

2016

# The Role and Impact of Cyber Security Mentoring

James O. Ellithorpe  
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# Walden University

College of Management and Technology

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Walden University  
2016

Abstract

The Role and Impact of Cyber Security Mentoring

by

James O. Ellithorpe

M. Div., Andrews University, 1981

BA, Atlantic Union College, 1978

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Applied Management and Decision Science

Walden University

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## Abstract

Business organizations are faced with an enormous challenge to improve cyber security, as breaches and lapses through firewalls are increasingly commonplace. The Chief Information Security Officer (CISO) and Information Technology (IT) staff are constantly challenged to identify and purge online and network structural weaknesses. The goal is to reduce overall business risk because unresolved risks are a constant concern to consumers who are uneasy about cyber security failures. The purpose of this general qualitative study was to examine the role and impact of Cyber Security Mentoring (CSM) from the perspectives of the workplace CISO, mentors, and protégés, who were randomly polled from various workplace settings across the United States. Mentoring allows IT staff members to learn from their CISOs and from workplace mentor mistakes and successes. Workplace IT staff are also closest to the various attack methodologies used by cyber hackers, and cohort and dyadic mentoring may provide insight into and responding to cyber-attacks and improving cyber defenses. Sixty-eight sets of respondent data relating to field experience, formal education, professional industry cyber security certifications, and mentoring were compared and examined between respondents. The goal was to determine where respondents agreed and disagreed on issues pertaining to cyber security and CSM. The findings suggested that CSM with a qualified mentor could improve cyber security in the workplace; in addition, more time must be devoted to continued professional education. Implications for positive social change included the use of CSM to enhance cyber security through the sharing of incidents, mindsets, procedures and expertise, and improvement of customer-consumer security confidence.

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## Chapter 1: Introduction to the Study

### **Introduction**

Today's Chief Information Security Officer (CISO) has a very complex role. With the growing presence of the CISO position, it appears to finally be coming into its own according to Caralli (2006). In this regard the CISO must consider cost effective measures that will improve the cyber security of their organizations. Corporate budgets are tight and sometimes inflexible according to Chinburg, Sharda, and Weiser, (2002). This includes hardware, software, and personnel selection. The variety of hardware appliances and software, including intrusion detection and intrusion prevention (IDS/IPS) further complicates the role. When the need for regular and sometimes sophisticated information system audits are considered, along with the compliance to a variety of industry standards and governmental regulations, the CISO task becomes monumental. To assist them are a variety of cyber security staff whose skill and expertise ranges from novices and entry level personnel to extremely well qualified information assurance veterans.

A significant question(s) is the role and impact of Cyber Security Mentoring (CSM). To what degree and extent does today's CISO have any real knowledge regarding workplace mentoring? How skilled are they in performing or superintending the CSM function in their organizations? If mentoring is occurring, was this merely passed down from superiors with little or no guidance? Is any real depth of CSM being performed? What are the results of that endeavor? What peer-reviewed studies on

workplace mentoring have they read? How is this research being integrated in their workplaces as a viable CSM program?

The role of workplace mentoring has seen tremendous growth in last few decades with research being published by Levinson, Darrow, Klein, Levinson and McKee (1978), and Kram (1985). This research indicated that workplace mentoring was directly related to professional development. Significantly, Scandura and Pellegrini (2010, p. 72) proposed 11 mentor roles, including “coaching, protection, sponsorship, exposure and visibility, challenging assignments, role modeling, acceptance and confirmation, counseling, friendship, social role, and parent role.” However, it must also be noted that there is scant integration with other research. While the role of professional coaching and mentoring may hold great potential and capacity for good in the workplace, I did not find published academic results or peer-reviewed studies demonstrating the efficacy of CSM.

CSM may also be tempered by those who have had mentorships in youth adolescent or academic environments that may have failed or ended negatively. If these previous mentoring experiences were viewed with a feeling of incompleteness, increased levels of bias or resistance may be present in regard to formal CSM in the workplace. If bias or Dysfunction in Mentoring (DIM) is present, it would be important to discover how this could be reduced. Another important aspect would be to determine if other factors that may increase or decrease the sense of professional bias or DIM and whether demographical characteristics (gender, race or ethnicity, educational background, previous academic mentoring) contributed to it.

I wanted to receive input from those who were actually in the role as cyber security mentors or protégés. To qualify, these potential respondents had to have completed formal mentoring programs in the previous two years, or participated in formal field internships during undergraduate or graduate study, or performed mentoring to those in that regard. I hoped that an analysis of this input would provide me with a first-hand look into the “who, what, where and why” of formal CSM. The key result I hoped to uncover was to what extent CSM effected or transformed the challenges faced by the CISO? Did it result in “better trained or prepared” cyber security staff?

Historically, cyber security has taken a “back seat” in budgets, and as a result information systems have become more and more vulnerable and open to hacking and cyber theft. The Council on Competitiveness performed reviews on national competitiveness and security as noted by Van Opstal (2007, January, p.17). The group reviewed five business sectors: (1) financial, (2) chemical, (3) utilities, (4) oil, and (5) pharmaceutical. The findings resulted in new proposals that were intended to redesign management's viewpoint of cyber security from being a line-item cost or expense towards a required investment necessary to do business in the age of the Internet.

### **Statement of the Problem**

The problem addressed in this research was to discover the role and impact of CSM. As previously asked, how much did the typical CISO know about workplace mentoring? Were they aware of the work of Levinson (1978) and Kram (1985)? This matters because a solid CSM program will improve data security, which in turn affects everyone, everywhere.

Cyber security data and security breaches occur much too often and with great regularity. This seems to be validated by simply watching the television news and reading the newspaper and professional journals. I assumed that there should be methods to lower the inherent risk, but I wanted a less biased confirmation. I wanted to know if CSM would be helpful, and whether or not effective and appropriate mentoring was occurring in the cyber security workplace. I wanted to determine if other factors would increase or decrease the sense of professional bias and whether demographic characteristics (gender, race or ethnicity, educational background, previous academic mentoring) contributed to any mentoring bias or DIM in the workplace. I wanted to receive input from cyber security mentors and protégés who had completed formal mentoring programs, or participated in formal field internships during undergraduate or graduate study, or supervised those who had. I hoped an analysis of this input would provide me with additional insight into formal CSM programs.

Initially, I wanted just to poll CISOs regarding their feelings towards mentors and protégés. Then the mentors and protégés would be queried regarding the information provided by CISOs. I hoped this process would allow me to compare and contrast feelings, attitudes, and opinions that would isolate CSM qualitative patterns. Did CSM transform the cyber security landscape and did it result in increased efficiency? Concurrently, was there any significant dissonance by CISOs or hiring managers on what qualifies a new hire in the field of cyber security regarding the need of a college or graduate degree or having recognized vendor cyber security certifications and previous work experience.

Information security, like everything else, is a human enterprise and is influenced by factors that impact the individual. It is well recognized that the greatest information security danger to any organization is not a particular process, technology or equipment; rather, it is the people who work within the “system” that hide the inherit danger. (Tipton and Krause, 2007, p. 521)

Since people within the system are the greatest risk to the organization, CISOs and companies would appear to benefit from a strong cyber security posture. I believed this would include Continued Professional Education (CPE) and CSM. However, what should be included in the CPE program and who should be conducting or supervising the CSM? The role of the CISO is “complex” according to Easley (2013, p.1). The CISO and the cyber security team are constantly challenged to complete daily job requirements. I wanted to find out if members of the cyber security staff would be open to CPE that blended formal academic study, vendor cyber security certifications and CSM, or would this impose just another hurdle to overcome?

### **Background**

The research literature on workplace mentoring is plentiful. However, it is specifically deficient in linking research of mentoring with specific standard industrial classification (SIC) codes. This presents a major gap in the professional literature (there is no SIC code for cyber security). I wanted to focus on this gap. Allen and Eby (2010) provides an in-depth review of mentoring on three levels: (a) youth and adolescence, (b) academic, and the (c) workplace. However, no peer-reviewed published research could be located that examined CSM. It was “virgin territory.”

### **Purpose of the Study**

To gain insight, three population groups consisting of R<sub>1</sub> (the cyber security protégé), R<sub>2</sub> (the cyber security mentor or manager), and R<sub>3</sub> (the CISO or the executive in charge of cyber security), participated in the primary research. I sought to uncover common qualitative themes and patterns that might occur in the workplace. The primary goal was to ascertain the feelings of the three population groups regarding methods that might reduce the risk of cyber security breaches, with special attention to CSM.

### **Significance of the Study**

The significance of this study was to aid C-level executives and their staff, to consider the role and impact of CSM as it related to the complex requirements of cyber security in the workplace. While the underpinnings and footings of recent mentoring theory can trace its roots to Levinson et al. (1978) and Kram (1985), most of the early works called for continuing research. A significant theoretical and research base has been established in the last 35-40 years on workplace mentoring. Mentorships of youth, adolescents, academia (undergraduate, graduate and post-graduate levels), and business organizations have flourished. However, there remained few in-depth studies of workplace mentorships on the case study or Standard Industrial Classification (SIC) code level. None focused on CSM.

While the references in this dissertation seem adequate, upon closer examination the real paucity becomes more noticeable. For example, in the International Journal of Cyber Security and Digital Forensics (IJCSDF), when “mentoring” was queried, no results were found in the database. In another search of Inderscience Publishers, which

includes 53,319 articles from 365 various academic research, scientific and professional journals, a search for “cyber security and mentoring”, or “information security and mentoring,” resulted in no published peer-reviewed or non-peer-reviewed articles.

My goals were becoming clearer. I was beginning to realize that I could be on the verge of creating one of the first major peer-reviewed studies on CSM. This would require that a method could be developed where the best principles and practices of academic and workplace mentoring could be merged with cyber security to better define CSM. If this could become a reality, then perhaps a new model might be able to be created that could significantly strengthen, protect, defend and shield corporate data infrastructure from cyber attacks, unauthorized hacking, information system based espionage, and cyber terrorism.

### **The Role and Short History on Hacking and Mentoring of Hackers**

Hacking and forensics has significantly matured over the years. Historically, it most likely be stated that hacking is most often performed by those with illegal intentions. Hackers are often mentored in the best methods of attacks by more experienced hackers, who preceded them. A key point is that the earliest hackers had those who mentored them and who then mentored others. Thus, a continuous and ever cyclical and ascending cycle is placed in motion. They also revealed that hacking had its roots beginning over 50 years ago at the Massachusetts Institute of Technology when students were attempting to learn and improve their skills about computer mainframe technologies. Vines referred to these earliest hackers would as Phreakers. A few students in particular became legendary. One was given a nickname of Captain Crunch when he

inserted a whistle into a cereal box of the same name to imitate and create a 2600 Hz tone that allowed users to access the American Telephone and Telegraph (AT&T) long-distance-network. This permitted other users to obtain free long-distance telephone calls. This led to the development of “blue boxes” (which also generated the required 2600 Hz tone). One of the individuals who developed and crafted these blue boxes was Steve Jobs, the future CEO of Apple Computer.

Hacking tools and techniques have grown exponentially over the last 30-50 years. Finally, they also mentioned that another major development in hacking was the introduction of 2600 – a hacker magazine in 1984. In 1986 U.S. classified computer systems were hacked by the Chaos Computer Club with the assistance of the USSR KGB. As incredible as it may seem, this infiltration was discovered by a \$.75 discrepancy in a computer account at the Lawrence Livermore Laboratories, and was chronicled in the *The Cuckoo’s Egg*, by Clifford Stoll in 1989. In 1988 the Morris Internet Worm spread through the emerging Internet and resulted in a large Denial of Service (DoS) attack. In 1990 a hacker by the name of Kevin Poulsen and others linked with him hacked a radio station’s telephone network to ensure that they won a call-in-contest broadcast for a new Porsche automobile and other prizes. In 1995, Russian hacker Vladamir Leven and his confederates stole \$10,000,000 from various international banks. In 1998, The Cult of the Dead Cow released a painfully effective trojan horse virus called Back Orifice, that allowed users to to remotely access Windows 95 and Windows 98 operating systems.

Hacking tools are easily and widely available to anyone who wanted them. At one time, these types of tools were available only to a small group of highly skilled

people, but today hundreds of web sites are devoted to telling people how to perform exploits and providing the tools for a small fee or for free. (Harris 2008, p. 1079)

Compounding the situation, Amaio (2009, pp.1-2) is the difficult economic times. In the age of the federal budget sequester, budgetary concerns are also a significant factor. Amaio (2009, 1-2) also wrote that “certainly not the least is finding the most cost-effective manner of implementing and sustaining effective cyber security programs that won’t break the bank.” Therefore positive social change like CSM becomes ever more needful if society is ever to reverse the current negative trends. While many would like to always view mentoring from a positive role model, it must be noted that in primary and secondary schools, the bullying of students to other students creates a pseudo-mentor, in that current bullies unwittingly create and foster future bullies by their current bullying of others. At its most extreme, all people are influenced by others and each one of us influence others. In spite of many good mentoring programs, mentoring also has a more ominous side where little research and study has been done (i.e., Dietrich Eckart was one of Adolf Hitler’s mentors).

The question to be decided is whether the implementation of a professional CSM program will result in substantial improvements in the corporate cyber security strategy. A CPE based CSM program may provide a real and cost-effective solution. Like the earliest hackers before them, there may be a direct benefit for cyber security protégés (already on salaries) to be mentored by more experienced and nuanced cyber security professionals, including their respective CISOs.

Effective mentoring centers around the deepest of human needs and desired – the need to belong and the need to contribute and to pass along some the lessons that life has taught us. However, any formal CSM program must be developed correctly and upon a solid foundation of the guiding principles and lessons learned regarding workplace mentoring for the last 50 years of peer-reviewed research. While there is certainly an objective and empirical basis for the academic study of the mentoring discipline, on another level is the psychosocial and subliminal level that remains so difficult to quantify. The literature review contained within this dissertation can only serve as the most basic introduction to the academic study of workplace mentoring. While the primary focus of this dissertation is workplace mentoring, it cannot be fully appreciated without first considering the role of youth-adolescent and academic mentoring. Those who conduct, supervise, or participate in workplace mentoring are influenced and biased by previous periods or the presence of other forms of mentoring in a protégés past. If that mentoring was a positive or negative instance, as in DIM, it will bias the attitude, openness, and flow of workplace mentoring relationships, which CSM would be part. Mentoring does not exist in a psychological vacuum. Mentoring in many ways is a lifelong pursuit and endeavor as each person transverses the various human development adult development stages that Levinson et al. (1978) initially discussed. In one way or another, formal or informal, individuals are always being mentored, whether it be ones parents, extended families, professional counselors, academic professors or workplace managers.

### **Nature of the Qualitative Research**

After receiving IRB approval (Appendix A), a pilot study was conducted with the officers and members of the Hudson-Valley, NY Professional Chapter of ISACA® to receive feedback regarding potential interview questions. These questions were made available through a SurveyMonkey® website. The goal was to reduce or eliminate all detectable bias in the on-line questionnaires. Each respondent was asked to complete an on-line consent form that had been approved by the IRB.

First, respondents were asked, which population group they belonged to, (protégés, mentors or CISOs or R<sub>1</sub>, R<sub>2</sub> or R<sub>3</sub>). Then, using three different questionnaires designed by me, interested potential participants completed the one that was most appropriate for them through the SurveyMonkey® or FluidSurveys® website. The goal was to obtain as many responses possible from each of the population groups.

Second, at the end of each questionnaire, respondents were asked if they wished to be considered to participate in the second phase of the research. If they agreed, then potential respondents would be selected randomly to participate in the second phase of research. All participants in the research were to be derived from professionals in the field of IT cyber security managers, IT audit and information assurance, IT risk management, corporate governance of IT, and other cyber security professionals from the FBI and DHS, who are members of the Hudson-Valley, NY Professional Chapter of ISACA®. Most, but not all, of these members held various well-known cyber security certifications such as Certified in the Governance of Enterprise IT (CGEIT®), Certified Information Security Auditors (CISA®), Certified in Risk Information Systems and Controls

(CRISC®), Certified Information Security Managers (CISM®), and the Certified Information Security System Professionals (CISSP®), Certified Ethical Hackers (CEH®), CISCO® Certified Network Associate in Security (CCNA-Security®), CISCO® Certified Design Associate in Security (CCDA-Security®), CISCO® Certified Security Professional (CCSP®), IC-EEC® Licensed Penetration Tester Certification (LPTC®), IC-EEC® Certified Hacking Forensic Investigator (CHFII®), and/or the IC-EEC® Certified Security Analyst Certification (CSAC®).

Third, once each population group had responded, I hoped that the qualitative research approach using Web-based questionnaires could describe the experience, meaning, and essence of formal CSM from the three different perspectives of protégés, mentors and CISOs. I could also compare and contrast the life and work experience from these three different perspectives. I hoped to determine if there were any similarities, patterns, or differences and try to determine what may have contributed to them.

Fourth, qualitative data would consist of replying and providing answers to a second set of sub-questions. The qualitative research (as detailed in the four primary research questions in Chapter 1 and 3) was dependent on these secondary questions. The goal was to gain insight and understanding into the experience of the protégé, mentor, and then how mentors and CISOs and other company personnel related to these protégés, both before and after their formal mentoring began and ended. I also hoped to uncover any other obstacles (perceived or actual) that current cyber security staff were confronted with and to ascertain the optimum methods to overcome them.

To gain this insight, I sought to uncover additional illumination to the secondary questions from protégés, mentors and CISOs in a second phase of research conducted on the SurveyMonkey® or FluidSurveys® website. Because the research was qualitative in nature, it was entirely appropriate to investigate the experience and feelings of those in formal mentoring relationships. I hoped to determine if there were any demographic patterns or themes present and if those patterns increased or decreased DIM in the mentoring relationship. For example, did African-Americans experience more or less resistance to formal mentoring than European American or Asian Americans. If so, why? If not, then the question becomes why not? What occurred during the mentoring relationship to reduce this tension?

Utilizing web-based questionnaire questionnaires that I developed, I sought to determine how many of them were formally mentored by other cyber security professionals in the past, and how many are current mentors of others. Besides discovering any demographic patterns or themes, I wanted to know if CSM aided the participants in developing new or nascent skills as cyber security professionals. I also wanted to discover, which cyber security certifications were prominent in the field of cyber security and, which credentials did other respondents (R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub>) believe would be the most desired in the future. I also wanted to determine what cyber security college degrees and certifications that a typical CISO may seek in new job applicants.

### **Research Questions**

The primary goal was to determine to what degree CSM adds or detracts from the process of improving cyber security. Four qualitative research questions guided my research.

1. How does formal cyber security undergraduate or graduate academic education play a role in a protégés continuing education as a cyber security specialist?
2. How do professional cyber security vendor certifications play a role in the continuing education of IT security specialists?
3. How does CSM play a role in continuing education of cyber security specialists?
4. What are some suggestions to improve cyber security education programs?

### **Conceptual Framework**

In regards to formal and informal mentoring, my study was deeply indebted to the work of Levinson et al. (1978) and Kram (1985). As I considered mentoring from an academic and work-business methodology, taking into consideration the other various factors of race, gender, ethnicity, sexual orientation, disability, religion, and socio-economic class. It was only through a candid and frank assessment with this approach that I hoped to gain more complete understanding of the connection between mentoring and cyber security that would result in a more refined model (that would become CSM).

Executives of the government sector have been urged to deploy proactive InfoSec into their business processes to enhance value to the organization...Among these

benefits are: business resilience, increased public confidence and trust, performance improvements and effective financial management, accountability, improved ability to deliver products and services electronically, and decreased risk to operations and business. (Amaio, 2009, p. 3)

The integration between cyber security and mentoring might be achieved by recruiting and inducing experienced cyber security professionals to be the mentors of less-experienced and yet promising protégés. Of special note to mentoring researchers is the work done by Ramaswami and Dreher (2010) who refer to various types of capital being created and exchanged in the workplace mentoring relationship and process. These include (a) human capital, (b) movement capital, (c) social/political capital and signaling, (d) path-goal clarity, (e) values clarity, and (f) relational gains.

Regarding positive social change, all business organizations and the private homes of everyday citizens should benefit from a more diligent cyber security posture. Western technological society would be severely affected by a large scale cyber-attack that would cripple airlines, AMTRAK, banking, utilities, communication networks, hospitals, schools, colleges, nuclear power generating facilities, oil, and petro-chemical production. Most private companies and most homes would become paralyzed with the collapse of radio, television, satellite communications, and of course the ubiquitous Facebook® and Twitter®.

To effectively merge formal undergraduate and graduate academic education along with multiple well-known cyber security vendor certifications is a long-term process that may take 6-10 years to complete if undertaken in a linear fashion. This

assumes four years of undergraduate education, followed by two years of graduate education, plus additional time to be allotted to gain expertise to earning vendor cyber security certifications and to complete field internships. If a post-graduate CSM program is the desired outcome, then true learning and development may indicate a need for long-term professional relationships. CSM would be the ideal vehicle for developing and maintaining these type of relationships. The development of a formal bifurcated CSM program that begins during academic formation and transitions into the workplace may be helpful. This would require a significant amount of time and financial support to complete. Perhaps some of the time and expense could be mitigated by college and universities offering academic college credit for those students who earned professional certifications.

Systemically speaking, it seems inconceivable to have a one-size fits all method in the rapidly shifting and transforming field of cyber security. The key to making it work is the overlay of cyber security and mentoring that allows for the customized approach to each situation. In the final analysis this is the major and most urgent research question of this study. Precisely what is the correct mix of formal education, cyber security vendor certifications, and CSM that the Top Management Team (TMT) would desire or require of their prospective new cyber security hires?

### **Definition of Terms**

*Dyad:* According to Allen and Eby (2010, p. 409) “it usually consists of two members in a mentoring relationship. The first is the mentor and the second is the protégé.”

*e-Mentoring:* According to Scandura and Pellegrini (2010, p. 78) “is the process of mentoring a protégé over the Internet by a mentor usually not physically present at the Protégés site or location.”

*Formal and Informal Mentoring:* According to Ragins and Cotton (1999) “may differ on multiple dimensions. One key difference is the way the relationship is formed. Informal relationships occur naturally... formal relationships are often the result of some type of matching process initiated within the context of a company-sponsored mentoring program.”

*Human Capital:* According to Ramaswami and Dreher (2010, p. 215) “deals with acquisition of knowledge , skills and abilities (KSAs) that ultimately enhance the protégés job performance.” From the protégés perspective, this pertains to the protégés attainment of knowledge, skills and abilities that improved their performance, which Becker (1975) states leads to career benefits. From the mentor’s perspective, it pertains to the mentor gaining new or increased awareness of age bracket distinctions, new developments in the field of work or study, and the creation of camaraderie with the protégé. This is similar to what Kram and Hall (1995) called co-learning that occurs through the interchange between the mentor and the protégé.

*Mentor:* According to Eby, Rhodes, and Allen, (2007) a mentor is a trusted counselor or guide, which traces itself back to Greek mythology in Homer's *Odyssey* between Odysseus and Telemachus, and in modern terms includes relationships of "mentor-protégé," "role model-observer," "teacher-student," "advisor-advisee," "supervisor-subordinate," and "coach-client."

*Mentoring Cohorts:* According to Mullen (2005, p. 98), is a "faculty-student support group that brings together learners with an academic instructor or dissertation chair."

*Mentoring Relationship:* According to Keller (2005a, p. 31) is "a mentoring relationship. Like any interpersonal relationship, [it] is complex because each person is simultaneously thinking, feeling, behaving, and pursuing goals." A mentoring relationship is an exchange between a mentor who has specialized knowledge or abilities that a protégé desires to learn or gain through a give and take process of sharing key and vital information, dealing with personal emotions, modifying behavior and attitudes, and developing mutually reciprocal goals.

*Movement Capital:* According to Ramaswami and Dreher (2010, p 216) "it is the protégés becoming noticed through the publicity generated in being mentored, which may lead to new job offers either within or without the business organization." If the protégé finds a better job externally, this will initially raise the turnover cost to the organization, however, it could lead to new business referrals in the future. It is a double-edged sword. However, if the mentor successfully introduced the protégé to senior managers within the organization, if they determine the protégé has the potential for promotion, the mentor

has helped the protégé make the appropriate contacts and external options look less appealing. From the mentor's perspective, as the protégé examines job or promotion offers, the mentor may be exposed to the identical or similar new opportunities, which may not be appropriate for the protégé, however, may be a good fit for the mentor's themselves.

*Path-Goal Clarity:* According to Bandura (1977), Kram (1985), "the protégé is refining and illuminating how they move along their intended career paths." To reach their goals, the mentor works with the protégé in three different areas: (a) role modeling, (b) acceptance and confirmation, (c) counseling and (d) friendship. As the protégé learns from the mentor the correct methods of working with peers and senior management through role modeling, they are being prepared for new jobs with more responsibility. The protégé gains ability within the organization and benefits from their increased productivity.

*Relational Gains:* According to Ramaswami and Dreher (2010, p 223) "this process applies to mentors. As the mentoring relationship develops and grows, the mentor and the protégé build a trusting and reciprocal relationship", which may help offset the feeling of aloneness, especially if the mentor is experiencing mid-life or post mid-life crisis' such as empty-nest when their biological children are not at home. The mentor may become reengaged with their protégés and have a sense of renewed purpose and find that when they have successfully "launched" a subordinate's career. It gives them a significant sense that they still have something of value to contribute both to the business organization and the protégé.

*Social/Political Capital and Signaling:* According to Ramaswami and Dreher (2010, 222-223) “this is closely linked to movement capital. Through the mentor’s influence and contacts, the protégé is exposed or represented in meetings with senior management when promotion decisions are being discussed and made. These increased professional introductions may result in promotion or job reassignment within the organization, and also may shield the protégé from inappropriate or premature job assignments. This shielding effect may also provide the mentor with an opportunity to teach about professional networking within the organization and how the “politics” within the organization function.

*Values Clarity:* According to Ramaswami and Dreher (2010, p. 220) “the Protégé gains a stronger and sharper understanding of their current work-life and how it may or may not intersect with their family life and long-term aspirations.” This process helps the protégé to enlarge the scope of career objectives and how satisfying their work-life is or could be in the future. New employees with the help of mentors, can decide whether the organizations they are working for can support their career goals, or whether they need to look for other opportunities. This process also helps the protégé to become more aware of how their personal ego identity is linked to their work life.

### **Assumptions**

Every author and all research has bias or presuppositions. To attempt to circumvent my bias would not be academically sound. For that reason, I have tried to provide readers with some of the concepts I believe to be true but, cannot definitely proven to be true by objective standards.

1. The research assumes that an early form of CSM begins in academia, which is a prerequisite to most employment opportunities.
2. CSM is then further developed as students participate in some form of external internship or externship where real-world lessons of the workplace are learned.
3. These students return to their college classrooms and academic instructors with new insights into the issues of cyber security..
4. This process repeats itself until formal academic graduation.
5. Upon graduation, the student either enters the workforce or moves on to graduate level instruction.
6. For those entering the workforce, they are assigned to a formal mentor for a 1-2 year time period of formal CSM.
7. At the conclusion of the formal CSM the protégé then is promoted, advanced or transferred to more substantive duties.
8. It continues with CPE by earning new cyber security vendor certifications and through self-applied reading and learning until advanced competence (as measured and required by the employer) is achieved.
9. It is completed with the development of a CSM professional relationship of the protégé with their mentor(s), or with other professionals.

### **Scope**

The scope of study is limited to cyber security professionals in the workplace or business organization. This includes the CISO (or the individual responsible for cyber

security in the workplace) and other senior management staff (e.g., security managers) that may be the current mentors of junior staff and other cyber security or IT personnel in the workplace. Of special interest are those who presently serve as cyber security mentors or who are cyber security protégés in the workplace. A qualitative study method was selected for use because I wanted to gauge the beliefs, feelings, and experiences of the respondents from a questionnaire format and not with personal interviews. In qualitative studies, the number of participants can range from 1-325 as seen in Dukes (1984) who recommended three to ten subjects, and Riemen (1986) studied ten people. The final total and breakdown of respondents ( $R_1$ ,  $R_2$ , and  $R_3$ ) in this study were,



*Figure 1.* Respondent breakdown.

Even with this very small sample, it would be sufficient to determine results, according to Singleton and Straits (2010, 180-184).

### **Functionary-Effect**

As with any research study questionnaire one never knows if the answers being given are honest and truly represent the candid views of the respondent, or if the answers merely reflect what the respondent thinks I want to hear. Because no follow up questions can be asked for “more clarification” after I concluded the qualitative portion of the research, it must be assumed that because the research is free of bias and that sincere responses will be supplied. In short, it continues to be dependent on the good-will of the respondent.

### **Tenure in Current Position**

The researcher sought out the views of the CISO, mentors and protégés. I wanted to know how long each of the respondents had been in their current position or role, how long they had been with the company, and if possible what their career plans are for the future or in the near-term. Of special note is that mentors and protégés must be, or have been in a current formal mentoring relationship in the recent past, usually no more than two to five years.

### **Willingness to Participate**

It should be recognized that the final total of participants in each of the population segments ( $R_1$ ,  $R_2$ ,  $R_3$ ) could not be guaranteed and how many of each segment would elect to be a part of this research. Another issue that could occur is that if the CISO asks mentors and protégés to complete the questionnaire and those latter segments respond out of a feeling of obligation or of being involuntary coerced into participating. If this occurs the research could end up tainted. However, an assumption is that as long as the

participant replies voluntarily and with confidentiality to the research, that the answers provided should be credible.

### **Summary and Transition**

There is a crisis in the field of cyber security. Unauthorized entries into privileged data stores by hackers and cyber terrorists requires a strong, substantive and well-reasoned response. Traditionally IT is viewed as a cost center. Expenses and costs are sunk. This is short-sighted. Cyber security expenditures need to be reframed away from merely a Return on Investment (ROI) to one of risk assessment, log analysis, hacking and forensics, Intrusion Prevention Systems (IPS) and Intrusion Detection Systems (IDS). These steps must *align and support* Control Objectives for Information and Related Technology (COBIT) and overall cyber security policies, augmented by solid senior management support that meets stakeholder requirements. The CISO and their cyber security staff must be remain constantly diligent and up-to-date. However, after academic training and even after earning various cyber security certifications, it is easy to become outdated and functionally non-operational, or “stale in the saddle.” A permanent philosophy of CPE that includes a structured high-quality formal CSM program, conducted and supervised by those with specialized training in its concepts, advantages and pitfalls, may be an additional tool in the cyber security defense arsenal. It is the purpose of this research to examine the experience of formal workplace CSM from the three different perspectives of protégés, mentors and CISOs. Its goal also includes making recommendations regarding the future feasibility of developing an ongoing CSM methodology.

The dissertation consists of five chapters and several appendices. The first chapter introduces and provides a general background to the research. The second chapter consists of a literature review that considers workplace mentoring from a formal model as compared to informal or naturally occurring workplace mentoring. Attention to the benefits, diversity and best practices of mentoring in each life-stage that was proposed by Levinson et al. (1978) and Kram (1985). The third chapter presents the method I used to discover, analyze, sort and answer research questions as they pertain and apply to formal CSM programs in business organizations. The fourth chapter includes analysis of the results of the research from the questionnaires sent out to CISOs, mentors and protégés. The fifth chapter provides for a summary, conclusions and recommendations from the research and additional areas for continued study.

## Chapter 2: Literature Review

### **Introduction**

As previously stated in Chapter 1, cyber security data and security breaches occur much too often and with great regularity. This seems to be validated by simply watching the television news and reading the newspaper and professional journals. I assumed that there should be methods to lower the inherent risk, but I wanted a less biased confirmation. I wanted to know if CSM would be helpful, and whether or not effective and appropriate mentoring was occurring in the cyber security workplace. I wanted to determine if other factors would increase or decrease the sense of professional bias and whether demographic characteristics (gender, race or ethnicity, educational background, previous academic mentoring) contributed to any mentoring bias or DIM in the workplace. I wanted to receive input from cyber security mentors and protégés who had completed formal mentoring programs, or participated in formal field internships during undergraduate or graduate study. I hoped an analysis of this input would provide me with additional insight into formal CSM programs.

Initially, I wanted just to poll CISOs regarding their feelings regarding mentors and protégés. Then the mentors and protégés would be queried regarding the information provided by CISOs. I hoped this process would allow me to compare and contrast feelings, attitudes, and opinions to isolate CSM qualitative study patterns. Did CSM transform the cyber security landscape and did it result in an efficiently trained and prepared cyber security staff? Concurrently, was there any significant dissonance by CISOs or hiring managers on what qualifies a new hire in the field of cyber security

regarding the need of a college or graduate degree or having recognized vendor certifications and previous work experience.

Information security, like everything else, is a human enterprise and is influenced by factors that impact the individual. It is well recognized that the greatest information security danger to any organization is not a particular process, technology or equipment; rather, it is the people who work within the “system” that hide the inherit danger. (Tipton and Krause, 2007, p. 521)

Since people within the system are the greatest risk to the organization, CISOs and companies would appear to benefit from a strong cyber security posture. I believed this would include CPE and CSM. However, what should be included in the CPE program and who should be conducting or supervising the CSM? The role of the CISO is “complex” according to Easley (2013, p.1). The CISO and the cyber security team are constantly challenged to complete daily job requirements. I wanted to find out if members of the cyber security staff would be open to CPE that blended formal academic study, vendor certifications and CSM, or would this impose just another hurdle to overcome?

To gain insight, three population groups consisting of  $R_1$  (the cyber security protégé),  $R_2$  (the cyber security mentor or manager), and  $R_3$  (the CISO or the executive in charge of cyber security), participated in the primary research. I sought to uncover common qualitative study themes and patterns that might occur in the workplace. The primary goal was to ascertain the feelings of the three population groups regarding

methods that might reduce the risk of cyber security breaches, with special attention to CSM.

### **The Problem and Purpose of the Qualitative Research**

The problem addressed in this study is to determine how CISOs and mentoring dyads feel about the process of formal CSM in the workplace. I wanted to determine what patterns, (differences or similarities) that might exist with those who participated in the purposeful sample. I also wanted to determine what qualifications newly hired staff members held and, which new qualifications they may seek in the future and how formal CSM might advance or retard this process. This posture includes CPE on both an academic, and cyber security vendor certification level, and a general basis. There seems to be a need for expertise and specialization within cyber security. Compounding the problem for the CISO and cyber security managers was the plethora of cyber security vendor certifications in this burgeoning field and the time constraints placed on cyber security staffs to study for, prepare and obtain those certifications. Unless something is done, the risk of cyber security breaches and unauthorized intrusions will only increase. The role of the CISO is complex because these

security officers' review and update existing equipment to ensure network computers remain secure. They write reports and submit personnel and computer systems evaluations to their superiors. Chief security officers are responsible for their companies' incident response planning, the investigation of security breaches, and the legal aspects involved. (Easley, 2013 p .1)

I believed that the CISO, the TMT and their cyber security staff have a constant need for continuous and on going education, which includes ongoing and formal workplace mentoring. A properly constituted CSM program may be one methodology to consider as part of this process. I also wanted to determine,

1. To what extent is CSM occurring.
2. How did R<sub>1</sub> – the cyber security protégé, (2) R<sub>2</sub> – the cyber security mentor or manager, and (3) R<sub>3</sub> – the CISO perceive its value and effectiveness.
3. Who was performing the formal mentoring (e.g., the CISO or other senior managers).
4. How did any aspects of diversity (e.g., age, race, gender, etc.) effect the formal dyads, mentoring groups, to create or sustain bias.
5. Was Web based e-Mentoring being utilized.

This chapter began with a restatement of the problem and purpose of the research and then will move to a review of the current literature that includes published works and peer-reviewed journals beginning in the early 20<sup>th</sup> century, and then greatly expanding in the 1970's and beyond as mentoring became a bone fide field of inquiry. A turning point was reached in the late 1970s and 1980s as the seminal works of Levinson et al. (1978) and Kram (1985) were written and follow-up studies and research was conducted. However, cyber security did not exist during this time frame because computer technology was limited to mainframes before the age of the Internet and microcomputer networks did not mature until nearly 20 years afterward. Cyber security during the age of the mainframe was largely limited to local physical access control. Users were limited to

terminals that required direct wiring and the user had to be on-site or physically localized to use it. As the modern day client-server microcomputer networking systems slowly became a tool of the office coupled with Internet access, it eventually spread to many American homes, the need for cyber security increased. However, no published or peer-reviewed study can be found that addresses or studies CSM. I used Google Scholar to search for "cyber security and mentoring," or "information security and mentoring" and no results were found, while numerous references on "information security" and "mentoring" as unique individual searches could be established. The remaining balance of the literature review (Chapter 2) is focused on mentoring in academia and in the workplace. Both an academic and workplace mentoring model is hypothesized as bringing about the strongest and most effectual CSM program.

### **Theoretical Foundation**

Levinson et al. (1978) conducted ground-breaking research that began the modern day interest in workplace mentoring. Levinson and his fellow researchers studied the lives of 40 men and concentrated on the various changeovers during their lives and developed a theory of adult development that clearly purported well-defined adult development stages. These shifts in their lives centered around their experience with a mentor. Mentoring scholars describe a mentor, in the words of Allen and Eby (2010, p.8) "as a guide, teacher, counselor, and developer of skills" that Levinson's team referred to as those that "facilitates the realization of a dream" (p. 98).

Another important milestone was Roche (1979) who stated that 67% of 4,000 of the Who's Who News column reported having a previous mentoring relationship. Kanter

(1977) also demonstrated that those who generally speaking made to the executive office of organizations, usually had a “Godfather” or “Rabbi” type of person who assisted them in the rites of passage. These early authors led the way to Kram (1985) and a “pioneering qualitative study of 18 mentor-protégé dyads.” Nearly a decade before Levinson, Chickering (1969) developed a “conceptual model of college impact that posited informal student-faculty interaction, which clearly influenced students’ intellectual development, academic achievement, career aspirations, and academic self-image” according to Allen and Eby (2010, p. 8).

Another study by Astin (1977), according to Allen and Eby (2010, p.9), also corroborated that “student-faculty interaction had a positive influence on a wide range of personal, career and educational outcomes.” These early studies formed the foundation of academic mentoring, which eventually led to more studies on workplace mentoring, which this study is predicated. Without the solid academic and workplace mentoring models in place, this study would be hampered in its efforts to uncover how a robust CSM program might be proposed and developed, which would then lead to a stronger cyber security posture.

### **The Literature Gap**

While a significant theoretical and research base has been established in the last 35-40 years on mentoring and mentorships of youth, adolescents, academia (undergraduate, graduate and Doctoral levels), and business organizations, there has been a real lack in study of workplace mentorships on the case-study level or SIC level. Because there are few (if any) published studies on the express experience of formal

CSM in the published professional literature, a qualitative study dedicated to CSM may be addressing primary or new research within academia. For example, in the International Journal of Cyber security and Digital Forensics (IJCSDF) when a key word search for “mentoring” was queried there are no results in the database. This presented me with a problem. I was not worried about having *too many* references or citations on mentoring but *too few* as it focused on CSM. I had to try to find a correct and sensible balance. Utilizing some of the more prominent works on mentoring research and after reading through a great deal of materials, I focused my attention on journal articles within these works and then from those journals to other references and journals to obtain the final materials for my research. Since I could not locate any materials on CSM itself, I knew that the gap in the research was clearly present and that I might indeed be one of the first to deal with the subject material.

In another search of Inderscience Publishers, which includes 53,319 articles from 365 various professional journals, a search for “cyber security mentoring” or “information security mentoring” resulted in no published peer-reviewed articles. This should not be interpreted that formative knowledge is not available, because extensive mentoring studies have been conducted that cover the primary concepts of youth/adolescent, academic and workplace mentoring. However, it seems to verify that no specific research has been conducted or reported on CSM. For this reason, I wanted to determine how CISOs and cyber security staffs might relate to the concept of CSM.

### **The Early Seminal Works on Mentoring**

The understanding of the theoretical background that this research is based upon is that of Levinson et al. (1978) and Kram (1985). Levinson et al. (1978) proposed “life stages” of the human development of adults from childhood to late adulthood. According to Eby, Rhodes and Allen (2007, p. 8), “Levinson and his colleagues provided a chronology of the lives of 40 men, focusing on developmental transitions and milestones that they experienced throughout the lifespan...specifically, the relationship with a mentor.” This preceded and prepared the way for Kram (1985) and her “pioneering qualitative study of 18 mentor-protégé dyads.” Concurrently, academic research that had preceded Levinson et al. (1978), with Chickering (1969), which Allen and Eby (2010, p. 8) stated it demonstrated “that informal student interaction positively influenced students’ intellectual development, academic achievement, career aspirations, and academic self-image.”

It was Astin (1977) who established that student-faculty advising and mentoring had a clear impact on an extensive array of private, occupational and didactic consequences. The work of Caplan (1964) revealed that in many family systems that the role of the “aged, seasoned, and overall wise-person” had a dramatic effect on younger generations, and in Williams and Kornblum (1985), a classic study *Growing up Poor* tracked 900 at-risk urban youth and discovered that mentors had an exceedingly weighty role in the effecting positive results. Following this was Werner and Smith (1982) whose 30-year study of 700 vulnerable youth revealed that those who found an adult-mentor were more successful than those, who did not. Other classic works include Merriam

(1983), and Jacobi (1991), which contributed to the emergent scholarship and research. Kram (1985) initially cautioned and alerted scholars to the possible detrimental and negative effects that possibly could arise from “dysfunctional” mentoring associations. This was later supported and enlarged by Ragins and Scandura (1997), and again by Williams, Scandura and Hamilton (2001). With these type of occurrences, Scandura and Hamilton (2002) felt “the result may be increased stress and employee withdrawal in the form of absenteeism and turnover.” The DIM scale that measured four dimensions of dysfunctionality was subsequently developed. These four dimensions were,

1. Negative relations, which included psychosocial behavioral issues such as bullying, intimidation, overly aggressive behavior, abuse of power, and provoking diversity issues.
2. Difficulty, which included different personalities, different work styles, unresolved conflicts, disagreements, placement of binds by the mentor, a mentor on the wrong career track, and over-dependence upon the mentor.
3. Spoiling, which reflected changes in the relationship that make a previously satisfying relationship disappointing that included vocational issues with good intent.
4. Submissiveness, which reinforced balance of power concerns – the protégé is submissive, over-dependent, accommodating, meek and passive (Williams, Scandura and Hamilton, 2001, p. 77).

### **Seminal and Early Works on Mentoring**

One should also note that Eby and McManus (2004) described a “spoiling” issue of some concern when a married mentor became romantically involved with one of their protégés. Kram also wrote significantly on other aspects of mentoring such as (a) mentoring as an antidote to stress, (b) mentoring in the context of diversity and turbulence, (c) peer relationships and career development, (d) phases of mentorship, (e) developmental relationships and (f) relational approaches to career development. However, Kram (1985) in her volume entitled, *Mentoring at work: Developmental Relationships in Organizational Life*, is where she is best known and appreciated. This research concentrated on a mentor’s behaviors and roles (functions), and significantly and successfully discriminated mentoring from other forms of growth-related associations.

### **The Concept of Reciprocal Relationships**

With the seminal works of Levinson et al. (1978) and Kram (1985), and others as a foundation, the latest research covering the entire scope of mentoring was questioned by Allen and Eby (2010). What is significant about their volume is that it encompassed the entire scope of mentoring in three distinct life stages from childhood, adolescence, and a workplace-model of mentoring in the business organization. Most significant of all is that their work provides one of the best, if not the best overview of the literature, in the field of mentoring from its earliest periods to the current day. It behooves any serious scholarship on the subject of mentoring to integrate Levinson’s life stages, but also not to lose focus – as the axiom states, of “not seeing the forest for sake of all the trees.” Contemporary with Levinson et al. (1978) and Kram (1985) was the research of Hunt and

Michael (1983) who developed the concepts of “reciprocal relationships” based around five major categories,

1. Contextual or environmental factors (how do differing institutional contexts affect mentoring?)
2. Mentor characteristics (what impact does personality, career or life stage of the mentor have on mentorships?)
3. Protégé characteristics (how does protégé gender, age, and personality impact selection by a mentor?)
4. Stage and duration of the mentorship (what events or changes bring about new changes in a mentorship?)
5. Outcomes for mentor, protégé, and organization (how do the various parties benefit and how can mentoring be facilitated?)

### **Source or Variance Theory**

This was followed by O’Neil and Wrightsman (2001) and the development of Source or Variance Theory of Mentoring that integrated mentorship “factors, parameters, correlations and tasks.” These included primary factors of personality characteristics of mentors, situational or environmental variables and diversity variables. Specifically this comprised of (a) interpersonal respect, (b) professionalism-collegiality, (c) role-fulfillment, power, control and competition. They also isolated six tasks of student-faculty mentorships of (a) defining the working relationship and included making the critical entry decision, (b) building mutual trust, (c) taking risks, (d) teaching skills, (e) learning professional standards, and (f) dissolving or changing the relationship.

## History of Mentoring

While the mentoring relationship had its origins in Greek mythology (Mentor and Telemachus), Levinson et al. (1978) wrote that the mentor's role was as a "guide, counselor and sponsor." This was later expanded by Ragins and Scandura (1999, p.496) where mentors were "influential individuals with advanced experience and knowledge who are committed to providing upward mobility and support to their protégés careers." It should also be noted that new methodologies such as cohort mentoring, e-Mentoring, and team mentoring are also viable options. These new methodologies require us to adjust our definitions of mentoring to include these updated concepts and to incorporate them into the corporate workplace. While Levenson et al. (1978) could not foresee these new methods this should not be interpreted to mean that the work they did was not foundational and that it should be lessened or ignored. (Kim, Liu, and Diefendorff, 2014 Overview)

In all actuality Levenson's work, along with the work of Kram (1985) that allows us a complete and mature knowledge of mentoring in the workplace. Especially noteworthy is the practice of team-mentoring where a protégé gains from the experience of a series of sequential mentors or "constellation of mentors," as proposed by Baugh and Scandura (1999), instead of relying on a single individual. All should also be reminded that Kram (1985) developed the concept of 18 developmental relationships in her workplace study of a large public utility that coalesced the mentoring functions down to two primary tasks of (a) career development and (b) psychosocial support. However, the

more functions that a mentor provided their protégés with, the stronger and more beneficial to the mentee.

### **Leader-Member Exchange Theory**

This leads into a consideration of the assimilation of mentoring theory and leadership theory. This best example of this is Leader-Member-Exchange (LMX) developed by Graen, G., and Uhl-Bien, M. (1995). In LMX leaders discriminate among their “disciples” and members of various cohorts and use fluctuating leadership styles with them. This allows mentors to test the conceptual strengths of each member of the cohort and their ability to assimilate key tasks within the business organization. Using this method two groups appear. The first is the in-group where there is a high level of trust, mutuality, respect, and commitment, and the second is the out-group where the individual contributes but does not fully engage. The members of the out-group meet the minimum requirements but most likely will not advance in the company because it will be felt that they did not perform at a higher-level required for advancement. They were content to just meet the minimums and had other priorities or did not understand the real benefits of the mentoring relationship.

The latest material on LMX theory was examined by Kim, Liu, and Diefendorff (2014),

We theorized and tested the mechanisms by which leader–member exchange (LMX) quality is associated with job performance. The results obtained using 212 employee–supervisor pairs from eight Chinese companies indicated that LMX quality had an indirect and positive relationship with taking charge via

psychological empowerment and had an indirect and positive relationship with job performance via taking charge. In addition, organizational tenure significantly moderated the relationship between taking charge and job performance, such that the positive effect of taking charge on job performance became weaker as organizational tenure increased. Furthermore, organizational tenure significantly moderated the indirect positive relationship between LMX quality and job performance via taking charge; the indirect effect became weaker as organizational tenure increased. These results suggest that organizations should encourage managers to develop high-quality LMX with their subordinates, which may make them feel more empowered and engage in more taking charge, and result in better job performance.

### **The Best Workplace Mentors**

The best mentors were those who understood the value of LMX and mentoring theories to develop themselves as transformational leaders in the organization. They knew that taking the time to share their knowledge and experience as a coach, teacher and mentor, as in Yukl (1989), and that the cost-benefit was positive over the long-term. Sosik and Godshalk (2000a) felt that transformational leadership of mentors strongly impacted the self-confidence of the mentee-protégé. In a global economy it is important to take the time to consider how paternalistic cultures view the role of mentors. In these situations, a mentor takes on a quasi parental view where the mentor feels a real sense of obligation to provide protection to their protégés.

### **Paternal Leadership Theory**

According to Paternal Leadership Theory (PLT), as developed by Pasa, Kabasakal, and Bodur (2001) it is most clearly demonstrated when the mentor is deeply interested in every aspect of their protégés life, including their personal lives, that mentoring truly succeeds. These highly skilled and devoted mentors make decisions for their protégés that are in their best interest, sometimes without consulting with or discussing the situation with them. Mentoring dyads in a paternalistic view are composed of a powerful leader who is the mentor, and the protégé is directed in their decision making and digression is not looked upon in a participatory manner. The protégé needs to “learn the ropes of the organization” and the mentor is there to pro-actively guide, instruct and require the protégé to respect the mentor’s input by strictly adhering to the mentor’s advice and opinion.

### **Group and Cohort Mentoring**

In addition to e-Mentoring there are some other variables like time-based, or time-phased, temporal-shift mentoring. In this format, mentoring is viewed not within a singular time period, but elapses over a multiple year context, usually in the range of two-five years. Interestingly, as the Figures in Chapter 4 reveal, CSM takes about the same period of time to fully develop the cyber security protégés skill sets. It begins with an initiation phase followed by other phases which lasts about six-months, which is then followed by a cultivation phase of several years. It is during this phase that the protégé gains information, knowledge, skills, and increasing visibility within the company or the professional sphere and the mentor gains the sense of transferring their wisdom and

expertise to the next generation. This often results in the mentor having a deep sense of personal and professional satisfaction.

As the mentorship enters its latter years, a separation phase begins that is similar to a mother releasing its suckling calf to begin a more independent life. This phase can last from six-months to two-years with decreasing number of contacts, meetings, and sessions as the end of the mentorship draws near. As both Kram (1985) and Ragins and Scandura (1997) and Scandura and Pellegrini (2010, p. 75), noted “the protégé may move onto another position, either through job rotation or promotion, which begins to limit opportunities for continued interaction” with their former mentors. Once the separation is completed, the final phase of redefinition ensues where the mentorship may terminate or transfigure itself into a peer-like friendship that retains intermittent support and social contact.

### **The DIM Scale**

There are also drawbacks and benefits to workplace mentoring that may not be initially apparent. Some of the drawbacks include, Marginal Mentoring (MM), which involve issues that play down the promise of the mentoring association. As already mentioned, Williams, Scandura and Hamilton (2001) derived the DIM scale. In the DIM scale, the mentoring dyad had to confront and address with relations involved psychosocial issues with bad intent such as bullying, intimidation, overly aggressive behavior, abuse of power, and provoking diversity issues. The measure of difficulty involved psychosocial issues with good intent such as different personalities, different work styles, unresolved conflicts, disagreements, placement of binds by the mentor,

mentor on the wrong career track, and over-dependence. A third DIM factor was that of spoiling, which involved vocational issues with good intent such as absence of malice, betrayal, and regret.

Finally, there was the DIM concept of submissiveness, which was reflected in the balance of power between the mentor and protégé. Sometimes the protégé was too submissive to the mentor or was too accommodating, meek and passive. Workplace mentoring has significant veiled benefits that are often hidden from view, which according to Scandura and Pellegrini (2010) occur at the organizational level. Organizations are increasingly recognizing the value of mentoring relationships and attempt to reap the advantages through launching formal mentoring programs as part of their career development initiatives. Some theorists have suggested that mentoring benefits organizations by improving competencies.

There is little theoretical development, however, for outcomes associated with mentoring at the organizational level. For example, institutional theory might be applied to better understand whether mentoring occurs more frequently in certain types of organizational settings (Clutterback, 2004, 75-76).

In addition to outcomes for protégé career development and work attitudes, the benefits of mentoring relationships may accrue at the organizational level as well as the management level.

### **Prior Qualitative Research on Mentoring**

In one qualitative study, Allen, Poteet, and Burroughs (1997) conducted interviews with 27 mentors who commented that factors such as (a) the desire to pass on

information to others, (b) the desire to help others, (c) the desire to work with others, and (d) the desire to increase personal learning were central to the practice of mentorship. In a later study, Eby and Lockwood (2005) interviewed both mentors and protégés and discovered that concepts such as learning, career planning, psychosocial support, developing a personal relationship, personal gratification, and enhanced managerial skills for managers were deeply desired.

In an experimental research study, Olian, Carroll, and Giannantonio (1993) worked with 145 managers in the banking industry and their mentors looked for protégés with superior work histories, which interestingly also correlated that men be married and women should be single. Many employers have the vestigial concept of not wanting to invest in non-married males and or married women because single males may take new job opportunities after they marry, and single women may decide to begin their families. Both of these factors influenced banking employers not wanting to invest time and money into protégés with whom their “investment” might be unproductive in the long-term.

Some other interesting facets with workplace mentoring is that informal mentoring seemed to be more effective than formal mentoring according to Allen, Day and Lentz (2005). This was also delineated by Ragins and Cotton (1999) who stated that across a broad spectrum, formal protégés had decreased amounts of sponsoring, protection, challenging assignments, exposure, friendship, social support, role modeling, and acceptance, and lower compensation than their informal peers. The central question is “Why?” No one quite knows for sure but it may lie in the fact that formal mentorships

may leave protégés feeling compelled into the relationship, which then hinders or encumbers a dyadic relationship to truly form. Regardless, many employers continue to seek formal mentoring in their organizations in spite of the lack of empirical evidence showing its merit. This caused Scandura (1998, p. 451) to state that “the jury is still out on the efficacy of formal mentoring programs.”

### **Lack of Consensus on Definition of Mentoring**

One thing is clear. There is no consensus on the definition of a mentor or mentoring. For example, Jacobi (1991) provides as many as 15 various designations when attempting to question others in the field. This had previously led Kuhn (1970) and Skinner (1953) to argue that because there is no consensus, the academic discipline of mentoring as a social scientific field of inquiry is not fully formed and yet significant strides and progress were and are occurring. As previously mentioned Roche (1979) who in Harvard Business Review stated that 67% of 4,000 the Who’s News column reported having a previous mentoring relationship, and Kanter (1977) demonstrated that those who generally speaking succeeded in advancing to the executive office of organizations usually had a Godfather or Rabbi type of person assist them in the rites of passage. These early authors led the way to Kram (1985) and her pioneering qualitative study of 18 mentor-protégé dyads. Some of the updated research of Ragins (1997), which was grounded upon the work of Levinson et al. (1978) and Kram (1985), are the most seminal works are cited by current scholarship.

### **Rise of e-Mentoring**

However, times have changed over the years and mentoring has expanded its delineations because in the age of the World Wide Web, e-Mentoring has emerged. This has further complicated the overall and crowded schema of mentoring. Today one must also consider the impact of race, gender, ethnicity, sexual orientation, disability, religion, socio-economic class, and others that according to Ragins (1997a) reflects and is associated with power in organizations. New glass ceilings in business organizations are being shattered every day. In many instances, one can observe the threat of historic power structures as newcomers and upstarts are challenging them. One can see the glass ceiling swapped for concrete ceilings so that those who are in power, remain in power. Mentoring of selected protégés is a means of retaining, maintaining and preserving top level management positions for a selected few. Regardless, a single and clear definition of mentors and mentoring continues to elude scholarship in spite of Jacobi (1991) proposing and identifying the 15 variant definitions. As Burke (1984) and Merriam (1983) aptly conclude, all of this indecision “create[s] problems” in the field.

### **Reason for the Complexity**

The primary reason behind the definitional complexity centers round at least five considerations:

First, as Garvey and Alred (2003) and Jacobi (1991) discovered is that mentoring is a sole and inimitable dynamic between two persons, that is not fixed, but stretches, flexes, and adjusts over time depending upon the needs of the dyad. To put it another

way, mentoring relationships are always unique and one of a kind and are not reproducible.

Second, as Roberts (2000) added, it is a “learning partnership” between the members of the dyad. While mentoring goals between unique dyads will remain constant, the exact and precise mechanisms to achieve the goals are not.

Third, mentoring is an activity that is progressive and procedural in nature. It has both a horizontal, vertical and transcendent aspect to it, which makes it very difficult to grasp and “get a handle on.”

Fourth, mentoring is mutual, joint, and cooperative in nature. Both the mentor and the protégé gain from the experience. While the protégé may gain knowledge and expertise, the mentor gains status and recognition by peers and others, which increases the likelihood that the protégé will advance within society or the organizational structure.

Finally, the mentoring relationship is not static, it shifts throughout the relationship as the protégé gains from the mentor and then the relationship shifts into a higher gear, which brings additional benefits and advantages to the protégé. This dynamism continues until the relationship climaxes and the optimum protégé exit point occurs. It is an “initial” exit, because it is common for the protégé in the years that follow to refresh the relationship on occasion. This is one method where the mentoring relationship continues beyond the “normal contract period” and for the protégé to gain from the mentor, as the cycle is expanded and enlarged.

### **Formal and Informal Mentoring**

In addition, there is the difference between formal and informal mentoring. The first has a definitive structure and purpose whereas the second does not specify the means or process and for a lack of a better phrase “goes with the flow” and allows the mentor and protégé flexibility to meet whatever needs or circumstances that may arise in the relationship. Lest anyone arrive at false conclusions, this informality has a solid research base as noted by Chao, Wale and Gardner (1992), and Ragins and Cotton (1999), and it sometimes allows and provides for a bonding process between mentor and protégé that may increase the viability of the mentoring program because of the relationships that are formed.

Formal mentoring has yet another aspect to consider in the relationship initiation and relationship structure. Formal mentoring programs usually have a beginning and an end, with stated goals or outcomes. The needs and the desired goals of the formal mentoring relationship must be quantified in contrast to informal mentoring that lacks these strict definitions. Sometimes this initiation involves an external third party (i.e., in the workplace by a senior manager) or in a youth mentoring program where a judicatory intervention has required it. However, formal mentoring programs do not mean that the members of the dyad have no say in who they accept as protégés, and vice-versa. In some situations, allowing a pool of potential protégés and mentors simply to gather allows for a more spontaneous process where members of dyads self-select each other.

Mentoring dyads could (and perhaps should) be developed based on (a) race, (b) gender, (c) socio-economic backgrounds, (d) educational backgrounds, (e) job roles, or

(f) shared interests in sports or hobbies. The concept is that whatever may assist in the bonding process helps foster the relationship so that trust, disclosure and commitment as Levinger (1979) and Allen, Eby and Lentz (2006a, 2006b) noted, may have an opportunity to take root.

### **Dual Axes in Mentoring**

There appears to be two axes in mentoring relationships. The first axis is horizontal and is usually aligned with the Levinson et al. (1978) developmental life-stages. Nearly all mentoring studies and research must factor this into their work. The formative ego development and self-identity that begins in infancy and early childhood, middle childhood, adolescence, early adulthood, and middle to late adulthood are paramount to our self-concepts. Poorly developed self-image results in stunted growth and abilities.

While mentoring can help overcome some of the deficit, it cannot overcome any unless the protégé is willing to do the hard work necessary to obtain success. It also requires that the mentor is aptly prepared and sensitive to each of their protégés unique requirements. Successful mentoring at earlier stages of adult development has a direct and positive affect on mentoring at the later stages. The opposite is also true. A failure to connect in initial mentoring relationships (e.g., youth and adolescent mentoring or academic mentoring) may have lifelong impact on the protégé, which they may never be able to amend.

The second axis is vertical. Allen and Eby (2010, p. 407) breakdown the vertical axis into four sub-levels: (a) individual, (b) dyadic, (c) setting and (d) societal. People

have personal and interdependent needs. To belong to something more than they themselves as individuals could achieve is a strong and motivating psychological force. People want to belong to something more, or to be part of a group of people who matter. This urge is sometimes referred to as the “belongingness hypothesis” and was developed by Baumeister and Leary (1995). As it applies to mentoring theory, those more likely to benefit from mentoring relationships are those who did not develop sufficient interpersonal bonds with significant others.

Common examples, according to Allen and Eby (2010, p. 407) are “first-generation college students who do not have role models” or “women and minorities in the workplace who have limited access to social networks.” In a posterior and extreme negative perspective, children who were abused, neglected or subjugated by one or both of their parents may carry deep psychological scars their entire lives, which they are completely unable to disengage and reverse. They will always have unfinished business as part of their egos and identities.

Mentors need to be cognizant that some of their protégés may hurt and feel deep individual pain in this regard. While mentoring may help, in some instances it may only bring back to the surface feelings of inferiority, which may result in interpersonal conflict and resistance to mentoring. Many mentoring programs target at risk populations like this in an effort to ameliorate social trauma. It may be a better use of time and resources, according to Rhodes, Grossman and Roffman (2002), to place the focus on fostering competencies among youth rather than trying to remedy deficits.

## **Mentoring Levels**

There are also several levels associated with mentoring. The dyad level sees both the mentor and the protégé as a single unit. They develop, over time, a shared sense of mutuality and belongingness. The dyad forms a working alliance. A connection is forged between the mentor and the protégé that is single-minded towards collaboration of common goals. These goals are negotiated during the initiation phase of mentoring by the mentor and the protégé as the desired outcomes of their specific relationship. The prime benefit is the dyadic fulfillment of their corporate or joint needs to belong. When this is not achieved, the mentoring relationship bond is lessened, deteriorates or dissipates altogether.

The setting sub-level is where the mentoring occurs. This is evident in workplace mentoring and academic mentoring. Many formal youth mentoring programs occurs in organizations like Big Brothers/Big Sisters, Boy and Girl Scout troops, churches, mosques, and synagogues, and after-school programs by local school districts. Informal mentoring is less restrictive on location and with extended families often occurs in the homes of aunts, uncles, grandparents, or other close related adults. While the setting is important in mentoring, little formal research has been conducted regarding its total influence. The question to be asked is “How does the setting influence whether or not belongingness is achieved?” The setting is more of an issue with formal mentoring than informal mentoring. The setting provides the platform where the mentoring occurs, which in turn may influence the goals and outcomes of the mentoring program.

In one study, Herrera, Sipe and McClanahan (2000) looked at school-based mentoring and community-based programs. In the first, the emphasis produced more academic outcomes, while the second generated more social activities. The society sub-level is crucial because our culture and society is a stabilizing role in all of our lives, which then contributes on a grand scale to our values at large and how each of us fits into the whole. This is a macro view of the sense of belongingness.

Generally speaking, society at large rewards those whose lives and contributions are most likely within the +1 or -1 of the standard deviation curve of the cultural bell curve. It punishes those with less, and it highly rewards those who exceed it. Those who become societal outliers (e.g., the ubiquitous 1%), in either direction see even more rewards or penalties. Thus, “a feeling of falling outside the mainstream of society puts individuals at risk for crime and other problems” according to Allen and Eby (2010, p. 413). Some cultures may frown on mentoring as Sedlacek et al. (2010) has noted. Protégés who have experienced a positive role model as a mentor in academic studies will have less resistance to workplace mentoring than those who have experienced a negative role model. The same could be said of youth and adolescent mentoring, which then leads to successful academic and workplace mentoring. However, while I believed an understanding of youth and adolescent mentoring would be helpful, it did not apply directly to my research and my interest in CSM. Therefore a literature review of academic mentoring followed by a review of workplace mentoring is now provided.

### **Literature Review - Overview**

As stated earlier, while the references in this dissertation seem adequate, upon closer examination the real paucity becomes more noticeable. For example, in the International Journal of Cyber Security and Digital Forensics (IJCSDF), when “mentoring” was queried, no results were found in the database. In another search of Inderscience Publishers, which includes 53,319 articles from 365 various professional journals, a search for “cyber security and mentoring”, or “information security and mentoring” resulted in no published peer-reviewed articles. I undertook a broad search in the Walden Library and through the Google search engine and did not locate any peer-reviewed journal articles or other academic published works on the subject of “cyber security mentoring” or “information security mentoring” I did find many articles on mentoring, and many other published works on cyber security but none on any combination of the terms. There was clearly a gap in the literature.

I therefore quickly realized that I might be a primary researcher in this new concept and began to study all the best materials I could find on academic and workplace mentoring. I then divided my review into two major sections consisting of (1) a literature review of academic mentoring and (2) a literature review of workplace mentoring. My dissertation would then attempt to blend and merge these two into a third that would consist of CSM.

### **Literature Review of Academic Mentoring – The History**

It is the relationship between the student (protégé) and the professor that should be seen as the key and critical part of the intellectual development of the student. At

times as Jacobi (1991) has observed, this stage typifies the trainee-intern archetype. The protégé is now beginning to gain and learn the new skills that will begin and launch their careers in a new field of endeavor and enable them to enter early adulthood, as described by Levinson et al. (1978). In this milieu, the faculty member or teacher-professor provides the protégé with a special set of skills and abilities that they have acquired through the years, and passes this esoteric base of knowledge to the protégé in the mentoring relationship. Formal class work and outside study and reading is routinely part of this process, along with testing for understanding and the presence of field skills that are normative to the professional setting.

For example a young woman training to become a registered nurse undertakes a course of study under the supervision of the faculty member, who after the completion of a sequence of course material and field supervision in an appropriate health related facility (i.e., nursing home, hospital, etc.) is prepared to take national boards (exams) and then applies for state or national licensing and official professional recognition as a Registered Nurse. However, academic mentoring may only have completed a first phase in the process. The next stage of the professional cycle is gaining additional or more advanced work experience under the “tutelage” of a more experienced Registered Nurse, perhaps holding a Bachelor’s or Master’s academic degree along with many years of work experience. This tutor-mentor relationship with the protégé imparts “knowledge, provides support, and offers guidance on academic classroom performance, academic skill-building as well as nonacademic personal problems, identity issues” according to Chickering (1969) and assisted the protégé with ethical issues.

Allen and Eby (2010, p. 16) stated that for undergraduate and graduate students “college is an important socializing agent and represents an important transition in adulthood...and may help students navigate this transitional period and increase their chance of academic success.” Although Jacobi (1991) analyses this as an indirect proof, Nagda et al. (1998) takes an exception on this and believes that there is a direct connection present. Mentoring in graduate education is deemed as a fundamental part of the advanced academic experience, and an integral part of “professional student development” according to Clark, Harden and Johnson (2000), and these types of mentoring experiences are quirky and distinctive because they usually lack standardized rules and guiding principles. Outcomes vary from mentor to mentor and protégé to protégé because of many factors that arise between the dyads that simply does not allow for solid “one-size fits-all” parameters. Unfortunately, as Johnson and Huwe (2002) and Allen and Eby (2010) note, this provides for openings of latent glitches such as “mentor neglect, relational conflict, and protégé exploitation.” Mentoring in academia is more informal on the undergraduate level and more formal on the graduate level. In many instances according to Nagda et al. (1998), those in the earliest years of their academic education along with minority (i.e., African-American, Asian-American) students are those sought for involvement. It appears that mentors want protégés who are openminded and willing to learn, were disadvantaged in some form or manner, and who were not as rigid and inflexible as upper classmen.

### **Theoretical and Methodological Issues in Student-Faculty Mentoring**

While the research panorama has certainly increased over the last few decades, most of the work has centered around the business organization and the workplace environment. Simultaneously, the research of mentoring in the youth and adolescent perspectives has also made significant steps forward. If there is one tendency that seems to pervade academic mentoring it is that most university and academic programs according to Johnson, Rose and Schlosser (2010, p. 49) “assume that undergraduates and graduate students alike benefit from a mentoring relationship with a faculty member.” This assumption also extends to the belief that mentorship is a guaranteed given in the academic environment. Part of the reason for this is that many academicians use different terminology to define mentoring and mentorships that range from formal one-on-one mentoring to academic counseling and advising. The former is seen more often on the graduate level with teaching assistants who work more closely with specific professors, and the latter is seen in the earlier stages of undergraduate studies where a faculty member of a college department is giving advice to a student regarding academic progress. It may be more appropriate to define this as modeling rather than mentoring. Modeling does not require a relationship. Instead it provides students an opportunity to see how each professor successfully navigated their academic careers to reach specified goals in the professors professional advancement.

After you have thought about all the professors that you have known, select the one professor who has had the greatest impact on you by demonstrating the kinds

of commitments, skills, and qualities that you see as important for yourself. (Erkut and Mokros, 1984, p.403)

The issue is whether one should attempt to better define the parameters of mentorship on the academic level. This may help alleviate some of the confusion in the field, and also allow for future research. It may also assist to delineate and demonstrate parallel and analogous work that can be better tested and confirmed because all are using a common foundation as Aagaard and Hauer (2003), Busch (1985), Clark, Harden and Johnson (2000) suggested. This which will also result in lowered ambiguity.

We propose the mentoring exists when a professional person serves as a resource, sponsor, and transitional figure for another person (usually but not necessarily younger) who is entering the same profession. Effective mentors provide mentees with knowledge, advice, challenge, and support as protégés pursue the acquisition of professional competence and identity. The mentor welcomes the less experienced person into the profession and represents the values, skills, and success that the neophyte professional person intends to acquire someday. (O'Neil and Wrightsman, 2001, p. 113)

It should be noted, as reported by Johnson, Rose, and Schlosser (2010, p. 51) this contributed to the concept of “the student assisting the mentor with various activities” and Aagaards and Hauer (2003) added “the relationship is sustained and ongoing” and Busch (1985, p. 258) specifically mentioned “the parameters of mutuality, comprehensiveness and congruence.” In another key study, especially relevant to PhD graduate students, Rose (2003, 2005) constructed the ideal mentor scale (IMS) to PhD

students at three universities. These students identified two desirable traits in their mentors, which were (a) communication skills and (b) the provision of feedback. These traits needed to be demonstrated across three dimensions of (a) integrity, (b) guidance, and (c) relationship. It appears obvious that PhD students not only wanted this from their academic mentors, but seemed to require it as part of the Doctoral training program. This is no doubt related to the fact that most PhD's had academic teaching positions as one of their primary professional goals, and the concept of an academic "role-model" was appealing, as well as needful in preparation for those goals.

### **Components of Academic Mentorships**

Johnson (2006) proposed "distinctive components" of academic mentorships as containing or having the following elements (a) mentorships are enduring personal relationships, (b) mentorships are increasingly reciprocal and mutual, (c) compared to protégés, mentors demonstrate greater achievement and experience, (d) mentors provide direct career assistance, (e) mentoring results in an identity transformation in the protégé, (f) mentorships offer a safe environment for self-exploration and (g) mentorships generally produce positive career and personal outcomes. These features greatly assist mentorship scholars in a more precise and complete definition of academic mentoring as compared to youth or adolescent mentoring, while still aligning a correct and corresponding parallel.

### **Issues in Academic Mentoring**

There are some significant issues in this academic field of research.

1. First, most of the questionnaires are of the self-reporting variety.

2. Second, there has been little or no standardization of these questionnaires.
3. Third, research focused on protégés views about their mentors and not the mentor's view of their protégés.
4. Fourth, according to the extant research student-faculty mentoring suffers from problems with sampling, self-selection bias, and the probability of social desirability and halo effects in student responses.
5. Fifth, bias extends to limit samples from those who were successfully mentored and does not include sampling from those who did not.
6. Sixth, it is typical that non-response of a protégé or mentor is related to the prior issue, in that only those who have something positive report are included in results. This was most likely due to the fact that academic mentors have a vested interest in only reporting positive results because to report negative aspects might jeopardize funding or progress towards tenure. Because only positive results are included, the final results of the research may be skewed accordingly. This may require that future research be conducted independently from the academic mentor in the dyad so that complete and accurate results may be obtained.
7. Seventh, there was a lack of construct clarity not only in the definition of academic mentoring, but questionnaires tended to ask questions that made too many assumptions about academic mentoring without providing the clear definition or construct being queried. Questions like, "If you had a mentor..." and then do not properly define the terms, often led to incorrect conclusions.

Other assumptions include the concept that Doctoral dissertation chairs automatically made good academic mentors. This may not be correct unless the dissertation chair has been appropriately trained in the field of academic mentoring.

8. Eighth, the stage of development of academic protégés needed to be more isolated or correlated. The results of undergraduate, graduate and Doctoral level academic mentoring should not be combined into a single whole, but tested and sampled individually and separately.
9. Finally, more research remains to be done that distinguishes between academic mentoring and specific career objectives, academic standing, and academic disciplines. (Johnson, Rose and Schlosser, 2010, p. 54-57)

### **Preliminary Results**

Some interesting preliminary results by Johnson, Koch, Fallow and Huwe (2000) hint at subtle differences in academic mentoring results in field of sub-specialties as in clinical versus experimental psychology. One might also consider multiple temporal points of testing like Green and Bauer (1995) where they queried Doctoral students at three different time periods over a two-year time frame. This may help isolate more precisely when academic mentoring had it most variations from a statistical mean, which may in turn help academic mentors to know when they should become more or less intense with Doctoral level protégés.

Because it is unlikely that any single mentor can adequately deliver every mentoring function or operate effectively in every critical role with a student,

students should be open to the notion of benefiting from multiple faculty role models, advisors, mentors, supervisors and peers. (Johnson, Rose and Schlosser 2010, p. 60)

### **Theoretical Advances**

In regards to theory, one significant step forward would be to combine research with notional contexts for mentoring in academic environments. More specifically and most needful is to explain the style and nature of student-faculty connection with more precision. How is mentorship similar and different to the concept of being a role model and an advisor? An advising role is not the same as that of mentorship, and a role model may differ from both. However, if one were to query the typical undergraduate or graduate student, could they demarcate the essential disparities?

Advisors and mentors are not synonymous. One can be an Advisor without being a mentor and certainly one can be a mentor to someone without being that person's Advisor. (Schlosser and Gelso, 2001, p.158)

It appears that far more students have advisors than mentors. In an earlier study, Johnson (2002), and Johnson, Rose and Schlosser (2010, p. 59) stated that, "excellent mentoring relationships (mentorships) in graduate settings are dynamic, reciprocal, personal relationships in, which a more experienced faculty mentor acts as a guide, role model, teach and sponsor of a less experienced student (protégé)." The following summary of the distinguishing elements of the mentor role,

A mentor is much more than an academic advisor. The mentor's values represent idealized norms that can have considerable influence on how protégés see

themselves and the profession...mentees have various emotional responses to their mentors, including admiration, awe, fear, and idealization. Experiences with mentors can be impactful and remembered for many years. The mentor's power and influence on the mentee approximates the intensity that parents and children have with each other. (O'Neil and Wrightsman, 2001, p. 112)

### **Relationship Quality**

Once this issue has been clarified between the mentor and the academic mentee or protégé (so that both members of the dyad are clear on what will and will not be included in the process), the quality of the relationship that is created, built and sustained between the mentor and protégé is most important. It is only within the terms and limits of this relationship that any real strength and development can truly occur. Some other more recent concepts is the development of relationship constellations or developmental networks. According to Kram (1985) and Higgins and Kram (2001) it is a set of people a mentee or protégé uses and refers to, that will assist them in their education, along with the facilitation and development of their professional career path. The advantage of these constellations is that the mentee-protégé is able to broaden their perspectives because the set of people provide them with multiple viewpoints for contrast and comparison. It is similar to a Doctoral dissertation committee where many eyes are always better than a single pair. This concept might also be described as multiple mentoring, and is supported in concept and theory by Morgan, Neal and Carder (1997).

### **The Student Development Vector Model**

Chickering (1969) who first proposed a student developmental vector model where a student's development was composed of multiple points of intersection or vectors including (a) achieving competence, (b) managing emotions, (c) becoming autonomous, (d) establishing identity, (e) experiencing freeing personal relationships, (f) clarifying purpose, and (g) developing integrity. What is interesting is that there has been little new research on how these vectors correlate with the principles of academic mentoring.

Transformational leadership within a mentoring context, as developed by Sosik and Godshalk (2004) is another attractive concept. The quest would be to investigate how several psychosocial activities including, (a) building trust by exhibiting idealized influence behaviors, (b) striving to develop followers through individualized consideration, (c) promoting protégés independence and critical thinking, and (d) inspirational motivation contribute to the transformation of the student-mentee-protégé into a fully transformed and newly inducted member of the professional stratum.

Lastly, with the introduction and growing acceptance of on-line education and distance-learning degrees and programs, one must not neglect the growing influence of e-Mentoring. Now that e-Mail is an everyday experience for most professionals, and certainly for academic students, as well as the professional social networking sites such as LinkedIn® and FaceBook® in the academic-professional repertoire, this form of mentoring may bloom and blossom.

Another concern is that most of the current and recent studies utilize self-reporting questionnaires post-mentoring for evaluative reviews. Very little or none is

being done in parallel with ongoing mentoring of active dyads in academic settings. As noted in Schlosser and Gelso (2001) studies should be undertaken, which are both multi-methodical and longer in duration. Researchers must also close ranks on more precise definitions and any esoteric constructs should have the same meaning in all new studies. This should result in less idiosyncratic analyses and understandings. There may also be some advantage in expanding beyond the mentor-protégé dyad itself for additional insight and perspective. Other members of academic faculty and advisors will review the process objectively thus eliminating or reducing bias.

While mentorships are often perceived as central to a student's progress and experience they have not been consistent to the practice of academia. More faculty need to become involved. As noted by Young and Perrewé (2000b), only as more data is collected from a variety of disciplines and nodes, will one be able to more completely understand the academic mentoring process. All must be mindful and reminded by Schlosser et al. (2003) that this data will also need to be viewed as context-specific. A good example of this was discovered by Clark et al. (2000), who "found that clinical psychologists from traditional PhD programs were significantly more likely to be mentored than graduates of practitioner (PsyD) programs."

Some other interesting approaches might be patterned in a similar vein after Zuckerman (1977) who studied the relationships that developed between eminent scientists (Nobel Prize winners) and their students (protégés). One should also look more to considered qualitative studies than quantitative, or utilizing mixed-method approaches. The advantage of this is less emphasis on statistics and more importance on the actual

words, feelings and perceptions of the protégé, as in Hill, Thompson and Williams (1997).

A final suggestion would be to consider more variables such as age, race, gender, rank, experience in the mentor or protégé role, relationship duration, where mentoring is formal or informal (naturally occurring), status of tenure or mentor, size and type of the academic institution and number of previous protégé dyads that the mentor has had. Overall, the field of academic mentoring is both youthful, rich, exciting and filled with the possibility of increasing exuberance and new findings if approached from the proper and professional guidelines.

### **Naturally Occurring Student-Faculty Mentoring**

As previously noted the largest concerns about academic (student-faculty) mentoring pertains that most prior research is too limited in population, and that as Merriam (1983, p. 169) observed, “no distinct line of research can be traced with respect to mentoring in academic settings.” Over the subsequent 30+ years since Merriam, considerable progress has been made. It may now be possible to more clearly investigate the role of informal (naturally occurring) academic mentoring with greater clarity and sense of direction.

To that end, Mullen (2010, p. 119) proposed new work should and could be completed within seven foci. These were, (a) clarification of informal mentoring, (b) benefits and drawbacks of spontaneous relationships, (c) personality characteristics of mentor and protégé, (d) functions of mentoring, (e) frameworks of informal mentoring phases, (f) formation, development, and termination, and (g) new types of mentoring

relationships. While this study has considered the benefits, diversity and best practices in academic mentoring, it is important to first create a solid-footing to build upon.

Informal academic mentoring has been described by Johnson (2002), Mullen (2005) as both spontaneous, gradual, unmanaged, non-structured, and not officially sanctioned by the college or university. Formal academic mentorships are not merely the opposite of these terms but are also more one-on-one in nature within cohorts led by qualified mentors. They are often arranged and setup by the academic department or academic chairs. Protégé satisfaction seems to be greater with informal mentoring according to Johnson and Ridley (2004) because these relationships are not forced, required, or coerced and this allows for mutual trust to develop between the mentor and the protégé.

According to Dickinson and Johnson (2000) 87% of academic mentorships in graduate psychology are informal. On the negative side, Bigelow and Johnson (2001) reported that 50% of graduate students did not receive any mentoring, and Clark et al. (2000) stated that many Doctoral graduates claimed that they wished that mentoring was a part of their professional preparation. Nyquist and Woodford (2000) conveyed that in their large U.S. study, 375 Doctoral students told of ineffectual or non-existent mentoring from their dissertation chairs.

All of these instances renewed a call by Johnson (2002) and Johnson and Huwe (2003) for academic professors and students to include mentorships as part of the graduate academic process. This would require some additional training by prospective academic mentors and protégés alike. This includes protégés to “communicate clearly,

work hard, demonstrate loyalty and accept new challenges” according to Johnson (2002, p. 92). It would require that academic mentors possess “ethical behavior, emotional balance, intentional role modeling, kindness, and competence as well as scholastic and professional recognition,” as recommended by Johnson (2002).

It is also interesting the protégés with certain personality types are also more likely to seek out academic mentoring than others. It requires protégés to be more outgoing (i.e., extroverted) because formal academic mentoring may not be considered a normal function of academic rigor. Added to this that many professors tend to be introverted, preferring instead the academic creature comforts of their academic offices, books, reading and research. Many professors, especially in graduate work use teaching assistants (TAs) to assist or to largely work directly with undergraduates, while they focus on mentoring Doctoral students. All of this seems to indicate that academic mentoring may be harder to obtain, and less proscribed to tenured faculty.

Kram (1985) who brought renewed attention to academic mentoring, and who proposed two major functions within it’s scope, (a) career-related and (b) psychosocial. Later in Johnson (2002), a third function was added of (c) transmission of applied professional ethics. Kram’s career relation functions to Mullen, (2010, p. 122) included “sponsorship, exposure, visibility, protection, and challenging work assignments.” The psychosocial functions were listed by Clark et al. (2000) as “role modeling, acceptance and confirmation, counseling and friendship.” Friendship according to Gallimore, Tharp, and John-Steiner (1992), has been found to be “essential.” Bean, Readence, Barone and Sylvester (2004, p. 374) mentioned one academic mentor named “Kathy,” who sought

her protégés to develop “a comfortable relationship where [my protégés] can come and talk to me, but [not one where] we hang out all the time.” Academic mentors may also help their graduate students navigate the tricky political landscape of collegiate academia, and to guide them in getting published, known, and accepted within their respective professional groups through peer-recognition.

However, Kram (1985) is perhaps best known for isolating four redundant and coinciding phases of mentoring: (a) initiation, (b) cultivation, (c) separation and (d) redefinition. Academic mentoring researchers regularly use and refer to Kram’s work and use it as a base reference point for their research and study. Another prominent work was O’Neil and Wrightsman (2001) that further enhanced Kram with six stages of interaction including, (a) making a critical decision and entering a relationship, (b) building mutual trust, (c) taking risks, (d) teaching skills, (e) learning professional standards, and (f) dissolving or changing the relationship. Johnson and Ridley (2004) that also corroborated Kram’s model within graduate school settings. Academic mentoring is not equal to scholastic advising. While there is a close similarity, the role of being an academic advisor is more akin to the traditional role of assisting students in completing courses for an academic major and fulfilling requirements for graduation.

Academic mentoring is far greater in depth, breadth and scope because one of its key goals is in taking the academic mentee-protégé and merging their course learning with something like an internship. The academic mentor guides the mentee-protégé through the final stages of adult learning as in Levinson et al. (1978) and preparing them for employment and work opportunities. By taking their protégés under their wings the

academic mentor teaches their “eaglets to fly on their own.” Once launched, they have left the safety and security of the nest to establish themselves in their own right.

Understanding this key differential in the role of function within academic mentorships is important. Some mentorships are within deeper functional roles such as developing correlations in the fields of feminism or social justice. As these obstacles are overcome, advanced learning occurs. As an example, Johnson, Bailey and Cervero (2004, p. 7) demonstrated an interesting interchange between a “black (*sic*) woman associate professor” and her “European-American male professor” with whom she took a Doctoral class. The final result of this exchange of ideas and discourse according to Mullen (2010, p.124), was “they produced a narrative of inquiry on their topic of mentoring relationship, concluding that cultural mores will need to change if new possibilities for mentoring across cross-racial lines is to be realized.”

One of the more interesting aspects of academic mentoring is the process of formation, development and cessation of the mentorship. Another stimulating and interesting aspect in academic mentorships is the rise in use of cohorts, support groups, multiple mentoring and co-mentoring by multiple mentors. Mentee-protégés gain in these concepts the advantage of having more than one mentor. Also, teams of mentee’s in common can be helpful to develop and work with and to “bounce” ideas to and from one another in a safe and non-threatening academic environment. This concept allows the mentee-protégé to gain confidence in themselves, and to create a secure footing in their professional spheres before attempting to float new entrepreneurial businesses or other concepts.

Because the examination of the theory and concepts that form the underpinning of academic mentoring, one cannot concretely establish the entire value that undergraduate, graduate and Doctoral academic mentoring provides. However, Doctoral situations can determine with more certainty the yearning for more wide-ranging relationships with their Doctoral professors, dissertation chairs and committee members. This is not entirely unexpected because Doctoral students have reached the pinnacle of their academic studies, and by their class and temperament seek out knowledge on an advanced level.

If there is one recommendation to make it would have to be that more colleges and universities require formal academic mentoring as part of the formal educational process, especially at the Doctoral level. While naturally occurring or informal mentorships are certainly acceptable, and better than nothing at all, formal and required academic mentoring most likely would result in better outcomes for all students. Faculty would need to be more proactive and engaged, and departmental budgets would need some adjustment to accommodate this, but the rewards would far outweigh the cost.

### **Benefits in Student-Faculty Mentoring**

There are clear benefits in the student-faculty relationship. This becomes important because in many situations this is where mentoring begins.

It was discovered that formal academic mentoring programs were becoming more prevalent. Graduate programs have some sort of faculty mentor system in, which students can obtain advice, counseling, and helpful direction in their training... Good mentoring represents one of the important factors in graduate

training, fosters long-term competence, and promotes effectiveness for both scientists and professionals. (Ellis, 1992, p. 575)

Scandura and Pellegrini (2010, 71, 86) state that mentoring in business organizations is “flourishing.” This endorses the need for mentoring at the academic levels because of the formative nature of mentoring at the early career level of the young adult. Successful mentoring on the formal academic level precedes and prepares the mentee-protégé for mentoring in the workplace. One must also be careful, as previously noted, to determine the vital difference between academic advising and mentoring. In the same year, Johnson wrote that

when an advisor-advisee relationship evolves into a more connected, active, and reciprocal relationship and when the advisor begins to offer a range of both career enhancing and emotional or psycho-social functions, the advising relationship has become a mentorship. (Johnson, 2010, 190-191)

Academic mentoring rates range from 33% to 100% depending upon the college or university, graduate level (Master’s vs. Doctoral), and academic major or discipline. As early as Kirchner (1969), it was reported that 50% of Pennsylvania State University graduate psychology students reported having a mentoring relationship. The single largest study was one that was conducted by Clark, Harden and Johnson (2000) where ( $N = 787$ ) of students were polled. Of the 79% reporting back, 66% reported having a mentor, with 71% for PhD students and 56% for PsyD students. This was confirmed by Fallow and Johnson (2000) in a later study ( $N = 658$ ) with 54% of PsyD students reporting having an academic mentor. Among ethnic minority students, research by

Atkinson, Neville and Casas (1991) and where ( $N = 101$ ), 73% were mentored. Another study by Smith and Davidson (1992) where ( $N = 182$ ) of African American graduate students discovered that only 33% of them were mentored and Dixon-Reeves (2003) found in their small study ( $N = 34$ ) that 97% of students reported being mentored.

When one focuses attention on undergraduate students, the situation is more dire. Jacobi (1991) who reported that 67% of undergraduates had difficulty in finding an academic mentor. Baker, Hocesvar and Johnson (2003) discovered that at the United States Naval Academy 47% of midshipmen reported having a mentor, although in many cases the mentor was an upperclassman, and not an academic professor.

School psychologists defined academic mentorship as an outgrowth of academic advising and development towards reciprocal, collegial and interconnected instruction according to Swerdlik and Bardon (1988). There was a tendency within academic mentoring to be seen as a means-to-an-end for letters of recommendation, advice on careers, and critiques of work rather than emotional support according to Dixon-Reeves (2003). It was this emotional support and an increased need for psychosocial purposes, that Tenenbaum, Crosby and Gliner (2001) demonstrated increased satisfaction in mentorships. On the contrary, Johnson and Nelson (1999) stated that, “owing to the hierarchical nature of academic mentorships, friendship, personal counseling, and genuine collegiality may be seen as inappropriate or ethically troubling.”

Another positive impact of undergraduate academic mentoring is that freshman students who had more personal contact with professors (not necessarily mentorships) were increasingly likely to return for their sophomore years. In Campbell and Campbell

(1997) it was found of 339 students assigned to mentors, and another 339 who were not (and who served as the control group), that GPAs were higher (2.45 vs. 2.29), more credits were completed per semester (9.33 vs. 8.49) and attrition was lower (14.5% vs. 26.3%). This should be an encouragement to college administrators because the four-year college mean drop-out rate of students approaches 50%. Thus many of those who begin college do not complete it, which is also true of Doctoral programs where non-completion ranges are between 40% to 60%. This factor alone should validate that academic mentorships can be and should be proactive in nature, and that more universities should incorporate formal mentoring as part of graduation requirements.

It was demonstrated by Hollingsworth and Fassinger (2002) that mentored protégés presented more papers at conferences, published articles and book chapters, and secured pre-Doctoral grant funding. Two studies by Dohm and Cummings (2002, 2003) accurately predicted that graduate school protégés would continue in scholarly research following graduation. Mentored students also reported in Smith and Davidson (1992) that protégés were more likely to teach, conduct research and perform more grant based writing than non-mentored students. Academic protégés also reported feeling “more connected” in Atkinson, Neville, and Casas (1991), Clark, Harden, and Johnson (2000), Dixon-Reeves (2003), and Tenenbaum, Crosby, and Gliner (2001) and as well as being more “engaged” with their peers and other professors.

Not surprisingly, it was verified by Sanders and Wong (1985) that academic mentored students of an “eminent mentor” increases the likelihood of securing initial and succeeding teaching jobs in the Academe. Johnson and Huwe (2003), concluded that

academic protégés were more likely to share in their mentor's "identity" and showed more professional confidence and that graduate students in psychology were more likely to hold to the same psychotherapy acclimations of their mentors.

Three other direct benefits of academic mentoring are a greater association with career eminence, a greater satisfaction of academic programs and academic institutions. Regarding career eminence, Zuckerman (1977) studied U.S. Nobel laureates through 1972, and discovered that more than 50% of them had been mentored under older and previous Nobel Laureates. Clark et al. (2000) found that mentored graduates were much more satisfied with their Doctoral programs. Another conclusion of Baker, Hocevar, and Johnson (2003) study of 500 U.S. Naval Academy students was a positive correlation existed between being mentored and satisfaction with the Naval Academy. Finally, Liang, Tracy, Taylor and Williams (2002) in a population ( $N = 296$ ) of undergraduate women, who had at least one mentorship, had greater levels of self-worth, and less feelings of isolation.

### **Benefits of Academic Mentoring to Mentors**

It must not be forgotten to mention the benefits of academic mentoring to the mentors, and to the colleges and university where mentoring took place. Current and future research must also consider any differences in the benefits (or drawbacks) to formal and informal mentorships, and what role (if any) that gender, race, aptitude, mentor neglect, mentor incompetence or other negative mentoring experiences may contribute. Does academic mentoring have direct or residual benefits for the academic mentor? While first-hand and observed results are almost entirely absent, there has been a

sense that there are indeed benefits for the mentor. Busch (1985) who engaged a study of 537 education professors, which asked them about their personal aftereffects of academic mentoring they had engaged in. Among the positive results were (a) a sense of excitement and fulfillment in the continued personal and professional development of the mentee, (b) the benefit of being on the frontier of new academic research, (c) and the satisfaction of the mentoring relationship in its own right.

As for a student's electing you as an advisor, acceptance is even more serious.

This academic relationship is one of the most important in your professional life.

You will find yourself spending almost as much time on your student's research

as on your own. Your efforts constitute the legacy you confer in terms of your

ethical and scientific values, and the student constitutes your legacy in the future.

(Rheingold, 1994, p. 29)

What one really wanted to ascertain is how Rheingold (1994) is using and defining the term "advisor." It appears that he wanted to say or at the very least deeply inferred "mentorship" in this passage, and may be looking at the terms as being more synonymous than others. It could also be interpreted that it leans more towards the latter because the passage mentions an academic relationship and spending time and conferring and receiving a legacy and not merely the selection of courses towards fulfilling degree or program requirements on an occasional basis.

In Campbell and Campbell (1997) it was discovered that academic institutions benefited from academic mentoring by increases academic success of its students and lower attrition rates. Students who had a strong and positive role-model in mentoring had

superior professional abilities, had greater success in post-graduate writing and publishing offers (e.g., “publish or perish”), which enhanced the institutions prestige. Those who were mentored also found themselves more willing to mentor others, and a positive redundant and self-reinforcing upward and repetitive cycle was created. Good mentoring led to more good mentoring, which led to even more good mentoring. With each reiteration, the academic institution received new benefits.

A problem within academic institutions is that faculty time constraints and financial budget pressures are squeezed and prevents many students who desire to be mentored from being mentored. New processes and techniques such as team mentoring or e-Mentoring have been utilized to overcome this inequality. Using a cohort model for team mentoring seems promising. In particular Mullen (2003) developed a Writers in Training (WIT) cohort of 25 Doctoral students, and Hughes et al. (1993) instigated a Research Vertical Team (RVT), and finally Ward, Johnson, and Campbell (2005) encompassed an expanded Practitioner Research Vertical Team (PRVT) for clinical psychology Doctoral students. The key advantage in these methods is that it merged peer mentoring into the mix, which also allowed full-time faculty to be made available to more student mentorships.

Team coaching (mentoring) has recently been seen a resurgence in the last few years. Thornton's Book, *Group and team coaching: The essential guide*, Thornton, (2011) and Hawkins book, *Leadership team coaching: Developing collective transformational leaders*, Hawkins (2014) are two examples.

It appears that most academic mentoring begins informally and then may transition into something more formalized. Formalized mentoring is also more targeted towards ethnic minority programs as seen by Thile and Matt (1995). One of the factors that repeats itself in regard to academic mentoring, and especially formal mentorships, surrounds methodological issues and as previously noted, a more precise and surgical definition of it and the various aspects of it. It was at first thought that female students would have more problems in securing mentoring as in Bogat and Redner (1985). Clark et al. (2000), Dohm and Cummings (2002, 2003), Tenenbaum et al. (2001) all disproved this hypothesis. Baker et al. (2003) revealed that women at a United States military-service academy were more likely to be mentored than their male counterparts. This is not entirely unexpected because as women were being admitted to the various military-service academies, it may have been felt that they would need or even require mentorships as they made transitions into what had been a traditional male enclave.

When one considers racial factors, because minorities are traditionally “under represented” in collegiate settings, one would expect there to be less mentoring of ethnic minorities. However, when represented as a percentage of total student populations Clark et al. (2000), Johnson et al. (2001), Smith and Davidson (1992) determined it was equal. Atkinson, Neville, and Casas (1991) had discovered it exceeded majority group demographics. Perhaps this is due to a societal need or expectation to help minority students “catch-up” to non-minority students and mentorships was one method in this attempt. It seems clear according to Young and Perrewé (2000b), that well-known professors who are seen as being pre-eminent in their fields of study prefer to engage in

mentorships with protégés who have the best aptitude, strong commitment to the academic program(s), a robust, clear-cut, and fervent attentiveness to the mentor's field of study or subspecialties, and workethic. They must also be committed, organized and responsive to feedback.

### **Adverse Results in Academic Mentoring**

One must also reflect on the adverse results in academic mentoring. As with any relationship, conflicts, disagreements, varying points-of-view, and psychological distress and dysfunction will occasionally arise. When a mentee receives feedback from their mentor the question arises, as in employment reviews, to what extent does the mentee challenge or dispute it? There is a danger of being too quiet and submissive (the mentee just sits there and is fearful to engage their mentor) or is the mentee aggressive or overly assertive towards their mentor (does the mentor expect and desire the mentee to challenge) any preconceived assumptions or beliefs. One of the reasons that these type of situations may arise is that the mentor may lose power or prestige in the process or some type of psychological variant is at work. One must also take into consideration that both the mentee and the mentor may privately attribute the negative outcome to the other member(s) in the dyad. Mentees may feel the the mentor did not fully engage or assist the mentee, and the mentor may question if the mentee truly tried to work with them or simply "gave up." Unless a neutral third party is involved in the evaluation processes one may not be able to completely determine the real dynamics involved. This does not preclude hard evidence of mentor neglect where the mentorship never fully matures. Levinson et al. (1978) commented,

Our system of higher education, though officially committed to fostering intellectual and personal development of students, provides mentoring that is generally limited in quantity and poor in quality. Added to this is the possibility of mentor ineffectiveness and ineptitude. Mentors need specific education and training on becoming an effective mentor. Not every professor has the skills, I am convinced that the success of graduate education depends on a student-faculty relationship based on integrity, trust, and support. Levinson et al. (1978), p. 334)

Instead according to Johnson and Huwe (2002), there may be inflexibility, self-centeredness, partiality and discrimination, and professional detachment and withdrawal. What is deeply troubling is mentor disengagement because it may be a causal factor in a protégé (e.g., academic student) not completing degree requirements or a graduate program.

Cameron and Blackburn (1981) who coined the term “cloning” as it applied to mentorships where mentors showed more interest in protégés who followed a similar career path to their own. Unethical comportment was also present from time to time. About 5% of mentors took credit for protégés research and work, and 2-3% sexualized the mentorship according to Johnson (2003), while 4% reported that the mentor was seductive according to Clark et al. (2000). It was suggested the best steps to undertake in academic mentoring:

1. Evaluate the benefits of mentoring in academe that would be facilitated by greater use of longitudinal, versus retrospective cross-sectional, designs.

2. At present, student-faculty mentorship outcomes are confounded by lack of control for pre-relational protégé characteristics. It is essential that researchers begin collecting data on variables such as protégé achievement, motivation, personality, prior mentoring experience, number of current mentorships, and aptitude.
3. Although the distinction between formal and informal mentorship formation is substantial in organizational settings...it is rarely, if ever mentioned in academic settings.
4. It would be useful for researchers to begin focusing on aspects and qualities of the mentoring relationship itself instead of assuming that mentorships share the same qualities and produce equivalent results.
5. It is recommended that researchers evaluate and compare mentorship experiences and outcomes at specific phases of mentor relationship development. (Johnson, 2010, p. 206)

Overall, there is some evidence that mentorships may assist or even enhance academic achievements including greater productivity, peer networking opportunities, and first post-graduate employer accomplishments. There is also greater evidence that mentee aptitude plays a greater role in academic mentoring than race or gender. To verify this will require (a) closer attention of pre-mentorship protégé characteristics, (b) more precise work with both formal and informal academic mentoring, (c) a larger cross section of colleges and universities, and (d) the academic majors of protégés. It will also be necessary to agree on better definitions of academic mentoring and how academic

mentoring both aligns and varies with other forms of mentoring and the role it plays as a bridge from youth or adolescent mentoring and mentoring in the workplace.

### **Diversity in Student-Faculty Mentoring**

When one considers the term “diversity” what comes to mind are the typical concepts of race, gender, age, sexual-orientation, etc. Diversity in academic mentoring certainly includes all of these, but one must expand the concept to include the differences and similarities of undergraduate and graduate and the role perceptions between academic advising and academic mentoring. Perhaps by having a clear-cut and well-defined understanding of diversity is the first order of business.

For the purposes of this section, the definition of a “traditional” mentee-protégé is understood to be a European-American, male, heterosexual, Judeo-Christian, middle-to-upper class individual. All “non-traditional” dyads will differ in one or more of these elements. The primary question under consideration is how do traditional protégés perform as compared to non-traditional protégés in the academic environment? Do they perform better or worse when paired with a mentor of the same background, or one where the differences between the mentor and the mentee are deliberate to test hypotheses? If there are disparities, are these differentiations a measurement of cognitive or non-cognitive variables? Cognitive is most often understood in terms of mental or intellectual prowess or their Intelligence Quotient (IQ) or Grade Point Average (GPA) that a mentee possesses and is normally understood as being a fixed or semi-fixed constant. A protégés (GPA) may rise or fall, but this is not due to the inborn characteristic of the mentee. Rather it is better to understand it as the complete application of the persons cognitive

functions when properly motivated and stimulated. A person is either “intelligent” or they are not. It is something innate within the person. Non-cognitive variables are relational, developmental and non-static in nature. They demonstrate growth and the ability to expand, evolve and change. They are progressive.

Because the cognitive function cannot truly change or be modified, academic mentoring focuses on the growth potential in the non-cognitive functions. It is research of Sedlacek, Benjamin, Schlosser, and Sheu, (2010, 262-267) that best delineates the non-cognitive variables. Suffice it to say, Sedlacek et al. (2010) provides a list of eight non-cognitive variables:

1. A percentage of total student populations Clark et al. (2000), Johnson et al. (2000), Smith and Davidson (1992) that determined it was equal. Positive self-concept: The mentee demonstrates confidence, strength of character, determination, and independence.
2. Realistic self-appraisal: The mentee recognizes and accepts any strengths and deficiencies, especially academic, and works hard at self-development. They recognize their need to broaden his/her individuality.
3. Understands and knows how to handle racism (the system): The mentee exhibits a realistic view of the system based upon personal experience of racism. They are committed to improving the existing system. They take an assertive approach to dealing with existing wrongs, but is not hostile to society, nor is it a “cop-out.” They are able to handle the racist system.

4. Prefers long-range to short-term or immediate needs: They are able to respond to deferred gratification, plan ahead, and set goals.
5. Availability of a strong support person: They seek and take advantage of a strong support network or has someone to turn to in a crisis or for encouragement.
6. Successful leadership experience: They demonstrate strong leadership in any area of his/her background (e.g., church, sports, noneducational groups, etc.)
7. Demonstrated community service: Participates and is involved in his/her community.
8. Knowledge acquired in or about a field: They acquire knowledge in a sustained and/or culturally related way in any field.

When these non-cognitive variables are utilized in conjunction with strong cognitive functions, the results can be significant. However, the final results may not appear in the earliest years of adulthood (undergraduate programs) because the mentee is still developing their knowledge base. It is not until graduate degrees or even post-graduate degrees are earned that the full and mature benefits appear, which interestingly enough aligns with Levinson et al. (1978) and his adult life-cycle theory.

### **Where Academic Mentoring Occurs**

Most academic mentoring therefore occurs at the graduate or Doctoral level because most graduate level programs are perceived by many, Sedlacek et al. (2010, p. 260), to be an “extension of the apprentice-master model of learning a trade.” One must also factor in that most academic mentors will be more interested in graduate-level

protégés because (a) the relationship will have greater duration, (b) upon completing their graduate degrees, those mentored will to some extent become the professional peers of their former mentors, and (c) graduate-level protégés are more mature, and approach the entire process of mentorships with greater cognitive skills and the ability to contribute to the process in a more comprehensive manner than undergraduate students.

It is not that undergraduate mentoring is not occurring. It is just that more mentoring is occurring on the graduate level. Undergraduate mentoring can gain insights from graduate mentoring models, however, on the undergraduate level, more student advising (e.g., it is both interpersonal and instructional based) occurs. While advising and mentoring are not the same, a good advisor-advisee relationship is quite similar to that found in the mentor-protégé association. In the mentoring affiliation the factors are psychosocial and increasingly career-related or career oriented. The reason this is true is that most people who complete graduate level degrees complete a Master's degree, and this degree attainment will be the one that most truly catapults the protégé's career. When Doctoral degrees are factored into the overall population sample, more mentoring occurs on this level than on the primary graduate (e.g., Master's degree) level, and this is especially so in many psychology, counseling, social work and other areas requiring significant clinical work before professional licenses are earned and issued. Some advanced knowledge and erudition can only be truly completed when one is professionally mentored because book-learning is limited. A hands-on or mentoring internship or residency (as with medical doctors) is used to perfect and satisfy the disparity from books to actual practice and procedure.

Diversity issues in academic mentorships become essential according to Sedlacek et al. (2010, p. 267), and should be a central and cohesive concept because (a) the non-traditional student has been historically under represented in academia, and (b) students of color represent a small, but growing number of new Doctorates in psychology, as verified by Kohout and Wicherski (2003). However,

if this trend holds true for other disciplines, then it appears critical for all academics to know how mentoring relationships with nontraditional students differ from those relationships with a traditional student, as well as knowing how to mentor nontraditional and traditional students with equal effectiveness.

(Sedlacek et al. 2010, p. 267)

This initial questionnaire should not be interpreted that gender, race or ethnicity issues are not present in academic mentoring. However, it seems according to Clark et al. (2000) that gender differences were amazingly nonexistent. This does not mean that one gender had any distinctive or peculiar advantage over another. Generally speaking, women may gain more from mentorships than men because sometimes women face issues like sexual harassment more than men. Learning through academic mentoring how to overcome this issue may have a central role in their first post-academic employment opportunities.

When one turns to racial discrimination or ethnic disparities the impact is more clear. African-American's and Asian-American's face additional barriers in securing mentoring such as, (a) reduced number of same-race faculty mentors, (b) overcoming variance in value systems when mentoring take place in mixed-race dyads, (c) failing to

consider the actual value of mentoring, and (d) a sense of fait accompli or hesitation to engage in cross-race or cross-cultural mentorships. This final factor is also impacted by faculty of the same racial background from receiving more requests for mentoring by students of their own race than they can possibly process and then mentor successfully. Thus, students may be forced to enter mixed-race models or face the possibility of never receiving any mentoring whatsoever. It would seem to me that some mentoring is better than none at all? Of course, this would depend upon the mentor and how well trained and sensitive to demographic issues they are. Members of academic mentoring dyads have mutuality in one or more perspectives that helps break down resistance and build collegiality. These affinities, according to Olian, Carroll, Giannantonio and Feren (1988), normally follow gender, race, ideals or some other characteristic. This reduces the need for preliminary groundwork to be completed before the formal mentoring process begins.

The dilemma that faces African-American students is that, according to National Center for Education Statistics in 2003 there were only 1.6 African-American faculty for every 100 African-American students. It becomes very clear that most African-American students will be wait-listed for a same race mentor. To secure an African-American female faculty mentor for African-American female students was even more tenuous. The use of African-American cohort or e-Mentoring is one area that may help reduce the gravity and strain in this regard.

Another methodology would be to train European-American faculty mentors to be more racially sensitive in working with ethnic minority students in cross-race dyads. Because mentorships work best within a collegial framework the use of racial quotas in

mentorships would probably fail, although limited research as in Johnson-Bailey and Cervero (2002) is often cited. When one turns their attention on Asian-Americans, as an ethnic minority, according to U.S. Census Bureau in 2004, 49.8% hold a Bachelor's degree, which is the highest when compared with other racial groups. What is interesting to note is that Sedlacek, Benjamin, Schlosser and Sheu (2010, p. 273) believed Asian-American students would benefit from mentoring and would assist them to develop cultural identity.

Another aspect kindred to Asian-American students was they were collectivist in their cultures (the needs of the many or the group were more important) as compared to the individualism present in the Western culture (where the needs of the one was more important than the group), according to Kim, Triandis, Kagitcibasi, Choi and Yoon (1994). Sedlacek, Benjamin, Schlosser and Sheu (2010, p. 274) also mentioned another aspect found in the Eastern culture was "deference to their elders." Asian-American protégés proscribed this value to their mentors. On the adverse side, Asian-Americans as a group tended not to discuss "personal problems" unknown to their groups, notably to outsiders as noted again by Sedlacek, Benjamin, Schlosser and Sheu (2010, p. 274). This requires cross-race and cross-ethnic mentors to become accepted into the group mentality of Asian-Americans if the cultural gap is to be bridged.

The central question is whether or not future research must consider separate research studies on mentoring with racial or ethnic minorities, or has this become a "dry well." This may be useful, but only when compared and contrasted with mainstream studies of academic mentoring and then making judicious and prudent applications to the

others. As Sedlaceck et al. (2010) isolated multiple non-cognitive variables, I wanted to be able to extract from them the precision and focus for additional research in the future that will advance all groups, race, gender and ethnic minorities in the advancement of academic mentoring.

### **Best Practices in Academic Mentoring**

The good news, according to Campbell (2010, p. 325) is that “mentoring has become so popular that virtually all universities provide mentoring for undergraduate and graduate students.” This progress is encouraging in spite of the problems that continue to plague mentoring. Chief among these difficulties is the (a) lack of a common core definition, (b) clearly differentiating between student advising and student mentoring, (c) attempting to meet the deep-seated needed of cross-race protégés, and (d) finding enough minority faculty as qualified mentors.

Some of the new concepts in academic mentoring that may bring some relief is the use of (a) cohort mentoring, (b) targeted mentoring, and (c) e-Mentoring. Targeted mentoring holds real promise. The groups and hopeful outcomes of targeted mentoring would include undergraduate freshman with the goal of increasing student retention and reducing drop-out rates. Another targeted group would be ethnic minority and female groups with the hope that more African-American and Asian-Americans would have access to same-race mentors, and eventually those mentored would become future mentors of others.

With gender-based targets in mind, women would be encouraged to find other female mentors who have successfully managed the transition from academia to the

workplace and are climbing the corporate ladder and breaking through the “glass” and “concrete” ceilings, “C-level” positions and corporate boardrooms. Lastly, a third group for targeted mentoring could be those in specific academic disciplines or majors or those preparing for highly specialized academic outcomes.

Other best practices that Campbell (2010, 333-341) offered is that formal mentoring should be intentional. Faculty mentors be recruited and selected on the basis of their personality for mentoring (e.g., not extreme, inflexible introverts), and that they should have reduced class loads or extra compensation tied to successful mentoring outcomes. Another good practice is matching of mentors and protégés by race, gender, ethnicity whenever possible. This also includes their academic disciplines and subspecialties. These academic mentors should also receive advanced training in the discipline of mentoring itself. While most have heard of mentoring as a practice, and most believe they are or could be good mentors, the best mentors are those who have received specialized training in this regard. The length or term of mentorships also needs to be clearly delineated. Most academic mentorships will reach their natural terminal points upon a protégés graduation. While some protégés will maintain contact with their former mentors, it is more likely to advance to a stage of greater collegiality and peer relationship as the years roll on. Some mentorships will be transformed into lifelong friendships.

### **Frequency of Mentoring Contacts**

The frequency of meetings with mentors should be clearly stated and adhered to. The best mentoring programs will be those that are formal and structured, require

planning, institutional support, funding, and recruitment of faculty. When difficulties or issues are recognized, the best mentoring programs will quickly address them and implement appropriate methodologies to overcome them. With youth, adolescent and academic mentoring as a foundation, a transition in this research to the organizational workplace is appropriate. Additional variables or requirements will be helpful to complete the most thorough understanding of the cyclical progression towards adult maturity and professional competence. Only then can anyone with some expertise engage in the new research proposed in this study. To summarize, academic mentoring includes the following aspects.

1. It is the relationship between the student (protégé) and the professor that should be seen as the key and critical part of the intellectual development of the student.
2. This tutor-mentor relationship with the protégé imparts “knowledge, provides support, and offers guidance on academic classroom performance, academic skill-building as well as nonacademic personal problems, identity issues” according to Chickering (1969), as well as assisted the protégé with ethical issues.
3. Many academicians use different terminology to define mentoring and mentorships that range from formal one-on-one mentoring to academic counseling and advising.
4. Researchers must also close ranks on more precise definitions and any esoteric constructs should have the same meaning in all new studies.

5. Outcomes vary from mentor to mentor and protégé to protégé because of many factors that arise between the dyads that simply does not allow for solid one-size fits-all parameters.
6. As noted in Schlosser and Gelso (2001) studies should be undertaken, which, is both multi-methodical and longer in duration.
7. Another positive impact of undergraduate academic mentoring is that freshman students who had more personal contact with professors (not necessarily mentorships) were increasingly likely to return for their sophomore years.
8. When one considers racial factors, because minorities are traditionally under represented in collegiate settings, one would expect there to be less mentoring of ethnic minorities. However, when represented as
9. Not every professor has the skills, personality, and temperament to perform high-quality mentoring. Instead according to Johnson and Huwe (2002), there may be inflexibility, self-centeredness, partiality and discrimination, and professional detachment and withdrawal.
10. African-American's and Asian-American's protégés face additional barriers in securing mentoring such as, (1) reduced number of same-race faculty mentors, (2) overcoming variance in value systems when mentoring take place in mixed-race dyads, (3) failing to consider the actual value of mentoring, and (4) a sense of *fait accompli* or hesitation to engage in cross-race or cross-cultural mentorships.

11. When difficulties or issues are recognized, the best mentoring programs will quickly address them and implement appropriate methodologies to overcome them.

Another interesting aspect of mentoring is what happens when a previous mentor passes away. According to Sullivan (2014), “missing from these models is a final stage – when mentors pass. This narrative discusses the evolution of mentoring relationships over time, and the impact and reaction to this loss of mentors.”

### **Literature Review of Workplace Mentoring – The History**

This literature review now turns to the literature in the field that specifically addresses workplace mentoring. The goal is to ascertain where differences in the approach or modes differ from academic mentoring. It will be shown that both academic and workplace mentoring provides a solid footing for CSM to develop and occur. Without these foundations in place, CSM might end up wandering in the desert, or chasing mirages for an undetermined length of time.

Allen and Eby (2010, p. 16) state that “Workplace mentoring involves a relationship between a less experienced individual (the protégé) and a more experienced person (the mentor), where the purpose is the personal and professional growth of protégé.” The mentor in this instance is usually a more seasoned or senior manager or professional within the business organization but normally (not always) in the protégés direct chain of command, who takes the protégé under their wings and exposes and trains them. The mentor lays open to them the intricate nature and finer points of the mentor’s sphere of experience and influence. Sometimes the mentor and the protégé share the same

chain of command but this is not highly recommended. In this manner the protégé does not experience the same level of trepidation or apprehension as when reporting to a direct superior. This allows for a more relaxed approach to the mentoring experience, which permits the protégé to be candid and outspoken.

Organizational mentors provided two key roles to their protégés according to Kram (1985). The first is career related support...that helps them learn how to navigate within the organization. The second includes mentor support such as sponsorship, exposure, visibility (psychosocial support that) helps protégés develop a sense of competence and identity as a professional. By allowing their protégés to tag along with the mentor in the organization, this also gives the protégé a higher sense of acceptability and recognition within the organization that enhances their professional development. This also provides the mentor with an elevated sense of status, because senior management deemed the mentor was someone that deserved, warranted or merited a protégé. A danger sometimes present is a sense of envy and jealousy on the part of others in the organization who also would like to mentor, but were not given that opportunity. Therefore mentors need to approach their mentoring from a greater aspect of humility and also as an opportunity for personal and professional growth.

Workplace mentoring is often seen as a very critical part of early career formation according to Noe, Greenberger, and Wang (2002). Many times, workplace mentoring develops informally and unexpectedly according to Dougherty, Turban and Haggard (2010). Yet, at other times business organizations formalize their mentoring programs to capitalize on the positive benefits of mentoring according to Finkelstein and Poteet

(2010). Eddy, Tannenbaum, Alliger, D'Abate, and Givens (2001) believed that formal mentorships tended to have contracted goals, a specific timeline, and offer guidelines on how often and in what context the mentor and protégé should meet. The downside to formal workplace mentoring programs is that according to Chao, Wale, and Gardner (1992) and Ragins and Cotton (1999). They appear to be less effective in promoting personal and career growth than spontaneously developed mentor-protégé relationships.

Irrespective of these issues, the primary goals of workplace mentoring is to assist the protégé in the transition from academia or a previous job and to integrate them into the new business organization, to introduce them to the “right” people, to add to their skill repertoires, and to provide them assistance in career objectives and in their management ascension. This process is more informally known as “grooming the individual.” This process is usually only done for selected candidates, whom current top level management has selected as being the future heirs apparent within the organization.

The entire process is one that merges the protégés personal drive, intellectual capacity, natural talent, academic achievement, political skills, and personal networking. Those who do this the best, are normally the ones who rise to the top like cream in a bottle of milk. These individuals are assertive, have a clear idea of their career goals and aspirations, and take the appropriate steps and develop action-plans to reach their objectives.

They can sometimes be viewed negatively by others who are passed over or passed by and they must be careful not to be overtly aggressive or boastful. Instead they have learned to build up and appropriately utilize others like childhood building blocks.

In doing so they are owed favors and assemble their own internal networks to keep strategic information flowing to them. They always try to assume personal control and advantage in all situations and will deftly employ various stratagem to their benefit behind the scenes, and then when the time comes will pounce like a lioness upon her prey. While this may sound unduly insensitive, ruthless, or callous, all business organizations only have one chief executive officer. The same can be true of any career advancement opportunity. While many may be considered, only one will be chosen. Many times subjective opinion outweighs objective fact or accomplishments.

To understand this entire process more completely, the research of workplace mentoring is an excellent source of materials. Most C-level and TMT members have had at least one mentor who has guided them through the labyrinth of the corporate maze. It is the wise and circumspective mentee-protégé who utilizes their time with their mentor(s) to gain insight and to improve opportunities, skills, and competence in their quest towards mastering their business acumen and becoming proficient and adept within the workplace environment.

### **Approaches and Methodological Issues in Workplace Mentoring**

In Levinson et al. (1978), *The Seasons of a Man's Life*, and the corresponding second volume Levinson (1996), *The Seasons of a Woman's Life*, are two of the primary texts that most scholarship cites. In these works, Levinson et al. (1978) and Levinson (1996) moves through the physical, mental, social, and psychological phases of a person's life cycle, which delineate the major adult development stages and periods and what the individual experiences in a "normative" essence of the word. The obvious portent for

mentoring is that the mentor must be sensitive to and psychosomatically cognizant of these phases with their protégés. A significant point is that in the later stages of adult life, mentoring in the previous years was formative in nature and shapes the present and future experience of the protégé. In later life, mentoring is more akin to being the wise sage who shares insights with their protégés. These experiences can be either negative or positive, and if negative may be reflected in cognitive differences and resistance (both perceived, actual and non-perceived) by the protégé. When resistance does appear, the mentor must assess if the root cause arises from the developmental stages of the protégés life, previous failed mentoring experiences, or personality differences. In some instances resistance will be reduced if psychological type as in Myers (1982) is taken into consideration. One must also consider race, gender, age, and other diversity factors. A more recent consideration of the effect of personality on career success was undertaken by Faqeer-Ul-Ummi, Javed, and Amjad. (2014). They stated,

The relationship between personality and career success was investigated in a questionnaire study with a sample of 200 doctors and educators, who were employed in different hospitals and universities on different organizational designations. Personality judged by the “Big Five Personality Model”. Career Success comprised of subjective (intrinsic) career success (financial success, life success, interpersonal success and job success) and objective (extrinsic) career success (salary and promotion) dimensions. In Pakistani society/culture people are unaware about their personality, so the research on personality and its impact on career success were unjustified and mostly insignificant. Meaning of success in

our society is to earn money and get competitive advantages as compared to colleagues. Personal life and interpersonal relationships have less worth in success counter. Research presents the insignificant impact of personality, person environment-fit and job performance on career success. With respect to limitations of the study, construct of personality like: education, knowledge and experience levels not included in research. (Faqeer-Ul-Ummi, Javed, and Amjad. (2014, Abstract).

In Levinson et al. (1978) the focus was on four periods in a man's life: (a) childhood and late adolescence to age 22 years old, (b) early adulthood from age 17-45 years old, (c) middle adulthood from age 40-65 years old, and (d) late adulthood from 60+ years old. One of the first and most apparent observations is the overlap in the life-cycle of five years between the periods. This is accounted for by the copious research that has been done, which at that time could not be given a more precise definition until more agreeable time frames could be agreed upon by social scientists. In other words, for some people early adulthood would begin earlier, as with late adulthood, or to put it another way, adolescence would end earlier for some than for others. The point was (and remains) that each male person could be different, but not necessarily so. In Levinson (1996, p. 16-18), the focus changed to a woman's life. The macro life-cycle continued and an underlying and corresponding sub-macro was attached with an (a) early adult transition from age 17-22 years old, and (b) entry life structure for early adulthood from age 22-28 years old, and (c) age 30 transition from age 28-32 years old, and (d) culminating life structure for early adulthood from age 33-40 years old, and (e) mid-life transition from 40-45 years

old, and (f) entry life structure for middle adulthood from age 45-50 years old, and (g) age 50 transition from age 50-55 years old, and (h) culminating life structure for middle adulthood from age 55-60 years old, and (i) late adult transition from age 60-65 years old. What made this so very important is that with women the earlier stages were largely devoted to the role of homemaker, which then transitioned and culminated into a career path in later periods of a woman's life. When her role as wife and mother morphed from an empty nest syndrome to a senior-manager and increasingly an executive, the transition was complete. This was not true of males who filled the more classic role of breadwinner and career advancement, which was seen as the normal path of development and ascendancy.

The significance for mentoring appears straightforward. The central question is to what affect did men and women who were mentored and groomed for advancement possess over those who were not? Did women who elected to forgo the traditional role of motherhood and homemaker have an equivalent opportunity for company advancement as men did? Johnson (2013) believes the answer to that issue is "no." It is highly doubtful for the time periods when Levinson et al. (1978) wrote. However, times have changed greatly since and one can observe a greater number of women in high-profile roles as demonstrated by U.S. Secretary of State Hillary Clinton, former CEO of HP Carly Fiorina, and Yahoo CEO, Marissa Mayer. However, these may be the exceptions and not the rule.

Levinson et al. (1978) who developed the first real present day awareness in mentoring. Levinson's theory of adult development stages or "life structure" that

eventually became better known as the Levinsonian Method and divided the stages of early adulthood (first of males and later of females), was that each person was according to Johnson, Rose and Schlosser (2010, p. 52) an “apprentice adult, facing several large tasks in his efforts to move from the world of childhood and its quandaries to life as a fully hatched adult.” To “hatch” according to Roberts and Newton (1987, p. 155) required that each person complete certain tasks including “(a) forming a dream, (b) forming a mentor relationship, (c) forming an occupation, and (d) forming an enduring love relationship.”

This obviously required mentoring to be an ongoing process in the individual's life from childhood-adolescence, academic and college, and finally the business organization and workplace. Because Levinson (1996, p. 18) developed a woman's life cycle (like males in his earlier work), it was lifelong in nature. It only reached final maturity in old age, as the individual prepared for the final decline of life and eventual death.

It must be noted that there are at least three times in a person's life when mentoring (formal or informal) occurs. This parallels Levinson et al. (1978) and at least three stages of the life cycle. The first stage or phase is during the formative years of childhood and adolescence. The second is in early adulthood (usually the time when career formation begins during undergraduate and graduate academia). The final is in mid-life or during later adulthood when many change careers or take on new business ventures. Just as in Levinson et al. (1978) phases of life, mentoring also occurs in (a) youth, pre-adolescence, and adolescent level, which is then normally succeeded by mentoring on an (b) academic level between students and professors, and then finally one can see the (c) workplace and career mentoring on the business organizational level.

During this final phase of mentoring, many people change the focus of their lives or begin new entrepreneurial ventures, or seek to become specialists in their fields, or pursue Doctoral academic degrees with the hope of becoming a mentor to future generations in order to complete their careers with a finalized sense of purpose, ego fulfillment, and wellbeing.

Because mentoring occurs in these three distinct phases, it would be unsound to consider mentoring from just one perspective. While this study intended to focus on the role of the CISO as mentor to their business organizations, mentoring does not occur in a vacuum and mentoring on the other two levels precedes and informs the final level. This earlier formative mentoring directly influenced the other stages because the mentoring experience will be viewed as either a negative, neutral, or a positive influence on the protégé. In other words, CISOs may have to overcome resistance to mentoring by their staffs, because in some instances the previous experience was so negative or even psychologically traumatizing (as in females who were sexually propositioned or assaulted by their previous mentor), that for them to engage in any new mentoring program is problematic.

### **Naturally Occurring Mentoring Relationships in Workplace Mentoring**

There seems to be a clear advantage with informal mentoring when compared to formal mentoring in the workplace. Informal mentoring allowed the mentoring dyad to form spontaneously and effortlessly with the mentor and the protégé self selecting each other almost by accident. The pairing can be initiated during workplace orientation, professional conferences, video chats, e-Mail or day-to-day contact. This is often

accompanied by some type of spark or intuitive sense that allows the two members to “click.” They usually discovered during this mentorship courtship period that they already had commonalities between them like gender, race, graduating from the same college or university, both having been raised in the same general locale, shared hobbies, interests or past academic research areas. The one area that they will not normally share in common is their age. Mentor’s most often are older and more experienced practitioners in their respective fields and the protégé is a younger, less-nuanced person who is seen possessing great potential and who demonstrates eagerness to learn, grow and develop.

The leading authority on workplace mentoring is most definitely Kram (1985) and she is the most often cited researcher in this specific mentoring field. Her study of 18 different relationships with 15 managers and 16 senior managers was and remains extremely influential in workplace mentoring. While Kram hesitated to use the term “mentoring” because of definition issues, a new term was developed describing developmental relationships at work. Over time most current research has become more comfortable with the term workplace mentoring than Kram ever did, which demonstrates the significant strides in this field of research since 1985. It should also be noted that workplace mentoring has become more accurate and precise because developmental relationships could be construed in so many different ways today in the field of social sciences, which is quite ironic.

Kram’s study had some interesting variables. There were no female mentors, so all female protégés were matched with male mentors. All of the protégés were relatively young in physical age (between the ages of 26 and 34) and certainly in terms of

chronological career development. Of the mentors, 10 of the 18 were at least one-level above the protégé in the organization, and were most likely the protégés direct supervisor, which is now frowned upon. Kram later defined primary mentoring as being a strong relationship of one protégé to one mentor, and secondary mentoring as that between a single protégé and multiple mentors, which was less concentrated or extreme.

Kram's study was qualitative in nature. She isolated two broad categories of developmental relationships at work, (a) career mentoring functions and (b) psychosocial functions. The first focused on assisting protégés on how to do things and how things got done in the business organization. It centered around the "who," "what," and "where" in the company that would lead to new assignments, and how protégés could and should position themselves for future advancement. The second dealt with the softer side of mentoring including "role-modeling, counseling, and friendship." The goal was to provide protégés with a safe environment for professional growth where the mentor was the "knight in the shining armor" who protected the mentee at the beginning of their career journey. A mentor may also pattern themselves after their mentor's morals, principles, mindset, approaches and mannerisms. What seems to bind the entire process is the development of camaraderie and familiarity where a genuine rapport is built between each of them. As the research continued, Ragins and McFarlin (1990) added two additional psychosocial functions of (a) parent and (b) social, and Scandura (1992) developed the concept of role-modeling beyond that of Kram.

After Kram had completed her research, Scandura (1992) examined the relationship between mentoring and career outcomes and career success. These studies

discovered that those who were mentored made more money and received promotions than those who did not. Other factors such as organizational justice, less job burnout, and a fairer sense of distribution of organizational power was also noted. All of these meant increased fulfillment and happiness of protégés with their careers. Interestingly, both women and men who were mentored had similar results from their mentorships, although not all mentors could deliver the higher rewards. This was caused by the simple fact that those who were mentored by more senior managers rather than junior managers had an open preference for their protégés during annual reviews and the more challenging work assignments, which led directly to greater job promotions within the company. In Dreher and Cox (1996) where mentoring relationships of MBA graduates was analyzed, “neither gender nor race was related to mentoring. European-American men were more likely to have a European-American male mentor than were females, African-American or Hispanics.” It became clear, according to Dougherty et al. (2010, p. 143), “that not all mentors are created equal” and suggests that there is value in examining mentoring relationships, rather than asking participants to report on mentoring received from unspecified sources.

As previously noted Kram’s four phases of mentoring as being (a) initiation, (b) cultivation, (c) separation and (d) redefinition. In addition, it is important to observe Allen (2004) that mentoring provides clear benefits such as career success and positive work attitudes. In this regard, a cost-benefit analysis must demonstrate that the benefits of workplace mentoring always exceed its costs, which Blau (1964) and Homans (1958) required in all social exchanges.

Some mentorships do not succeed. Mentors may invest time and energy into a protégé only to realize later that the poorly performing protégé had sapped the mentor's vitality levels, caused a degree of burn-out, which may reflect on the mentor negatively. The protégé may suffer if the mentor does not give good advice, or the mentor is demoted, or is viewed by his superiors unfavorably. It is therefore quite important that both the mentor and the mentee carefully examine both costs and benefits before entering the initiation phase, or at the very least place milestone markers throughout the process to determine if the mentoring relationship is valuable to all concerned and worth continuing.

At the very least mentors must be agreeable to offer mentoring. Having prior experience, according to Allen, Russell and Maetzke (1997) and Ragins and Scandura (1999), as either a mentor or as a protégé is an indicator for new or additional mentoring in the future. Mentor personality is sometimes another indication of a willingness to mentor others. Mentors also viewed mentoring as a means of ascendant motivation in business organizations. Those who engaged in mentoring others were viewed by senior management as making a vested interest in the future of the organization and was viewed positively. There were also personal altruistic reasons for engaging in mentoring others, which included personal satisfaction and a willingness to help others. While there does not seem to be a strong correlation between mentor age, education level, nor organizational rank, Wanberg, Welsh, and Hezlett (2003), felt that older mentors provide less psychosocial assistance. This should be contrasted with Allen and Eby (2004) where female mentors provided more psychosocial mentoring than male mentors.

In Dougherty et al. (2010, p. 151), the authors state “the evidence seems to suggest that protégé personality characteristics influence formation of a mentoring relationship as well as mentoring received in the relationship.” Of special interest was Bozionelos (2004) that examined the interrelationship of the “Big-5” personality characteristics and mentoring was “correlated positively with extroversion and openness.” Earlier in Godshalk and Sosik (2003), it was discovered that both mentor and protégé learning goal orientation were correlated with protégés’ reported career and psychosocial learning. A Hong Kong study conducted by Aryee, Lo and Kang (1999) found that extroversion, self-monitoring, and “Type A” behavior were related to the initiation of mentoring. A possible area for future research is additional study of other variables present in mentoring, most importantly in the areas of temperament, persona, requisites, drive and intentions.

Another area of inquiry related to the degree of mentor-protégé similarities and the amount and type of mentoring received. Kram (1985) who suggested that mentors seek out potential protégés who reminded them of themselves when they were younger. These and other variables such as gender and race have been classified as surface-level characteristics. While these may be used to form or initiate mentorships and reduce psychosocial barriers, as the mentor and the protégé learn more about each other as the relationship continues, these surface-level factors became of less importance. They are replaced with the real work of mentoring in career and skill development, which helped the protégé to gain professional competence. This was confirmed by Allen (2004) who theorized that mentoring was a two-step process consisting of the (a) initiation of the

relationship and (b) the receipt of mentoring. Overall, mentors sought out protégés who needed help, were motivated to learn (thus properly motivated), and had some innate or natural ability (personality alignment with the mentor), and the desire and capacity to succeed in the business organization. Protégés wanted mentors who were well respected, had specific or key knowledge and skills, and were able to transfer skills and knowledge to them during the relationship.

These naturally occurring mentorships, according to Kram (1985) either in one of two ways. It ended in either (a) functional or (b) dysfunctional separation. Formal mentorships had a built in mechanism or time-limit for the relationship termination. A functional separation takes place when both the mentor and the protégé agree the time has come for the protégé to move on to the next stage of their careers independently from the mentor. A dysfunctional separation was similar to a job termination. The mentoring relationship ended because of human ego and jealousy, over-dependence of the protégé on the mentor, some form of harassment, strong and unresolvable differences of opinion, a non-willingness of the protégé to listen to the mentor, or general incompetence on the part of either member of the dyad. Sometimes the mentor left the business organization for a new job and the protégé felt abandoned.

As one begins the transition to the benefits of workplace mentoring, it is important to mention under what factors or circumstances that mentoring could be invigorated and expanded. Most important is the need for open communication at all levels in the workplace, especially with managers and senior managers upon whom the bulk of mentorships will be done. Senior and executive management need to openly

encourage their managers and TMT's to the possibility of mentoring and provide potential mentors with both time, budget and other company resources to undertake it. In this manner, everyone in the business gains real benefits.

The development of junior personnel is a positive outcome for the workplace. Even if that protégé eventually leaves the company, they may bring new business back to their former employer and in many situations, as long as they leave on a functional basis, connections and bridges to the future have been built. Concurrently, the mentors themselves who do remain often become stronger managers and have a renewed interest in advancing themselves with additional learning opportunities. It is not unlike professional teachers or professors who often state something to the effect that they gained more from the teaching than their students did because they were exposed to new challenges by their students. These challenges forced new thinking and new thinking may stimulate new business concepts and opportunities that may have been previously overlooked.

### **Benefits in Workplace Mentoring**

Most research confirms the primary benefits of workplace mentoring to include better job promotion rates, increased income, and more job satisfaction by protégés. For mentors there is the sense of renewal and affirmation of being a mentor and the general perceptions of increased trust by senior management and ego satisfaction from their peers. While not trying to minimize these aspects, it must be noted that a real problem exists in these studies because as Ramaswami and Dreher (2010, p. 211) state, so many of them have relied on "self-reported field studies" and may not have used the best scientific

or empirical methods in making these determinations. Unfortunately it is quite difficult to conduct longitudinal studies in business organizations. Some of the problems encountered are corporate employee turnover. Many employees stay at current jobs less than three-five years as compared to seven-ten years in previous generations. The days of working for a single employer for 40 years seems to be a relic of the past. However, many people do “hunker down” during times of recession or job retraction and wait for better timing to make career moves.

The most important studies regarding benefits of workplace mentoring are Noe, Greenberger, and Wang (2002) and Wanberg, Welsh, and Hezlett (2003). The primary value of workplace mentoring for the protégé is career promotions and salary increases. These are considered “hard” outcomes, where the psychosocial and ego benefits are “soft” outcomes. The crucial consequence of workplace mentoring for the organization (because of protégé mentoring) is talent pool development, increased productivity and performance, and changes in turnover costs. The same applies to mentors, but there is also less stress as mentors share their workloads and a lowered lack of “loneliness” for the mentor. There is also an increased ego satisfaction with their managerial peers and an increased possibility of hard outcomes for them as well. The soft outcomes for mentors, which is not to be denigrated in any way, would be the ego satisfaction of senior management that has demonstrated trust and confidence in the mentor’s competence.

Another way to consider workplace mentoring from both the protégés and mentor perspective is through what Ramaswami and Dreher (2010, 215-216) called Process Paths (PP). The path for protégés includes viewing mentoring through the “lens” of (a)

human capital, (b) movement capital, (c) social/political capital and signaling, (d) path-goal clarity and (e) values clarity. For the mentor, the process path includes (a) human capital, (b) movement capital, optimal resource usage, (c) social/political capital and signaling, (d) identity validation, and (e) relational gains. What do these process paths mean, include and tell us about workplace mentoring?

The assumption we make about the mentoring process that the protégé (and mentor) will be fundamentally changed into a fuller person over time – need not be true. While one generally speaking can say that this is certainly a goal, these processes can backfire. If the protégé and mentor have a positive relationship and outcome then both will be viewed as assets that provided increased advantages, strengths, talents and abilities. However, just the opposite can occur if the relationship ends poorly and either the mentor or protégé are viewed as liabilities or burdens to the business organization. There are certainly many other benefits to workplace mentoring, one may not be able to empirically quantify or delineate them until more research is conducted, especially on a qualitative methodology across a broad spectrum of industries and then correlating them to discover additional patterns or process paths. (Ramaswami and Dreher, 2010, p. 227)

### **Diversity in Workplace Mentoring**

Fullerton and Toosi (2001) estimated that 32% of the labor force in 2010 would be persons of color, and in an earlier study Fullerton (1999) expected this to expand to 36% by 2025. According to the 2004 Bureau of Labor statistics 47% of the labor force

are women. In the U.S. Census of 2000, 12% of the workforce had some form of disability, and 4-17% were non-heterosexual. Gonsiorek and Weinrich (1991) predicted that 42% of the workforce would be 45 years of age or older by 2015, and Digh (1998) projected that Islam will be the second largest religion in the United States by 2010. All of these statistics and projections predicts that differentiated mentoring associations will be the standard rather than the exception in workplace mentoring.

One may also say with some certainty that the social change that will accompany this transition in the American melting pot, will also bring a great deal of social change and turmoil. Part of the reason for this is that the workplace changes slower than most think, and established paradigms die slowly. One must also add in the fact that in some of these instances of diversity growth and advancement may not be accompanied by all. The required factors for upward mobility in the workplace is uneven. Even in the best of situations only some will be chosen to enter workplace mentoring relationships by senior management, just as only some are hired in the first place. Educational achievement through the acquisition of college and graduate degrees is one factor, as well as recommendations from subordinate managers. Workplace ethics and enthusiasm of prospective candidates of mentoring or for career advancement is also limited by the total number of “slots” available. Not everyone can be selected for advancement. There is only one “queen bee” per hive and the rest of the hive or colony are the drones and the worker bees.

One must also factor in the presence of residual prejudices that exist in all people. It would be naïve and disingenuous to believe that these prejudgments, biases, and

bigotries vanish quickly. In some instances, even with legal changes in the law, business organizations find ways to circumvent the rules. All too often in grievances or litigations, it is not what “one believes, but what one can prove” that matters in the end. This is one reason why many states have “right to work” laws where an employee can quit or the employer may discharge any employee at will. This is also why for many senior management positions there are more and more written employment agreements that protect both management and the manager, and why senior and executive management are often provided “golden parachutes.” If they are hastily terminated, with or without cause, these clauses protect their interests. It should not be too surprising to see a similar process occurring with workplace mentoring, especially formal mentoring agreements.

Workplace mentoring is fraught with unique questions and predicaments. However, diversity should not always be seen as a negative aspect of mentoring. It can also provide some very positive results because it forces the member of the dyad to “expand their thinking and horizons” in new ways and practice. The role of positive psychology and organizational behavior, is opening up new theories and models for continued research as seen in the studies of Luthans and Youssef (2004) and Dutton and Ragins (2007). Often, workplace mentoring has been traditionally viewed from a negative perspective in constantly comparing the mentoring outcomes of non European-American males with other diverse groups to ascertain if these protégés obtain the same benefits and outcomes as heterosexual, anglo-saxon, Judeo-Christian (Protestant) European-American males (WASP), which has been the historical normative group. However, as previously noted and supported by Kram (1996) the female mentor provides

more and deeper relational outcomes, personal learning, development and growth to her protégés when compared to the traditional White Anglo-Saxon, Protestant (WASP) and male gender model. The concept of positive social capital postulates, according to Ragins (2010, p. 282), that it “expands the generative capacity of its members and creates states of positive psychological capital involving self-efficacy, hope, optimism, and resilience in its members.”

Diversity in mentorships occurs when mentors and protégés differ in terms of gender, race, ethnicity, sexual orientation, disability, religion or economic class. Diversity in workplace mentorships includes all of these but Ragins (1997a) adds another dimension that it includes any other variable that is directly and indirectly related to power and authority in business organizations. It is critical to understand that diversity in workplace mentorships requires expansion in this regard and not merely in the minimal sense of the word. Non European-American mixed demographical dyads are typically considered as not being attractive to European-American protégés, according to Dreher and Cox (1996) and Ragins and Cotton (1999), because non European-Americans are often not in senior or executive management roles and thus they cannot provide the same career outcomes as European-American mentors do, as agreed by Johnson (2013).

This last study along with Wallace (2001) demonstrated that male protégés with male mentors received the best compensation packages, followed by female protégés with European-American male mentors, and female protégés with female mentors received the lowest levels of compensation. European-American male mentors earned more compensation for their protégés than African-American male mentors. However,

these findings are not all-inclusive because there is a paucity of published research regarding mentorships that included other nondominant groups in the workplace. Succinctly, the IT workplace environment is still the domain of the WASP male, especially upper level and senior management. There is clearly an urgent need to gain a broader perspective on workplace mentoring.

What is missing from current dialogues is a relational perspective that defines mentoring relationships in terms of their ability to foster mutual growth, learning, and development in personal, professional and career domains that extend within and beyond organizational boundaries. (Ragins, 2010, p. 288)

Therefore, since this is the prevailing mode and the decision makers of who is mentored, and who are the mentors, and who are the protégés it seems more and more like a “closed environment” that will only change slowly.

### **Positive Social Capital in Workplace Mentoring**

For this reason Ragins (2010) proposes a positive social capital approach to mentoring. These Positive Organizational Relationships (POR) are centered on the concept that interpersonal relationships, psychologically speaking, are the key source of finding fulfillment and ego satisfaction. These relationships develop what is called High-Quality Connections (HQC). These HQC have three innate abilities. First, they have the ability to have and to maintain “higher emotional carrying capacity.” Second, they have the ability to have a greater level of “tensility,” which allows the relationship to bend like a tree in the wind, instead of snapping off from the increased strain. Finally, they have the ability to increase their “connectivity,” which is more clearly defined, according to

Ragins (2010, p. 290) to the degree of “openness to new ideas and influences as well as the ability to deflect behaviors that will shut down generative processes.”

Dutton and Heaphy (2003) formulated there were at least three subjective capabilities with HQCs, which were, (a) feelings of positive arousal, vitality and aliveness, (b) feelings of positive regard, and (c) a sense of mutuality. They also proposed four outcomes for individuals and relationships, (a) HQCs create new and valued resources, (b) HQCs provide a safe environment for experimentation, (c) HQCs produce psychological growth and (d) HQCs facilitate the establishment of new knowledge. Taken together, Luthans and Youssef (2004) hypothesized that positive social capital was directly derived from HQCs including, (a) self-efficacy and confidence, (b) hope, (c) optimism and (d) resiliency. It is easy to see why HQCs and positive social capital in protégés is a tremendous leap forward in research of mentoring and mentoring relationships. Workplace organizations deeply desire to develop these type of outcomes in their subordinate staff because the ensuing strengths will increase the protégés productivity.

In the context of a highly competitive business environment, every company wanted to squeeze out every last ounce of productivity to maximize the cost-expense ratio and cost-benefit to them. If this can be induced with a total lower number of higher quality employees, then overall costs go down, profits rise, and Return on Investment (ROI) to stakeholders is greater in spite of the financial investment in the mentoring program and the ever present risk of employee turnover. There are also significant benefits to mentoring scholars using the positive capital method.

First, it expands the lens for viewing the nature, processes, and outcomes of mentoring relationships...Second, a positive capital approach can explain processes underlying the relationships between mentoring and career outcomes...Third, a positive capital approach increases our understanding of the benefits mentors receive from the relationship. Finally, the relational aspect of positive social capital makes it particularly relevant to groups with cultural values aligned with collectivism, communal norms, interdependence, and mutuality, such as women, Asian Americans, and Latinos. (Ragins, 2010, 291-292)

Diversity intersects with positive social capital in mentoring relationships. Dutton and Heaphy (2003) and Luthans and Youssef (2004) that offered four well-defined results in this regard.

1. Development of valued, authentic, and expanded identities: For diverse and nondominant groups in the workplace who battle self-identity issues, a better understanding of these processes may help them to simultaneously integrate and conform and maintain and preserve their respective heritages. Diversity in the workplace is here to stay and those who feel or experience a sense of loss or prejudice because of their diversity need to have the strength and capacity to stand up and be counted. They have a great deal to contribute to their business organizations, peers, superiors and upper level management by sharing their unique points of view. A strong mentoring relationship where the mentor is sensitive to these qualities and who can selflessly integrate these divergent aspects, is a positive role model for protégés.

2. Psychological growth and positive psychological capital: Poisonous workplaces are extremely stressful for employees. Many have a deep sense of fear or dread when Monday morning arrives. Being in a supportive, nurturing, and caring mentoring relationship can ease the feelings of despair and hopelessness many feel. There is a way out of the trap because mentoring relationships can offer a safe-haven or refuge from the struggle. Here the protégé can examine their own attitudes, attributions, and prejudices...and can confront their own stereotypes...and push members beyond the comfort zones...where meaningful psychological growth can develop.
3. New knowledge and ways of learning: Members of diverse or nondominant groups may not have access to key knowledge that traditional WASP or nondiverse groups enjoy. Having a mentor who is a member may provide the nonmember with significant insights and advantages. The tradeoff is that by having a mentor from the same or different nondominant group may reduce the protégés ability to learn thriving strategies in the workplace. These nondominant mentors can provide nondominant protégés with methods to succeed in spite of the deck being stacked against them, which often includes many teachable moments as the protégés begin their careers. Diversity may also be spun as an opportunity to learn about the culture, experiences, and values of nondominant groups and to gain insight into the everyday experience of being the other in workplace organizations...The ability to learn

and integrate knowledge about other cultures is a core competency associated with the effective management of diversity in workgroups and organizations.”

4. Exchange of resources: At the heart of workplace mentoring is the concept of the mutual exchange of ideas and resources. Protégés of all diverse and nondiverse groups gain from this rich and open marketplace of knowledge. However, protégés who are members of diverse populations may acquire added benefits particularly in light of vague and murky workplace discrimination. By their participation in group or cohort mentoring, or e-Mentoring they may be reframed by senior management as a meaningful contributor that is worthy of promotion, of new challenging work assignments, and other mentoring outcomes that were denied to them in the past. Thus, they may be able to fulfill their specific career objectives more successfully. (Ragins, 2010, 292-294)

Diversity has often been viewed as a roadblock to many in the workplace organization. Cross-cultural mentoring may be a good method to address the inequalities in the workplace by allowing mixed-dyads to share their respective points of view within a safe relational environment. Both the protégé and the mentor gain from these type of relationships. There is the expansion of ideas, concepts, knowledge, and issues that cross-diverse relationships may be better suited to handle. In a global marketplace and worldview, the mentoring taking place in diverse dyads may actually become a benefit to the company as they expand their business organizations and models to capture new markets and increase revenues outside their

normal geographic boundaries. Positive psychological and social capital may assist mentors and continued researchers to expose the real thrust of mentoring relationships, which is to build bonds that equally help mentors and protégés to develop, bloom and prosper both internally and externally to the workplace environment.

### **Best Practices in Workplace Mentoring**

Workplace mentoring must take into account several different factors to be truly successful. A key issue is whether or not workplace mentoring should be formal or informal. Eddy et al. (2001) and Ragins (1989) that found 143 different companies had formal mentoring programs. However, the tendency of academic mentor research showed a clear preference towards informal mentoring because as Kizilis (1990) “noted that forced pairing, if not done well, can contribute to resentment, hurt feelings, and suspicion.” When one also factors diversity issues, formal workplace mentoring programs must address innate and underlying resistance when mentoring is initialized between the mentor and the protégé. However, Finkelstein and Poteet (2010, p. 345) felt that formal workplace mentoring programs can succeed and will be viewed by some as a “perk” or job recruiting advantage. It all depends upon how well the formal mentoring programs are structured and what matching mechanisms are incorporated into the selection of the dyads. In other words, diversity issues should not be viewed as being or becoming insurmountable.

Because the extant research and literature is “mixed” in opinion one must avoid the snare of being overly inflexible. This may block receptivity to future research. Any

mentoring relationship, formal or informal, that contains mismatched members derived from abuse or neglect, are equally flawed. It might be more productive to ascertain what factors make all workplace mentoring relationships successful regardless of any rigid classification as informal or formal.

For formal mentoring programs to be entirely successful they must have strong support for the program from senior management, both verbally and by their active participation. There must be clear and well defined objectives and outcomes that result in protégé development and advancement within the business organization. When selecting protégés and mentors to participate, experienced and skilled mentors are needed.

Protégés, according to Tyler (1998) must consist of those most likely to benefit from the mentoring relationship and can advance or be promoted within the business organization. They are future “leaders, managers and high-potential employees.” Mentors should be identified with specific “knowledge, skills, and abilities (KSAs) that protégés see as valuable and worth emulating. The mentor and the protégé should be allowed time during normal work hours to discuss issues, concerns, and to formulate action plans for professional growth. Clear guidelines must be crafted or negotiated with each dyad so that unambiguous and distinctive procedures are implemented and followed up. A “safe environment” must be created so that true freedom of expression without a fear of retaliation can ensue.

A prudent “matching process” between mentor and protégé must be developed that takes into consideration issues of diversity. Both mentor and protégé should be allowed to meet each other before formal initiation of mentoring to “feel” each other out,

ask questions, and to determine if there is a “spark” or “personal chemistry” and an alignment between them and each must have “veto” power if either of them determines otherwise. This Participative Decision Making (PDM) process may also help lessen any negative effect of unilateral forced pairing. While total compatibility may be impossible, similarity is more important than any objective measure of similarity.

Time should also be given to both the mentor and the protégé for orientation and training, if nothing more than a few meetings where outcomes and expectations can be discussed and agreed upon. Additional and advanced training for new mentors would be a positive and proactive step to ensure that the mentor has optimum sensitivity for protégés. This would be especially true in cross-cultural mentoring. As workplace mentors completed a mentoring cycle(s) with a series of protégés they would be ideal for “mentoring the mentor” programs within business organizations or by being promoted to a chief learning officer or chief talent officer.

In the better workplace mentoring relationships the frequency and method of the mentoring process is detailed and scheduled. Eddy et al. (2001) also discovered with 30 mentoring programs, 40% were primarily face-to-face meetings. For those involved in long-distance mentoring 90% used the telephone and 80% used e-Mail. This seems to suggest that e-Mentoring programs would be well received. Regarding actual frequency, 41% of programs desired monthly contacts or meetings, 15% wanted weekly sessions, and 12% wanted longer intervals between consultations. Interestingly, many business organizations according to Viator (1999, 2001), found that 62.8% of protégés were either told or instructed by senior management that they had to participate in required regular

meetings, however this may or may not have clearly defined as to what “regular” meant. This would suggest that senior management was keenly aware or at least concerned that if given the opportunity, the mentoring dyads might disengage if they were not carefully monitored and the investment being made into promising young talent would be lost. To prevent this, many business organizations required quarterly reports from both the mentor and the protégé and that the relationship duration would range from six months to a maximum of two years. This allowed for an initial period of orientation of about three months, actual mentoring work for another eighteen months, and a final period of three months for winding down and final evaluation.

Finkelstein and Poteet (2010, 363-364) provided several excellent ideas regarding what “we know” and what “we do not know” about workplace mentoring. To determine additional conclusions regarding workplace mentoring will require additional longitudinal and qualitative studies to be conducted. The answers cannot be discovered or ascertained by quantitative research because to construct a meaningful questionnaire instrument would be impractical and severely limiting in scope and latitude. Another possible venue is for mentoring scholars to form partnerships across multiple business organizations and industries to unlock what current programs there are for mutually supporting and conducting exit interviews with both mentors and protégés who have completed any formal mentoring programs. In this fashion, both the workplace and all the multiple level of stakeholders, along with mentoring scholars will equally benefit and maximize the impact of formal mentoring programs for all.

As Allen and Eby (2010, p. 399) have pointed out, “effective mentorship...fulfills the need to belong; in other words, the need to form and maintain positive interpersonal relationships with others...is what makes mentoring relationships a powerful agent for individual growth and well-being.” Other research such as Allen, Day and Lentz (2005), and Young and Perrewé (2000b) speak of interpersonal comfort and trust as transcending all forms of effective mentoring. Of interest to all mentoring scholars and theorists is in obtaining a better understanding into how and why mentoring relationships have the positive effect that they do. There must be an underlying and transcendent need being fulfilled. It has been suggested by Karcher, Davis and Powell (2004) the “need to belong” and that when protégés have this basic need met, they can develop self-esteem and feelings of personal competence, achieve in school, and master work-related tasks. Mentors also have their needs met in mentoring others and the need for affiliation through close relationship according to Miller (1976). Mentors may also vicariously participate in the success of their protégés and obtain peer recognition and commendation from senior management.

### **Axes in Workplace Mentoring**

It is a key concept to remember that there appears to be two axes in mentoring relationships. The first axis is horizontal and is usually aligned with Levinson et al. (1978) developmental life-stage. Nearly all mentoring studies and research must factor in these adult development stages into their work. The formative ego development and self-identity that begins in infancy and early childhood, middle childhood, adolescence, early adulthood, and middle to late adulthood are paramount to our self-concepts. Poorly

developed self-image results in stunted growth and abilities. While mentoring can help overcome some of the deficit, it cannot overcome any unless the protégé is willing to do the “hard work” necessary to obtain success and then only if the mentor is aptly prepared and sensitive to each of their protégés unique requirements. Successful mentoring at earlier stages has a direct and positive affect on mentoring at the later stages of the life-stage cycle. The opposite is also true. A failure to connect in initial mentoring relationships may have lifelong impact on the protégé, which they may never be able to amend.

The second axis is the vertical. Allen and Eby (2010, p. 407) breakdown the vertical axis into four sub-levels: (a) individual, (b) dyadic, (c) setting and (d) society. People have personal and interdependent needs. To “belong” to something more than they themselves as individuals could achieve is a strong and motivating psychological force. People want to belong to something more, or to be part of a group of people who matter. As noted earlier, this urge is sometimes referred to as the “belongingness hypothesis” and was developed by Baumeister and Leary (1995). As it applies to mentoring theory, those more likely to benefit from mentoring relationships are those who did not developing sufficient interpersonal bonds with significant others. Common examples, according to Allen and Eby (2010, p. 407) are “first-generation college student who do not have role models” or “women and minorities in the workplace who have limited access to social networks.” In a posterior and extreme negative perspective, children who were abused, neglected or subjugated by one or both of their parents may carry deep psychological scars their entire lives, which they are completely unable to

disengage and reverse. They will always have “unfinished business” as part of their human egos and identities. Mentors need to be cognizant that some of the protégés may hurt and feel deep individual pain in this regard.

While mentoring may help, in some instances it may only bring back to the surface feelings of inferiority, which may result in interpersonal conflict and resistance to mentoring. Many mentoring programs target at risk populations like this in an effort to ameliorate social trauma. It may be a better use of time and resources, according to Rhodes, Grossman and Roffman (2002), to place “the focus on fostering competencies among youth rather than trying to remedy deficits.”

The dyad level sees both the mentor and the protégé as a single unit. They develop, over time, a shared sense of mutuality and “belongingness.” The dyad forms a working alliance. A connection is forged between the mentor and the protégé that is single-minded towards collaboration of common goals. These goals are negotiated during the initiation phase of mentoring by the mentor and the protégé as the desired outcomes of their specific relationship. The prime benefit is the dyadic fulfillment of their corporate or joint needs to belong. When this is not achieved, the mentoring relationship bond is lessened, deteriorates or dissipates altogether.

As previously mentioned it is in settings sub-level where the real mentoring occurs. This is evident in workplace mentoring and academic mentoring. Many formal youth mentoring programs occurs in organizations like Big Brothers/Big Sisters, Boy and Girl Scout troops, churches, mosques, and synagogues, and after-school programs by local school districts. Informal mentoring is less restrictive on location and with extended

families often occurs in the homes of aunts, uncles, grandparents, or other close related adults. While the setting is important in mentoring, little formal research has been conducted regarding its total influence. The question to be asked is “How does the setting influence whether or not belongingness is achieved?” The setting is more of an issue with formal mentoring than informal mentoring. The setting provides the platform where the mentoring occurs, which in turn may influence the goals and outcomes of the mentoring program. In one study, Herrera, Sipe and McClanahan (2000) looked at school-based mentoring and community-based programs. In the first, the emphasis produced more academic outcomes, while the second generated more social activities.

The society sub-level is crucial because our culture and society is a stabilizing role in all of our lives, which then contributes on a grand scale to our values at large and how each of us fits into the whole. This is a macro view of the sense of belongingness. Generally speaking, and as noted earlier, society at large rewards those whose lives and contributions are most likely within the +1 or -1 of the standard deviation curve of the cultural bell curve. It punishes those with less, and it highly rewards those who exceed it. Thus, “a feeling of falling outside the mainstream of society puts individuals at risk for crime and other problems” according to Allen and Eby (2010, p. 413). Some cultures may frown on mentoring as Sedlacek et al. (2010, 273-274) has noted.

Some may be tempted to say or feel that the future in the workplace belongs solely to the next generation or to those who are just beginning their professional careers. A word of caution may be in order. Perhaps the most significant advantage of mentoring relationships (e.g., internships) is to provide for a safe and semi-confidential environment

to experience personal growth and to learn. Everyone makes mistakes in life. As one advances in years sometimes the latter stage of life are filled with deep regret for past failures. Being a mentor provides protégés the benefit of learning from the past errors of their mentors, and hopefully avoid repeating them. This may be extremely beneficial in cross-cultural mentoring or when diversity is present in the mentoring dyads. A naïve or unintentional error may occur because the protégé may not have had the requisite professional exposure to avoid them. A mentor who has trod the path beforehand can be quite helpful in steering the protégé and providing protection to them as needed.

Although the concept of mentoring may have begun with the ancient Greeks, in the centuries and millenia since, the overarching goal of mentoring has been to develop and pass along “wisdom” from one generation to the next. Progress has been made. More needs to be accomplished. For researchers in the field of mentoring, a significant goal of new learning may be able to achieved by not allowing themselves to compartmentalize future studies too rigidly. All can learn and be mentored by each other.

### **Recent Research on Mentoring (2011-2016)**

While the history on academic and workplace mentoring is foundational, the real question is where should the next emphasis be focused on. I am convinced that protégés look upon their CISOs and mentors in two other corresponding roles: (a) as a leader and (b) as a learner. If protégés are expected to learn and be followers of their workplace executives and mentors, then the CISOs and mentors should be expected to lead and learn. This is especially so in the field of CSM and cyber security. It just changes too fast and expands in so many different directions simultaneously. If protégés have limited

time to learn then CISOs and mentors are faced with the same situation. It is only in a joint effort of executive management, mentors and protégés that there is any real hope in improving security in the workplace environment. It is a team effort and every member of the team must engage themselves fully and completely to the task. Protégés will have more respect and admiration of their CISOs, managers, and mentors if they too are faced with the same predicaments as they are. Protégés may be able to learn more quickly, fully and efficiently in observing how their leaders deal with complex issues. Mentoring is more than just telling a protégé what to do, it is showing them how to do it.

Another issue to beware of is getting caught in a circular trap of literary references. With the history of academic and workplace mentoring clearly established by Kram (1985) as verified by Allen and Eby (2010) along with the integration of Levinson et al. (1978, 1996), it would be quite easy to overlook or even to find really “new” groundbreaking primary research. This should not be interpreted to mean it might not exist (because new research is always occurring), it is just that its foundational basis may be repetitive in nature. To add “new” materials just for “addings sake” is to be avoided.

A cursory review of new peer-reviewed primary studies indicates that there were 1,321 articles or studies from 2011-2015 on academic mentoring, and 690 articles or studies from 2011-2015 on workplace mentoring. Of these only 66 peer-reviewed articles were found and of those found, many did not apply to the focus of this dissertation. I decided to focus my attention on workplace mentoring only since CSM is a workplace event. The authors of the most current research have updated past research.

For example, Allen, Finklestein, and Poteet (2011) have amplified research from two years earlier in their book. They state,

Two overarching themes are presented in the book. One theme is that organizations should develop the program with specific objectives in mind and to base decisions regarding the design and structure on those objectives. The mentoring program should be strategically aligned with the organization's core values and mission... This is the essence of what makes a formal mentoring program unique from, but potentially more powerful than, many other organizational programs and, ironically, what makes a formal mentoring program difficult to implement successfully. (Allen, Finklestein, and Poteet 2011, p. xii)

The authors then go in the next seven chapters along with fifteen appendices in providing their readers with the theory and the materials to build a solid workplace mentoring program. Another familiar author, Allen and Eby (Eds) (2012) wrote about "Personal Relationships: The effect on employee attitudes, behavior, and well being." While new authors are introduced, it covers much of the same materials as their previous volume published in 2010. While Kram (1985) discouraged equating mentoring with coaching, In "The psychology of coaching and mentoring" by Passmore, Peterson, and Freire (2013) are some excellent materials, as well as in Bachkirova, Jackson and Clutterback (2011). Fletcher and Mullen (2012, Chapter 2, p.24) also provide an excellent volume on the field of coaching and mentoring saying, "Where the education world's attention was transfixed on mentoring between 1995 and 2005, it has dramatically shifted towards coaching since then."

The issue of a definition in coaching is one which has been actively explored in the literature, in a way which is not found in mentoring. A host of papers have considered the question, some focusing on reviewing previous definitions, others offering new definitions. This activity reflects the immature nature of the domain and the desire to delineate boundaries and mark out territory for coaching being a different and distinctive intervention to other organizational interventions such as mentoring, careers counseling, appraisals, and feedback. The reality, in our view, is that coaching has many similarities and overlaps with many of these interventions...The book is structured using four sections focused on coaching, mentoring, theories and models, and a final section on issues in coaching and mentoring. (Passmore, Peterson, and Freire 2013, p.1, 6)

In an excellent academic paper, Dominguez and Hager, (2013) synthesized the most recent studies in the field.

The purpose of this paper is to present a synthesis of the origins and theoretical frameworks of adult mentoring practices in educational and workplace settings along with an analysis and critique of their application to mentoring processes. The authors systematically analyzed books and articles published in peer-reviewed journals from 1978 to 2012 using qualitative meta-summary and qualitative meta-synthesis methodological approaches. This systematic review of the literature resulted first, in an organized, historical framework of theories of adult mentoring in academic and workplace and educational contexts from 1978 to 2012. Second, it provided information regarding the recognized challenges in

traditional mentoring endeavors that led to the more expansive concept of developmental networks and participation in communities of practice. Third, it served as a foundation for a critique of the theories as applied to mentoring relationships and programs. The paper provides the theoretical foundation for future empirical work in the field of adult mentoring in educational and workplace settings. This paper is the first to condense the vast theoretical frameworks that inform the field of adult mentoring in the twenty-first century. (Dominguez and Hager, 2013, Overview)

A key question is whether or not the “traditional” role of mentoring still applies in the 21<sup>st</sup> century. It may not according to Srivastava and Jomon (2013).

Traditional mentoring is defined as a relationship between an older, more experienced mentor and a younger, less experienced protege for the purpose of developing and helping his/her career (Hunt & Michael, 1983; Kram, 1985; Ragins, 1989). According to this mentoring theory (Kram, 1985), mentors help their proteges through providing career functions (i.e., sponsorship, exposure and visibility, coaching, protection, and challenging assignments) and psychosocial support (i.e., role modeling, acceptance and confirmation, counseling and friendship). The traditional mentoring is an instrumental approach that uses a transactional frame and values the relationship for what it can do rather than what it can be. Recognizing that organizations have downsized, the traditional, hierarchical view of mentoring is changing (Kram & Hall, 1995; McManus & Russell, 1997). The traditional role of an older, wiser person guiding a younger

one has been undermined in an age where experiences of the past and accumulated knowledge no longer guarantee relevance in the future. (Srivastava and Jomon 2013, p.1)

This should not come as a complete surprise because mentoring must adapt to its current needs and parameters within the business organization. If the organization shifts as previous generations retire (e.g., the Baby-Boomers) and are replaced by younger and newer people (e.g., the Millennials), these newer people have a completely different mind set and point of view. Bridging those generational gaps will be challenging.

New work on the concept of DIM was reviewed by Kumar and Blake-Beard (2012).

There are several reasons why it is imperative for researchers to delve deeper into understanding the darker side of mentoring. First, it is suggested that negative events have more of an impact on an individual than positive events...so much so that with regard to leadership, followers tend to recall negative events more than positive ones... also, the consequences of negative mentoring for the protege can be far-reaching leading to personal damage. Negative mentoring can lead to a protege cloning himself in the image of the mentor, or can lead to ingratiation behavior to physical withdrawal in terms of absenteeism or turnover, loss of valuable career time and a sense of betrayal or can lead to decreased job satisfaction and increase in stress. (Kumar and Blake-Beard, 2012, p.1)

There is nothing surprising here. DIM is a major issue in workplace mentoring and must be avoided or reduced to minimum levels as quickly as possible. The aftereffects of uncontrolled negativism could spell doom for many workplace mentoring programs

unless a check is placed on it early in the program. Regarding “best practices” in workplace mentoring, Brondyk and Searby (2013) produced a well-reasoned article on the subject.

The purpose of this paper is to describe the complexity that underlies categorizing best practices in the field of mentoring. A further purpose is to propose a way to deal with this issue in order to begin to develop and identify research-based best practices in mentoring in education. This is a conceptual paper proposing a structure for identifying best practices in mentoring. The field of mentoring is replete with suggestions about best practices in education, but many are unsubstantiated by empirical research. The authors believe this is due in part to the breath of mentoring resulting in the use of so many different terms, conceptualizations, and applications that it is difficult for practitioners to converse about mentoring and for researchers to synthesize what is already known. They suggest an additional problem is the ambiguity regarding the term best practice. The authors cite these challenges and offer suggests for defining best practices and synthesizing the literature across contexts. The value of the paper is in the awareness it creates and in the possibilities it presents. By outlining the complex factors related to mentoring best practices, scholars will better understand the constraints that limit our ability to harness all that is known about mentoring best practices. Further, the authors offer a unique way to approach this task, utilizing a collaborative team approach across contexts. (Brondyk and Searby 2013, Overview)

### **CISOs and Mentors as Leaders**

One of the classic volumes on leadership theory and practice is Nohira and Khurana (2010). Within this volume of 26 chapters, the various authors provide a comprehensive view of leadership. The one fact that emerges is that leadership is not a simple concept. Instead, it is extremely complicated and requires much thought and contemplation. It is beyond the scope of this dissertation to give the subject of leadership due process without significantly straying from goal mentioned in the Abstract.

Suffice to say, leadership within organizations is a major role of the CISO and managers/mentors. As these upper and secondary level people advise, consult and develop protégés their leadership functions become clear. Protégés and the recently hired people look to management for insight and for guidance. This is especially so within the very precarious landscape of cyber security. CSM plays an integral role. The typical cyber security staff of an organization is usually quite busy in dealing with day-to-day crises as they arise. They also have to be on the constant lookout for new issues that their risk-inherent employees founder into. The stress and the constant need of “another urgent matter to attend to” only increases the load. At times there are the regular offenders who forget their passwords or innocuously change a setting on their systems in a hapless manner. Someone is forced to deal with these situations and this invariably lands squarely on the “help-desk” which can be escalated to various levels as needed. Hackers always are on the lookout for the “weakest link” in the chain to exploit, and so very often as Tipton and Krause (2007) has noted this is where the true risk is found.

Leaders in organizations attempt to pro-actively deal with these problem issues and problem people ahead of time. It takes patience, which on certain days of any week may be in short supply. As the frustrations grow, more mistakes and errors can easily occur, which only exacerbates the situation. For this reason, one needs to look at leadership in a very broad sense of the word and with multiple concepts of definition. One of the best ways to view leadership is found in Vinod and Sudhaker (2011).

There seems to be general agreement that leaders have two basic roles in business: one of vision and the other of implementation. In the visionary role, leaders are the definer of direction. They must communicate the mission, values and beliefs the organization aspires to for its people. Once people are clear on where they are going, an effective leader's role switches to the task of implementation. Servant Leadership is the key to the realization of this dream. In a traditional organization, managers are thought of as responsible and their people are taught to be responsible to their boss. "Boss watching" becomes a popular sport and people get promoted on their upward influencing skills. That role does not do much for accomplishing a clear vision. The servant leader feels that once the direction is clear, his or her role is to help people achieve their goals. The servant leader seeks to help people win through teaching and coaching individuals so that they can do their best. You need to listen to your people, praise them, support them and redirect them when they deviate from their goals. (Vinod and Sudhaker 2011, Abstract).

What I enjoy about this concept is how easily it can be adapted to mentoring dyads.

Dyads need a plan. Mentors and the CISO develop the plans and concepts that they want their protégés to implement and must communicate “the mission, values and beliefs the organization aspires to for its people. Once people are clear on where they are going, an effective leader’s role switches to the task of implementation... The servant leader seeks to help people win through teaching and coaching individuals so that they can do their best.” I ask myself the question, “Isn’t this the essence of mentoring?” The answer is a resounding “yes.” The concept of “servant leadership” is also supported by Schmidt (2013). In her article she explores the concepts of servant leadership, and just as there are good leaders (as well as mentors and CISOs), there are also poor ones.

The article discusses various aspects of the concept of servant leadership culture. It presents examples of behaviors exhibited by poor leaders including grabbing credits for accomplishments they do not deserve, micromanagement and use of intimidation to get results. The qualities of a servant leader are also discussed including attentiveness to growth and development of employees and customers. Benefits offered by servant leaders to their organizations are highlighted.

(Schmidt, 2013, Abstract)

This is a reflection of DIM in the workplace especially those examples of “grabbing credits for accomplishments they do not deserve, micromanagement and use of intimidation to get results.”

Servant leadership is a self-contradiction to many people. To most people there are “leaders” and “followers.” For these people leaders lead and followers follow. But

the concept of real servant leadership goes back to the biblical times of Jesus as recorded in the New Testament, where in the Gospel of Mark (Chapter 10), Jesus had to deal with two of his disciples in this regard.

James and John, the sons of Zebedee, came forward to him and said to him, “Teacher, we want you to do for us whatever we ask of you.”<sup>36</sup> And he said to them, “What is it you want me to do for you?”<sup>37</sup> And they said to him, “Grant us to sit, one at your right hand and one at your left, in your glory.”<sup>38</sup> But Jesus said to them, “You do not know what you are asking. Are you able to drink the cup that I drink, or be baptized with the baptism that I am baptized with?”<sup>39</sup> They replied, “We are able.” Then Jesus said to them, “The cup that I drink you will drink; and with the baptism with which I am baptized, you will be baptized;<sup>40</sup> but to sit at my right hand or at my left is not mine to grant, but it is for those for whom it has been prepared.”<sup>41</sup> When the ten heard this, they began to be angry with James and John.<sup>42</sup> So Jesus called them and said to them, “You know that among the Gentiles those whom they recognize as their rulers lord it over them, and their great ones are tyrants over them.<sup>43</sup> But it is not so among you; but whoever wishes to become great among you must be your servant,<sup>44</sup> and whoever wishes to be first among you must be slave of all.<sup>45</sup> For the Son of Man came not to be served but to serve, and to give his life a ransom for many.” (Mark 10:35-45 New Revised Standard Version)

While this is a classic example of the concept, even as noted in the Gospel of Mark, the real trick is in the implementation. In mentoring others (and Jesus was in a very real

sense a Mentor of mentors), there is a delicate balance between leadership and mentoring. However, the best mentors are those who can bridge the gap with their protégés so that there is a clear delineation between the role of the mentor and the role of the protégé. It was Hunter, Neubert, Perry, Witt, Penney and Weinberger (2013) that stated,

Despite widespread adoption of servant leadership, we are only beginning to understand its true utility across multiple organizational levels. Our purpose was to test the relationship between personality, servant leadership, and critical follower and organizational outcomes. (Hunter, Neubert, Perry, Witt, Penney and Weinberger 2013, Abstract)

They proposed several hypotheses regarding servant leadership. Those that would apply to CISOs, and mentors include (a) leader agreeableness is positively related to follower perceptions of servant leadership, (b) leader extraversion is negatively related to follower perceptions of servant leadership, (c) individual-level servant leadership is negatively related to follower turnover intentions, (d) individual-level servant leadership is negatively related to follower disengagement. It seems that protégé and mentor perception of their respective CISOs, the possibility of constant turmoil and turnover, along with an introverted leader who is more likely to be approachable as a “servant,” and the ability to engage others pro-actively in cyber security paradigm are critical.

A good research study on Servant Leadership was conducted by Mook (2012) in his Ed.D. dissertation from the University of Tennessee at Chattanooga. In his Abstract he stated,

This study sought to determine the perception of servant leadership in business-model organizational settings and to assess the potential significance between servant leadership perception and variables, both demographic and others, related to volunteer service. Using the Servant Leadership Scale a 28-item survey, combined with 9 additional questions, individuals in five organizational settings in the Southeast region of the United States of America were queried via an online survey method distributed by email. Respondents from each organization reported an overall perception of servant leadership according to the seven-dimension means of emotional healing, creating value for the community, conceptual skills, empowering, helping subordinates grow and succeed, putting subordinates first, and behaving ethically. Using Kruskal-Wallis and Mann-Whitney U nonparametric statistical testing, significance was found for three of organizational settings: between the collected variables of gender, years worked, years volunteered outside of workplace, years volunteered within organizational site, professional/industry related certifications obtainment, and educational attainment, as these variables related to the servant leadership dimension means. Reference to the servant leadership dimensions correspond to respondents' perceptions as reported in the SL Scale and categorized according to the survey items linked to each dimension area. (Mook, 2012, Abstract)

Another principle already discussed and explored earlier was the concept of team mentoring. There is an old axiom that there is no limit to what can be accomplished if it does not matter who gets the credit. Team mentors may exemplify this concept.

Protégés gain from the total and sum knowledge of all the “leaders” in the workplace. Of course, this is an ideal matter and so often human ego does indeed get in the way of real altruism. It is human nature to seek the benefit(s) to one’s self. So often in the workplace it is the childhood game of “king of the mountain.” But as Zaleski (2013) observed,

Our program at its core revolves around team mentoring. A really good mentor in our case recognizes the skills they bring to the table as well as the skills the other people bring to the table. They interject when appropriate, but also do a lot of listening when their skills aren’t particularly relevant. The team approach to mentoring recognizes individuals have insight into a certain industry, or experience in a certain place. But they also get to spend a lot of time listening to the entrepreneur and ceding the floor either to the entrepreneur to speak or to a colleague to speak... We look for somebody who can be a coach and a very good listener. But we also look for someone who’s incredibly accomplished, so they bring experience and credibility to the table that will impress the mentee and make them more open to listening and learning. But the commonality amongst our mentors is they’re all very humble. (Zaleski 2013, Abstract)

There are other forms of leadership styles which the CISO and manager/mentors should be aware of in CSM. According to Johnson, R. (2013), these are:

*Laissez-Faire:* A laissez-faire leader lacks direct supervision of employees and fails to provide regular feedback to those under his supervision. Highly experienced and trained employees requiring little supervision fall under the laissez-faire leadership style. However, not all employees possess those

characteristics. This leadership style hinders the production of employees needing supervision. The laissez-faire style produces no leadership or supervision efforts from managers, which can lead to poor production, lack of control and increasing costs.

*Autocratic:* The autocratic leadership style allows managers to make decisions alone without the input of others. Managers possess total authority and impose their will on employees. No one challenges the decisions of autocratic leaders. Countries such as Cuba and North Korea operate under the autocratic leadership style. This leadership style benefits employees who require close supervision. Creative employees who thrive in group functions detest this leadership style.

*Participative:* Often called the democratic leadership style, participative leadership values the input of team members and peers, but the responsibility of making the final decision rests with the participative leader. Participative leadership boosts employee morale because employees make contributions to the decision-making process. It causes them to feel as if their opinions matter. When a company needs to make changes within the organization, the participative leadership style helps employees accept changes easily because they play a role in the process. This style meets challenges when companies need to make a decision in a short period.

*Transactional:* Managers using the transactional leadership style receive certain tasks to perform and provide rewards or punishments to team members based on performance results. Managers and team members set predetermined goals

together, and employees agree to follow the direction and leadership of the manager to accomplish those goals. The manager possesses power to review results and train or correct employees when team members fail to meet goals. Employees receive rewards, such as bonuses, when they accomplish goals.

*Transformational:* The transformational leadership style depends on high levels of communication from management to meet goals. Leaders motivate employees and enhance productivity and efficiency through communication and high visibility. This style of leadership requires the involvement of management to meet goals. Leaders focus on the big picture within an organization and delegate smaller tasks to the team to accomplish goals. Johnson (2013, Overview),

A key question is when to use one of these leadership styles and the potential impact it might have on the organization – in this case how the CEO, CFO, CIO and CISO and top managers and *mentors* apply it to the rank and file employees and *protégés*. That is not easy to answer, but the insight of others like Blanken (2013), who expanded and summarized the concepts may help. She summarized it succinctly stating, “If you’re leading well, you you won't have just one leadership style. You'll mix and match to engage your team and meet your goals.” She then goes on to explain what she means in the various concepts and models of leadership styles.

*Charismatic:*

- Influences others through power of personality
- Acts energetically, motivating others to move forward
- Inspires passion

- May seem to believe more in self than in the team
- To spur others to action
- To expand an organization's position in the marketplace
- To raise team morale
- Can create risk that a project or group will flounder if leader leaves
- Leader's feeling of invincibility can ruin a team by taking on too much risk
- Team success seen as directly connected to the leader's presence

*Innovative:*

- Grasps the entire situation and goes beyond the usual course of action
- Can see what is not working and brings new thinking and action into play
- To break open entrenched, intractable issues
- To create a work climate for others to apply innovative thinking to solve problems, develop new products and services
- Risk taking is increased for all
- Failures don't impede progress
- Team gains job satisfaction and enjoyment
- Atmosphere of respect for others' ideas is present

*Command and Control:*

- Follows the rules and expects others to do the same
- In situations of real urgency with no time for discussion
- When safety is at stake
- In critical situations involving financial, legal, or HR issues

- In meeting inflexible deadlines
- Demands immediate compliance
- Engages in top-down interactions
- Is the sole decision maker
- If used too much, feels restrictive and limits others' ability to develop their own leadership skills
- Others have little chance to debrief what was learned before next encounter with leader

*Laissez-Faire:*

- Knows what is happening but not directly involved in it
- Trusts others to keep their word
- Monitors performance, gives feedback regularly
- When the team is working in multiple locations or remotely
- When a project, under multiple leaders, must come together by a specific date
- To get quick results from a highly cohesive team
- Effective when team is skilled, experienced, and self-directed in use of time and resources
- Autonomy of team members leads to high job satisfaction and increased productivity

*Pace Setter:*

- Sets high performance standards for self and the group
- Epitomizes the behavior sought from others

- When staff are self-motivated and highly skilled, able to embrace new projects and move with speed
- When action is key and results are critical
- Cannot be sustained too long, as staff may "burn out" from demanding pace
- Results delivered at a speed staff can't always keep up with

*Servant:*

- Puts service to others before self-interest
- Includes the whole team in decision making
- Provides tools to get the job done
- Stays out of limelight, lets team accept credit for results
- When leader is elected to a team, organization, committee, or community
- When anyone, at any level of the group, meets the needs of the team
- Organizations with these leaders often seen on "best places to work" list
- Can create a positive culture and lead to high morale
- Ill-suited if situation calls for quick decisions or meeting tight deadlines

*Situational:*

- Links behavior with group's readiness
- Includes being directing and supportive, while empowering and coaching
- Where ongoing procedures need refinement, reinvention, or retirement
- Can be confusing if behavior changes unpredictably and too often

*Transformational:*

- Expects team to transform even when it's uncomfortable

- Counts on everyone giving their best
- Serves as a role model for all involved
- To encourage the group to pursue innovative and creative ideas and actions
- To motivate the group by strengthening team optimism, enthusiasm, and commitment
- Can lead to high productivity and engagement from all team members
- Team needs detailed-oriented people to ensure scheduled work is done

One also needs to consider the forms of mentoring – whether a formal or informal method is selected and who are the mentors and protégés and their backgrounds. If the incorrect style is used, it may contribute to DIM. The point to made about *leadership style* is that one's form of leadership may shift on the mentoring axis as well. As noted previously there are two axes in mentoring: horizontal and vertical. Therefore, the concept of leadership in a very real sense also is reflected and observed in a *mentoring style*. The CISO and mentors assigned to develop protégés must keep this forefront in their minds and constantly consider its ramifications.

As good as this material is, it has its limitations. The problem seems to be that many students in the field merely memorized theories but did not understand how to apply them effectively. According to Scandura (2016),

After decades of using Organizational Behaviour (OB) textbooks, I realized they were not communication the right messages for today's students. They memorized the theories and dutifully wrote them down on exams, but I felt they were missing out on how to apply these theories to become a better leader.

Students want take-away skills they can put into practice immediately. A new approach to teaching OB is needed... (that) shows students how to be effective leaders and managers in organizations. With a focus on leadership and management development, students will go beyond memorizing theories and will apply the most relevant concepts to effectively motivate followers, lead their teams, and champion organizational change. (Scandura, 2016, xix)

In an earlier study that directly related to the role of Information Systems in the workplace, Cho, Park and Michel (2011) wrote,

We examined the positive impact of transformational leadership on IS success in organizations via two psychological mechanisms of system users'—perceived organizational support and systems self-efficacy. Our conceptual model was assessed using a sample of 251 employees from a multi-national bank in Korea. Overall, our results supported the hypothesized relationships: transformational leadership was positively related to system users' IS success, and both perceived organizational support and systems self-efficacy of the system users mediated the relationship between transformational leadership and IS success. The results call for manager's attention to the importance of transformational leadership development in organizations. (Cho, Park, and Michel, 2011, Abstract).

It appears that the CISO as a leader in the workplace must move in the direction of “transformational leadership,” which means like cyber security is never a fixed point of reference. The challenge to the CISO, and their mentors and proteges is finding the time to fully integrate these concepts into practical and meaningful implementations.

### **CISOs and Mentors as Learners**

The classic volume in adult learning is Mirriam, Caffarella, and Baumgartner (2007).

However as is pertains to mentors learning how to mentor or mentors learning in general it was Rekha and Ganesh (2012) where this subject was thoroughly reviewed.

The purpose of the study was to understand the learnings of adults (who are undergraduates, post graduates or working professionals) who volunteered to be the mentors to make a difference in the life of the adolescents who are from underprivileged backgrounds. The authors conducted their study in a not for profit organization (NPO) which has a unique mentoring program called Dronocharya Ekalavya (DNE) mentoring program in Hyderabad, India. The authors conducted telephonic interviews with 15 mentors using a semi-structured questionnaire and also administered an online survey to 59 respondents. Since the study is a qualitative research, results cannot be generalizable (*sic*). The findings of the study conclude that mentors do learn from the mentoring program organized by NPO. Mentors learnt soft skills such as interpersonal skills, leadership skills, etc. Also they learnt to build rapport and trust. The study highlighted the changes in behaviors of mentors such as self-realisation (*sic*), and change in attitude. Social desirability effect might have impacted the results but all efforts have been invested in carefully handling the data. A possible longitudinal study can focus on comparing learning outcomes of mentors at the beginning of the mentoring program with learning outcomes of mentors at the end of the mentoring program. Future research could focus on how and what do they learn from each other by

expanding the study to many organizations. There is no empirical research conducted to study the benefits gained by mentors through mentoring program, especially referencing to youth mentoring. This study will help organizations (both NGO and other businesses) understand the benefits of mentoring to the mentors. (Rekha and Ganesh 2012, Overview).

In another unpublished dissertation from the University of Canterbury, Aman (2014) considered the implications of mentors as learners in what was termed a “quality learning circle.” The concept is that mentors, (and thus the CISO) would become part of a larger circle of influence with other mentors and protégés that would assist all members within the circle of “influence.” While written with teachers in mind, the principles can apply to a much broader audience.

The focus for my study is the skillset of curriculum leaders for their work with teachers within their learning areas. The participants for this study were five curriculum leaders, all from the same secondary school. This intervention study investigated the factors which contributed to the professional learning of the mentors, their views of their leadership role and the kinds of learning about mentoring which were beneficial to understandings about mentoring. By focussing (*sic*) on key adult learning principles, structures that support learning, and attention to a mentoring skill set, the participants were supported to develop their mentoring skills. The mentors participated in a professional learning experience, referred to as a Quality Learning Circle (QLC), over one and a half school terms, to co-construct their understanding of mentoring practice. In a QLC

the focus is on the learners seeking and making changes to their practice in a collaborative, supportive environment...The mentors collaboratively developed new understandings through deliberate talk in the QLC about their shared interest in mentoring. They also had opportunities for immediate and practical application of their new knowledge. While they participated in the QLC they co-currently developed their mentoring skills by working with a mentee who taught in the same subject area as themselves. (Aman 2014, Overview).

No other articles or research could be located on mentors as learners.

### **Communities of Practice**

The concept of Communities of Practice (COP) has already been mentioned. This concept can and should be expanded. Discrete groups of people could be corralled not only by profession, but in various groups or subsets of professions like cyber security, or by academic endeavors, race, culture and gender. This may allow for a more relaxed environment for mentoring relationships to develop. It may also have a direct impact on reducing DIM. In a more recent study, Laukhuf and Malone (2015) found that women entrepreneurs needed mentors. Not only would that assist them in the general workplace, but may also serve as badly needed examples of women in the field of information technology, which up to this time, as noted later in this dissertation, has been a male dominated profession. Specifically,

As of 2014 United States' women entrepreneurs own 9.1 million businesses creating the fastest growing business segment. This phenomenological study highlights how women entrepreneurs can learn to be more objective while

managing their company through a leadership position. The main themes emerging from the study were the value of a mentorship experience and how a transformational leadership style may help women entrepreneurs grow their businesses and develop personally and professionally. Seventy-five percent of women leaders maintain that mentoring plays an integral part in their career. This study may contribute to positive social change by encouraging women entrepreneurs to establish on-going mentoring relationships. (Laukhuf and Malone, 2015, p.70)

In this article entitled *Woman Entrepreneurs Need Mentors* they reviewed and developed the role that successful businesswomen could use in mentoring junior women in their emerging business ventures. One of the best methods is the use of role modeling. This includes wide reading in the field of leadership and learning, because those who teach (or mentor) others is always committed to learning new things. In the field of CSM that evolves so quickly, this is a key and vital concept. Regarding the mentoring of women, Dragoo (2014) from the National Association of Women Business Owners (NAWBO) who summarized it all very nicely stating,

As women, we often have the “Superwoman” complex where we feel like we can do everything on our own and be everything to everyone, since we do so much already. What we don’t realize is that we can be even better if we just ask for help from a trusted mentor—be it a fellow entrepreneur, a former boss or a friend at a similar company. Studies show, however, that women have a more difficult time finding mentors than men. In fact, a LinkedIn study of more than 1,000 working

women shows that 1 out of 5 have *never* had a mentor at work. But for women entrepreneurs—of all size companies and industries—having a mentor or even a portfolio of mentors with different areas of expertise is critical. When choosing a mentor, you want someone you look up to, who inspires you and who can offer smart solutions and fresh perspective and hold you accountable when needed. You want someone who is experienced, maybe an expert in a particular field or on a certain business aspect. It's also important that this person has the time to give and the interest in mentoring you to achieve your short- and long-term goals. I know the value and rewards that come from being both a mentor and mentee, because I've been on both sides of this powerful relationship throughout my entrepreneurial life. (Dragoo, 2014, Overview)

An interesting development was reported by Kyrgidou and Petridou (2013) regarding e-Mentoring. In their opinion e-Mentoring did not fulfill *mentor's* expectations and was deeply disappointing in not meeting hoped for results. However it seems that women *protégés* did benefit. It appears to be a “mixed bag” of results. While their research was limited to Greece, it may be that the mentors of Greek women preferred face-to-face mentoring relationships. This may not apply to the United States where the Internet and Web-based culture may yet allow e-Mentoring to blossom. Their thoughts on the matter were,

E-mentoring can serve as a dynamic, two-fold relationship that can create a significant learning database benefiting both sides. Mentees' knowledge and skills were positively influenced, while their attitudes facing uncertainty, flexibility and

innovation were found to be strongly influenced in the short and long run. Mentors did not seem to acquire extraordinary benefits from e-mentoring in terms of knowledge and skills, while their attitudes towards flexibility and interest in people demonstrate a marginally negative tendency. Both mentors' and mentees' self-confidence demonstrated an increased tendency and was influenced throughout the intervention and six months upon its completion. Besides benefiting the direct e-mentoring participants and enhancing the development of women entrepreneurship, findings can also significantly benefit management and policy-makers alike, creating avenues to further advance future efforts and practices in raising tomorrow's women entrepreneurs. (Kyrgidou and Petridou, 2013, Overview)

In another recent study, Stavropoulou, and Protopapa (2013) wrote about a “strengths-based approach to mentoring women entrepreneurs” in light of the facts that women are often discriminated against in the marketplace. This discrimination was based on females who had to bypass obstacles that arose from societal and cultural perceptions and norms, their eventual plan or unplanned interruptions to their budding businesses for childbirth and childrearing, (thus the need to undertake multiple roles in their business and at home), and the extreme difficulty to convince investors and raise capital, and overall perceptions of insecurity and fear of failure in a very competitive and dog-eat-dog business world.

In general, strengths-based mentoring focuses on individual virtues, talents and

human ability for fulfilment rather than on weaknesses and deficits. It is a positive perspective that elaborates on, and culminates in, the things one can do rather on those that one cannot. Stavropoulou and Protopapa (2013, p. 3).

While the mentoring of women is laudable, Amaio (2009) reminds me that only 25% of women are in the field of cyber security. What remains quite disconcerting is that Williams (2011) stated, “that 82 percent of women agree that having a mentor is important, but what will knock your socks off is that considering the competitive employment landscape...19 percent have never had a mentor.” While there is a solid belief that mentorship is critical to professional success, the real question for CSM is how to attract more women to the field.

Another article that dealt with racially based mentoring (i.e., diversity mentoring) was by Govan (2013). He summarized his findings as,

This qualitative phenomenological study explored the lived experiences of 20 African American business owners regarding contribution of mentoring programs to maintaining a sustainable business operation. The research study was grounded upon social network and social penetration theories relating to formal and informal mentoring relationships. African American small business owners in the southeast United States were interviewed, and the data from the interviews were coded and analyzed to discern themes or patterns. Fifteen themes emerged from the study suggesting mentoring could provide African American business owners with viable information and solutions about the business ownership challenges. Two important themes were (a) mentoring is viewed as an ongoing support line

for the new business owner to keep the business sustainable and growing; and (b) mentoring is only effective if mentors have a sustaining commitment for long-term relationships. Implications for positive social change include the use of mentoring to enhance business success through the sharing of experiences, ideas, business techniques and knowledge, which can enhance individual and community economic development. (Govan, 2013, Abstract).

What he meant by “social network and social penetration theories” was that it seemed best, where possible, to have African-American mentors paired with African-American protégés so that DIM was minimized from the outset. For Caucasian mentors to overcome African-American culture and attitudes it would take longer to build trust within the dyad and in some instances it might never be fully overcome. Because “mentoring is only effective if mentors have a sustaining commitment for long-term relationships,” this was an issue that had to be met directly.

### **Conclusion**

While my primary interest in this dissertation is workplace mentoring, that stage of mentoring cannot be fully appreciated without first considering the role of youth-adolescent and academic mentoring. Those who conduct, supervise, or participate in workplace mentoring are influenced and biased by previous periods or the presence of mentoring in their past. If that mentoring was a positive or negative instance, it will color the attitude, openness, and flow of workplace mentoring relationships. Mentoring does not exist in a psychological vacuum. Mentoring in many ways is a lifelong pursuit and endeavor as each of us transverse the various adult development stages that Levinson

(1978) initially discussed. In one way or another, formal or informal, someone is always mentoring us whether it is our parents, extended families, professional counselors, academic professors or workplace managers.

Effective mentoring centers around the deepest of human needs and desired – the need to belong and the need to contribute and to pass along some the lessons that life has taught us. While there is certainly an objective and empirical basis for the academic study of the mentoring discipline, on another level is the psycho-social and subliminal level that remains so difficult to quantify. A review of potential studies indicates that from 1985-2010 was the highest period of peer-reviewed research on mentoring being conducted with extensive studies undertaken as verified by Allen and Eby (2010). From 2010-2015, according to Google Scholar, 1,321 articles or studies considered academic mentoring, and 690 articles or studies focused on workplace mentoring. A complete review of many of these studies and research is provided in Appendix J. A review of these articles indicated they were largely based on research and studies conducted in the earlier time frame. Because academic mentoring may skirt the focus of this dissertation away from my intended research, I did not consider further examination in this field of endeavor. Of the 690 articles dealing with workplace mentoring, only 66 peer-reviewed articles were found that truly had some impact. Of these 66 articles most of these were not unique enough in their research and repeated or reviewed the work of Kram (1985) and others as mentioned in Allen and Eby (2010) and Appendix J. Therefore, they did not shed any new information that would elucidate this dissertation. One did deal with mentoring from the aspect of an “African-American,” one with “Dysfunction” in workplace mentoring,

and none pertained to “Asian-American” mentoring dyads. I also took one final look at key mentoring journals such as the *Journal of Vocational Behavior*, *International Journal of Mentoring and Coaching in Education*, *Mentoring & Tutoring*, and *Mentor* to find any new pertinent research. About ten new books, studies and research were discovered from 2011-2016. Only *one* new study Martin (2015) dealt with CSM, and *it was just eight pages long*. Another volume in 2016 dealt with organizational behavior of leadership. About ten new books, studies and research were discovered from 2011-2016. Only *one* new study Martin (2015) dealt with CSM, and *it was just eight pages long*. Another volume in 2016 dealt with organizational behavior of leadership. The same problem with these latest works and research indicated that they too were based on the research and other authors from 1985-2005, and few if any would be considered *new* and groundbreaking. This confirmed that the historical research of the past 30 years was the prime period for research on mentoring and coaching, and most were conducted within very tight parameters, were esoteric and constricted in nature. This literature review has therefore apparently exhausted the applicable resources.

## Chapter 3: Research Method

### **Introduction**

To gain insight, three respondent ( $R_n$ ) groups consisting of  $R_1$  (the cyber security protégé),  $R_2$  (the cyber security mentor or manager), and  $R_3$  (the CISO or the executive in charge of cyber security), participated in the primary research. I sought to uncover common qualitative study themes and patterns that might occur in the workplace. The primary goal was to ascertain the feelings of the three respondent groups regarding methods that might improve the overall cyber security infrastructure with special attention to CSM.

### **Research Methodology**

The goal of qualitative study research, according to Moustakas (1994) is to condense some type of shared experience that individuals have first-hand knowledge of into a single common meaning. Mentoring research would contain both aspects. More precisely, this study has spotlighted cyber security professionals where mentors and protégés have completed a mentoring relationship in the last 1-2 years, or may be currently engaged in one. The purpose of the study was to discover the respondents view of CSM. As I sought out common patterns and themes, I wanted to find out through an examination of the collected data any themes and patterns that emerged from the questionnaires.

1. What was it like to be mentored?
2. What did protégés think about their mentoring?
3. What did mentors think about their mentors?

4. How does a corporate executive (CISO) evaluate good mentors or protégés from poor ones?
5. How did academic education, cyber security vendor certifications add or detract from CSM?
6. How could the entire process be improved?

As noted in this study, past research has overwhelmingly demonstrated the value of both informal and formal mentoring across Levinson's (1978) adult development stages spanning childhood to late adulthood. Concurrently, it also revealed that a "gap" occurs simultaneously in the field of cyber security and CSM. I have attempted to address this gap by examining the role and relationships within cyber security between CISOs, mentors and protégés. I hoped that an analysis of the responses would help me to determine common beliefs, patterns and themes. I also hoped that my research would assist future researcher's into obtaining additional insight into the research questions.

### **Research Design**

The research centered around the development of three unique populations that comprised the qualitative sample. These respondent segments were designated as follows:

1. R<sub>1</sub> – Entry level cyber security specialists (new hires, interns, externs, recent college graduates and supervised protégés)
2. R<sub>2</sub> – Intermediate cyber security specialists (those in their first jobs or roles in the industry)

3. R<sub>3</sub> – Senior and Middle Management cyber security specialists (CISOs, VP of IT Security, mentors, managers and supervisors)

Each member of the final respondent sample was asked identical questions with the same questionnaire with their responses being tabulated for their group, and then compared with the other two groups.

The final questionnaire I developed and used (Appendices I) was randomized. There were several advantages to this approach. By using the Web, anonymity was provided to the respondent. I hoped this would allow me to secure (a) multiple individuals who had experienced CSM, (b) each of whom was either a protégé, mentor or CISO and, (c) which could be reported, recorded or transcribed easily. This was naïve. I discovered that many participants did not respond as I had expected. Resistance was present. In a normal localized interview process, I could “prod and poke” to some extent, but I could not do this. I was entirely at the mercy of my respondents. Those in my study were nationwide in the United States and completely unknown to me. The advantage of this is that being unknown to the participants may provide less bias and a less tainted analysis. Glesne and Peshkin (1992, p. 21) “questioned research that examines your own back yard – within your own institution or agency, or among friends or colleagues.” They felt it was too political and too risky to study or perform research from within one’s own organization.

The ProQuest database contained 330 Doctoral dissertations on the subjects of qualitative studies and mentoring. Of special note was the qualitative study research

conducted by was Johnson (2013), who studied gender differences in mentoring within cyber security technology management. She wrote,

The study found that male dominance in the IT security management field is a fact, yet has the potential to change over time if the current mindset on women in the field were changed. Young girls need role models that look like them and can expose them to the many options in the security field. The involvement of STEM programs, internships, and mentoring are absolutely necessary to get girls interested in the IT security and other technology fields while at a young age. In turn, the exposure can prepare them for college and university level academic programs that will eventually provide them opportunities to enter the IT security workforce. (Johnson, 2013, abstract)

She went on to state that,

The disproportionate number of men to women in information technology jobs, including cyber security positions is apparent. Some of the primary causes for this are that the field of cyber security often requires its staff and senior executives to be available around-the-clock and that many women do not want to make that type of commitment, which could require them to sacrifice family life, or delay having children. Cyber security careers also do not align themselves well with telecommuting job opportunities. (Johnson, 2013, p.3)

On the positive side, it was Douse (2009) stated that women did better when mentored by other women. As noted earlier, Laukhuf and Malone (2015) concluded in their research that,

The significance of the study is reflected through the mentoring experiences reported to be helpful in the personal development and business growth of mentored women entrepreneurs. The theory of mentoring was expanded by these women who developed stronger transformational leadership competencies. Their lived experiences of running a business through transformational leadership suggests women entrepreneurs need to find a good balance between their career and personal life. The practice of mentoring was said to help them face their challenges and pro-actively confront barriers. A key success factor was reported to be the ability to ask for help. These women entrepreneurs also learned sexism should not distract them from their mission of running a successful business. (Laukhuf and Malone, 2015, p. 81)

### **Coding and Tabulation**

Because of the nature of qualitative data, the method used to code and tabulate the responses was critical. A typical approach for conducting social research according to Singleton and Straights (2010, 49-450) is normally associated by asking five questions. These type of questions include, (a) what does the researcher want to uncover, (b) what is to be observed, (c) how many subjects are to be examined, (d) how is the event of interest to be observed, and (e) how are answers to be decided? It is more than just one part of the cycle that is important.

The entire process of the cycle from inception to the final endpoint must be considered. Often, an over emphasis on one or two portions of the approach results in the research being incomplete, tainted, biased, or compromised. The research must then

consider common patterns and themes and then ascertain the results. This is a very common methodology research design in qualitative studies.

### **Locating Site/Individual**

Qualitative research need not be located at a single site. However, each potential respondent queried must have experienced the event being investigated. Unless there is commonality, it would most likely fail to meet the strict requirements of qualitative research. Of particular note was the grounded theory research study by Creswell and Brown (1992). They interviewed 32 department chairpersons who had mentored faculty in their departments that resulted in three different roles of department chairs being either an (a) administrator, (b) advocate, or (c) interpersonal. Cyber security mentors (in other geographic locations) may undertake a similar role with their protégés.

### **Gaining Access and Making Rapport**

If good data cannot be obtained the subsequent research will fail. Several procedures must be undertaken to block this. I had to have a sound academic and professional basis for my research. After securing Walden University approval to conduct research (Appendix A), the development of an on-line or Web based consent form was required. I then had to explain the purpose of the research, and indicate there was approval to conduct research. I had to also include the right of the participants to voluntarily withdraw at any time and how the confidentiality of the participants was to be protected. Also, any known risks to participating in the research and the benefits that may result from it needed to be clearly communicated. Each participant must agree to voluntarily participate.

### **Sampling**

A key concept was made about whom and how many people were needed to be used in the sample for the qualitative research. The population subset must purposefully inform the research about the event studied. A central recommendation to qualitative research is to study only a few sites, but study them comprehensively, but again this is not a steadfast rule. One must be cautious not to generalize the data. In qualitative studies, the number of participants can range from 1-325 as seen in Dukes (1984) and Riemen (1986) who studied ten people. There is no set number. Obviously the more who participated the better the outcome would be, as in any polling situation.

### **Collecting Data**

Four forms of data could be collected and are normally used in the qualitative research: (a) observations, (b) interviews, (c) documents, and (d) audiovisual materials like photographs, computer disks, and videotapes. However, other methods of data collection are now available utilizing the Web that did not exist earlier. Historically speaking, according to Bryman (2012, p. 714) Phenomenology is a “philosophy that is connected with the question of how individuals make sense of the world around them and how in particular the philosopher should bracket out preconceptions concerning his or her grasp of that world.” It normally utilizes an in-depth interview(s) as its method of collecting data. I did not use this method. Since I did not use in-depth interviewing to gather my data, I had to base my study upon general qualitative data research methods.

I used a Web-based questionnaire (Appendix J) to collect data. I received input from 68 cyber security professionals, with 22 responses from R<sub>1</sub>, 20 responses from R<sub>2</sub>,

and 26 responses from R<sub>3</sub>. This allowed for an appropriate sample. In a qualitative research study, it is required that each member of the sample is among those who have experienced, felt or participated in the event. This becomes one of the required criteria of the research, and only then is a purposeful sample formed. In this research it specifically included respondents according to the following criteria:

**Location:** United States

**Age:** 21 - 70

**Education:**

- Some college
- 2-year college
- 4-year college
- Graduate degree

**Student:**

- Full time in graduate school
- Part time in graduate school
- Full time at a four-year college
- Part time at a four-year college
- Full time at a two- year undergraduate
- Part time at a two-year undergraduate.

**Job Function:**

- Consulting, Human Resources & Management
- Information Technology

Today, new tools such as Web-based questionnaires may also contain and provide insight into the research questions including more anonymity. The traditional format in collecting research data may become more difficult to obtain as potential respondents and their busy personal and work schedules do not respond vigorously to repeated requests for their input. This proved true in the pilot study, which required a change in methodology for the primary research phase of this dissertation. This should not be interpreted that oral interviewing is passé. Instead, researchers should always be considering the best methods to meet their research requirements. I used a Web-based questionnaire and tools provided by SurveyMonkey® and FluidSurveys® to sort, collate, and determine qualitative research patterns. I wanted, at the very least, to investigate the following qualitative research questions in Figure 2.

<p>Time of interview: Date: Place: Interviewer: Interviewee: (Briefly describe the Research Study or Project)</p> <p><b>Questions:</b></p> <ol style="list-style-type: none"><li>1. How does formal cyber security undergraduate or graduate academic education play a role in a protégés continuing education as a cyber security specialist?</li><li>2. How do professional cyber security vendor certifications play a role in the continuing education of IT security specialists?</li><li>3. How does CSM play a role in continuing education of cyber security specialists?</li><li>4. What are some suggestions to improve cyber security education programs?</li></ol>
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*Figure 2.* Primary research questions.

### **Recording Information and Resolving Field Issues**

The data collection process protocol is normally in association with observing the respondents. This was not possible using the Web. Normally, field issues include gaining access to organizations and then convincing potential respondents or respondents to

participate and respond. In the end this may be the most difficult issue in conducting field research. Many times potential respondents are concerned with the time it might take to participate. Regarding the ethical issue of confidentiality, in this study the required IRB Participant Consent Form (Appendix H) helped to gain the trust of respondents. When the research was completed and all of the data used is sorted, collated, and categorized and the final report or dissertation is completed, then the confidentiality, integrity and access to the data is the last step in the data collection cycle. All electronic computerized data was archived. One copy was placed in bank security box (off site), or a fireproof file under my direct control for a time period of five years. Trustworthiness of the respondents was assumed because due to confidentiality there is no credible reason for them not to be candid and trustworthy in their responses.

In this research, one of the thorniest issues was actually obtaining the number of samples for each respondent subset. It took 9–12 months to isolate and query them. The final Web based questionnaire (Appendix I) had to be edited to reduce the number of questions from over 60 to 22 because I discovered that potential respondents simply would not complete an on-line questionnaire with too many questions. I also decided to eliminate open-ended questions. However, some questions allowed for respondents to elaborate on their feelings or experiences. Sometimes even with multiple choice options, respondents simply would not respond or would not contribute anything more than the multiple choices provided. Most demonstrated an aversion to participating in oral-interviews, and displayed a generalized pattern of resistance to subjective type questions. I hypothesized that time was a significant factor during the workday. When respondents

were queried on weekends, the response rates nearly doubled, which seemed to reinforce this postulation.

### **Research Questions**

Because the research is qualitative and because I used a Web questionnaire I had little or very limited ability to discuss critical details with the respondents. Therefore, it was vital to use “good targeted questions” to the potential respondents. I wanted to determine how much formal CSM was occurring in the workplace, who was involved, and to what degree did top management (CISOs) participate. If possible, any direct information from a company human resource department added to the veracity of the study. I wanted to determine what qualifications newly hired staff members held and, which additional qualifications they should or would seek in the future. I assumed that most HR departments worked along the same principles or hiring guidelines for their future cyber security staff.

I reduced the final questionnaire (Appendix I) to 22 questions that seemed to produce enough information to gain insight into the research questions. Previous questionnaires are listed as Appendices B, C, and D. These latter questionnaires were not used in the final primary research because respondents did not respond or the IRB required changes. This indicated they might have been cumbersome, deemed intrusive, unwarranted or were too time consuming. By examining demographic patterns, similarities and differences, I attempted to describe what a typical manager, recent new hire, or those seeking their first job in cyber security looked like, and more importantly what they felt was important to the professional development of their careers. I could

then attempt to focus or propose hypotheses regarding formal and informal CSM based upon respondent data. From this data, I could then hopefully uncover the answers to my research questions that were posited (Figure 2).

To assist each sample (in the event of confusion) I attempted to expand and develop the scope of the research by asking realistic and timely questionnaire research questions, which then were coded and tabulated. I hoped that by comparing and contrasting the responses I could then assess the CSM experience in more detail. Most importantly I wanted to ascertain what mentors and protégés had experienced as a event during their mentoring relationship. What did they experience and feel beyond the simple transfer of knowledge or technical knowhow? As far as possible I wanted to know what it was like to be fully involved or immersed in the concept of CSM. How did the CSM relationship increase the protégés ability to understand the issues pertinent to cyber security and how prepared did the protégé feel at the conclusion of their formal CSM program? What suggestions for improvement might be made to managers and mentors was also highly desirable.

### **The Pilot Study**

Before the research process was started, IRB approval (Appendix A) was secured. A pilot study was conducted to test sampling methods, to refine questions, and adjust procedures (as deemed necessary). The pilot study was conducted from March 15, 2014 to June 15, 2014, and the primary purposes was to test sampling methods, adjust and refine questions, and to make any needed changes in order to conduct the primary

research. This was done and completed by seeking responses and input from the Albany, NY Chapter of ISACA®.

All participants in the research were to be derived from professionals in the field of IT cyber security managers, IT audit and information assurance, IT risk management, corporate governance of IT, and other cyber security professionals from the FBI and DHS, who are members of the Hudson-Valley, NY Professional Chapter of ISACA®. Most, but not all, of these members held various well-known cyber security certifications such as Certified in the Governance of Enterprise IT (CGEIT®), Certified Information Security Auditors (CISA®), Certified in Risk Information Systems and Controls (CRISC®), Certified Information Security Managers (CISM®), and the Certified Information Security System Professionals (CISSP®), Certified Ethical Hackers (CEH®), CISCO® Certified Network Associate in Security (CCNA-Security®), CISCO® Certified Design Associate in Security (CCDA-Security®), CISCO® Certified Security Professional (CCSP®), IC-EEC® Licensed Penetration Tester Certification (LPTC®), IC-EEC® Certified Hacking Forensic Investigator (CHFI®), and/or the IC-EEC® Certified Security Analyst Certification (CSAC®). Each population subsets were then compared to the others to look for common patterns, similarities or differences.

I received only two responses from R<sub>1</sub>, seven responses from R<sub>2</sub> and four responses from R<sub>3</sub> out of a potential 200 members. Any responses that were either incomplete or where the respondent spent less than 10 minutes completing the questionnaire was deleted. Therefore a grand total of 13 responses were received in total and then were used to refine and adjust the final Web based questionnaire (Appendix I)

used in the primary research. It quickly became apparent that resistance was occurring on the part of potential respondents. The reason for this resistance had to be investigated and then changes made before the primary research could begin. Since, “time” was later discovered to be very limited to respondents, I came to the conclusion that taking away time from potential respondents daily schedules was most likely responsible for the meager results. While the results from the pilot study were not tabulated into the final results of the primary research, the results were critical because it allowed adjustments to the final questionnaire (Appendix I) to be made.

### **Instrumentation**

I discovered in the pilot study that IT personnel did not like to answer open-ended text questions. For whatever reason, respondents bypassed these questions, or circumvented these types of research questions. In other words, they preferred objective questions. Subjective type questions made them uncomfortable. They did not want to answer questions regarding how they “felt.” To compensate for this, about 20% of the questions also were given an option where the respondent was allowed to elaborate on their responses. With that change, some limited subjective data of was received and was deemed quite significant and crucial to the fundamental research because the respondent actually *took the time* to provide a more specific and detailed answer voluntarily.

Before state-of-the-art and up-to-date technological and software advances, two “split-halves” would be manually placed into some form of database or spreadsheet and then meta data (e.g., data about the data) would be produced. The process was both tedious and subject to error because when the data were entered, it would be common for

human input error. In the former method, at random, one-half of each population subset would have formed the first-half of the “split-half” and the remaining balance would have formed the second-half of the “split-half.” Both “halves” of the “split-half” (Singleton & Straight, 135-36) would have been used to test for correlation and internal reliability.

However, with Web-based questionnaires this is not required because the Web based survey companies like SurveyMonkey® or FluidSurveys® had querying software that did this automatically. The only way to obtain traditional split-halves is to conduct the same Web-based questionnaire twice to completely different respondents and then compare the two “split-halves”. As Singleton and Straits (2010, p. 136) state, “The higher the correlation the more equivalent the halves, and the greater the reliability of the measure.” Since time was of the essence I decided for forego this. It should also be noted that the responses from the questionnaire respondents were very similar to one another, so an additional questionnaire to ascertain “split-halves” may have not added any new deviations from the initial questionnaire. Perhaps repeating the questionnaire in one or two years would be more beneficial and then by comparing the results would test for changes in the CSM environment.

To eliminate bias in the research questions, words communicating or that might communicate value judgments such as “should” were not used. Because some of the information collected might be considered “sensitive” to one cultural group or another, social scientific terms were preferred. Instead of “White” or “Black” mentors or protégés, the term “European-American,” or “African-American” was used. Instead of “men” or “women,” the terms “male” and “female” were used. Ragins (1999a) recommended that

the word “mentor” be used instead of other common synonyms like “coach” or “trainer” to be used in the questionnaires so that confusion would be reduced or eliminated. The terms mentor and protégé was highly suggested. Terms had to be more generalized. Instead of specific chronological ages of the respondents, age-group was preferred because it would more closely align with the Levinson et al. (1978) adult development stages. However, it became necessary to use other terms like supervisor, intern, extern as well. While mentor and protégé were preferred I did not want terminology to become a barrier in the research. Using more familiar terms seemed to help in this regard.

### **Data Collection Procedures and Analysis**

The first step was the approval of the Walden University Institutional Research Board (Appendix A). Then after the pilot study was completed, changes made to the final questionnaire, the primary research began. Data analysis was then completed and Microsoft® Excel spreadsheets and graphs were constructed for presentation purposes. After obtaining approval from my dissertation committee, this process was followed by Walden University Form and Style review, and my Oral Conference (dissertation defense.) The final step was approval by the Chief Academic Officer of the University.

In a qualitative research study, there are six key steps in the process according to Moustakas (1994),

1. First, describe personal experiences with the event under study. This was completed by each respondent in the questionnaire when they agreed to participate and hopefully was express in the wording of the questionnaire questionnaire.

2. Develop a list of significant statements.
3. Group the significant statements into larger units of information called “meaning units” or themes.
4. Write a description of “what” the participants in the research experienced. A comment section followed the logical themes or units.
5. Write a description of “how” the experience happened. Each respondent was given the opportunity to add a short sentence or two describing what each of them experienced in their mentoring.
6. Finally, write a composite description of the event incorporating both the textural and structural descriptions. The final answers to the research questions included in the hypotheses and best understandings of the qualitative research experience of the respondents. This also included some initial conclusions.

I used tools from the SurveyMonkey® and FluidSurveys® website to assist in the qualitative coding process of this research. It should also be noted that demographic analysis is normally not a primary function in qualitative research, whereas it is in quantitative research. However, “Statistical procedures are normally associated with quantitative research, there are certain parallels concerning methods because all researchers “are concerned with data reduction.” Bryman (2012, p. 409). What this means to me is that it is not possible to entirely eliminate all quantitative analysis. Even beliefs, feelings, patterns and experiences can be categorized and tabulated. It is just done differently in qualitative research as compared to quantitative research. However, with

such a limited number of participants, there is always a real danger of generalizing the data. If this does indeed occur, it would mean that too much emphasis was being placed on developing quantitative demographic data and basing conclusions on this basis.

I desired insight into what constitutes a typical mentor and a typical protégé. If a mentor or protégé somehow felt that they were not typical what did that mean, and more importantly what effect did that have in the mentoring relationship? Did it advance or impede the mentoring process as previously described as DIM? Was there any gender, age group or racial-ethnic diversity in the mentoring dyads and did this result in any subliminal or unconscious processes in the mentoring relationship? Was any other DIM discernable?

### **The Rationale Underlying the Questionnaires for R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub>**

There was a single questionnaire (Appendix I) used in the final research. The objective was to determine how each population subset “felt about” the formal mentoring event. What were the differences or similarities in the responses, and what did that mean? The results were then tabulated to determine similarity or dissimilarity of responses. This was then compared and contrasted with specific demographic data to determine if any bias was present. I was pleasantly surprised of the many direct similarities and correspondences between the respondent groups as reported in Chapter 4. It would be interesting to conduct the same research after a period of time (e.g., two to five years from now) to determine if any new patterns developed in the interval. Would future respondents change their feelings, beliefs or attitudes after gaining critical field

experience? What caused these views to shift? Were respondents savvier or more enlightened? Did they become more aware of the subtleties their jobs required?

### **Other Considerations and Conditions of the Research**

There were no other preconditions or criterion for respondents to be included in the research except being part of the “IT community” and who participated in a formal mentoring program in the previous two years. While it would have been nice to have more stringent preconditions, my fear was that by placing too many requirements on potential respondents that it would inhibit the research. While there is a difference between formal and informal (naturally occurring) mentoring, sometimes mentoring in the workplace is more ambiguous. It cannot be neatly stratified between formal or informal mentoring. While these terms have already been identified earlier in the literature review and in the definition of terms, the presence of informal mentoring should be noted as well as that of informal mentoring relationships are beneficial to protégés.

A workplace mentoring relationship can be described as a senior-employee providing guidance and assistance to a more junior-level employee on a voluntary basis. Although the mentor may be the employee’s direct supervisor, all supervisors are not necessarily mentors. The workplace mentor is a unique source of power and support that facilitates the professional development of the protégé within the organization. (Lentz and Allen, 2005, April, 159-160)

What bearing or direct influence will the formal mentor or CISO have on their protégés or interns. It appears that those protégés who are in formal workplace mentoring relationships may have also engaged in additional informal mentoring, perhaps with their

peers. The informal relationship may be more “relaxed” thus allowing the workplace protégé to assimilate new learning and cyber security techniques faster and with increased proficiency. The problem is that it is difficult to “measure” informal mentoring relationships because they lack the needed structure or scaffolding that is present in formal mentoring relationships. Since the informal mentor cannot be “isolated,” they cannot be queried in the research nor can it be empirically proven that they belong to any of the population groups ( $R_1$ ,  $R_2$ , or  $R_3$ ).

### **Summary**

The executive and senior management in cyber security (e.g., CISOs or VP of IT Security) of the workplace are faced with many challenges in the fulfillment of their executive duties. One of these responsibilities is being the executive level cyber security leader in the business organization. They are charged to maintain the confidentiality-integrity-availability (CIA) triangle by ensuring that their cyber security managers and staff are being kept up-to-date and current with the latest developments (e.g., hardware and software, etc.) in the cyber security field. This dissertation reveals that many members of the cyber security staff would be open to some form of CPE and CSM that included formal academic study and degrees, and well-known and established professional IT or cyber security certifications.

While the senior management and staff may be desirous of that outcome, time and budgetary and time constraints may present a significant obstacle to overcome. This may also indicate the requirement of formal internal or external independent professional based CSM.

Chapter 4 of this dissertation will attempt to resolve these issues and uncover other obstacles (perceived or actual) that current cyber security staff confront, and Chapter 5 will propose methods to overcome them.

## Chapter 4: Results

### **Introduction**

The primary goal was to determine to what degree CSM adds or detracts from the process of improving cyber security. Four qualitative research questions guided my research.

1. How does formal cyber security undergraduate or graduate academic education play a role in a protégés continuing education as IT security specialists?
2. How do professional cyber security certifications play a role in their continuing education as IT security specialists?
3. How does CSM play a role in continuing education as IT security specialists?
4. What are some suggestions to improve cyber security education programs?

### **Sampling and Data Collection**

After obtaining IRB approval (Appendix A), a pilot study was conducted. One of the most significant results of the pilot study was just how difficult it would be to find the required number of potential participants for the primary research. Only 13 respondents from all three population subsets were recruited during the pilot study. The minimal results were unexpected and disappointing. I attributed this to lack of formal research experience on my part, and an attempt was made to adjust the data collection process to determine if there were more robust ways to obtain the needed data. All attempts failed.

It appeared that respondents either did not have a strong interest in the research or that organizations and their executives I contacted (e.g., ISACA®, ISC<sup>2</sup>® and GIAC®)

did not sufficiently engage their members. I could only hypothesize that many may have not chosen to participate in the pilot study because they did not want to spend the time answering questions, or that they were not properly motivated. Of those who did respond, for some reason many of them did not complete the research process by skipping questions, or not providing enough detail in their answers. While a skipped answer was an answer in one sense of the word, the lack of a full and complete answer would most likely skew results. The respondents used one-word answers, or simply said no or yes or put a string of letters to complete the question, or skipped them altogether. It became evident quickly that the original concept of the research had been undermined and that a new approach would be needed. Because results from the pilot study were so disheartening and inadequate, I received approval from the IRB for the use of an electronic approval form (Appendix G), and contracted with SurveyMonkey® and FluidSurveys® to obtain respondent data for my primary research questions.

### **Adjustments to the Research Methodology**

The pilot study required an honest reappraisal and reexamination of the original research method proposed in Chapter 3. In order to proceed, the final Web-based questionnaire in (Appendix I) was completed. It had to be completed by the respondent subsets ( $R_1$ ,  $R_2$ , or  $R_3$ ). Those responses would be subsequently examined for pattern analysis.

Questionnaire research comprises a cross-sectional design in relation to, which data are collected predominantly by questionnaire or by structured interview on more than one case (usually quite a lot more than one) and at a single point of

time in order to collect a body of quantitative or qualitative data in connection with two or more variables (usually more than two), which are then examined to detect patterns of association. (Bryman, 2012, p. 60)

These patterns of association had to be extracted from the data. All three methods of research (quantitative, qualitative and mixed-methods) all share a common need to present research data using some form of analysis. Quantitative research often uses SPSS®, qualitative research normally uses NVivo®, and mixed-methods may use one or both. In a mixed-methods approach I might have been able to “draw certain inferences about causality” Bryman (2012, p. 59), but further research or repeated sampling may be required to pinpoint the precise patterns of association. Bryman (2012, p.409) believed it might be appropriate, in very limited circumstances, to permit simple statistical procedures such as “frequency tables” in qualitative research. The use of NVivo® to reduce oral interviews into patterns or themes, and then to relate or make inferences is a good example.

The pilot study also demonstrated that the number of preliminary questions in the demographic data would need to be significantly reduced. While approximately 65 questions were asked in the pilot study, I reduced this to 22 questions for the final primary research. Instead of having three unique questionnaires (R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub>), a single questionnaire (Appendix I) was developed and used (R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub>) in the primary research. All respondents were asked the same questions. While in the pilot study there were two sections consisting of multiple choice and open-ended text responses, and the

possibility of oral interviews, only multiple choice questions remained in the primary research. After these adjustments were made, the primary research process began.

I hoped I would be able to create the needed subsets of data from the responses received from the final batch of survey respondents which I called the new R<sub>1</sub>, R<sub>2</sub> and R<sub>3</sub>. While the primary research questions remained the same, I also hoped that I could provide at least some definition as to what the term “typical” means so that responses regarding the primary research questions remained focused on the qualitative approach. As previously mentioned a deep concern was not to allow the research to be transformed from a qualitative research study into a quantitative statistical analysis. In an attempt to preclude this, I decided to forgo the use of statistical tables and focus on producing figures and simple graphs where future readers could visualize qualitative patterns from the questionnaire data itself. The figures were also integrated with the primary research questions (Chapter 3) to contextualize the data. In this way, future readers alike would be able to compare and contrast the primary research questions with the actual Web-based questionnaire results.

### **Benefits and Problems of Web-based Questionnaires**

There are a number of benefits using Web-based questionnaires over traditional paper or oral-interview methods. According to Wyatt (2000) some of these are (a) they are more inclusive, (b) they are inexpensive to carry out, (c) data are captured directly in an electronic format making analysis faster and cheaper, (d) data definitions can be linked to the data computer forms and vice versa, (e) rapid checking of results, (f) enforced

branching of responses, and (g) allow rapid updating of questionnaire content and question ordering to user responses.

Wyatt (2000, p. 428) also discusses problems stating that “two key disadvantages of Web-based questionnaires concern the generality and validity of their results.” He goes on to state that “a response rate of 80% is usually vital to ensure the generality of questionnaire results, but it is not always necessary.” This study only examined results from respondents who completed the entire Web-based questionnaire. Therefore, there was a 100% participation.

In open-ended qualitative studies using paper questionnaires questionnaire respondents could also utilize techniques to circumvent true inquiry from occurring (as was observed in the pilot study). If a true random population was not quickly isolated and closed respondents might send the on-line questionnaires to friends or to workgroups in a singular company or organization, which would result in bias and skewed results. Therefore the use of professional Web-based questionnaire companies like SurveyMonkey® and FluidSurveys® that have exclusion methods built-in to their questionnaire respondent database was indicated and utilized.

The Web questionnaire has an important advantage(s) over an e-Mail questionnaire in that (a) it can use a much wider variety of embellishments in terms of appearance, (b) the questionnaire can be programmed to allow filtering of one question at a time, and (c) automatic download of responses directly into a database. (Bryman 2012, p. 671)

This last feature Bryman (2012, p.671) specifically refers to his use of a SurveyMonkey® Web-based questionnaire and then stated, “Each respondents replies are logged, and the entire dataset can be retrieved once you decide the data-collection phase is complete.” A concern often raised about Web questionnaires is that “not everyone is online,” but that did not seem to be a significant factor in my research. It was the responsibility of SurveyMonkey® and FluidSurveys® to secure the data I needed.

### **Resolving Field Issues in the Primary Research**

Field issues included gaining access to organizations and then convincing potential respondents to participate. This may be the most difficult issue in conducting field research. Many times potential respondents are concerned with the time it might take to participate. Using SurveyMonkey® and FluidSurveys® helps to eliminate this concern to a large degree. I assumed that potential respondents to the research would not spend more than 15-20 minutes (or less) to complete the Web-based questionnaire. Potential respondents may also have some concerns about confidentiality, so making this clear in the agreement to participate is crucial. By using SurveyMonkey® and FluidSurveys®, this was eliminated to a great degree. The size of the potential sample was not a limiting factor in the research.

The first goal was to determine if I was able to obtain a purposeful sample from each of the population segments ( $R_1$ ,  $R_2$  or  $R_3$ ). Using the SurveyMonkey® and FluidSurveys® website for the primary research, a total of 68 samples was obtained. I felt this met my research requirements. Another goal was to obtain (if possible) a wide and extensive sample, across age groups that would align with Levinson’s adult development

stages and of Kram's study of 18 mentoring dyads, and be geographically dispersed in the United States. This was also met according to Web-based analytical tools from SurveyMonkey® and FluidSurveys®.

### **Primary Research Questions**

The final research questions consisted of 22 Web-based questions. From this data I was able to place response data into tables and to form inferences and patterns of associations (e.g., meta data) from the Web-based questionnaire. This would hopefully lead and allow for my primary research questions to be answered and some insight into the secondary research questions provided. Microsoft® PowerPoint graphs were constructed that became the Figures in Chapter 4.

Each of the following pages includes a graphical representation that forms the foundation of the qualitative research pattern of association between the population subsets, and an explanation of the Figure noted below the Figure itself. To determine the qualitative substance of the research questions (as a whole) requires that each of primary research questions to be compared with others. Then a final overall pattern of qualitative themes such as the dominant “experience,” “feeling,” “belief,” or its “dissonance,” “contrast,” or “comparison,” within the population segments could be developed.

The first three questions were used to “sort” and “categorize” respondents. I desired more specificity in, which area of IT a potential respondent worked in. By doing so, a more “select set” of meta data was collected that could speak more precisely and authoritatively about the overall impact and experience of CSM. In some instances as noted by me, certain patterns or themes and comments seem to be conflicted with others.

This is most likely attributed to respondent confusion, error, or an incomplete understanding to my query. Overall the data appeared to be very consistent between the various populations.

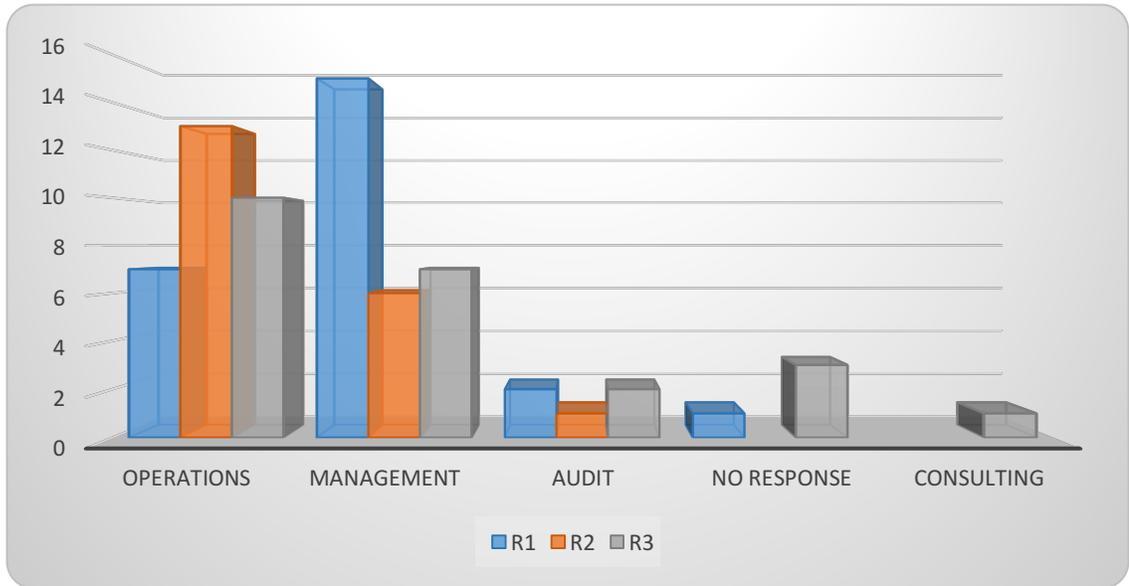


Figure 3. The department worked in.

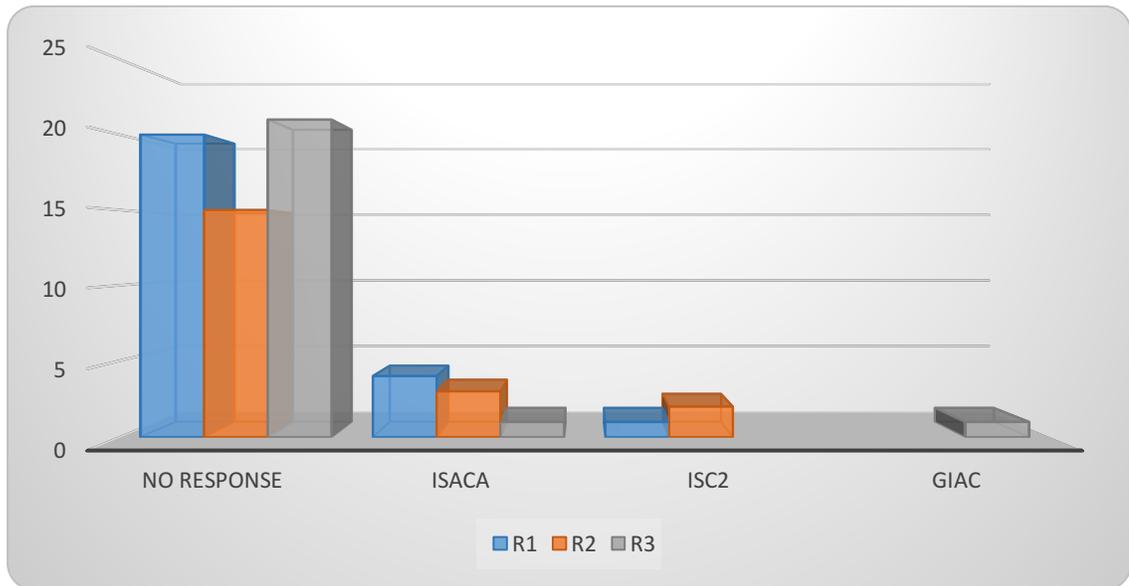
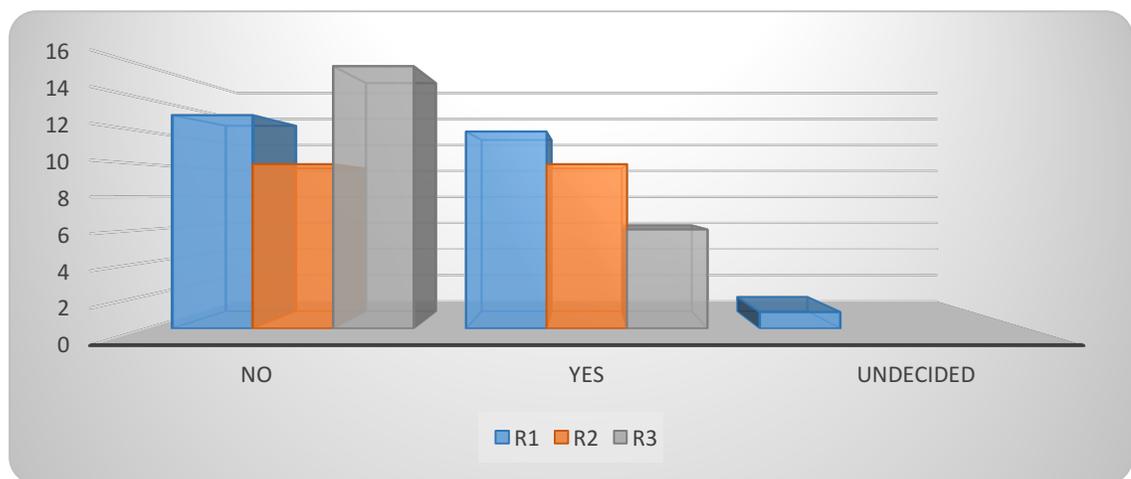


Figure 4. Professional organizations belonged to.

There are three population groups that were questioned and included in this dissertation research according to (Figure 1) were protégés ( $R_1$ ) who consisted of those who had just completed college and obtained their first degree (either Associate's or Bachelor's), or were in their first jobs in cyber security. Some of those in the intermediate level ( $R_2$ ), who comprised most of my mentors, were not yet in managerial roles, but also were not new hires or recent college graduates. The final population ( $R_3$ ) consisted of those who were in executive management, senior-management and middle-management and had been in those roles for several years, and most of them were directly involved in mentoring their staff. They were in these positions with their current companies, organizations or previous companies where they served in similar roles. Thus both  $R_1$  and  $R_3$  were at the opposite poles of a continuum and represented the least experienced and the most experienced, while ( $R_2$ ) was positioned between the other two poles. Thus the intermediate level should have viewpoints and experiences that bridged both  $R_1$  and  $R_3$ . This would be normative for the research. It should be noted that  $R_1$  had the largest percentage of responses and  $R_2$  had the least.

According to (Figure 3) the first pattern of association is clear between the respondents. Operations and management were the primary roles that respondents predominated. A very slight difference gave operational roles the lead position, which seems to indicate that rank-and-file cyber security staff were quite vital to the company organization. It is the operational staff that performed the daily tasks under the supervision of senior management, project managers, and other managers who most likely were the mentors of lower-level staff or those in audit and compliance. It would

have been interesting to know more about the specific roles in IT operations that each respondent was assigned such as help-desks, or 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> level responders to various cyber security crises in the workplace. These could have included forensic analysts, penetration analysts, log analysts, hardware and software specialists, database personnel, and various technicians. However, an exhaustive list would tend to become cumbersome to analyze further and even with further analysis a real question to be raised would be the ultimate value of that analysis. It is extremely interesting to note however, that audit and compliance, which was measured was extremely lower than the first two groups measured and that outside IT consultants were even smaller. According to (Figure 4) the second pattern of association is apparent in that all of the populations did not see any strong intrinsic value to being a member of outside professional organizations. Without further research it may not be possible to determine why this is the case.



*Figure 5. Vendor cyber security certification held.*

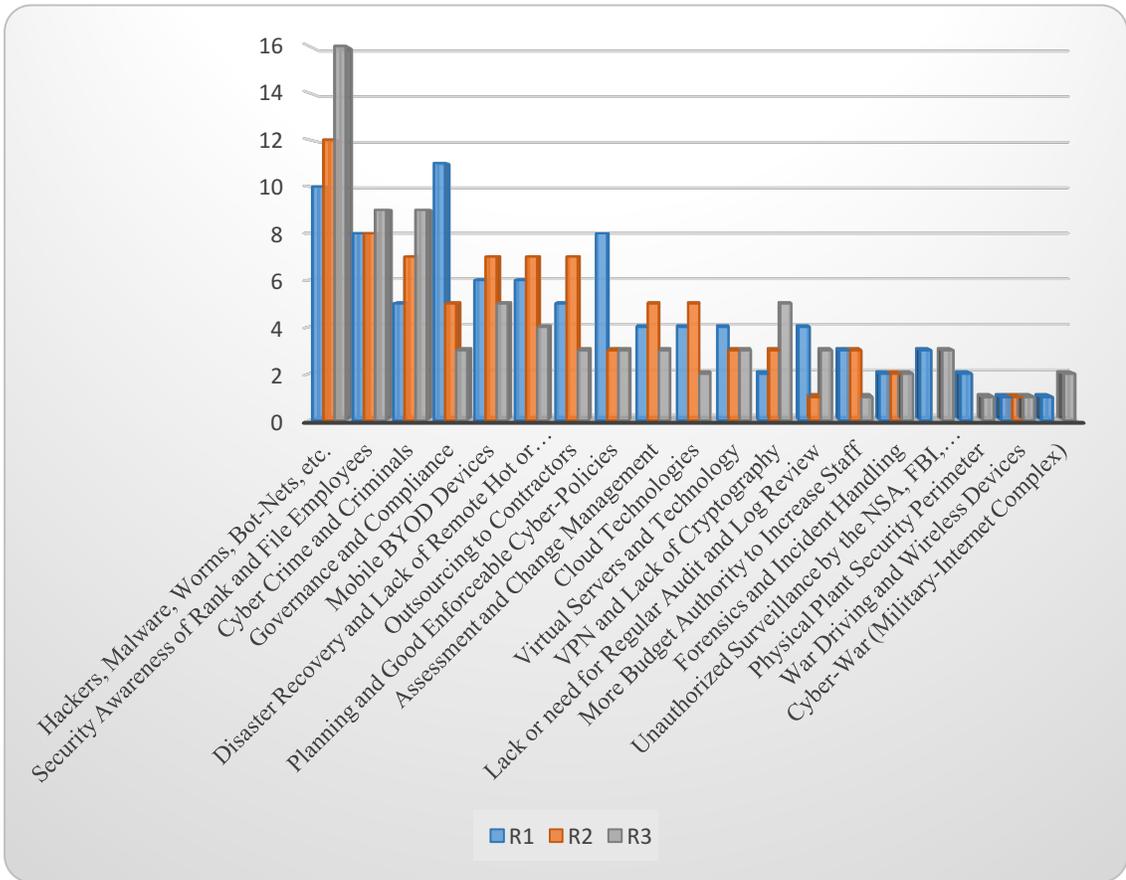


Figure 6. Greatest risk to company.

The top threats (least significant to most significant) are indicated (Figure 6). The most obvious threat was not a surprise. It was good to see that security awareness of rank and file employees was number two in the list, especially in light of the fact that “it is the people who work within the system that hide the inherit danger” according to Tipton and Krause (2007, p. 521). This ranking would seem to indicate that cyber security professionals are aware and are concerned about this threat. Hopefully employees and users of their systems are being better trained and they are less likely to fall prey to the common techniques that hackers and cyber criminals use like social engineering, phishing, and spear-phishing, and the use of good password policies.

All of the populations showed fairly consistent themes and patterns, except R<sub>2</sub> and R<sub>3</sub> felt that hackers were the great single threat, and that R<sub>1</sub> felt that governance and compliance was significantly more important. I was not pleased to see that planning and good enforceable cyber policies registered as low as it did and that the need for more budget authority to increase staff came in even lower. In light of other factors as in (Figure 15, Figure 18) that time was scarce commodity in the workplace, one would expect this to be higher in the list. Obviously with more qualified cyber security staff, perhaps potential threats could be more properly addressed.

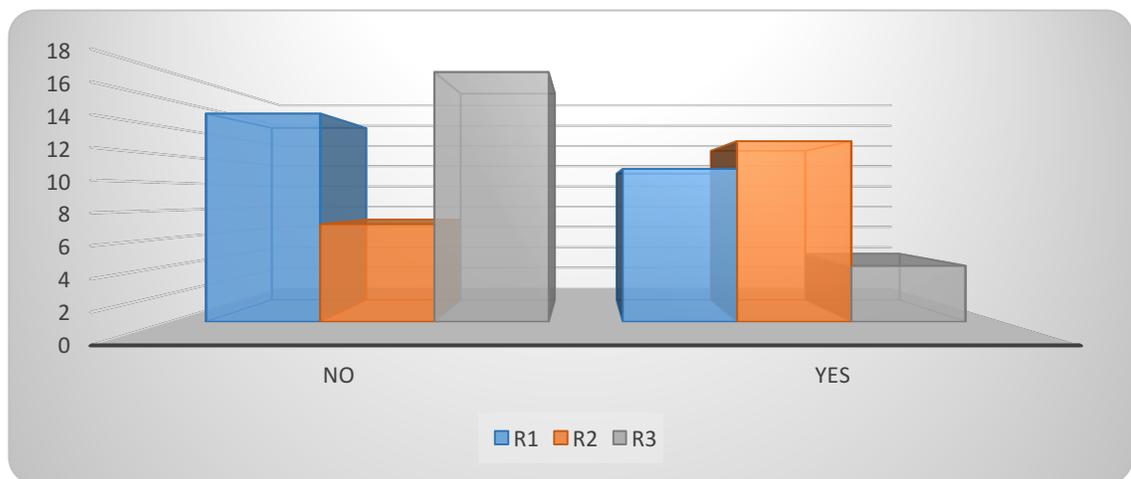


Figure 7. Had mentoring during college.

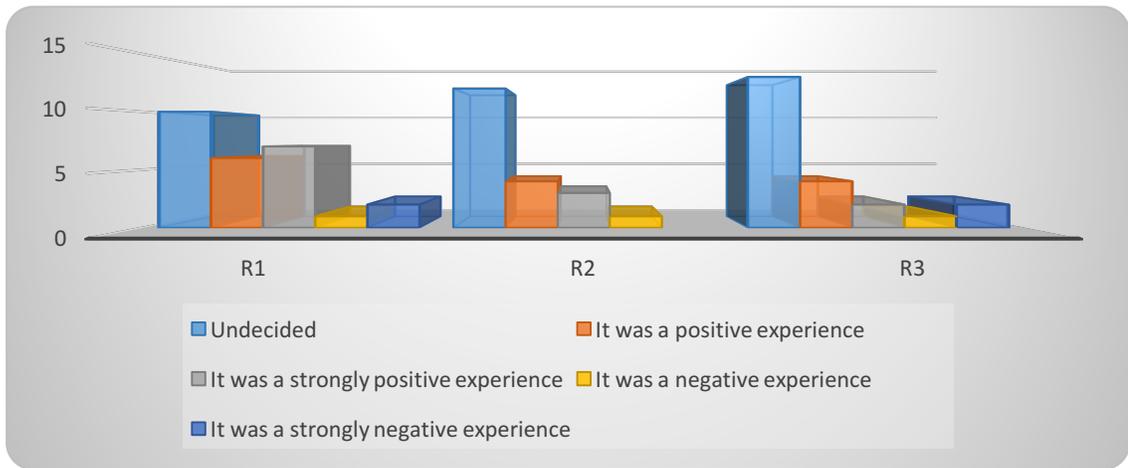


Figure 8. Feelings about being a protégé in college.

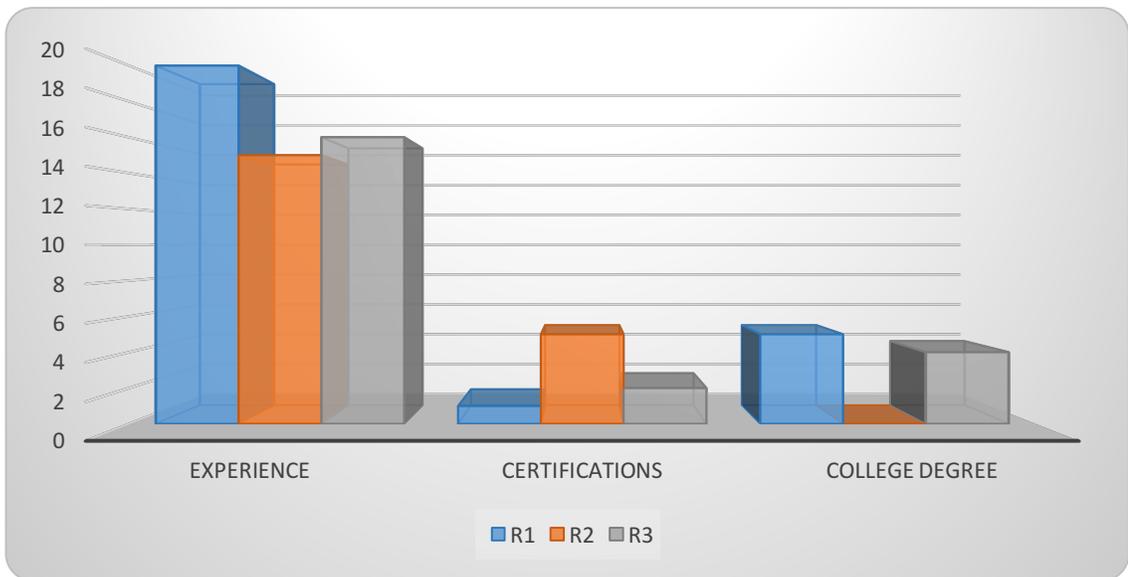


Figure 9. Most important factor regarding cyber security competency.

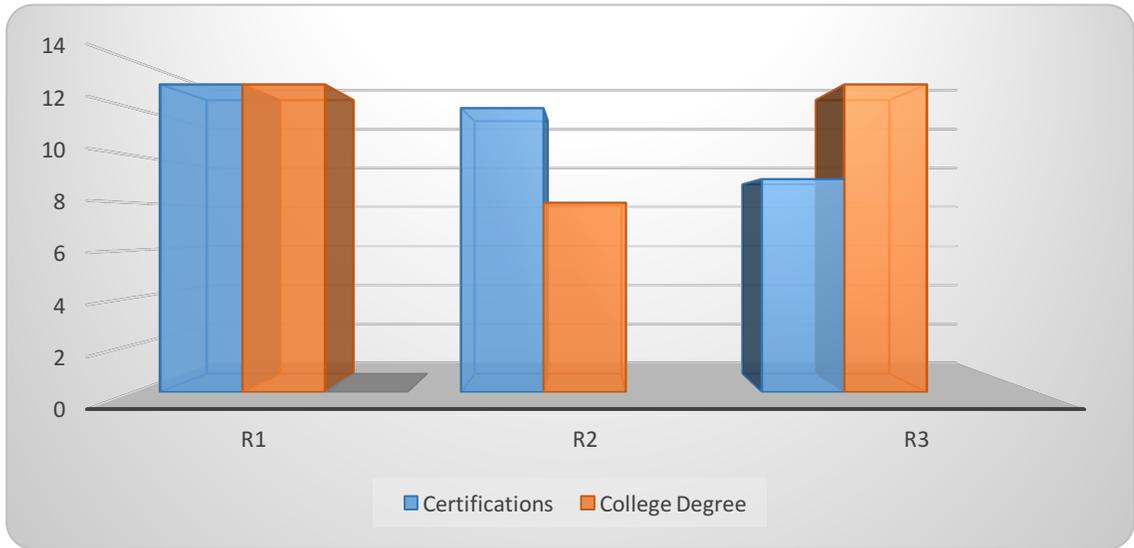


Figure 10. College degree or vendor certifications.

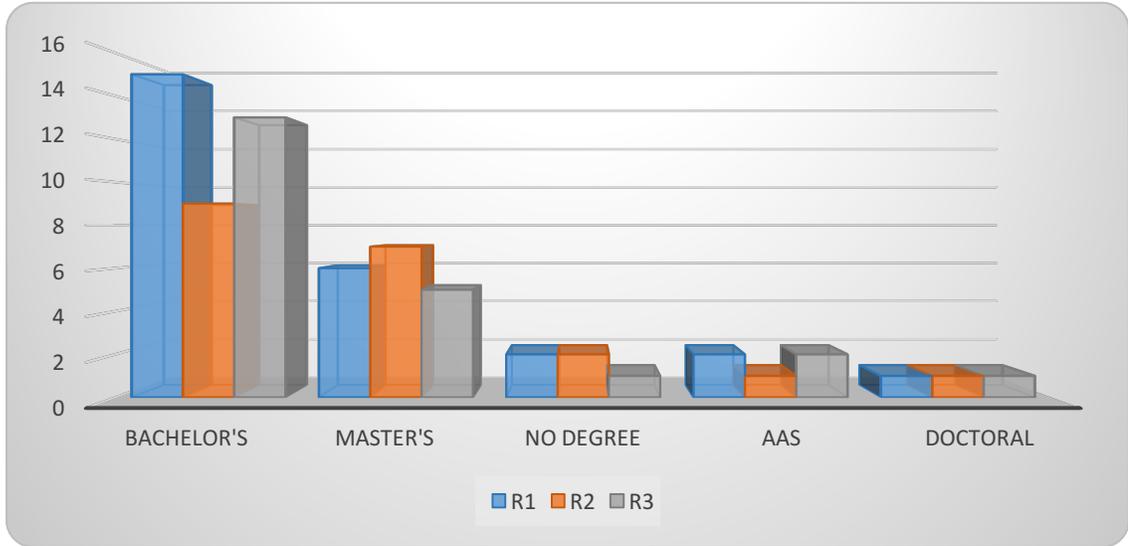


Figure 11. Academic level of college degree of respondents.

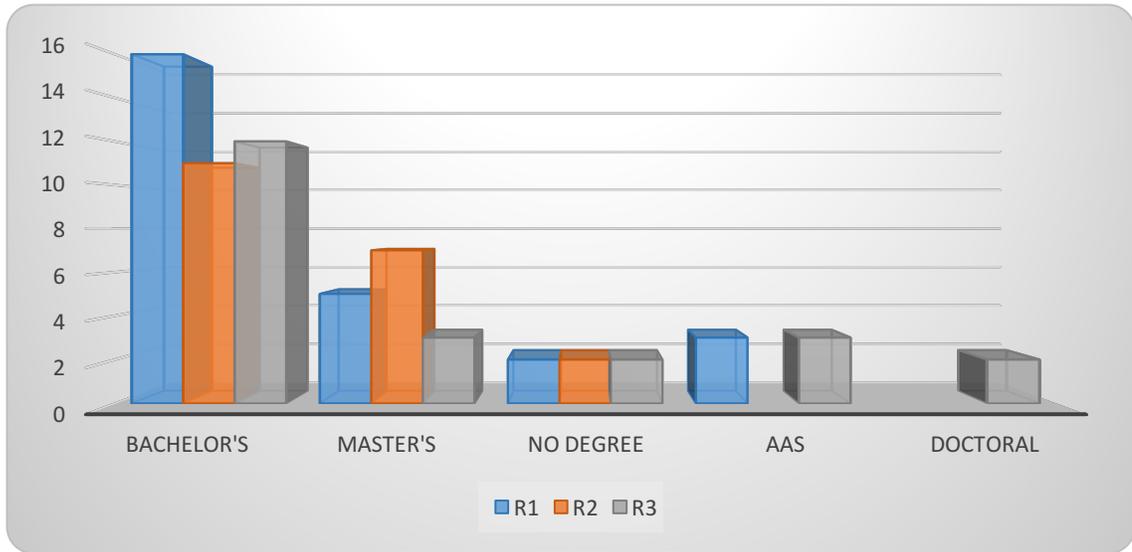


Figure 12. Mentor academic level of college.

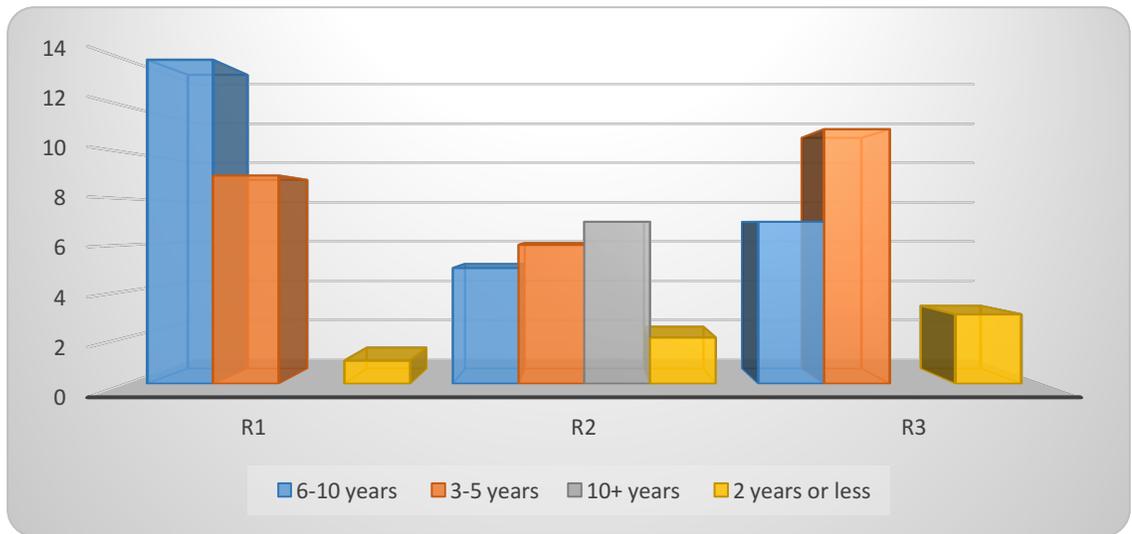


Figure 13. Required experience for cyber security competency.

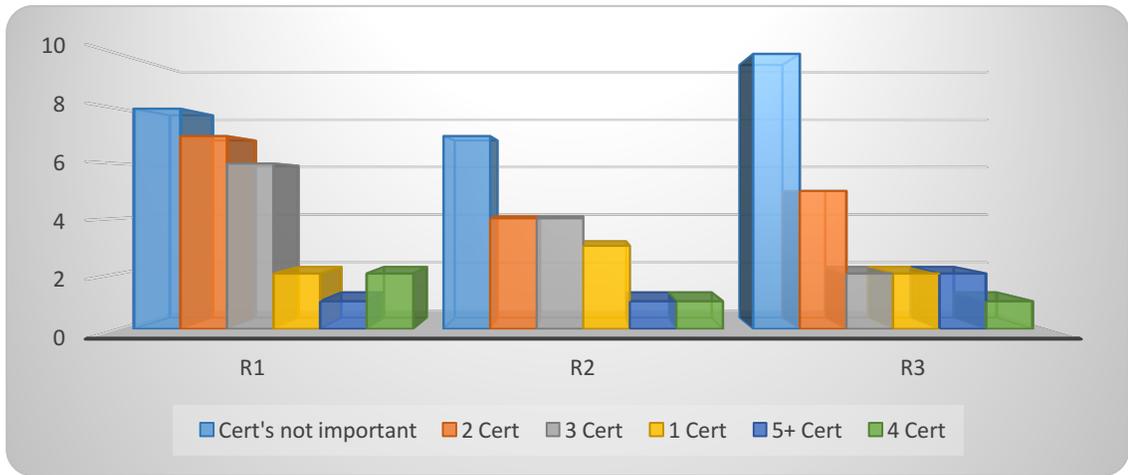


Figure 14. Required vendor certifications for cyber security competency.

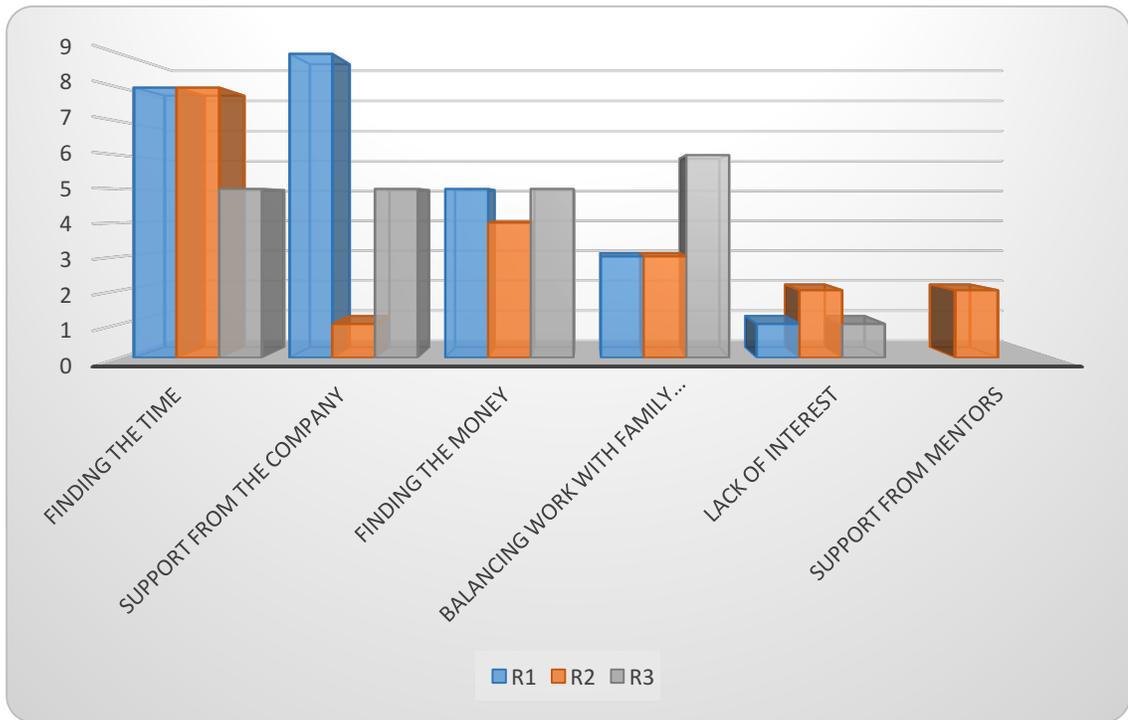


Figure 15. Factors mitigating against CPE in cyber security.

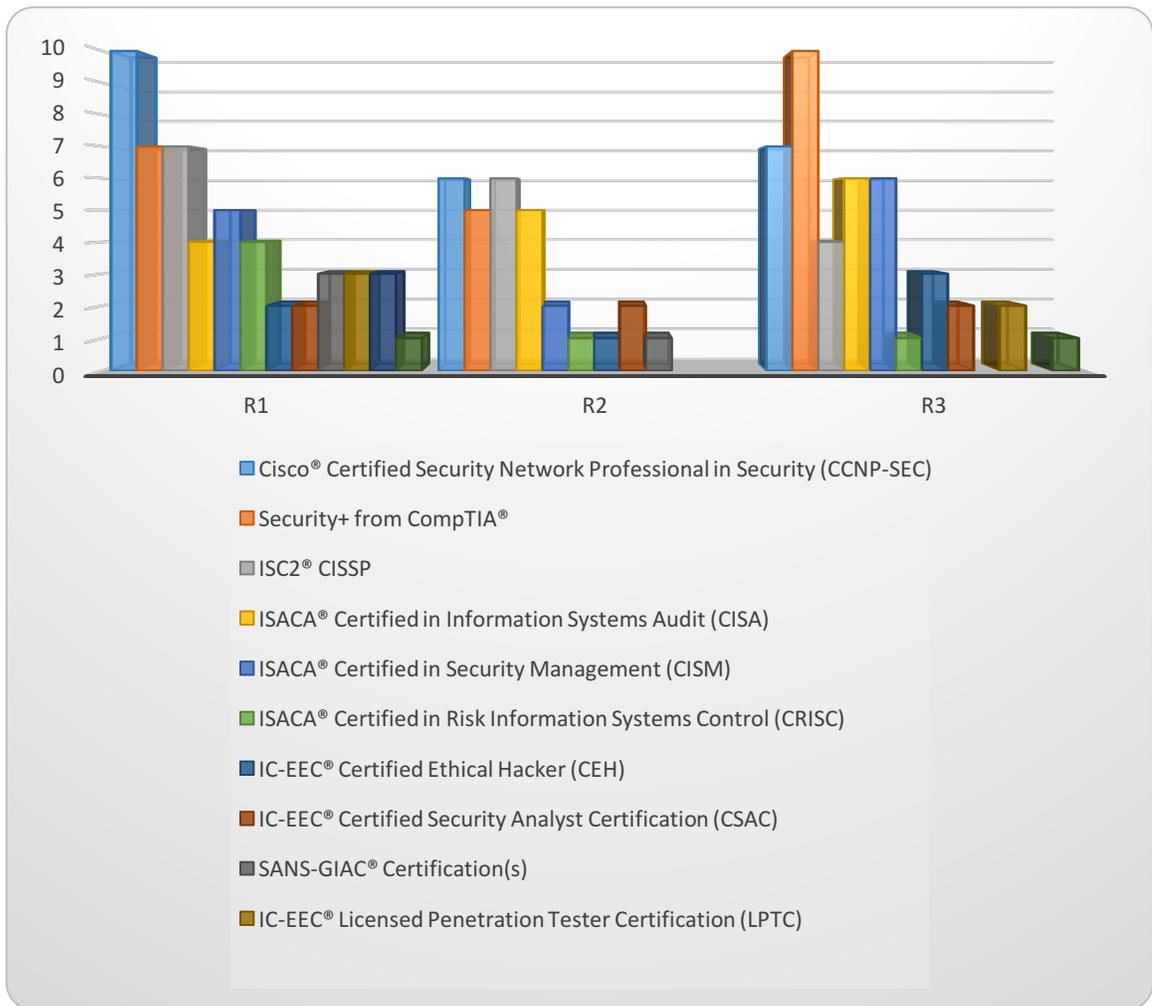


Figure 16. Vendor cyber security certifications desired.

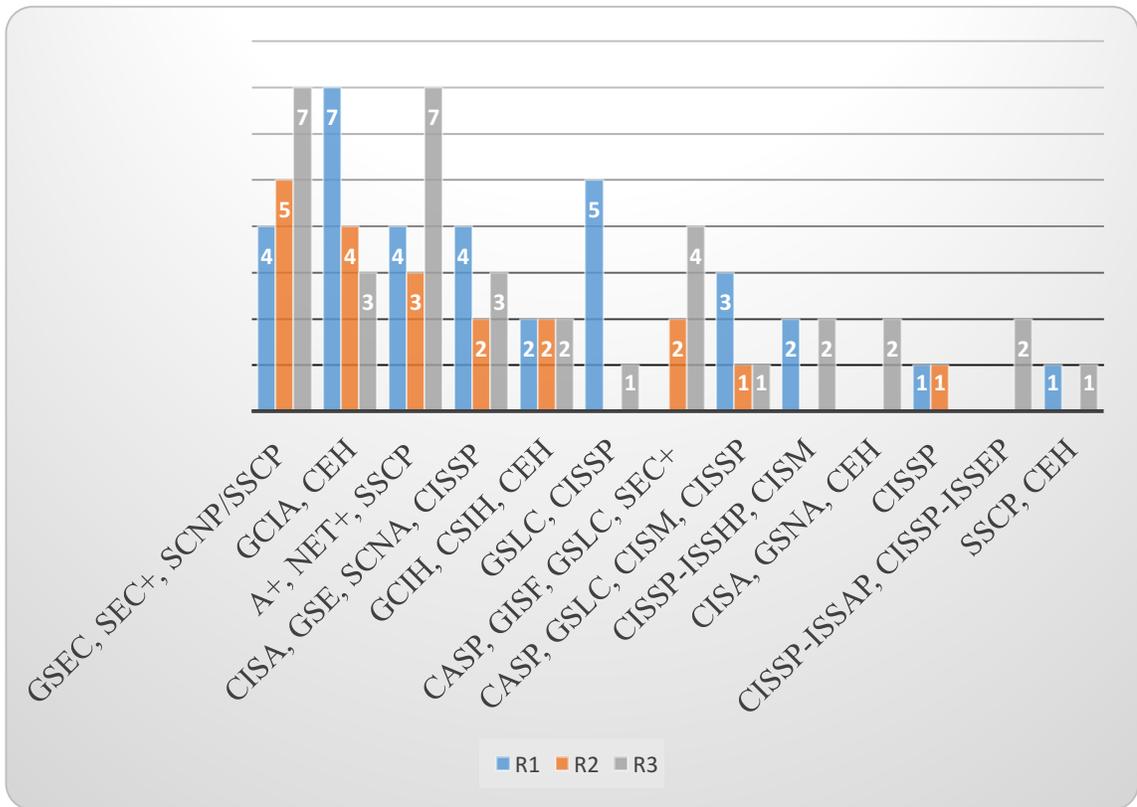


Figure 17. DoDD 8570.01-M Vendor cyber security certifications desired.

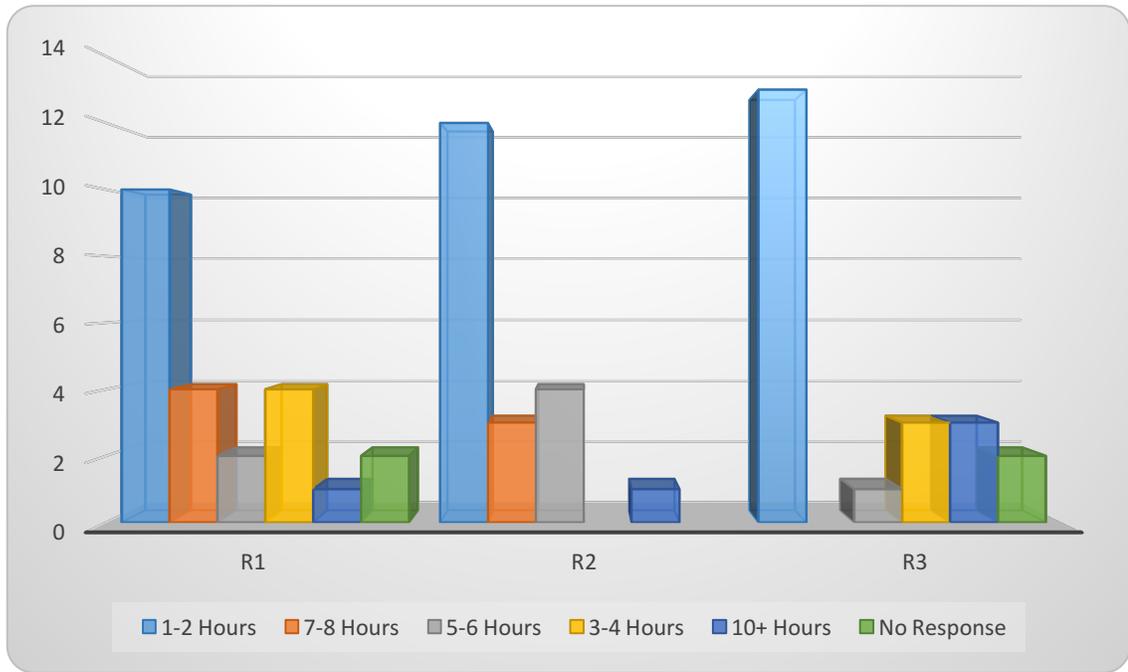


Figure 18. Number of hours per week utilized in self-improvement.

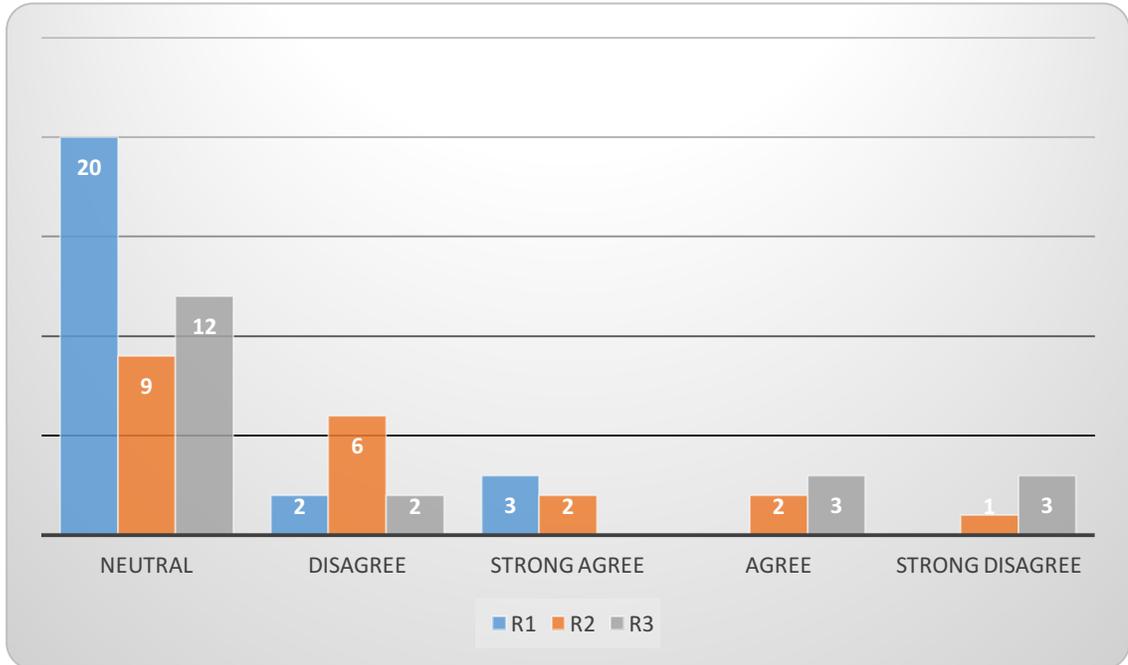
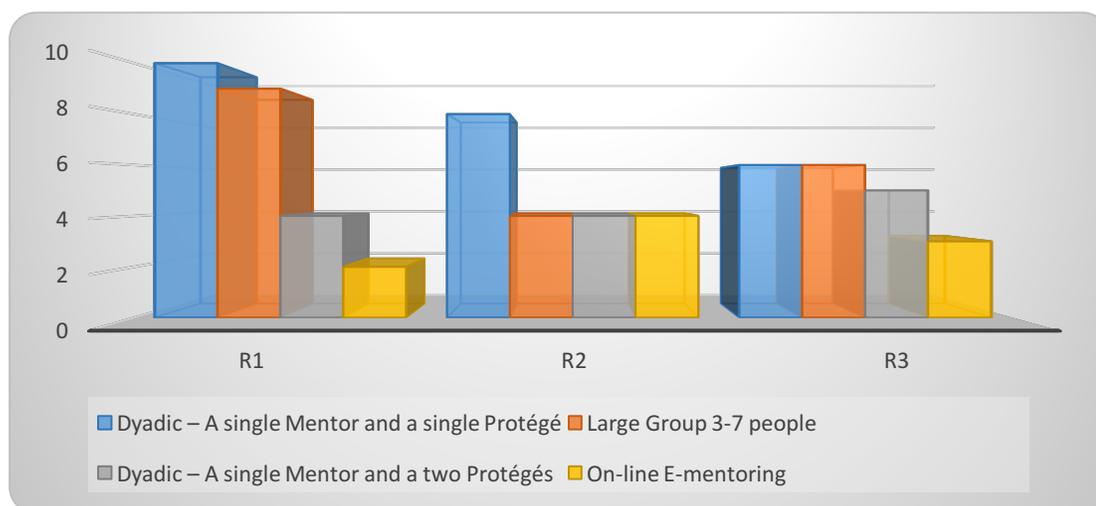


Figure 19. Mentor's or CISO's diversity characteristics effect on DIM.



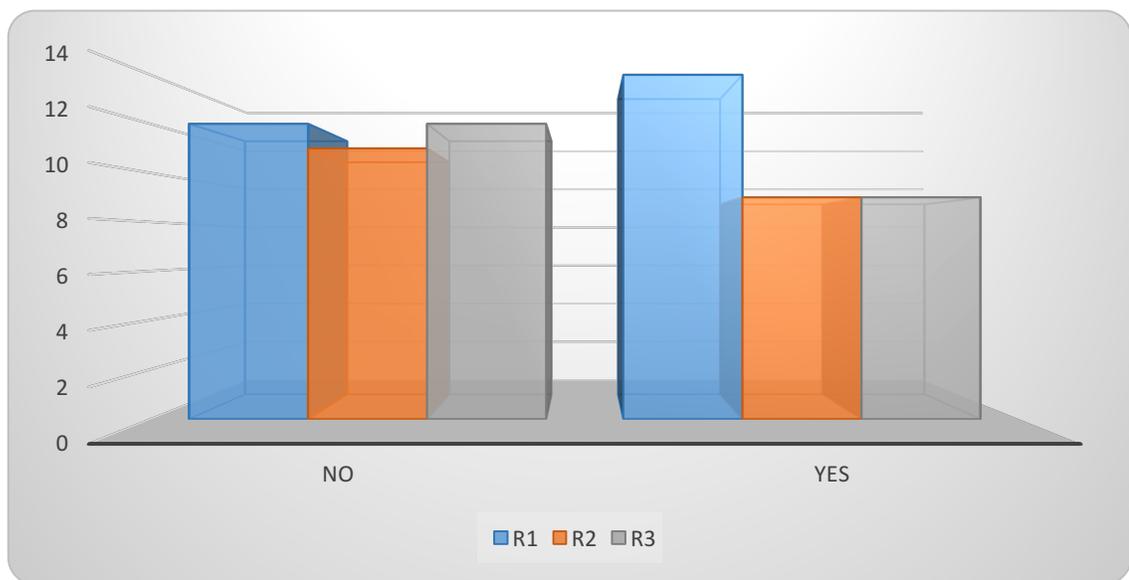
*Figure 20.* Number of protégés in mentoring group.

This dissertation's primary focus was centered on learning about the attitudes of key populations towards CSM. Figure 7, Figure 8, Figure 19 and Figure 20 had a direct bearing on the research questions and therefore significant to the study. One would not expect to find that R<sub>3</sub> had the single largest number of individuals who had not been mentored. Since this population group was farthest to recently completing college degrees and held positions in senior or executive management, mentoring was a distant past event if at all.

What was interesting was that R<sub>2</sub> had the least number of "no" replies, which demonstrated that there has been a shift in attitude from the past when mentoring was deemed more important. That such a significant pattern felt "undecided" about their mentoring experience in college (Figure 8), this reinforced and supported that mentoring had declined, or was not being conducted at all. Possible causes to this pattern could include that whoever was conducting the mentoring in the past did not do a good job or

did not understand the issues inherent to good mentoring practice and that some form of DIM was present. If future study could confirm this, then this could provide an opening to conduct mentoring training to key professionals so that good mentoring did occur.

The welcome news was that there did not seem to be any pervasive negative pattern of association that impaired those who had received mentoring. This needs to be counter-balanced (Figure 21), which demonstrates ample room for improvement in the future.



*Figure 21.* Cyber Security Mentoring (CSM) improvement of key skills.

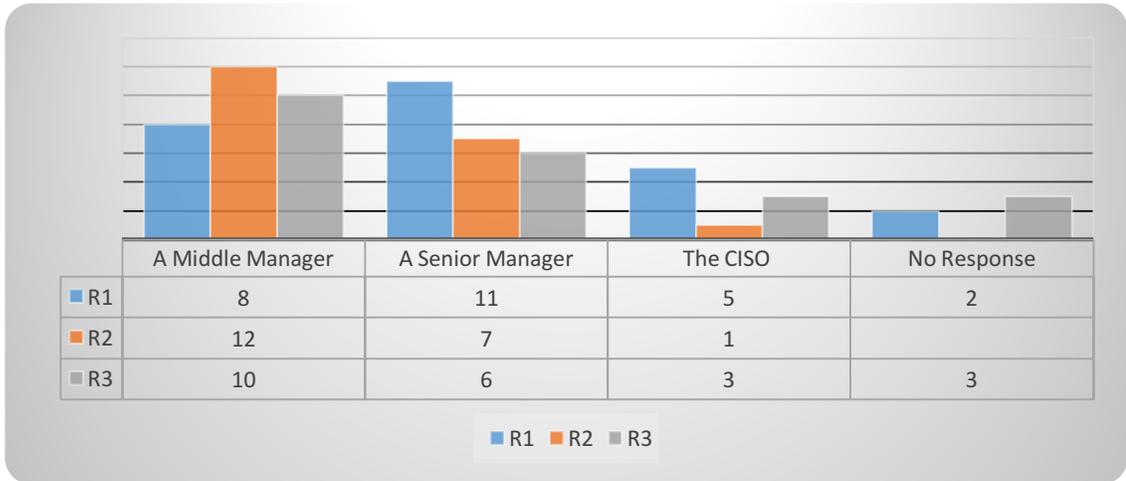


Figure 22. Identity of company mentor.

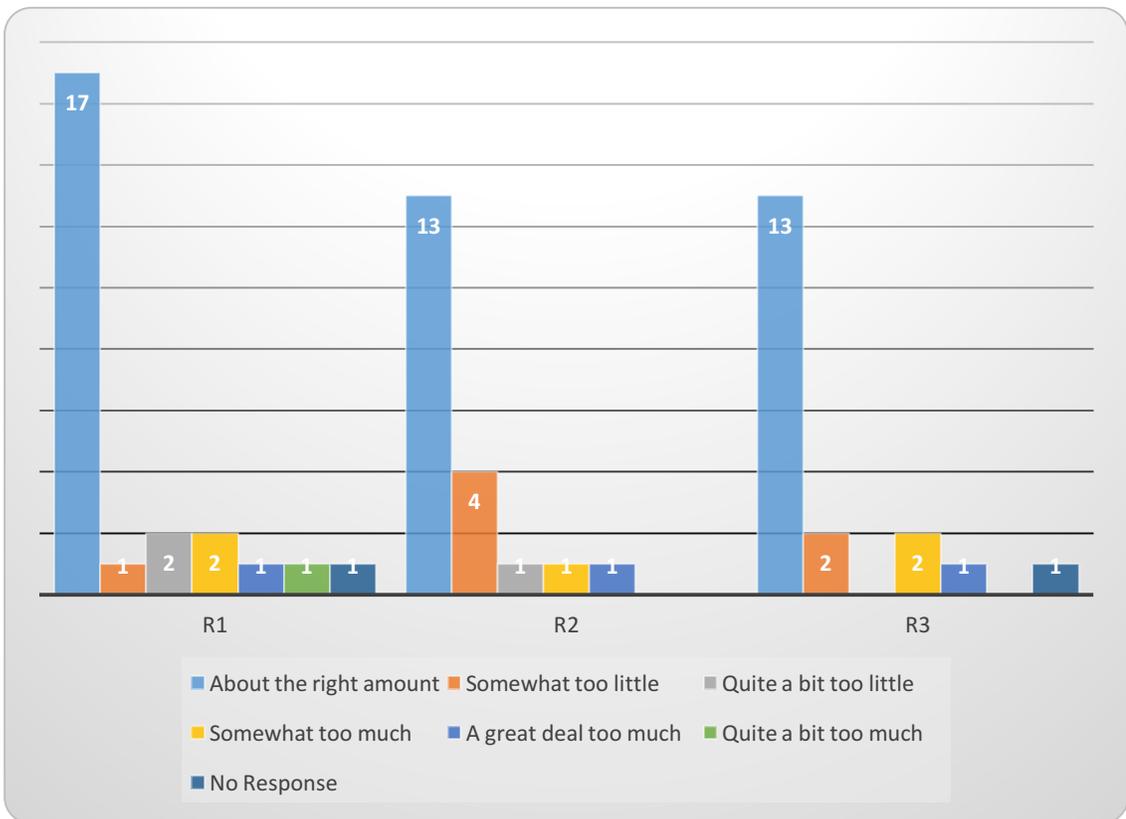


Figure 23. Duration of mentoring.

A few critical questions remain. Was there any DIM that occurred, and if so, can it be determined why it occurred? What type or kind of mentoring occurred, for how long, and more precise feelings about the mentor/protégé experience. However, in light of the fact that respondents did not answer open-ended questions and did not desire to be interviewed (as demonstrated by the pilot study), precluded gaining more precise qualitative research data. We can however, gain additional information from (Figure 21, Figure 22, Figure 23). While protégés were largely undecided about the overall value of mentoring in college (Figure 8), more respondents felt their skills were improved in the workplace as seen (Figure 21). Oddly enough they also felt they had been mentored sufficiently (Figure 23). This may reflect that those who did not feel their skills were improved in college, may have had poor mentors, or were experiencing some form of cognitive dissonance with their academic mentors. Interviews and direct follow up questions would have been very helpful to isolate the issues in play, but respondents did not respond well to this approach either as seen in the pilot study. At this juncture in the data results it is now time to consider each of the four primary research questions and what qualitative research patterns or associations were present.

### **Research Question 1**

How does formal cyber security undergraduate or graduate academic education play a role in a protégés continuing education as an IT security specialist? To determine the qualitative research patterns, the first thing that needs to be ascertained was how the population subsets viewed the relative importance of a college degree compared to professional certifications and field experience. Accordingly, (Figure 9, Figure 10) all of

the respondents felt that field experience was the most important criteria in determining competence in cyber security. When I asked “What helped more in obtaining experience – college degrees or certifications, responses were equally split between professional certifications and college degrees (Figure 10) with the CISO and management, and there was a slight preference with intermediate level staff towards professional certifications. This was probably due to the fact that they were more experienced than recent college graduates and had a greater appreciation for cyber security vendor certifications, which helped them keep up their knowledge base.

New hires and recent college graduates felt that a college degree was more important than vendor certifications and this should be expected since they were closest to completing college degrees. It would be interesting to see if having all three factors of experience, college degrees and professional certifications made any difference in that individuals with all three factors would seem likely to be the most balanced and prepared of any cyber security staff or personnel.

What may tip the balance in favor of college degrees is that most newly hired protégés (R<sub>1</sub>) and experienced mentors (R<sub>2</sub>) held college degrees (Figure 11, Figure 12). This demonstrated a college degree was the preferred method of preparing for initial employment. As a qualitative research pattern it may also have revealed a conflicted response. Senior management (R<sub>3</sub>) preferred a college degree above professional certifications. mentor and middle management (R<sub>2</sub>) preferred professional certifications. New hires and protégés (R<sub>1</sub>) was exactly equal in their opinions. Future study is indicated.

While the majority of respondents still felt the professional certifications were not important (Figure 9), the pattern showed a definitive breakout or breakdown that suggested that 2-5 certifications would not be uncommon (Figure 14). When the research asked, which vendor certifications were deemed of more value among a broad swath of potential answers (Figure 17), it became clearer that respondents in the earlier question (Figure 9) may have misunderstood the intent of the Web-based questionnaire. Innocently, they became ensnared in a ploy, which revealed their true feelings, or only those who answered they were of value replied positively to the former question. There were no predominant qualitative research patterns of association, except the data was skewed towards the left. The raw data revealed a variety of opinion and feelings among all of the populations.

The responses to (Figure 18) was the most revealing and disconcerting of all. The clear pattern across all of the population groups was that 1-2 hours a week was devoted to improvement of cyber security skills. The qualitative research patterns strongly suggested that a college degree is very important in the field of cyber security. The most common degree held across all the respondents was a Bachelor's degree. When asked, which professional certifications were considered most valuable or pertinent to cyber security (Figure 16), it is quite interesting to notice the shift in the pattern.

I determined that it was not from a lack of interest or support from mentors that was causing a negative feeling towards CPE. The top four reasons (Figure 15) demonstrate a clear feeling from the respondents that in their experience. Instead, it was (a) finding the time, (b) support from the company, (c) finding the money and, (d)

balancing work with family commitments that were the real issues. Clearly cyber security staff and managers were hard-pressed for time in the busy workplace environment, which means they needed to obtain more budget authority to hire more staff, and to more efficiently manage the staff they did have. When a cyber breach occurred this only increased the workload. They felt like they were experiencing a double-edged sword. It is no wonder they had so little time to devote to continued study. This provides some insight into why there are so many reported and unreported breaches in cyber security. With little free time to devote to keeping up their knowledge base, and little perceived support from their employers, money and family commitments, it is clear these qualitative research patterns of association resonated across all of the groups of respondents.

The populations most often held a Bachelor's degree, followed by a Master's degree. The Figures were definitely skewed in that direction. More mentors held a Master's degree than non-mentors. Only a very few held Doctorates. Significantly there were more who held no degree of any kind than what I expected, which was about the same of those who AAS degrees. Nevertheless, the next primary research question will provide more insight into the role of professional certifications and it is hoped that a comparison between these first two primary research questions will illuminate the overarching quest of this research.

## **Research Question 2**

How do professional cyber security vendor certifications play a role in the continuing education of cyber security specialists? One of the first findings was there

were a significant number of respondents (Figure 9) who did not feel there was a need or value in vendor certifications. This was especially true of R<sub>3</sub> and to some extent by R<sub>1</sub>. R<sub>2</sub> was also heavily conflicted, so it seems that the qualitative research patterns of association were substantiated through all the respondents. The reason why this may have been felt is once a college degree and experience was obtained, vendor certifications appeared to be of less importance. However, as I continued to probe the data another viewpoint seemed to emerge.

### **Research Question 3**

How did CSM play a role in the continuing education of cyber security specialists? There was a clear pattern (Figure 10) of association between the population groups that experience was the key factor in determining cyber security competency. The next key concept is to determine much experience was needed and how long will it take to obtain it. The consensus (Figure 14) among the respondents is from three to ten years.

It is little wonder that it takes takes three to ten years to gain enough education, knowledge and experience (Figure 13). When one takes into consideration the constantly evolving cyber security environment, it is not unreasonable to expect that it will take a person longer to accomplish that task. Taken solely, this factor strongly supports the need for a robust CSM program. When one considers the other factors that contribute such as the need to secure funding, support and balancing work with family commitments, (Figure 15) displayed a pattern of association that seems to infer that respondents faced a significant obstacle just to keep up nominal defenses and (Figure 18) revealed that only

1-2 hours a week was being spent in keeping one's knowledge base current. This is even more critical when one factors in "risk factors" amongst the population groups.

#### **Research Question 4**

What are some suggestions to improve cyber security education programs? Specifically, who, how and why are cyber security staff selected, promoted, and developed in the workplace? The key word here is "developed." This has a direct bearing and corresponding relationship to CSM. Once staff are hired or selected, promotion should follow. The opinion of the mentor would be crucial here. So also would be the pattern of association on how did respondents viewed their CSM experience.

It is difficult to ascertain what caused this indecision or negative feelings or what contributed to DIM? It most likely would take oral interviews to determine this. Overall, more research and study will need to be conducted in the future to verify results. This leaves a real opportunity for mentoring to improve and certainly when it comes to CSM, that a real growth potential may significantly contribute to improved cyber security defenses. It should be a subject for continued discussion and for additional and more precise research into the interrelationships between the variables and if possible to have protégés provide future researchers more depth into protégés experience in the phenomenon of cyber security mentoring.

#### **Insights Gained Regarding Research Questions**

The research was focused on answering four questions. These were centered around the mentoring dyads and their experiences and what they believed were the most

important lessons learned. I also wanted their opinions regarding the role of academic education, professional certifications, and field experience.

The four primary research questions were not directly asked to respondents, because the pilot study clearly demonstrated an aversion to answering subjective open-ended questions. The respondents simply wanted possible multiple-choices presented to them and they would then answer the questions. Even when the respondents were given the opportunity to elaborate there were relatively few respondents that took advantage of this opportunity. I hypothesized that this was due to human personality.

The primary research questions were originally posited to provide insight in the role of academic education, professional certifications, and experience into the direct relationship regarding the feelings and best judgment of CISOs and Management on what was most needed within cyber security and the hiring and promotion factors of cyber security staff. One of the reasons the research was undertaken was to ascertain how various team members of cyber security related to one another, their opinions regarding CSM and what they considered were the optimum hiring qualifications for new cyber security personnel.

Clearly, experience was the number one factor (Figure 10). This left a real conundrum as to how should new hires and promotions within an organization. Just how does an individual get experience? We also know according to the data Figure 7 that the majority of respondents did not receive CSM as part of their training or academic studies. The problem was exacerbated by the fact that respondents felt that the way to obtain experience was equally obtained by a college degree or by obtaining vendor certifications

(Figure 9, Figure 10). However, I believed the momentum leans towards obtaining college degrees since according to (Figure 11, Figure 12) most of respondents held some form of an academic degree. When this was compared to (Figure 16) that most would likely seek certifications in the future, a determination between the need for a college degree or vendor cyber security certifications could not be made.

The study also desired to gain more insight into the future prospects of CSM. One of the more interesting patterns of associations was that a pattern of association was noted (Figure 7). Because most of the populations were not mentored in their career preparation, I believed this means that a significant opportunity for CSM exists for the future. This could lead to vast improvements in cyber security defenses if implemented correctly and with properly trained mentors. However, the research also revealed that not everyone makes a good mentor. This is apparent because so many of the respondents were undecided (Figure 21) about the value of the mentoring they had received in the past. For those who had been mentored in the past a clear pattern was established in that respondents were undecided as to its efficacy or benefit and remained neutral in their feelings. The preferred mentors (Figure 22) that were company middle and senior level management and to a lesser extent the CISOs themselves. The preferred method of CSM was one-on-one mentoring with a single mentor and single protégé (Figure 20), and large group mentoring also showed promise. On-line e-Mentoring was a distant fourth. We also know that there was no evidence (Figure 19), that mentor diversity (e.g., age, race, or gender) factors played any significant role in DIM.

### Secondary research questions

I wanted to determine more precisely how the primary research questions correlated to the secondary research questions. Especially important were the following questions to Senior Management:

1. What presuppositions or demographic bias (if any) preexisted in the workplace in organizations where a formal CSM program was implemented? The qualitative research patterns demonstrated that no bias was detectable.
2. Did your presuppositions or bias on the part of the mentors or the CISO or other executives or top managers in the workplace contribute to the resistance in the formal mentoring programs by protégés? The qualitative research pattern demonstrated the only resistance detected was that of answering subjective questions.
3. Has CSM been helpful in the past or present and do CISOs believe it will continue to be helpful in the future in an effort to ameliorate cyber security risk? The qualitative research pattern demonstrated it was undecided but there seemed to be real potential in this regard.
4. What lessons did CISOs and mentors learn about themselves and their protégés during the formal mentoring process? Because so few responded to Is request for more detailed elaboration, this question remains largely undecided. However, some of the comments were quite revealing:

One mentor commented, "I consider it my management responsibilities." This individual also stated that there was "a widely varying consistency of cyber education between institutions." Another mentor said they felt "honored" to be a mentor, and that mentoring required "different approaches to different people." Another affirmed that, "The protégé helped me to understand new traits." One entry-level protégé said, "Nervous at first. I wanted to excel in my field, but it just seemed to be overwhelming," and "Happy." It gave me a sense that someone was looking over my shoulder, guiding me and helping me to put things in their proper perspective," and "I felt a certain sense of security in knowing someone with a lot more experience than I had, was there to help me in the event I felt overwhelmed." This protégé also noted that the mentoring was "An excellent relationship. I hope to continue it in the years ahead on a more informal and professional 'peer' basis." This individual also showed excellent insight into the issues confronting cyber security when stating one of the greatest lessons learned was, "To ask the right questions. The field is a complex one with many different aspects in making sure our systems are protected. I also realized that it was not possible to secure our systems 100% of the time, that we can only do our best, and accept the risk that sometimes breaches do occur." Other reactions included, "It deepened my first-hand knowledge," and "It helped," "It was more applied," "Think it did," "Don't need it," and "Real life experiences matter the most."

5. Were you a “typical” cyber security mentor? If not, how did this effect your mentoring with protégés both similar and dissimilar to you? The qualitative research pattern demonstrated according to background demographics of the respondents, 50% were male and 50% were female, the average or typical age was 45-60 years old, income tended towards high five figures to low six figures (\$75,000 to \$125,000 with the highest being about \$200,000 and lowest being \$10-\$25,000) for those who answered, most had completed a Bachelor’s degree and the United States was regionally dispersed, which seemed to indicate internal consistency and reliability.
6. How did you overcome any protégé resistance or bias to your being required to participate in formal CSM programs? This was not able to be determined and would require personal interviews and to obtain these would take considerable time and effort in light of the resistance on the part of respondents answers to subjective open-ended questions in both the pilot study and the primary research.
7. Did cyber security protégés who participated in formal mentoring on the undergraduate collegiate or post-graduate level have less or more resistance to formal CSM in the workplace? The qualitative research pattern demonstrated there was no indication of any great resistance to mentoring nor any DIM.
8. If so, how did the mentor overcome this resistance or presuppositional bias to their formal CSM? If not, how did they feel about this? The qualitative research pattern demonstrated no DIM was present. To obtain a more

complete answer would require personal interviews or a more precise follow-up questionnaire. Since personal interviews were not conducted, this could not be discerned.

9. How much professional respect did you have for your CISO and what independent variables contributed to this respect? It seemed that there was true respect between mentors and protégés, since (Figure 22, Figure 24) demonstrated a slight negative perceived benefit. The qualitative research pattern demonstrated that most did not improve their skills by CSM, which is somewhat puzzling and contradictory in that the qualitative research pattern demonstrated the majority of respondents felt that had been mentored “about the correct amount.”

### **Summary**

The following insights can be deduced or inferred in relationship to the primary research questions as determined from the qualitative research patterns of associations.

1. I was most surprised that the respondents spent so little time improving themselves with reading and study, especially protégés, which confirmed that the “finding the time” was a strong indicator why the respondents as a whole more than likely did not or could not fend off cyber-attacks. They were simply too busy in “putting out the fires they had” that “more extensive fire prevention measures” could not be implemented with any consistency.
2. I determined (Figure 15) that finding the time to do CPE was the largest challenge, that only a slight majority (Figure 18) managed to find 1-2 hours a

week for continued study or certification preparation in personal reading and study.

3. I also observed (Figure 9) that a super majority of respondents felt that experience in the workplace *was most* important.
4. I discovered that many respondents felt (Figure 14) that certifications were *not* important, especially senior management who preferred academic degrees.
5. I realized that a majority of respondents according to (Figure 21) felt that CSM did *not* improve their skills. To what can one attribute such an opinion? Only a few options are available. Either the protégés felt some form of non-reported resistance from mentors or other management or perhaps even rank-and-file employees or mentors did not have the skills, talents or abilities to perform mentoring, or did so only because their senior executives told them to do it, and it was performed in an incompetent, ineffectual, and insufficient manner. In any instance, there is considerable room for improvement in CSM and this should be undertaken posthaste.

In Chapter 5, my goal is to provide a final overview and discussion of the research to and to make some recommendations regarding CSM and future research direction.

## Chapter 5: Discussion, Conclusions, and Recommendations

### **Introduction**

The problem addressed in this research was to discover how various team members of cyber security related to one another as well as their opinions regarding CSM and the hiring qualifications needed to improve cyber security preparedness. To accomplish this, a qualitative research study was conducted. Those participating in the research belonged to any one of the following populations: (1) recent hires (protégés) and new college graduates, and (2) managers, mentors, intermediate level cyber security staff and (3) senior managers (CISOs) and other TMT members.

This qualitative research study demonstrated that implementing a CSM program is both needed and appropriate in the workplace. Simultaneously, finding good mentors and the time to implement a formal mentoring program in most companies is the most significant task. The burden of the cyber security team is usually undertaken in dealing with daily issues, and since most could only manage to find 1-2 hours a week for CPE leads me to suspect that implementing an in-depth CSM program would be challenging. Chapters 1-3 introduced some of the issues in the field of cyber security and information assurance, a literature review and the methodology this research utilized. Chapter 4 reported the results. The purpose of Chapter 5 is to reach some conclusions and to elucidate possible solutions and to propose areas for future research.

## Discussion

A high-quality and ongoing CSM program can greatly assist CISOs and management. It can be an integral part of protégé (e.g., employee) CPE to help cyber security staffs recognize the techniques of external and internal hackers, moles and infiltrators and to implement these staffs into the proper methods and procedures to protect their systems and data. I propose the following specific recommendations. Included are various ISO/IEC standards and a generalized risk management flowchart.

Cyber security is very fluid at all times. Things change rapidly. It seems almost on a weekly basis that another breach has occurred and the onset of cyber espionage (e.g. spies) and even cyber war is a real possibility. All one has to do is just read a major newspaper, periodical, or peruse the ever increasing new books being published on these subjects to verify that enormous tasks that confront cyber security staffs today. This increase in cyber negativity leads to some specific recommendations for mentors and what type of exposure and training they should provide to their protégés. While additional and continued research is required, I propose the following steps to be undertaken at a minimum.

1. Protégés should participate in cyber security think tanks where the best and brightest in the field can gather to discuss, design and test new cyber security methodologies. This might include conducting cyber war games between students at the 20 top universities in the cyber security field in conjunction with U.S. Service Academies, the NSA, FBI, DHS, DIB and top technology

vendors. This may require the need for top-secret security clearances for all participants.

2. Protégés should learn how to keep one's most sensitive data off public networks (e.g., Internet) and isolate the priority information within a company to those who have a need to know with ultra-high level materials on paper only.
3. Protégés should learn how to set up and enforce company or network policies that strictly limits or disallows BYODs (Bring Your Own Device) into company sites like cell phone with cameras, iPads, personal laptop computers, USB thumb drives, etc. The use of thin-client technology eliminates many of these issues.
4. Protégés should learn how to monitor or disable the use of wireless networks and place wireless network barriers to prevent war driving and wireless eavesdropping.
5. Protégés should learn the value and the know-how to set up secure sites that implement protection from Electronic Magnetic Pulse (EMP) surges and weapons, or bury data centers in the lower levels of facilities protected by layers of physical security. This would include armed guards for U.S. and State Government facilities and sensitive facilities like nuclear reactor sites, dams and electrical generation plants and stations, air traffic control, and oil and natural gas pipelines patrolled by surveillance drones.

6. Protégés must submit and allow extensive and full background checks on themselves, and cyber security personnel must learn to insist upon required annual vacations and separation-of-duties for key personnel. These backgrounds checks should be renewed on an annual basis and accounts in the event of retirement, job relocation, termination or suspicious activity detected through computer and network log-analysis should be deleted. Administrative or “root-privilege” passwords should be changed frequently.
7. Protégés must keep themselves academically and professionally updated and require constant upgrades in education and knowledge through attendance at professional cyber security conferences and/or advanced academic education.
8. Protégés should learn how to efficiently keep all network clients and servers “patched” with the latest security updates and fixes from all vendors used by their employers. This in and of itself is a full-time plus job for multiple members of the cyber security staff in companies with tens of thousands of computer systems and IP addresses.
9. Protégés must learn how to keep all systems backed-up with images or on tape in the event of a catastrophic failure or natural disaster like earthquakes, hurricanes, floods, tornadoes, terrorist attacks, pandemics and or course fire.
10. Protégés should regularly participate in all server and critical client backups, and these should be stored and maintained in at least three separate locations – locally, at a warm site, and underground at a protected and secure vault site on a separate power grid. Rotate and test the backups every 90 days.

11. Protégés should learn how to shift your systems IP addressing scheme to use IPv6 as exclusively as possible. Where IPv4 is required for connectivity, install both software and hardware firewalls and IDS/IPS systems to isolate and shield the internal company network.
12. Protégés should learn how to conduct log analysis and methods of encryption and the means of cyber forensics/incidents and cyber penetration (SANS-GIAC) techniques and analysis. For those who seek employment with the U.S. Federal or State Governments protégés must become DoDD 8570.1 certified or higher and all others should strongly consider doing so.
13. Protégés should always have the goal to make their networks less vulnerable and appealing to would be attackers or hackers considering cyber security exploits.
14. Protégés should have as much in-depth exposure to the full gamut of the International Organization for Standardization (ISO) 27000 and ISO 31000 series regarding cyber security and IT Risk Management, which according to ISO includes:
  - ISO/IEC 27000 — Information technology - Security Techniques - Information security management systems — Overview and vocabulary
  - ISO/IEC 27001 — Information technology - Security Techniques - Information security management systems — Requirements. Note: The older ISO/IEC 27001:2005 standard relied on the Plan-Do-Check-Act cycle; the newer ISO/IEC 27001:2013 does not, but has been updated in other ways to reflect changes in technologies and in how organizations manage information

- ISO/IEC 27002 — Information technology - Security Techniques - Code of practice for information security management
- ISO/IEC 27003 — Information technology - Security Techniques - Information security management system implementation guidance
- ISO/IEC 27004 — Information technology - Security Techniques - Information security management — Measurement
- ISO/IEC 27005 — Information technology - Security Techniques - Information security risk management
- ISO/IEC 27006 — Requirements for bodies providing audit and certification of information security management systems
- ISO/IEC 27007 — Information technology - Security Techniques - Guidelines for information security management systems auditing (focused on the management system)
- ISO/IEC 27011 — Information technology - Security Techniques - Information security management guidelines for telecommunications organizations based on ISO/IEC 27002
- ISO/IEC 27031 — Information technology - Security Techniques - Guidelines for information and communication technology readiness for business continuity
- ISO/IEC 27032 — Information technology - Security Techniques - Guideline for cybersecurity
- ISO/IEC 27033-1 — Information technology - Security Techniques - Network security - Part 1: Overview and concepts
- ISO/IEC 27033-2 — Information technology - Security Techniques - Network security - Part 2: Guidelines for the design and implementation of network security
- ISO/IEC 27033-3 — Information technology - Security Techniques - Network security - Part 3: Reference networking scenarios - Threats, design techniques and control issues

- ISO/IEC 27033-5 — Information technology - Security Techniques - Network security - Part 5: Securing communications across networks using Virtual Private Networks (VPNs)
- ISO/IEC 27036 Guideline for security of outsourcing
- ISO/IEC 27037 Guideline for identification, collection and/or acquisition and preservation of digital evidence
- ISO/OEC 31000 Guideline for Risk Management in Information Systems

15. Protégés must gain deep understanding about the various cyber security

“frameworks” such as the Zachman framework, TOGAF, DoDAF, MODAF, SABSA, COBIT, SP800-53, COSO, ITIL, Six Sigma, and Capability Maturity Model Integration (CMMI) and NIST 800-53 compliance with FISMA guidelines

16. Mentors and protégés alike must not rely upon security through obscurity, but act with deliberation, planning, due diligence, good design and documentation. If not, the end-result may be chaos as cyber security personnel or technologies shift.

17. Executives (CISOs), managers and supervisors (mentors) should provide protégés a mix of a (1) strong formal academic preparation (college degrees), (2) professional certification(s), and (3) experience in externships and internships, and (4) CPE. This is the primary reason why it nominally takes an individual 5-10+ years to gain true expertise in the field of cyber security and information assurance. For example, in (Figure 23), the protégé can see the complexity and interweaving of the suggested guidance and should also be

viewed within a regular Plan-Do-Act-Check (PDAC) IT audit and review. The most sensitive the data should be protected by frequent audits.

18. An annual risk assessment should be undertaken annually and the ISO/OEC 31000:2009 or higher should be implemented.

### **Other Recommendations**

Since hackers and cyber thieves focus their attention on obtaining credit-card data from banks and retail establishments, utilizing Payment Card Industry – Data Security Standard (PCI-DSS) protocols seems logical and most protégés will need to learn about this concept. It also appears that adding isolinear circuits or chips (now required by law by the end of 2016) is a very positive step in the correct direction. The end result would be significant improvement in PCI-DSS vulnerability. It would require re-educating people and require significant investment in new card readers and software, but it could be a very sound method to thwart cyber thieves. The most recent innovation is Apple iPay®. While it may be quite premature to know for certain if Apple iPay® is truly secure, history of hacking seems to suggest that with each new leap in technology it is only a matter of time before someone figures out how to crack the technology secrets and cause a massive cyber security breach.

All companies should require their cyber security staff to stay current with technological changes by either academic coursework, vendor recertification, or a mix of both in their CPE and integrate it into formal CSM. Attendance at professional conferences should be strongly encouraged. An annual risk assessment should be undertaken annually and the ISO/OEC 31000:2009 or higher should be implemented.

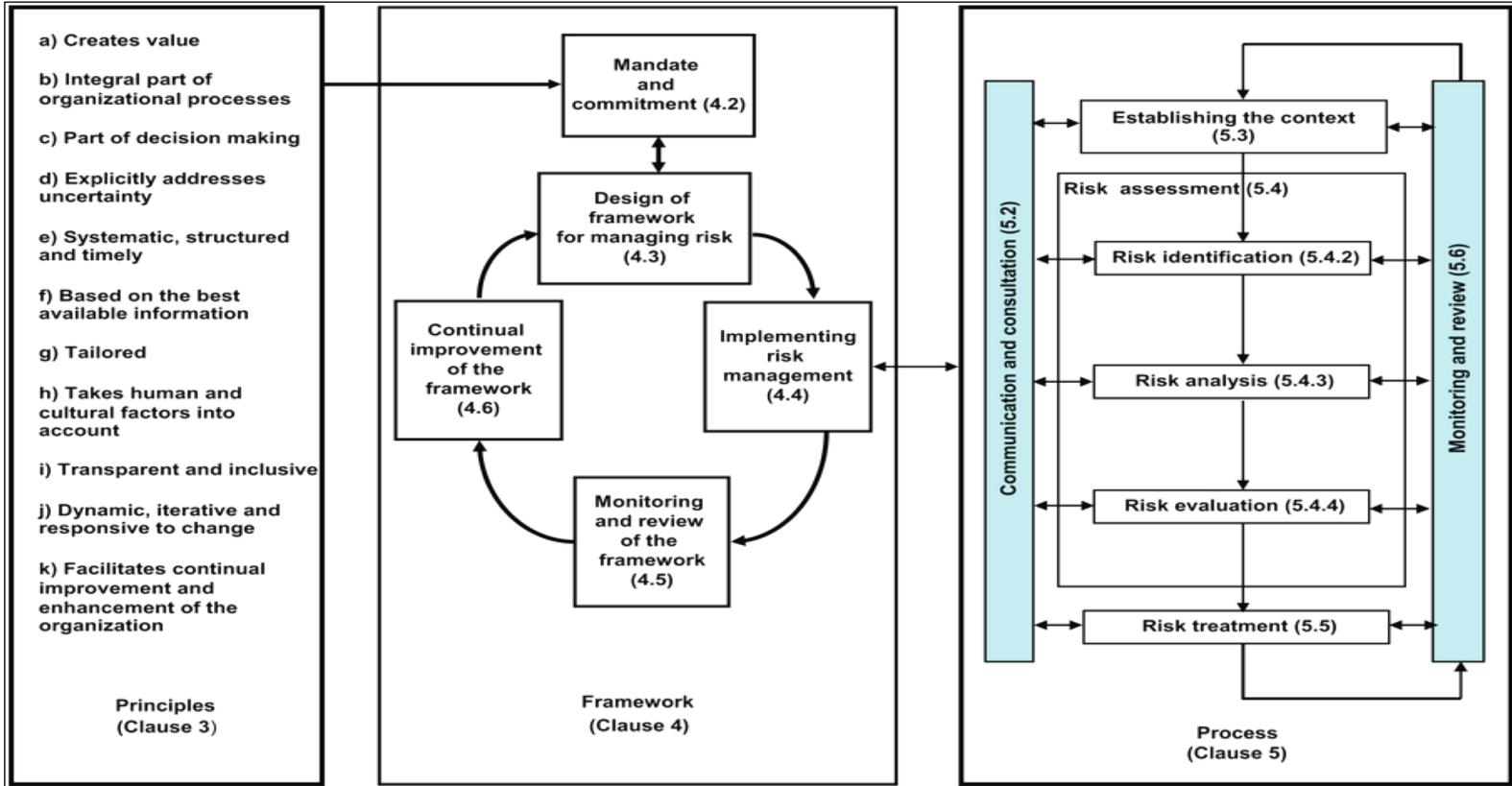


Figure 24. The ISO/OEC 31000:2009 Standard.

### **The Role of Cyber Security Academic Education**

One of the most significant issues reviewed in Chapter 4 was role of academic education of cyber security staff. While the research question was primarily focused on protégés, mentors were also polled. What the research (Figure 11, Figure 12) revealed was that most protégés and mentors held a Bachelor's degree and to a lesser extent held a graduate degree (Master's more than Doctoral). What it did not disclose was whether a college degree was in a field that directly related to cyber security or information assurance, computer science or information systems management. Individuals could have held a degree in a non-technical field (i.e., mid-life career changes) or liberal arts degree (history, business administration, etc.) and then supplemented their formal education with vendor certifications. This ambivalence may be reflected (Figure 10) where there was a 50/50 split between what was more important between (a) a college degrees or in obtaining (b) vendor cyber security certifications. This complicated the research findings. The only method to fix this would be to conduct a follow-up Web-based questionnaire and ask more specific questions. The only concern here is whether or not respondents in a later study would show the identical resistance shown in this study. If so, future results may demonstrate similar patterns.

Field experience dominated both college degrees and certifications according to (Figure 9). The time span considered that "enough time" ranged from three to ten years according to (Figure 13) and this may be because some or many of those working in the field had an appropriate college degree in the cyber security arena. It would seem logical that those who did took less time to develop and mature their cyber skills than those who

did not. If this could be correlated in future research then CISOs, hiring managers and HR staff would be able to be more aware of the true credentials and abilities of job applicants.

### **The Role of Vendor Cyber Security Certifications**

When respondents were asked whether they held any professional certifications or were expecting to obtain them in the future. It was demonstrated (Figure 5) a clear majority did not, but (Figure 16, Figure 17) revealed there were some who would certainly complete cyber security certifications. This was especially true of recent hires. It is assumed that that they either did not see the intrinsic value of obtaining them, or perhaps because new hires may have just completed college degrees in the field, they were not interested in doing so. We simply do not know. Again, more focused research would need to be conducted in the future to isolate and illuminate responses. However, a minority did see value in them.

When (Figure 14) is taken into consideration, one notices that many felt that certifications were “not important.” However, if one took all of the other responses combined, from two to five certifications this outweighed all of those who did not feel they were of value. Hence, one can clearly deduce that they were of value to the total majority of respondents. This led to another question of why in (Figure 5) were the responses different as seen in the fact that so many did not have certifications. Some insight can be gained by considering (Figure 16, Figure 17). Certain certifications had more perceived value than others did. We also do not know when respondents would actually commence the certification preparation process in relationship to their academic

degree graduation date and how much field experience their managers would require before seeking additional knowledge. There was also an apparent difference in whether respondents would work for the U.S. Federal Government (or specified agencies within it) or State Governments, which would look favorably or even require DoDD 8570.1-M certifications should be earned before any official hiring could occur.

After consideration of all the data and factors, I tend to agree that professional vendor cyber security certifications are not as important as obtaining a college degree. The reason for this is that certifications only test the skill to memorize test answers and not integrate high-level reasoning abilities that a college degree would. If employers added a high-quality CSM program, with college and field experience, I believe the end result would be the best prepared candidate. With all of the books, manuals, and International Organization for Standardization (ISO) 27000 and ISO 31000 guidelines the need to integrate and apply this material thoughtfully is critical. To regurgitate test answers is too one-dimensional and simple-minded. Therefore, (a) field experience, (b) a college degree, (c) CSM and finally (d) certifications seem indicated and are the most important aspects in employment hiring criteria.

Another recommendation is that those who do elect to earn vendor cyber security certifications should earn a few “generalist” certifications and then focus on a specific subset of others. If someone attempted to earn each and every professional certification they would not have the time to maintain them since as reported most respondents only have 1-2 hours a week to devote to CPE. I would strongly recommend that a formal COP be developed for CSM. This would allow for compartmentalization and increased skill

development for CSM protégés. For example, the following COP concept seems to be the most reasonable:

- Generalist Certifications:
  - CompTIA® A+, CompTIA®Net+, CompTIA®Sec+
  - GIAC® Security Leadership Certification (GSLC)
  - ISACA® Certified Information Systems Risk Controls (CRISC)
  - Microsoft® Windows MCSE & Windows® 7, 8, & 10
- ISC<sup>2</sup> Certified Information Systems Security Professional CISSP® Operating
- System & Network Technologies:
- Advanced Certifications:
  - Auditing & Security Management:
    - GIAC® Systems and Network Auditor (GSNA)
    - ISACA® Certified Information Systems Auditor (CISA)
    - ISACA® Certified Information Systems Management (CISM)
  - CISCO® Security
  - Hacking, Intrusion & Forensics:
    - EC-Council® Certified Ethical Hacker (CEH)
    - EC-Council® Computer Hacking Forensics Investigator (CHFI)
    - GIAC® Certified Intrusion Analyst (GCIA)
    - GIAC® Certified Forensic Analyst GCFA

A correct balance of some of these certifications will also fulfill DoDD 8570.M requirements, which will allow those who have earned them to work for the United States Department of Defense, and many State and Federal entities.

### **CSM's Role in Continuing Cyber Security Education**

With the first two research questions reviewed, it is now appropriate to examine what is most likely the more important of the research questions of this dissertation. In what ways does CSM apply to the workplace and the roles of both mentors and protégés? I believe that CSM is very promising to CISOs and managers. Since time is the key issue (Figure 15, Figure 18) a high quality after-hours asynchronous or synchronous e-Mentoring program makes the most sense. With a paltry 1-2 hours a week available during normal work-hours, only a post-work program seems appropriate. This would require a change of mind-set by all involved, and then finding or developing a high-quality program that should be delivered to potential clients. With a plethora of potential risks as noted in Figure 6 any program developed would need to be extensive and updated frequently and participation *must be made mandatory* by Senior Management or the CIO/CISO.

According to (Figure 7, Figure 8) most protégés did not participate in a CSM program during academic education (e.g., internships, externships). They also felt very “undecided” about their experience if they did participate. For many it was a positive experience, but for a small number some DIM was felt in the relationship between protégés and their academic mentors. According to (Figure 21) CSM did not always improve protégés skills, but it was very close between those who did and those who did

not. A question for future research is how could this be improved? Were mentor's insufficiently prepared, or were protégés resistant or bored with the process that was being implemented? Most participated in a dyadic mentoring relationship with a mentor with one or possibly two protégés according to (Figure 20), and most believed that either a senior or middle manager should be the mentor according to (Figure 22). Overall, most who participated in some form of CSM felt they were mentored "about right" (Figure 23) however, this was not specifically or clearly defined as to what "about right" means.

### **Suggestions to Improve Cyber Security Education**

This leads to the final phase of this dissertation. The research has already demonstrated the feelings, attitudes, beliefs, experiences and thoughts of cyber security professionals (e.g., the newly hired, college graduates, externs and interns, mentors, middle management, and CISOs), thus fulfilling the qualitative research requirements of this dissertation. It also determined a reasonable understanding the demographics currently present in the field. It behooves me to propose some common sense proposals to strengthen information cyber assurance programs in the marketplace within the overall context of CSM. To put it another way – what are the concepts that a cyber security mentor needs to tutor their protégés in what constitutes a well-thought out and comprehensive training program for CSM.

First, I would strongly recommend that mentoring begin at the collegiate undergraduate level and then advance through graduate and perhaps post-graduate degree programs. It is the most logical place for CSM to occur, and if it begins at the beginning of the undergraduate program by the time the graduate degree is received the cyber

security candidate would have six-to-eight years of mentoring and exposure to the latest technologies and techniques.

Second, when coupled with ISO 31000:2009 for Risk Management, and with the ISO/IEC 27001:2013 standard for Information Security Management and interim updates and corrections like ISO/IEC 27001:2013/Cor.1: 2014, the three standards provide a cumulative or aggregate baseline for CSM. However, in light of what has been recently divulged by Edward Snowden, and the NSA cyber spy craft, more and more it is obvious that it is impossible to 100% fully secure any system.

Third, with the constant evolution of new tools and technologies, white-hat hackers simply do not exist in the cyber space mainstream. There is always some form of a hidden agenda. There are only various shades of gray-hats and of course the ever present and ubiquitous black-hat hackers worldwide. Just too many malevolent, malicious, criminal and immoral attackers would love nothing more than to hack their way into the most sensitive of systems to cause ruin and panic. Why would they desire such a thing? Their motivations are sometimes very mysterious and in the end, the reason may be simpler than most think – because they can.

Fourth, another factor to keep in mind is hacker ego. Generally speaking, hackers want to bring attention to themselves so there is more interest in selecting large profile targets and ignoring or showing little interest in Small Office Home Offices (SOHOs) or micro-business concerns. There is “no glory” in attacking a private medical practice or small-business or micro-business enterprise, unless it leads to a “greater prize.”

### **Implications for Positive Social Change**

A problem in cyber security and information assurance is the massive amount of knowledge that is needed to know and the increasing sophistication of cyber-attacks. The simple and stunning fact that most cyber security professionals can only squeak out 1-2 hours a week in after work improvement is a frightening revelation. This means that cyber security staffs need to be increased, and more budget authority (Figure 6) given to CISOs and management to hire more staff and urgent upgrades to many systems needs to occur. This seems to indicate and possibly confirm resistance to do so by CEOs and CFOs. This means that corporate executives and boards prefer to take on additional risk, or that they need more education regarding cyber risk. It seems they may be rolling the dice and then if things go wrong to find someone else to blame or become the scapegoat. Generally speaking, the CISO may be that individual.

Good cyber security policy and procedures are not just the responsibility of management. Rank and file employees should be informed and education about corporate cyber security policy and the regular information system audits should be completed to determine if compliance is in place. If not, steps should be undertaken to do so.

### **Recommendations for Action**

CSM within distinct COP's may be the best way of building and creating a solid cyber defensive shield. While appropriate academic education is good, and professional certifications are helpful, gaining credible field experience is the most pertinent of all. This field experience should include CSM on a continuing basis in some form or manner. The cyber security and information assurance field is just too complex and evolving to

ignore CSM. The ultimate issue is whether or not CSM can provide the means to strengthen cyber security defenses. This can only be ascertained over time and if CSM is widely and consistently applied, and regular sampling can occur. One method may be to access new respondents at national cyber security professional conferences conducted by ISACA®, GIAC®, or ISC<sup>2</sup>® or sponsored by the U.S. Department of Defense for additional input.

### **Recommendations for Further Study**

Every dissertation should leave unanswered questions and allow for future research to hopefully find solutions. There are two issues directly mentioned in this dissertation. First, why did the respondents see little or no perceived value in being a member of professional organizations? Second, how could respondents be motivated to complete more in-depth oral interviews or to provide more complete answers to the questionnaire (Appendix I) so that more precise “patterns of association” could be discovered?

Additionally, I would like to obtain more insight into the feelings of both mentors and protégés regarding CSM. The best this research can do for the moment is to infer that there is a real opportunity for CSM in companies based on (Figure 7, Figure 8, Figure 19, Figure 20, Figure 21, Figure 22 and Figure 23). The good news is most CSM protégés felt they had been mentored “about the right amount,” (in the workplace) but, we do not know specifically what this means. More study needs to be completed on what a good mentor preparation program consists of and what separates “good” mentors from “poor” mentors in both academic and workplace settings. While Chapter 2 did provide

background and substance to these issues, what is of continued concern in light of time restraints on cyber security staff is that most mentors may not be aware of this material.

Another area for further study is to try to learn why so many respondents did not see any real value in earning vendor certifications according to (Figure 14). This is especially curious in light of the fact that a simple cursory review of new job posts by potential employers (e.g., DICE®, Monster®, CareerBuilder®, etc.), desired new hires to hold cyber security certifications and keep them maintained. While an academic education seems to be foundational, continued knowledge and skills must be updated on a regular basis and cyber security certifications may provide a means to do so. While many people may circumvent earning certifications through on-line “crash courses,” (e.g. boot-camps) in the end these unskilled people will be weeded out. The concern is the damage that might occur during the interim of their limited tenure. Cyber security personnel need to study the means and methods of hackers and other cyber sleuths. Unfortunately, these nefarious types of people are not going to go away. The task of protecting the cyber homeland seems endless and constant. Further study may also be indicated in AI systems to assist in this spirited contest.

### **Reflection on the Researcher’s Experience**

When I first began to consider the rudimentary concepts of this dissertation, he did not realize all of the twists and turns that would be encountered. The proposed study seemed so straightforward that it would only take about 6–12 months to complete. It has now been 2 years and with each page written, the areas for continued study and advanced research seem endless. In countless discussions with colleagues and professors the

research advanced slowly and many sections had to be re-written several times, especially Chapter 2 and the Literature Review. Now that this process is completed, I am a bit more humbled and less sure as I consider the vast depth and breadth of cyber security in the world today. It has been said that those who prepare for the CISSP® professional certification must master information that is “a mile wide and an inch deep.”

As technology has taken great strides in the last 50 years from mainframes to client/server and then to the cloud technologies of the Internet, the complexity of providing the C-I-A (e.g. Confidentiality, Integrity and Availability) triangle grows exponentially. Information assurance will be a strong and vital cog in the business and technological world indefinitely. Nevertheless, there are clear warning signs in the road ahead if society does not place a system of checks and balances in place. If history teaches us anything at all, it is with each leap forward, the new technology is so often used to diabolical ends of human misery, war and suffering. Computer technologies are not exempt.

## **Conclusion**

It is highly doubtful that any business organization or government agency or department will fully implement every aspect or best practices mentioned in this dissertation, or the copious cyber security literature that is available in the marketplace. The reason is cost and staffing requirements and the changing and evolving nature of cyber security itself. While each of the models have their advantages and emphasis, a good cyber security and information, assurance program has a unique and limited life cycle. A danger that exists is allowing that program to morph into a project, because projects and project management all have a terminal beginning and ending point. Cyber security is always ongoing, growing, adapting and changing.

Cyber security, while staggering in scope, could be reduced to in all reality simply to two things. First, do your best to protect your data by training the “good-guys” in proper procedures and rank-and-file staff in corporate IT policies – in short trust only a very few people with administrator or root privileges. Second, constantly keep an eye out for the “bad-guys” by monitoring and auditing and then do it again repeatedly watching for anomalies or pattern shifts. After that, all that remains is to remember the RST acronym – read, study, and think. Then constantly repeat that cycle over and over again. One must never become complacent or totally satisfied that your systems are secure, because it is impossible to have 100% security. This means there will always be some residual risk that one will have to accept. While it can be minimized, it can never be entirely transferred to a third party. Computer and networked systems and those who staff them will need to be tweaked and fine-tuned constantly and this is precisely where a solid

and comprehensive CSM program becomes essential. In other words, there are no perfect CNA's or CDA's (e.g., cyber network attacks or cyber defensive actions) now or ever. Strong cyber security policies supported by Senior and Executive Management, along with a thoughtful security objectives (COBIT), which then transcends downward in the organization is much more important. Cyberspace is constantly changing and this requires constant diligence, and again CSM becomes even more valuable and helping in developing "good security practices." As Harris (2013) [Kindle Version: Location 8557/31245] states, "Just like cops and robbers, there will always be attackers and security professionals. It is a game of trying to outwit each other and seeing who will put the necessary effort into winning the game."

If you ever do think your systems are impenetrable or largely so, a good practice is to hire a reputable firm to conduct a "gray-hat" hacking attack on them. One may be very surprised to discover precisely how many weaknesses become evident and where the greatest problems truly are. Once one knows where the "holes in the dike are," only then can you begin to make the required patches. It is important to remember that robust cyber security requires both offensive (only the U.S. government may authorize cyber offensive "weapons") and defensive measures that comprise a mix of techniques. There is no one single secret, but like an onion, a good cyber defense model is always multi-layered and sometimes makes your Chief Financial Officer wince and cry. One could "cry wolf" or that the "sky is falling" but in the final analysis this would not be very helpful. While great strides have been taken to shore up cyber defenses in the typical workplace

environment, there is always more to do. The trick is finding a good cost-effective balance.

Future study, research and questionnaires of CISOs, executive and senior management, middle management, new hires, college graduates and their professors will be needed to determine if CSM does indeed make any lasting impact within cyber security. One area where this might be accomplished in a more expeditious manner is with professional conferences where cyber security personnel regularly meet to discuss the latest advances. The advancement of cyber war games between major universities and the U.S. Service Academies could also be another area where college students can learn to integrate advanced skills, as well as those who enter and then exit the U.S. military services. Cyber security is a field of study that many military services veterans might find appealing in continued service to the U.S. Homeland.

The need for well-trained and seasoned cyber specialists and cyber warriors is critical in light of the fact that black-hat hackers, cyber spies and cyber terrorism could have a devastating impact upon Western society. The rise in significance of cyber security has led to an increase in the range of interesting career paths that can be followed in this area. Inevitably there has also been an explosion in the diversity of available cyber security education, qualifications and training, most of which is targeted at those seeking to engage with this promising job market. In this article, some guidelines are provided on how to select appropriate education, qualifications and training in cyber security, alongside a review of some of the

many current offerings and how to differentiate between them. (Martin, 2015, Abstract)

Wherever technology is ever implemented on the geo-political stage, cyber security risk is present. While cyber war may be morally indefensible, enemies will continue to exist in cyber space. Therefore, as awful as it may sound or be, in the final analysis perhaps limited and brief periods of cyber war may become a future reality (if it is not a reality already). This tension may well be a defining factor of the 21<sup>st</sup> century. In the end, remember that cyber security and information assurance is never a finished task. There will be many sleepless nights wondering and worrying if one's systems have failed, and whether or not a significant breach has occurred. However, developing and enforcing common sense cyber security policies, and by "hardening systems" and taking the most obvious and prudent steps is a solid first step. This should be followed by a robust CSM program. With these steps undertaken, CISOs should be able to demonstrate that they have exercised due care and diligence and thus narrowed and minimized their outstanding risk exposure and any remaining lingering liability.

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## Appendix A: IRB Approval

02/28/14

Dear Mr. Ellithorpe,

This email is to serve as your notification that Walden University has approved BOTH your dissertation proposal and your application to the Institutional Review Board. As such, you are approved by Walden University to conduct research.

Please contact the Office of Student Research Administration at [research@waldenu.edu](mailto:research@waldenu.edu) if you have any questions.

Congratulations!

Jenny Sherer  
Associate Director, Office of Research Ethics and Compliance

Leilani Endicott  
IRB Chair, Walden University

Approval Number: #0228140145159

## Appendix B: Protégé Questionnaire

Instructions: Please respond to the following statements by checking the appropriate response related to the degree of agreement with the statement, ranging from (5) strongly-agree to (1) strongly-disagree. Some questions are used only for demographic analysis. Skip this section if you did not participate in a formal CSM program **as a PROTÉGÉ** in the last 2 years. **DO NOT** place your name, your company name, or any other type of self-identifying information on the questionnaire.

1. My CSM experience helped me to enlarge the scope of personal and professional connections inside the organization:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

2. My CSM experience helped me to enlarge the scope of personal and professional connections outside the organization:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

3. My CSM experience helped me to understand more clearly the breadth and depth of my company or business organization:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

4. My CSM experience helped me to clarify and develop a plan for the future realization of personal career goals:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

5. Which cyber security or other “well-known” IT certifications do you currently hold: Select all that apply.

- a.  A+, Network+ and Security+ from CompTIA®
- b.  Microsoft® Windows 7
- c.  Microsoft® Windows 8
- d.  Microsoft® Enterprise Desktop Administration
- e.  Configuring Windows Server 2008 or 2012 Active Directory
- f.  Configuring Windows Server 2008 or 2012 Network Infrastructure
- g.  Configuring Windows Server 2008 or 2012 Infrastructure
- h.  Configuring Windows Server Enterprise Administration (70-647)
- i.  Microsoft® Threat Management Gateway Server (TMG/UAG)
- j.  Microsoft® SQL Server 2010
- k.  Microsoft® Exchange Server 2010
- l.  Microsoft® SharePoint Server 2010
- m.  CISCO® CCENT/CCNA
- n.  CISCO® Certified Security Associate in Security (CCNA-SEC)
- o.  CISCO® Certified Design Associate in Security (CCDA-SEC)

- p.  CISCO® Certified Security Professional (CCSP)
  - q.  CISCO® Certified Internetworking Expert in Security (CCIE-SEC)
  - r.  Advanced Data Center Design, Engineering & Management
  - s.  ISACA® Certified in the Governance of Enterprise IT (CGEIT)
  - t.  ISACA® Certified in Risk Information Systems Control (CRISC)
  - u.  ISACA® Certified in Information Systems Audit (CISA)
  - v.  ISACA® Certified in Security Management (CISM)
  - w.  IC-EEC® Certified Ethical Hacker (CEH)
  - x.  IC-EEC® Licensed Penetration Tester Certification (LPTC)
  - y.  IC-EEC® Certified Hacking Forensic Investigator (CHFI)
  - z.  IC-EEC® Certified Security Analyst Certification (CSAC)
6. Which of the following Department of Defense (DOD) 8570.1 cyber security certifications do you currently hold: Select all that apply.
- a.  IAT Level I: A+, Network+ and the SSCP certifications.
  - b.  IAT Level II: GSEC, Security+, SCNP or SSCP certifications.
  - c.  IAT Level III: CISA, GSE, SCNA and CISSP certifications.
  - d.  IAM Level I: CAP, GISF, GSLC and Security+ certifications.
  - e.  IAM Level II: CAP, GSLC, CISM and the CISSP certifications.
  - f.  IAM Level III: GSLC, the CISSP certifications.
  - g.  CND Analyst: GCIA and the CEH
  - h.  CND Infrastructure Support: SSCP and the CEH
  - i.  CND Incident Handler: GCIH, CSIH, and the CEH

- j.  CND Auditor: CISA, GSNA, and the CEH
- k.  CND-SP manager: CISSP-ISSHP and the CISM
- l.  IASAEI Level I or IASAEI Level II: CISSP
- m.  IASAE Level III: CISSP-ISSAP and the CISSP-ISSEP

7. My new career development plan includes earning new cyber security or other “well-known” IT certifications:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

8. How many and, which cyber security or other “well-known” IT certifications: Select all that apply or that you would like to earn in the future.

- a.  A+, Network+ and Security+ from CompTIA®
- b.  Microsoft® Windows 7
- c.  Microsoft® Windows 8
- d.  Microsoft® Enterprise Desktop Administration
- e.  Configuring Windows Server 2008 or 2012 Active Directory
- f.  Configuring Windows Server 2008 or 2012 Network Infrastructure
- g.  Microsoft® Threat Management Gateway Server (TMG/UAG)
- h.  Microsoft® SQL Server 2010
- i.  Microsoft® Exchange Server 2010
- j.  Microsoft® SharePoint Server 2010
- k.  CISCO® CCENT/CCNA

- l.  CISCO® Certified Security Associate in Security (CCNA-SEC)
  - m.  CISCO® Certified Design Associate in Security (CCDA-SEC)
  - n.  CISCO® Certified Security Professional (CCSP)
  - o.  CISCO® Certified Internetworking Expert in Security (CCIE-SEC)
  - p.  Advanced Data Center Design, Engineering & Management
  - q.  ISACA® Certified in the Governance of Enterprise IT (CGEIT)
  - r.  ISACA® Certified in Risk Information Systems Control (CRISC)
  - s.  ISACA® Certified in Information Systems Audit (CISA)
  - t.  ISACA® Certified in Security Management (CISM)
  - u.  IC-EEC® Certified Ethical Hacker (CEH)
  - v.  IC-EEC® Licensed Penetration Tester Certification (LPTC)
  - w.  IC-EEC® Certified Hacking Forensic Investigator (CHFII)
  - x.  IC-EEC® Certified Security Analyst Certification (CSAC)
9. Which of the following Department of Defense Directive (DoDD) 8570.1 cyber security certifications would you like to earn? Select all that apply or that you would like to earn in the future.
- a.  IAT Level I: A+, Network+ and the SSCP certifications.
  - b.  IAT Level II: GSEC, Security+, SCNP or SSCP certifications.
  - c.  IAT Level III: CISA, GSE, SCNA and CISSP certifications.
  - d.  IAM Level I: CAP, GISF, GSLC and Security+ certifications.
  - e.  IAM Level II: CAP, GSLC, CISM and the CISSP certifications.
  - f.  IAM Level III: GSLC, the CISSP certifications.

- g.  CND Analyst: GCIA and the CEH
- h.  CND Infrastructure Support: SSCP and the CEH
- i.  CND Incident Handler: GCIH, CSIH, and the CEH
- j.  CND Auditor: CISA, GSNA, and the CEH
- k.  CND-SP manager: CISSP-ISSHP and the CISM
- l.  IASAEI Level I or IASAEI Level II: CISSP
- m.  IASAE Level III: CISSP-ISSAP and the CISSP-ISSEP

10. Of the following choices, in your opinion, what constitutes the greatest risk to your company: Using a scale of 1-5 (with “5” being extremely important and “1” not being important), rank the top five cyber security risks only.)

- |                                       |  |   |
|---------------------------------------|--|---|
| <input type="checkbox"/> Hackers      | <input type="checkbox"/> Malware           | <input type="checkbox"/> Governance     |
| <input type="checkbox"/> Change Mgmt. | <input type="checkbox"/> Assessment        | <input type="checkbox"/> Compliance     |
| <input type="checkbox"/> Planning     | <input type="checkbox"/> Audit             | <input type="checkbox"/> Outsourcing    |
| <input type="checkbox"/> Physical     | <input type="checkbox"/> Virtual           | <input type="checkbox"/> Security Aware |
| <input type="checkbox"/> Wireless     | <input type="checkbox"/> Mobile Devices    | <input type="checkbox"/> Continuity     |
| <input type="checkbox"/> Recovery     | <input type="checkbox"/> Cyber Crime       | <input type="checkbox"/> Forensics      |
| <input type="checkbox"/> VPN          | <input type="checkbox"/> Incident Handling |   |

11. My new career development plan includes completing additional formal cyber security academic education culminating in a new college cyber security degree:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

12. I hope to complete a new cyber security academic degree at the following academic level:

- No degree (0)
- Associate's Degree (1)
- Bachelor's Degree (2)
- Master's Degree (3)
- Doctoral Degree (4)
- Post-Doctoral (5)

13. I hold a college degree at the following academic level:

- No degree (0)
- Associate's Degree (1)
- Bachelor's Degree (2)
- Master's Degree (3)
- Doctoral (4)

14. My mentor holds a college degree at the following academic level:

- No Degree (0)
- Associate's Degree (1)
- Bachelor's Degree (2)
- Master's Degree (3)
- Doctoral Degree (4)
- Post-Doctoral (5)

15. My CISO holds a college degree at the following academic level:

- No Degree (0)
- Associate's Degree (1)
- Bachelor's Degree (2)
- Master's Degree (3)
- Doctoral Degree (4)
- Post-Doctoral (5)

16. What is more important in determining cyber security competency: Select only one answer:

- Not sure or don't know (0)
- Experience Only (1)
- Certifications Only (2)
- Degree Only (3)
- Experience and College (4)
- Experience and Degree (5)
- Certifications and Experience (6)
- Certifications and Degree (7)
- Certifications, Degree and Experience (8)

17. How many years of experience do you feel you will need until you feel competent in cyber security:

- Not sure or don't know (0)
- 1 Year of Experience (1)
- 2 Years of Experience (2)
- 3 Years of Experience (3)
- 4 Years of Experience (4)
- 5 Years of Experience (5)
- 5-7 Years of Experience (6)
- 8-9 Years of Experience (7)
- 10 Years or More of Experience (8)

18. How should cyber security knowledge or competency be confirmed: Check all that apply.

- Letters of Reference (1)
- Academic Transcripts (2)
- Previous Experience (3)
- Pre-employment Screen by Prospective Employer (4)
- Background Checks (5)
- A "Peer-Review" (6)

19. The expected outcomes of my formal CSM experience was made clear to me before beginning the mentoring relationship:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

20. Which of the following are the most important in determining cyber security competency: Select only one answer.

- Letters of Reference (1)
- Academic Transcripts (2)
- Previous Experience (3)
- Pre-employment Screen by Prospective Employer (4)
- Background Checks (5)
- A "Peer-Review" by the mentor (6)
- A "Peer-Review" by the CISO (7)
- A "Peer-Review" and "Validation Certification" (8)

21. How many certifications do you feel you will need until you feel competent in cyber security:

- Not sure or don't know (0)
- 1 Certification (1)
- 2 Certifications (2)
- 3 Certifications (3)

- 4-5 Certifications (4)
- 6-7 Certifications (5)
- 8-9 Certifications (6)
- 10-15 Certifications (7)
- 15 Certifications or More (8)

22. At what college academic level would you feel competent in cyber security:

- Degree Not Needed (0)
- Associate's Degree (1)
- Bachelor's Degree (2)
- Master's Degree (3)
- Doctoral or Post-Doctoral Degree (4)

23. What single factor inhibits or prevents you from achieving your personal or professional Continuing Professional Education (CPE) in cyber security:

- Finding the Time (1)
- Finding the Money (2)
- Balancing Work with Family Commitments (3)
- Support from my mentor (4)
- Support from my Company (5)

24. Who should cover the financial costs of helping you achieve your personal or professional goals and advancement in cyber security:

- My Sole Responsibility (1)
- The Company's Responsibility Solely (2)
- A Shared Responsibility (3)

25. My company and my CISO supported me with time and funding to earn new certifications or cyber security college degrees that my mentor recommended or suggested:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

26. My CSM experience helped me strengthen my sense of professional aptitude and expertise within the organization:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

27. My CSM experience helped me to strengthen my sense of professional aptitude and expertise outside the organization:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

28. My CSM experience helped me to “feel better” about myself:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

29. I previously participated in the following types of mentoring before beginning any CSM:

- Academic Mentoring (4)
- Adolescent Mentoring (3)
- Childhood or Youth Mentoring (2)
- Former Workplace Mentoring (1)

30. My prioring was a positive and affirming time in my life:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

31. Your gender:

- Female (1)
- Male (2)

32. Your mentor's gender:

- Female (1)
- Male (2)

33. Your CISOs gender:

- Female (1)
- Male (2)

34. Your age group:

- 18-25 Years (1)
- 26-35 Years (2)
- 36-49 Years (3)
- 50 Years and Up (4)

35. Your mentor's age group:
- 18-25 Years (1)
  - 26-35 Years (2)
  - 36-49 Years (3)
  - 50 Years and Up (4)
36. Your CISOs age group:
- 18-25 Years (1)
  - 26-35 Years (2)
  - 36-49 Years (3)
  - 50 Years and Up (4)
37. Your Racial/Ethnic Background:
- African-American (1)
  - European-American (2)
  - Asian American (3)
  - Latino-American (4)
  - Native American (5)
  - Non-American (6)
38. Your mentor's Racial/Ethnic Background:
- African-American (1)
  - European-American (2)
  - Asian American (3)
  - Latino-American (4)
  - Native American (5)
  - Non-American (6)
39. Your CISOs Racial/Ethnic Background:
- African-American (1)
  - European-American (2)
  - Asian American (3)
  - Latino-American (4)

- Native American (5)
  - Non-American (6)
40. Your sexual orientation:
- Heterosexual (1)
  - Non-Heterosexual (2)
41. Your mentor's sexual orientation:
- Heterosexual (1)
  - Non-Heterosexual (2)
42. Your mentor's sexual orientation:
- Heterosexual (1)
  - Non-Heterosexual (2)
43. Did your mentor's diversity characteristics (Gender, age, race, etc.) affect your mentoring relationship?
- Very strong in a positive manner (5)
  - Somewhat strong in a positive manner (4)
  - Neutral – No discernable difference (3)
  - Somewhat strong in a negative (2)
  - Very strong in a negative manner (1)
44. I have been with my current company or business organizations for:
- Less than 1 Year (1)
  - Less than 2 Years (2)
  - Less than 3 Years (3)
  - More than 3 Years (4)

45. I plan to remain with my current company or business organizations for:
- Less than 2 Years (1)
  - 2-5 Years (2)
  - 6-10 Years (3)
  - 10 Years or more (4)
46. My mentor has been with my current company or business organizations for:
- Less than 5 Years (1)
  - Between 5-10 Years (2)
  - 10 Years or more (3)
47. My CISO has been with my current company or business organizations for:
- Less than 5 Years (1)
  - Between 5-10 Years (2)
  - 10 Years or more (3)
48. Who should be or would you like to have as your cyber security mentor?
- The CISO or VP of Information Security (1)
  - My immediate superior's supervisor (2)
  - My immediate superior (3)
  - An outside cyber security consultant (4)
49. My mentor's "rank" with my current company or business organizations is:
- Junior Management (1)
  - Middle Management (2)
  - Senior Management (3)
  - Executive Management (4)

50. My mentor plans to remain with my current company or business organizations for:

- I don't know (0)
- Less than 2 Years (1)
- 2-5 Years (2)
- 6-10 Years (3)
- 10 Years or more (4)

51. My CISO plans to remain with my current company or business organizations for:

- I don't know (0)
- Less than 2 Years (1)
- 2-5 Years (2)
- 6-10 Years (3)
- 10 Years or more (4)

52. The CSM program involves how many protégés with your mentor:

- Dyadic – Just me (1)
- Small Group 2-3 people (2)
- Large Group 3-7 people (3)
- On-line e-Mentoring (4)

53. The CSM program involves how many mentors with you:

- Dyadic – Just me and a single mentor (1)
- Co-mentoring with 2-3 mentors (2)
- Co-mentoring with 4-5 mentors (3)
- Co-mentoring with CISO and mentor(4)
- Co-mentoring with External Consultant (5)
- On-line e-Mentoring – Many mentors (6)

54. The planned duration of my formal CSM program is:

- Less than 1 Year (1)
- 1-2 Years (2)
- More than 2 Years (3)
- Ongoing or Continuous (4)

55. I expect that my mentor or the CISO meet with me at least:

- As needed or Required (7)
- Once a Week (6)
- Twice a Week (5)
- Every two Weeks (4)
- Once a Month (3)
- Once every two Months (2)
- Quarterly (1)

56. My mentor's depth of knowledge and understanding in the field of cyber security was:

- Very strong (4)
- Strong (3)
- Averages (2)
- Weak (1)
- Very Weak (0)

57. What specific outcomes do you expect to receive when you complete your formal CSM experience? Select no more than two choices.

- A New and More Challenging Assignment (5)
- A New Title and a Salary Increase (4)
- A New Title but not a Salary Increase (3)
- A New Title Only (2)
- A Salary Increase Only (1)
- Nothing – Remain in Current Role (0)

58. I experienced significant dissonance or resistance in my mentoring relationship:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

59. This resistance originated with:

- My perceptions (5)
- My fellow protégés (4)
- My mentor (3)
- My CISO (2)
- Other employees (1)

60. I was able to overcome this resistance:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

61. I am willing to participate in a 15-20 minute phone call to explain more fully and completely my experiences in the mentoring relationship:

- Agree (2)
- Disagree (1)

Final Instructions: Complete only one of the questionnaires. Make sure that you have NOT placed your name, your company name or any other form of self-identifying marks or initials on the questionnaire.

**Please sign and include one copy of the Participant Consent Form and Company Consent Form and include it with your completed questionnaire.** This will be separated from your questionnaire when your envelope is opened to ensure confidentiality of your responses. It will also be used to contact you if you are selected to participate in the telephone or e-Mail phase of the research.

**Mark on the outside the envelope whether you are an CISO, mentor or protégé. Return the Participant Consent Form and your questionnaire in a plain manila envelope** and use the following address for both the return address and mailing address. This study is a random-blind study and does not require your locale or your company's locale.

Send your completed forms to:

**Walden University Doctoral Research Study  
Research Study #: 145159  
P.O. Box 2166  
Glens Falls, NY 12804-2166**

You will be contacted by e-Mail if you are selected for an "oral interview." Please provide an e-Mail address below if you wish to be considered. Only a limited number of respondents will be selected.

E-Mail Address:

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In advance, I wish to extend my personal thanks to each one electing to participate.

## Appendix C: Mentor Questionnaire

Instructions: Please respond to the following statements by checking the appropriate response related to the degree of agreement with the statement, ranging from (5) strongly-agree to (1) strongly-disagree. Some questions are used only for demographic analysis. Skip this section if you did not participate in a formal CSM program **as a MENTOR** in the last 2 years. **DO NOT** place your name, your company name, or any other type of self-identifying information on the questionnaire.

1. My CSM experience helped me to enlarge the scope of personal and professional connections inside the organization:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

2. My CSM experience helped me to enlarge the scope of personal and professional connections outside the organization:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

3. My CSM experience helped me to understand more clearly the breadth and depth of my company or business organization:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

4. My CSM experience helped me to clarify and develop a plan for the future realization of personal career goals:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

5. Which cyber security or other “well-known” IT certifications do you currently hold: Select all that apply.

- a.  A+, Network+ and Security+ from CompTIA®
- b.  Microsoft® Windows 7
- c.  Microsoft® Windows 8
- d.  Microsoft® Enterprise Desktop Administration
- e.  Configuring Windows Server 2008 or 2012 Active Directory
- f.  Configuring Windows Server 2008 or 2012 Network Infrastructure
- g.  Configuring Windows Server 2008 or 2012 Infrastructure
- h.  Configuring Windows Server Enterprise Administration (70-647)
- i.  Microsoft® Threat Management Gateway Server (TMG/UAG)
- j.  Microsoft® SQL Server 2010
- k.  Microsoft® Exchange Server 2010
- l.  Microsoft® SharePoint Server 2010
- m.  CISCO® CCENT/CCNA
- n.  CISCO® Certified Security Associate in Security (CCNA-SEC)
- o.  CISCO® Certified Design Associate in Security (CCDA-SEC)

- p.  CISCO® Certified Security Professional (CCSP)
  - q.  CISCO® Certified Internetworking Expert in Security (CCIE-SEC)
  - r.  Advanced Data Center Design, Engineering & Management
  - s.  ISACA® Certified in the Governance of Enterprise IT (CGEIT)
  - t.  ISACA® Certified in Risk Information Systems Control (CRISC)
  - u.  ISACA® Certified in Information Systems Audit (CISA)
  - v.  ISACA® Certified in Security Management (CISM)
  - w.  IC-EEC® Certified Ethical Hacker (CEH)
  - x.  IC-EEC® Licensed Penetration Tester Certification (LPTC)
  - y.  IC-EEC® Certified Hacking Forensic Investigator (CHFI)
  - z.  IC-EEC® Certified Security Analyst Certification (CSAC)
6. Which of the following Department of Defense (DOD) 8570.1 cyber security certifications do you currently hold: Select all that apply.
- a.  IAT Level I: A+, Network+ and the SSCP certifications.
  - b.  IAT Level II: GSEC, Security+, SCNP or SSCP certifications.
  - c.  IAT Level III: CISA, GSE, SCNA and CISSP certifications.
  - d.  IAM Level I: CAP, GISF, GSLC and Security+ certifications.
  - e.  IAM Level II: CAP, GSLC, CISM and the CISSP certifications.
  - f.  IAM Level III: GSLC, the CISSP certifications.
  - g.  CND Analyst: GCIA and the CEH
  - h.  CND Infrastructure Support: SSCP and the CEH
  - i.  CND Incident Handler: GCIH, CSIH, and the CEH

- j.  CND Auditor: CISA, GSNA, and the CEH
- k.  CND-SP manager: CISSP-ISSHP and the CISM
- l.  IASAEI Level I or IASAEI Level II: CISSP
- m.  IASAE Level III: CISSP-ISSAP and the CISSP-ISSEP

7. My new career development plan includes earning new cyber security or other “well-known” IT certifications:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

8. How many and, which cyber security or other “well-known” IT certifications: Select all that apply or that you would like to earn in the future.

- a.  A+, Network+ and Security+ from CompTIA®
- b.  Microsoft® Windows 7
- c.  Microsoft® Windows 8
- d.  Microsoft® Enterprise Desktop Administration
- e.  Configuring Windows Server 2008 or 2012 Active Directory
- f.  Configuring Windows Server 2008 or 2012 Network Infrastructure
- g.  Configuring Windows Server 2008 or 2012 Infrastructure
- h.  Configuring Windows Server Enterprise Administration (70-647)
- i.  Microsoft® Threat Management Gateway Server (TMG/UAG)
- j.  Microsoft® SQL Server 2010
- k.  Microsoft® Exchange Server 2010

- l.  Microsoft® SharePoint Server 2010
  - m.  CISCO® CCENT/CCNA
  - n.  CISCO® Certified Security Associate in Security (CCNA-SEC)
  - o.  CISCO® Certified Design Associate in Security (CCDA-SEC)
  - p.  CISCO® Certified Security Professional (CCSP)
  - q.  CISCO® Certified Internetworking Expert in Security (CCIE-SEC)
  - r.  Advanced Data Center Design, Engineering & Management
  - s.  ISACA® Certified in the Governance of Enterprise IT (CGEIT)
  - t.  ISACA® Certified in Risk Information Systems Control (CRISC)
  - u.  ISACA® Certified in Information Systems Audit (CISA)
  - v.  ISACA® Certified in Security Management (CISM)
  - w.  IC-EEC® Certified Ethical Hacker (CEH)
  - x.  IC-EEC® Licensed Penetration Tester Certification (LPTC)
  - y.  IC-EEC® Certified Hacking Forensic Investigator (CHFII)
  - z.  IC-EEC® Certified Security Analyst Certification (CSAC)
9. Which of the following Department of Defense Directive (DoDD) 8570.1 cyber security certifications would you like to earn? Select all that apply or that you would like to earn in the future.
- a.  IAT Level I: A+, Network+ and the SSCP certifications.
  - b.  IAT Level II: GSEC, Security+, SCNP or SSCP certifications.
  - c.  IAT Level III: CISA, GSE, SCNA and CISSP certifications.
  - d.  IAM Level I: CAP, GISF, GSLC and Security+ certifications.

- e.  IAM Level II: CAP, GSLC, CISM and the CISSP certifications.
- f.  IAM Level III: GSLC, the CISSP certifications.
- g.  CND Analyst: GCIA and the CEH
- h.  CND Infrastructure Support: SSCP and the CEH
- i.  CND Incident Handler: GCIH, CSIH, and the CEH
- j.  CND Auditor: CISA, GSNA, and the CEH
- k.  CND-SP manager: CISSP-ISSHP and the CISM
- l.  IASAEI Level I or IASAEI Level II: CISSP
- m.  IASAE Level III: CISSP-ISSAP and the CISSP-ISSEP

10. Of the following choices, in your opinion, what constitutes the greatest risk to your company: Using a scale of 1-5 (with “5” being extremely important and “1” not being important), rank the top five cyber security risks only.)

- |                                       |  |   |
|---------------------------------------|--|---|
| <input type="checkbox"/> Hackers      | <input type="checkbox"/> Malware           | <input type="checkbox"/> Governance     |
| <input type="checkbox"/> Change Mgmt. | <input type="checkbox"/> Assessment        | <input type="checkbox"/> Compliance     |
| <input type="checkbox"/> Planning     | <input type="checkbox"/> Audit             | <input type="checkbox"/> Outsourcing    |
| <input type="checkbox"/> Physical     | <input type="checkbox"/> Virtual           | <input type="checkbox"/> Security Aware |
| <input type="checkbox"/> Wireless     | <input type="checkbox"/> Mobile Devices    | <input type="checkbox"/> Continuity     |
| <input type="checkbox"/> Recovery     | <input type="checkbox"/> Cyber Crime       | <input type="checkbox"/> Forensics      |
| <input type="checkbox"/> VPN          | <input type="checkbox"/> Incident Handling |   |

11. My new career development plan includes completing additional formal cyber security academic education culminating in a new college cyber security degree:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

12. I hope to complete a new cyber security academic degree at the following academic level:

- Associate's Degree (1)
- Bachelor's Degree (2)
- Master's Degree (3)
- Doctoral Degree (4)
- Post-Doctoral (5)

13. I hold a college degree at the following academic level:

- No Degree (0)
- Associate's Degree (1)
- Bachelor's Degree (2)
- Master's Degree (3)
- Doctoral Degree (4)
- Post-Doctoral (5)

14. My typical protégé holds a college degree at the following academic level:

- No Degree (0)
- Associate's Degree (1)
- Bachelor's Degree (2)
- Master's Degree (3)
- Doctoral Degree (4)
- Post-Doctoral (5)

15. My CISO holds a college degree at the following academic level:

- Associate's Degree (1)
- Bachelor's Degree (2)
- Master's Degree (3)
- Doctoral Degree (4)

16. What is more important in determining cyber security competency: Select only one answer:

- Not sure or don't know (0)
- Experience Only (1)
- Certifications Only (2)
- Degree Only (3)
- Experience and College (4)
- Experience and Degree (5)
- Certifications and Experience (6)
- Certifications and Degree (7)
- Certifications, Degree and Experience (8)

17. How many years of experience do you feel you will need until you feel competent in cyber security:

- Not sure or don't know (0)
- 1-2 Years of Experience (1)
- 3-4 Years of Experience (2)
- 5-7 Years of Experience (3)
- 8-10 Years of Experience (4)
- 11-15 Years of Experience (5)

18. How should cyber security knowledge or competency be confirmed: Check all that apply.

- Letters of Reference (1)
- Academic Transcripts (2)
- Previous Experience (3)
- Pre-employment Screen by Prospective Employer (4)
- Background Checks (5)
- A "Peer-Review" (6)

19. The expected outcomes of my formal CSM experience with my protégés was made clear to me before beginning the mentoring relationship:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

20. Which of the following are the most important in determining cyber security competency: Select only one answer.

- Letters of Reference (1)
- Academic Transcripts (2)
- Previous Experience (3)
- Pre-employment Screen by Prospective Employer (4)
- Background Checks (5)
- A "Peer-Review" by the mentor (6)
- A "Peer-Review" by the CISO (7)
- A "Peer-Review" and "Validation Certification" (8)

21. How many certifications do you feel you will need until you feel competent in cyber security:

- Not sure or don't know (0)
- 1 Certification (1)
- 2 Certifications (2)
- 3 Certifications (3)

- 4-5 Certifications (4)
- 6-7 Certifications (5)
- 8-9 Certifications (6)
- 10-15 Certifications (7)
- 15 Certifications or More (8)

22. At what college academic level would or did you feel competent in cyber security:

- Degree Not Needed (0)
- Associate's Degree (1)
- Bachelor's Degree (2)
- Master's Degree (3)
- Doctoral Degree (4)

23. What single factor inhibits or prevents you from achieving your personal or professional Continuing Professional Education (CPE) in cyber security:

- Finding the Time (1)
- Finding the Money (2)
- Balancing Work with Family Commitments (3)
- Support from my mentor (4)
- Support from my Company (5)

24. Who should cover the financial costs of helping you achieve your personal or professional goals and advancement in cyber security:

- My Sole Responsibility (1)
- The Company's Responsibility Solely (2)
- A Shared Responsibility (3)

25. My company and my CISO supported me with time and funding to earn new certifications or cyber security college degrees that my mentor recommended or suggested:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)

- Disagree (2)
- Strongly Disagree (1)

26. My CSM experience with my protégés helped me strengthen my sense of professional aptitude and expertise within the organization:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

27. My CSM experience with my protégés helped me to strengthen my sense of professional aptitude and expertise outside the organization:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

28. My CSM experience with my protégés helped me to “feel better” about myself:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

29. I previously participated in the following types of mentoring before beginning any CSM:

- Academic Mentoring (4)
- Adolescent Mentoring (3)
- Childhood or Youth Mentoring (2)
- Former Workplace Mentoring (1)

30. My prioritizing mentoring with my protégés was a positive and affirming time in my life:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

31. Your gender:

- Female (1)
- Male (2)

32. Your protégé's gender:

- Female (1)
- Male (2)

33. Your CISOs gender:

- Female (1)
- Male (2)

34. Your age group:

- 18-25 Years (1)
- 26-35 Years (2)
- 36-49 Years (3)
- 50 Years and Up (4)

35. Your protégé's age group:

- 18-25 Years (1)
- 26-35 Years (2)
- 36-49 Years (3)
- 50 Years and Up (4)

36. Your CISOs age group:
- 18-25 Years (1)
  - 26-35 Years (2)
  - 36-49 Years (3)
  - 50 Years and Up (4)
37. Your Racial/Ethnic Background:
- African-American (1)
  - European-American (2)
  - Asian American (3)
  - Latino-American (4)
  - Native American (5)
  - Non-American (6)
38. Your protégé's Racial/Ethnic Background:
- African-American (1)
  - European-American (2)
  - Asian American (3)
  - Latino-American (4)
  - Native American (5)
  - Non-American (6)
39. Your CISOs Racial/Ethnic Background:
- African-American (1)
  - European-American (2)
  - Asian American (3)
  - Latino-American (4)
  - Native American (5)
  - Non-American (6)
40. Your sexual orientation:
- Heterosexual (1)
  - Non-Heterosexual (2)

41. Your protégé's sexual orientation:
- Heterosexual (1)
  - Non-Heterosexual (2)
42. Your CISO's sexual orientation:
- Heterosexual (1)
  - Non-Heterosexual (2)
43. Did your protégé's diversity characteristics (Gender, age, race, etc.) affect your mentoring relationship?
- Very strong in a positive manner (1)
  - Somewhat strong in a positive manner (2)
  - Neutral – No discernable difference (3)
  - Somewhat strong in a negative (4)
  - Very strong in a negative manner (5)
44. I have been with my current company or business organizations for:
- Less than 1 Year (1)
  - Less than 2 Years (2)
  - Less than 3 Years (3)
  - More than 3 Years (4)
45. I plan to remain with my current company or business organizations for:
- Less than 2 Years (1)
  - 2-5 Years (2)
  - 6-10 Years (3)
  - 10 Years or more (4)
46. My protégé has been with my current company or business organizations for:
- Less than 5 Years (1)
  - Between 5-10 Years (2)
  - 10 Years or more (3)

47. My CISO has been with my current company or business organizations for:
- Less than 5 Years (1)
  - Between 5-10 Years (2)
  - 10 Years or more (3)
48. Who should be a mentor in your organization?
- Junior Management (1)
  - Middle Management (2)
  - Senior Management (3)
  - Executive Management (4)
  - An cyber security consultant (5)
49. As a mentor my “rank” with my current company or business organizations is:
- Junior Management (1)
  - Middle Management (2)
  - Senior Management (3)
  - Executive Management (4)
50. My protégé plans to remain with my current company or business organizations for:
- I don’t know (0)
  - Less than 2 Years (1)
  - 2-5 Years (2)
  - 6-10 Years (3)
  - 10 Years or more (4)
51. My CISO plans to remain with my current company or business organizations for:
- I don’t know (0)
  - Less than 2 Years (1)
  - 2-5 Years (2)
  - 6-10 Years (3)
  - 10 Years or more (4)

52. The CSM program involves how many protégés with a single mentor:
- Dyadic – Just me (1)
  - Small Group 2-3 people (2)
  - Large Group 3-7 people (3)
  - On-line e-Mentoring (4)
53. The CSM program involves how many mentors with you:
- Dyadic – Just me and a single mentor (1)
  - Co-Mentoring with 2-3 mentors (2)
  - Co-Mentoring with 4-5 mentors (3)
  - Co-Mentoring with CISO and mentor (4)
  - Co-Mentoring with External Consultant (5)
  - On-line e-Mentoring – Many mentors (6)
54. The planned duration of my formal CSM program is:
- Less than 1 Year (1)
  - 1-2 Years (2)
  - More than 2 Years (3)
  - Ongoing or Continuous (4)
55. I expect that my protégé(s) or the CISO meet with me at least:
- As needed or Required (7)
  - Once a Week (6)
  - Twice a Week (5)
  - Every two Weeks (4)
  - Once a Month (3)
  - Once every two Months (2)
  - Quarterly (1)
56. My protégé's depth of knowledge and understanding in the field of cyber security at the BEGINNING of Mentoring was:
- Very strong (4)
  - Strong (3)
  - Averages (2)

- Weak (1)
- Very Weak (0)

57. My protégé's depth of knowledge and understanding in the field of cyber security at the CONCLUSION of mentoring was:

- Very strong (4)
- Strong (3)
- Averages (2)
- Weak (1)
- Very Weak (0)

58. What specific outcomes do you expect to receive when you complete your formal CSM experience with your protégés? Select no more than two choices.

- A New and More Challenging Assignment (5)
- A New Title and a Salary Increase (4)
- A New Title but not a Salary Increase (3)
- A New Title Only (2)
- A Salary Increase Only (1)
- Nothing – Remain in Current Role (0)

59. I experienced significant dissonance or resistance in my mentoring relationship:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

60. This resistance originated with:

- My perceptions (5)
- My fellow protégés (4)
- My mentor (3)
- My CISO (2)
- Other employees (1)

61. I was able to overcome this resistance:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

62. I am willing to participate in a 15-20 minute phone call to explain more fully and completely my experiences in the mentoring relationship:

- Agree (2)
- Disagree (1)

Final Instructions: Complete only one of the questionnaires. Make sure that you have NOT placed your name, your company name or any other form of self-identifying marks or initials on the questionnaire.

**Return the Participant Consent Form and Company Consent form along with your questionnaire in a plain manila envelope.** This will be separated from your questionnaire when your envelope is opened to ensure confidentiality of your responses. It will also be used to contact you if you are selected to participate in the telephone or e-Mail phase of the research.

**Mark on the outside the envelope whether you are an CISO, mentor or protégé. Return the Participant Consent Form and your questionnaire in a plain manila envelope** and use the following address for both the return address and mailing address. This study is a random-blind study and does not require your locale or your company's locale.

Send your completed forms to:

**Walden University Doctoral Research Study  
Research Study #: 145159  
P.O. Box 2166  
Glens Falls, NY 12804-2166**

You will be contacted by e-Mail if you are selected for an "oral interview." Please provide an e-Mail address below if you wish to be considered. Only a limited number of respondents will be selected.

E-Mail Address:

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In advance, I wish to extend my personal thanks to each one electing to participate.

## Appendix D: CISO Questionnaire

Instructions: Please respond to the following statements by checking the appropriate response related to the degree of agreement with the statement, ranging from (5) strongly-agree to (1) strongly-disagree. Some questions are used only for demographic analysis. Skip this section if you did not participate in a formal CSM program **as a CISO** in the last 2 years. **DO NOT** place your name, your company name, or any other type of self-identifying information on the questionnaire.

1. My CSM experience helped me to enlarge the scope of personal and professional connections inside the organization?

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

2. My CSM experience helped me to enlarge the scope of personal and professional connections outside the organization?

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

3. My CSM experience helped me to understand more clearly the breadth and depth of my company or business organization?

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

4. I was formally mentored during the early stages of my cyber security career and found that the mentoring experience helped me to clarify and develop a plan for the future realization of personal career goals?

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

5. Which cyber security or other “well-known” IT certifications do you currently hold? Select all that apply.

- a.  A+, Network+ and Security+ from CompTIA®
- b.  Microsoft® Windows 7
- c.  Microsoft® Windows 8
- d.  Microsoft® Enterprise Desktop Administration
- e.  Configuring Windows Server 2008 or 2012 Active Directory
- f.  Configuring Windows Server 2008 or 2012 Network Infrastructure
- g.  Configuring Windows Server 2008 or 2012 Infrastructure
- h.  Configuring Windows Server Enterprise Administration (70-647)
- i.  Microsoft® Threat Management Gateway Server (TMG/UAG)
- j.  Microsoft® SQL Server 2010
- k.  Microsoft® Exchange Server 2010
- l.  Microsoft® SharePoint Server 2010
- m.  CISCO® CCENT/CCNA
- n.  CISCO® Certified Security Associate in Security (CCNA-SEC)
- o.  CISCO® Certified Design Associate in Security (CCDA-SEC)

- p.  CISCO® Certified Security Professional (CCSP)
  - q.  CISCO® Certified Internetworking Expert in Security (CCIE-SEC)
  - r.  Advanced Data Center Design, Engineering & Management
  - s.  ISACA® Certified in the Governance of Enterprise IT (CGEIT)
  - t.  ISACA® Certified in Risk Information Systems Control (CRISC)
  - u.  ISACA® Certified in Information Systems Audit (CISA)
  - v.  ISACA® Certified in Security Management (CISM)
  - w.  IC-EEC® Certified Ethical Hacker (CEH)
  - x.  IC-EEC® Licensed Penetration Tester Certification (LPTC)
  - y.  IC-EEC® Certified Hacking Forensic Investigator (CHFI)
  - z.  IC-EEC® Certified Security Analyst Certification (CSAC)
6. Which of the following Department of Defense (DOD) 8570.1 cyber security certifications do you currently hold? Select all that apply.
- a.  IAT Level I: A+, Network+ and the SSCP certifications.
  - b.  IAT Level II: GSEC, Security+, SCNP or SSCP certifications.
  - c.  IAT Level III: CISA, GSE, SCNA and CISSP certifications.
  - d.  IAM Level I: CAP, GISF, GSLC and Security+ certifications.
  - e.  IAM Level II: CAP, GSLC, CISM and the CISSP certifications.
  - f.  IAM Level III: GSLC, the CISSP certifications.
  - g.  CND Analyst: GCIA and the CEH
  - h.  CND Infrastructure Support: SSCP and the CEH
  - i.  CND Incident Handler: GCIH, CSIH, and the CEH

- j.  CND Auditor: CISA, GSNA, and the CEH
- k.  CND-SP manager: CISSP-ISSHP and the CISM
- l.  IASAEI Level I or IASAEI Level II: CISSP
- m.  IASAE Level III: CISSP-ISSAP and the CISSP-ISSEP

7. My personal career development plan includes earning new cyber security or other “well-known” IT certifications?

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

8. How many and, which cyber security or other “well-known” IT certifications do you expect your mentors or protégés to hold or earn? Select all that apply.

- a.  A+, Network+ and Security+ from CompTIA®
- b.  Microsoft® Windows 7
- c.  Microsoft® Windows 8
- d.  Microsoft® Enterprise Desktop Administration
- e.  Configuring Windows Server 2008 or 2012 Active Directory
- f.  Configuring Windows Server 2008 or 2012 Network Infrastructure
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  - o.  CISCO® Certified Design Associate in Security (CCDA-SEC)
  - p.  CISCO® Certified Security Professional (CCSP)
  - q.  CISCO® Certified Internetworking Expert in Security (CCIE-SEC)
  - r.  Advanced Data Center Design, Engineering & Management
  - s.  ISACA® Certified in the Governance of Enterprise IT (CGEIT)
  - t.  ISACA® Certified in Risk Information Systems Control (CRISC)
  - u.  ISACA® Certified in Information Systems Audit (CISA)
  - v.  ISACA® Certified in Security Management (CISM)
  - w.  IC-EEC® Certified Ethical Hacker (CEH)
  - x.  IC-EEC® Licensed Penetration Tester Certification (LPTC)
  - y.  IC-EEC® Certified Hacking Forensic Investigator (CHFI)
  - z.  IC-EEC® Certified Security Analyst Certification (CSAC)
9. Which of the following Department of Defense Directive (DoDD) 8570.1 cyber security certifications do you expect your mentors or protégés to earn?
- a.  IAT Level I: A+, Network+ and the SSCP certifications.
  - b.  IAT Level II: GSEC, Security+, SCNP or SSCP certifications.
  - c.  IAT Level III: CISA, GSE, SCNA and CISSP certifications.
  - d.  IAM Level I: CAP, GISF, GSLC and Security+ certifications.
  - e.  IAM Level II: CAP, GSLC, CISM and the CISSP certifications.

- f.  IAM Level III: GSLC, the CISSP certifications.
- g.  CND Analyst: GCIA and the CEH
- h.  CND Infrastructure Support: SSCP and the CEH
- i.  CND Incident Handler: GCIH, CSIH, and the CEH
- j.  CND Auditor: CISA, GSNA, and the CEH
- k.  CND-SP manager: CISSP-ISSHP and the CISM
- l.  IASAEI Level I or IASAEI Level II: CISSP
- m.  IASAE Level III: CISSP-ISSAP and the CISSP-ISSEP

10. Of the following choices, in your opinion, what constitutes the greatest risk to your company: Using a scale of 1-5 (with “5” being extremely important and “1” not being important), rank the top five cyber security risks only.)

- |                                       |  |   |
|---------------------------------------|--|---|
| <input type="checkbox"/> Hackers      | <input type="checkbox"/> Malware           | <input type="checkbox"/> Governance     |
| <input type="checkbox"/> Change Mgmt. | <input type="checkbox"/> Assessment        | <input type="checkbox"/> Compliance     |
| <input type="checkbox"/> Planning     | <input type="checkbox"/> Audit             | <input type="checkbox"/> Outsourcing    |
| <input type="checkbox"/> Physical     | <input type="checkbox"/> Virtual           | <input type="checkbox"/> Security Aware |
| <input type="checkbox"/> Wireless     | <input type="checkbox"/> Mobile Devices    | <input type="checkbox"/> Continuity     |
| <input type="checkbox"/> Recovery     | <input type="checkbox"/> Cyber Crime       | <input type="checkbox"/> Forensics      |
| <input type="checkbox"/> VPN          | <input type="checkbox"/> Incident Handling |   |

11. How important is it to you or your company for your staff to have just a college degree (no experience, no certifications) in cyber security or information assurance?

- Vital (4)
- Nice to Have (3)
- Optional (2)
- Not Required (1)

12. How important is it to you or your company for your staff to have well-known IT certifications (no college, no experience) cyber security or information assurance?

- Vital (4)
- Nice to Have (3)
- Optional (2)
- Not Required (1)

13. Which cyber security certifications would you consider mandatory?

- a.  A+, Network+ and Security+ from CompTIA®
- b.  Microsoft® Windows 7
- c.  Microsoft® Windows 8
- d.  Microsoft® Enterprise Desktop Administration
- e.  Configuring Windows Server 2008 or 2012 Active Directory
- f.  Configuring Windows Server 2008 or 2012 Network Infrastructure
- g.  Configuring Windows Server 2008 or 2012 Infrastructure
- h.  Configuring Windows Server Enterprise Administration (70-647)
- i.  Microsoft® Threat Management Gateway Server (TMG/UAG)
- j.  Microsoft® SQL Server 2010
- k.  Microsoft® Exchange Server 2010
- l.  Microsoft® SharePoint Server 2010

- m.  CISCO® CCENT/CCNA
  - n.  CISCO® Certified Security Associate in Security (CCNA-SEC)
  - o.  CISCO® Certified Design Associate in Security (CCDA-SEC)
  - p.  CISCO® Certified Security Professional (CCSP)
  - q.  CISCO® Certified Internetworking Expert in Security (CCIE-SEC)
  - r.  Advanced Data Center Design, Engineering & Management
  - s.  ISACA® Certified in the Governance of Enterprise IT (CGEIT)
  - t.  ISACA® Certified in Risk Information Systems Control (CRISC)
  - u.  ISACA® Certified in Information Systems Audit (CISA)
  - v.  ISACA® Certified in Security Management (CISM)
  - w.  IC-EEC® Certified Ethical Hacker (CEH)
  - x.  IC-EEC® Licensed Penetration Tester Certification (LPTC)
  - y.  IC-EEC® Certified Hacking Forensic Investigator (CHFII)
  - z.  IC-EEC® Certified Security Analyst Certification (CSAC)
14. Which Department of Defense Directive (DoDD) 8570.1 cyber security certifications would you consider mandatory? Select all that apply.
- a.  IAT Level I: A+, Network+ and the SSCP certifications.
  - b.  IAT Level II: GSEC, Security+, SCNP or SSCP certifications.
  - c.  IAT Level III: CISA, GSE, SCNA and CISSP certifications.
  - d.  IAM Level I: CAP, GISF, GSLC and Security+ certifications.
  - e.  IAM Level II: CAP, GSLC, CISM and the CISSP certifications.
  - f.  IAM Level III: GSLC, the CISSP certifications.

- g.  CND Analyst: GCIA and the CEH
- h.  CND Infrastructure Support: SSCP and the CEH
- i.  CND Incident Handler: GCIH, CSIH, and the CEH
- j.  CND Auditor: CISA, GSNA, and the CEH
- k.  CND-SP manager: CISSP-ISSHP and the CISM
- l.  IASAEI Level I or IASAEI Level II: CISSP
- m.  IASAE Level III: CISSP-ISSAP and the CISSP-ISSEP

15. How important is it to you or your company for your staff to have just experience only (no degrees, no certifications) in cyber security or information assurance?

- Vital (4)
- Nice to Have (3)
- Optional (2)
- Not Required (1)

16. How likely would it be for you to hire a person who only had an appropriate cyber security college degree?

- Very Likely (5)
- Likely (4)
- Neutral (3)
- Unlikely (2)
- Very Unlikely (1)

17. How likely would it be for you to hire a person who only had cyber security certifications?

- Very Likely (5)
- Likely (4)
- Neutral (3)
- Unlikely (2)
- Very Unlikely (1)

18. How likely would it be for you to hire a person who only had verifiable experience?

- Very Likely (5)
- Likely (4)
- Neutral (3)
- Unlikely (2)
- Very Unlikely (1)

19. How much experience?

- 10+ Years (5)
- 7-9 Years (4)
- 5-6 Years (3)
- 3-4 Years (2)
- 2 Years or Less (1)

20. How likely would it be for you to promote a person who only had an appropriate college degree?

- Very Likely (5)
- Likely (4)
- Neutral (3)
- Unlikely (2)
- Very Unlikely (1)

21. How likely would it be for you to promote a person who only had certifications?

- Very Likely (5)
- Likely (4)
- Neutral (3)
- Unlikely (2)
- Very Unlikely (1)

22. How likely would it be for you to promote a person who only had verifiable experience?

- Very Likely (5)
- Likely (4)

- Neutral (3)
- Unlikely (2)
- Very Unlikely (1)

23. How much experience before promotion with experience only?

- 10+ Years (5)
- 7-9 Years (4)
- 5-6 Years (3)
- 3-4 Years (2)
- 2 Years or Less (1)

24. How likely would it be for you to hire a person who had a college degree and certifications?

- Very Likely (5)
- Likely (4)
- Neutral (3)
- Unlikely (2)
- Very Unlikely (1)

25. How likely would it be for you to promote a person who had a college degree and certifications?

- Very Likely (5)
- Likely (4)
- Neutral (3)
- Unlikely (2)
- Very Unlikely (1)

26. How many certifications did you feel you needed until you felt competent in cyber security?

- Not sure or don't know (0)
- 1 Certification (1)
- 2 Certifications (2)
- 3 Certifications (3)
- 4-5 Certifications (4)
- 6-7 Certifications (5)

- 8-9 Certifications (6)
- 10-15 Certifications (7)
- 15 Certifications or More (8)

27. How likely would it be for you to hire a person who had a college degree, certifications and experience?

- Very Likely (5)
- Likely (4)
- Neutral (3)
- Unlikely (2)
- Very Unlikely (1)

28. How likely would it be for you to promote a person who had a college degree, certifications and experience?

- Very Likely (5)
- Likely (4)
- Neutral (3)
- Unlikely (2)
- Very Unlikely (1)

29. How much experience along with a college degree and certifications is typically required before promotion?

- 10+ Years (5)
- 7-9 Years (4)
- 5-6 Years (3)
- 3-4 Years (2)
- 2 Years or Less (1)

30. I expect my mentors to counsel their protégés to include completing additional formal cyber security academic education culminating in a new college cyber security degree as part of their professional development?

- Strongly Agree (4)
- Agree (3)
- Disagree (2)
- Strongly Disagree (1)

31. I expect my mentors to hold or to complete a new cyber security academic degree at the following academic level?

- Associate's Degree (1)
- Bachelor's Degree (2)
- Master's Degree (3)
- Doctoral Degree (4)

32. I hold a college degree at the following academic level?

- Associate's Degree (1)
- Bachelor's Degree (2)
- Master's Degree (3)
- Doctoral Degree (4)

33. What guidelines does your Human Resource Department look for when seeking or filling cyber security openings in your company? Select only one answer:

- Experience Only (1)
- Certifications Only (2)
- College Degree Only (3)
- Experience and Certifications (4)
- College Degree and Experience (5)
- College Degree and Certifications (6)
- College Degree, Certifications and Experience (7)

34. How many years of experience did your feel you needed until you felt competent in cyber security?

- Not sure or don't know (0)
- 1-2 Years of Experience (1)
- 3-4 Years of Experience (2)
- 5-7 Years of Experience (3)
- 8-10 Years of Experience (4)
- 11-15 Years of Experience (5)

35. How should cyber security knowledge or competency be confirmed? Check all that apply.

- Letters of Reference (1)
- Academic Transcripts (2)
- Previous Experience (3)
- Pre-employment Screen (4)
- Background Checks (5)
- A "Peer-Review" by the mentor (6)
- A "Peer-Review" by other (7)

36. Which of the following are the most important in determining cyber security competency? Select only one answer.

- Letters of Reference (1)
- Academic Transcripts (2)
- Previous Experience (3)
- Pre-employment Screen by Prospective Employer (4)
- Background Checks (5)
- A "Peer-Review" (6)
- A "Peer-Review" and "Validation Certification" (7)

37. How many certifications did you feel you needed until you felt competent in cyber security?

- Not sure or don't know (0)
- 1 Certification (1)
- 2 Certifications (2)
- 3 Certifications (3)
- 4-5 Certifications (4)
- 6-7 Certifications (5)
- 8-9 Certifications (6)
- 10-15 Certifications (7)
- 15 Certifications or More (8)

38. At what college academic level did you feel competent in cyber security?

- Associate's Degree (1)
- Bachelor's Degree (2)
- Master's Degree (3)
- Doctoral Degree (4)

39. What single factor inhibits or prevents your protégés or mentors from achieving their personal or professional Continuing Professional Education (CPE) in cyber security?

- Lack of Interest (1)
- Finding the Time (2)
- Finding the Money (3)
- Balancing Work with Family Commitments (4)
- Support from mentors (5)
- Support from the Company (6)

40. Who should cover the financial costs of helping you mentors or protégés from achieving their personal or professional goals and advancement in cyber security?

- Their Sole Responsibility (1)
- The Company's Responsibility Solely (2)
- A Shared Responsibility (3)

41. My previous CSM experience helped me strengthen my sense of professional aptitude and expertise within the organization?

- Strongly Agree (4)
- Agree (3)
- Disagree (2)
- Strongly Disagree (1)
- I was not Mentored (0)

42. My previous CSM experience helped me to strengthen my sense of professional aptitude and expertise outside the organization?

- Strongly Agree (4)
- Agree (3)
- Disagree (2)
- Strongly Disagree (1)
- I was not Mentored (0)

43. My previous CSM experience helped me to “feel better” about myself?

- Strongly Agree (4)
- Agree (3)
- Disagree (2)
- Strongly Disagree (1)
- I was not Mentored (0)

44. Your gender:

- Female (1)
- Male (2)

45. Your typical mentor’s gender:

- Female (1)
- Male (2)

46. Your typical protégés gender:

- Female (1)
- Male (2)

47. Your age group:

- Less than 35 Years (1)
- 35-45 Years (2)
- 45-55 Years (3)
- 55 Years or Older (4)

48. Your typical mentor's age group:
- 18-25 Years (1)
  - 26-35 Years (2)
  - 36-49 Years (3)
  - 50 Years and Up (4)
49. Your typical protégés age group:
- 18-25 Years (1)
  - 26-35 Years (2)
  - 36-49 Years (3)
  - 50 Years and Up (4)
50. Your Racial/Ethnic Background:
- African-American (1)
  - European-American (2)
  - Asian American (3)
  - Latino-American (4)
  - Native American (5)
  - Non-American (6)
51. Your typical mentor's Racial/Ethnic Background:
- African-American (1)
  - European-American (2)
  - Asian American (3)
  - Latino-American (4)
  - Native American (5)
  - Non-American (6)

52. Your typical protégés Racial/Ethnic Background:
- African-American (1)
  - European-American (2)
  - Asian American (3)
  - Latino-American (4)
  - Native American (5)
  - Non-American (6)
53. Your sexual orientation:
- Heterosexual (1)
  - Non-Heterosexual (2)
54. Your typical mentor's sexual orientation:
- Heterosexual (1)
  - Non-Heterosexual (2)
55. Your typical protégés sexual orientation:
- Heterosexual (1)
  - Non-Heterosexual (2)
56. I have been with my current company or business organizations for:
- Less than 2 Years (1)
  - 2-5 Years (2)
  - 6-10 Years (3)
  - 10 Years or more (4)
57. I plan to remain with my current company or business organizations for:
- Less than 2 Years (1)
  - 2-5 Years (2)
  - 6-10 Years (3)
  - 10 Years or more (4)

58. My mentor has been with my current company or business organizations for:

- Less than 2 Years (1)
- 2-5 Years (2)
- 6-10 Years (3)
- 10 Years or more (4)

59. I expect that my typical mentor plans to remain with my current company or business organizations for:

- I don't know (0)
- Less than 2 Years (1)
- 2-5 Years (2)
- 6-10 Years (3)
- 10 Years or more (4)

60. I expect that my typical protégé plans to remain with my current company or business organization for:

- No opinion (0)
- Less than 2 Years (1)
- 2-5 Years (2)
- 6-10 Years (3)
- 10 Years or more (4)

61. The CSM program involves how many protégés with your mentor?

- Dyadic – Just them (1)
- Small Group 2-3 people (2)
- Large Group 3-7 people (3)
- On-line e-Mentoring (4)

62. The planned duration of my formal CSM program is:

- Less than 1 Year (1)
- 1-2 Years (2)
- More than 2 Years (3)
- Ongoing or Continuous (4)

63. I expect or require that my mentors and protégés meet at least:
- As needed or Required (7)
  - Once a Week (6)
  - Twice a Week (5)
  - Every two Weeks (4)
  - Once a Month (3)
  - Once every two Months (2)
  - Quarterly (1)
64. My typical mentor's depth of knowledge and understanding in the field of cyber security is:
- Very strong (4)
  - Strong (3)
  - Average (2)
  - Weak (1)
  - Very Weak (0)
65. Who should be your company's cyber security mentor?
- The CISO or VP of Information Security (4)
  - Another Senior cyber security manager (3)
  - Another Mid-Level cyber security manager (2)
  - An External cyber security Consultant (1)
66. My mentors or protégés experienced significant dissonance or resistance in their mentoring relationship:
- Strongly Agree (5)
  - Agree (4)
  - Undecided (3)
  - Disagree (2)
  - Strongly Disagree (1)

67. This resistance originated with:

- Their perceptions (5)
- Other protégés (4)
- Other mentors (3)
- Me (2)
- Other employees (1)

68. They (we) were able to overcome this resistance:

- Strongly Agree (5)
- Agree (4)
- Undecided (3)
- Disagree (2)
- Strongly Disagree (1)

69. I am willing to participate in a 15-20 minute phone call to explain more fully and completely my experiences in the mentoring relationship:

- Agree (2)
- Disagree (1)

Final Instructions: Complete only one of the questionnaires. Make sure that you have NOT placed your name, your company name or any other form of self-identifying marks or initials on the questionnaire.

**Please sign and include one copy of the Participant Consent Form and include it with your completed questionnaire.** This will be separated from your questionnaire when your envelope is opened to ensure confidentiality of your responses. It will also be used to contact you if you are selected to participate in the telephone or e-Mail phase of the research.

**Mark on the outside the envelope whether you are an CISO, mentor or protégé. Return the Participant Consent Form and Company Consent form along with your questionnaire in a plain manila envelope** and use the following address for both the return address and mailing address. This study is a random-blind study and does not require your locale or your company's locale.

Send your completed forms to:

**Walden University Doctoral Research Study  
Research Study #: 145159  
P.O. Box 2166  
Glens Falls, NY 12804-2166**

You will be contacted by e-Mail if you are selected for an “oral interview.” Please provide an e-Mail address below if you wish to be considered. Only a limited number of respondents will be selected.

E-Mail Address:

---

In advance, I wish to extend my personal thanks to each one electing to participate.

## Appendix E: Cover Letter and Participating Company Consent Form

Research Title: The Role and Impact of Cyber Security Mentoring

To Whom It May Concern:

As part of my work towards a PhD In Management (Applied Management and Decision Sciences) at Walden University, I am conducting qualitative research entitled “The Role and Impact of Cyber Security Mentoring.” For the purposes of this study, the company-mentoring program must be considered formal or structured in nature.

To qualify as a formal mentoring program, it must include the following features: senior management involvement, equal opportunity for participants due to various diversity factors such as gender, race, age, sexual orientation, cultural background and ethnicity. The mentoring program must be consistent with company wide Cyber Security Mentoring personnel recruitment goals, high standards for both mentors and protégés, clear expectations, and regular defined and scheduled times of contact between the cyber security mentor and the cyber security protégé.

Findings of this research will assist cyber security staff and senior management (e.g., the Chief Information Security Officer or CISO), cyber security mentors and past and present cyber security protégés to more completely understand the interrelationships between formal academic college degrees, field experience and “well-known” IT Certifications. Specifically, it seek to find insight in the following questions:

1. How does formal cyber security undergraduate or graduate academic education play a role in protégés continuing education as IT security specialists?
2. How do professional cyber security certifications play a role in their continuing education as IT security specialists?
3. How would you describe the experience of cyber security and mentoring in the workplace?
4. How would CISOs, mentors and protégés improve the cyber security education or formal mentoring program in their company?

Other benefits of this study has help guide current and future cyber security mentors and protégés as they attempt to determine the best methods to keep current and up-to-date in the fast-pace and quickly changing cyber security environment, and how the CISO and other top management can support their cyber security staffs in this regard.

Participation in this study is entirely voluntary and no compensation is paid to participants. Those who elect to reply will remain anonymous, and all responses will be confidential and there will be no risk to any subjects.

As the principal researcher, I am requesting authorization from this company for participation in this study, to use employees mailing lists (if any), which includes the names of managers, mentors and former protégés, which would be eligible for participation in this study, and for employee approved use of the company records regarding salary, compensation and other confidential data regarding diversity in your workplace.

\_\_\_\_\_ (Signature of Approving manager)  
 \_\_\_\_\_ (Printed Name of Approving manager)  
 \_\_\_\_\_ (Title of Approving manager)  
 \_\_\_\_\_ (Date of Approval)

James O. Ellithorpe, PhD (ABD)  
 \_\_\_\_\_ (Name of Principal Researcher)

## Appendix F: Cover Letter for Participants

Research Title: The Role and Impact of Cyber Security Mentoring

To Whom It May Concern:

As part of my work towards a PhD In Management (Applied Management and Decision Sciences) at Walden University, I am conducting research entitled “The Role and Impact of Cyber Security Mentoring.” For the purposes of this study, the company-mentoring program must be considered formal or structured in nature.

To qualify as a formal mentoring program, it must include the following features: senior management involvement, equal opportunity for participants dues to various diversity factors such as gender, race, age, sexual orientation, cultural background and ethnicity. The mentoring program must be consistent with company wide cyber security personnel recruitment goals, high standards for both mentors and protégés, clear expectations, and regular, defined and scheduled times of contact between the cyber security mentor and the cyber security protégé.

Findings of this research will assist cyber security staff and senior management (e.g., the Chief Information Security Officer or CISO), cyber security mentors and past and present cyber security protégés to more completely understand the interrelationships between formal academic college degrees, field experience and “well-known” IT Certifications. Specifically, it seek to find insight in the following questions:

1. How does formal cyber security undergraduate or graduate academic education play a role in a protégés continuing education as IT security specialists?
  2. How do professional cyber security certifications play a role in their continuing education as IT security specialists?
  3. How would you describe the experience of Cyber Security Mentoring in the workplace?
  4. How would CISOs, mentors and protégés improve the cyber security education or formal mentoring program in their company?
  5. Other benefits of this study has help guide current and future cyber security mentors and protégés as they attempt to determine the best methods to keep current and up-to-date in the fast-pace and quickly changing cyber security environment, and how the CISO and other top management can support their cyber security staffs in this regard.
- Participation in this study is entirely voluntary and no compensation is paid to

participants. Those who elect to reply will remain anonymous, and all responses will be confidential and there will be no risk to any subjects. **There is no compensation for participating and all who chose to participate must be willing volunteers.** Each person participating must also include a signed copy a Company Permission Form and a Participant Consent Form. All of the signed Company Permission Forms and Participant Consent Forms will be detached and stored separately from the Questionnaire forms to protect the confidentiality of all responses.

Within the questionnaire there are three separate sections. The term “past” means within the last 1-2 years. Do not place your name or any other form of self-identifying Employee ID number or your company name on any returned questionnaire EXCEPT for the group you belong to (e.g., CISO, mentor or protégé.) **Complete only the section of the questionnaire form that is most appropriate for your classification (e.g., CISO, mentor or protégé).**

All completed forms will remain stored and locked for five-years after, which they will be securely destroyed. The entire questionnaire and required forms should take 30-45 minutes to complete. When you have completed the questionnaire, please mail it back in a plain manila envelope and DO NOT FOLD the completed questionnaire or any of the forms. Return to all completed Company Permission Forms, a single questionnaire, and a signed participant Consent Form to:

**Walden University Doctoral Research Study  
Research Study #: 145159  
P.O. Box 2166  
Glens Falls, NY 12804-2166**

**If you are contacted by e-Mail for a secondary “oral interview,”** this process may take another 30 minutes of time and additional responses by e-Mail.

E-Mail Address:

---

Sincerely,

James O. Ellithorpe, PhD, (ABD)

## Appendix G: Oral Interview Consent Form

Research Title: The Role and Impact of Cyber Security Mentoring

I understand that I will be participating in a research study concerning the efficacy of cyber security education, and formal mentoring programs. I understand that I will be asked to complete and have signed a Company Consent Form by the appropriate supervisor or manager in my company. I understand that I will be asked to complete and sign this Participant Consent Form and Company Consent Form. I may keep a copy of the forms or contact Walden University's IRB office if I have questions or concerns.

I understand that I will be asked to anonymously complete one copy of the cyber security Questionnaire Instrument (ISI), which includes questions about gender, race, cultural background, sexual orientation, ethnicity, and other personal information. There will also be questions about my collegiate background, certifications, work experience and current and future compensation expectations, prospects for future promotion and my experience as a protégé or mentor.

I understand that my participation is entirely voluntary, will take about 30-45 minutes to complete, and that I can withdraw at any time. I may contact Walden University IRB office or I directly with any questions or concerns. I understand that my responses will always remain 100% confidential and will remain in a secured environment for a period of five-years after the results are published and then will be securely and totally destroyed. I understand that no possibility of psychological or emotional distress is expected.

**Certification: I understand the procedures that will be involved in this research study. I have had ample opportunity to ask questions at any time. I understand my participation is totally voluntary and confidential, and that I may withdraw from the research at any time. I am participating in this study of my own free will and for no compensation whatsoever.**

\_\_\_\_\_ (Name of Participant)

\_\_\_\_\_ (Signature of Participant) (Date)

\_\_\_\_\_ (Telephone or E-Mail Address)

## Appendix H: Electronic Consent Form

### **Consent Form**

You are invited to take part in a research study of Senior and Middle Management in IT Security, and from those who are just beginning their careers, and are currently interning or being mentored. I am inviting members ISACA®, ISC2® and GIAC® as well as those who may not be members of any of these organizations to participate in the research.

This form is part of a process called “informed consent” to allow you to understand this study before deciding whether to take part. As a Doctoral student at Walden University, I am conducting this study.

#### **Background Information:**

The primary purpose of this study is to conduct research into the role and implications of CSM in the workplace.

#### **Procedures:**

Everyone who agrees to participate will be asked 22 multiple-choice questions by completing an online questionnaire. I estimate that it will take 15 or 20 minutes to complete the questionnaire. For the purposes of this research, "mentoring" is equivalent to "internships," "externships," or being "supervised" by a mentor or manager.

#### **Voluntary Nature of the Study:**

This study is voluntary. I will respect your decision of whether or not you choose to be in the study. I will not treat you differently if you decide not to be in the study. If you decide to join the study now, you can still change your mind later. You may stop at any time.

#### **Risks and Benefits of Being in the Study:**

Being in this type of study involves some risk of the minor discomforts that can be encountered in daily life, such as fatigue, stress, or becoming upset. Being in this study would not pose risk to your safety or wellbeing. The potential benefits of the study of this research will assist cyber security staff and senior management (e.g., the Chief

Information Security Officer or CISO), cyber security mentors and past and present cyber security protégés. Specifically, it will assist them to understand the interrelationships between formal academic college degrees, field experience and “well-known” IT Certifications. In particular, the other benefits of this study has help guide current and future cyber security mentors and protégés as they attempt to determine the best methods to keep current and up-to-date in the fast-pace and quickly changing cyber security environment, and how the CISO and other top management can support their cyber security staffs in this regard.

**Payment:**

There are no payments for participating in the research by I. This does not preclude any “token” payments by On-line research companies that are paid to potential respondents for their willingness to engage in the research.

**Privacy:**

Any information you provide will be kept confidential. The information submitted on the SurveyMonkey® or FluidSurveys® website is secure. I will not use your personal information for any purposes outside of this research project. In addition, I will not include your name or anything else that could identify you in the study reports. Any printed data will be kept secure in a fireproof locked filing cabinet that only I will have access to, and it will be securely destroyed after five-years, as required by Walden University.

**Contacts and Questions:**

You may ask any questions you have now or later by contacting me at my Walden University Email address (James.Ellithorpe@WaldenU.Edu) or by my phone number at (518) 321-3339. If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number is (612) 312-1210. The Walden University approval number for this study is 0228140145159 and it will expire on February 27, 2015. You are encouraged to print and save a copy of this consent form for your records.

**Statement of Consent:**

I have read the above information and I feel that I understand the study well enough to make a decision about my involvement. By clicking I AGREE button I am agreeing to participate.

## Appendix I: IT Security Mentoring Questionnaire

1. Which of the following best describes your current job level?
  - Senior or Middle Management Position
  - Intermediate Level (Non-Management) Position
  - Recent Hire, College Graduate or Current Student
  
2. What department do you work in?
  - IT Audit or Compliance
  - IT Management
  - IT Operations
  
3. Which, if any, Professional organizations do you belong to?
  - ISACA
  - None
  - ISC<sup>2</sup>
  - SANS-GIAC
  - Other - Please Specify: \_\_\_\_\_
  
4. Do you currently hold any professional or cyber security certifications or plan to in the future?
  - Yes
  - No
  
5. Of the following choices, in your opinion, what constitutes the greatest risk to your company? Check the top five cyber security risks only.
  - Surveillance by the NSA, FBI, CIA, DHS (etc.)
  - Disaster Recovery, Remote Hot or Warm Sites
  - Mobile BYOD Devices
  - Cyber War (Military-Internet Complex)
  - Planning and Good Enforceable Cyber Policies

- Cloud Technologies
- Cyber Crime and Criminals
- Forensics and Incident Handling
- Outsourcing to Contractors
- Governance and Compliance
- Hackers, Malware, Worms, Bot-Nets, etc.
- Lack or need for Regular Audit and Log Review
- Virtual Servers and Technology
- Security Awareness of Rank and File Employees
- VPN and Lack of Cryptography
- More Budget Authority to Increase Staff
- Physical Plant Security Perimeter
- War Driving and Wireless Devices
- Assessment and Change Management

6. Were you Mentored or supervised during your collegiate or training program such as in an internship or externship, or when you first began your career in IT?

- Yes  No

7. Describe your feelings about being a protégé? What was it like? Did you find the experience to be positive or negative? Why or why not?

- Strongly positive  
 Positive  
 Undecided  
 Negative  
 Strongly negative

8. What is more important in determining cyber security competency?
- College Degree
  - Experience
  - Certifications
9. If experience, what helps more in getting experience – A College Degree or Certifications?
- College Degree
  - Certifications
10. I hold a college degree at the following academic level:
- No degree
  - Associate's degree
  - Bachelor's degree
  - Master's degree
  - Doctoral degree
11. My mentor holds or held a college degree at the following academic level:
- No degree
  - Associate's degree
  - Bachelor's degree
  - Master's degree
  - Doctoral degree
12. How many years of experience do you feel you will need until you feel competent in cyber security:
- 2 years or less
  - 3-5 years
  - 6-10 years
  - 10+ years

13. How many certifications do you feel you will need until you feel competent in cyber security:

- 1 certification
- 2 certifications
- 3 certifications
- 4 certifications
- 5+ certifications
- Certifications are not important

14. What single factor inhibits or prevents you from achieving your personal or professional Continuing Professional Education (CPE) in cyber security:

- Lack of Interest
- Finding the Time
- Finding the Money
- Balancing Work with Family Commitments
- Support from mentors
- Support from the Company

15. Which cyber security or other “well-known” IT certifications do you hold or feel that it is necessary to earn in the future? Select all that apply.

- Security+ from CompTIA®
- CISCO® Certified Security Network Professional (CCNP-SEC)
- SANS-GIAC® Certification(s)
- ISACA® Certified in the Governance of Enterprise IT (CGEIT)
- ISACA® Certified in Risk Information Systems Control (CRISC)
- ISACA® Certified in Information Systems Audit (CISA)
- ISACA® Certified in Security Management (CISM)
- ISC2® CISSP
- IC-EEC® Certified Ethical Hacker (CEH)

- IC-EEC® Licensed Penetration Tester Certification (LPTC)
- IC-EEC® Certified Hacking Forensic Investigator (CHFI)
- IC-EEC® Certified Security Analyst Certification (CSAC)
- War Driving and Wireless Devices

16. Which of the following Department of Defense Directive (DoDD 8570.01-M) certifications do you hold or feel that it is necessary to earn in the future? Select all that apply.

- IAT Level I: A+, Network+ and the SSCP certifications.
- IAT Level II: GSEC, Security+, SCNP or SSCP certifications
- IAT Level III: CISA, GSE, SCNA and CISSP certifications.
- IAM Level I: CAP, GISF, GSLC and Security+ certifications.
- IAM Level II: CAP, GSLC, CISM and the CISSP certifications.
- IAM Level III: GSLC, the CISSP certifications.
- CND Analyst: GCIA and the CEH
- CND Infrastructure Support: SSCP and the CEH
- CND Incident Handler: GCIH, CSIH, and the CEH
- CND Auditor: CISA, GSNA, and the CEH
- CND-SP manager: CISSP-ISSHP and the CISM
- IASAEI Level I or IASAEI Level II: CISSP
- IASAE Level III: CISSP-ISSAP and the CISSP-ISSEP

17. How many hours a week do you spending reading or improving your skills, taking new academic course work, or preparing for new professional certifications?

- 1-2 hours
- 3-4 hours
- 5-6 hours
- 7-8 hours
- 9-10 hours
- 11+ hours

18. Did your mentor's or CISO's diversity characteristics (Gender, age, race, etc.) affect your mentoring or supervisory relationship negatively?

- Strong Agree
- Agree
- Neutral
- Disagree
- Strong Disagree

19. The CSM program involves how many protégés with your mentor or vice-versa?

- Dyadic – A single mentor and a single protégé
- Dyadic – A single mentor and a two protégés
- Large Group 3-7 people
- On-line e-Mentoring

20. Did your CSM improve your skills?

- Yes
- No

21. Who should be your company's cyber security mentor?

- The CISO or VP of Information Security
- Another Senior cyber security manager
- Another Mid-Level cyber security manager
- An External cyber security Consultant

22. Were you supervised or mentored too much at work, supervised too little, or supervised about the right amount?

- A great deal too much
- About the right amount
- Quite a bit too little
- A great deal too little
- Quite a bit too much
- Somewhat too little
- Somewhat too much

### Appendix J: Appeal to the Chief Academic Officer

Walden University requirements found in the PhD Dissertation Check List, seek to have the most recent research included as the basis for PhD Dissertations. This is done in order to show a required depth of scholarship for a Doctoral degree. The idea here is to show both seminal and current research. The goal is to have the bulk of the research (85%) to be current (i.e., within five years of the expected graduation date) and the remaining balance to consist of seminal materials (i.e., earlier materials prior to the current research requirements.) This appendix is offered to justify why this was *not* possible in this dissertation.

As stated in the conclusion to Chapter 2, “A review of potential studies indicates that from 1985-2010 was the highest period of peer-reviewed research on mentoring being conducted with extensive studies undertaken as verified by Allen and Eby (2010). From 2010-2015, according to Google Scholar, 1,321 articles or studies considered academic mentoring, and 690 articles or studies focused on workplace mentoring. A complete review of many of these studies and research is provided in Appendix J. A review of these articles indicated they were largely based on research and studies conducted in the earlier time frame. Because academic mentoring may skirt the focus of this dissertation away from my intended research, I did not consider further examination in this field of endeavor. Of the 690 articles dealing with workplace mentoring, only 66 peer-reviewed articles were found that truly had some impact. Of these 66 articles most of these were not unique enough in their research and repeated or reviewed the work of Kram (1985) and others as mentioned in Allen and Eby (2010) and Appendix B. Therefore, they did

not shed any new information that would elucidate this dissertation. One did deal with mentoring from the aspect of an “African-American,” one with “Dysfunction” in workplace mentoring, and none pertained to “Asian-American” mentoring dyads. I also took one final look at key mentoring journals such as the *Journal of Vocational Behavior*, *International Journal of Mentoring and Coaching in Education*, *Mentoring & Tutoring*, and *Mentor* to find any new pertinent research. About ten new books, studies and research were discovered from 2011-2016. Only *one* new study Martin (2015) dealt with CSM, and *it was just eight pages long*. Another volume in 2016 dealt with “organizational behavior of leadership.”

Following is the list (in APA 6<sup>th</sup> Edition format) of over 1,000+ sources in peer-reviewed journals, books, and other primary reference material I reviewed in preparing and developing this dissertation. It is my opinion that the research requirements for a Doctoral level degree have been met and that I have completed a legitimate and substantial exhaustive review that meets required academic standards.

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