Bachelor's Degree, and 4% reported having an Associate's Degree. Each woman's academic field of study varied: Political, Legal, and Economic Analysis, Political Science and Sociology, E-Business, Computer Science, Guidance Counseling, Management and Leadership, Strategic Intelligence, English, Japanese Language, and East Asian History, Accounting, Forensic Psychology, Business Administration, Information Systems, Information Science, Internetworking Technology, Economics, Forensic Science, and Marketing and Management Information Systems. More than half of the women were traditional students during the time they pursued a college degree. In specific, out of the ten women that earned a Master's Degree, six of them were considered traditional students, typically considered as a recent undergraduate that continuously pursued higher education without any academic breaks. The same went for the eleven women who earned a Bachelor's Degree; nine of them were also traditional students. Three of the eleven women that reported having their Bachelor's Degree are currently in the process of completing their Master's Degree, while also working full-time. One woman, with children, mentioned that although completing her Master's Degree will bring a positive outcome to her life in the end, she feels as though her family suffers in the meantime because she lacks the time to spend with them. Out of the 91% of women that are college educated, to include, Associate, Bachelor, and Master Degrees, only 45% earned a degree in a computer-related field. In other words, less than half of the women currently working in a computer-related field with a federal law enforcement agency are college educated in a computer-related area (See Table 1). All in all, 9% of women do not have a degree – one, however, has been employed with one agency for 31 years; this was her first job (See Figure 4).

Figure 4. One Woman's Federal Law Enforcement, Professional Computing Employment History.

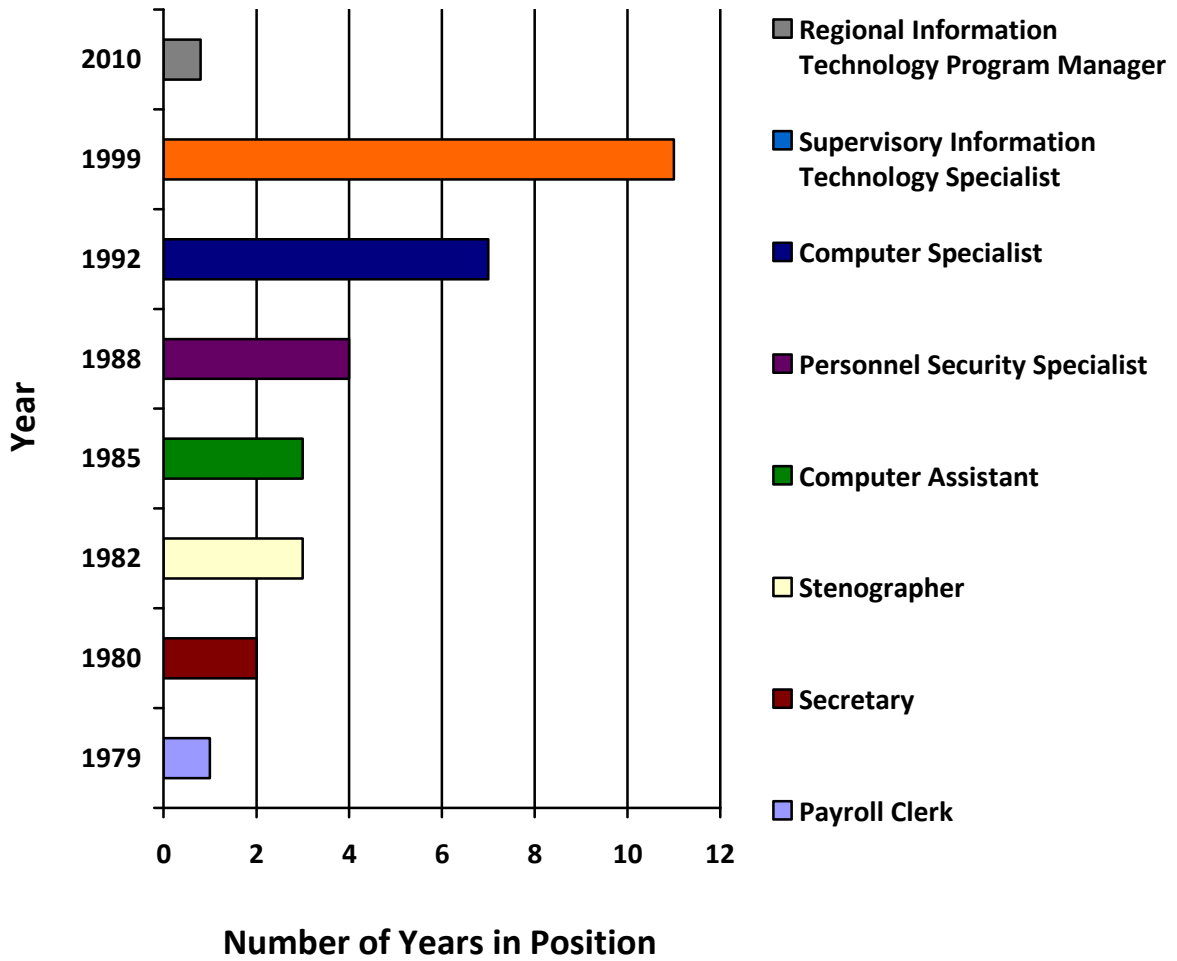


Table 1. Frequency by Academic Major.

	Degree Fields	Frequency (%)
Traditional Subjects	Computer Science, E-Business, Marketing and Management in Information Systems, Information Science, Business Administration in Management Information Systems, Business Administration in Information Technology Project Management, Information Systems, Internetworking Technology	8 (35%)
Non-Traditional Subjects	See Table 2	13 (57%)
Non-Direct Subjects	High School Diploma	2 (9%)

*\*Traditional Subjects – Women in a computing career by majoring in a computing-related field*

*\*Non-traditional Subjects – Women in a computing career by majoring in various fields other than computing*

*\*Non-direct Subjects - Women entered into a computing career based on on-the-job experience, to include internships (no educational background in computing)*

As illustrated in Table 1, more women, at 57%, were non-traditional students because they majored in various fields other than computing.

Table 2. Non-Traditional Academic Major.

Associate's Degree	Bachelor's Degree	Master's Degree
	Political, Legal, and Economic Analysis	
	Political Science and Sociology	
	Economics, with a minor in Biology	
	Unknown	Business Management
	English and Japanese Languages, and East Asian History	Geographic Information Science (in process)
	International Business	Management and Leadership
	Business Administration in Management Information Systems	Criminal Justice (in process)
	International Relations	Strategic Intelligence
	Forensic Science	
	Chemistry	Business Management in Finance
	Psychology	Guidance Counseling
	Unknown	Forensic Psychology
Accounting		

As shown in Table 2, in furtherance of Table 1, one woman was traditional in earning a Bachelor's Degree in Business Administration, with a concentration in Management Information Systems. However, she transitioned to a non-traditional student as she began the pursuance of a non-computing Master's Degree, in Criminal Justice; although, she entered a computing position in a federal organization, possessing a Bachelor's Degree in a computer-related field.

## **5.2. INITIAL INTEREST IN COMPUTING AND FEDERAL LAW ENFORCEMENT**

All 23 women reported a variety of instances that they initially became interested in federal law enforcement. One woman stated that after graduating college with a Bachelor's degree, she simply "applied to a job post that sounded interesting." An additional woman mentioned that she "wasn't really interested in federal law enforcement per se, but just wanted to advance in the computer networking field." Another woman stated she was merely bored with the direction in which her prior position was going, whereas other women stated they always wanted to pursue a career in law enforcement. Nearly the majority of women, however, reported the influence of family members, friends, or college experiences as the main reason behind becoming interested in a federal law enforcement agency. A woman that was a recent college graduate, within the past 5 – 7 years, reported applying to a federal agency because, as she noted, "Many of my friends had trouble finding jobs, even with their degrees." A specific college experience that a couple women mentioned was not even considering a career in federal law enforcement because, "It wasn't a job that a girl grew up knowing that she could do," but were later recruited, to their surprise, by a federal employee.

When women were faced with the topic of initially becoming interested in computing, the responses were much like the ones from initially becoming interested in federal law enforcement. For instance, the common influences of women resulted back to school (high school and college) experiences, in addition to already being employees within federal law enforcement and purely being allowed the flexibility to pursue different positions that led them to the area of computing. Each of these women were recognized for their knowledge and skills in technology, and further competitively applied to progress within their federal law enforcement agency.

Very few of the women, 22%, mentioned having military experience prior to the transition to a federal law enforcement agency.

### 5.3. CAREER PATH INFLUENCES

The influences and motivations that led the women to pursue the paths of computing and federal law enforcement are summarized in Table 3. The various influences and motivations that interested women in computing professions within federal law enforcement were reported as the following: an initial interest, personal influence, academic experience, career influence, the motivation of job security, personal discovery, and the motivation of family and/or friends. With all 23 women kept in mind, 22% of them reported an academic experience that influenced them to become involved in federal law enforcement. In addition, 17% of women reported a family member or friend, and a specific career experience motivated their interest in computing. With regard to the five women that reported having a significant academic experience, one woman noted that she had a federal law enforcement official speak to her college Criminal Justice course. Another woman took an academic-related trip to the Federal Law Enforcement Training Center with a school club and liked the idea of federal law enforcement so much that she applied to a variety of agencies. With regard to the four women that reported having a family member or friend that motivated them to pursue computing, one woman described her mother as being her motivation. She said, "My mom is a computing professional and successful in the field. Her success actually initially steered me away from a computing profession, but I seemed to have found my way back by the skills I learned from her." On the other hand, two out of the four women that reported a professional motivation toward computing said, "I was never interested in computing, I was placed in this field by my federal law enforcement employer." One woman mentioned, "I came into computing by accident actually, but have since learned a lot from my younger colleagues."

Below, in Table 3, it is illustrated that an initial interest in computing is referred to as women having a desire to work for federal law enforcement at an early age. A personal influence had several meanings; one woman indicated her personal influence in computing as a sense of wanting to assist people with computers, whether it was family, friends, co-workers, and even fellow classmates; this woman found it as a personal skill. Some women also mentioned becoming interested in computers on a personal level when they first became popular through various video games. In addition, the academic experiences women referred to included, recruitment at a career fair, and a specific computing course of study in high school or college.

In addition, career influences were very common among women, as also shown in Table 3. Few women noted that they "jumped in" to computing and started to try things and unexpectedly became "unofficial computer instructors," since no one else really understood the environment. With regard to this, all of the non-direct subjects mentioned that they didn't have much of a choice going into computing professionally because they were initially employed with federal law enforcement as the era of computing emerged. These women said, their offices were in demand of individuals to be in the field, and some employees were forced to train and support fellow co-workers in helping them to become familiar with computers; thus, developing a personal interest from that point on, not necessarily ever interested in computing. One of the woman said that she was selected by upper management to be part of the training team for the first computer systems installed in the office.

With regard to job security as a significant motivation for women to pursue computing in federal law enforcement, women stated it was because they wanted a job that would expand their horizons and help them grow as a person and as an employee. They stressed the fact that computing, especially in federal law enforcement, paid well and provided the stability and benefits needed for them and their families. Some women discovered federal law enforcement through their experiences in the military, the Internet, and even local newspaper classified advertisements. Other woman became motivated by family members and friends because they had parent's that retired from federal law enforcement and private industry computing companies, and friends employed with federal law enforcement organizations working computer-related matters.

Table 3. Summary of Influences and Motivations Leading to Federal Law Enforcement Computing Professions.

	Traditional Subjects (n=8)	Non-Traditional Subjects (n=13)	Non-Direct Subjects (n=2)
Initial Interest	2 (25%)-FLE		
Personal	1 (13%)-FLE	2 (15%)-Computing	
Academic Experience	<b>3 (38%)-Computing</b>	<b>5 (39%)-FLE</b>	
Career Influence	2 (25%)-Computing	<b>4 (31%)-Computing</b> 1 (8%)-FLE	<b>2 (100%)-Computing</b>
Security		3 (23%)-FLE	1(50%)-FLE
Discovery	<b>4 (50%)-FLE</b>	1 (8%)-FLE 1 (8%)-Computing	
Family/Friends	1 (13%)-FLE <b>3 (38%)-Computing</b>	<b>4 (31%)-Computing</b> 2 (15%)-FLE	1(50%)-FLE

Note: n=the number of women in each field (e.g. 8 out of 23 women are traditional subjects, etc.)

As Table 3 depicts, the bolded information is the highly represented influences and motivations for the women that are either traditional subjects, non-traditional subjects, or non-direct subjects. For the traditional subjects, the women in a computing career, by majoring in a computing-related field, showed the most common federal law enforcement influence as discovery, at 50%; whereas, 38% of women encountered an academic, or family and friends influence that led them to the computing field on a professional level.

For the non-traditional subjects, women in a computing career, by majoring in various fields other than computing, 39% of women reported an academic experience that led them to federal law enforcement; whereas, 31% of women had a career, or family and friends influence that interested them in computing on a professional level.

Finally, for the non-direct subjects, women who entered into a computing career based on on-the-job experience, to include internships but not an educational background in computers or technology, 100% of them noted a career influence on their interest in computing; whereas, 50% of them mentioned job security, or family and friends as an influence on their decision to become employed with federal law enforcement.



#### 5.4. APPLICATION PROCESS

While 61% of women affirmed they did not encounter any frustrations throughout the application process, being a woman applicant for a computing profession, others did mention further significant factors, to include: (1) It's a timely process, especially given the length of time it takes for a background check to be completed; (2) The office environment is very political, in the sense that not everyone is given the equal opportunity they deserve to receive computing positions; this then leads into the next factor; (3) Women need to be more competitive, given it's a male-dominated position, or a "boys club" type of environment; and lastly, (4) One woman spoke of management emphasizing the fact that she is a mother, and having a family may be difficult in a demanding technological field. In lieu of this, one woman mentioned the fact that on occasion, others believed she was the Secretary, or Administrative Assistant, rather than an employee handling significant cyber-related issues to further on-going investigations.

When the women were asked what they wanted to accomplish as a result of pursuing a professional computing career, all of them responded with the same types of reactions – a stable, constantly changing position, that allows for continuous learning, while still able to pursue personal interests, such as family, friends, etc. One woman responded with, "My only goal was to choose a career that would be fulfilling and would involve something that I was interested in – I did not want to go to work just to earn a paycheck." Another woman, that had quite a bit of federal experience, stated that serving the public and protecting possible victims is what she wanted to accomplish in life and that's exactly what she is able to do in her current computing career with a federal law enforcement agency. One woman noted that her husband was involved in the software aspect of computing, so she wanted to have a better understanding of the technology so she could further relate to him on a cognitive level. She also mentioned that various opportunities arose to attend computer courses to further her knowledge, and although she was not the most technical person, she joked about the fact that her husband asked her if she knew what pixels were – and she did!

## 5.5. EDUCATIONAL EXPERIENCES

Women are shown to have moved from private industry positions after college internships to federal government positions; this was common because, the concept of job security in today's society gives the impression to be non-existent with private industry, but rather with government positions instead. In addition, slightly more than half of the women (52%) reported to have accepted a position with federal law enforcement as a result of the notion of a secure future, and a higher than average salary with promotional potential. In support of this, one woman reported that, "Absolutely, a secure future, gracious salary, and the room for growth were at the top of my influential list." One woman stated that the "empowerment to effect change" is what influenced her toward a computing career in federal law enforcement. In addition, another woman actually accepted a decrease in salary when she accepted a position with federal law enforcement; with that said, the notion of a secure future and a higher than average salary with promotional potential is what initially influenced her to pursue a computing career with her prior profession.

The women that went on to pursue a higher education in a computing academic field, experienced some sort of academic frustration, rather than the women that did not pursue a higher education or pursued a dissimilar degree. For instance, the women that were enrolled in the academic field of Business in fact outnumbered the male students. On the other hand, the remaining 44% of women that pursued a Master's Degree in a computer-related field, such as Information Science, Information Systems, and an MBA in Information Technology Project Management, reported having many internationally cultured students and male-dominated courses. In addition, it was mentioned that women's opinions would be disregarded during laboratory exercises because they're not taken seriously, and one woman also reported the ratio of a given Computer Science course she was once enrolled in as being 6 females to every 100 males.

Looking back on their educational experiences, nearly more than half (48%) of women stated that past course instructors, both academically and professionally, had the strongest and most permanent impression on them as students, whether negative or positive. Women reported various areas in which academic instructors made a positive impact, to include, providing knowledge into professional writing and interview skills, stressing the significance of having a professional demeanor, offering praise for accomplishment, providing a sense of comfort and mentoring, showing by example, in that the barriers in technical occupations were changing and emerging, and providing professional guidance in the right direction. Women found these facets to be beneficial as they've grown as women, started their careers, and progressed as competitive technological women. However, women also reported the opposite as well, as instructors have had a lasting, unconstructive impact in their minds. For instance, one woman mentioned being the only female enrolled in the Computer Science Department on campus throughout earning her Bachelor's Degree – all four years. "It was frustrating in the sense that some of the instructors were elderly and unaccustomed to women, but I wouldn't say it was unfair." A further reply was that it was difficult to learn all of the technical aspects of the job

without the college background. Fortunately, the training and instructors available within the agency were positively helpful for this woman to expand her knowledge of technology in order to perform her job.

A certain response that made an impression was from a woman’s explanation that she was initially interested in pursuing computers in high school; although, her high school only offered very few computer laboratories at the time. Thus, she attempted to enroll in one of the computer courses, as an elective, but was not selected because her last name began with a letter at the end of the alphabet – putting her at the end of the enrollment line. A positive outcome to this unfortunate circumstance was that this woman took it upon herself to learn computers and ended up becoming more evolved with them than what the course taught. Another woman mentioned that her college advisor was supportive and encouraged her to seek as many experiences as possible beyond the classroom. She also noted that her advisor believed in her and her aspiration to become a female federal law enforcement official. However, her peers unfortunately did not take her serious, and had the notion that a female could not be a federal law enforcement official.

Table 4. Summary of Educational Background.

Internship Experience	Initial Career	Current Career in Federal Agency
Unknown Internship	Communications Specialist	Staff Operations Specialist
Private Industry Internship	Private Industry Computing Company	Intelligence Analyst
No	Accounting-Related	Field Photographer
County and Medical Internship’s	Private College Database Analyst and Programmer	Intelligence Analyst
Internship with Department of Transportation	Network Administrator and Consultant	Intelligence Analyst
Internship with Mobile Phone Supplier	Systems Programmer	Intelligence Analyst
Unknown Internship	Clerical	Information Technology Specialist/Forensic Examiner
County Serology Lab Assistant Internship and Medical Pathology Lab Assistant Fellowship	Evidence Technician	Office Services Supervisor
County Crime Analyst Internship	Information Systems Specialist	Intelligence Analyst
Web Designer for Private Industry,	Asset Forfeiture	Information Technology Specialist

Executive Office Assistant, and Management at Chain Restaurant Internship's		
No	Support Services Technician	Technical Information Specialist and Administrative Assistant
State Senate	Computer Specialist	Intelligence Analyst
No	Payroll Clerk	Regional Information Technology Specialist Program Manager
No	Local News Reporter	Intelligence Analyst
No	Special Agent	Special Agent
No	Information Systems Administrator	Special Agent
No	Software Support	Information Technology Specialist
Military	Information Management Officer	Intelligence Analyst
Elementary School	Guidance Counselor	Special Agent
No	Software Engineer	Special Agent
Senator, Department of Justice, State Department, Federal Law Enforcement Training Center, and District Attorney	N/A	Intelligence Analyst
College Student Assistant	N/A	Intelligence Analyst
No	Special Agent	Special Agent

As shown in Table 4, 48% of women had a computer-related profession as their initial career. Surprisingly, 13% of women were hired at a young age into a federal agency and still remain employed with the same federal agency. These women have also had the opportunity to gain experience and climb the ladder professionally through their careers.

## **5.6. FIRST COMPUTER USAGE**

When the women were asked about their first computer usage, 48% reported to have encountered computers at school, 30% reported to have encountered them on a personal level, 13% reported to have initially gained experience with computers on the job, and 14% reported they were unsure as to the exact time of their first computer usage. This suggests that school is a significant influence in introducing women to technology; although, it also suggests that young women need to be introduced to computers at an early age in the home on a personal level as well. One woman in specific reported that she bought her first, and very own, Adam computer with the money she earned from her paper delivery job when she was ten years old. An Adam computer was a home computer developed in the early 1980's. Another woman said that she had a computer in the home while growing up for as long as she could remember. She said, "We had an Apple II+, and I have baby pictures where I'm sitting on my father's lap at the computer with my hands on the keyboard. The keyboard was the size of a breadbox and the monitor was the shape of a shoe box with a screen about 4in x 4in at the ends. I think my father may have used the computer for work, but I only remember using it for playing games. We were one of the first families in my area to get Prodigy Internet in the early 90's."

## **5.7. INTERPERSONAL SKILLS AND INTERESTS**

When the question about personal, academic, and professional strengths was presented, all of the women interviewed responded with a variety of answers that ultimately coincided. The common strengths all 23 women discussed having were, internal motivation, honesty and integrity, analytical and problem solving skills, the willingness to welcome opportunities to learn and seek challenge, and the enthusiasm in meeting new individuals and a strong interest in assisting others in areas they are not familiar in – a sense of leadership.

The various skills the women mentioned having on a personal, academic, and professional level also played a significant role in their opinions of what is required to be successful in a computing profession. As women in computing professions, emphasis was put on specific factors that made them more suited to the position(s). For instance, several of the women agreed that the most critical skill in a computing profession, in a federal law enforcement agency, is the ability to learn and adapt quickly and efficiently to new material. An additional skill the women also agreed upon as being vital to succeed is the capability to retain information as it's presented. Lastly, a few additional skills that were stated and stressed upon included the need for basic knowledge of standard computer applications, the proficiency to think outside the box and willingness to jump in and try new things, and perseverance of communication skills.

One woman stated that research was one of her significant strengths. She said, "I feel very comfortable in my job, researching exploits or hackers and talking to the tech agents who study the malware and writing up their findings in reports; because I'm still learning, I rely on open source information which is sometimes fallible. I wish I had a computer science degree, but I'm not sure how much it would help me, as I would likely never need to write software or manage hardware. If I knew more about writing software, I'm not sure I could provide more hands on expertise examining malware or not. At this point, writing well is more useful than knowing how to examine malware. The government loves to hire people with computer science degrees, but a computer science degree is more of a math theory degree than proof that someone knows practical application of computer skills. Many of the federal agents that I work with now, who are really good, are self-taught and took the classes later."

According to this remark, in specific, when referring to computers, or a computer science degree in particular, it is assumed by women that the sole outcome of the curriculum was to develop a skilled individual in merely the areas of "software," or "malware." The issue with this is that many women fear this as well, and have this frame of mind on the topic; thus, the reason why more women are not involved in computers and technology on a personal level, as well as educational level.

The women agreed that technology is pervasive in today's society; therefore it has an impact on increasing the number of women involved in federal law enforcement agencies. As technology surfaces and becomes more and more prominent in our daily lives, federal law enforcement agencies need to employ the most skilled professionals as possible. As a result of emerging technology, when the women were asked why they believed it was significantly essential to increase the number of women in federal law enforcement agencies, the majority of them discussed the personal and professional skills women encompass versus these skills most men lack. For instance, it was stated that women are more methodical than men, and most times more attentive to detail as well; they have the ability to multi-task with less anxiety and constant worry; and women are more intuitive and can often get a better feeling for, or 'read,' an individual. Another woman mentioned that women bring emotion and thus, it is beneficial to have a well-rounded organization with a fair amount of both men and women.

An straightforward statement was made when a woman said, "Technology is commonly marketed toward men/boys (video games, cell phone apps, GPS systems, etc.), therefore men grow up with more of an interest in technology and more prolonged exposure to technology; by the time they get into college, they already have quite a bit more exposure and have a "leg up" over girls." Although technology has been expanded upon through the years, and continues to grow, boys do tend to be interested in electronic gadgets more than girls at a younger age, which further leads to women's disinterest in technology as they become older. It is important to note that women are very detail oriented; thus, women should be taught at a young age about the importance of logic and technology. One woman took her first programming class at the age of six through a local University that offered children programming classes; she learned binary.

Some of the women that began their federal law enforcement careers at an early age noted that the number of women employed in the cyber-related areas were very low, and although they have increased in the past 2-3 decades, they still remain very low. She went on to state that the older generations of women are familiarizing themselves with technology and capabilities in the federal workforce, allowing them to become more comfortable with the various computing tools. She takes advantage of web-based training, hands-on training, conferences/seminars, and the knowledge of the younger personnel in the agency. Although, one woman mentioned that out of the four women that work cyber-related matters, she is the only one that is college educated in the field and has prior work experience in the area as well. It is important for women to continue to increase their knowledge on the newest and latest technologies and understand the use.

All of the women agreed that the computing field gets more and more competitive, and specialized skills are needed and will be highly valued in any federal government organization. A woman was confident in her statement when referring to the ability women have to adapt to change well; thus, women can accept and adjust to new technology as it surfaces. In the meantime, it was recommended that advertisements are provided on the Internet or through the recruitment of a technology-specific position in federal law enforcement is publicized to women, so they are aware of what is offered. With that being said, there are many annual conferences held for women in computing-related fields, whether it is professionally or academically, to mend the gender gap. In an effort to implement these recommendations, annual conferences provide women in attendance with a sense of empowerment, encouragement, and confidence during the pursuance of their goals in computing. Although many of these conferences are sponsored by numerous corporations and academic organizations, women failed to be introduced to or encouraged to pursue computing in law enforcement, specifically federal law enforcement. Although it has slightly increased over the years, academically-funded conferences, in specific, lack the government sponsorship in attendance in order to recruit women, and provide women with the mentoring, networking, and research needed in order to know their options and abilities.

## 5.8. SUPPORT SYSTEMS AND FAMILIAL INFLUENCES

When all 23 women were asked who they grew up with in the home as a child, 83% of them reported to have lived with their mother, father, and/or sibling(s), while 17% reported to have divorced parents, but mostly grew up with their mothers rather than fathers. The majority of women also reported having siblings, whether brothers and/or sisters. Out of the 23 women that participated, 61% of them had a brother(s) that had an interest, and/or career, in the area of teaching, college advising, sports and outdoor activities, mechanical engineering, master craftsmanship, computers, law, and accounting. However the majority (33%), 5 out of 15, had a passion for computers and technology. The same fraction of the women reported having a sister(s) at 61%. When the women discussed their sister(s), all 19 of their interests were wide spread and existed in different areas, to include: social media advertising, science, fraud analysis, socializing, sports, fashion, small gift shop ownership, Associate Director of Admissions for an out-of-state University, Physical Therapy Aid for a local Hospital, nursing/care giving, and a housewife/homemaker.

Out of 23 women, the majority (74%) of their mothers worked while they were growing up; whereas all of the women's fathers worked as they were children. Correlations showed that 4% of women followed the footsteps of their mother, with regard to pursuing a career in computing. On the other hand, 26% followed the footsteps of their father, with regard to pursuing a career in either computing or law enforcement. 4 out of 6 women followed the computing aspect, and 2 out of 6 women followed the law enforcement aspect, both of which were federal.

The women reported their mother's as having a variety of professional careers, but the most common, at 26%, were referred to as housewives, then 9% were Registered Nurses, 9% were Accountants, and 9% were Mail Carriers. Other professions included: Teacher, Librarian, Reporter and Editor, Office Worker, Technology Entrepreneur, Board of Education Representative, school district Tax Collector, Auditor, Health Inspector/Social Worker, and one woman said her mother held various jobs because her father was in the military and the family moved frequently.

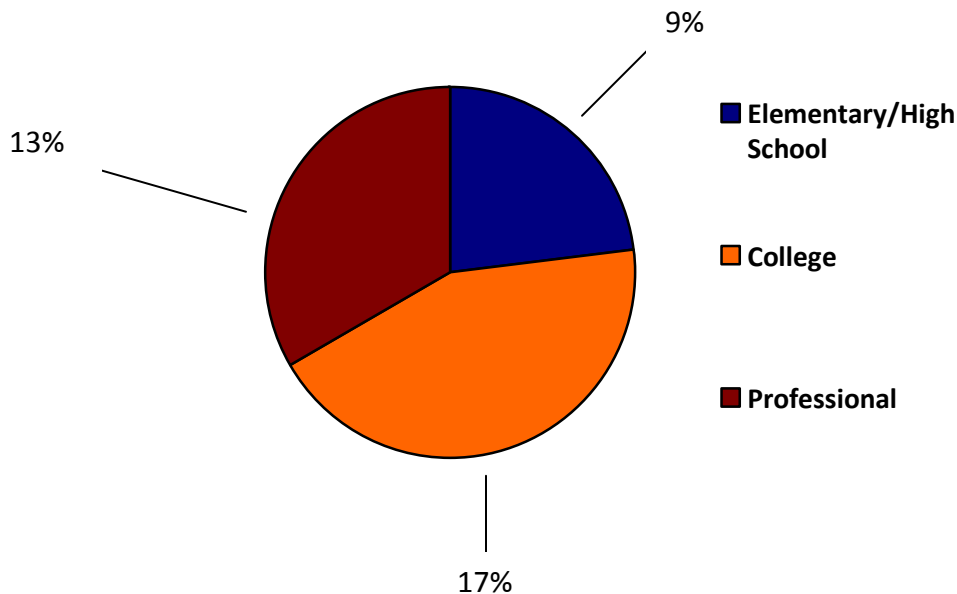
The women interviewed also reported their father's as having a variety of professional careers, but the most common, at 13%, were in law enforcement, 9% were Computer Programmers, 9% were Truck Driver's, 9% were Bankers, and 9% were involved in the Train business (parts and operators). Other professions included: Lawyer, Land Surveyor, Steel Plant worker, Technical Support, Sales, and Junior Vice President, Mail Carrier, a Foreman at a tire company, Mortgage Officer, Heating and Air Conditioning business owner, Sign Mechanic; involved in the Military, a convenience store (restaurant/deli) owner, and blue collar/union worker.



## 5.9. INTERNAL AND EXTERNAL INFLUENCES

When all of the women were asked if they had some form of computers in the home, personal computer, video games, etc., while growing up, 39% reported they did, and 52% reported they did not have any computer interaction in the home as a child. One woman mentioned having a “TRS-80 at the age of 12, but it was so limited, I used it very little. Around the same time, we had a Nintendo, but my brother’s hogged it.” Another woman said that she had minimal access to computer systems in the home, mostly stand alone gaming type electronics. An additional woman mentioned having one single computer and one Atari game machine in the home when she was a child. Another woman stated that she had one desktop computer in the home while growing up at the age of 15. She said, “I was the one who requested the computer from my parents and the only one who used the computer. No one else in the home was interested in figuring out how to use it.” Unfortunately, 9% reported not having experience with computers until entering elementary/high school, a surprising 17% did not receive experience with computers until beginning college, and 13% did not have any experience with computers until entering the workforce.

Figure 5. Influences of Computers on Women.



When the women were asked if they had any mentors throughout their lives who they trusted and encouraged them, 96% of the women responded yes. However, one woman reported that because she had such a large family and many siblings growing up in the home, she essentially became self-sufficient in the areas of learning and education; she had no choice but to rely on herself. The responses were across the board between parental, academic, and co-worker mentors. The most common form of mentoring came from parents, as they were growing up, and families, as they were older. One woman noted that her mother was encouraging, but her father discouraged her and she always wanted to prove him wrong; he was a negative person, but not to her brother; her father always said she wouldn't like federal law enforcement as a career. Another woman reported that she had significant mentors in her life, but not in the computer field. In fact, she said, "I thought that the computer field, both academically and professionally, were strangely isolated, competitive, and non-helpful, sort of like every man for himself." In addition, one woman's supervisor in her previous job was very encouraging in developing her knowledge and perseverance in the computing field. She stated, "I was hired simply to do a data entry project for my supervisor, but my supervisor taught me all about the company and the position in order to train me to eventually become a supervisor – anytime I doubted my abilities, I was encouraged and my supervisor made sure that I realized the extent of my knowledge." Although one woman's parents were supportive of her interests, her mother was concerned that federal law enforcement jobs were for men. One woman was supported and encouraged by the woman that hired her during her initial year of college. She said, "She worked with me as a peer and as a mentor; she encouraged me to learn and follow my career path in law and a government agency."

The participating women were asked about any specific influential experience(s) they encountered at any point in their lives. Again, there were a variety of answers provided, and the women reported family/friends, travel, and work, to name a few, as prominent factors in

their momentous experiences. With regard to family influences, one woman noted that her father maintained the same career for over thirty years; the stability appealed to her to follow in his footsteps. On the other hand, many of the women recall academic experiences to be the most influential in their lives while growing up. These educational occurrences have made them into the women they are today. One woman noted that by going out of state to pursue a higher education, and further having the opportunity to travel overseas for the military, gave her the chance to meet bright and independent-minded individuals, enabling her to have the confidence in herself that she has today. Another woman found her high school chemistry teacher to be very encouraging in that he made it clear that as a student, you don't need to be at the top of your class to be considered 'smart,' but working hard at something can get you where you want to be with anything in life. An additional meaningful experience for one woman was being part of the Collegiate Science and Technology Program through a local hospital because it introduced her to professionals in science and computer related fields, which further provided her with mentoring and tutoring to assist her throughout school. One woman mentioned that she was never interested in computers or technology as a child or young adult, but while attending school, she frequently worked with computers and helped others with various computer systems. She emphasized the fact that when she was younger, her brother, now an engineer, and her would compete with each other when it came to matters that involved computers. Although her brother was more efficient with computers, she always felt the need to be better than him; for instance, on one occasion, her father asked her brother to set up speakers in the home instead of asking her, assuming she would not be able to handle the task. Although she faced these challenges, they were beneficial because as she grew up, she consistently found, as she stated, "computers following me." Another woman made a witty comment when she said, "I really started to like computers when I started playing video games and PC games. I still play a lot. Sometimes I can talk about games with a co-worker or an employee at a company when we have nothing else in common."

Aside from academic influences, one woman mentioned that while in school, one of her closest friends was a very smart and competitive individual, so between the both of them, they kept one another motivated and thriving to do better. One woman's most significant and influential experience was when she implemented the first network for the organization she was employed with. From that point on, all of her fellow employees relied on her to install systems, teach applications, and run the networks. Further, one woman surprisingly stumbled upon a profession in computing, without having a dying interest in the field. Unpredictably she stated that, "Working with the best and brightest is who I like to attach myself to for the purpose of learning everything I can from them, but typically would do any and all of their grunt work just so I could be around them to learn as much as I could. I don't particularly care for the computing side or forensic side of my profession, and I struggle with it on a daily basis, but I consider myself a fairly intelligent woman, just struggle with grasping the concepts of the highly technical and forensic details involved in computing – thus, I have no clue how to encourage more women to be involved in something that I find so challenging myself." Another woman found that it was helpful to have worked for a company that utilized old and out of date computer systems because it forced her to learn about different technologies from the ground up. She said, "You could not just call a help line and depend on someone to fix a problem for

you if something went wrong, things had to be reversely engineered and programmed to make them work correctly. Though not one of my favorite parts of the job, I worked to support a lot of end users who did not understand why some of the old operations did not always work. However, having to troubleshoot the systems and work with irate end users built my knowledge base and enabled me to learn how to better work with people. The position helped me grow as a person when it came to interpersonal skills.” Lastly, a woman stated, “I started as an intern with a private computing company and progressively worked my way up, I worked with teams providing the hardware and software to clientele, and I learned valuable information about the development of the companies software, as well as the technology behind their software. This was an enormous benefit and surge to my passion for the industry.”

## 5.10. FURTHER ENCOURAGEMENT FOR INVOLVEMENT

The women respondents of the study were asked, what can be done to further encourage women to become involved in computing within federal law enforcement agencies? Their judgments were as follows:

“More programs for middle school and early high school girls. In high school, I felt more lost with my career choices. I would have liked, and greatly benefited from, some sort of program educating and encouraging me towards this path. I think I would be a stronger candidate if I had such a vision when I was younger – I would’ve taken more classes on this subject and likely interned in the field earlier.”

“Promoting the computing degree can be used in federal law enforcement for other positions and not just computer maintenance and troubleshooting. Informing women of this notion at a young age will help against computing and law enforcement posing as a deterrent in their minds.”

“Take the mystery out of it. The computing worlds, e.g. blogs, head of departments, etc., have usually been male driven. Federal law enforcement is male dominated so when you put the two together, it can be very male dominating and daunting. Getting women that are involved in computing in law enforcement out in the community and schools and have them maybe mentor and/or be in young students “virtual network” of friends could help to answer questions and offer guidance as they attend schools and put in for internships.”

“Outreach at elementary schools, high schools, and social/academic groups.”

“Encourage a Youth club.”

“Introduce computers as a “tool” at an early age. I don’t consider games and social use of technology as an adequate introduction to computers; I’m talking about a programming class. Introduce women to federal law enforcement by introducing them to other women who are already in the career path.”

“Recruitment! Start at a young age, perhaps junior high school or even earlier; get involved in the community; target women; give them the understanding of what you can do with technology.”

“This will solve itself; the new generations of girls are growing up with computers in the home. My own 13 year old already runs circles around me, it’s not a matter of getting them interested in computing fields, its federal law enforcement that keeps women away – it’s not a woman/mother/wife friendly position. The hours are typically bad, and it’s a very demanding career. It will only appeal to girls/women with a sense of justice, who are not looking for a particularly glamorous life.”

“Women need to be made to feel that they are valued, that their contributions are important, and that those people they work for, and with, have confidence in their abilities. Although, now I investigate cyber crime matters and am slightly less involved in the technological end of how things work, I still feel like my knowledge of computers is appreciated among my peers and by my supervisor. Most people believe that it is hard to be a woman in a male dominated field, and it has its moments, but I feel completely assured of my boss’ faith in me and my abilities. More women need a supervisor like mine, who are supportive of their efforts at furthering their education, and giving them the trust to do their jobs.”

“Promote the idea, advertise it, and market it. I never thought about it, because it wasn’t something women did when I grew up.”

“Teach women that they need to stay aggressive and learn all they can to stay competitive in the computing world. They have to take care of themselves by staying abreast of changes, or the world of computing will pass them by.”

“I think we have to encourage women that they can do it. Women’s challenges come from wanting to work and have a family. I would tell a high school or college student to stick with what they want to do. Don’t let anyone tell you what you want; there are so many different positions in federal law enforcement that relate to computing that you would never think of them off the top of your head.”

Promote a “Federal law enforcement working group – aimed more at officers/agents. Many analysts are women, especially in cyber-related matters, and the number is growing every year. Learning at a very young age is truly when it becomes of interest.”

“Advertise these positions directly to women in Computer Science Departments on college campuses.”

“Educate and advertise the various computing positions within law enforcement. I don’t think many people know that positions other than an “agent” exist.”

“Talk to girls in middle school and high school; bring girls to offices for a “career day;” and offer more internships.”

“I feel like some of my female co-workers embrace technology classes as a tool to do their jobs better, but just as often, I feel like some of them dismiss it as being too technical to understand and not very useful to our work – it’s a mixed bag. I assume that more exposure would help. Cyber crime is not going to go away just because no one feels like getting certified. More classes and more time for self-initiated study would really help. I feel like there’s never enough time to keep up with new information on technology or viruses; if I stop reading about it, my knowledge will be obsolete in six months.”

### 5.11. TENACITY

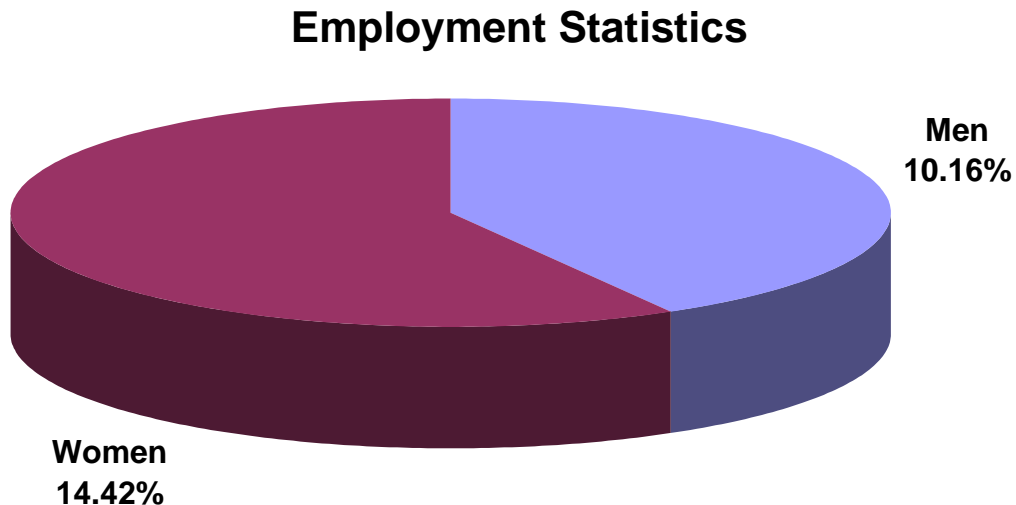
When the participants were asked about the types of “labels” put on women in careers in computing, the majority that replied, 43%, stated it was described as too technical, challenging, geeky, and nerdy. One woman mentioned that she believed the science and technology fields were more of an interest area to other nationalities, rather than American women. She also said women must prove themselves because their opinions and thoughts are not listened to or considered right away. For instance, during her initial career experience, she felt as though she was looked at as a girl, rather than a well-respected woman that knew what she was doing. A few additional women described computing as possibly coming across as “too hard,” “too male dominated of a field, I won’t be accepted,” or “I can’t compete because the money goes to the man.” Although the computing field is viewed to be for nerds, a woman declared that she believed it’s a generational thing, and that having the knowledge of computers is becoming more acceptable or even desirable among the younger women. On the other hand one woman noted that, “Most women working in computing are well respected.” Her comment was supported by another woman that reported, “When I meet another woman in computing, I seem to immediately assume she’s creative and has strong character.” Lastly, one participant said, “I think women label careers in computing as challenging, fulfilling, and flexible. Many women looking to start families want the flexibility of a job they can do from home, which describes many computer positions – but not federal law enforcement.”

All of the women that participated in this study were asked what they felt were the types of challenges women faced when trying to pursue a federal law enforcement career in the computing sector. A common response, at 35%, was related to competition – women having to compete with men to succeed in the field of computing. For instance, 9% of the women mentioned federal law enforcement as the “boys club,” and “...every once in a while you have to show men that you know your stuff – especially new co-workers who don’t know your skills.” Another woman said that careers in computing are, “Male dominated, and in some male dominated law enforcement circles, it’s difficult to break into the group,” which poses a rigorous challenge to women as well, because “Women feel as though they need to be “one of the guys.””

Of the 35% of women, all agreed that the largest challenge among women was competing with other candidates, especially the large number of men in the computing industry; computing is the most competitive environment, not just in federal law enforcement, but in private corporations as well. A universal statement was made by one participant when she said, “Women in federal law enforcement in general face the challenge of being the minority.” With that said, women end up “competing with men who have better references and experiences dealing with hiring personnel who don’t take women and their achievements seriously.” Lastly, one woman said, “I think the only challenge there is, that still remains a culture in some circles, is that women do not belong in law enforcement careers, whether that be the computing sector or otherwise. I know that in a male dominated field, such as law enforcement, some males still tend to think women do not belong.” Unfortunately, there are not enough women in these positions, as the women agreed, and one’s opinion was, “Most women in federal

computing careers are in support, or administrative positions. This is probably because of the typical lack of women in law enforcement anyway.” This may be a result of the amount of training that goes into maintaining a computing profession within federal law enforcement. As one woman mentioned from her personal experience – “I almost didn’t accept my position because it required a 12 week training session, five hours away from family; I had a 2 year old and a 5 month old at the time. The course was an absolute requirement, and that fact alone almost kept me from entering the federal law enforcement workforce. I did end up accepting the offer and leaving my children for 3 months, and that was one of the hardest decisions I have had to make in my life; it’s very difficult to stay in the workforce and raise a family at the same time. This urge to take time off from work impacts the longevity and continuity of women advancing in the workplace.” A further woman stated, “Women are perceived generally as “software” people and men “hardware” people. Males tend to seek out other males for computer and electronic repairs, and seek out women for web site content and help desk questions. This may go back to the days where males in the office were law enforcement officers and females were clerks. Computer programming assistance is about equal in perceptions of male versus female abilities. Some women also categorize themselves this way.” This is a unique way of looking at things, with relation to what women’s strengths are perceived to be, verse men’s strengths. On the other hand, one woman made it clear when she said, “I think it may actually be easier for women within the government to operate in a computing position than in the private sector.”

Figure 6. Federal Employer Information of Participating Women, as of September 2008.





## 5.12. WOMEN IN INDUSTRY

Although women comprise approximately half of the American labor force [9], the number of women in technology is dropping in industry; the women reported how they felt about having to share the computing field's challenges and rewards.

"As long as you have the skills, pursue the position – if you have them, then you need to go for it."

"I think women are sometimes more sharp and analytical than men. But really, I don't discriminate between men or women – they either know their stuff or they don't."

"I think it's inevitable that women will receive fewer award/management positions within the computing field. One of the reasons I feel this way is because I am a woman who is currently in the federal law enforcement field with 2 young children, and I could see how my home life could negatively impact my work life. I am experiencing first hand the difficulties of balancing a demanding and technical workload with a busy home life and a long commute, and it just doesn't seem like a long-term, sustainable proposition for even the most dedicated and hard working woman. Having children, and more specifically fulfilling society's expectations of being a mother, make it more difficult to put in overtime or work on weekends, which has a direct impact on advancement within the computing field. A very specific example of this is my reluctance to go away for a 2 week cyber training course. My male colleagues often take these courses, but it's very difficult for a mother to leave a 1 and 3 year old for 2 weeks at a time."

"It is important to share your experiences with those new to the field to encourage growth and to mentor. As the computing sector constantly changes, so must your guidance."

"I believe if they are competitive enough, the challenges and rewards will be there for them as well as anyone else."

"I am a believer of everyone sharing equally so I believe women in the field should share the computing field's challenges and rewards equally with the men in the same field."

"It's always disappointing to hear of women's participation in fields related to science and technology decreasing."

"I think it would be beneficial for women to share their challenges and rewards. This will only encourage future generations of women to seek out these industries for careers, knowing that other women have paved a path in some way."

"Security issue – hard to find a career, but when I started, computing is where the big money was, but now it's in the medical field."

“The drop is, again, probably due to marketing of technology or marketing of computer education. If women haven’t generated an interest in the field in high school or college, they probably aren’t going to pursue it later in life either. The only marketing I’ve seen in the past several years showing women in pursuit of high-tech fields is for the US air force. I don’t think there is a door shutting for women due to discrimination – it’s just a matter of their general lack of interest in the field. I have been to, and have extensive knowledge of, Japan – in Japan, video games and other types of technology for amusement (virtual pets, photo booths where you can decorate the photos on a computer screen, animated movies, arcade games, high tech karaoke, and that sort of thing) are highly marketed toward girls between the ages of 10-17. It would be an interesting cross-comparison to see what girls in Japan are pursuing as far as the computer field goes, having had that exposure to technology while growing up.”

“I feel that women can definitely be a positive impact on the computing field. There are many challenges that women can bring a different perspective to, women have endurance, both physically and mentally. Women have stepped up and changed history just like in WWII, when men were deployed to the war; the women stepped up to fill the positions in factories and other traditional male roles. Women not only performed the duties they were tasked with, but in some cases invented new and improved technology, e.g. remote-controlled, jam-proof radio communication systems for the US military, that was patented during WWII.”

“I believe in general that this field is male dominated, but the opportunities are out there – you just have to stick with it, know that you deserve to be there just like everyone else and the reward is working in a field that you have spent so much time and training on and now you get to put that into action.”

“I’m not sure if there is an organization of women in computing, but something like that might encourage women to enter, stay in, and provide mentoring.”

“I think the problem lies with women beginning their careers do not see technology as a viable choice – perhaps it doesn’t seem as accommodating to women or accessible. I don’t think women have a clear view of the positions available in the technology industry and thus have not pursued them fully. Again, better education about the field and mentoring of middle/high school girls could help.”

“I think the computing field is rewarding because it is always changing, which is also a challenge to keep up with. You are always learning something new.”

“I didn’t realize the number of women was dropping in federal computer positions. Although, when my friends worked in software, ten years ago, there was 1 woman for every 20 men at their company. At outreach presentations I attend with my co-workers, I’ve never encountered a ratio; however, the computer field has always been a little bit of a “boys club,” but I think that’s based on personal interests of individuals. Males are just

more interested in taking gadgets apart and putting them back together. I don't know, but it may be a biological thing."

"Women must continue to push the computing field's boundaries."

### 5.13. RECOMMENDATIONS

The women were asked to share the advice they would give a high school or college student, or woman, starting her career thinking about computing in federal law enforcement.

“Learn when you’re young, and do all you can. Don’t get discouraged by it being a male dominated field. You’re going to have to work a bit harder than the guys, but you can do it. Get a little experience before you go federally; however, the salary will drop compared to private sector and it will be competitive federally.”

“Women have to get past the notion that the IT department is all about the engineers, or being a “techie,” and put more focus on individual skills and how they can contribute to the overall law enforcement mission.”

“It’s a great job! It’s worth the hard work that you put forward in college and they should think about using their skills to better their society and their country; plus, federal law enforcement is very fun!”

“Get an internship; take courses in both computer forensics and criminal justice.”

“Gain as much experience as you can on hard technical skills. The rest can be taught at the federal law enforcement level.”

“Get a degree and good job experience for support. Look outside the box for solutions that you come up with, but be prepared to always work as a team with others so you can learn as well. The computing environment does not stop in one place, it grows daily and new technology is out there each and every day; staying abreast of it.”

“I would absolutely encourage her to follow her interests. Computing careers will always be thriving and prospering as far as I’m concerned. Computing careers, or any type of technology career for that matter, tends to pay fairly well and offer a stable career path. I would tell the student to take advantage of any extra learning opportunities that are available to her – internships, job shadowing programs, after school technology programs, etc. The more she increases her knowledge, the more valuable she makes herself as a future asset to her field. I would also tell her to start planning for her computing career early. Girls who want to enter the technology field have a wide variety of resources and scholarships available to them if they know where to look. Finally, I would tell her to never let anyone tell you that you can’t do something, the only one that can decide that is you.”

“We need to encourage our high school aged girls to go into these fields, highlight the positive aspects of it, such as salary and employability. I would say that if you find federal law enforcement interesting, like I did, you can have a satisfying career, and lots of fun along the way. Don’t let the boys have all the fun!”

“Go for it! You can do anything you put your mind to, but study hard and be persistent.”  
“Network, join clubs, talk to people they know are in the field, and see if they can spend a day with them on the job (job shadowing). Schools should mandate these types of things, and as a result, more will be learned about themselves as individuals.”

“To get the “hard core” skills (programming, architecture, security) and not bother with learning the nuances of different software programs.”

“Get some tough skin and try not to take things too personal. Many times you will go through an initiation and not even know it, you have to be strong and work hard but never take yourself too seriously and always sit back, relax, and observe before you do or say anything in the beginning.”

“Encourage women to study computers, technology, etc. because everything they will do in the future will involve a computer and it will place them with an advantage.”

“Go for it, nothing or nobody can stop you, but you!”

“Remember that a federal job may involve moving away from home, traveling frequently, and working with a wide spectrum of skill levels, all of which are challenging, but can also be rewarding. Overcoming challenges is one of the most fulfilling parts of my career.”

“I think she should determine what exactly it is that she wants. Pursuing computing in the private industry provides strong training for a career in federal law enforcement later. If she is interested in federal law enforcement specifically, I think the positions for a traditionally trained computer expert are slim.”

“I would tell them to pursue a computer-related field in college and to try and find an internship or part time job. Some of the best computer training I had was on the job.”

“They have to have a passion for the job. It’s not glamorous; it’s a lot of hard work, occasional long hours, and very rewarding.”

“Do not give up; be assertive; do not compromise; remember that you are as good as any man.”

“When you have a question or an interest, research it on a search engine and read about it. Many of my colleagues ask questions that I can answer with an Internet search in minutes. I think everyone forgets there are amazing resources at our fingertips and we take them for granted.”

The women were also asked how they believed computers would shape the future.

“We have so many new technologies, older people cannot keep up; holographic monitors are not that far away; even instant messaging (social networking) within the workplace has increased; people will always be using computers – soon there will be jackets with USB capabilities and glasses to record daily schedules; this will be a huge challenge for law enforcement and no way to track it all; interconnected society.”

“I think we will become more dependent on computers and computer-related technology. I would encourage any student, regardless of their academic program, to take several computer courses in order to obtain knowledge in the areas of software and how computers work, in general.”

“I think computers will be involved in every facet of our future. Computers are already important for almost everything we do. Computers are also the tools the criminals use – no matter what the crime.”

“They will become an integral part of how all humans operate within their surroundings, and will eventually become more integrated into our lives.”

“National security and criminal cyber activities will continue to increase at an alarming rate and there will not be enough federal law enforcement personnel to counter the attacks.”

“I think we will become more and more dependent on computers, some good and some bad – kids now barely speak to one another and don’t know how to interact socially, due to the frequent use of social networking sites and Instant Messaging, but I do think computers will be a great benefit in years to come.”

“They definitely will not be going away. They are getting smaller in size and everything we do in this world revolves around computers. Our grandchildren will be born into them – much different from when I was born. It’s exciting and those who don’t grasp it will be left behind.”

“Computers are here and they are here to stay. Almost everyone in America is affected by, or uses computers in some way. They are increasingly integrated into our lives and I do not see that trend ever changing. The only change I see is that we will become even more dependent on computers as we try to move to a paperless society. People need to accept that computers are currently a part of their lives, and learn about them to find positive ways to make them a part of their everyday life and their future.”

“Computers are shaping today. I envision 75% of federal law enforcement investigations will be conducted from a computer terminal, if that’s not already the case. They are already used in commerce, social networking, medicine and education; Job security!”

“I believe that we’re only seeing the ‘tip of the iceberg’ in terms of the dependence we have on computers today.”

“We are in a particularly interesting timeframe now with regard to technology, and it will only continue to change not only the social but also the physical structure of how we operate daily. We no longer need to be sitting at a terminal; everything we need is in our hands. The downside to this is everyone is more vulnerable for the ease of technology, from personal online banking to advertisers and creditors using your online purchasing history to target or deny you credit. This is happening today and will only continue until the average individual resists the urge to do certain things online – which may work for those of us in this current generation, but for the next generation they will heavily rely on this technology to teach them everything they know and to keep ahead of the curve both, nationally and internationally. While the vulnerabilities exist, it will be up to the general person to be conscious of what they release on the web 2.0, soon to be 3.0, about themselves and those they wish to protect. This will be the only way to safeguard personal information and assets.”

“There will be so many automated systems within the next 5 years and they will look different when my daughter gets older. Housework will be different and automated; you will know when to close the garage door and when to wake up in the morning; students won’t need erasers!”

“There will likely be more telecommuting or jobs where you can work in one state/country and the main office is in another – you can be hired and complete your work having never visited the main office. There will be a declining need for retail stores, as everything can be shipped online and major advancements in the computer graphics/arts and video games industry. The cell phone may replace the need for homes to have a 2<sup>nd</sup> or 3<sup>rd</sup> computer, and will likely replace the laptop computer for things like business presentations where there is a need for a portable connection to a network. Computer financial fraud, and theft of proprietary information about how to make certain products, will continue to drain the US economy, and increase the economies of third world countries. This will level the playing field with the US only dominating certain industries for 1 – 5 years versus the long lived decades of being the “top dog” in certain industries that the US enjoyed during the 1900’s. Wars in industrial countries will probably be preceded by computer network attacks – temporarily shutting down banking, transportation, and defense industries. Computer chip advancement for weapons, robotics, and space exploration will continue to become extremely sophisticated. I don’t think it will happen during our lifetime, but I really want my own personal robot.”

“I think my vision is constantly changing regarding how computers will shape the future. In the near future I think that computers will allow for the race, disability, and gender walls to be taken down even more. Computers provide opportunities for careers and capabilities for all types of people that wouldn’t have those opportunities without computers and technology.”

“I think computers may evolve, probably in the very distant future, but nevertheless, evolve to a place where they can think and not just compute; dare I say...and maybe even feel. This will completely shape the future of our lives – crazy thought huh?”

“Computers are a major function of our daily lives, and we have become so dependent on them. For example, myself and spell check have become best friends.”

“I think our entire lives will eventually be conducted online in a virtual environment. If you’ve seen the movie, “Surrogates,” that’s what I envision life being like.”

“Social media and access to information (news, academic) will continue to increase. I see more things being automated and tracked by computers – SCADA systems and health records, for example.”

“Everything in the future will involve computers, and everyone will have some level of proficiency with technology.”

“They already are our future, we heavily rely on them and this will not stop, but only grow.”

“I’m expecting an increasing number of computer crimes and harder detection because of better encryption and greater complexity in systems. I’m expecting websites to become less accessible and experience more problems because sites are more interconnected. A single site relies on multiple other sites to work and there are more things that can go wrong as systems get more complex. I research almost everything I think about on the Internet – cancer treatments, restaurants, book reviews, and ingredients in foods and products.”



## **6. SUMMARY**

### **6.1. ASSESSMENTS**

Women have made remarkable progression in the workplace during the years; it has been long recognized that women are underrepresented in the computing workplace, specifically federal law enforcement. Women must take initiative and move forward to take advantage of the professional opportunities presented in these fields. The number of women employed by federal law enforcement agencies, involved in computing professions, is extremely low, underrepresented, and has not been adequately researched.

With regard to the study conducted on the Sisters members previously mentioned, the experiences these women encountered were much of the same experiences a select number of women currently working in the computing field related to. Although only approximately 10% of the Sisters organization responded to the given study, those results lead to the framework of further interviewing 23 women currently in computing positions within federal law enforcement. Many challenges were noticed to be common among the women based on the research performed; however, a few of the prominent challenges are noted below.

After interviewing the 23 women, it was concluded that many of the women did not have much, if any, educational and/or academic experience in computing. The majority of women did not become exposed to computing or federal law enforcement until school (elementary, high school, or college). Due to the lack of mentors, many women did not become exposed to these fields until attending school, rather than at home and/or on a personal level. Computing is such a new and emerging technology that parents did not have much experience in the area, if any, because they themselves did not grow up with computers or technology in the home. In addition, it was shown that many of the women were placed in these computing positions by upper management within federal law enforcement based on the lack of resources in the field, not by choice, and further received computing experience on the job. As a result, much more involvement must take place at the educational level for women in order to become influenced prior to being exposed to the workforce. If more women understood the level of opportunity and advancement potential presented in the computing field, sooner than later, the higher the possibility women would be involved in federal law enforcement computing professions. This notion relates to the theory of internal influences, also known as motivation.

Another significant challenge noticed among the women was that many of them did not have an interest in computers or technology, especially in the federal law enforcement environment. The interest did not develop with these women until they were already working in this field on a federal level. The reason many women resolve to employment with the federal government is because it's considered to be relatively stable; it is less susceptible than private industries to fluctuations in the economy. In justification, slightly more than half of the women reported to have accepted a position with federal law enforcement as a result of the notion of a secure future, and a higher than average salary with promotional potential, not because of an attraction to federal law enforcement.

Many of WIFLE's and the WIFLE Foundation's goals and objectives have been addressed as a result of this research project as well. For instance, research has been completed on the issues regarding recruitment, retention, and promotion of women, the visibility of the WIFLE Foundation was increased through the key issues and challenges women face in law enforcement, specifically federal law enforcement, and these significant findings will be provided to law enforcement agencies, the WIFLE Executive Committee, and the public (as seen appropriate).

## **APPENDIX A**

### **DELIVERABLES**

All required coursework for the degree of Master of Science in Networking, Security, and Systems Administration has been completed. The completion of this thesis is my part-time commitment, as well as the final deliverable of this project. Due to my full-time employment obligations, the thesis will be completed by February 2011. The final report will include all of the research and data collection information in detail.

# APPENDIX B

## INTERVIEW QUESTIONS

### MOTIVATIONAL AND INFLUENTIAL TOPICS

1. Characteristics of Subjects
  - What is your age?
  - What is your current job title?
  - Have you had an assortment of professional computing positions?
  - How many years have you been in your current and, if any, past computing position?
  - What country did you grow up in?
  - Did you grow up in the city or a suburb?
  
2. Initial Interest in Computing and Federal Law Enforcement
  - When and how did you initially become interested in federal law enforcement?
  - When and how did you initially become interested in computing?
  - Who interested you in federal law enforcement?
  - Who interested you in a computing profession?
  - What, if any, frustrations did you encounter through the application process, being a women applicant for a computing profession?
  - What was it that you wanted to accomplish in life when you were pursuant of a professional computing career?
  - Did the notions of a secure future and a higher than average salary influence you?
  
3. Education
  - Are you college educated?
  - What degree(s) do you hold?
  - What was your major(s)?
  - Were you a traditional or non-traditional student?
  - Did you have any internships or cooperative education experiences in college?
  - Did you encounter any academic frustrations, being a woman in computing?
  - What, when, and where was your first computer usage (place and age)?
  - Looking back on your educational experiences, what were some permanent impressions that perhaps helped you the most or hurt you the most?
  
4. Interpersonal Skills and Interests
  - What do you regard as your personal, academic, and professional strengths? Likes?
  - What skills do you find necessary to be successful in a computing profession for a federal law enforcement agency? Do you have them?
  - Technology is pervasive in today's society, what is its impact on increasing the number of women involved in federal law enforcement agencies?

5. Support Systems and Internal and External Influences

- Who did you live with while growing up?
- What are/were your parents' occupations?
- Did you have siblings? What were their interests?
- Did you have computers in the home while growing up?
- Did you have mentors that you trusted and encouraged you?
- What experiences were particularly influential?
- What can be done to further encourage women to be involved in computing within federal law enforcement agencies?

6. Tenacity

- What type of "labels" do women put on careers in computing?
- What types of challenges do women face while trying to pursue a federal law enforcement career in the computing sector?
- The number of women in technology is dropping in industry; please tell me how you feel about women sharing the computing field's challenges and rewards?
- What would your advice be to a high school or college student, or women starting her career thinking about computing in federal law enforcement?
- What is your vision of how computers will shape the future?

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